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DEPARTMENT OF "VETERINARY SANITARY EXPERTISE"

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"VETERINARY AND SANITARY EXPERTISE"

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The QMC is designed in accordance with the approved curriculum, the working curriculum, syllabus and work study plan.

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SUBJECT "VETERINARY AND SANITARY EXPERTISE"

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Head of the Department, Associate Professor Ph.D. _____ Ibragimov F.B.

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The discipline "Veterinary and sanitary expertise with the basics of technology and standardization of livestock products" (abbreviated "Vetsanekspertiza") studies methods of veterinary and sanitary and technochemical examination of products of animal (meat, fish, eggs, milk, etc.) and plant (honey, vegetables, fruits, root crops, etc.) origin and determines the ways of their sale. In addition, the object of Veterinary Sanitary Expertise is technical raw materials (wool, feather, down, etc.).

The study of these issues is closely related to the technology of food production, and only with this combination, the student can get a clear idea of the studied subject.

Students take this course in their senior year (IV, V) after studying a number of clinical disciplines (clinical diagnosis, microbiology, pathological anatomy, surgery, parasitology, internal non-contagious diseases, epizootology, etc.), without knowledge of which it is impossible to understand and absorb the discipline. As a result, in the process of studying the subject is the formation of the student as an expert veterinarian. Vetekspertiza gives him a wide range of professional knowledge, will give him the right to release for food purposes only benign and safe in a veterinary relation ─ products, which is of great social importance.

It is impossible to calculate the economic efficiency of the results of practical activity of a veterinary surgeon, as no one can take into account how many human health and lives this profession saves, preventing the spread of infectious and parasitic diseases among animals and humans.

There is a famous aphorism by S. S. Evseenko, Master of Veterinary Sciences: "Medicine saves human, veterinary science saves humanity.

Veterinary surgeons-experts work in state veterinary laboratories of food markets, in booneries and meat processing enterprises (meat processing plants, poultry processing plants, slaughterhouses, meat processing plants, slaughterhouses of poultry factories, sausage factories, etc.).), in veterinary laboratories, animal disease control stations, border and transport veterinary points, dairy plants, fish processing plants, research institutes, food product certification laboratories.

Veterinary expert examination is of particular importance nowadays. Kazakhstan, which has embarked on the path of open economy, makes certain steps aimed at further liberalization of activities in the field of foreign trade. In particular, we are talking about joining the World Trade Organization (WTO). In this regard, the development of measures aimed at the earliest integration of the country into the world food market acquires particular importance. Realization of these measures foresees creation of system of the harmonized rules and methods of an estimation of quality and safety of food raw materials and production of an animal origin at carrying out of veterinary sanitary expertise and certification in accordance with the requirements of the "Agreement on sanitary and the standard

of phytosanitary measures" (SPS) of WTO and standard of FAO (World Food Organization). In this connection new normative and legal documents have been recently developed and approved in our country, which are taken into account in this book.

HISTORY OF DEVELOPMENT AND FORMATION OF THE BOE BUSINESS AND DOMESTIC VETERINARY AND SANITARY EXPERTISE

The study of historical documents shows that in the Russian Empire from 1649 to 1682 there were instructions concerning only cattle mortality. The first hints on the veterinary and sanitary inspection of meat appeared during the reign of Ivan and Peter Alexeyevich. In 1683 was issued a decree forbidding to sell fish and meat in huts and on benches.

In 1691 was issued another decree relating to the meat trade, ordering butchers the rest of their sale in the "autumn and Christmas meat" meat to salt "in vats and in kadah" and the presence of such meat to declare "in the public and record in the book.

In Russia the first attempts of practical application of veterinary and sanitary pre-slaughter inspection of livestock and after slaughter - meat were noted during the reign of Peter I, to whom belongs the initiative of organizing this business in Russia.

In the beginning of the XVIII century epizootics among cattle were rampant in Russia. Because of the great loss of life Peter I was forced to take measures to prevent the spread of contagious ¬diseases. First of all he paid attention to the order of slaughtering livestock for meat.

In 1713 the king issued a decree "About non-sale of bad meat", i.e. meat of sick animals. This document, in fact, put the beginning of pre-slaughter examination of cattle and inspection of meat in places of its sale.

In 1718. Peter I issued a decree demanding "that no cattle and animals without a certificate... No cattle were killed", and in 1719 - a decree forbidding butchers to slaughter livestock in the butcher's rows, and to carry out it in specially designated places. These decrees had extremely important veterinary and sanitary significance.

In 1722 was established an inspection, which was charged to supervise butchers, that they did not sell "stinking meat" for their selfish ends, and the guilty persons were to be fined, and in case of nonpayment of the fine "they should beat with whips". And if someone will find "dead meat" among edible goods for sale, such "criminals, instead of death, shall be beaten with a whip and exiled to hard labor for the years of hard labor". Control over the sanitary quality of meat and fish in the markets at that time was entrusted to police officials who had no special knowledge.

The severity of these legislative documents, bordering on cruelty, is explained by the fact that the cattle and meat traders did not comply with the elementary veterinary and sanitary requirements established at the time.

The initiatives of Peter the Great in the organization of slaughterhouses and veterinary surveillance continued to develop. Thus, the decree of 1728 forbade building slaughterhouses within the city. It was offered to build them in special places.

In the beginning of the 19th century there were very few public slaughter-houses in Russia, mainly private slaughter-houses which were in unsanitary conditions. The animals were slaughtered without veterinary and sanitary control. In large cities private slaughterhouses were located on the outskirts. Scattered and numerous private slaughterhouses in Russia facilitated slaughtering of obviously sick animals. In order to implement veterinary and sanitary measures it was necessary to concentrate the slaughter of animals for meat in one place.

The first public slaughterhouses appeared in St. Petersburg. Veterinary and sanitary supervision over the slaughterhouses and pre-slaughter inspection of the animals was entrusted to a bailiff of the herring bouyant, a person not at all knowledgeable in this field.

In 1879 the St.-Petersburg City Council made a decision to construct the public city slaughter-house. Similar slaughterhouses were built in Moscow, Odessa, Minsk and Kiev. In 1892 the Ministry of Internal Affairs demanded the soonest possible construction of public slaughterhouses in other cities. In the same year there was an order to close private slaughterhouses which was not fulfilled everywhere.

There were laws for creating public slaughterhouses in the Western countries: in France in 1810, in Austria in 1850, in Bavaria in 1862, in Belgium in 1889, in Spain and Italy in 1890.

Unfortunately, for almost two centuries there was no general law for the whole empire on the order of opening, organization and running of the boonies.

This data shows that in the tsarist Russia there were practically no equipped slaughterhouses either in private or in public sector although some measures were taken to regulate the slaughtering of animals and organization of places for selling meat and meat products.

In 1733 a decree was issued which allowed selling meat in retail only to those butchers who were enrolled in the "St. Petersburg Posad" and subjected to medical examination, and in 1741 a decree was issued which allowed selling meat only in the places allocated for this purpose. In 1782 the government ordered to arrange a market in each part of the city. Insufficient number of markets for the capital and the great demand for meat forced to allow the opening of shops. About 150 such shops were opened. Slaughtering of small ruminants in the shops was carried out on necessity, so veterinary and sanitary control in this case could not be carried out. It should be noted that at that time there were very few veterinarians in Russia.

When organizing veterinary affairs in Russia the legislative bodies paid attention to imported meat from foreign countries. So, in 1745 and 1749 the tsarist government banned imports of cattle, smoked meat and corned meat from Holland, Holstein, Hamburg and Saxony to Russia until a special order. The reason for this

was the emergence of contagious diseases among farm animals in those areas. At the same time veterinary and sanitary measures were taken inside the country.

In 1749 was published a decree authorizing butchers to buy animals for slaughter only in places free of epizootic diseases. These archival materials show that the tsarist government paid attention to the organization of pre-slaughter veterinary and sanitary control.

In 1738 was issued a decree obliging the police to control meat in the places where it was sold and to monitor the slaughter of livestock so that "decrepit and lean cattle meat" was not sent for sale.

In 1756 there was issued a decree, demanding that "no cattle from infected places... was not allowed to pass". In 1761 there was another decree, which required the inspection of cattle brought to St. Petersburg for sale and of meat after slaughter. This regulation introduced mandatory pre-slaughter inspection of livestock and after slaughter - of meat and by-products, i.e. formed a complete veterinary and sanitary supervision over the slaughter of animals and the sale of meat.

In 1867 the Ministry of Internal Affairs approved the instruction for the guidance on veterinary and sanitary control during the inspection of the horses before and after the slaughter. In 1868 the government issued a decree, obliging all the cattle driven to slaughter to undergo medical-police inspection. In 1882 "The Veterinary-police rules", which determined the order of animal use in case of contagious diseases detection, were issued. In the same year in St. Petersburg the first in the country microscopic station for trichinelloscopy of pork was opened.

In 1885 were published common for the whole empire "Rules of veterinary and sanitary control of slaughter livestock and meat products".

Unfortunately, it does not seem possible to establish who performed the inspection of cattle and meat in the slaughterhouses from 1649 to 1825. Apparently, these functions were performed by medical workers at that time.

The study of archive materials of those years shows great mortality rate in the areas where the population ate mostly pork meat. Trichinosis referred to as "trichinosis" at that time was registered in Wurttemberg in 1675 and in Russia in 1873 (Saint-Petersburg). The veterinary and sanitary measures were not taken in Russia at that time. Only in 1876 the Ministry of Internal Affairs sent out a circular № 527 "On measures of precaution against human diseases through the consumption of pork meat, which contains trichinosis", i.e. trichinella.

In view of differences in actions of veterinary supervision as for rejection of meat and meat products and their release for food purposes in 1904 the Ministry of Internal Affairs published uniform rules throughout the empire "Regulations on the order of rejection of meat products" having cancelled all earlier issued instructions on this question.

Pre-slaughter inspection of animals and veterinary inspection of slaughter products were regulated in Spain only in 1859, in France - in 1881, in America - in 1890, in Germany - in 1868 (Kingdom of Prussia).

As we see, in Russia much earlier than abroad there was a regulation about slaughtering animals for meat in specially designated places, which obliged to

slaughter animals only in specially built slaughter-houses, which were later moved out of the city limits.

In our country as far back as 1713 the government forbade to slaughter sick animals and sell their meat, while abroad such decrees were introduced much later.

Thus Russia had priority in establishing special places for slaughtering animals for meat, in building slaughter-houses, in transferring slaughter-houses outside cities and in introducing pre-slaughter veterinary and sanitary examination of animals and meat after slaughter.

In 1919 a decree was issued, according to which all the veterinary affairs in the country, except for the army, were concentrated in the jurisdiction of People's Commissariat. This document essentially laid the foundation for the formation of veterinary legislation and the proper organization of veterinary affairs.

In order to prevent indiscriminate slaughter of horses the decree of 1919 was issued, which permitted to make slaughter of horses, unfit for work only.

In 1921 a decree was issued which required the animals to be slaughtered exclusively in the state abattoir which were under the constant veterinary and sanitary control. According to the decree the meat products which are let out from the slaughter-houses for export by railway or water ways had to have a certificate of veterinary and sanitary control.

In 1923 in our country the first Veterinary Statute was adopted. In 1924 the circular order № 157/3-VS "About strengthening of veterinary supervision in places of slaughter" was issued in order to prevent the danger of selling unwholesome meat products. In order to provide population with high quality meat and meat products in 1925 it was sent out a circular order "About organization of veterinary and sanitary control at inspection stations".

In pre-revolutionary Russia there were meat inspection stations. The first such station was opened in 1882 in St.-Petersburg. Nevertheless these stations were obviously not enough. In 1900 there were only 97 of them, in 1910 - 277. - In 1910 there were only 97 stations and in 1910 - 277, and in 1912 - 301. - In 1910 there were only 97 stations, in 1910 - 277, and in 1912 - 301. In 1925-1926 their number was 1150. They carried out the large and very responsible work on protection of health of the population, animals and birds.

In order to regulate the slaughterhouse business and to satisfy the population with meat products of higher quality in 1923 the rules for opening, arrangement, equipment, exploitation and veterinary supervision on slaughterhouses and slaughterhouses were issued.

Earlier the meat products, which were recognized conditionally suitable, were to be destroyed. Meanwhile these products after deactivation could be used as food products. That is why in 1928 there was an order to organize a shop on neutralization of conditionally suitable products at the slaughterhouses.

In order to protect public health and prevent outbreaks of various infectious diseases among farm animals were approved "Rules of veterinary and sanitary inspection of slaughter animals, the study and rejection of meat products" (1924), which were revised in 1931, 1934, 1940, 1951, 1959, 1969, 1983 and 1988. Boehan business in the country required vigorous efforts, that ─ to put it on an

appropriate height. This question was resolved by the historic decision of December 20, 1929. It was found necessary to create an association "Soyuzmyaso", which was entrusted to organize the supply of meat to the population of the country. Responsible tasks of creation of cattle-breeding base were given to the organization "Cattle breeder". This very important decision opened a completely new page in the whole history of our livestock and cattle breeding.

At this time began construction of meat processing plants, booths, cold stores, refrigerators and other meat industry enterprises. In 1931 a decree "On the development of meat and canned food industry". There was deployed a lot of work on creating the meat industry. In 1933 the first-born of the meat industry of the country - Baku meat processing plant - was put into operation.

For the years 1935-1940 was built a lot of meat processing plants, including giants, such as Moscow, Leningrad and Semipalatinsk. All in all it was put into operation: meat processing plants - 17, poultry processing plants - 4, canning plants - 27.

Attention was paid to rabbit slaughterhouses. In 1933 the rules "On opening, arrangement, equipment, operation and veterinary surveillance in rabbit slaughterhouses" and "Regulations on the organization of meat control stations in the collective farm markets and bazaars of cities, new buildings and workers settlements" were issued.

In 1933 was published the direction "About creation of strict control on the enterprises of food industry". This very important directive improved the sanitary-hygienic regime in meat production, providing production of high quality food.

Powerful development of meat industry changed the direction and content of veterinary control. In 1937 the order according to which on meat enterprises of I-IV categories veterinary supervision, chemical and bacteriological laboratories and technological control were united in single supervising body - "Department of production and veterinary control" (OPVK), and on bono enterprises which had no OPVK, veterinary service was created.

Their main tasks were as follows: 1) Issue for the consumer only high quality products; 2) Exclusion of possibility of human contamination by diseases common for people and animals (zooantroponosis) through food products or technical raw materials of animal origin; 3) Prevention of bacterial, viral and helminth infections of animals through products and wastes of boon production.

World War II caused enormous damage to our country. The meat industry suffered seriously. Many enterprises were destroyed and thousands of farms-suppliers of cattle were robbed. As a result of the heroic work of our people in the postwar years the national economy was quickly restored and the meat industry developed intensively. So, in 1946-1956 were put into operation 21 canneries, 260 sausage factories and workshops, 126 meat and fat workshops and 700 chillers. The pre-war level of the number of productive cattle and poultry was surpassed by 40% for cattle, by 63% for sheep and goats, by 49% for pigs and 2 times for poultry which created a solid basis for further development of food industry of the country.

In the future, the meat industry is constantly increasing production capacity, improving production technology, equipped with new automatic lines. For the years 1959-1965 was built and put into operation 156 meat and poultry processing plants, reconstructed and expanded about 200 bono plants. Production of all kinds of food products began to be carried out according to the uniform technological instructions and the standards obligatory for all enterprises of meat industry at manufacturing, control and release of finished goods.

In the second half of the XIX century, the foundations of a new domestic science - meat science - were born in Russia. A great role in the development of meat science as a branch of knowledge belongs to Prof. I. I. Ravich, G. M. Prozorov, B. V. Zemmler, M. A. Ignatyev and I. M. Kovalevsky who worked at that time at the Veterinary Department of the Petersburg Medical and Surgical Academy, as well as Prof. A. P. Dobroslavin, R. V. Antonevich and other Russian scientists.

At the beginning of the XX century, prominent scientists in this field were: N. N. Mari, G. I. Gurin, M. I. Romanovich, N. P. Savvaitov, P. N. Andreev, F. P. Polovinkin, A. V. Dedyulin, K. 3. Kleptsov, etc. Each of them made a great contribution to the organization and scientific improvement of meat science.

Along with development of boon business in the country and the organization of the appropriate veterinary and sanitary control for release of benign production preparation of the veterinary experts owning methods of examination of meat and meat products was carried out.

In 1918 Professor P.V. Bekensky for the first time in the country founded the chair of meat science in Kazan, and then in Petrograd (1920) veterinary institutes.

In 1922 the Department of Meat Science was opened at the Moscow Veterinary Institute (now K.I. Skryabin Moscow Veterinary Academy). Then similar chairs were opened in other higher educational institutions.

In 1918 at the All-Russian Institute of Experimental Veterinary Medicine (now VIEV named after R.Ya. Kovalenko) was formed the Department of Meat Science. Its task was to carry out scientific research work on the regulation of boon industry in the country, as well as research on the diagnosis and veterinary and sanitary evaluation of animal slaughter products for diseases of infectious and parasitic etiology. This department was reorganized in 1941.

The merits of Professor P.V. Bekensky consisted not only in the organization and foundation of the departments of meat science. For the first time he saw an inseparable connection of meat science with technology of meat production and meat products. He created a school of veterinary experts of a new generation. On his initiative and on his suggestion in 1930, the chairs of meat science were renamed into chairs of veterinary and sanitary expertise. Today departments at different higher educational institutions are independent or, depending on the number of students and the teaching staff, may be combined with other disciplines. The discipline itself according to the sample curriculum (2001) is called "Veterinary and sanitary expertise with the basics of technology and standardization of livestock products".

Departments of veterinary and sanitary expertise work on new special programs, which are periodically updated and improved. The author of the first program on this discipline was professor V.P. Koryazhnov. A textbook, which had 5 editions, was created according to this program. It was written by Volfertz. He was an outstanding scientist and talented pedagogue. He developed the optimum periods of pre-slaughter conditioning of animals, suggested a hollow knife for aseptic exsanguination, mechanical removal of skins, wet carcasses toilet, processing frozen pork carcasses by hydrochloric acid solution for trichinellosis. He was a co-author with an engineer I.G. Koledin who had worked out a method of stunning cattle and pigs by the electric current.

The development of Russian meat science was promoted by the appearance of original works on bono business and veterinary and sanitary evaluation of meat in Russian: R. V. Antonievich. "Slaughterhouses and slaughter business" (1896); N.N.Marie. "Guide to the Examination of Meat" (1912); R. Os-tertag. "Examination of meat" (1915). These fundamental works played an important role in the training of veterinarians, experts in veterinary and sanitary evaluation of products of animal and plant origin.

Scientists N. V. Vereshchagin, K. K. Gappikh, G. S. Inikhov, A. A. Kalantar, S. A. Korolev, V. G. Khlopin and others made a great contribution to the development of scientific research on dairy business. Their works on technology and expertise of milk and dairy products were the basis of this science - Veterinary Sanitary Expertise of Milk and Dairy Products.

Rapid development of meat industry has led to the organization in 1931 of the Moscow Technological Institute of Meat and Dairy Industry (now MGUPB - Moscow State University of Applied Biotechnology), where for the first time in our country veterinarians were trained for the meat and dairy industry. In 1930 VNIIMP - the All-Union meat industry research institute (now the All-Russian research institute of the meat industry) was created, which primary goal was to conduct scientific researches on technology and veterinary and sanitary expertise of meat and meat products.

In 1935 the All-Union Veterinary Sanitary Research Institute (now the All-Union Veterinary Sanitary, Hygiene and Ecology Research Institute) was organized which laboratories conduct scientific research on veterinary sanitary expertise and disinfection problems.

Thus, scientific research on topical issues of veterinary and sanitary expertise were conducted not only at the academic departments of universities, but also in laboratories of research institutes.

The solution to many problems set before veterinary sanitary expertise, became possible in the presence of highly qualified teaching and scientific personnel. Along with the founders of domestic veterinary medicine, a worthy contribution to its development have made X. C. Gore-lyad, I. V. Shur, G. V. Kolobolotsky, B. N. Fedotov, V. P. Koryazhnov, N. G. Kozhemyakin, V. A. Kuznetsov, S. A. Lubianetsky, L. L. Kuharkova, I. I. Arkhangelsky, D. M. Teternik, I. S. Zagaevsky, A. N. Kosobryukhov, L. A. Yakovlev, V. I. Ryakhovsky, A. M. Mironov, A. S.

Myagkov, P. V. Zhitenko, V. A. Makarov, VP Frolov, SA Serko, V. S. Kasatkin, AV Aganin, J. I. Boykov, NF Shuklin, JT Kostenko and others.

Very significant contribution to the theory and practice of veterinary and sanitary expertise was made by Prof. G.V. Kolobolotsky. It has developed and offered physical and chemical methods of definition of meat of sick animals (reaction with neutral form¬maline, definition of factor acidity-oxidizing); color oxidizing reaction on the microbic toxins containing in meat; reactions with redox indicators (tetrazolium chloride, etc.); definition of amino-ammoniac nitrogen with use of aluminum alum at establishment of meat freshness. He is a co-author of several textbooks and normative documents, the author of monographs and reference books on veterinary and sanitary expertise for practical veterinarians.

Scientific developments of many above mentioned scientists found practical realization in normative documents (State Standards, rules, instructions, methodical recommendations etc.). Currently a lot of work is carried out on revision of normative documents on veterinary and sanitary expertise and creation of technical regulations on their basis.

Last years our country carries out considerable purchases of meat food abroad. With the entry of Russia in the World Trade Organization (WTO), these supplies will increase significantly. In this regard, there will be a growing need for highly qualified veterinary specialists - veterinary experts capable of conducting expert examinations of supplied products at a high scientific and medical level. Food safety of Russian consumers is one of the priorities of our state.

Topic 2: Basic technology and hygiene of meat packing plants and primary processing of animals.

1. **Enterprises for processing animals for meat**
2. **The importance of meat processing and slaughterhouses**
3. **Sanitary and hygienic requirements for production shops and equipment of bono enterprises**

Enterprises for processing animals into meat and meat products are commonly referred to as slaughterhouses. Raw materials for these enterprises are slaughter animals.

The slaughterhouse should be considered as an industrial facility where veterinary and sanitary tasks should dominate the industrial interests. Theyareofgreatveterinaryandsanitaryandeconomicimportance.

The veterinary and sanitary importance of these enterprises lies in the fact that they aim to protect the health of the population. Thanks to properly organized and qualified veterinary and sanitary control over the slaughter and processing technology of animals, as well as the manufacture of finished products manufactured for the needs of the population, abattoir enterprises guarantee the sanitary welfare of these products and thus ensure the prevention of food toxicosis and toxicoinfections, as well as infectious and parasitic diseases transmitted to humans through meat products.

An important role is played by animal breeding facilities in preventing and combating animal epizootics and helminthiasis. Veterinary and sanitary control carried out at the reception of animals and their pre-slaughter confinement allows to identify sick and suspicious animals. In addition, if contagious diseases are detected among slaughter animals, the veterinary service of abattoirs must inform the veterinary authorities in the region where the animals are delivered.

The veterinary and sanitary significance of slaughterhouses is also the possibility of at least partial reduction of backyard slaughter which causes significant sanitary and economic damage.

The economic importance of abattoirs is that there is an opportunity to use all the products of animal slaughter to the fullest extent.

As manufacturers say, at meat processing plants "disappears" only the last exhalation of the animal, i.e. everything from the slaughtered animal is used as much as possible.

Slaughtering animals outside the slaughterhouse causes great economic losses to the national economy, since in this case a significant number of valuable slaughter products (blood, stomach, intestines, bones, hide, etc.) are lost unused. In addition, unskillful cutting of carcasses at farms reduces their quality.

The main objectives are assigned to the bono enterprises: 1) release high-quality meat products, prosperous in the veterinary and sanitary respect; 2) protection of the population from the diseases transmitted from animals to humans through meat and meat products; 4) the organization and carrying out preventive measures against environmental pollution.

REQUIREMENTS FOR THE CONSTRUCTION AND PRODUCTION HALLS

The choice of location for slaughterhouses. During the construction of enterprises for slaughter and processing of livestock and poultry for meat there is a question about the places of construction. It is rational to locate them in the zones of developed cattle breeding and commercial poultry breeding, in the places of growing and fattening of livestock and poultry, i.e. not far from the raw material bases (50-150 km). It allows to reduce the long-distance and irrational transportation of livestock and poultry, to keep their marketable condition and exclude the spread of epizooty and territory contamination, which are inevitably caused by long-distance transportation.

A very important question that arises during the construction of animal houses is the choice of the construction site. The chosen building site should be located in relation to the settlement on the leeward side for the prevailing winds and have a clean area. It is forbidden to build animal breeding facilities on the territory of former cemeteries, landfills, cemetery, low-lying places, etc. Subsurface water on the construction site should be at a depth of at least L.6-2 m. The most desirable terrain for the construction site is an elevation with a very gentle rise.

When selecting the site it is necessary to provide a sanitary protection zone, i.e. a certain gap between the created enterprise and residential quarters or livestock buildings.

The sanitary protection zone should be not less than 200 m for the animal breeding enterprises with bases for pre-slaughter keeping of animals. For enterprises which do not have a slaughterhouse, as well as sausage and canning plants (shops), the sanitary protection zone is allowed to be not less than 50 m.

The territory of abattoirs is fenced with a solid fence 2 m high; the base of the fence is dug into the soil to a depth of 0.5 m. Fencing of the territory pursues an important goal - to prevent free access to the territory of the enterprise for stray animals (dogs, cats), as well as unauthorized persons. Most of the territory is asphalted and its free areas are landscaped with trees and shrubs and lawns. The territory of the animal house must be maintained in proper sanitary condition.

Layout of slaughterhouses. When designing slaughterhouses it is necessary to provide a platform for sanitary treatment of transport (washing, disinfection), which is used to deliver animals for slaughter. Provide for the construction of a disinfecting station for disinfecting wagon equipment returned to suppliers after the unloading of wagons of animals delivered for processing. For disinfection of the territory of the enterprise it is necessary to have a mobile disinfection unit (UDK).

Particular attention must be paid to the planning of production, auxiliary production, auxiliary and domestic premises.

In accordance with the sanitary standards, the planning of premises must first include appropriate sanitary protection zones or gaps between the premises, which are heterogeneous in terms of sanitary and hygienic characteristics.

The layout of the buildings and structures on the territory of the enterprise shall provide the transportation of raw materials and finished products without crossing the cargo traffic: 1) food products with animals, production wastes (manure, garbage, etc.); 2) healthy animals with sick or disease suspect ones; 3) decontaminated products with non-decontaminated ones.

In order to avoid the intersection of the cargo flow of food products with other cargoes having different sanitary and hygienic characteristics, it is advisable to build at least two gates through which different cargoes are taken out and brought into the territory of the enterprise separately.

When planning the buildings and constructions on the territory of enterprises, it is also important to provide for the separation of premises, which will produce food and medicinal products, from the premises designed for the production of technical products.

The need for veterinary specialists to study the basic principles of planning various objects of reprocessing enterprises is caused by the fact that the existing veterinary law projects for new cattle-breeding enterprises are subject to agreement with the Veterinary Service.

Water supply. A significant amount of good quality water is required for the normal operation of the booneries. Without a sufficient amount of water can not maintain proper sanitary condition of the enterprise. Water is required for the maintenance of slaughter animals, as well as for operations on the slaughter of

animals and cutting the carcasses. In addition, it is necessary for washing floors, panels, equipment and inventory, getting steam and cold, drinking and sanitary needs of the working staff, watering the area and greenery.

To determine water consumption for economic needs, maintenance of animals, watering of the territory and green spaces, the following norms are used:

For the maintenance of animals (per 1 head per day):

cattle - 60 liters;

pigs - 25 liters;

sheep, goats - 10 liters;

horses - 60 liters;

For watering of the territory (per 1 m2) - 2 liters.

For watering green spaces (per 1 m2) - 1,5-4 liters.

For production purposes, the boon companies are provided not only with cold, but also with hot water.

Water used for drinking, sanitary purposes and industrial purposes must comply with the requirements of current GOST for drinking water. It should be of pleasant taste, transparent, colorless, odorless and free of any impurities. It should not contain any poisonous substances or pathogenic microorganisms.

To check the quality of water arriving at the enterprise, carry out periodic control laboratory analysis. In order to ensure water quality it is purified by one of the following methods: filtration, coagulation, chlorination, boiling.

Boeing enterprises are provided with water either by connecting to the water supply of the city or other enterprise, or by building their own water supply facilities. These facilities are artesian wells or mine shafts from which water is pumped by a pump to the water tower. From this tower water is transmitted through pipes to the shops and departments.

Sewage. Each animal breeding facility must have a sewage system providing mechanical treatment, fat trapping and, if necessary, disinfection of waste water coming from all stages of technological processing of animals.

Wastewater contains organic easily degradable substances. Their rapid decomposition produces decomposition products up to stinking gases, the smell of which spreads to the abattoir and to the surrounding area. The wastewater can contain not only putrefactive microorganisms, but also the pathogens of various infectious and parasitic diseases. In connection with this wastewater can be a source of contamination of animals, and in some cases, people.

Wastewater treatment should provide:

1) mechanical removal of suspended solids;

2) capturing of fat;

3) neutralization of pathogens of infectious and parasitic diseases.

Safe wastewater goes to the general sewer, irrigation fields or filtration fields.

For the collection and disposal of wastewater in the slaughterhouse enterprises there is a sewage system, which includes links for different types of wastewater.

Wastewater from the quarantine department, isolation ward and sanitary slaughterhouse must be disinfected before being discharged into the general

sewerage system. Local treatment facilities include: grates, sand traps, grease traps, sedimentation tanks and installations for wastewater disinfection.

At small-scale slaughterhouses and slaughterhouses located in areas without sewage system for the disposal of waste water and other impurities a removal system is used. Such enterprises include: small slaughterhouses, slaughterhouses, slaughterhouses located in rural areas. Wastewater at these enterprises is collected in a cesspool. It should be located close to the production buildings. Usually it is located on the side of the intestine department. The capacity of the cesspool is 4-6 m3.

The bottom and walls of the cesspool are made from bricks, concrete or other water-permeable material. The inner surface of the walls and the bottom of the pit plaster to prevent seepage of sewage into the ground. Cesspool covers ─ tight lids. As the cesspool is filled with sewage, the latter is taken to the places allocated for decontamination or destruction.

TYPES OF BODEGAS AND MEAT PROCESSING ENTERPRISES

There are the following types of enterprises in our country: 1) meat processing plants; 2) slaughterhouses; 3) slaughterhouses; 4) slaughterhouses; 5) slaughterhouses; 6) poultry processing plants and slaughterhouses of poultry farms; 7) meat processing plants 8) sausage factories (workshops); 9) canneries (workshops).

MEAT PROCESSING PLANT

Meat-processing plants are the main type of meat-processing enterprises. They constitute the overwhelming majority of meat processing enterprises in our country. According to production capacity meat processing plants are divided into five categories. I category - companies producing more than 35 thousand tons per year of meat, sausages and other meat products, II category - from 20 to 35 thousand tons, III category - from 8 to 20 thousand tons, IV category - from 3 to 8 thousand tons and V category - up to 3 thousand tons.

A distinctive feature of meat processing plants is not only the processing of livestock for meat, but also the production of finished products (sausages, preserves and other meat products) as well as the storage of meat and meat products.

Industrial buildings of meat-packing plants are mainly one-or two-storey; in large cities meat-packing plants can be three-, four-, and five-storey. Large meat processing plants were few in our country (Moscow, Leningrad and others). These meat processing plants are characterized by high production capacity. For example, Moscow meat processing plant could per day process 15-20 thousand head of cattle and pigs; Leningrad meat processing plant processed up to 1800 head of cattle, 2500 pigs and 2500 sheep per shift. Due to reduction of livestock in our country, these meat-packing plants have partially lowered their capacities. Currently they mainly work on imported raw materials.

On the territory of any multi-storey meat-packing plant there are: abattoir, main production, subsidiary production, auxiliary, household premises and sanitary unit, which includes quarantine section, isolation unit and sanitary slaughter house.

Production facilities of mechanized meat processing plant are panel buildings. The main departments are: slaughter and cutting, fat (meat-fat), intestine, sausage, ham-salted, technical factory shop, pelt-salted and others. Inside the meat processing plant must be placed holo¬dilnye chambers for cooling and freezing the meat, as well as storage of finished products ⌋ . Bodies are connected to each other (at the level of upper 2-3 floors) by closed galleries (Fig. 1, 2).

Multi-storey meat processing plants have advantages over single-storey ones. Processing of livestock at these meat processing plants is carried out on vertical flowing system. Eliminates costs for inter-shop transportation of slaughter products, which fall from the top down through non-rusting pipes. Additionally, these slaughter products are isolated from the external environment and do not come into contact with vehicles, containers and workers hands. This significantly reduces the possibility of their contamination with pathogenic and conditionally pathogenic microflora.

One of the characteristic features of multi-storey mechanized plants is the presence of conveyor, automated lines, which provides continuity and flow of the production process, as well as improved conditions and productivity.

Multi-storey meat processing plants are equipped with the latest high-performance equipment. High level of mechanization of production, introduction of perfect methods, mechanisms and equipment provide high capacity and output of wide assortment products of high quality.

Despite the merits of this type of booneries, their construction is currently discontinued. The reasons are too high cost of construction of such enterprises and lack of sufficient quantity of raw cattle.

SLAUGHTERHOUSES

Slaughterhouses are designed for primary processing of animals. In addition, these enterprises provide refrigeration, freezing and storage of meat in the form of carcasses, half-carcasses or quarters.

The processing of meat in the cold stores is not carried out. They process those slaughter products which cannot be exported from the enterprise in unprocessed form. Such slaughter products include: blood, intestines, stomachs, fat and some others.

Slaughterhouses are located in places with well-developed livestock breeding (see Fig. 3). A characteristic feature of slaughterhouses is that they serve as meat storages which are delivered to places of consumption as needed.

Cattle barn and sanitary unit, which includes quarantine section and isolator, should be located in the other half of the territory of the slaughterhouse. The layout of the refrigerated slaughter house includes placement of separate rooms and sections, which provides the clarity of production processes, strict division of food and technical products and their transportation without crossing the traffic.

Production shops of the slaughterhouse must be mechanized and equipped with modern equipment.

BOYNY

Slaughterhouses are non-mechanized facilities for processing animals for meat. The main task of slaughterhouses is to provide meat and some meat products to the inhabitants of settlements (working villages, district centers).

The production process in the slaughterhouses provides: the slaughter and primary processing of livestock, ie, getting the carcasses, by-products and skins. Further processing of these products of slaughter are not engaged in the slaughterhouses. Some slaughter products (blood, stomachs, intestines) have an appropriate treatment, which ensures the preservation of these products during the time required for the delivery of ¬ them to meat processing plants. Capacity of slaughterhouses is small and amounts to 10-15 tons of meat per shift.

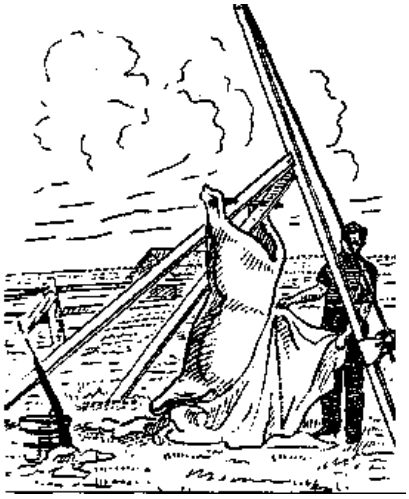
The slaughterhouses are arranged according to the same general veterinary and sanitary rules that are stipulated for any slaughterhouse. The area of the slaughterhouse must be enclosed by a high, tight fence.

There is a one-story production building on the territory of the slaughterhouse. It includes the following departments: slaughter and dressing, blood, by-products, intestines, fat, cooling, as well as a room for preserving skins. Besides this building there are also a veterinary, dressing-rooms, shower rooms and workers` rest rooms. There is a refrigerator for meat and other products storage at the slaughterhouse. Slaughterhouse has closed rooms and open pens for animals. There is a manure storage facility on its territory. Quarantine section and isolation ward of the slaughterhouse are arranged and located in accordance with veterinary and sanitary requirements. There are administrative and economic premises on the territory of the slaughterhouse. The source of water for the slaughter house is the water supply of the settlement. If necessary, the slaughterhouses may have an autonomous water supply.

SLAUGHTERHOUSES AND SLAUGHTERING FACILITIES

Slaughterhouses are small stationary enterprises of small capacity for slaughtering and processing of animals for meat. At the point of slaughter can be processed up to 20 head of cattle for meat in a shift, up to 60 heads of pigs or up to 100 heads of small ruminants.

Slaughterhouses are located in small district centers, worker settlements, LLC, CJSC and other agro-industrial enterprises.Slaughterhouses may provide not only slaughter and primary processing of animals for meat, but also the processing of by-products, stomachs, intestines, and canning of skins. Meat and other slaughterproducts are cooled in refrigerators with subsequent short-
term storage.



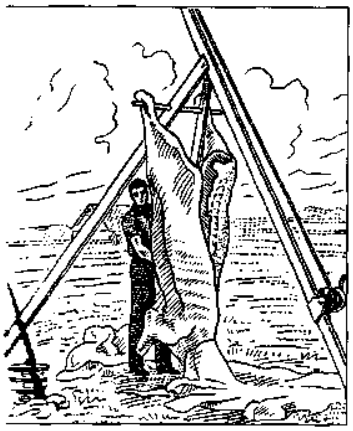


Рис. 4
Полевой убойный пункт

A field slaughterhouse can be a variation of the slaughterhouse (Figure 4). This is a temporary slaughterhouse designed for slaughtering and processing animals under field conditions. For slaughtering animals in the field you can limit yourself to a tripod.

Two standing trees can be used in the woods. A crossbar is placed between these trees. In the center of the crossbar fasten block, through which a rope or cable to raise the carcass in an upright position for better exsanguination.

At some distance from the slaughtering area, dig a pit for dumping all waste products and those that cannot be used in the field (blood, genital organs, etc.).

At the end of the slaughter, the slaughter area is cleaned by removing the top layer of soil, disinfecting the area and filling it with sand.

MEAT PROCESSING PLANTS

Meat-processing plants are designed to process meat and produce finished products. Slaughtering of animals is not carried out.

SPECIALIZED MILITARY ENTERPRISES

Poultry processing plants. Specialized animal breeding facilities include poultry processing plants and slaughterhouses of poultry farms.

The same veterinary and sanitary requirements are applied to the construction of these enterprises as to the construction of any slaughterhouse.

Poultry processing plants are designed for slaughtering and primary processing of land and water birds, as well as for the production of sausages, canned food, melange and egg powder. For this purpose, poultry processing plants have appropriate production departments. Poultry processing plants are sometimes used for fattening poultry. Poultry processing plants can also work on imported raw meat of other types of animals.

Slaughterhouses in poultry farms. Due to the fact that transporting poultry over long distances is expensive and associated with losses in live weight, slaughterhouses are organized at poultry farms. They carry out only slaughter and primary processing of poultry carcasses with subsequent cooling (freezing) and short-term storage. These units have mechanized production lines with full carcass gutting. Semi gutting (removal of intestines only) is not provided in our country.

Reindeer slaughterhouses are a kind of cattle-slaughter station, designed for slaughter and cutting of reindeer. There are permanent (stationary) and mobile stations for reindeer slaughter. Stationary stations operate in places of large accumulation of reindeer during culling or planned slaughtering.

Design and equipment of reindeer slaughtering stations are the same as in usual slaughtering stations. Production area of stationary reindeer slaughter station includes slaughtering area, cutting, cooling and drying rooms, room for preserving skins, and also rooms for workers and working room for veterinary specialist.

Additional construction on the place for reindeer slaughter is a roundhouse. It represents a corral, fenced with wooden poles. The corral consists of several compartments and is like a cattle base; it is adjacent to the slaughtering area, where the reindeer prepared for slaughtering go one by one through a narrow corridor. The corals facilitate organization and carrying out of all operations on preparation of reindeer for slaughter, including veterinary inspection, and also provide convenience in feeding reindeer to slaughter.

Rabbit slaughterhouses are located near large rabbit farms. These are small stationary buildings for slaughtering and primary processing of rabbit carcasses. They have sections for receiving incoming animals and pre-slaughter inspection, slaughtering and processing of carcasses, desiccators for skins, tanks for collecting rabbits and intestines and ancillary facilities. For cooling and freezing the carcasses there are cooling tanks. In recent years, rabbit farms organize slaughterhouses that perform the same work as rabbit slaughterhouses.

SANITARY AND HYGIENIC REQUIREMENTS FOR PRODUCTIONSHOPS AND EQUIPMENT ANIMAL BREEDING FACILITIES

The workshops of the boeuf enterprises are located in the production buildings taking into account the sequence of the technological process. Such location of the workshops is necessary in order to exclude crossing of the production flows.

The surface of internal walls and ceilings of workshops should be smooth, plastered and whitewashed. The lower part of the walls height of 1.8 m must be covered with glazed tiles or painted with oil paint. The floor of the production shops and premises are made waterproof, non-slippery, without potholes, with a slope ⌐ slope towards the sewer manholes. As a rule, is used matlacha tiles.

Asphalt flooring is allowed in the rooms for curing meat, in the skin-salting shop, in the cold rooms and in the pens for pre-slaughter cattle.

All production and auxiliary departments and premises of cattle houses are equipped with ventilation devices using natural, mechanical or mixed ventilation systems. These ventilation devices must ensure normal temperature and humidity conditions in the production departments, especially in those where there is a significant allocation of moisture and heat, as well as reduce air pollution by dust and gases.

Over the open boilers and vats, you must provide a device steam vents in the form of hoods, shrouds, umbrellas, etc.

The temperature and humidity of the air in the production shops and auxiliary rooms depend on the technological processes and the ambient temperature.

In the autumn and winter seasons at ambient temperatures below -10 ° C in most proizvodstvennyh shops air temperature is maintained at 16-20 ° C.

In summer, when the outside temperature exceeds 10 ° C, the inside temperature in production facilities with little heat production should not be more than 3 ° C above the outside temperature, for rooms with considerable heat production - not more than 5 ° C.

Relative humidity in the autumn and winter period in all production shops shall not exceed 80%.

Production facilities must be well lit. This creates normal working conditions for workers engaged in production, allows to perform high quality technological operations, eliminates the risk of injury, and also contributes to the quality of veterinary and sanitary examination of slaughter products.

Equipment and tools for production facilities should be made of materials that do not have a harmful effect on the products made, are easy to clean and do not corrode during disinfection. Aluminum, non-rusting steel, plastics, polymeric and some other materials meet these requirements.

It is possible to use covers of tables with marble chips or concrete. Vats, tubs, trays, metal containers must have a smooth, easy to clean interior surface, without cracks, gaps and protruding bolts or rivets.

The internal surfaces of floor carts, carts, hanging buckets in contact with food products shall be made of stainless steel or covered with harmless anti-corrosion varnishes. It is not allowed to paint industrial utensils and equipment with lead whitewash, surik, as well as the use of galvanized iron equipment.

Cleaning, washing and disinfection of equipment and tools shall be carried out systematically under the control of the veterinary service.

Topic 3: Morphology, chemical composition and marketability of meat.

Plan:

1. **The Doctrine of Meat**
2. **The morphological composition of meat**
3. **Factors affecting the maturation of meat**
4. **Cutting of animal carcasses**

The term "meat" has a collective meaning. Meat is understood as muscle tissue with enclosed or adjacent connective tissue formations, fat, bones, lymph nodes and nerves.

The main component of meat is skeletal striated muscle. The presence of muscle tissue determines the concept of "meat"; other tissues separated from muscle are not called meat.

In the meat industry, muscles in the processing of semi-finished or finished products are separated from the bones, fat and connective tissue. The following categories of meat are distinguished:

1) meat on the bone - carcasses, half-carcasses, quarters;

2) deboned meat - muscles, separated from the bones;

3) ground meat - muscles, free from visible connective tissue formations, lymph nodes and fat.

MORPHOLOGICAL COMPOSITION OF MEAT

The meat includes the following main tissues: muscle, fat, bone and connective tissue (vessels, ligaments, tendons, aponeurosis, etc.). Muscular tissue. This tissue makes up an average of 50-60% of meat. The main indicators of the muscle tissue: color, smell, consistency and taste.

The color of muscles is red, but it has a considerable variety of shades of different kinds of slaughter animals. The most dense red color inherent in the meat of the horse, the meat of small ruminants is brick-red, cattle - crimson-red, pigs - light red or reddish-gray.

The red color of the striated muscles is due to the protein myoglobin in them. The color depends not only on the type of animal, but also on other factors (age, sex, degree of fattening, load performed by the muscle, thermal condition, degree of exsanguination, degree of freshness, storage time).

The pale color of muscles in fattened and little working animals ─ is associated with a low content of myoglobin in it and indicates the low intensity of oxidative processes. Smell of meat is specific. Beef and mutton have a distinctive aromatic smell, the parts of carcass near the udder meat smells like milk, pork has the smell of fat. Easily perceived odor of steamed meat, chilled meat (0 ... 4 ° C) has a very weak smell, meat, exposed ┘ the action of low temperatures, the smell does not have.

The consistency of steamed meat is dense, cooled meat is elastic. Pit from pressing on such meat with your finger quickly replenished. Thawed meat has reduced consistency, pressing on such meat with your finger is a cavity. Frozen and frozen meat consistency is not opredelyatsiyu.

Meat taste depends on many factors. Boiled and fried meat of the majority of animals used for slaughter has an aromatic and pleasant taste. Meat of males, which are not castrated or castrated late, of old and working animals has low flavor. Presence of fodder (fish, etc.) and medicinal (camphor, etc.) odors may be the cause of unsuitability of meat for food purposes.

According to its anatomical and morphological structure, muscle tissue is a multinucleated tissue structure. Primary fibers - myofibrils - are covered by a thin connective sheath - sarcolemma. Under the sarcolemma there are nuclei. Myofibrils consist of light isotropic and dark anisotropic discs. Adjacent myofibrils have identical disks at the same level so transverse dark and light stripes are clearly seen during histological examination. These muscles are called transverse striated muscles.

Protoplasm of muscle fibers consists of sarcoplasm and contractile substance, and their protein composition is different.

Muscular fibers are connected in bundles, big bundles are muscles, surrounded by dense connective tissue formations - fascia. There is a mucous substance, mucin, between muscles, which makes sliding of neighboring muscles during contraction relatively to each other.

Fatty tissue. There is fatty tissue in the meat, which accumulates in the form of large or smaller deposits in the cells of loose connective tissue. Amount of fatty

tissue in carcasses of cattle can be 2-25%, in pork carcasses fatty tissue content may be up to 40%.

In emaciated animals fat cells are flat or spindle-shaped, filled with protoplasm. At intake of a significant amount of food in the body of animals the smallest drops of fat are deposited in protoplasm of such cells, they gradually increase, then merge and fill the entire cell; protoplasm and nucleus are pushed to the periphery of the cell, connective tissue membrane is stretched and becomes more dense. In well-fed animals connective tissue cells are filled with fat and become spherical.

Deposition of fat in animals during fattening occurs in a certain regularity: to a greater extent fat is deposited near internal organs, then between muscles and in subcutaneous tissue. Fat around internal organs is called internal fat. It may be: pericardial, perirenal, leticular (covers the book), cicatricial, shirt (omental fat), ottic (mesentery fat). Its mass in cattle is 0.5-6.4%, in sheep 0.2-5.4%, in pigs 1.9-6.8%.

Apart from internal fat, there is external, or blubber fat. In pigs, it is called speck.

When deposited between the fat between the muscle fascicles meat on the cut has a marbled pattern (muscles red and fat white or yellowish). When describing such meat in practice, the term "marbling. This characteristic is evidence of high nutritional, culinary and marketable qualities of meat.

In cattle subcutaneous fat deposition is uneven - first of all fat is deposited on croup, near malleolus, skin fold of dipstick and scrotum; further on with sufficient feeding fat deposits spread to sacral spine, lumbar vertebrae, scapula and pectoral region; in the last turn fat is deposited in intercostal spaces and upper part of neck. Undernutrition results in fat disappearance from the body in reverse sequence.

In pigs and sheep, subcutaneous fat is deposited more evenly. In sheep

subcutaneous fat deposition is more concentrated under the skin and less between the muscles and around internal organs. Goats have less fat under the skin, less between the muscles and more near the internal organs. Some animals are capable of depositing fat in special fat depots (fatty tail of sheep, hump of camel). Young animals store fat to a greater extent between muscles, older animals - in subcutaneous tissue.

The fat of different kinds of slaughter animals differs from each other in color, odor, consistency, taste, melting and solidification temperature and other indicators. For example, pig fat is white, horse - gray, beef - yellow or yellowish (has a dyeing substance - lipochrome). The melting and solidification point of the fat depends on the ratio of saturated and unsaturated fatty acids.

The total mass of fat tissue in the carcass depends on the type of animal, age, fatness and other factors. It may vary: 1.5-10.1% for cattle, 0.6-7.5% for sheep, 12.5-40% and more for pigs.

Bone tissue. The content of bones in the carcass of different animals is from 7 to 32%. This ratio varies depending on the fatness, breed and species of the animal.

Bones are subdivided into tubular (limb bones) and spongy (flat and mixed). Tubular bones yield on average 9.8% fat and 29.6% of exciting substances; spongy

bones yield 22% fat and 37-55% gelatin. Spongy bones are more valuable nutritionally than tubular bones.

Connective tissue. Connective tissue formations have many varieties - loose connectiveand fibrous tissue, fatty (cell membranes), reticular, elastic, cartilage, bone, etc. In a narrow sense, connective tissue includes tendons, ligaments, fascia, external and internal perimysium of muscle tissue. Connective tissue yield by carcass weight in cattle is 9,7-12,4%.

The more connective tissue formations, the worse quality of meat, such meat is tough and less nutritious. Connective tissue formations are strongly developed in the meat of old animals, a lot of working, low fatness; these formations are more in non-castrated animals compared with females.

CHEMICAL COMPOSITION

The chemical composition of meat is very complex and depends on the type of animal, age, sex, fatness, level of feeding and other factors. Substantially changed the chemical composition of meat animals with severe pathological conditions.

The chemical composition of meat includes: water, proteins, fats and lipoids, carbohydrates, extractive substances, minerals, vitamins, enzymes and hormones.

The chemical composition of muscle tissue. Protein is the most important part of muscle tissue. Protein content is about 20%; water is 70-77%, and other substances are 3-10%. Muscle tissue proteins are divided into two groups: plasma proteins and stretch proteins (Fig. 20). Plasma proteins make up 85-87% of all proteins; they have tubular consistency, can be extracted with cold water or weak solutions of salts and are of full value. Stroma proteins are dense, they are not extracted by cold solutions of salts and are incomplete.

Plasma proteins belong to albumin and globulin classes. Albumins are neutral, soluble in water, weak acid and alkali solutions, do not precipitate in dialysis and are hardly saline. Globulins are acidic, insoluble in distilled water and acids, not extracted by alkalis and salt solutions; they precipitate in dialysis and are precipitated.

Myosin is the main protein of muscle tissue. It is insoluble when extracted with water, but soluble in salt solutions. Myosin has ATP-enzymatic activity. Actin protein easily combines with myosin to form actomyosin. Actomyosin can appear only in the absence of adenosine triphosphoric acid, because if it is present, actomyosin splits into its original components. Actomyosin has high viscosity and contractile ability. This protein complex plays a prominent role in muscle contractions under nerve impulses during animals' life and in post mortem rigor mortis after the animals are slaughtered. Myosin and actin belong to globulins.

Myogen is water soluble. It occupies a kind of a middle ground between albumin and globulin, because it has certain characteristics of both groups of proteins. Globulin X has all characteristic features of globulin. Myoalbumin is a typical albumin. Myoglobin is an albumin. Its content is responsible for red color of muscles. It contains a pigment group "heme" like the blood protein haemoglobin.

Cell nucleus proteins, nucleoproteins, contain phosphorus and are soluble in weak alkaline solutions.

Content of certain fractions of proteins in muscle tissue is not constant; it changes significantly due to postmortem changes. Among all proteins of muscle tissue, different kinds of proteins are as follows: myosin 40%, actin 15%, myogen 10%, globulin X 20%, myoalbumin 1-2%, myo-globin about 1%, collagen and elastin 10%', nucleoproteins - fractions of percentage.

Extractive substances are subdivided into nitrogenous and non-nitrogenous. Nitrogenous extractive substances include creatine, creatinophosphoric acid, creatinine, purine bases, adenosine triphosphoric acid (ATP), adenosine diphosphoric acid (ADP), single amino acids and ammonium salts. One of the main nitrogenous excipients - carnosine - is able to increase secretion of gastric juice. Creatine is found in muscle in the form of creatine phosphoric acid, when boiled with acids it transforms into creatinine with restorative properties. Nitrogenous extractive substances account for 0.7% of muscle tissue. They are non-caloric, introducing them into the body increases the tone of the nervous system.

Nitrogen-free extractive substances are glycogen (animal starch), glucose, lactic acid, inositol and various phosphorus compounds. Glycogen is used up during muscle work, when it is converted to lactic acid. Subsequently, glycogen is synthesized in reverse. Muscles of working animals (horse, camel, etc.) contain more than 1% glycogen, while muscles of cattle, cattle and pigs contain less than 1%.

Glucose, lactic acid, inositol are formed from glycogen during post mortem changes of muscle tissue. These compounds, as well as nitrogenous extractive substances give meat a specific taste and aroma.

Water in meat is in different forms: in the form of mono-, di- and trihydrolys and as deuterium oxide. Only free water can be detected by drying out muscle tissue, water bound to a protein molecule cannot be detected by drying out. The existence of hydrate-bound water explains many biochemical phenomena in meat during storage. Water content in muscle tissue varies mainly according to age and fatness of the animal.

Minerals are represented by macronutrients, trace elements and metal salts. In total there are up to 34 elements in the composition of the living organism. Introduction of microelements with food is of great physiological significance since the last ones are part of hormones and enzymes. Total ash content in muscle tissue is 0.7-1.2%.

Chemical composition of adipose tissue. Lipids and lipoids (fat-like substances) are divided into: 1) simple fats; 2) complex fats that include other compounds besides fatty acids and glycerol - phospholipids, sulfolipids; 3) sterols - high molecular weight alcohols - cholesterol, lecithin. In addition to visible fat deposits between individual muscles or muscle groups there is also protoplasmic fat deposited in the sarcoplasm of muscle fibers. Fats and lipoids are insoluble in water; when meat is extracted they are extracted from the plasma and form an emulsion.

The physical and chemical constants of fat are species traits, although they can change under the influence of various factors.

Chemical composition of connective tissue. Connective tissue formations consist of collagen, elastin and myostromin. Collagen is the main protein of connective tissue; it is a part of loose and dense connective tissue formations. Collagen is insoluble in cold water, under the influence of water heated above 70 ° C, it goes to gelatin and in this form is absorbed by the human body. Gelatin is able to swell in cold water and dissolve in hot water.

Elastin is a part of elastic fibers of connective tissue periphery, artery walls and cattle vomeronasal ligament. It can be dissolved neither in cold or hot water; the body does not assimilate elastin. Collagen and elastin are related to inferior proteins.

The chemical composition of meat is influenced by many factors.

1. Type of animal. The quantity of proteins in the meat of different kinds of animals is distinguished by a relative constancy: beef of the 2nd category contains 21% of proteins, mutton of the 2nd category - 22,4%, pork meat - 16,5%, horse meat of medium fatness - 21,5%. Only in turkey meat the amount of protein can reach 24%.

The ratio of protein fractions in the meat of different types of animals is not the same. Protein ratio (ratio of albumin to globulin) is the higher the greater the content of glycogen.

2. Age of the animal. Muscle tissue of young animals contains more water and glycogen and less fat compared to adult animals. Young animals have a more active system of different enzymes and the intensity of oxidative processes prevents the formation of fat. With age, there is a known stabilization in the composition of muscle tissue. For example, the meat of cattle aged 2-3 years old acquires physico-chemical parameters which change little in future.

3. Sex of the animal. Muscles of females have greater ability to swell due to less connective tissue.

4. Work of animal. Favorable conditions for oxidative processes are created in muscles by work. Trained animals have muscles richer in substances that are important for energy (glycogen and others). Acidic diets improve conditions for oxidative and synthetic processes to a greater extent than alkaline ones.

5. Fattening of an animal. Fattening of young animals (especially in the first year of life) promotes the development of muscle tissue; in mature animals fattening leads mainly to the deposition of fat. Oxidative processes in muscles decrease during fattening. An increase in muscle fat entails a relative decrease in water. The total amount of water in the muscle remains almost unchanged.

FEATURES OF POULTRY MEAT

The meat of birds in many ways differs from the meat of other animals for slaughter.

Meat of chickens and turkeys is white in the breast area and red in other parts of the body; waterfowl have red-brown meat.

Fibers of transverse-striped muscle tissue of birds are thinner (especially terrestrial), connective tissue is developed poorly, there are no large tendons, as they ossified very early. Fat is deposited under the skin and near the intestines.

There are almost no fatty deposits between muscles, and the skin is also edible as part of bird carcasses.

The meat of birds consists of water, proteins, nitrogenous extractive substances, minerals and a relatively small amount of carbohydrates. Meat of land birds has protein content (on average) of 19-24%, fat 4,5-8%; meat of waterfowl has 16-18% of protein and 17-26% of fat. White muscles contain more protein than red ones. Avian meat differs from meat of other animals for slaughter by its high content of high-grade plasma proteins (up to 98.5% of all proteins) and low content of collagen and elastin (about 1.5%). Poultry meat (especially turkeys and chickens) has good taste and is easy to digest and is recommended as a dietary food product.

PHYSICAL AND COLLOIDAL STRUCTURE OF MEAT

Meat is a polydisperse system of lyophilic colloids. The disperse medium in this system is water and the disperse phase is proteins, lipoids, nitrogenous and non-nitrogenous extractive substances and salts of various metals. Difference of components of size of a disperse phase is the reason of heterogeneity of meat as colloidal system and provides polydispersity to it. Some tissues and formations of meat are dense, others are in a semi-liquid condition (for example, fat).

In lyophilic colloids, such as meat, the dispersed phase is very tightly bound to the dispersion medium, i.e. water. Such colloids have some properties used in meat production: 1) property of reversibility, i.e. ability of meat to keep protein solubility after freezing and thawing; 2) property of swellability, i.e. 2) property swelling, i.e. ability of meat to absorb water; this property is observed at meat defrostation and is used in sausage manufacture - minced meat easily absorbs water; 3) property of ageing, i.e. loss by meat of water (syneresis) with loss of a condition of balance between the disperse phase and the dispersion environment. This property is one of the reasons of limitation of terms of storage of meat in refrigerators as at long storage it gets dense consistence.

FERMENTATION (MATURATION) OF MEAT

Meat of a freshly slaughtered animal has a dense consistency, when cooked gives unflavorful broth, from such meat it is almost impossible to isolate the meat juice, its reaction is close to neutral, it is hard, poorly digested. During the first 24 hours after slaughter (depending on temperature and other factors), the nutritional quality and appearance of meat dramatically change: the meat becomes tender, the meat juice is easily separated, cooking the meat gives a clear flavored broth, its reaction is shifted to the acid side, the meat is well digested. Meat acquire other new properties due to changes occurring in its chemical composition and physical and colloidal structure. The process by which meat acquires new characteristics is called fermentation or maturation of meat.

Maturation of meat is caused by activity of enzymes of a muscular fabric. The most intensively these processes proceed at temperature optimum for action of ferments (body temperature of an animal or a bird).

Muscle tissue, like other tissues of the body, during the life of the animal receives a continuous inflow of oxygen, so oxidative processes in the body prevail over autolytic ones. After slaughter of an animal stops the flow of tissue fluids to the muscles, oxidative processes are reduced, increasing influence of hydrolytic en¬ments, the process of disintegration of constituent parts of meat - autolysis begins, but in meat this process runs its own way, not causing a significant cleavage of the main system of meat - protein.

Changes in meat after slaughter under the influence of tissue enzymes can be divided into three phases: postmurder rigor mortis, fermentation (maturation) and deep autolysis.

In the post-slaughter rigor mortis stage the muscles become tense and shortened. This condition is observed almost immediately after slaughter and lasts several hours, after which the muscles become soft again.

At 15-200ºC, complete rigor mortis occurs 3-5 hours after slaughter, at approximately 0ºC in 18-20 hours. Rapid cooling delays the development of rigor mortis. Acidity of the muscles increases rigor mortis. It has been noticed that muscles of animals killed by convulsions rigor mortis faster. Rigor mortis without lactic acid accumulation is characterized by weak muscle tension and rapid resolution of the process.

The cause of rigor mortis is thought to be the formation of a protein complex called actomyosin, which occurs due to the breakdown of adenosine triphosphoric acid. Actomyosin is very viscous and causes muscle thickening.

Rigor mortis is the last slow contraction of muscles. Muscle contraction and relaxation occurs continuously during the life of the animal, rapidly replacing each other. While alive, this process is influenced by reflex nerve impulses. After the animal is slaughtered, nerve stimulation stops. Muscle relaxation occurs under the influence of chemical changes in the meat.

Enzymatic activity of myosin promotes decomposition of adenosine triphosphoric acid (ATP) into adenosine diphosphoric acid (ADP) and adenosine monophosphoric acid (AMP). As ATP decreases, muscle thickens.

There is a special thermolabile protein substance in muscle tissue, which blocks enzymatic activity of myosin during certain periods so that myosin can be in a complex with ATP. This inhibitor was named Marsh-Bendall factor. In case of termination of its action ATP is broken down under enzymatic action of myosin. Marsh-Bendall factor can become weaker or stronger under the influence of magnesium or calcium ions. In relaxed muscles, magnesium is associated with Marsh-Bendall factor and calcium with myosin. During contraction this distribution is reversed.

At fermentation (ripening) of meat two processes are leading - decomposition of glycogen and change of chemical composition and physical-colloid structure of proteins. Processes of post-slaughter changes of meat as a complex biochemical system are very diverse.

During the life of the animal the source of energy for muscle work is glycogen. Carbohydrate system plays a role in the dynamics of contraction of living muscle tissue is very labile and therefore after slaughter of an animal in the muscles, first

of all, glycogen disintegrates. The content of glycogen in the meat of bovine animals immediately after slaughter is 550-650 mg%, in two days the amount of glycogen decreases to 200-250 mg%, ie by 2.5-3 times. The first day after slaughtering, under the influence of amylase, muscle glycogen is broken down to lactic acid. ATP decomposition occurs parallel to glycogen decomposition under the effect of myosin enzyme. As a result, orthophosphoric and adenylic acids are formed.

Significant accumulation of acids contributes to a rapid decrease in pH. During the life of the animal the pH of muscles is about 7.2, in 1 hour after slaughtering this value falls to 6.2-6.3, and in 24 hours it decreases to 5.6-5.8.

Almost simultaneously with glycolysis during meat fermentation there is a change in the protein system. Acidic environment changes the permeability of muscle membranes and the degree of protein dispersion. Acids interact with calcium proteins by detaching calcium from proteins. This results in coagulation of proteins. The actomyosin complex dissociates into actin and myosin in parallel with the increase in the amount of coagulating proteins in the extract. Actomyosin dissociation is caused by the accumulation of inorganic phosphorus because inorganic pyrophosphate has a dissociating effect similar to adenosine triphosphoric acid, although to a lesser extent.

In the process of maturation of meat falls out a number of vital processes, in particular ¬ oxidizing, which leads to the accumulation of intermediate products of metabolism. These intermediate products of metabolism give meat a pleasant taste and smell.

Decrease in pH of muscles and the associated changes in the colloidal system lead to changes in many physical indicators of meat. Conductivity during meat fermentation increases. It means that the quantity of inorganic salts in the extract increases. The surface tension increases in the first fermentation stage and then decreases and relatively high viscosity by 24 hours decreases and then increases.

Acids accumulated in the meat during fermentation, as if preserving the meat, prevent the life of microorganisms, ie act bacteriostatic. Therefore, ripened meat of healthy animals is a product, resistant to the effects of microflora ¬ ka with relatively stable biochemical parameters.

To improve the quality of meat, especially of old animals, sometimes used artificial fermentation. Pieces of meat are dipped into solutions containing proteolytic enzymes of animal or vegetable origin, such as extracts from pancreas, extract of melon tree leaves, pineapple. Under the influence of enzymes connective tissue of meat acquires delicate consistency and pleasant taste. The use of artificial fermentation is harmless. Enzymes can also be administered through the circulatory system before slaughtering the animal.

The main factors affecting the process of meat fermentation are the state of the animal before slaughter (sick, fatigued or healthy), the temperature of the room in which the carcasses are stored and ventilation. Biochemical processes in meat slow down or speed up depending on the temperature. In the absence of ventilation in the steam carcasses develops the process of tanning.

Biochemical processes occurring during maturation in the meat of animals killed in a severe pathological condition differ from the biochemical processes in the meat of healthy animals. During fever and fatigue energetic process in the body is increased. Oxidation processes in tissues are increased.

Changes in carbohydrate metabolism in diseases and overfatigue are characterized by rapid loss of glycogen in muscles. Increased activity of oxidative enzymes in a sick animal after death can slow down the activity of hydrolysis resulting in deficiency of glycolysis and phosphorolysis. Lack of gas exchange in the lungs of seriously ill animals and reduced supply of tissue with oxygen leads to oxygen starvation of the latter. Metabolism under oxygen starvation changes in the direction of reducing the intensity of fat metabolism of tissues. Deposition of fat in organs is accompanied by reduction of glycogen reserves. Almost every pathological metabolism decreases glycogen content in muscles. Since glycogen in the meat of sick animals is less than in the meat of healthy animals, the number of glycogen decomposition products (glucose, lactic acid, etc.) in the meat of sick animals is insignificant.

In severe diseases during the life of the animal intermediate and end products of protein metabolism are accumulated in the meat. In some cases in the first hour after slaughter of the animal in the meat is detected increased against the norm amount of amine and ammonia nitrogen.

Slight accumulation of acids and increased content of polypeptides, amino acids and ammonia cause less reduction of hydrogen ion concentration during fermentation of meat of sick animals. This factor affects the activity of meat enzymes.

Accumulation of extractive nitrogenous substances in meat of sick animals and relatively high pH are conditions favorable for the development of microorganisms.

Changes occurring during glycolysis in meat of sick animals have a different effect on the nature of the physical and colloidal structure of meat. Lower acidity causes a slight precipitation of calcium salts, which in turn causes less change in the degree of dispersion of proteins and their transition into the stroma.

Comparatively high pH (6,3 and more), accumulation of products of protein decomposition and microorganism development predetermine lower stability of meat of sick animals during storage.

Meat fermentation of healthy animals is characterized by sharp changes in the majority of physicochemical indicators in the period between 6 and 24 hours after slaughter of an animal. Subsequently, during storage of meat in production conditions changes of these indicators occur insignificantly. The air temperature in meat fermentation chambers is maintained at 0 ... +4°C.

Dynamics of the majority of physico-chemical indicators at meat fermentation of sick animals has other law: sharp break of physico-chemical indicators in the same terms after slaughter of animal does not occur, these changes are expressed less or almost are not observed. Therefore, physico-chemical indicators of meat of healthy and sick animals in most cases are different.

Physico-chemical methods of examination of meat make it possible to establish the character of fermentation of meat and to a certain extent to judge about the severity of pathological process.

MEAT PROCESSING

Meat, released from the bono enterprises, must meet certain requirements stipulated by state standards. The standards specify: 1) technical conditions; 2) rules of acceptance and methods of testing and 3) marking, transportation and storage. If meat does not meet requirements standard, it cannot be realized in a trading network.

Meat classification is carried out depending on a kind, a floor, age, condition of animals, thermal processing and food appointment.

Classification of meat by type of livestock. Meat is subdivided into beef (from the Old Slavonic word "govedy" - bull, cow), mutton, pork, horse meat, deer, goat, buffalo, camel, bear meat, yak meat, wild boar meat, moose and others.

Meat of large animals is released in halves and quarters, pigs - in carcasses and half carcasses, and small ror¬ cattle - whole carcasses.

Classification of meat by sex livestock. Meat of adult animals is subdivided into three groups: meat of females, meat of castrated males (ox, hog, ram, castrated goat, gelding, capon and others) and meat of uncastrated males (bull, boar, ram, goat).

Carcasses of females and castrated males, if they meet the specifications for other indicators, are considered as meat meeting the requirements of the standard.

Classification of meat by age of animals. Meat of different age groups of slaughter animals is subdivided into meat of dairy animals, meat of young animals and meat of adult animals.

The carcasses of calves, lambs, buffalos aged 14 days to 3 months, camel carcasses aged 14 days to 2 years, stags - from 14 days to 4 months, piglets weighing 3-6 kg, goats - from 14 days before the first pair of permanent incisors; foals, donkeys - from 28 days to 1 year old.

To the meat of young animals include: carcasses of cattle, buffalo, yaks - at the age of 3 months to 3 years; carcasses of small ruminants - up to 8 months; pig carcasses - up to 10 months; horse and donkey carcasses from 1 to 3 years; camel carcasses, regardless of sex, aged from 2 to 4 years; carcasses of wild red deer regardless of sex, aged from 4 months to 2 years.

To the meat of mature animals belong: carcasses of cattle, yaks - over 3 years old, small cattle - over 8 months; pigs - over 10 months; horses, donkeys - over 3 years; camels - over 4 years; reindeer - over 2 years.

Meat of dairy animals up to 14 days old is not allowed to be used for food purposes because of its high water content.

Classification of meat according to the fatness of animals is based on taking into account the degree of muscle development, carcass configuration (roundness or angularity) and the prevalence of fat deposits.

Beef, mature cattle, young cattle, as well as lamb and goat meat are divided into 1st and 2nd categories. The standard describes the lower limits that meat in these

categories must meet. Category 1 beef must show at least satisfactory muscular development; the spinous processions of the vertebrae, sciatic tuberosities and malleoli should not be so prominent, and fat deposits should be visible in small areas on the neck, shoulder blades, hips, pelvis and groin; and the layers of blubber from the 8th rib to the sciatic tuberosities may have large openings.

Beef of the second category is characterized by less satisfactory development of muscles (hips with depressions); spinous processes of vertebrae, sciatic tuberosities and malleoli are distinct; small fat deposits are present in the sciatic tuberosities, lambs and last ribs.

The meat of young beef of the 1st category has satisfactorily developed musculature; the spinous processes of the dorsal and cingulate vertebrae are slightly protruding; the shoulder blades are without depressions, the thighs are not taut. Subcutaneous fat deposits are clearly visible at the base of the tail and on the upper part of the inner thigh. Clear layers of fat can be seen on the sternum and between the spinous processes of the first 4-5 dorsal vertebrae.

The meat of young beef of the 2nd cate¬gory has less developed musculature (the femur is depressed); spinous processes of vertebrae, sciatic tuberosities and malleolus are distinctly seen, fatty deposits may be absent.

Mutton and goat meat of the 1-st category must have satisfactorily developed muscles; spinous processes of vertebrae in the back and tail appear slightly; there must be a thin layer of subcutaneous fat on the back and slightly on the lower back; openings on ribs, in the sacrum and pelvis are permitted.

Mutton and goat meat of the 2nd category have poorly developed muscles, the bones are noticeably protruding, subcutaneous fat on the surface of the carcass is in the form of minor deposits or may be absent.

Carcass fatness of mature pigs is determined by measuring the thickness of the fat above the spinous process of the dorsal vertebrae at the level between the 6th and 7th ribs. Pork is subdivided: into fat pork, which has a thickness of speck from 4 cm and more, bacon pork with a thickness of speck from 2 to 4 cm, and meat pork with a thickness of speck from 1.5 to 4 cm; meat pork of the fatness category must be covered with a layer of speck over the whole surface of the carcase or half carcass.

Bacon pork, unlike bacon pork, is obtained by processing a special bacon fattening pig. Bacon pork carcasses are produced in their skins, the speck should be white or with a pink tint, dense, without pinching, and the skin is undamaged. The thickness of the fat is measured without the skin; for frozen pork, the thickness of the fat is reduced by 0.5 cm.

Pork of the standard grades of fatness after removal of the speck refers to trimmed pork.

Carcasses of well-fed gilts weighing from 12 to 34 kg, having a layer of blubber on the dorsal, shovel and hind parts, belong to the meat category.

The meat of piglets is subdivided into 1st and 2nd categories: 1st category - carcasses of dairy piglets weighing from 1.3 to 5 kg inclusive, with rounded shape; 2nd category - carcasses of piglets weighing from 3.2 to 12 kg, not enough rounded shape, with hypodermic fat on the back, shoulder-blade and hind parts.

According to the fatness, horse meat is divided into fat, extra-medium, average, and low-medium.

Well-fed horseflesh is characterized by excellent muscling, subcutaneous fat covers the carcass from the shoulder blades to the ischial tuberosities; the scapula shows traces of fat, intercostal muscles clearly show fatty deposits.

A horse of medium body condition has well-developed muscles, subcutaneous fat covers the whole carcass, but with gaps; there may be no fat on the forearm, the front part of the chest and the belly, with moderate fat deposits visible on the cut between the ribs.

In medium-faturity horseflesh, muscles are satisfactorily developed, subcutaneous fat covers the carcase back and loin up to the 8th intercostal space; cuts through the intercostal muscles show traces of fat.

Lower-moderate fatness horseflesh is characterized by poor muscular development, no fat deposits on the carcass surface, with the exception of the upper neck.

The meat of adult camels and young camels is divided into three categories of meatability: high, medium and low-medium.

Camel meat of higher fatness is characterized by good development of musculature, the humps are dense cone-shaped fat deposits and stand vertically, the carcass is covered with subcutaneous fat at the shoulder-blade, rib bases, sacrum, thighs, and on the inside - at the pelvis, lower back and buttocks.

Camel meat with medium body mass has good muscular development, the humps are filled with fat about half of the body mass, tilted to one or different sides, the subcutaneous fat covers the back part of the carcass at the loin and base of the humps, and on the inside - at the pelvis and loin.

Camel meat of moderate fatness has unsatisfactory muscular development, humps are slightly filled with fat and hang down to one or different sides, subcutaneous fat and fat deposits on the inner side of the carcass are absent.

Camel meat is usually of the same fatness grade and must meet the following conditions: good or satisfactory muscular development and fullness of the humps; deposition of subcutaneous or interior fat.

Meat of all types of animals which do not meet the requirements of the lowest fatness categories (beef, mutton and goat meat of the 2nd category, pork meat, horse meat and camel meat below the average fatness) is considered substandard and refers to lean fatness.

Adult carcasses of land and waterfowl birds and young animals (chickens and ducklings) are classified according to their fatness into two categories: 1st and 2nd.

The meat of poultry of the first category must have well-developed muscles, chickens and turkeys must have considerable accumulation of blubber in abdominal area and on back, in ducks and geese blubber must cover all carcass except head and wings.

The meat of poultry of the 2nd category is characterized by satisfactory development of musculature, chickens and turkeys have slight deposits of subcutaneous fat in the lower belly and back, but they may be absent, ducks and geese should have slight deposits of subcutaneous fat in the lower belly.

Meat of young animals of the 1st category is characterized by good development of musculature, chickens have deposits of subcutaneous fat in the area of lower abdomen and on the back in the form of solid line, in ducks subcutaneous fat covers the whole carcass, except the sides, legs, femur and wings.

The meat of young laying hens of the 2nd Category has the following characteristics: the muscles are satisfactorily developed; chickens have slight deposits of subcutaneous fat in the lower part of the belly and lower back, but fat deposits may be absent; ducklings have slight deposits of subcutaneous fat in the lower part of back.

Carcasses that meet the fatness requirements of the 1st category, but have processing defects (stubbiness, tears, abrasions, bruises) are transferred to the 2nd category. The carcasses of old roosters (with spurs over 15 mm), regardless of fatness, are not accepted to the 1st category.

Bird carcasses are marked by gluing a color label (90x15 mm) with the fatness category on one leg of the bird. For carcasses of the 1st category a pink label is used, for the 2nd category - a green one.

For category 2 chicken, chicken and turkey carcasses, the last two fingers next to each other on one of the legs are removed. Geese and duck carcasses of the 2nd category have all fingers on one leg with a membrane between them removed.

The carcasses of birds not satisfying the fatness requirements of the 2nd category and technical conditions for processing, and also frozen carcasses twice and carcasses with color changes and severely deformed carcasses are considered substandard.

Carcasses classified as substandard are not allowed to be sold in the trade network and are used for industrial processing.

Classification of meat according to thermal condition. According to the thermal condition of the meat is divided into three categories:

Cooled, i.e., cooled at ambient temperature for at least 6 hours after cutting the carcass;

Chilled, ie, subjected to curing ¬ in cooling chambers and have acquired the thickness of the muscle tissue (the bones) at a temperature of 0 to +4 ° C; such meat has a surface crust ⊒ drying;

Frozen, i.e. subjected to freezing to a temperature in the thickness of the muscle tissue (at the bone) not exceeding -8 ° C.

In addition to these categories, meat according to its thermal condition can be: steamed, frozen, defrosted, thawed.

Freshly slaughtered meat, which has retained its body heat, is referred to as fresh meat. Fresh meat is not released from the enterprises, as it may quickly acquire undesirable characteristics.

Release of meat allowed after a lapse ─ 6 hours after cutting the carcass, by which time the meat cools to the temperature of the ambient air and gets sour.

Frozen meat is called a meat, which in the thickness of the muscle tissue has a temperature of -1 ... -6 ° C. This temperature may be in the meat initially frozen, but then partially thawed for transportation. When arriving frozen meat in the refrigerators it is frozen - bring the temperature in the depth of muscle to -8 ° C.

Defrosted meat is meat defrosted in special chambers (defrosters) to a temperature of 1 to 4 degrees Celsius in the muscle.

Thawed meat, unlike defrosted meat, is called thawed meat under normal conditions. The nutritional value of such meat is lower than defrosted meat, as defrosted meat loses part of the meat juices and licks off the surface.

Classification of meat by nutritional purpose.

According to the food purpose of meat is divided into two categories: table and subjected to industrial processing.

Table meat refers to meat that meets the technical conditions specified in the standard. It is released to the trading network or for public ─ catering enterprises.

Meat, subject to industrial processing, is used to produce sausages or ready-to-cook products. It is suitable for food purposes, but does not meet the standards set ─ the standard. This category includes lean meat, boars, boars and wild pigs, as well as meat with blisters and tears of blubber (for lamb, goat and pork over 10% of the carcass, beef over 15%) and meat with discoloration from repeated freezing: carcasses of cattle and small ruminants with a dark color in the neck and pig carcasses with a darkened spin. Meat with significant stripping or tearing of subcutaneous fat, as well as the meat of cattle and small ruminants with discoloration in the neck area is allowed for use in public catering enterprises.

CARVINGBEEFCARCASSES

Carcase beef cutting. Beef is produced in the form of longitudinal halves, which are divided into quarters between the 11th and 12th thoracic vertebrae and ribs. The front quarter is divided into 7 and the back quarter into 4 parts. Thus, there are 11 cuts. Beef is divided into 3 varieties: 1st grade - the best parts of the carcass - hips, lumbar, dorsal, chuck (shovel and shoulders), brachial (shoulder and forearm) and breast. The total yield of the 1st quality cuts is 88% of the carcass weight; the 2nd quality - neck and pastern part. The yield of cuts is 7% of the whole semi-knife weight; the 3rd quality is the least valuable part - rear leg, fore-end and hind leg, which is 5% of the whole semi-knife weight. These cuts contain much bone and connective tissue, but little muscle.

The anatomical borders of the 3rd quality cuts are as follows: the cut - between the 2nd and 3rd cervical vertebrae; the anterior nelson - along the transverse line passing through the middle of the radius and ulna; the posterior nelson - along the transverse line at the level of the lower third of the femur. For the 2nd grade: cervical cut - at the place of separation of the cut, the rear boundary between the 5th and 6th cervical vertebrae. Ribs - along the line running from the knee joint to the junction between the true and false parts of the 13th rib and then along the rib arch to the thoracic hand of cuts. See Figure 21 for delimitation of the cut.

Some parts of a cut have names of their own, according to trade or culinary designation. Thus, the fleshy part along the vertebrae is called entrecote, the front dorsal part - thick edge, rear - thin edge, ribs - edging, lumbar - sirloin (best cut), femur - rump, etc.

Cutting of pork carcasses. Pork comes in the form of longitudinal carcasses, each of which is divided into 7 cuts. The cuts are divided into two varieties. The first grade refers to ham, brisket, lumbar (with stick), dorsal and shovel parts. The total yield of cuts is 95 per cent

of the carcass weight. The 2nd quality is the forearm (knuckle) and shin, which is 5% of the carcass weight. The border line of 2nd quality cuts is: a forearm (knuckle) - on a line through the shoulder joint; a shank - on a line through the upper third of the tibia bones. Borders ─ Grade 1 cut is shown in Figure 22.

In the trade network carcass cuts of all types of animals are cut into smaller pieces (0.5-1.5 kg) with the expectation that their included tissues (especially bones, and in pigs the fat) were distributed evenly, without splitting the bone. At cutting avoid loss of meat in the form of crumbs, fleshy part is cut, and bones are cut across.

Cutting the carcasses of lamb and goat meat. Lamb and goat meat are produced as whole carcasses. Each carcass is divided into two transverse halves - front and back along the line behind the last rib. Both halves are separated into 6 cuts, which are divided into two varieties: 1st - hip and lumbar (including thicket) and dorsal-spine cut (including brisket and neck). The yield of 1st quality cuts is 93% of the carcass weight.

The yield of 1st quality cuts is shown in Figure 23. 2nd quality cuts include butcher's, forearm, and shin. Total yield of 2nd quality cuts is 7% of carcass weight. The anatomical borders of the 2nd quality are as follows: the cut - on a line through the middle of the 2nd cervical vertebra; the forearm - on a line through the humerus joint; the rear shin - on a crossbar line through the shinbones, 1 to 2 cm above the Achilles tendon.

Topic 4: VSE in infectious diseases.

Plan:

1. **Veterinary and sanitary examination of animal slaughter products for infectious diseases**
2. **Anthrax**
3. **Tuberculosis - Pre-slaughter diagnosis. Veterinary and sanitary evaluation**
4. **Brucellosis**

Infectious diseases of animals cause significant economic damage. It consists of the loss of animals, utilization of slaughter products for some diseases, loss of productivity, loss of fatness, deterioration of meat quality parameters (reduced content of protein, fat, vitamins, minerals and other substances). Often the meat of sick animals is very dangerous for humans: the possibility of infection or outbreaks of food toxicocoinfections and toxicosis.

The veterinary expert in diagnosing infectious diseases sets himself two main tasks: 1) making a diagnosis and 2) veterinary and sanitary evaluation of slaughter products (i.e., the ways of their realization) and carrying out a set of veterinary and sanitary measures. Diagnostic examinations in boon facilities consist of pre-slaughter veterinary and sanitary examination of animals, post-slaughter diagnostics (i.e. veterinary sanitary examination of carcasses and internal organs and, if necessary, laboratory tests).

The peculiarity of veterinary sanitary-analytical examination of carcasses and internal organs lies in the fact that their examination reveals pathologoanatomical changes, typical mainly to the early stages of diseases. Often conveyed animals with latent (hidden) and abortive forms of diseases.

The sanitary-veterinary estimation is affected by the danger of the causative agent for a human, its resistance to physical and chemical factors, the degree of damage of organs and tissues, as well as the possibility of secondary infestation by microflora (E. coli, Salmonella, etc.).

During the processing of sick animals that are a danger to humans, measures are taken to prevent the disease of the workers of the slaughterhouse enterprise. The work of slaughtering animals and cutting carcasses is done with rubber gloves. At the end of the work disinfect the room, equipment, tools and clothing.

ANTHRAX

An infectious disease with septicemia or carbuncles of various sizes.

Cattle and small ruminants, horses, camels and pigs are susceptible to the disease among slaughter animals. Poultry under natural conditions are not affected by anthrax. Wild animals such as elks, roe deer, caribou, bears, wild boars, zebras, bison, elephants and others are affected. Humans also fall ill.

The source of the pathogen is a sick animal, slaughter products, carcasses, soil and feed serve as a factor of transmission. The main way to infect animals with anthrax is by nutritional way, and very rarely by aerogenic way.

Pathogen is B. anthracis, aerobic, gram-positive, motionless bacillus forming chain-like filaments surrounded by capsule. Outside the organism it forms spores in 6 hours after access of oxygen and temperature 15-42°C. The vegetative forms of bacteria die at 60°C within 1 hour; 5% solution of bleach kills them in 15-20

minutes. Spores die at 125-130°C in an autoclave within 30 minutes. Potassium hydroxide and caustic soda solutions in 10% concentration kill spores within 2 hours.

Pre-diagnostics. Incubation period is 1-3 days. More often the disease has an acute and superacute course, less often subacute and chronic.

Superacute course of anthrax prevails in sheep and goats, less often in cattle and horses. The animal may die suddenly without any clinical signs. This situation may occur in the livestock depot of a slaughterhouse. The appearance of a corpse in the middle of a batch of animals always raises suspicion of anthrax. The cadaver is forbidden to dissect until the disease is ruled out. For this purpose blood is taken from the ear of the animal on the side on which it lies and sent to a veterinary laboratory. Anthrax in pre-slaughter examination of animals and post-slaughter veterinary sanitary examination of carcasses and internal organs is an emergency case.

If the disease is prolonged, some clinical signs appear. Sheep and goats become agitated, grind their teeth, fall down or make maneuvering movements. Body temperature rises rapidly and the animals may die within a few minutes in violent convulsions.

Cattle and horses will have high body temperature, may become agitated, their pulse will beat faster and their breathing will be heavy and intermittent. Visible mucous membranes are cyanotic, excitation is often changed by oppression. The animal falls down and dies. Oral and nasal discharge of bloody foamy fluid and blood from anus. Death comes suddenly or within a few hours.

Acute course of the disease is characterized by high temperature (41-42°C), pulse rapid, respiration intermittent, visible mucous membranes cyanotic. Fecund animals abort. Digestive disorders are observed, manifested by flatulence, constipation or diarrhea. Horses exhibit colic with discharge of liquid bloody masses. Sheep and goats will sometimes sit up, fall over and lie down in various poses.

Sick animals experience convulsions and die. In agony you will notice a bloody, frothy discharge from the nose and mouth. The disease will last for 2 to 3 days.

Subacute course. The same clinical signs as in acute course are observed. The difference is that in subacute course animals may temporarily improve their health, but in a few hours their condition worsens sharply. Seizures may be repeated two or three times.

Swelling of the udder, lower abdomen and reproductive organs may occur in sheep and goats. They are of various shapes and sizes, dough-like, cold and painless. Carbuncles are sometimes observed. The duration of the disease will not exceed 8 days.

Chronic course. Progressive emaciation is observed in ruminants and horses. In pigs the lymph nodes in the head area are affected. The disease will last for 2-3 months. Chronic anthrax is usually recognized at the slaughterhouse during postmortem examination of carcasses and internal organs.

Depending on the localization of the pathological process, there are carbunculous and local forms.

Carbunculous form. Carbuncles occur in various parts of the body. In the beginning there are dense, hot and painful swellings. Very soon they become cold and painless. Necrosis of tissue and ulceration occur in the center of carbuncle. Body temperature rises insignificantly.

The local form. It is characterized by a long course. Body temperature increase is insignificant. Mandibular, pharyngeal and cervical lymph nodes are often affected. The disease appears as angina. Swallowing is disturbed and the animal may choke while eating. With severe swelling of the pharynx and larynx the death of the animal comes from suffocation. The local form is most commonly seen in pigs.

The atypical form. It occurs very rarely. The main symptom is a mild rise in body temperature. The animal usually recovers.

Lungs are edematous, therefore, they are dark red; sometimes dot and spot hemorrhages under pleura and in organ parenchyma are visible. Mediastinal and bronchial lymph nodes are enlarged, dark red in color, yellowish-reddish lymph runs down from their incision surface.

On the inner surface of the pericardium there are pinpoint hemorrhages, and the cavity contains a bloody-yellowish exudate. On epicardium and under it there are massive dot and spotty bleedings of dark (black) red color. Hemorrhages are more often localized in atrial walls (cardiac ears) and in epicardial fat. The epicardium has dark red stained and striated hemorrhages.

The spleen is enlarged, flabby, softened on the cut. At the initial stage of carbunculous form of the disease the spleen enlarged slightly and its consistency is almost normal. Liver is dark brown, sometimes clayey and flabby. Portal lymph nodes are enlarged, flabby, yellow or dark red in color; bloody-yellowish fluid flows from the cut surface of such nodes. The kidneys are dark red, bloody, flabby with massive hemorrhages on the surface and section. The border between the cortical and cerebral layers is obliterated. Mucous membrane of renal pelvis was diffusely hyperemic.

On the mucous membrane of the stomach and intestine there are point or diffuse cro-illusions. In the intestinal form of anthrax mesenteric lymph nodes are enlarged, flabby, outside look like dark red cords; they are dark red at the cut, yellowish-red lymph runs down from the surface of cut of affected nodes.

Differential diagnosis. Emphysematous carbuncle and pasteurellosis in cattle, as well as gas edema, bradsitis and enterotoxemia in sheep must be excluded when making the diagnosis. There is a crackling sound (crepitation) in swellings if palpation is palpated with emcaria and gas edema and a tympanic sound if percussion is palpated. This is not the case with anthrax. At pasteurellosis inflammatory edemas have no hemorrhages and are located in the area of the head, neck and sometimes the underbelly, and at anthrax carbuncles have no certain localization. The thoracic form of pasteurellosis is accompanied by serous fibrinous pneumonia, which is not seen in anthrax. The spleen in livestock with pasteurellosis is not enlarged and is of dense consistency.

In sheep, goats and horses pathological anthrax changes are usual, but it should be remembered that anthrax in horses and sheep is more acute than in other animals.

In pigs, anthrax most often runs chronically. However, there are cases when the disease occurs in acute septic form.

Veterinary and sanitary measures for detection of anthrax and sanitary evaluation of slaughter products.

In case of suspicion of anthrax the slaughter of animals and the movement of products in the slaughterhouse are stopped, pathological material (pieces of spleen, altered parts of tissue and diseased lymph nodes) are sent for laboratory examination. The diseased carcass and its neighbors (two on each side) are isolated together with internal organs and skins.

Upon laboratory confirmation of anthrax, the isolated carcasses, internal organs and skins shall be sent for incineration.

All impersonal products (legs, ears, udders, blood, etc.) obtained from the slaughter of other animals mixed with products of anthrax slaughter are incinerated.

Skins from healthy animals coming into contact with skins from an animal with anthrax are subject to disinfection in accordance with the procedure prescribed by the current legislation.

After isolation of the above slaughter products in the slaughterhouse immediately take preventive measures.

Other carcasses and slaughter products suspected of being contaminated with anthrax bacilli in the course of the technological process shall be immediately decontaminated by boiling, but no later than 6 hours after slaughter, in open boilers within 3 hours of boiling, and in closed boilers at 0.5 MPa steam pressure - within 2.5 hours. If it is not possible to carry out neutralization within the above period, these carcasses must be isolated in a room at a temperature not exceeding 10°C and then sent for neutralization as stated above but no later than 48 hours from the time of slaughter. If this is not possible, the carcasses and slaughter products to be decontaminated must be sent for disposal or incineration.

Carcasses and slaughter products that are not contaminated with anthrax bacilli during the production process shall be used without restriction.

Resumption of slaughter at the meat processing plant is permitted only after all measures to guarantee the elimination of the infection, as the veterinarian draws up the relevant act. ЮО

The head of the OPVK (senior veterinarian) of the enterprise, where anthrax was detected, notifies the veterinary organizations of the area where the batch of livestock unpreventable for this infection arrived

TUBERCULOSIS

It is a chronic infectious disease characterized by formation of specific tuberculosis nodules in various organs and tissues. Domestic and wild animals, birds and humans are susceptible to tuberculosis. Cold-blooded animals also become ill with tuberculosis.

Cattle and pigs are the animals most affected by tuberculosis in the slaughterhouse. In pigs it is caused by avian bacteria, less often by bovine and very rarely by human bacteria. In cattle, tuberculosis is most often caused by a bovine species of microorganisms. Rarely, goats and even more rarely sheep and horses get tuberculosis. In humans, tuberculosis is caused by the human type of bacteria, sometimes bovine and very rarely avian.

The causative agent is Mycobacterium tuberculosis, a slightly curved, immobile, acid-resistant bacillus. TB bacteria are killed at 60°C for 15-20 minutes and at 70°C for 10 minutes. They are not affected by minus temperature. Hydrogenous sodium or caustic potassium in 5% concentration killed tubercle

bacilli in 2-3 hours. Bacteria in liquid manure retain for 478 days, and in the body of fish - 485 days.

Pre-diagnostics Clinical manifestation of this disease in animals depends on the localization of tuberculosis process and the degree of damage. When the lungs are affected the cough is noted, when the musculoskeletal system is affected - lameness, when the udder is affected - lumpiness and flakes in milk, etc. Affection of internal organs (liver, kidneys, spleen etc.) does not have clinical manifestation. For in vivo diagnosis of tuberculosis an allergic reaction is used, i.e. tuberculinization is performed.

Post-slaughter diagnostics. In parenchymatous organs (more often in lymph nodes of lungs) there are tuberculous lime-like tubercular formations. The latter may be of lymphoid or epithelioid origin.

Lymphoid tubercles are clusters of lymphoid cells with leukocytes admixture. Epithelioid tubercles contain granulation tissue, consisting of clusters of epithelioid cells, soft fibers or coagulated fibrin grains with admixture of lim-phocytes or polymorphonuclear leukocytes; among them there are so called giant cells with numerous nuclei at the edges. These tubercles have no blood vessels (endothelium of capillaries is used for tubercle formation), so they are easily subjected to necrosis. Lymphoid and epithelioid tubercles are initially gray and translucent, after the transparency disappears, they become yellowish, dry, cheesy, ie turn into caseosis. The cottageous transformation occurs earlier in lymphoid (exudative) tubercles. Epithelioid tubercles retain granulation tissue even if caseous decay has begun. Sometimes cells of epithelioid tubercles don't undergo caseous decay and together with adjoining connective tissue cells turn into fibroblasts. Such tuberculous swellings on serous membranes in cattle are called pearl. If the rupture of fibrous tissue (tuberculous granuloma) occurs before the cottage cheese decay of epithelioid tubercle then it turns into fibrinous nodule (obesity). They are hard, crunchy when cut, and on the surface of the cut they look like big foci or radial focus.

In acute and progressive cases of the disease the tubercles merge with each other and undergo caseous decay (open process).

At the same time there is destruction of parenchymatous tissue and walls of blood vessels. This causes the bacteria to enter the blood and spread throughout the body. In this case, the tuberculosis bacteria may enter any part of the animal's body. Tuberculous lesions are very susceptible to proliferative inflammation, which often ends in dense fibrous tissue, resulting in a fibrous capsule around the tuberculous focus, isolating the diseased part of the organ (closed process). Isolated tuberculoma may contain young lymphoid and epithelioid tubercles, but more often there are tubercles already subjected to curd disintegration.

Lungs are most often affected in cattle with tuberculosis. Apparently, it can be explained by functional peculiarities of lung tissue and venous blood which carries microflora into lungs in the first place.

At pulmonary tuberculosis around soft yellowish-white purulent foci are grayish semiluminescent and yellowish nodules with hemp seed. During fast development of tuberculosis process big foci sometimes soften and form cavities (caverns) which are covered with thick connective tissue capsule.

Between the tuberculas lung tissue seems to be normal but filled with mucus and exudate (catarrhal pneumonia) or thickened and without air (interstitial pneumonia). In young animals, tuberculosis most often occurs as catarrhal pneumonia. Affected lungs are yellowish or reddish-gray on the cut, and the surface of the cut is dripping with curdish-purulent secretion.

Pulmonary tuberculosis is almost always accompanied with catarrhal bronchitis. Therefore, the bronchial mucous membrane is swollen, reddish, it has mucopurulent exudate on its surface and there may be tubercles and ulcers with roll-shaped edges. Mushroom granulomas as big as a pea or larger are sometimes found in the larynx.

Affection of serous membranes (more often pleura, less often peritoneum) is characterized by bloating of intense pink and gray-red granulomas of soft but resilient consistency, attached to pleura or peritoneum with thin stalk or broad base. In old cases these ramifications are firm to the touch, thick, round or mushroom-shaped, sometimes becoming fused together and creating cauliflower-shaped ramifications; inside the ramifications are found curd-like or calcified focus. Such granulomatous lesions on serous membranes are called pears. Sometimes they cover the whole surface of pleura. From the pleura the process may proceed to the outer and inner surface of the pericardium, so the heart is as if in a shell. If pericardium fuses with epicardium the process involves heart muscle as well which becomes degenerated and turns pale gray. Only a thin layer of normal-looking muscle remains on the inside of the heart.

Lymph nodes are initially enlarged, dense, elastic, later becoming hard, knobby. In acute cases the nodes are juicy, intensely pink on the cut. They have grayish-yellowish or gray-white luminescent bumps inside; turbid purulent maggoty mass scrapes off the cut surface of such nodes. In chronic cases when cut the node under the knife is crispy and gray-white. On the surface of the cut you can see syrupy calcified nodules and big tubercles surrounded by dense connective tissue formations. Posterior mediastinal lymph node is a solid con-glomerate of tubercles filled with layers of lime.

Renal tuberculosis is characteristic of older animals and is indicative of a generalized form of the disease. On the surface under capsule and in parenchyma of organ, in most cases in cortical layer, there are yellowish or grayish nodules from poppy-seed to pea. They contain grayish-yellowish pus, curd-like mass or lime salts. Sometimes these foci are surrounded by dense connective tissue.

Swelling of intestinal walls and yellowish nodules or sometimes ulcers on mucous membranes are noted in the intestine (the latter is rarely affected by tuberculosis).

Mesenteric lymph nodes are involved more often than intestine, but less often than parenchymatous organs; changes in them are similar to those in other lymph nodes.

When the dense connective tissue around the udder foci is dilated the affected udder is hard and lumpy. A cut of the udder reveals lesions surrounded by a connective tissue capsule containing syrupy mass and lime salts.

Tubercular lesions in muscles, bones, skin and subcutaneous tissue are very rare, usually with severe organ involvement and generalized process.

The lymph nodes, which collect lymph from the skeletal musculature, are often affected even if no tuberculosis process is found in their respective regions.

The mandibular, pharyngeal and cervical lymph nodes are uniformly enlarged, sometimes lumpy and dense. Hyperplasia and hyaline degeneration of their connective-tissue base (tuberculosis granuloma), appearing on gray background in form of tree-like branching, are seen on section of these nodes; turbid desquamating spots or small yellowish-grayish tubercles containing purulent or curd-like masses are often observed. In chronic cases curd foci are surrounded by dense connective tissue capsule with lime salts inside, sometimes mixed with dry caseous mass.

There are curdgy-purulent or dry curd-like centers (caseous pneumonia) of equal size, dense, in some cases tuberculous; on section they are gray-yellow or gray-pink color and their caseous decay is seen in the center of centers. Intensively pink and even red fibrous granulomas are seen on pleura; pericardium is also involved. There are purulent-caseous tubercles in submucous layer of inner surface of trachea. Tuberculosis process in bronchial and mediastinal lymph nodes proceeds similarly as in lymph nodes of neck and head. Tuberculous lesions are found in the spleen (more frequent) and liver (less frequent). They are wide in the cortical layer and narrowing in the medulla and are represented as thick pockets of enlarged granulomatous tissue. These granulomas are white-gray or white-yellow in color on section. They contain neither purulent nor curd-like tubercles. There are sometimes granulomatous swellings on the peritoneum, similar to those on the pleura. Tubercular affection occurs in the skeletal muscles but if it occurs, it is very characteristic. Among muscle bundles or inside them and even in fatty tissue there are many small tubercles of poppy-seed to pea-sized ones. They are dense, rigid, yellow-gray or grayish-white on the cut surface with beams going from the center. The center contains a caseous mass and lime salts.

In tuberculosis of bones they become bloated and osteoporotic. Often mesenteric lymph nodes are affected and large (as big as hazelnuts) curd-like foci surrounded by a dense connective tissue capsule are found inside them.

Goats may see numerous tubercles or large nodules in the lungs filled with purulent or curd-like mass, sometimes calcified. There are abscesses and caverns surrounded by dense connective tissue and filled with a dirty greenish mass. On pleura and serous membranes there are granulomatous growths similar to pearl. Tuberculous foci in the udder are also observed.

Rarely in horses are tuberculous lesions of the mucous membrane of the nasal septum in the form of small tubercles the size of a hemp seed which disintegrate and form crater-like ulcers with flat or thickened edges of whitish-grayish color. The ulcers heal, and in their place ─ form radial scars with wart-like dislocations. Tubercular foci are also seen in regional lymph nodes. There are many small vitreous tubercles in the lungs, as if the lungs are covered with sand grains. There are tubercles as big as a hazelnut or larger. They are surrounded by dense fibrous capsule. Tuberculi consist of developed granulosa tissue; they resemble sarcomatous blisters or have softened formations with yellowish or grayish-

purulent mass in the center. Affection of serous membranes (pleura, peritoneum and pericardium) in the form of granulomatous swelling is observed, and serous-fibrinous exudate is found in body cavities. In the liver (less frequently) and spleen (more often) there are tubercula with purulent-caseous content or similar to lymphoadenoma. These organs are severely enlarged in tuberculosis and may become amyloid-infected in the chronic course of the disease. If the mediastinal lymph nodes are severely affected, the wall of the aorta and vena cava are also involved. Bones are also affected, but muscles very rarely.

In birds. The liver, spleen and sometimes kidneys affected by tuberculosis are enlarged, deformed, contain nodules from a millet grain to a hazelnut, yellowish-grayish in color, softened or dense. At the beginning of the disease in nodules and tubercles contains whitish, creamy, sticky pus which then becomes like a fatty mass. In prolonged cases the tubercles become calcified. Under severe damage, tubercles of varying stages of development are found in the mesenteric lymph nodes, on the walls of the intestines, in the ovaries, oviducts. This observed ascites and peritonitis. Sometimes all the internal organs due to productive inflammation are fused and form conglomerates. From time to time lesions are found in lungs, heart muscle, pericardium and skeletal muscles. Disease of joints of extremities is also noted. Depending on the degree of damage the carcasses may be emaciated, jaundiced or hypodermic.

Tuberculosis foci in rabbits in the lungs and liver appear in the form of yellowish-gray translucent nodules of different sizes from a millet grain to a bean. Small nodules may coalesce into larger ones with yellowish pus or curd inside them. Tuberculous nidi are very rare. The intestinal walls and rarely the lymph nodes may be affected.

In birds and rabbits, tuberculosis usually involves mycobacteria in the skeletal muscles.

Differential diagnostics. According to macroscopic pathological anatomical changes tuberculosis may be confused with infectious and invasive diseases and neoplasms.

Actinomycosis foci differ from tuberculosis foci by strong gray-white fibrous tissue development and concentrated arrangement of its bands. Both halves of the lesion are convex on the section. Lesion of mandibular lymph nodes in the form of granulomas (1-5 mm), enclosed in a well-defined smooth-walled connective tissue capsule, from which they are easily removed.

Eimeriosis should be excluded in birds and rabbits.

Pigs after outbreak of salmonellosis and plague show necrotic focus in mesenteric and other lymph nodes as well as destructive changes in the intestines (the latter are absent in case of tuberculosis).

Sometimes nodules are found in parenchymatous organs in place of dead larvae. Helminthic (helminthic) lesions are easily excised and don't cause changes in regional lymph nodes. Blastomatous lesions are more commonly found in organs (sarcomas and carcinomas) or on serous membranes and skin (papillomas, fibromas). They consist of homogeneous tissue and do not involve regional lymph nodes.

Tuberculosis foci should also be distinguished from corynobacteriosis lesions. Coryne bacteria cause purulent pneumonia in foals and calves.

Veterinary and sanitary assessment. Carcasses regardless of the state of fatness and internal organs (including intestines) in case of generalized tuberculosis process, i.e. when simultaneously affected thoracic and abdominal organs with regional lymph nodes are sent for disposal.

Skinny carcasses with any form of tuberculosis of organs or lymph nodes are discarded.

Carcasses with normal body weight (except for swine carcasses) with tubercular lesion in a lymph node, in one of the internal organs or in other tissues as well as unaffected organs are sent for production of sausage bread, preserves or boiling. The internal fat is reboiled.

Intestines not infected with tuberculosis are sent for use in that plant as casings in the production of cooked sausages, and if this is not possible, are sent for the production of dry fodder.

The organs and tissues affected by tuberculosis, irrespective of the form of lesion, shall be sent for disposal.

If tuberculosis lesion is detected in pork carcasses in the form of calcified lesions of mandibular lymph nodes only, the latter shall be removed and the head together with the tongue shall be sent for boiling; carcass, internal organs and intestines shall be used without restrictions. If only the mesenteric lymph nodes are affected by tuberculosis, the intestines shall be sent for disposal; the carcass and other internal organs shall be used without restrictions.

If any of the above lymph nodes show lesions in the form of caseous, unresectable foci or tubercular lesions (irrespective of their type) in both mandibular and mesenteric lymph nodes, the latter shall be removed, the intestines shall be sent for utilization, and the carcass and other organs for making sausage bread, preserves or boiling.

When slaughtering animals responsive to tuberculin, the sanitary evaluation of meat and other products is carried out depending on the detection of tuberculosis lesions. If tuberculosis lesions in lymph nodes, tissues and organs are not detected, the carcasses are used to make cooked sausages.

Hides from tuberculosis animals after normal salting are released without restriction.

BRUCELLOSIS

Infectious, chronic disease affecting domestic and some wild animals.

Brucellosis affects cattle, sheep, goats, pigs, horses; in laboratory animals it affects guinea pigs. This disease has also been established in many species of wild animals (bison, gazelles, saigas, ground squirrels, hares and others).

Humans are also susceptible to brucellosis. He becomes infected by contact with brucellosis animals and products of their slaughter, as well as by eating meat of sick animals.

The causative agent is bacteria of the Bru¬cella genus (Br. abortus, Br. suis, Br. melitensis, etc.). It is a small oval aerobic bacterium of cocciform shape,

motionless, does not form spores, gram-negative, well stained according to E.V. Kozlovsky. Brucella dies at 70°C for 5 minutes. Freshly slaked lime in 5% concentration kills microbes in 2 hours.

Pre-diagnostics. The main clinical sign in cows is abortion or birth of non-viable offspring. Retention of placenta, mastitis and metritis accompanied by dirty brown or reddish uterine discharge, sometimes of unpleasant odor, are observed. Orchitis and epididymitis occur in bulls.

In pigs, brucellosis abortions are observed much less frequently than in cattle and small ruminants. They occur on the 60-90th day of pregnancy. Then endometritis, mastitis, arthritis (claudication) occur. Orchitis and epididymitis in boars, as well as purulent arthritis, bursitis, osteomyelitis and paralysis of the assay are reported. The most typical sign is arthritis, usually accompanied by tense gait and lameness.

Mastitis, endometritis and vaginitis with incomplete mucopurulent vaginal discharge, often accompanied by high body temperature, prolonged lameness, arthritis or synovitis, bursitis, tendovaginitis, panorrhaginitis, sometimes paresis and paralysis of the ass are noted in sheep. In rams, along with limb lesions, orchitis, sometimes with suppuration, is observed.

Horses have abscesses on the withers and arthritis.

Birds are resistant to the brucellosis pathogen.

Antemortem diagnosis of brucellosis is greatly facilitated by annual mass diagnostic tests (RA, RSK).

Post-slaughter diagnostics. In brucellosis there are no sufficiently characteristic pathological anatomical changes in the internal organs and lymph nodes.

Bursitis, hygromas and abscesses on the limbs in cattle are observed in brucellosis; orchitis and epididymitis in bulls; vaginitis and metritis in cows.

Parenchymatous or interstitial inflammation of the udder and arthritis are found in sheep and goats. Under kidney capsule nodules as big as buckwheat grain are found; sometimes changes in lungs typical for pneumonia are registered.

Arthritis is more common in pigs. Orchitis in boars is not uncommon with necrotic foci of grayish-yellow color and equal size. Pustules vary in size from hardly visible nodules to peas (miliary uterine brucellosis) are found on the mucous membrane of the uterus. There may be encapsulated abscesses in the subcutaneous tissue, spleen and synovial pouches.

In horses brucellosis is accompanied by arthritis and bursitis containing serous or fibrous-purulent exudate, first liquid and then smear-like.

Veterinary and sanitary evaluation. Meat from the slaughter of animals of all species that have clinical or pathological signs of brucellosis is destroyed.

Meat from animals reactive to brucellosis shall be sent for decontamination by boiling.

Hides, horns and hooves from all types of brucellosis animals are released only after disinfection.

FMD

A contagious disease of cattle, sheep, goats and pigs. Reindeer and camel are also susceptible to FMD, while wild animals include elk, deer, antelope, wild boar,

roe deer, bison, and bison. Young animals are more susceptible to FMD than older animals and they are often severely ill and die.

People become infected with foot and mouth disease when eating uncontaminated milk from sick animals, as well as when milking sick animals or preparing them for meat.

The causative agent is a virus. It consists of RNA and protein envelope. There are types A, O, C, CAT-1, CAT-2, CAT-3, Asia-1 and others. It is multivirulent, epitheliotropic and affects epithelial cells and tissues.

Persistence of the virus depends on its environment. The dried foot-and-mouth disease lymph on the paper tissue (in the room), on the glass (in the stable) retains its virulence for 5-7 days, and dried in the sand and kept in the open air proved virulent as of the 11th day. At 60°C the virus dies within 5 to 15 minutes, and at 80°C it dies almost immediately. Foot and mouth disease lymph frozen at -15°C remains active up to 2 years, and dried and frozen - up to 52 months. Virus dies in sour milk; on heating milk to 85°C it is destroyed in 1 minute, at 80°C - in 3 minutes, at 75°C - in 15 minutes, at 70°C - in 30 minutes. Very destructive to the virus is a 1-2% solution of caustic soda or caustic potash - they are especially effective in a hot form.

Pre-diagnostics. Signs of the disease are most typical in adult cattle. In lambs, calves and piglets they may be less typical.

Foot-and-mouth disease may be benign and malignant. Patients will have the following symptoms: fever, reddening of mucous membrane of oral cavity and conjunctivae, gum disturbance, dryness of the nasal mirror, abundant salivation accompanied by teeth grinding and characteristic "smacking". Edema and hypersensitivity are evident on the skin of the hoof vein and interdigital cleft. After 3 days in the oral cavity there are round or oblong aphthae. They may also be on the nasal mirror. Papules and vesicles as big as a dove's egg develop on the corolla and in the interdigital cleft. Aphthae can also be located on the skin of the udder teats. After 1-3 days the aphthae will break down and in their place irregularly shaped erosions with jagged edges of various sizes can be seen. Viscous saliva is secreted from the mouth.

In pigs, foot-and-mouth disease occurs with formation of aphthae on the navel, udder skin and corolla.

FMD in sheep is much milder than in cattle. The most constant sign is high fever. As a rule aphthae forming in the mouth cavity remain unnoticed. When corolla or arch of interdigital cleft is affected, lameness is observed.

Post-slaughter diagnostics. The presence of aphthae in the oral cavity, on the udder and limbs is characteristic. Sometimes aphthae and erosions are found on the mucous membrane of the scar and the book. During generalization of the process local inflammatory changes are found in muscles of femur; emphysema of lungs and edema of abomasum are also noted.

Young animals with FMD show catarrh of upper airways, acute catarrh of gastrointestinal tract. Mesenteric lymph nodes are enlarged, mucous membrane of lips and desens swollen, reddened, with small yellowish nodules and yellowish-gray scabs.

Severe exanthema and in severe cases gangrenous dissection of tissues, more often on extremities, are the most characteristic pathological anatomical changes in foot and mouth disease. Certain animal species show these changes as follows.

In cattle the mucous membrane of the inner surface of

Lips, gums, tongue are reddened and on its surface there are single or numerous blisters (aphthae) of different size - from pea to nut, containing transparent or turbid liquid (lymph). At the site of the bursting blisters found intensely pink or yellow-gray covered with a plaque erosions - small bleeding ulcers.

Complications of oral mucous membrane erosions turn into ulcers covered with purulent-choroidal secretion. Inflammatory edema is noticeable around the ulcers. Occasionally FMD lesions are observed in the upper respiratory tract, bronchopneumonia is possible.

There are nodules and deposits of fibrinous films on heart valves. In malignant form of foot-and-mouth disease heart cavities are enlarged, heart muscle is flabby, easily torn, yellowish or gray-white stripes and spots - "tiger heart" are seen on the surface of the cut muscle.

The spleen is enlarged and softened. The liver is dark brown or spotty, flabby and soft. Lymph nodes (bronchial, mediastinal, portal) are enlarged, flabby, juicy; whitish-gray mass scrapes off the cut surface of the nodes. Purulent foci of metastatic origin are sometimes found in parenchymatous organs. Mucous membrane of small intestine is dotted with pitting hemorrhages or diffuse-striped reddened, sometimes its surface has erosions and ulcers. The kidneys are dark red or gray-clay color, the boundary between the cortical and medullary layers is absent.

Blisters of various sizes (from pea to nut) are found on the corolla of hooves, crumbs and on the wall of interdigital cleft. Areas where the blisters were opened are covered with a scab with bright red bleeding surface under it. At the development of foot-and-mouth process in the area of coronary or ulnar joints purulent and hypochorotic inflammation is observed accompanied by gangrenous decay of deep tissues and exposure of joint cavity. As a rule, metastatic pneumonia is noted.

Blisters, erosions or ulcers covered with scab are found on the udder teats. The udder is thickened, reddened; aphthae and erosions are also found on it. In severe cases there are yellowish or whitish-gray stains or streaks in the skeletal muscles, which makes the muscle look like fish meat; intermuscular tissue is infiltrated. Carcass lymph nodes are juicy, enlarged (hyperplasia).

The lips, cheeks and pharynx of sheep and goats are swollen. Transparent or turbid aphthae the size of a lentil grain or more are found on the mucous membrane of the oral cavity. The corolla of the hoof and the walls of the interdigital cleft are often affected (purulent inflammation and gangrenous decay). Exanthematous lesions are found on the udder and mammary lips.

Blisters of various sizes and ulcers covered with moist or dry scab are found on the metatarsus of pigs. The lips and gums are swollen. The mucous membrane of the tongue, oral cavity and pharynx is red, with blisters and small ulcers covered with a soft gray scab. On the corolla of the hooves, crumbs, on the walls between

the hooves there is a bright pink or dark red swelling, clearly visible in white pigs. In severe course of the foot-and-mouth disease process purulent inflammation of joints with gangrenous decay of tissues and metastatic pneumonia can be observed. Skeletal muscles are flabby, with pale yellowish or grayish striation visible on the cut surface. Carcass lymph nodes are juicy, enlarged, hyperplated, but sometimes without changes.

Differential diagnostics. The pathological anatomical picture of foot-and-mouth disease is similar to plague of cattle, smallpox, stomatitis, burns of the mucous membrane of the lips and walls of the mouth, malignant catarrhal fever of cattle and other diseases. These diseases are differentiated by the following signs.

In plague, there is diffuse hemorrhagic inflammation of the intestines; the extremities are never affected, while in foot-and-mouth disease they are always affected.

In case of smallpox, udder, nipples, sometimes outer surfaces of lips are affected; the extremities are not affected.

Malignant catarrhal fever is accompanied by ichoros purulent rhinitis and necrotic crusty overlappings on inner surfaces of lips, gums, tongue root and pharyngeal mucosa, but no blisters, erosions or inflammations on extremities.

Stomatitis has blisters and ulcers only in the oral cavity but they are small, yellowish or grayish; there are no large blisters filled with lymph and no lesions on extremities.

Veterinary and sanitary evaluation. It is forbidden to slaughter sick and suspect animals for meat in the first cases of the disease in a favorable area. They shall be subject to slaughter.

In other cases it is allowed to slaughter such animals for meat, but release of slaughter products in raw form is forbidden. Meat and other products obtained from slaughter of animals sick and suspected of being affected by foot-and-mouth disease are sent for making cooked or cooked smoked sausages, cooked cooking products or canned food. If this processing of meat is not possible, slaughter products are decontaminated by boiling.

If there are multiple or extensive necrotic foci in many muscles (pelvic and thoracic limbs, ankoneus, etc.), as well as in complicated forms of FMD accompanied by gangrenous or purulent inflammation of udder, limbs and other organs, carcass and other slaughter products shall be sent for utilization.

In case of presence of single necrotic foci in the muscles the affected parts of muscles are utilized, and the question on the ways of use of other slaughter products (the remaining parts of carcass, internal organs) is solved depending on the results of bacteriological examination. If Salmonella is detected, the slaughter products are boiled; if not, they are transferred to cooked or boiled-smoked sausages.

If sick or suspected FMD cases are found in the batch of animals to be slaughtered, the entire batch of animals is immediately sent to a sanitary slaughterhouse for slaughter. If it is impossible to process these cattle at the sanitary slaughterhouse, the slaughter is carried out in the general hall of the slaughter and dressing workshop.

Carcasses and all other products obtained from the slaughter of animals affected by FMD and sent for slaughter prior to expiration of 3 months after the disease and lifting of quarantine from the farm as well as animals vaccinated with inactivated vaccine against FMD within 21 days in FMD-affected areas are released without restrictions, but they may not be exported outside the region, territory or republic.

If more than 3 months have passed since removal of quarantine from the farm the animals affected by foot-and-mouth disease may be sent to an animal health facility and the meat and other slaughter products may be sold without restrictions but only within the country.

At forced slaughter of animals sick with FMD on the farm the meat and slaughter products are used only after boiling and strictly inside the farm. Taking them out of the farm in raw form is prohibited. Hides, horns, hooves, hair and bristles must be disinfected.

Veterinary and sanitary measures on the bonfire enterprise. Animals from FMD-unfected farms within the quarantine zone adjacent to the facility are allowed to be slaughtered, but are delivered to the facility in specially equipped vehicles; their skin and hooves are subjected to sanitary treatment before sending animals from such farms.

If foot and mouth disease is detected at an enterprise, the reception of cattle is stopped and the whole lot of diseased animals is sent for slaughtering; the meat obtained from them is considered conditionally suitable. If a herd of cattle or other cattle is delivered to the slaughterhouse and the number of animals with the disease is determined by clinical symptoms and temperature data, the whole batch is divided into two groups: 1) animals with clinical signs of FMD and suspected of the disease; 2) animals without clinical signs of FMD, with normal temperature, but suspected of being infected because they have been in contact with the sick. The first group of animals is immediately sent to a sanitary slaughterhouse or, if the latter is not available, to a slaughterhouse separately from healthy animals. To prevent the spread of infection, animals from the second group are also killed in separate batches without overbreeding.

The attendants of the livestock farm should only stay in their assigned premises. Every day after processing a party of foot-and-mouth disease cattle, the pens where the animals were kept, as well as the cutting rooms and their equipment, must be thoroughly cleaned mechanically and disinfected with 1-2% hot solution of caustic soda or caustic potash. All manure accumulated during the epizootic at the enterprise is neutralized by biothermal method in specially allocated manure storage, according to the instructions on FMD control.

Workers assigned to service the animals must leave the territory of the animal shed through certain gates. Unauthorized persons should not be allowed into the animal house at this time. Overalls workers who have had contact with sick animals or their raw products, sent to the laundry for processing, and footwear decontaminated by a 0.5-1% solution of alkali. The workers themselves, as well as the conductors of batches of cattle, among whom there were FMD patients, must undergo appropriate medical examinations. Transportation equipment (buckets, troughs, shovels, sacks, tethers, etc.) brought to the cattle depot with the sick cattle

are taken in a separate place and disinfected under the supervision of a veterinaryspecialist.

OSPA

Contagious viral disease of many species of mammals and birds, characterized by fever and papulopustular rash on the skin and mucous membranes. Cattle, horses, pigs, sheep and goats are susceptible to smallpox. Smallpox affects people. Smallpox has different characteristics in various animals: in cattle, horses, goats and sometimes pigs it is often local; in sheep it is manifested in the generalized form and spreads as epizootics. Humans contract smallpox when consuming milk from cows with smallpox and when handling calves with smallpox.

The causative agent is DNA-containing viruses, epitheliotropes. Independent species are viruses: cowpox; smallpox in sheep, goats, pigs and birds. Virulence properties of the causative agent in cold conditions (-12...-15°Ñ) are maintained for 2 months; virus dies in 15 minutes after heating at 53°Ñ. Virus is as quickly destroyed by 2.5% sulfuric acid solution, 10% vinegar and diluted hydrochloric acid. Drying does not kill the virus but preserves it for up to 1.5 years; in decaying material the virus dies quickly.

Pre-diagnostics. At the beginning of the disease in animals a fever with severe chills, catarrhal lesions of mucous membranes, sometimes purulent rhinitis are observed. Later on red spots pale on pressure-roseolae, gray-red, round or conical nodules- papules (papule stage), reticulate, multi-cavity vesicles- vesicles (vesicle stage), pustules (pustule stage) appear on hairless places of skin and some mucous membranes. At the pustular stage connected with suppuration the fever of animals increases sharply and their general condition worsens; further on the pustules dry up and scabs fall off the temperature becomes normal.

Post-slaughter diagnostics. Smallpox usually affects the gentler (hairless) parts of the body: wings of the nose, lips, tongue, skin near the eyes, labia, udders (and nipples), scrotum, inner thighs; in sheep, smallpox lesions are also found on the neck and abdominal wall. In piglets, smallpox affects the whole body. General changes in smallpox in animals are typical of exanthematous inflammation.

Round red spots with reddish nodules (papules) the size of hemp seed may be found on parts of the body with soft skin. At the surface of these nodules is serous fluid. Along with papules occur vesicles the size of a pea or larger, which ¬ kotory contain clear yellowish serous fluid. At the top of some blisters have recesses. Around blisters skin hyperemic, subcutaneous tissue edematous, infiltrated, so affected area of body swells up. The content of many pustules became cloudy with an admixture of purulent bodies, and pustules formed it white. Depressions in pustules are smoothed; redness and edema around pustules are more intensive than in pustular stage. The apex of some pustules is sunken; their walls are folded. Crusts appear after drying. Under the crusts of dried pustules form epithelium, after which the crusts fall off. After desquamation a red stain or scar will remain for some time in place of the resorbed pustules and then turn pale.

Post-slaughter examination shall show catarrhal bronchopneumonia with grayish nodules with a curd-like center; infarcts may occur. There are dot and spot hemorrhages on serous membranes. Interstitial inflammation begins in the kidneys.

Lymph nodes are flabby, enlarged, juicy, with lymphoid elements easily scraped from the cut surface.

In severe course of the disease smallpox turns into malignant form, characterized by gangrenous inflammation of lips and udder.

Veterinary and sanitary evaluation. Carcasses and internal organs of cattle, sheep, goats and pigs at benign form of smallpox and pustule healing are released without restrictions after removal (cleaning) of pathologically changed tissues.

Carcasses as well as slaughter products of sheep, goats and pigs with draining, hemorrhagic and gangrenous forms of smallpox are sent for utilization.

The skins are disinfected.

Topic 5: VSE in invasive diseases

Plan:

1. **Trichinellosis**
2. **Veterinary and sanitary evaluation and measures.**
3. **Cysticercosis of cattle. Veterinary and sanitary evaluation of products and measures 4.**
4. **Cysticercosis of pigs.**
5. **The concept of echinococcosis and veterinary and sanitary evaluation of products**

Anthropozoonotic acute and chronic disease of many mammalian species of pronounced allergic nature, caused by larvae and sexually mature nematodes of the genus Trichinella. Pigs, wild boars, bears, badgers, dogs, cats, wolves, foxes, rodents (rats, mice), nutria, sea mammals of the far north (white whales, walruses, seals) and humans are affected.

Natural foci of trichinellosis are registered all over Russia; however, they predominate in the Republic of Sakha, Kamchatka, Magadan Regions, Krasnoyarsk and Khabarovsk Territories; and in areas with developed pig industry, such as Krasnodar Territory, North Ossetia, Moscow, Kaliningrad and Murmansk Regions, Krasnoyarsk and Primorski Territories. In the North Caucasus, there are synanthropic-natural outbreaks where the pathogen actively circulates among pigs, domestic dogs, cats, wild boars, bears, small carnivores and rodents.

Pathogen. To date, four species of the pathogen have been described: Tr. spi¬ralis, Tr. native, Tr. nelsoni, Tr. pseudospiralis.

All these species are parasitic in humans. Life cycle of trichinella is made in one host. They are very small nematodes of hair-like shape: male 1.4-1.6 mm long and 0.04 mm thick, female 3.5-4.4 mm long and 0.06 mm thick. Females are viviparous. They penetrate into lumen of libercune glands or intestinal villi of the host and give birth to live larvae, which are carried into muscles by lymphohematogenic current (Fig. 37). Favourite places of larva parasitization are legs muscles of diaphragm, tongue, esophagus, intercostal, chewing, etc. After 17 days they reach invasive stage and acquire spiral shape. After 3-4 weeks a capsule is formed around the larva, which begins to calcify after 6 months. One capsule may contain 1 to 7 trichinellae. Complete calcification ends after 15 to 18 months.

The viability of muscle trichinellas in animals lasts for many years, and in humans, up to 25 years. Humans and animals can become infected with trichinellosis through meat containing invasive trichinella larvae. The meat is digested, and the released muscle trichinellae in 2-7 days turn into intestinal ones. Males fertilize the females and die. Females give birth to 1,500 to 10,000 trichinella larvae after 6-7 days, and then die.

Resistance of Trichinella muscularis to various external stimuli is rather high. Long-term heat treatment is required to destroy trichinellae in meat, especially in thick cuts: the temperature in the thickness of pieces should not be below 80°C. In meat stored at -17 ... -27°C, trichinellae remain viable for 6 weeks. Salting and smoking meat products do not deactivate trichinellae. Muscle trichinellae are capable of secreting toxic substances with high thermal stability.

Pre-diagnosis. There are no characteristic clinical signs of trichinellosis. Live diagnosis of trichinellosis in pig farms consists of enzyme-linked immunosorbent assay (ELISA).

Post-slaughter diagnostics.A reliable method of detecting trichinellosis is trichinelloscopy of meat of pigs, wild boars, bears and other animals. Suckling piglets are tested for trichinellosis from 3-weeks of age.

From meat samples with curved scissors along muscular fibers 12 pieces the size of an oat grain are sliced. The slices are placed on a compressor and crushed so that it is possible to read newspaper print through them. The prepared 24 muscle slices are examined thoroughly under a trichinelloscope with low magnification of microscope (40-100 times) and projection camera CM or screen trichinelloscope.

During examination of frozen meat, corned beef, smoked meat, bacon, sausages, special treatment of slices is required for trichinella detection. Thin sections (1.5-2 mm) of frozen meat after thawing are prepared in such a way that muscle fibres are placed in a single layer. Slices squashed between glasses are covered with 1-2 drops of 0.05 n diluted hydrochloric acid or a mixture of 0.5 ml of saturated methylene blue solution diluted in 10 ml of distilled water.

If treated with hydrochloric acid, muscle fibers become translucent and grayish in color, the capsule of trichinellas swells and becomes well delineated, the fluid in the capsule cavity becomes lighter. If the slices are treated with methylene blue solution, the muscle fibers are stained pale blue, the adipose tissue is not stained or becomes slightly pink around the periphery, trichinella capsules turn purplish-pink or blue, and the parasite is not stained.

When examining corned meat and cured pork meat slices are made as thin as those of frozen meat. If the examined material is very hard (old corned beef, smoked meat), it is cut with a sharp knife or razor or soften the muscle fibers by heating slices of meat with 5% solution of caustic potash on the watch glass to the temperature not higher than 45 ° C and incubated for 10 minutes. Then slices are treated with glycerine half and half with water. For this purpose they are slightly crushed between glasses, the upper glass is removed and a few drops of glycerine and water are applied. After a few minutes the upper glass is put on and the examination is begun.

Slices of sausages and pork cutlets are processed in Petri dishes with 10% solution of caustic potash during 0.5-1 hours.

Trichinelloscopy of pork bacon. Trichinellae can be localized in subcutaneous fatty deposits, which macroscopically do not have visible muscular interlayers. Bacon without visible muscular interlayers is cut to full thickness and slices are taken from the internal surface of bacon along its cleavage line (such lines are formed in the places of atrophied muscles). At least 5 sections of about 0.5 mm in thickness are prepared and sunk for 5-8 minutes in 10% fuchsin solution in 5% caustic soda solution. Then they are removed from the solution, placed on the lower glass of the compressor, closed by the upper glass, lapping a little weaker than muscle tissue sections, and examined under trichinelloscope. Against the background of uncolored fat cells trichinellas are sharply distinguished as light red or yellow-red inclusions.

Method of minced meat digestion in artificial gastric juice with subsequent microscopy of the sediment. This method is more accurate for differential diagnosis. A meat sample weighing 20-30 grams is ground into minced meat and placed in a large conical flask, into which the artificial gastric juice is added in the ratio of minced meat to 10:1 (200-300 ml). The artificial gastric juice is prepared by adding 3% pepsin to a 1% hydrochloric acid solution. The solution of hydrochloric acid is prepared beforehand, pepsin is added before the beginning of the analysis. The flask is closed with a cork and its contents thoroughly shaken, after which it is placed in thermostat at 37 ° C for 12-24 hours for digestion of meat. During this time the contents of the flask is shaken several times, then filtered through a fine sieve or centrifuged in tubes. The sediment is transferred onto a slide with a bacteriological loop and examined under a trichinelloscope. Trichinella larvae are easily detected. Spores are found in the sediment in the presence of calcified sarcocysts.

Currently, the method of group examination of pork for trichinellosis is used at meat processing plants. It is based on digestion of muscle tissue samples taken from several pork carcasses diaphragm legs in a special fluid and finding trichinella larvae in the sediment (digested mass). The study is carried out using an apparatus for the isolation of trichinella larvae (AVT). It represents a thermostatic chamber with 8 reactors mounted in it and designed for digestion of muscle tissue in a special fluid. Each reactor has an agitator with an individual motor drive and sediment collector. Muscle samples are taken from the legs of the diaphragm on the border of the transition of muscle tissue in the tendon. During examination of pork carcasses obtained from animals from areas where trichinellosis is registered, a group sampling is prepared with a total mass of 100 g of 20 samples (5 g each), i.e. 2.5 g from each of the legs of the diaphragm.

From pork carcasses from areas where trichinellosis has not been registered during the last 8-10 years, prepare a group sampling up to 100 g of 100 samples (1 g), ie 0.5 g from each leg of the diaphragm. The group sample is ground on a meat grinder and the minced meat is collected in a beaker with a serial number corresponding to the number of the reactor.

In the thermostatic chamber of the device is poured to the marked level of water-conducting water with a temperature of 40-42 ° C and connected electric heating element¬.

To obtain special liquid 2.5 l of warm water (40-42 ° C) is poured into each reactor. Before filling the reactor with crushed group sample 6 g of food pepsin with activity of 100 000 U and 30 ml of concentrated hydrochloric acid are added. To mix the mixture the stirrer is switched on for 1 minute. Then the crushed group sample is added and the stirrer is switched on for 45 minutes. The remaining reactors are loaded in the same sequence. The digestion time is controlled with a time relay.

At the end of group digestion the time relay switches off the stirrer automatically. After standing liquid in the reactor (within 15-20 minutes) the clamp covering the elastic tube settling tank is opened, 1-1.5 ml of liquid with sediment is poured out onto a watch glass and the sediment is examined for trichinellas under a microscope, magnifying glass or trichin micro-projector.

If at least one larva of trichinella is detected in the sediment, the studied group of pork carcasses is transferred to the emergency sling, divided into 8 groups of 12-13 carcasses (if the original group sample of 100 carcasses) or 2-3 carcasses each (the original group sample of 20 carcasses), samples are taken again and trichinelloscopy is made by group method of investigation, as described above.

Carcasses from the group that tested positive by second trichinelloscopy are examined individually in an ABT machine, thus identifying the carcass affected by trichinella larvae.

Differentiation of trichinellae from air bubbles, cysticerca, sarcocysts and concrements. Air bubbles are round or oval in shape with a sharp black border around them. They become blurred or disappear when compressing the glasses of compressoria.

Cysticerca, even if underdeveloped, are up to 2 mm in diameter, i.e. much larger than trichinell larvae. Moreover, they are located between the muscle fibers, and their structure is clearly visible under the microscope.

Sarcocysts (mischer sacs) have oval, sometimes elongated shape. They are localized inside muscle fibers, their body is divided by partitions into chambers filled with spores. Sarcocysts are from 0.5 to 3 mm in size. In contrast to trichinellids, calcification of sarcocysts begins in the center, no connective-tissue membrane is formed around calcified sarcocysts.

Lime concretions may be of different nature and their size is not the same. Sometimes dense connective tissue membrane is formed around the concrements. It is impossible to detect trichinella by compressive trichinelloscopy when solid calcareous concrements are formed. To differentiate calcified trichinellae from calcified sarcocysts and nodules of non-trichinellosis nature, the slices are stained by Yamschikova method with additional processing on a slide with 15% hydrochloric acid solution for 1-2 minutes. The sections are examined under low and medium magnification of microscope.

Muscular bipeds with two suction cups (head and abdominal) may be found in the meat under study. But it is rarely found in pork, more often it is found in the

meat of wild animals living in swampy areas. It is located in the intermuscular connective tissue. Its larva is mobile, flat, transparent, gray, 0.4-0.7 mm in length and 0.2 mm in width. The larva is located in tissues in a free form, and sometimes it is encapsulated or obyzvestvated.

Veterinary and sanitary evaluation and measures. Carcasses, half-carcasses, quarters and carcasses of pigs (except piglets up to 3 weeks old), wild boars, badgers, bears, other omnivores and carnivores, as well as nutria are to be examined for trichinellosis.

There are two methods of postmurder diagnostics of trichinellosis: compression trichinelloscopy and trichinelloscopy of sediment after muscle digestion in artificial gastric juice.

Samples are taken from the diaphragm pedicle (at the boundary of muscle-tendon transition) or, in their absence, from parts of intercostal, cervical, masseter, lumbar, calf muscles, flexor and extensor muscles of the heel, as well as tongue, esophagus and larynx muscles; from marine mammal carcasses - tip of tongue and eye muscles; from bears - legs of diaphragm, parts of chewing or intercostal muscles; from wild boars - legs of diaphragm; from other carnivores - samples of calf muscles.

The weight of each muscle group must be at least 5 g, and the total weight of the sample from one animal must be at least 25 g.

Samples of salted, smoked bacon (in the presence of cuts or interlayers of muscular or connective tissues) are taken from each slice, the mass of the sample must be at least 25 g.

Samples of smoked meat taken from 3% of packaging units, making 10-15 samplings from each unit, which are combined sample.

Pig by-products (tongues, heads, shanks, tails) in the absence of veterinary evidence of their origin from trichinelloscopically processed carcasses are examined as follows: Take 10-15 extractions from each of 3% of packaging units and make a combined sample of not less than 25 g.

Examination of meat and meat products for presence of trichinella larvae is determined depending on the epidemiological and epizootic situation in the outlet area of meat products according to the scheme given in Table 9.

If any of the above methods detects at least one trichinella larva (regardless of its viability), carcass and by-products with muscle tissue, esophagus, rectum, as well as decontaminated meat products shall be sent for disposal.

The outer fat (bacon) is removed and re-smoked. Internal fat is released without restriction.

Guts (other than rectum) may be released without restriction after normal processing.

Skins are released after removal of muscular tissue. The latter is sent for disposal.

All cases of trichinellosis must be reported to the veterinary and medical authorities of the region where the infected animal came from.

Rodents, stray cats and other suspected trichinellosis carriers should be exterminated in the farm where the pigs are found to have trichinellosis. The

population should be informed about the danger of trichinellosis disease everywhere, and hunters should be obliged to deliver meat samples from wild carnivores they catch to the veterinary surgeon (at their place of residence) to be tested for trichinellosis and prophylactic measures taken.

PORCINE CYSTICERCOSIS

Chronic anthropozoonotic disease of pigs, dogs, cats, rabbits, and humans, caused by parasitization in muscles, heart, tongue, and brain of larval stage (cysticerca) of Taenia armed chain. In humans, cysticercosis most often occurs in the brain and eyeball. Cysticercosis is found everywhere. Earlier this disease was called cysticercosis.

The causative agent is larval stage of cestode T. solium. The definitive host is a man who gets infected by eating poorly cooked or raw cysticercosis pork. The cestode, which parasitizes in the small intestine of humans, becomes sexually mature after 2 to 3 months and is ribbon-like, 1.5 to 3 m long. The scolex (0.6-1.0 mm in diameter) is armed with a double crown of hooks, the number of which varies from 22 to 32 (more often 28).

The body of the parasite consists of individual segments. As it matures, the segments filled with tens of thousands of eggs (up to 50,000 eggs each) break off and are expelled. Pigs become infected by eating feces containing the segments or eggs. In the pig intestine, the oncosphere released from the shell, which has three pairs of hooks, penetrates into the lymph, and then into the blood. The bloodstream carries the oncospheres throughout the body, but in most cases they are deposited in the intermuscular connective tissue of the skeletal muscles (Fig. 38). After 2.5-4 months oncospheres turn into cysticerca surrounded by their own shell developed from the connective tissue of the host. The parasite's own shell forms a blister, usually ellipsoidal in shape, 5-20 mm long and 5-10 mm wide.

The cysticerca is filled with transparent, slightly opalescent fluid, which contains an inside-out scolex attached by its neck to the inner shell. The fluid contained in the bladder is toxic. When examined, cysticerca can be easily detected with the naked eye. Scolex structure is the same as that of the mature cestode.

Longevity of cysticerca in pigs is 3-6 years. Dead cysticerca appear as oval or rounded formations of different size. If the cysticerca has died after the scolex has finally formed, they can be recognized by microscopic examination by the presence of lime bodies and hooks, which are not subject to destruction.

In some cases a human can be an intermediate host. This occurs when autoinvasion occurs when mature flies detach from the strobilus during vomiting and enter the stomach, and also when swallowing the eggs (oncospheres) of the louse.

Cysticerca are sensitive to temperature. At -120C they died within 3 days, at 800C - instantly. Strong mixed salting of meat neutralizes them after 20 days. Presence of 7% or more salt in meat is destructive to parasites.

It is very difficult to make a pre-slaughter diagnosis of swine cysticercosis, because there are no clinical symptoms typical for this disease. The use of allergic reactions has not given any practical result.

Post-slaughter diagnostics. In pigs, the masseter, anconeus, heart and tongue muscles, lumbar, cervical and scapular muscles are particularly severely affected. The muscles of the anterior part of the carcass are affected to a greater extent, the posterior part (thigh and gluteal muscles) to a lesser extent. Often larvae are found in the brain. Cysticerca are located mainly in the intermuscular connective tissue. When examining the masseter, parallel incisions are made across their entire width. Two incisions are made on the external masticatory muscles, one on the internal ones on each side. If cysticerca is detected during examination of the masseter or heart, incisions are made in the carcass and diaphragm muscles.

The tongue is palpated, in doubtful cases incised. Incisions are made in several places of the heart.

Differential diagnosis. When examining pork for cysticercosis it is necessary to differentiate live cysticerca from degenerative cysticerca and also from thin-necked cysticerca. Degenerative cysticerca can be detected under the microscope by revealing calcareous corpuscles. Thin-cavity cysticerca is usually located under the serous membrane of the organs and not in the muscle. It is also distinguished by the greater number of hooks in the scolex (32-48 vs. 22-32 in porcine cysticerca) and longer neck.

Veterinary and sanitary evaluation. If cysticerca (fins) are found on cuts of head and heart muscles, two additional parallel cuts of the neck muscles in the cervical region, scapulo-elbow, dorsal, lumbar, pelvic limb and diaphragm are made. Sanitary evaluation of the carcass and organs is differentiated according to the degree of damage.

If more than three live or dead cysticerca are found per 40 cm2 cut of head or heart muscles and at least one of the carcass muscle cuts, the carcass, head, internal organs (except intestines) shall be sent for disposal. The internal and external fat (bacon) shall be removed and sent for re-heating for food purposes. The bacon may also be decontaminated by freezing in the manner described in Chapter 19.

If no more than three live or dead cysticerca per 40 cm2 of a cut in the head or heart muscles and if no or no more than three cysticerca are found in the remaining cuts of the above muscles, the head and internal organs (except intestines) shall be discarded and the carcass shall be decontaminated by one of the methods specified in Chapter 19.

Inner fat and bacon shall be decontaminated in the same way as described above.

Freeze-dried or salted carcasses of pigs shall be sent for production of stuffed sausages or canned stuffing. Skinned by-products are sent for industrial processing.

Intestines and skins regardless of the degree of cysticercosis are released without restrictions after normal processing.

CYSTICERCOSIS

CATTLE

Acute and chronic disease of cattle, including buffalo, zebu, yak, deer, caused by larval stage of Taeniarhynchus unarmed louse (species T. saginatus, T. hominis, etc.). Sometimes it affects humans as well. It occurs widely but more commonly in Transcaucasia, southern and eastern areas of Siberia. Obsolete name is fin¬nosis (Fig. 39).

The causative agent is larval stage (cysticercus) of unarmed carp T. saginatus, parasitizing in human intestinal tract, reaching 10m length and 12-14 mm width. As the parasite matures the segments filled with eggs (up to 175 000 eggs in each segment) are rejected. If they are fed to cattle, the oncosphere is released in the intestine and then the larval stage of the parasite develops. Subsequently, the larvae penetrate through the lymphatic and circulatory systems into the muscle tissue, where they develop into mature cysticerca after 6 months. Bovine cysticerca is a transparent, round or oval, grayish-white vesicle of pinhead to pea size. Outside cysticerca is surrounded by connective-tissue capsule, through which the parasite is translucent. The head and neck of the cysticerca retracted inside the fluid-filled vesicle. When you put pressure on the bubble it ejects from him scolex having 4 strongly developed suction cups.

Bovis cysticerca is less resistant than porcine cysticerca. Heating up to 50 degrees C is harmful to them. Sodium chloride in strong curing of meat disarms them within 20 days.

Pre-diagnostics. It is very difficult to diagnose this disease when the animals are alive. Clinical signs of the disease are absent.

Post-slaughter diagnostics. In cattle, the most frequently affected muscles are masseter muscles, heart, forearm, tongue and neck muscles, and less often the muscles of the hind part of the body. In severe infestation, cysticerca can be found in lungs, liver, kidneys, spleen, brain, pancreas, lymph nodes and adipose tissue. In calves, the heart is more often affected.

Veterinary and sanitary evaluation. Slaughter products are evaluated in the same way as in pig cysticercosis. When neutralizing beef cysticercosis carcasses by freezing the regime is somewhat different. Carcasses frozen to -12°C in muscle thickness are released without keeping in the chamber. If the carcass is frozen to -6°C, it is kept for 24 hours in the chamber at air temperature 9°C.

VETERINARY AND SANITARY EXPERTISE OF ANIMAL SLAUGHTER PRODUCTS FOR DISEASES OF NONCONTAGIOUS ETIOLOGY

Veterinary and sanitary expertise under conditions of meat processing plant, veterinary sanitary expertise laboratory of food market or farm slaughterhouse may reveal pathological changes in slaughter products caused by non-contagious diseases. In this case the changed internal organs are sent for technical utilization. Carcasses with normal external signs are released without restrictions. However, it should be taken into account that many non-infectious diseases can be complicated by salmonellosis, colibacillosis, layering of coccus microflora and clostridia. Therefore, it is necessary to take into account the results of pre-slaughter inspection of animals and veterinary and sanitary examination of organs and carcasses. If gastro-intestinal diseases, severe inflammatory processes in lungs, degenerative changes in liver and kidneys, signs of general state disorder are revealed, the meat of such animals are subjected to bacteriological examination. If the results are negative, the meat shall be used on general grounds.

The veterinary and sanitary examination reveals characteristic changes in the liver - capillary ectasia, which is stagnant blood in the capillaries. At the same time on the surface and on the section in the liver are found areas of round or oval shape

of dark purple color, the size of a penny coin or less, their consistency is flabby. This is the result of age-related changes. This defect is found in old animals, mainly in cattle. In case of capillary ectasia the liver is sent for technical disposal and the carcass and other products are used without restrictions. Fatty infiltration and fatty degeneration can be found in the liver.

Fatty infiltration changes the color of the liver, it becomes yellowish, but it retains elasticity and shine on the cut. Fatty liver infiltration is observed in obese and old animals.

Fatty liver is characterized by its color changing to clay-yellow. Sometimes there are red stripes on the surface of the organ, liver tissue is matt and flabby on cut and the edges of the organ are blunted. Exposure to toxic substances is a consequence of fatty degeneration.

In case of fatty infiltration the liver and carcass are released without restrictions, but in case of fatty degeneration the liver is sent for technical disposal, the carcass is subjected to bacteriological examination. If poisoning of an animal is suspected, the sanitary evaluation of slaughter products is conducted depending on the nature of the substance that caused the poisoning.

At mastitis of non-infectious origin udder are sent for utilization, and meat is subjected to bacteriological examination, veterinary and sanitary evaluation is carried out depending on its results.

Transportation illnesses — myopathosis, transport tetany - characterized by neuromuscular excitation, shifting oppression. The disease occurs when animals are transported by rail or road, or during the first hours after unloading. The cause of transport sickness is long transportation of animals (more than 3 days) with excessive loads, as well as violations in feeding and watering. Old, weakened animals become ill more often. After emergency slaughter during veterinary and sanitary examination of the products they mention venous congestion in all organs, flabbiness of skeletal muscles, meat has unpleasant smell, it is hydraemic or dry. Muscular tissue and internal organs are heavily contaminated with intestinal microflora. Carcasses and organs of forced slaughter with the above mentioned pathology are sent for utilization in case of poor exsanguination.

Metabolic diseases. Deficiency or excess of any elements in the diet, as well as pathological deviations in the body of animals lead to metabolic disorders.

White-muscular disease. Lesions are observed mainly in young animals, including poultry. The disease is accompanied by deep disturbances of metabolism, functional and morphological changes in organs and tissues. Most often heart and skeletal muscles are affected. The disease is rarely registered in adult animals. Degenerative changes, white color of muscles, flabby consistency are marked. It is believed that the disease is based on the factor of inadequate feeding of pregnant mothers, the lack of selenium, cobalt, manganese and vitamin E in the feed with excess of calcium.

Post-slaughter diagnostics. Swelling and discoloration are noted in skeletal muscles and heart muscles. There are striated and porous areas on muscle section. Most often muscles of extremities and croup are affected. Streaky and dotty blotches are seen in the heart.

Veterinary and sanitary evaluation. Use of slaughter products depends on the degree of damage. In the presence of dehornerative changes in musculature, carcass with all organs shall be sent for utilization. If the damage is slight, heart or muscle sections are affected, it is examined bacteriologically for the presence of toxic agents. If positive, internal organs are sent for utilization, and carcass is cooked. If no toxic agents are isolated, carcass and uninfected internal organs are sent for industrial processing. Slaughter of animals after treatment with sodium selenite shall be allowed not earlier than 45 days.

In case of hydraemia increased moisture content in the subcutaneous tissue, in the musculature is found. Meat of flabby consistency. Lymph nodes enlarged, edematous.

Veterinary and sanitary evaluation. In case of severe hydraemia, carcass and organs are sent for utilization. If the signs of hydraemia are slight, and smoothed out after curing for 1 day, a bacteriological examination shall be conducted. If the results are negative, the carcasses are sent for industrial processing, if positive - for boiling.

Acute uremia develops with severe kidney disease, urethral blockage, bladder rupture. This is a process of self-purification of the body.

Veterinary and sanitary evaluation. If urine odor is present, all slaughter products are sent for disposal.

Jaundice. Yellow staining of slaughter products may be pathological, fodder-related and age-related. Causes of the defect can be different - it is blockage of bile ducts, leptospirosis, blood-parasitic diseases, salmonellosis and others, as well as eating in excess of some feed. With true jaundice persistent staining of different shades observed in all tissues. However, staining of some tissues may be from the food, as well as in older animals. In some cases only fat tissue is yellow, in other tissues its peculiar color. In old animals the fat is colored yellow due to accumulation of lipochromes. Laboratory methods are used to distinguish pathological jaundice from fodder jaundice.

Veterinary and sanitary evaluation. Depends on the cause of jaundice. In case of jaundice of fodder and age origin slaughter products are released without restriction. In the presence of jaundice staining of all tissues of the carcass meat is maintained for 2 days. The use of meat is possible with the disappearance of yellow discoloration, the absence of fecal odor and bitter taste set by the test of cooking, taking into account the results of bacteriological examination. If the meat retains unusual features, it should be sent for disposal.

Osteodystrophy endemic. This disease is associated with disorders of mineral metabolism due to the lack of cobalt and manganese in the body of animals. Cows aged 3-6 years become ill. In this case, note the grayish-red coloring of the muscles with the presence of white spots and edema in places of fat deposition. Bones are softened, easily broken and flat bones easily cut with a knife. In addition, there is myocardial dystrophy, heart muscle infarcts, enlargement and rearrangement of the liver.

Veterinary and sanitary evaluation. In case of dystrophic changes in muscle tissue all products are directed for utilization.

Ketosis occurs as a result of impaired carbohydrate, lipid and protein metabolism in dairy cows. Ketone bodies accumulate in the body and dystrophic changes occur in many organs. Pale, flabby muscle tissue with abundant fat deposition in intermuscular connective tissue, edematous jelly-like fat deposits on peritoneum, omentum, around kidneys are noted. The liver is 1.5-2 times enlarged, flabby, yellow-orange, kidneys are enlarged, edematous, lymph nodes are enlarged and hyperemic. During development of osteodystrophy ribs and tubular bones are deformed, and fractures and jaundice of tissues are possible.

Veterinary and sanitary evaluation. Slaughter products are subjected to bacteriological examination. If toxic infectious agents or pathogenic staphylococci are isolated, the carcass shall be sent for boiling after cleaning of lesions, and internal organs for utilization. If the results are negative, the carcass is used for industrial processing.

Wasting is a pathological process which arises as a result of a serious illness of the animal with impaired metabolism. Carcasses of emaciated animals in the fat deposition areas show jelly-like infiltrates, lymph nodes are enlarged, surrounded by yellowish fluid infiltrates.

The liver is in a degenerated state, marrow is reddish in color, of semi-liquid consistency and does not fill up the whole bone lumen.

Veterinary and sanitary evaluation. Meat of emaciated animals (insufficient feeding, old), but not sick animals, is sent for industrial processing. Meat of emaciated animals with presence of gelatinous edema in places of fat deposition is sent together with internal organs for utilization.

Stress. This condition occurs in response to strong stimuli. Some stressed animals have pale meat (so-called PSE meat) or, on the contrary, dark meat (DFD meat). Pale, soft, hydraemic (exudative) PSE meat is found mainly in pigs, with the most valuable cuts (ham, lumbar muscles). It has more sour reaction (pH 5,2-5,5), lower water-holding ability and gustatory qualities. Such meat has a greater loss of water during salting and cooking. Dark, sticky meat is found in pigs and cattle. It has a higher pH (6.2-7.0), better water-binding ability, contains less glycogen and lactic acid, but, like exudative meat, has poor taste qualities.

Veterinary and sanitary evaluation. If organoleptic changes are present, the meat should be subjected to biochemical and, if necessary, bacteriological examination. The use of such meat will depend on the results of these studies. It is sent for industrial processing or boiling.

Mechanical injuries. Tissue damage is subdivided into open wounds, bruises, hematomas, lymphatic evasions, sprains, tears and bone perforations. Examination of meat more often reveals closed mechanical damage in the form of intramuscular haemorrhages. Fresh mechanical haemorrhages are represented by loose blood clots. The changes after 3-5 days are characterized by hard clot and edema of adjoining tissues. Regional lymph nodes are hemorrhagically inflamed.

Veterinary and sanitary evaluation. Depends on severity of injury, terms of slaughter (after injury) and body temperature of the animal before slaughter. For example, with fracture of the bones conducted slaughter of the animal. If slaughter is carried out in the first hours after injury and body temperature is within normal limits, after cleaning the place of fracture, meat products are used without

restriction. At slaughter of such an animal in 1 day and afterwards the meat products are subjected to bacteriological examination. Carcass is used depending on the results. In case of extensive traumas and multiple fractures, which cannot be cleaned up, carcass with internal organs is sent for utilization. During cleanup of cattle carcasses over 15%, and ram and pig carcasses over 10%, they are to be sent for industrial processing only.

Thermal injuries. Muscle tissue changes resulting from burns are different and depend on the degree of the injury and the time elapsed after its occurrence.

Minor burns up to 5% of the skin surface are most often accompanied only by local changes. These are swelling of subcutaneous

swelling of the subcutaneous tissue, gray exudate proliferation. With skin lesion of up to 10% and slaughter of animals in the first 3 days edema of subcutaneous tissue, enlarged lymph nodes, flabby heart muscle, congestive hyperemia of lungs and liver are observed. If the animal is sent for slaughter in 6 days or more after the occurrence of the burn and more than 10% of the skin is affected, the muscles at the affected area are flabby, grayish-pink, regional lymph nodes are enlarged, edematous and tuberculate. The heart is enlarged, flabby, with hemorrhages. Lungs were enlarged, there were hemorrhages under serous membrane. The liver is considerably enlarged, flabby and of dark cherry color. Kidneys have hemorrhages under capsule and infarcts. Possible pleurisy, peritonitis, pneumonia and other complications.

Veterinary and sanitary evaluation. Depends on the severity of the burn and timing of the slaughter of the animal. If the burns are insignificant and the animal is slaughtered within the first 3 days, the mutilated tissue is cleaned up and sent for utilization, and the carcasses are sent for industrial processing. If a significant portion of the skin is affected or the animal is slaughtered in 4 days or more, it is necessary to conduct a bacteriological examination of the meat. The use of slaughter products depends on the results of the study. If pathogenic microflora is detected internal organs are to be utilized and carcass is to be boiled. In the absence of microflora the meat is used for industrial processing.

Inflammation of respiratory tract is understood as diseases associated with nasal cavity lesions, as well as bronchitis, pneumonia, pleurisy, bronchopneumonia and pleuropneumonia of non-contagious etiology. They are registered more often in young animals and less often in adult animals. The causes of these diseases: keeping animals in damp, cold rooms, in draughts, feeding moldy fodder, violation of trans- portation regime.

Inflammation of the upper respiratory tract is determined by the condition of mucous membranes. Bronchitis may have liquid or foamy exudate in bronchi and trachea, bronchial mucous membrane pink-red, edematous, with catarrhal or catarrhal-hemorrhagic inflammation. Bronchopneumonias are registered more often. Together with pathological changes in bronchi there are seats of thickening in separate lobes or large areas of lungs. These areas are grayish-red on section. Bronchial and mediastinal lymph nodes are juicy, sometimes enlarged, cross-sectional hemorrhages. Pleurisy patients note color changes of costal and pulmonary pleura, presence of fibrinous exudate on pleura and adhesions between

costal and pulmonary pleura. For objective sanitary evaluation of slaughter products it is necessary to exclude the diseases of infectious etiology - tuberculosis, pasteurellosis, malignant catarrhal fever and others with the possible pathological changes in the lungs.

Veterinary and sanitary evaluation. Lungs partially or completely are sent for disposal. In case of focal pneumonia of non-contagious etiology only lungs are rejected, other slaughter products are released without restrictions. For pneumonias with lymph node reaction, pleurisy and pleuropneumonias use of slaughter products depends on results of bacteriological examination. It should be noted that during slaughter of cattle, aspiration with lungs or pre-stomach contents is possible, and for pigs during scalding of carcasses - aspiration with water. In all cases of aspiration the lungs are sent for disposal.

Pericarditis is a fibrinous or purulent inflammation of the coronas. This disease is caused by cold or traumatic effect of foreign body. Pericarditis of cold aetiology is more common in piglets and gilts as well as in calves. Traumatic pericarditis is more common in cattle and small ruminants.

Examination reveals dulling of pericardial serous membrane, its roughness and presence of fibrin films. Pericardium wall is thickened, and in the cavity there is accumulation of fluid or pus with hypochromic odor. Fibrin accumulation and partial or diffuse fusion of pericardium with epicardium and parietal pulmonary pleura are noted in the pericardium cavity. Pustules of various sizes may be present in the thoracic cavity, edema of sub-thoracic muscles, enlargement of lung lymph nodes, jaundice staining of carcass musculature.

Veterinary and sanitary evaluation. If any changes are evident in the pericardium, epicardium, lungs and certain parts of the thorax, the affected organs are sent for disposal, and the carcass is used depending on the results of bacteriological examination. If toxic agents are isolated the carcass is sent for boiling. If not, it is sent for industrial processing.

Liver cirrhosis. The liver is reduced in size, dense, with sprouting of connective tissue, grayish or dark yellow.

Veterinary and sanitary evaluation. The liver is sent for utilization, the carcass without pathological changes is sent for realization or industrial processing.

Peritonitis is an inflammation of the abdominal cavity, which can be caused by bruises, injuries, inflammation of the umbilical cord, uterine inflammation, gastrointestinal diseases, colds.

Peritonitis in the abdominal cavity accumulates serous-fibrinous or hemorrhagic exudate. Peritoneum becomes rough with sharply marked capillary pattern, fibrin accumulation with adhesions of intestine is observed. In the chronic course, in addition to the above, purulent abscesses are found on the peritoneum.

Veterinary and sanitary evaluation. Diseased internal organs and tissues are sent for disposal. The use of carcasses depends on the results of bacteriological examination. In the absence of pathogenic microflora the meat is used for preparation of canned meat or bread or boiled.

New growths. Examination of slaughter products shows neoplasms, benign and malignant tumours. Neurofibromas and lipomas are more often found among benign ones.

Fibrous overgrowths of nerves (neurofibromatosis, neuroma or Reklinghausen's disease) are found more often in the front part of the carcass. Tumors are found in the extremities and the scapular area. Sometimes tumors grow between the ribs. Tumors in the neck area have spindle-shaped, from pin-head to goose egg size and in some cases up to 2 kg. Color of neurofibroma is white with grayish shade, consistency is dense and on the cut many threads are noticeable. Neurofibromas are also found in the heart under the epicardium. They are sharply separated from normal tissue of the affected organ (spleen lymphoma, liver fibroma, aortic fibroanginoma etc.) and cause only partial dysfunction in most cases.

Lipomas are found in the places of fatty tissue deposition; they are distinguished by irregular sizes of fatty accumulations and the presence of interlayers of fibrous connective tissue. When animals become thin, lipomas are preserved although fat deposits are practically absent.

Malignant tumors are less common than benign ones. They include sarcomas, carcinomas, melanosarcomas. Sarcomas have pink and white color, soft consistency. They are found in parenchymatous organs, muscles, bones, on serous membranes, in lymph nodes. Carcinomas are found only in slaughter products of cattle. They look like lumpy masses rising above the surface of the diseased tissue and look to some extent like alveococcal blisters. The sarcomas have a spongy structure on the section.

Melanosarcomas are found in products of horse slaughter. They are easy to identify by their dark brown, sometimes completely black color. They are localized in the skin, mammary gland, liver, spleen, lymph nodes.

Veterinary and sanitary evaluation. The use of slaughter products depends on the type of tumor. If organs and muscle tissue are affected by malignant neoplasms, as well as multiple benign tumors, they are sent for utilization, and carcass parts without lesions are processed into cooked, boiled-smoked sausages or sent for utilization. If any benign tumors are found, the affected parts are removed and the carcass and organs are released without restrictions.

Veterinary and sanitary evaluation of the slaughter products of sheep affected by shovel. It depends on the stage of the disease. With covalent peritonitis or pus lesions in the subcutaneous tissue or other inflammatory processes, the carcass is to be sent for disposal. If there is crust in the hypodermis, but no inflammation, the carcass may be released without restrictions after boning.

Veterinary and sanitary evaluation in case of pigmentation of tissues. Detection of unnatural coloring (melanosis, brown atrophy, hemochromatosis) of lungs, liver, kidneys, muscles and bones is associated with a pathological state of the animal.

Melanin is deposited in organs, on serous covers, in muscle tissue, in lymph nodes of the liver. If pigmentation occurs only in individual organs, they are sent for disposal and the carcass is released without restriction. With generalized pigmentation all slaughter products are sent for disposal.

Veterinary and sanitary evaluation in the presence of lime. Internal organs or tissue sections with the presence of lime must be sent for disposal.

Veterinary and sanitary evaluation in case of strange smell or taste. If extraneous odor and taste do not disappear when the sample is cooked, all slaughter products are sent for disposal.

Theme 6: VSE products in animal poisoning.

Plan:

1. **Poisoning and its causes**
2. **Veterinary and sanitary expertise of animal slaughter products in case of poisoning**

Due to the use of pesticides in agriculture, animal poisoning is not uncommon. Pesticides of different groups are used to treat fields against ticks, gadflies and other ectoparasites. It should be noted that there are enough poisonous plants, which eats animals resulting in poisoning of varying severity. Mineral fertilizers, salts of heavy metals, etc. should be added to these toxic substances.

Pesticides used in agriculture are divided into organochlorine, organophosphorus, carbamates, pyrethroids and salts of heavy metals.

Organochlorine and mercury-containing drugs have material cumulation and remain in meat (especially in fat) for a long time even after the disappearance of clinical signs of poisoning and thus pose a danger to humans. When ingestion of preparations of the above mentioned groups the disease usually occurs chronically, though acute poisoning is also possible.

Organophosphorus pesticides cause acute disease usually in a short period of time after penetration of the preparation into animal organism. Moreover, clinical signs of poisoning grow violently, often lethal if forced slaughter is not held in time.

Pyrethroids belong to the group of preparations low-toxic for warm-blooded animals and poisoning is practically not observed since therapeutic effect is achieved at low concentrations.

While treating animals against exoparasites and helminthes, accidental overdose of drugs is possible resulting in poisoning of considerable number of animals. Poisonings may also occur due to other reasons - when feeding animals with pesticide residues or poisonous plants. In these cases it is necessary to slaughter animals to prevent their death. However, the use of slaughter products is decided depending on which poison caused the poisoning, as well as take into account organoleptic, physical and chemical parameters and the results of bacteriological examination of meat. Many pesticides are highly potent substances, which, being in the meat in minimal quantities, have a toxic effect on humans. Even high temperatures do not destroy organochlorine, organophosphorus and carbamate pesticides, and some of them have gonadotropic and embryotoxic effect.

When animals are poisoned by many toxic substances, the body's resistance is reduced. Toxic substances block the reticulo-endothelial barrier of the intestine, creating conditions for the spread of intestinal microflora in the body of the animal, secondary infections occur. In such cases, meat can be a source of human food toxico-infections or toxicosis.

Pathological changes in the slaughter products of poisoned animals are similar to the signs of sick animals. The place of slaughter may be flat (with severe poisoning), the

degree of exsanguination is poor or very poor. Meat is dark red in color, fatty tissue is colored pink and internal organs are visibly bloody.

Haemorrhages of varying intensity on the mucous membranes of the mouth and serous membranes are noted, it is connected with the development of secundum infection. At poisoning and secundum infection development the lymph nodes are enlarged in size, lilac-pink on section, hemorrhages are noted. Liver in most cases is enlarged, flabby, clayey or dark brown. Gall bladder is full of viscous bile. Congestive hyperemia and hemorrhages in liver, kidneys, heart, lungs, brain and spinal cord are also noted. Acute exacerbation causes pulmonary edema with foci of atelectasis. The border between cortical and cerebral layers is blurred in the kidneys. The stomach and abomasum, small intestine under serous membrane have various sizes of hemorrhages and the presence of areas of necrosis.

In poisoning by cyanides, nitrates the color of blood and muscular tissue is scarlet; in lead poisoning - hyperemia of urinary bladder mucosa and jaundiced staining of articular surfaces of bones.

Veterinary and sanitary examination of slaughter products in case of poisoning is carried out according to the generally accepted scheme. Laboratory tests are necessary to establish possible residual quantities of poisonous substances in the meat and the degree of bacterial contamination. Samples of muscles 6x6x8 cm, 2-3 lymph nodes, samples of internal organs (necessarily liver and kidneys) and content of predigestion and stomach are sent to the laboratory.

The procedure of chemical toxicological examination of samples for detection of toxic substances is determined by the accompanying document and on the basis of pathological anatomical examination of the material sent. If necessary the farm is asked what toxic chemicals have been recently used in animal husbandry and plant growing, or what fertilizers could be the cause of poisoning. The composition of diets and quality of feeds are also investigated.

Veterinary and sanitary evaluation of slaughter products is differential. Meat of animals killed in a state of agony in all cases shall be sent for utilization. The same is done with meat, which has an abnormal color and smell.

If the organoleptic, physical and chemical parameters and the results of bacteriological examination are satisfactory, the veterinary and sanitary evaluation will depend on the type of toxic substance. Toxic substances are divided into three groups, they vary in nature and chemical composition.

The first group includes toxic chemicals that are not allowed in meat. They include yellow phosphorus, cyanide, organophosphorus, organochlorine and carbamate pesticides, mercury-containing and arsenic-containing preparations. The natural content of mercury and arsenic in meat products must be taken into account. Arsenic in meat contains up to 0.5 mg/kg, and mercury in the liver does not exceed 0.03 mg/kg, in the kidneys - 0.05 mg/kg.

The second group includes substances for which there are maximum permissible quantities in slaughter products. 1 kg of meat may contain 1 mg of lead, 40 mg of antimony, 100 mg of ammonium nitrate and 300 mg of barium. Maximum allowable quantity of BAA - up to 0,005 mg/kg (temporarily).

The third group includes substances in the presence of which the meat is used for food purposes after decontamination by cooking or for making meat loaves. This group includes meat of animals poisoned by preparations of fluorine, salts of zinc and copper, sodium chloride and potassium, acids and alkalis, chlorine, carbon monoxide, ammonia, urea, alkaloids and glucosides, plants containing saponins, essential oils, resins and substances of photodynamic action; Poisonous and mold fungi and products of their life activities, plants, causing lesions of the gastrointestinal tract (pupa, thrush), plants of the buttercup family, poisonous milfoil and aconite dzhungarian. Meat is to be utilized in case of trichodesmata gray.

Meat and by-products of animals bitten by snakes, tarantulas, scorpions, released for food purposes without restrictions only after the removal of tissue, which was poisoned.

Hides are used in all cases on general grounds.

In cases where chemical toxicological examination does not reveal the presence of toxic substances, with satisfactory organoleptic and physico-chemical parameters, and the bacteriological study isolated microorganisms, which are allowed to use meat for food purposes, it is directed to the boiling, and internal organs for disposal.

It is important for practicing veterinarians to know legal terms of slaughter for meat of animals that suffered from poisoning or were treated for therapeutic or prophylactic purposes against ectoparasites.

Such terms are regulated and scientifically grounded. In acute nitrate poisoning, slaughter is permitted 3 days after symptoms of intoxication. In case of intoxication with DDVP, dibrom, ruelen, chiadrin - after 7 days; with carbophos, phosphamide, butiphos - after 20 days; with fosalon and chlorophos - after 30 days; with polychlorvamfen in chickens - after 50 days; in rabbits and sheep - after 60 days; TMTD in rabbits - after 20 days; in chickens - after 25 days; in sheep and cattle - after 30 days; in pigs - after 35-40 days; polycarbocide in all animal species - after 20 days.

Periods of slaughter of animals after application of antibiotics for therapeutic or prophylactic purposes are given in guidelines for their use in veterinary medicine.

Fattening animals stop receiving antibiotics 7 days prior to slaughter, when non-alcoholic drugs are used - 1 day prior to slaughter; chlortetracycline, levomycetine, tetracycline - 3 days prior; neomycin, monomycin, streptomycin - 7 days prior; bicillin - 6 days prior.

Topic 7: VSE in the forced slaughter of animals. Changes in meat during storage.

Plan:

1.Veterinary and sanitary expertise of carcasses of internal organs of animals at forced slaughter

2.Changes in meat during storage

Forced slaughter refers to the deprivation of life of a sick animal due to inexpediency or ineffectiveness of its further treatment in order to prevent the loss

of life. Forced slaughter of livestock at meat processing plants is carried out only at the sanitary slaughterhouse. Permission for involuntary slaughter is given by a veterinarian or paramedic and an act is drawn up.

The following do not qualify as cases of involuntary slaughter: 1) the slaughter of clinically healthy animals with normal body temperature who cannot be fattened to the required conditions; those retarded in growth and development; young animals; low-productive animals; 2) the slaughter of healthy animals threatened with death and had to be killed as a result of a natural disaster (flood, earthquake, snow drifts in winter pastures, etc. 3) slaughter of healthy animals that were injured before slaughter in a meat processing plant, slaughterhouse, slaughterhouse or slaughtering area.

When deciding on compulsory slaughter, it is necessary to be clear about the diseases and other conditions in which animals may not be slaughtered for meat.

Animals shall not be slaughtered for meat:

1) animals sick and suspicious of anthrax, emphysematous carbuncle, plague of cattle, plague of camels, rabies, tetanus, malignant edema, bradsotum, enterotoxemia of sheep, Catarrhal fever of cattle and sheep (blue tongue), African swine fever, tularemia, botulism, sap, epizootic lymphangitis, meliodosis (false sap), myxomatosis and hemorrhagic disease of rabbits, avian influenza. If for any reason (latent period, oversight, etc.) the animal was killed during these diseases, the slaughter products must be destroyed (incinerated). Beckeri pits may be used for this purpose;

2) animals in an agonal state regardless of the causes of this state. The agonal condition is characterized by sudden loss of cardiac activity, absence of reflexes to stimulus, corneal opacity, decrease of body temperature by 1-2 degrees Celsius and shall be established by a veterinary surgeon or a paramedic. An animal killed in agony is regarded as a corpse and is to be disposed of or destroyed depending on the disease that caused this condition;

3) young slaughter animals (calves, piglets, lambs, goats, etc.) under 2 weeks of age. All slaughter products shall be discarded if slaughtered animals are slaughtered before 2 weeks of age.

4) Animals within the first 14 days after vaccination with anthrax vaccines or treated with anthrax serum and within 21 days after vaccination against foot-and-mouth disease in areas with high infection risk. In some cases by permission of the veterinary surgeon the slaughter of such animals is possible before the specified date upon condition that the animals have normal temperature and no reaction (complications) to vaccination. Carcasses of such animals are subjected to bacteriological and physicochemical examinations. Meat of such animals is subject to decontamination depending on the results of laboratory analysis;

5) one-legged animals (horses, mules, donkeys, etc.) not subjected to malleinization at the meat processing plant or slaughterhouse. If they are slaughtered without pre-slaughter malleization, the carcasses and all other slaughter products are sent for utilization. At the slaughterhouse one-hoofed animals and camels are tested for sap by single ophthalmomalleinization. An animal reacting to mallein is to be destroyed;

6) animals within 30 days and birds within 10 days after the last feeding them fish, fish waste or fish meal. Carcasses and internal organs of animals slaughtered earlier than that time have a distinct fish smell. They should be discarded;

7) animals treated with antibiotics for therapeutic and prophylactic purposes during the period specified in the Manual on antibiotic use in veterinary medicine;

8) animals treated with pesticides before expiry of terms specified in the "List of chemical preparations recommended for treatment of agricultural animals against insects and ticks" and terms of restrictions according to instructions on their use.

Animals clinically ill with brucellosis and tuberculosis, with unconfirmed diagnosis of the disease, with low or elevated body temperature; birds sick with ornithosis, influenza, Newcastle disease are not to be sent to the slaughterhouse.

In other than those mentioned above, infectious, invasive and non-contagious diseases, poisoning, burns, injuries, fractures, etc., which threaten the life of the animal or require long and economically unjustified treatment, emergency slaughter is allowed.

1) animals sick and suspicious of anthrax, emphysematous carbuncle, plague of cattle, plague of camels, rabies, tetanus, malignant edema, bradsotum, enterotoxemia of sheep, Catarrhal fever of cattle and sheep (blue tongue), African swine fever, tularemia, botulism, sap, epizootic lymphangitis, meliodosis (false sap), myxomatosis and hemorrhagic disease of rabbits, avian influenza. If for any reason (latent period, oversight, etc.) the animal was killed during these diseases, the slaughter products must be destroyed (incinerated). Beckeri pits may be used for this purpose;

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Organoleptic indicators. External signs that should be taken into account when determining the meat of a fallen, sick or killed in agony are as follows: condition of the place of slaughter, degree of exsanguination of the carcass, presence of hypostases and changes in lymph nodes. In addition, a cooking test must be carried out.

Condition of the area to be slaughtered. An animal killed in normal physiological condition has an uneven and more blood-soaked cut. An animal killed in a gravely ill or in a state of agony, butchered after death has a nearly flat area which is less saturated with blood. However, if the area of the slaughter is well cleaned or severed, this indicator is not taken into account.

The degree of exsanguination of the carcass. Determined by various methods:

Visually determine the presence of blood in large vessels under serous membranes (pleura, peritoneum);

Look for blood in muscle slices under a microscope;

Haemoglobin-peroxidase test (according to Schoenberg, Roeder, I. S. Zagayevsky).

The first method is the most acceptable and easy to do, as the others require some time and laboratory equipment.

The degree of exsanguination depends not only on the physiological state of the animal but also on other factors (method of stunning, method of exsanguination, incomplete cutting of blood vessels, etc.). The vertical method of bleeding is better than the horizontal one. Horizontal bleeding leaves part of the blood on the side the animal is lying on.

Four degrees of exsanguination are distinguished: good, satisfactory, bad and very bad.

With good exsanguination no blood in muscles and blood vessels, no small vessels under pleura and peritoneum which means the meat comes from a healthy animal.

When exsanguination is satisfactory few blood vessels are detected in large blood vessels; no blood in muscles or blood in small drops when the cut is pressed on the surface. On the pleura and peritoneum side the vessels are poorly permeable. Satisfactory exsanguination is observed in old, gaunt and overworked animals.

In case of poor exsanguination the muscle incision shows blood drops; there are blood residues in large vessels; blood vessels are clearly seen from the pleura and peritoneum. Pressing on the surface of the muscle incision reveals dark drops of blood. Poorly exsanguinated are usually carcasses of sick animals or animals killed in agonal state.

In very bad exsanguination large and small blood vessels are full of blood; vessels under pleura and peritoneum are injected with blood, surface of pleura and peritoneum are purple-red; blood flows when the muscle is cut. Carcasses of animals killed in severe pathological or agonal state are always badly exsanguinated.

Presence of hypostases. Hypostases are areas of tissue soaked in blood. Blood in sick animals firstly stagnates and then due to increased porosity of vessels goes beyond their limits and stains parts of surrounding tissue in red-blue color. Hypostases are found in corpses, carcasses of seriously ill and animals killed in agonal state. As a rule they are on the side where the animal was lying. Therefore, during veterinary and sanitary inspection carcasses are turned on the other side.

Changes in lymph nodes. In carcasses of healthy and timely slaughtered animals the cut surface of lymph nodes is light gray or slightly yellow. Sick animals killed in agony have lilac-pink lymph nodes on the cut. This is caused by blood accumulated in the small vessels of the lymph node, which gets into the sinuses through the walls of the vessels and turns it pink. Inhibition of oxidative processes in the body of sick animals leads to accumulation of carbonic acid, which causes cyanotic (bluish) staining of tissues.

Depending on the disease pathological anatomical changes in lymph nodes are diverse: enlargement, hyperemia, edema, hemorrhage, atrophy, tuberculosis granuloma, cysticercosis, actinomycosis etc.

Boiling test. During vet examination of meat in food markets it is necessary to conduct boiling tests. It helps to determine the origin of meat from animals treated with medicaments (smell of medicaments). In addition, this test allows you to determine by the smell of meat of late castrated individuals (bulls, boars - the smell of decomposing urine, boars - the smell of stale garlic). At spoiling of meat the test by cooking allows to reveal extraneous odors (musty, putrefactive and others).

Organoleptic method is subjective. In some cases, it is not always possible to establish the origin of meat from a sick animal (for example, at acute tympany, at acute infectious diseases ─ at acute poisoning, etc.).

Laboratory tests. According to the "Rules of veterinary inspection of slaughter animals and veterinary and sanitary expertise of meat and meat products" (1983) at forced slaughter, regardless of the reason, conduct bacteriological and physical-chemical analysis. If necessary toxicological analysis is used.

Bacterioscopy. To find out microflora contamination of meat and pathogen detection of acute infectious diseases bacterioscopy smears imprints from deep layers of muscles, internal

organs and lymph nodes are made. Bacterioscopy should precede the physical-chemical examination. There are no microflora in smear-prints from deep layers of meat, internal organs and lymph nodes of healthy animals. Cocci or bacilli are found in the meat and internal organs of sick animals. After bacterioscopy in a veterinary laboratory the culture is examined on nutrient medium with subsequent identification of the culture grown.

For bacteriological examination a veterinary laboratory should be sent:

1) two muscle samples - part of a flexor or extensor of the anterior or posterior

1) Two muscle samples - part of an extensor or extensor of the fore or hind limb or a piece of another muscle together with fascia covering it, size 8x6x6 cm at least;

2) lymph nodes (at least two); lymph nodes are taken as a whole with surrounding connective and fatty tissue. In addition, the mandibular lymph node is taken from pigs;

3) Internal organs - whole spleen and kidney, lobe of liver with renal lymph node and emptied gallbladder; the surface of the

The cut surface of the lobe of the liver is cauterized up to the formation of a scab;

4) tubular bone (sent to confirm the diagnosis in order to isolate

more pure culture of the pathogen);

5) altered tissue sections.

For physical-chemical analysis a piece of muscle of not less than 200 gr shall be sent to the veterinary laboratory.

Carcass and internal organs after taking and sending samples are placed in an isolated room and kept at a temperature of 0-4 ° C until an answer is obtained on the results of bacteriological analysis.

Determination of pH. The pH of meat depends on its glycogen content at the time of slaughter, as well as the activity of intramuscular enzymes. When the animal is alive, the reaction of the muscle environment is slightly alkaline or neutral. After slaughter in the process of meat fermentation of healthy animals there is a sharp shift of hydrogen ion concentration indicator to the acid side. So, in one day pH decreases to 5,6-5,8. Meat of animals that are sick or killed in agonal state does not have such a sharp decrease in pH. Meat of sick or overworked animals has pH in the range of 6.3-6.5; meat of healthy animals has pH of 5.7-6.2. The pH is determined by potentiometric method.

Peroxidase reaction (benzidine test). The essence of the reaction is that the enzyme peroxidase in the meat decomposes hydrogen peroxide to form oxygen, which oxidizes benzidine. Parahinondiimide is formed, which with unoxidized benzidine produces a compound blue-green color, turning brown in a few minutes. Peroxidase activity is important. In the meat of healthy animals it is very active, in the meat of sick and killed in the agonal state its activity is significantly reduced.

Peroxidase activity depends on pH, although there is no complete correspondence between benzidine reaction readings and hydrogen ion concentration. At pH of concentrated extracts (1:4) below 6.0 the result of the reaction with benzidine in most cases is positive, at pH 6.1-6.2 - comparable, and at pH above 6.2 - negative.

Formol test (according to G.V. Kolobolotsky and E.V. Kiselev). Intermediate products of protein metabolism - polypeptides, peptides, peptones, amino acids and others are accumulated in muscle in considerable quantity during severe diseases

during life of an animal. The essence of this reaction is precipitation of these products by formaldehyde. An aqueous extract of meat in the ratio of 1:1 is necessary for sampling.

The extract from the meat of an animal killed in agony, seriously ill or slaughtered after slaughter turns into a thick clot; flakes precipitate in the extract from the meat of a sick animal; the extract from the meat of a healthy animal remains transparent or turbid.

Meat is considered as received from a healthy animal if the carcass has good organoleptic characteristics, no pathogenic microbes, pH 5,7-6,2, positive peroxidase reaction and negative Formol reaction.

Meat of the sick and overworked animal is insufficiently exsanguinated, pH 6,3-6,5, the reaction to peroxidase is negative and the shape reaction is positive (flakes).

Meat of an animal killed in agony is poorly exsanguinated, with blue or lilac-pink coloring of lymph nodes, pH 6,6 and higher, the reaction to peroxidase is negative, and the shape reaction is accompanied by formation of a gelatinous clot.

Veterinary and sanitary evaluation. If the results of bacteriological and physico-chemical tests show that meat and other slaughter products are suitable for food purposes, they are sent for boiling or for making meat loaves or preserves. Realization of meat of animals of compelled slaughter in the food markets is forbidden. Release of such meat and other products of slaughter, irrespective of results of the laboratory analysis, in a raw kind, including in a network of public catering (canteens, cafes, etc.), without preliminary deactivation is forbidden.

If infectious diseases are determined by laboratory testing to be prohibited for slaughter, the carcass, together with the skin, is to be destroyed. Carry out veterinary and sanitary measures prescribed by the relevant instructions.

If pathogens of infectious diseases are found in the slaughter products, the carcass and internal organs are used in accordance with applicable regulations.

If Salmonella is found in the carcass or organs, the internal organs are utilized and the meat is sent for boiling, processing into meat loaves or preserves.

If E. coli is detected in muscle tissue or lymph nodes, the meat is sent for processing into cooked or cooked smoked sausages. If E. coli is detected only from internal organs, the carcasses are boiled and released without restrictions.

If bacteria of the coconut group are found in deep layers of musculature or lymph nodes, as well as putrefactive microbes (particularly of Proteus group), but under good organoleptic indices the meat is sent for boiling or for processing into meat loaves. With organoleptic indicators of putrefactive decomposition of meat and meat products or an unusual smell that does not disappear in the sample cooking, such meat and meat products are sent for disposal or destruction.

Until the results of bacteriological examination, meat and by-products must be stored in isolated conditions at a temperature no higher than 4 ° C.

CHANGES IN MEAT DURING STORAGE

Meat refers to perishable products, which under normal conditions can not withstand long storage. During storage it can be subjected to various changes. Some of these changes are desirable and take place immediately after slaughter (maturation), others are undesirable (tanning, rotting, mouldiness, sintering, luminescence and others). These changes occur under the influence of physical and chemical factors or under the influence of various micro¬organisms.

MEAT TANNING.

Tanning - a special kind of meat deterioration that occurs in the first day of storage. This is an enzymatic process. The reason for tanning is the lack of ventilation and relatively high temperature in chambers for cooling and storing meat. Development of tan contributes to the presence of moisture on the surface of the carcass. Sunburn develops quickly if pairs of carcasses are in close contact with each other or meat of fat animals (pigs) are frozen immediately after slaughter (single-phase freezing). Most often tanning occurs in fresh meat when transporting it in closed containers (cardboard boxes, cellophane bags, etc.). In this case the deep layers of meat for a long time is not cooled, the high temperature inside the carcass increases the activity of intra-tissue enzymes. Lack of aeration reduces oxidative processes in meat, which accelerates anaerobic decomposition of carbohydrates.

Autolytic processes develop during tanning and decomposition of myoglobin and protein compounds containing sulfur begins. Myoglobin and oxy-myoglobin form unstable compounds with water which disintegrate with the destruction of coloring substances. Sulfur-containing amino acids (cystine, cysteine, methionine) are separated from proteins to form hydrogen sulfide. More often tan develops in pork carcasses and fatty carcasses of waterfowl (geese, ducks). This is due to the presence of a thick layer of subcutaneous fat, which prevents rapid cooling of the carcass, and a large amount of sulfur-containing amino acids.

Acid products of anaerobic glycolysis, carbon dioxide and hydrogen sulfide accumulation lead to the rapid increase of hydrogen ion concentration. Under tanning, pH of muscles reaches 5,2-5,3 and organoleptic characteristics of meat are changed. Its color becomes gray-red or gray-brown. The bird carcasses become copper-bronze color (color of copper samovar). Red-brown and yellowish color of meat appears due to changes occurring with myoglobin. Subsequently, there are greenish shades, which is associated with a deeper transformation of myoglobin (formation pseudohemoglobin), and the separation of iron from it - green pigment biliverdin and sulfomioglobin. Smell of meat becomes suffocatingly acidic with a clear sense of hydrogen sulfide. The consistency of the muscle becomes loose.

Tanning of meat is a reversible process if its development has not led to profound autolytic changes.

Veterinary and sanitary evaluation. Carcasses are cut in pieces and fermented for 48 hours in a well ventilated room. Greenish places are cleaned up. If after ventilation the astringent and sour odor and abnormal color disappear, the meat is sent for

industrial processing. Carcasses (carcasses) are to be disposed of if the tanning process is irreversible.

ROTTING OF MEAT

Rotting is the most dangerous type of meat spoilage because this process breaks down protein compounds and produces substances that are dangerous to humans. Of all the constituents of meat, the most susceptible to putrefaction are muscle tissue and by-products. Connective, fat, bone tissue is much less susceptible to this process, as it contains few protein substances.

Rotting of meat, as well as other organic nitrogen-containing products is caused by putrefactive microorganisms. Putrefactive micro-organisms can be both aerobes and anaerobes. They secrete enzymes that break down proteins - proteases. Aerobes include: B. pyocyaneum, B. mesentericus, B. subtilis, B. megatherium, B. mycoides, streptococci and staphylococci; anaerobes include B. putrificus, B. histolyticus, B. perfringens and B. sporogenes. Proteins are firstly broken down by enzymes of putrefactive microorganisms into polypeptides and peptides, and then peptones and amino acids are formed. Amino acids decompose to indole, scatole, mercaptan, ammonia, amines and fatty acids. The latter are broken down into carbon dioxide, water and methane. The formation of intermediate and final decomposition products from amino acids occurs according to the scheme of hydrolysis, oxidative and reductive deamination, as well as decarboxylation reactions. Peptides are cleaved by aerobes (B. proteusvulga-ris) and anaerobes (B. ventriculosis, B. orbiculis, B. bifietus, B. acidofilus, B. butyricus). Aerobic species of microorganisms have the ability to break down amino acids: B. faecalisalcaligenes, B. proteuszenzeri, B. lactisaerogenes, B. aminophilus, B. coli. Mold fungi may also be involved in the decomposition process.

Difference in the ability of microbes to break down complex and simple nitrogenous substances can be explained by the unequal composition of the microbial fauna of rotting meat. There is a certain degree of metabiosis (replacement of one species by another) between the various species of micro-organisms causing putrefaction. During the initial stages of meat decomposition, coccus forms multiply on the surface. Then they are changed by bacillus aerobic bacteria and bacillus which are able to move through intermuscular layers to deep layers of meat and further anaerobic kinds of bacteria develop.

Putrefactive microorganisms multiply under certain favorable conditions: plus temperature (optimum - 22-37 ° C), increased humidity and access of oxygen.

Meat is subject to putrefactive decay if it is kept in a warm and humid room.

Meat of healthy animals is more resistant to putrefactive micro-organisms than meat of sick animals. Chilled meat of healthy animals is acidic (pH 5.7-6.2) and covered with a dry crust of drying on the outside, which prevents the reproduction of microorganisms on the surface of the carcass. Acidic environment of the muscle acts bacteriostatic, and the muscle plasma has bactericidal properties. These factors prevent the development of putrefactive microbes in the meat.

Meat of sick and tired animals has pH higher than that of healthy animals (6.3 or more) and its bactericidal properties are significantly lower.

Rapid spoilage of meat is observed at poor bleeding of carcass, at its contamination with content of gastrointestinal tract, at violation of muscular integrity, resulting in no

formation of dense and dry crust pod¬hraniya. The decomposition of meat occurs more quickly with access to air, slower in anaerobic conditions (for example, if after gutting the carcass is not removed from the skin).

At temperatures below 0 ° C the vital activity of putrefactive microbes stops. Dry air, presence of bactericidal substances and carcasses exposed to ultraviolet rays are not favorable for rotting in food.

Rotting microorganisms from the external environment first reach the surface of the meat. From the surface they move down into the deep layers up to the bones through the intermuscular connective tissue layers. Weak alkaline reaction of connective tissue is favorable for the development of putrefactive microbes. This explains the appearance of signs of meat spoilage in bones earlier than in muscles covered with fascia. In sick animals putrefactive microorganisms sometimes penetrate into the blood stream, disperse throughout the body and therefore rotting meat of such animals can occur simultaneously in both the surface and in deep layers.

More toxic amines are formed from amino acids in the initial stages of putrefaction. Such meat is more dangerous than in the far gone process of spoilage. The content of free amino acids in the meat during rotting increases. During decomposition of meat under anaerobic conditions (in the skin) sulfur-containing amino acids and hydrogen sulfide are formed to a greater extent.

Accumulation of amino acids and ammonia in meat is the most characteristic and constant sign of spoilage. Aromatic derivatives such as indole, skatole, mercaptan and other compounds are formed as a result of the oxidative decomposition of cyclic and heterocyclic compounds, they are allocated inconstantly and in varying quantities. The simplest decomposition products of meat are ammonia, hydrogen sulfide, carbon dioxide, water and hydrogen.

At the same time with putrefaction of proteins in meat there is fermentation of carbohydrates, hydrolysis and oxidation of lipoids, oxidation-reduction reactions and other chemical processes. All this affects the speed and consistency of the formation of various substances in the rotting of meat. For example, during fermentation of carbohydrates acids are released, they bind ammonia and other alkaline decomposition products of meat and inhibit the reproduction of putrefactive microorganisms.

As the process of meat decomposition develops pH naturally increases, the reaction gradually becomes close to neutral, and with advanced spoilage - alkaline.

Spoiled meat has toxic properties. Dogs fed such meat exhibited symptoms characteristic of intoxication. Autopsy of dog corpses has revealed pathologoanatomical changes indicating absorption of toxic substances into the organism from the gastrointestinal tract.

Rotting of meat is accompanied by changes in the structure of muscle fibers. At the same time, transverse striation is smoothed out and disappears, the nuclei are poorly colored, and then destroyed, connection between the muscle fibers weakens.

Organoleptic characteristics of meat depending on the degree of deterioration change. It becomes darker in color and later appears greenish hue, the surface of the meat strongly oslizsya. The smell of meat becomes musty, putrid, sometimes rancid, in rare cases - sharply sour. The consistency of the muscle becomes flabby.

Color of fat changes from white or light yellow to yellow-green or light brown with mat color and its consistency becomes smeared. Tendons soften and their color changes from white to gray or dirty-gray. If the meat is spoiled the synovial fluid becomes turbid, flakes appear in it, the marrow liquefies, becomes dull and does not fill the entire lumen of the tubular bone.

Veterinary and sanitary evaluation. Assessment of meat freshness is conducted on the basis of organoleptic, physico-chemical (content of volatile fatty acids, the result of the reaction with a 5% solution of sulfuric copper in the broth) and microbiological (the result of bacterioscopy of smear-prints) indicators.

Meat is considered fresh if organoleptic characteristics and cooking sample (appearance, color, consistency, smell and transparency and aroma of the broth) correspond to fresh meat, microflora is not detected in smear-prints or in the field of view of the preparation single cocci and bacilliform bacteria (up to 10 microbial bodies) and no tissue decay residue; When added to the broth with 5% copper sulfate solution, the broth remains transparent and has a volatile fatty acid content of up to 4 mg KOH (in rabbit meat - up to 2.25 mg KOH, and in poultry meat - up to 4 mg KOH). When testing rabbit and poultry meat for ammonia and ammonium salts, the extract becomes greenish-yellow and remains transparent or slightly turbid. When determining peroxidase in poultry meat (except for waterfowl and chicken) the extract turns blue-green and turns brown within 1-2 minutes.

Meat is considered doubtful fresh if there are slight organoleptic changes: its surface moistened, slightly sticky, darkened, the muscles on the cut are slightly sticky and dark-red, and in thawed meat from the surface of the cut slightly runs down murky meat juice, the smell of meat is slightly sour with a touch of mustiness, the broth is transparent or cloudy with a slight smell of stale meat; in smear-prints find no more than 30 microbes (average number), as well as traces of tissue decay, when adding a 5% solution of sulfuric copper in the broth noted turbidity broth, and in the broth of frozen meat - intensive turbidity with the formation of flakes, the content of volatile fatty acids, from 4 to 9 mg KOH (in the meat of rabbits - from 2.25 to 9 mg KOH, in the meat of poultry - from 4.5 to 9.0 mg KOH). When testing rabbit and poultry meat for ammonia and ammonium salts, the extract becomes intensely yellow in color, there is significant turbidity, and for frozen meat - precipitation.

Meat of doubtful freshness is used for boiled sausages or boiled after appropriate cleaning (removal and disposal of sticky, deformed areas) and, if necessary, washing.

Meat is considered stale if it has the following changes: its surface is covered with mucus or mold, the muscles on the cut are moist, sticky, red-brown in color, and in thawed meat, murky meat juice drips from the surface; the smell of meat is putrid, broth is turbid with lots of flakes and a sharp unpleasant smell; In the field of view of smear-prints more than 30 microbes are found, there is a significant decay of tissues, in the broth by adding a 5% solution of sulfuric acid copper observed the formation of gel-like sediment, and in the broth from unfrozen meat - the presence of large flakes, the volatile fatty acids more than 9 mg KOH (regardless of the type of meat). In the study of meat of rabbits and poultry on ammonia and ammonium salts, the extract becomes yellow-orange or orange color, rapid formation of large flakes falling out as a precipitate is observed. When determining peroxidase in poultry meat (except waterfowl and chickens) the extract either does not acquire a blue-green color, or appears brownish color.

MOLDY MEAT

Meat mold growth is caused by the development of various mold fungi. Contamination of carcasses with mold spores can come from the air, from the walls of refrigerators and coatings, at transportation and improper storage of meat.

Moulds are aerobes, so they grow mainly on the surface of meat. Unlike rotten microorganisms moulds can grow in an acidic environment (pH 5,0-6,0), rather low humidity (about 75%) and low temperatures; some types of moulds grow at 1 °Ñ, others - at -6 ... -14cC. Weak air circulation promotes spore adhesion to the surface of meat. Meat in stuffy ice ¬rooms with absence of ventilation is often exposed to mold. High level of carbon dioxide in the air delays mold growth. Development of mold requires a relatively long time, so moldy meat occurs during prolonged storage of carcasses.

On a carcass can develop different types of molds. On fresh meat with a moist surface grows mainly aspergillus, on dried meat - brush fungi, with meat defrostats and storage at a temperature ╟ C - species tamnidium and mucorm. Black mold (Cladosporumherbarum) and white velvety mold grow at minus temperatures.

Moulds use proteins as a source of nitrogen for their development. Under intensive development of molds decomposition of proteins to amino acids and deamination of the latter with the formation of ammonia takes place. Thus the reaction of meat is shifted to the alkaline side. Under the influence of mold enzymes decomposition of fats occurs, methyl ketones and other carbon compounds are formed. The decomposition of fats is accompanied by not only a change in appearance of meat, but also the appearance of musty smell.

Mildew of meat creates favorable conditions for development of putrefactive microorganisms.

Veterinary and sanitary evaluation. Assessment of meat affected by mold is carried out depending on the type of mold and depth of external signs. If the meat is affected by mold growing only on the surface (mucor, aspergillus, white velvety, etc.), its surface is carefully wiped with a towel moistened with 5% solution of acetic acid or brine or a thorough cleaning is made, after which the meat is immediately realized without restrictions or sent for industrial processing. If there is a musty smell, established by sampling cooking, the meat is rejected.

If green or black mould penetrates shallowly into the muscle tissue, the meat after cleaning shall be sent for industrial processing, and if it penetrates deeply - for utilization. Carcasses should be cleaned in a separate room.

If mould is detected on carcasses or meat products, the refrigerator compartment must be immediately emptied and cleaned and disinfected as prescribed by "Sanitary Rules for Enterprises of Refrigeration Industry". Meat with mold is not allowed for transportation.

MEAT SINTERING AND FORMATION OF DRY PLAQUE

Mucus may form on the surface of the meat. The cause of slime-forming meat is intensive development of mucus-forming microorganisms. These microorganisms include various types of lactic acid bacteria, yeasts and micro¬cocci. On the dry surface of meat, slime-forming microorganisms do not grow, the main conditions for their

development are presence of moistened, humidified areas and relatively high temperature (18-25 °C) of the room where the carcasses are kept. Insufficient cooling of carcasses promotes shriveling.

Some microorganisms causing mucus formation may develop even at sub-zero temperatures. Such microorganisms do not go deep into the meat, so only the surface layer is subjected to slimeing.

The meat becomes sticky, grayish-green in color, with an unpleasant sour and musty odor; the pH of the meat of the surface layers of the carcass is sharply acidic (5.2-5.3).

From putrefaction caused by lactic acid bacteria and yeast, should be distinguished from the initial stage of putrefaction, which develops on the surface of meat bacilli and bacilli, causing the decay of muscle, connective and fatty tissues. During putrefaction meat surface is putrefied, the smell becomes putrid and musty with pH 6,4-6,6 and more.

There are species of yeasts and micro¬cocci (Debaryomyces, Pichiamembranofaciens, Pichiafazinosa), which develop on the dried surface of the meat a dry scum. As well as slicing, the dry scum forms only on the surface of carcasses, deep layers of muscle tissue remain unchanged.

Veterinary and sanitary evaluation. Assessment of meat in the presence of sloughing or dry plaque is to remove changed parts (cleaning), after which the meat is immediately sold in catering establishments or sent for industrial processing. Altered parts of the carcass are disposed of.

GLOW (PHOSPHORESCENCE) OF MEAT

The phenomenon of phosphorescence is widespread in nature. For example, there is known glow of rotters, fireflies, deep-sea fish, etc. Meat luminescence is a very rare phenomenon that takes place under the influence of various micro organisms. Luminescence is caused by the development of photobacteria, of which Photobacterium fischeri, Ph. ponticum, Ph. cyanophosphorescens and other types of microorganisms are more common.

Photobacteria are obligate aerobes. In the dark, the meat emits a bluish, greenish

bluish, greenish-yellowish or blue-white color. Glow can be point, focal or continuous; duration of phosphorescence of beef carcasses - up to 6 days, horsemeat - up to 9 days.

Meat is infested with photobacteria in cooling or refrigerating chambers. For the development of luminous bacteria required high humidity, temperature of 5 to 30 ° C and the pH of the meat above 5.6. Phosphorescence begins on wet surfaces of carcasses (joints, cartilage). A thin gelatinous film appears in phosphorescent parts of the carcass, but no toxic products are formed in the affected parts of the carcass. When the initial signs of putrefactive spoilage appear the glow of meat immediately stops, as proteolytic bacteria inhibit phosphorescent microflora. Some specialists consider luminescence of meat as an indicator of the absence of putrefactive micro-organisms.

Veterinary and sanitary evaluation. Assessment of meat by phosphorescence means that it is washed with weak acetic acid solution or brine, after which the carcasses are dried and released for free sale or sent for industrial processing.

CHANGE IN THE COLOR OF MEAT

The appearance of pink-red color is associated with the development on the surface of carcasses or pieces of meat Chromobacterium prodigiosum (Miracle

Bacillus). The formation of blue-blue spots and turning blue is due to the development of colonies of Pseudomonas pyocyanea or Vas. cyanogenes. These pigment-forming microorganisms are nontoxic to humans. They do not have proteolytic properties and develop only on the surface of the carcass or pieces of meat, reducing only their marketable appearance.

Veterinary and sanitary evaluation. Colored spots and areas detected during the development of pigment-forming micro-organisms are cleaned up, and the carcasses are sold without restrictions or sent for industrial processing.

VETERINARY AND SANITARY EXAMINATION OF MEAT IN CASE OF CHANGES OF SANITARY SIGNIFICANCE.

These changes may be detected immediately after slaughter or in later cooking of the meat.

Changes in smell and taste. Their appearance is associated with feeding animals shortly before slaughter musty and subjected to spontaneous combustion root vegetables (beets, rutabaga, turnip, etc.), oily cake or strong smelling plants (wormwood, bugaboo, etc.). Smell and taste of fish in pork, beef, poultry meat may be caused by long and intensive feeding them with fish, poorly defatted fish meal, fish waste or by adding fish oil to feed. Together with unpleasant smell and taste, the fat in such cases acquires softer consistency and a yellowish, brownish or grayish color.

Meat of adult males, when not castrated or late castrated, has unpleasant smells: goats have the smell of sweat (goat smell), boars have the smell of decomposing urine, boars have fresh garlic. These smells in the meat may disappear in 2-3 weeks after castration, but they remain in the fat for 2-2.5 months. Castration of males is advisable 2.5-3 months before they are slaughtered for meat.

Carcasses quickly perceive and retain extraneous odors: fresh paint, flooring, disinfectants, etc. Non-typical odors in meat and fat of animals are preserved if they have been injected with odorous medicinal substances (camphor oil, etc.) before slaughtering.

Veterinary and sanitary evaluation. If there is an unpleasant smell and taste, the carcasses are cut into pieces and aired for 2 days. Then the sample is boiled, which allows to clearly identify the offensive smell. To put boiling samples take pieces of muscle along with fatty tissue, as the fat smells more distinct. If foreign and unusual smells and tastes completely disappear from the meat, it is sent for industrial processing. If foreign and non-meat odors and flavors persist, the meat is discarded.

LIPOCHROMATOSIS

Lipochromatosis is a yellow coloring of fat deposits. It is observed in the carcasses of old animals (cattle and horses); it is possible in all herbivorous animals at their abundant feeding with corn, carrots, rapeseed or flax cake. Changing color of fat deposits in such cases is explained by accumulation of coloring substances of lutein group, fat-soluble pigments, first of all carotinoids contained in green plants and the above mentioned food. In such cases only adipose tissue is stained yellow, and intermuscular fat is much less colored than fat deposits under skin, on

omentum, mesentery and near kidneys. All other tissues (muscular, bone, connective) are not yellow. For proper veterinary and sanitary estimation it is necessary to differentiate yellow coloring of fat as a physiological phenomenon from pathological processes in the animal organism (leptospirosis, pyroplasmidosis and other).

Veterinary and sanitary evaluation. Carcasses and other slaughter products upon detection of lipochromatosis of fodder origin are to be released without restrictions.

MELANOSIS

Melanosis is the black coloring of various tissues. It is associated with excessive accumulation of melanin pigment in carcass tissues. It is registered in cattle, horses and, less often, in pigs. Most frequently melanin is accumulated in the liver, portal lymph nodes, sometimes in lungs, subcutaneous tissue and at generalization of the process - on pleura, peritoneum, fascia, cartilage and bones. Small amounts of melanosis may cause black spots and stripes in the liver and other organs. With generalization of the process the organs become dark brown or even brown or black in color and focal pigmentation is found in almost all tissues of the carcass.

In the southern areas of the country melanosis is often associated with eating vetch, rye, reeds, chaganrose and other grasses on pastures.

Veterinary and sanitary evaluation. At generalized melanosis (pigmentation of internal organs, muscles and bones) carcass and internal organs are sent for utilization. In case of changes only in individual organs, they are disposed of, and the carcass is released without restrictions.

IMMATURE MEAT

This includes carcasses of newborn fetuses as well as young animals (calves, piglets, lambs, goats, etc.) up to 2 weeks of age. Stillborn foetuses and foetuses withdrawn from uteruses during the last 1-2 months of pregnancy have well developed navel with blood, hooves round and soft, lungs with atelectasis areas and their pieces sinking in water, muscles of gray-red color, flabby and watery. Fetuses have 1-2 pairs of incisors in the mouth and 3 pairs in stillborn calves.

Carcasses of immature animals have grayish-reddish muscles, flabby and poorly developed (especially in the croup and thighs). Underdeveloped kidneys, they are purple on the cut, fatty tissue around kidneys gelatinous grayish-red. Bone marrow also gelatinous, dark red. Belly button or its scab is preserved (the belly button dries up on 3-5 days and falls off at the end of the 2nd week). Meat of young animals up to 2 weeks of age is not dangerous for humans. It is forbidden for consumption because of economic considerations, and, most importantly, because of animal health issues. Such meat contains a lot of water and glucose, which is a favorable environment for microorganisms. For this reason it should not be stored. Abroad, there is no ban on the use of meat of young animals for food purposes, depending on their age.

Veterinary and sanitary evaluation. Slaughter of calves, piglets, young goats, lambs (with the exception of karakul, which are slaughtered for pelts) before 14 days of

age is prohibited. Meat of immature young animals and newborn fetuses shall not be released for food purposes and shall be sent for disposal.

Topic 8: Veterinary and sanitary examination of poultry meat and eggs.

Plan:

1. **The concept of canning meat and meat products**
2. **Preservation of meat at low temperature**
3. **Canned meat and meat products at high temperature**
4. **Preservation of meat with boiling salt**

The most acceptable of all known methods of preserving meat and meat products is canning with refrigeration, in which the products mainly retain their nutritional and gustatory properties. Physico-chemical and biochemical processes are sharply slowed down in the product and the development of various microorganisms is suppressed or slowed down. In addition to cold, to stop these processes the following can be applied:

- high temperatures;
- antiseptics;
- Ultraviolet and radioactive irradiation;
- Microwave heating;
- freeze drying.

However, in practice, preference is given to refrigeration treatment not only of meat, but also other products. Each method of preserving meat and other products must meet certain requirements. First of all, it should be harmless, to preserve good quality and nutritional value, not to reduce the organoleptic characteristics. It should be noted that not all methods of preservation equally meet these requirements. However, all methods used in industrial production are of sanitary and economic importance.

PRESERVATION OF MEAT AT LOW TEMPERATURE

The use of low temperature inhibits or completely stops the growth of microorganisms, in addition, reduces the activity of tissue enzymes. It should be noted that most micro¬organisms stop growing already at 0 ° C, and molds - at -11.6 ° C.

According to the standards, meat is subdivided by thermal condition into chilled, cooled, frosted, frozen and thawed.

Chilled meat refers to meat, which after cutting the carcass at a depth of 8 cm has a temperature no higher than 12 ° C. Cooled meat is used at the plant where it was received, export for realization¬ are limited, the exception represent the food markets.

By chilled meat refers to ¬ temperature in the thickness of the muscle is no higher than 4 ° C. The surface of chilled meat is covered with a crust of drying. Refrigeration is considered the best type of preservation ─ of meat. It is relatively stable in storage, the nutritional indicators are much better than frozen. Meat is

cooled in refrigerated chambers equipped with ventilation and instrumentation. Carcasses, half-carcasses and quarters are suspended in the chambers on hooks, keeping the gap about 5 cm for better aeration. If the chamber is too densely packed, the meat may become tanned. The temperature in the cell must be -2 ... -3 ° C, relative humidity - 95-98%, the air speed of 2 m/s. Meat chilling lasts 24-36 hours, depending on species and weight. During cooling the meat undergoes the process of maturation, formed crust shrinkage, which has a great sanitary value, as ─ is an unfavorable environment for microbial growth. With prolonged storage of chilled meat or violations of temperature conditions, it can develop undesirable changes: tanning, darkening, putrefaction, mold growth, rotting. When cooling inevitably there is a loss of weight (shrinkage) due to evaporation of moisture. Drying may range from 1.4% to 3.02%, depending on the species and category of fatness of the carcasses.

Meat cooling duration can be reduced by reducing the temperature in the chamber before loading and multiplicity of air exchange.

Subproducts are cooled in metal forms with a loading no higher than 10 cm. Kidney, heart, tongue, brains, spaced in one row, at a temperature of the chamber from 0 to -2 ° C and relative humidity of 90-95%. Cooling duration: 24 hours.

Chilled meat can be stored at -1 ° C in the chamber up to 15 days. During this time it loses some weight: in the first 2 days fat pork loses 0.2% of its weight, beef - up to 0.3% and further 0.01% daily.

Subproducts after cooling are stored for not more than 2 days.

Organoleptic characteristics of chilled meat - elastic consistency, smell peculiar to each type of meat, the surface of beef and lamb carcasses are covered with crusts drying, muscle tissue on the cut moist, characteristic color.

Frozen meat by organoleptic and physical-chemical indicators is almost similar to chilled meat, but the temperature in the muscle thickness is between -1 ... -2 ° C. Under such temperature regime it is kept up to 20 days.

Frozen meat is considered if the temperature in the thickness of the muscle thickness reached -8 ° C. It should be noted that meat at this temperature ─ should not be stored for a long time. Optimal storage temperature ─ 16 ... -18 ° C. However, it should be noted that the cold is not able to correct defects already present in the meat.

Two-phase and single-phase methods of meat freezing are used in practice. When using biphase method, meat is frozen after preliminary cooling, and when using single-phase method, fresh meat is frozen, which significantly reduces the time of freezing and decreases the weight loss due to natural loss by 0,2-1,6%.

It is more appropriate to freeze the meat at -23 ... -27 ° C, and even better at -35 ° C. Under such regime small crystals are formed, which do not violate the integrity of sarcolemma of muscle fiber, so the thawing of the loss of muscle juice will be minimal. Relative humidity is kept at the level of 90-95%, velocity of air movement 0,1-0,3 m/s. Freezing lasts 20-24 hours (at -35 ° C). Natural losses at a single-phase freezing are about 1.6%.

Frozen meat is kept in stacks, on slats or pallets. The stack is laid back from the walls along the perimeter by 30-40 cm and by 40 cm from the cooling batteries.

Frozen meat, beef, mutton can be stored for 10-12 months, pork - up to 8 months (without skin - up to 6 months) (Table 15).

Table 15
Shelf life of frozen meat products

Product type and category	**Shelf life (in months) at temperature, 0 C**			
	-21	**-18**	**-15**	**-12**
Beef and mutton:				
first category	18	12	9	6
second category	15	10	7	5
Pork				
in the skin	15	10	7	5
without the skin	12	8	6	4
Chickens, turkeys,	15	10	7	5
Geese, ducks	12	8	6	4
Byproducts	No more than 4-6 months			

Natural losses (shrinkage) depend on the period of the year and storage temperature. In the first quarter they are equal to 0.16-0.22%, in the subsequent - 0.2-0.32%. Calculations of losses are made according to effective norms and fluctuate greatly, taking into account specificity and category of fatness, capacity of storage chamber.

During prolonged storage of frozen meat, the upper layers shrink due to sublimation shrinkage. Meat loses its natural colouring from the surface. Pork carcasses have oxidation of fat, which turns yellow.

To decrease the natural loss and to improve the preservation of meat along the perimeter of the chamber, they install baffles. For this purpose, aside by 40-50 cm along the perimeter, the cloth is stretched from floor to ceiling and frozen with ice. This storage method keeps meat for a longer period of time without significant changes, since ice sublimation from the screen takes place first of all, but not from meat.

Freezing meat in blocks is considered more rational compared to freezing carcasses, half carcasses and quarters. Frozen meat is better preserved in blocks, and storage costs for trans¬portation decrease sharply. For freezing the meat is subjected to deboning, or dismembered into separate parts in accordance with the requirements of the current standard on the sort cutting. The cuts are placed in forms 380 x 380 x 150 cm, with the calculation that in each form were pieces of different types of meat, and freeze at a temperature of -23 ... -27 ° C. Freezing lasts 12-24 hours. Then the blocks are taken out of the moulds, packed into paper and cardboard boxes, marked and sent to storage chambers. In storage chambers blocks

are stacked compactly. The temperature in the storage room should not exceed -18 ° C, the relative humidity of 95-100%. Shelf life of meat in blocks at least 12 months.

In addition to meat, frozen in blocks by-products (liver, kidney, heart) and trimmed meat.

Meat frozen in blocks has many advantages over freezing it in carcasses.

Blocks, packed in cardboard boxes are protected from the external environment, so the meat is protected from mechanical pollution, contamination with microflora and weathering. Natural loss is significantly reduced and storage chambers are used more rationally.

Defrosting of meat - a process of heating it and bringing the temperature in the thickness of the muscle up to 0-2 ° C. The main task is to ensure that the defrosted meat to keep, if possible, the original organoleptic and physical-chemical ╡ ics. Defrosting is carried out by several methods: slow defrosting in air medium with temperature from 0° to 6°C for 3 days; fast, at temperature in the chamber of 12-20°C, duration of process 15-25 hours; fast in steam-air medium at temperature 25-40°C for 5-7 hours; in water, at temperature 10-20°C, for 10-15 hours.

The most rational method of thawing is the second. When thawing meat requires special control ─ veterinarian to maintain sanitary-hygienic regime. Meat after thawing is unstable.

BRIEF INFORMATION ABOUT SOURCES OF COLD

Low temperatures are widely used in the meat industry, where machine cold is used. However, even now the cold obtained without machines is still used. Ice, ice-salt mixtures, dry ice (solid carbon dioxide), and freezers are used for this purpose.

Machine cold is obtained through the use of refrigerants - substances which, when their state of aggregation changes, absorb heat from the environment. In the meat industry ammonia is a refrigerant.

Machine-free refrigerant production method is the use of ordinary ice mixed with various salts (NaCl, CaCl, etc.). Ice melts at 0°C, but if we add to it 33% NaCl, the melting temperature decreases to -21°C, and when CaCl is added we can obtain a temperature of -32°C. On the surface of the dry ice briquette (solid carbon dioxide) during sublimation the temperature is within -78°C.

To obtain cold using ice and ice-salt mixtures build ice ¬ tanks and ice warehouses. They can be ground and underground. Above-ground facility - meat warehouse - is shown in Fig. 41.

Krylov's ice warehouse is widely used in the North. In winter, the ice is frozen, and then the boards are used to construct a vaulted frame, on which the ice is frozen 2-3 meters thick. Sawdust or peat with a thickness of 1 m or more is poured on the ice.

Ice and salt mixtures are used to lower the temperature in such a warehouse. With proper maintenance such warehouses are used for many years.

Machine method of reception is based on changing the aggregate state of the refrigerant. Refrigerating plants depending on the principle of their work are subdivided into compressor, vacuum and absorption. Compressor machines are

more widespread. They consist of compressor, condenser, receiver, control valve and evaporator (see Fig. 42). All these links are interconnected by pipelines where ammonia refrigerant circulates. Boiling (evaporation) temperature at 0.42 atm rarefaction is -50°C. When moving ammonia from one part of a refrigeration plant to another its aggregation state is changed (evaporation) resulting in formation of cold.

In the compressor at reciprocating motion of the piston there is suction of ammonia vapors from the evaporator and their compression. The condensed ammonia vapors are fed into the condenser (coil of pipes), where there is liquefaction (condensation) of the vapors. Liquefaction takes place under the influence of cold water on the pipes of the coil. Liquid ammonia flows through the pipeline to the receiver - settling tank. From receiver liquid ammonia is fed into evaporator by means of adjustable valve. Ammonia cycle repeats. Compressor refrigeration system is a closed system with the same refrigerant.

The second way of transferring the cold is by means of cooled brine (Fig. 43). In this process the mediator is used. Such mediator is represented by aqueous solutions of salts with low freezing point. For obtaining the temperature down to -15 °C we use brine of table salt, and for lower temperatures - calcium chloride solutions. For this purpose the refrigerator coil is placed in the tank with brine. The cold formed in the refrigerator is transferred to the brine. The brine is pumped into the batteries of the refrigerated room, where the brine gives the cold to the stored products and returns to the refrigerator for cooling. During this transfer of refrigeration the refrigerator is outside the point of refrigerant consumption, so you can not get as low temperature as with direct refrigeration.

The third method of cold transfer is air cooling. In this case the intermediary is air. It is cooled by the refrigerator of the refrigeration plant and then after purification from dust it is pumped by the fan through the metal pipes into the room where cooling is required.

The enterprises of meat industry build production refrigerators, in large cities - distribution, in the places of meat procurement - procurement, and for the servicing of export-import transportation by sea - port refrigerators.

The main thing for all the refrigerators is to preserve the good quality of the cargo.

VETERINARY AND SANITARY INSPECTION OF MEAT ON REFRIGERATORS

Veterinary and sanitary control of meat on refrigerators is carried out on a permanent basis state veterinary inspection. Depending on the amount of work for the refrigerator assigned one or more state veterinary inspectors.

When entering the refrigerator consignment of meat or meat products, they soprovoditelno the following documents: veterinary certificate ¹ 2, quality certificate, certificate of conformity, consignment note ⌐ transportation.

In the absence of documents the meat is unloaded in a separate chamber. If the documents are not sent upon request a full veterinary and sanitary expertise is

carried out and the products are dealt with in accordance with the results ¬ according to its results.

Upon receipt of products in packaging inspection is subject to at least 10% of packages, and if there are deviations from the standard checks the entire batch.

When unloading meat, the veterinarian checks organoleptic characteristics, presence of brands, quality of meat processing and temperature parameters. If necessary, conduct cooking samples, as well as laboratory tests.

Frozen meat in doubtful cases are thawed and tested.

The veterinarian, having examined the cargo, ascertains the duration of its storage, as indicated in the acceptance report, and the results of veterinary and sanitary examination recorded in the journal. Defective products which are subject to restricted use are unloaded into a separate chamber and a banner indicating the cargo and methods of its use is hung on the door. A similar entry is made in the registration book.

If the meat has rodent damage or droppings, it is placed separately in the chamber of defective cargoes and cleaned. If the meat is covered with slime or mould, it should be unloaded into a separate cell and given a sanitary treatment.

For meat with defects the veterinary state inspector draws up a report, in which he marks out the number of products, wagon number, railway consignment note, station of departure and destination, consignor and consignee, the number of veterinary certificate and specific defects. In the act record the conclusion about the use of meat - realization, industrial processing or technical utilization.

The duties of the veterinarian check chambers on the degree of contamination, the proper stacking of meat, storage regimes, provision of special clothing and staff performance of hygiene and sanitary rules for contact¬ contact with products, the quality of stored¬ products, etc.

During storage of meat in the chambers, a periodic check of its qualitative condition is carried out. For bacteriological control of contamination of rooms once a quarter, air samples are taken and scrapings from the walls of the cell.

Veterinary and sanitary control is also carried out at the release of meat from the refrigerator. Released products are subjected to inspection as well as at the reception ¬. Transport, which will be loaded ─ meat, must meet sanitary requirements.

When release from the refrigerator for meat to write out a veterinary certificate № 2 or certificate № 4, in addition, issue a certificate of conformity and consignment note ⌐ . These documents are written out for each trade organization or per¬processing company.

DISINFECTION AND DERATIZATION ON REFRIGERATORS

Disinfection is an important activity in refrigerators. It takes the leading place in the system of sanitary and hygienic measures. Disinfection provides not only for preventing the general bacterial contamination of the food products, but also for combating the scourge of the refrigerators - mould.

The chambers are disinfected as they are emptied of cargo and twice a year for preventive purposes. In case mold is detected on the meat, a forced disinfection is carried out.

The chambers are released from cargo and equipment, warmed and cleaned from dirt. After such preparation they are disinfected. Disinfecting solutions are applied to the walls, ceiling and floor with a spray gun or a brush. Chambers are also treated in corridors and stairwells. After disinfection the cells are closed for 2 hours, then aired and dried. In conclusion, the walls are whitewashed and the floor is washed. Inventory taken out of the cell is also disinfected.

The best disinfectants against molds are bleach, antiseptol, sodium hydroxyphenolate (f-5), and sulfuric iron. Chambers can be treated at -4°C and above.

Chlorine lime is used with active chlorine concentration at least 2%, antiseptol (2.5 kg of chlorine lime with 25% active chlorine and 3.5 kg of soda ash per 100 liters of water), sodium oxyphenolate - 2% water solution, iron sulfate and NaOH - 5% water solutions.

The effectiveness of disinfection is determined by bacteriological examination of washes from the walls, floor and samples from the air environment of the cell. The indicator of satisfactory disinfection is the growth of single mold colonies per 1 cm2 of environment.

Deratization. Rodents are practically constant inhabitants of refrigerators. Despite low temperatures, they penetrate into meat storage chambers and bring considerable harm, spoil their tradeable appearance and pollute products with droppings and urine. All this is fraught with the spread of anthropozoonozoic diseases.

Preventive and exterminative deratization is used to control the rodents. Preventive deratization includes all economic and sanitary measures to prevent penetration of rodents into the territory and premises of the refrigerator, destructive - physical and chemical ways of their destruction.

Traps and traps are used to exterminate rodents by physical method. Chemical substances such as zinc phosphide, zoocoumarin, ratsid, ratindan and others, as well as carbon dioxide are also used. Poisons are added to baits and placed in places frequented by rodents. The corpses of rodents are collected and burnt. Safety precautions should be observed when working with poisons.

Very effective method of rodents extermination using carbon dioxide. All holes made by rodents are plugged up in the chamber, the chamber is sealed and filled with carbon dioxide from cylinders.

CANNING OF MEAT AND MEAT PRODUCTS AT HIGH TEMPERATURE

Technology for canning comes to the fact that the prepared meat or other products are put in tin or glass, hermetically sealed jars, which are sterilized at temperatures above 100 ° C. Canned foods are good food products, stored without spoiling ⊒ years. Portability and speed of cooking give a whole range of

advantages to canned food in comparison with other types of food preservation. It is known that canned meat, in spite of high temperature processing, preserve most of the nutrients and biologically active components.

Canned products are made in canning factories or canning departments of meat processing plants. Canned shop or plant has two main departments: 1) tin can, where they produce cans and 2) technological, which conduct all the technological operations in the manufacture of canned food.

The manufacture of cans. In the manufacture of cans use a thin sheet of tin, which is covered on both sides with tin or corrosion-resistant varnish. Bottoms and lids are called ends, stamped on them eccentric circles (hidden reserve zhieti). This is necessary for jar sterilization when the metal and interior of the jar expand under the influence of high temperature. If there were no concentric circles, jars would break. The next operation is the connection of the bottom with the body. For complete tightness before joining the rubber paste is applied to the circumference of the bottom (the same is done on the lid).

Jars can be full-taut —. Stamping machines receive cans with the bottom. Finished jars are washed and processed with sharp steam.

Used for making canned food and cans can be tin and glass cans can be different in volume, depending on which ⊒ their numbering. For example, "Stewed meat" is produced in tin cans number 1 - volume 374.6 cm3, number 2.5 - volume 861.4 cm3, number 9 - volume 515 cm3, and in glass jars number 83 al - volume 550 cm3, number 83 l - volume of 1000 cm3.

At the ends of cans in the center make a marking in accordance with the standard, in which the numbers in three rows include the following data: in the upper row - date of manufacture (day, month, year - two digits in each value), in the second row - assortment number and number of shift, in the third row - index system, MM - meat and milk industry, K - food industry, CC - consumer cooperation, TC - agricultural production) and number of enterprise (plant, shop).

The technology of production of canned meat. The whole technological process of manufacturing of canned meat consists of several operations: preparation of the basic raw materials and auxiliary materials, filling of cans with raw materials, exhausting (removal of air from cans), sterilization, cooling, first sorting, temperature control, second sorting, marking, packing and storing.

Raw materials for production of canned meat are meat of all kinds of slaughter animals and poultry, by-products, salt, spices, vegetable and animal fats. All ingredients must meet the requirements of standards, technical specifications, veterinary and sanitary rules and technological instructions.

At receipt of meat and by-products in the canning shop from the refrigerator of the same enterprise, inspection of carcasses is carried out on hanging rails. Check the quality of boning and heat treatment and the presence of brands.

Upon delivery of raw materials from other enterprises they are subjected to repeated veterinary and sanitary expertise. Meat products in this case must be presented all the necessary veterinary and commodity documents.

For making canned food it is not allowed to use badly bleeding, re-frozen, fallow, dirty, with signs of stale and strange odor, and meat of not castrated producers and pork with yellowed speck.

In the manufacture of canned meat such as "Goulash", "Fillet of Chicken", "Boiled Beef" and some others, introduced an additional operation called blanching. Blanching - this short-term boiling of meat before putting it in the jar.

In the manufacture of canned "Beef stew" as a basic raw material is beef. In addition to meat, raw material for this type of canned food is fat. Fat may be used as raw fat (subcutaneous, perinephric, cicatricial) or clarified fat. Auxiliary raw materials include onions, fresh and dried, table salt, bay leaf, black pepper.

The quantity of raw materials is determined according to the size of the jar. For tin can # 9, the recipe provides the following quantity of raw materials in grams:

- meat - 295;
- raw fat (or baked fat) - 35 (27);
- table salt - 3.5;
- fresh onions (dried) - 4,5 (1,0)
- ground black pepper - 0.04
- bay leaf - 0.25-0.5.

Before making canned food, prepare the raw materials. The first such operation ─ cutting meat carcasses, ie, dismembering them into pieces according to the standard. After dismemberment they are subjected to deboning - separation of meat from the bone. Next operation is deboning - removing fat, sinews, fascia, cartilage and other connective tissue elements from the flesh. Raw fat is also subjected to skinning. After boning, meat and fat are transferred to the beating room, where they are cut to the required size. Packing raw material is carried out sequentially. First they add salt, pepper, bay leaf, onion, then meat and fat. Introduction components are made manually or by dispenser. The jars with contents are selectively weighed and conveyed to the roller. The sealing of the lids is combined with vacuum exhausting. After the lid sealing the jars are placed in metallic baskets with water (to avoid deformations). When the baskets are filled with jars they are lifted with a winch and moved into autoclaves for sterilization. During sterilization the microflora is inactivated and the meat is boiled.

During sterilization, it is necessary to follow the regime, which is expressed by a formula. The formula is set for each type of canned food, depending on the capacity of the jar. "Meat stew" in a jar number 9 is sterilized according to the formula:

$$\frac{20 - 90 - 20}{113} \quad \text{или} \quad \frac{20 - 40 - 20}{120}.$$

The first formula should read as follows: 20 - time (in minutes) for the gradual heating of the autoclave and jars with open valves; 113 ° C - the temperature in the autoclave, with closed valves, maintained at this level for 90 minutes; 20 - time (in minutes) to gradually lose steam (reducing pressure).

For each autoclave there is a control and measuring self-recording device. On the thermogram the data of sterilization mode are recorded. Thermograms are stored for 5 years.

After sterilization the baskets with preserves are removed from the autoclave and cooled in the air, after which the first sorting is done. During sorting remove jars with different defects. After sorting 3 cans are taken from the batch for bacteriological examination. Canned after sorting placed in a thermostat room with a temperature of 37 ° C for 5 days. When thermostatting identify the presence of residual microflora, if it is present, the banks bloated (bombage). After temperature control is carried out a second sorting to remove (if any) bombazhnyh cans.

When canned goods are sent for sale, they are ethically sorted. If canned food goes for storage, the banks are covered with a thin layer of vaseline to protect against rust, and placed in boxes. Labels are not glued in this case, they are placed in a box with cans. Canned products are transferred to the warehouse finished products, which is maintained at a temperature of 0-6 ° C, relative humidity of 75-80%. Higher temperature storage canned food spoil, the content becomes metallic flavor, color and consistency change ┘ ments of chemical bombage.

Durability of canned meat in warehouses - 5-6 years, delicacies, meatballs, pates - up to 2-3 years.

Periods of storage may vary depending on conditions. Check the quality ─ canned food is carried out twice a year - in the spring and autumn.

VETERINARY AND SANITARY EXPERTISE IN THE PRODUCTION OF CANNED AND FINISHED PRODUCTS

The clear organization and implementation of hygienic requirements at all stages of canning production is crucial for obtaining high quality and sanitary conditions for canned meat. Hygiene canning production is similar to that of sausage production.

Veterinary and sanitary examination of finished canned meat has its own characteristics. When it can identify cans with different defects. The main task of the veterinary and sanitary expert is to detect and recognize defects and establish reasons for their occurrence. Causes of defects and flaws in canned food cans can be different.

The examination of canned food is carried out by laboratory methods and tasting.

Organoleptic characteristics of canned food set by tasting, the following: specific smell, taste, typical for this formulation; cons¬tence of meat elastic; broth yellowish color, transparent (possible insignificant turbidity). For determination of organoleptic characteristics canned food is tasted by the commission which consists of engineer-technologist, engineer-chemist, veterinary and medical doctors, state inspector of quality. Taket one or two jars from the batch. Tasting of ham, tongues, tourists' breakfast is conducted in chilled condition, meat stew, goulash - in warmed condition and pates - at room temperature. Good-quality preserves in 5-6 months of storage acquire a more pleasant taste compared with fresh ones.

Flaws and defects in canned food. According to external signs set leakage, deformation of cans, bombage, and when examining the contents of the can - souring, foul odor, deviations in taste, softening of tissue, melting fat and vegetable components.

If leakage at the seams (after sterilization), the can is opened and sent for processing in the sausage production. If leakage is detected during storage, the jars are sent for technical disposal.

Deformation of jars appears when there is a mechanical impact (dent) or a sharp decrease in pressure after sterilization. In such cases the jars are opened, the contents are processed into pâtés.

Jars with vibrating ends and "clappers" have a permanently raised¬ lid or bottom. When pressing on the convex surface it will be pressed through, but the opposite one will stick out. This defect is more often related to overfilling of the jar with its contents. If the bacteriological and organoleptic study did not find deviations, these canned goods are sent for realization.

Bombage may be microbiological, chemical and false - physical. During bombage the ends of cans sometimes stick out to the point that their corrugation is completely flattened. Bulging occurs due to the high pressure of gases inside the jar, formed as a result of micro-biological, chemical or physical processes.

Physical bombage occurs when the contents expand during heating or freezing. Cans with a physical (false) bombage are not defective. After elimination of the cause that caused the deviation, they are implemented within the stipulated terms.

Chemical bombezh occurs when hydrogen accumulates inside the can, as a result of the reaction of components of the product with metal containers. In such cans ob¬vidutsya metal salts of packaging - tin, iron, aluminum, which give the meat a metallic flavor, sometimes ¬ change the color of the product. Canned goods with chemical bombage are subjected to organoleptic, chemical and bacteriological examination. If the results of research are satisfactory they are allowed for food purposes by the decision of health authorities.

Bacteriological bombage is connected with outgassing and is a result of vital activity of microorganisms in the bank, usually anaerobes. Microbiological bombage in single cans indicates a defect in the can. When bombarding a significant number of jars of the batch - it is the result of insufficient sterilization mode with unsatisfactory sanitary condition of the equipment, raw materials, containers. In microbiological bombage can spores of B. subtilis, B. mesenterium, B. megaterium, as well as CI. botulinum. Cans with micro-biological bombage are sent for technical disposal.

Rust on cans occurs with high humidity or due to significant temperature fluctuations. Jars with a slight rust buildup are wiped down and sent for storage. If after wiping the surface of the jars dark spots and pits remain, the jars should be urgently sold.

In addition to organoleptic and microbiological research to assess the quality of canned food their overall acidity, the amount of dry substances, fat, table salt, nitrite, tin, lead, copper, etc. Lead in canned food is not allowed, and other metals are limited depending on the type of products.

CANNING OF MEAT WITH COOKING SALT

General characteristics of the method. Salted meat as a method of preservation has been used since ancient times. Meat subjected to pickling is called corned beef. Corned beef can be kept at above zero temperature for a long time. However, this method of preservation has a number of serious drawbacks. The main one is reducing the nutritional quality of meat. In the process of salting and storing meat loses a significant amount of valuable nutrients - protein, extractive substances, phosphates, which go in the brine. Salt penetrates into the muscle tissue, dehydrates it partially and the meat becomes tough and less tasty. It should be noted that, despite these shortcomings, the use of salt in a number of cases is inevitable, feasible and profitable in the manufacture of food in industry ─ bacon, bacon, smoked meats, sausage production.

The essence of salting. Salt is a chemical method of preservation based on the physical law of diffusion, which is based on the osmotic-diffusion exchange. In the salting process such exchange takes place between the meat and brine. Common salt penetrates into the meat, and water and other water-soluble organic substances go into the brine, i.e. there is a balance of salt concentration in the brine and tissues of meat. This process of salting is considered completed. Duration of salting is a direct dependence on the concentration of salt solution and ambient temperature. At high concentrations of salt and high temperature salting meat worsens its useful properties. For this reason a moderate amount of salt is used, and the process runs at a temperature of 2-4 ° C. Salted meat is considered ready in 20 days.

Ingredients of pickling mixtures. In addition to table salt, the main ingredient, the following substances are used as additional: nitrate (nitrate) or nitrite, sugar and ascorbic acid. All ingredients must meet the requirements of the standards.

Salt, even in 1% solution, creates osmotic pressure of 6.1 atm. Preserving effect of salt is based primarily on the impact of osmotic pressure on microbial cells. Most putrefactive microorganisms stop growing at 10% concentration. However, salt does not kill microorganisms and does not destroy their toxins. Special emphasis should be placed on the resistance of halophilic microorganisms to table salt. They develop at high concentrations of salt. Their development in long-term storage can lead to processes that render corned meat useless.

The addition of nitrate to the salt is highly desirable because nitrite is formed under the influence of de-nitrophying bacteria (always present in the brine. The resulting nitric acid is an active oxidizer, acts on the bacterial enzymes and the bacteria themselves, even the clostridia. Under the influence of nitrite meat retains a red color that does not disappear during cooking. Nitrite used in the form of a solution under the control of the laboratory. The content of nitrite in the finished product should not exceed 5 mg per 100 g of weight of the product.

To accelerate coloring and protect ¬ products from discoloration used ascorbic acid or sodium ascorbinate (0.05% by weight of meat). Ascorbic acid directly reduces nitrite to nitric oxide.

Adding sugar during salting softens the saltiness of meat products and protects the nitrites from oxidation. Amount of sugar ¬ sugar should not exceed 2% by weight of brine or 6% of the dry salt mixture.

When preparing salted meat there are three ways of salting: dry, wet and mixed.

Dry method of salting. Each cut or piece of meat rubbed with brine mixture at the rate of 8-10% by weight of meat. Pieces ⊒ ses are packed tightly into containers, pouring over a salt mixture. Cover the last row with 2 cm layer. 3 days after draining, close container. Duration of salting - 20 days.

Dry salting method has positive and negative sides. Positive characteristics are high stability during storage, little loss of proteins, extractive and mineral substances. The disadvantages are high saltiness, stiffness, product dryness and significant meat losses, up to 8.6%.

Wet salting is most commonly used in the production of smoked pork. However, it is also used for making corned beef. The meat is placed in a container and poured in a brine of desired strength. All the meat should be in the brine, so it does not float, it is covered with lattice circles with weights.

Wet salting has advantages over dry salting. With wet salting gentle, moderately salted corned beef (6-7%), has an increased yield - up to 115%. The disadvantages are increased loss of protein, phosphate and high humidity.

Mixed salting includes the first two ways - dry and wet. It is used for obtaining corned beef on spits for prolonged storage and production of smoked pork. First, pieces of meat are rubbed with a salt mixture and put into containers. Each row is covered with the same mixture. The upper row should be above the container. In 3-4 days after setting, the container is replenished with meat of the same salt and covered with strong or weak brine. Strong brine contains about 24% salt, weak - 18,5-20%. Corned beef is considered ready after 20 days, it has a good marketable form, moderate saltiness (9-10%), a small loss of protein, high stability when stored ⊒ . For uniform salting meat once every 5 days shift in a container so that the upper layers are at the bottom and the bottom ones are on top.

Storage of corned beef and veterinary and sanitary expertise. Barrels with corned beef are set vertically in two tiers with a pad between them. During storage monthly quality control is set. Temperature in the cell must be from -10°C to 5°C. Duration of storage - up to 8 months.

During veterinary and sanitary examination determine the freshness of corned meat. Examination may reveal sloughing of surface of meat, presence of mould, flabby consistency of muscle tissue, abnormal coloring on the surface and on cut, sour or putrid smell, turbid, frothy brine.

Veterinary and sanitary examination of imported corned beef is carried out after opening 10% of barrels. If any defects are found, all barrels are opened. Sanitary evaluation is carried out as well as other products.

NEW PRESERVATION METHODS

New methods of preservation include freeze drying, ionizing and infrared irradiation, ultrahigh-frequency and electric contact heating.

Freeze drying. When freeze drying is carried out dehydration of the product in a frozen form in a vacuum. In this case, the ice (frozen moisture in the meat) goes into a vapor state, bypassing the liquid phase. Drying is carried out in special facilities, sublimators, which consist of drying chambers, refrigeration unit for

freezing the product, vacuum pump and condenser for water vapor removal. Using these units a product with a 2-3% moisture content is obtained in 10-16 hours.

Freeze drying has several advantages over heat. Products do not lose their original organoleptic properties, do not change shape and structure, enzymes, vitamins, extractive substances are preserved. They can be kept for more than a year at the usual temperature. Low moisture content prevents the development of microorganisms.

Pack dried products under vacuum in an inert gas atmosphere. Before use, dried products are watered with cold or hot water, and they recover their original properties, as well as the structure for 15-20 minutes. The good quality of such meat products are determined by organoleptic and physico-chemical parameters.

Irradiation with ultraviolet rays. This physical method of preserving meat is used in meat processing enterprises. However, it should be noted that the bactericidal and mycocidal effect of ultraviolet rays only extends to the surface of the product, as they penetrate only to a depth of 0.1-0.2 mm.

In the meat and refrigeration industry ⌋ used bactericidal lamps such as BUV-15 and BUV-30, they work at an ambient temperature of 10-25 ° C. Install lamps at the rate of 0.3-3.0 W of energy per 1 m2 of the premises with air circulation up to 5 vol/h. Distance from the lamp to the product should be 0.5-3.5 m. Prolonged irradiation may cause rancidity of the fat.

Ionizing irradiation.

This type of canning is under experimentation. This method produces undesirable changes in the product.

Ultrahigh-frequency heating. This method of processing is used most often for cooking. Our industry produces microwave household ovens - "Volzhanka", "Electronics", etc. When processing pork and beef with microwave heating they are considered ready in 4-5 minutes, and sausages are heated for 25 seconds. It is noted that during microwave heating protein de¬naturation is minimal.

Topic 9: Veterinary and sanitary examination of fish and fish products.

Plan:

1. general information about fish products.

2. Veterinary and sanitary appraisal of dried, salted, dried, smoked fish and fish products

3. Veterinary and sanitary expertise of fish diseases

In the basins of rivers, lakes, seas and other water bodies in Russia there are about 1,350 different species of fish, about 250 of them are commercially viable. The largest commercial basins are the Northern, Baltic, Azov-Black Sea, Volga-Caspian and Far Eastern.

Depending on habitat and spawning places fish are divided into marine, freshwater, anadromous and semi-anadromous.

Strictly marine fish include cod, haddock, pollack, flounder, sea bass, some species of herring and others.

Strictly fresh water fish include carp, carp and other carps, as well as river perch, pike, trout and others.

Anadromous fish live in the sea water but enter the rivers during spawning. However, there are such fish as eel that fatten up in the rivers and spawn in the sea. The group of migratory fish includes sturgeons, sturgeons, some species of salmon and some herring.

Semi-anadromous fish are those which spawn in rivers but fatten up in lakes or river mouths. This group includes carp, pike-perch, catfish, bream and silver carp.

Fish is used for food purposes: live, steamed, cooled, frozen, salted, dried, smoked and dried. Live, steamed and chilled fish is considered most valuable. Canned, frozen and salted fish is sold whole and in cut up form. Non-edible parts of carcasses are removed at cutting.

The major part of fish production is canned and preserved fish. Fish preserves are not sterilized. For filling this type of production different kinds of sauces and wine are used, which makes them more stable during storage and gives higher gustatory qualities.

THE CHEMICAL COMPOSITION OF FISH MEAT

In terms of calories and taste the meat of fish is not inferior to that of warm-blooded animals. Almost the entire fish body is used for culinary processing, except for internal organs, with the exception of caviar and cod liver. In the process of making canned fish, the content of edible parts is increased by the bones, which are edible after processing.

The nutritional value of fish is determined by the content of high-grade protein, fat, minerals and vitamins (Table 12).

Table 12

Composition and caloric content of fish meat (by Pushkarev et al.)

Name of the fish	Water	Squirrels	Fats	Caloric value, calories/kg
Whitfish:				
before spawning	53,8-57,5	18,3-19,2	21,2-26,1	2410-3175
after spawning	83,2	15,1	1,5	760
Salmon	61,9	17,2	19,5	2535
Semigas	64,2	21,1	13,5	2120
Chum salmon	73,6	18,0	7,2	1410
Trout	75,6	20,8	2,5	1095
Sig	79,0	18,3	1,5	890
Snapshot	79,2	16,3	2,0	875
Mackerel	70,8	18,9	8,9	1605
Black-backed herring	72,6	17,9	18,5	2455

Herring polar	60,1	18,6	22,05	2814
Herring Volga	69,5	18,9	9,9	1695
Herring Atlantic (Murmansk)	65,6	17,96	15,93	2218
Ivasi (Sardine of the seaside)	63,4	18,7	15,6	2220
Salaka	73,3	18,8	5,9	1350
Sardine European	73,7	22,1	2,3	1020
Sturgeon Caspian, Volga	72,2	15,8	10,3	1650
Steller's sea bream	69,8	18,4	10,9	1765
Sterlet	74,5	28,7	6,4	1360
Beluga	76,8	13,3	6,7	1285
Mullet European	79,4	18,3	1,2	880
Flounder	78,4	18,7	1,9	945
Cod	83,6	15,1	0,3	625
Pond carp	74,4-79,75	18,0-19,5	1,8-7,9	950
The bream Astrakhan	69,2	21,7	8,1	1645
Sazan-fall	77,5	17,4	4,0	1080
Carp	80,8	17,6	0,5	770
Pike European	80,3	18,3	0,5	800
Lake pikeperch	79,9	18,9	0,2	795
Perch European	79,5	18,5	0,7	825
Catfish	78,9	16,5	3,4	990
River eel	62,2	14,8	22,2	2670
Lamprey Astrakhan	53,8	11,3	34,1	3625

Fish proteins contain all the essential amino acids: arginine, cystine, histidine, isoleucine, lysine, methionine, threonine, tryptophan and phenylalanine.

Fish oil is of liquid consistency, because unsaturated fatty acids prevail in it. It should be noted that the fat in the body of fish distributed unevenly. Cod fish have liver

fat depot, there is almost no fat in the muscles; pike-perch has it around its internal organs, while roach has it under the skin and in the abdominal cavity.

Minerals are represented by such elements as calcium, potassium, phosphorus, iron, magnesium, iodine and others.

Fish meat is rich in vitamins, both water-soluble and fat-soluble. Vitamin D content in 1 g of fat of river perch liver amounts to 11 IU, cod - 100, halibut - 1200, and sardine - 2300 IU. There is little glycogen in fish meat, 0.036-0.04% in fresh fish. For this reason, the enzymatic processes associated with maturation do not occur in fish, and pH is in the range 6,72-7,02, which determines the unstability of fish during storage.

POISONOUS FISHES

Poisonous fish can also be found among commercial fish. They are divided into permanently poisonous and temporarily, during the spawning period. Permanent poisonous include moray, inhabiting the Mediterranean Sea, sea and river lamprey, blue catfish, yellow and red scorpionfish. The fish marinka, naked sturgeon, Sevan chromulas poisonous caviar, milk and black film lining the abdominal cavity. Such fish is gutted after being caught to remove the poisonous element and used without restrictions. Lampreys are processed with salt to remove poisonous mucus in the skin glands, and then used without restrictions. Temporarily poisonous include fish-dogs. Their toxicity is associated with the period of sexual maturity, especially during spawning.

VETERINARY AND SANITARY EXAMINATION OF FRESH FISH

Fresh fish is not a stable product. Its spoiling in the summer period occurs in 12-24 hours. It is connected with loose connective tissue, low content of glycogen, presence of mucin on the surface of the body, which promotes fast reproduction of microorganisms, high activity of intestine enzymes that cause tissue lysis and abdomen rupture. In this regard, it is necessary to establish the degree of freshness of fish. In addition, fish can be infected and parasitic diseases, exposed to residual amounts of various toxic substances, which also must be taken into consideration during the sanitary evaluation.

Determination of the freshness of fish. The whole batch of fish presented for realization or industrial processing is examined. It is necessary to pay attention to the appearance of fish, state of scales and mucous, color of gills, state of eyes, abdomen, consistency of muscular tissue and smell. The fish is sampled with a hairpin and the specific gravity is checked by dipping it into water. In addition, microbial contamination of muscle tissue is detected by preparing smear-prints with subsequent Gram staining, detect the presence of ammonia and hydrogen sulfide. Cooking test is carried out analogue to the examination of meat.

Necessarily examine for helminths. Fish with bloated belly is opened to reveal ligulosis, dropsy and other diseases.

When examining live fish pay attention to its condition in the cages. Healthy fish is mobile and is at depth. Slow-moving fish is caught and if infectious and invasive diseases are excluded, it is realized. Fish with bruises, loss of scales are not allowed to be sold; it is sent for industrial processing. Emaciated fish is sent for disposal.

During storage at relatively high temperature the fish as well as the cooled one is quickly spoiled, covered with dirty-gray slime, gills become discolored, and an unpleasant smell appears. Signs of various categories of fish freshness are given in Table 13.

Table 13

Signs of various categories of fish freshness

Tissue, organ or part of the carcass to be examined	Fresh	Doubtful Freshness	Unfresh
Slime	Abundant, transparent	Cloudy, sticky, sour-smelling	Dirty gray color, sticky, sour or putrid odor
Scales	Smooth, shiny, hard to pull out	Dull, easy to pull out	Dull, randomly falling out
Eyes	Convex, clear, cornea transparent	Hollow, dull cornea	Deeply sunken, cornea cloudy
Roth	Connected	Ajar	Open
Gills	The color varies from bright red to dark. The mucus is viscous and transparent. Gill lids are tightly seated	The color varies from light pink to slightly gray. The mucus is cloudy. Smell sour. Gill covers are ajar	Muddy green in color. Mucus cloudy, floating, rotten odor
Internal organs	The abdomen is not bloated. Internal organs are well distinguishable	Abdomen bloated. Intestine bloated. Yellow staining of internal organs. Kidneys, liver are softened.	The abdomen is heavily bloated or torn. Internal organs are poorly discernible
Muscles	Elastic consistency. The fish does not bend. The meat is difficult to separate from the bones	It is weakly bent. Meat is easily separated from the bones and separated into fibers	The fish bends easily. The meat is of weak consistency, sprawling
Specific gravity in water	Sinking in the water	Doesn't sink, floats up when submerged	Floats on the surface, often with its belly up

Frozen fish is examined according to the accepted method and sequence. Thawing of individual fish specimens is necessary to determine muscle condition, odor and

other indicators. The frozen fish by indicators should correspond to fresh, canned fish. Color of gills from intense red to light pink. Muscle tissue after thawing without foreign smell. Fatty fish may have a faint odor of oxidized fat. Unhealthy fish have a stale smell, eyes sunken into orbits, color of gills from gray to dark-dark with presence of putrefactive smell. Broth is turbid with musty odor.

If the presence of residual toxic substances in fish is suspected, a chemical toxicological and bacteriological examination is carried out.

Veterinary and sanitary evaluation. Fresh fish without any defects is subject for free sale. In case of doubtful organoleptic characteristics but satisfactory results of laboratory analysis it is sent for cooking. Unsatisfactory fish shall be sent for disposal.

VETERINARY AND SANITARY EXPERTISE OF FISH IN CASE OF INFECTIOUS DISEASES

Rubella (pseudomonas, hemorrhagic septicemia, infectious dropsy, Jublin disease) is an acute disease that mainly affects carp. This disease is noted in bream, bream, line and eel. The causative agent - short, motile gram-negative bacillus B. Pseudamonaspunctata. The most susceptible are fish aged 2-3 years.

Diagnosis is carried out by clinical signs and pathological anatomical changes. On the skin dot haemorrhages and ruffled jaw, red fins, and noted exophthalmia and bloating of the abdomen. Later red ulcers are formed, usually round with a white rim. Blood smears reveal a large number of gram-negative microorganisms.

Veterinary and sanitary evaluation. In the presence of single red spots, the fish is released for sale to public catering, the affected places are cleaned up. In the presence of extensive red spots on the skin, water spots or in the presence of purulent-necrotic ulcers or foci of hydraemia the fish is sent for disposal.

Fluorescent necrosis. This disease of pond carps is more often observed during the hot season.

The causative agent is B. pseudomonasfluorescens, a Gram-negative, motile bacillus. Penetrating into the fish skin the pathogen causes focal melting, necrosis and detachment of tissue flaps. Lesions are found on the lateral surfaces of the body. Muscular tissue is exposed in the places of skin tearing away.

Veterinary and sanitary evaluation. Same as in carp rubella.

Furunculosis. The disease is found in trout farms. On the body of fish found ¬ furunculi filled with pus. Sometimes marked by exophthalmia and pale gills.

Veterinary and sanitary evaluation. Fish with abscesses, skin necroses and ulcers are sent for utilization.

Vibriosis of fish. Affected carp, perch and bullhead fish families. The causative agent - Vibriocaspii - resembles a comma. On the surface of the body pustules are found, which later become ulcers.

Veterinary and sanitary evaluation. If there are isolated lesions, after cleaning, the fish is sent for public catering or canned food.

If pustules are detected, the fish is subject to utilization.

Smallpox. Viral disease of carps, carp, bream, bream, pikeperch, catfish, smelt. At the beginning of the disease dark gray spots appear on various parts of the body and fins. Later the whole body of fish is covered with plaque that resembles paraffin.

Veterinary and sanitary evaluation. Fish may be released without restrictions in case of limited damage. Fish with presence of overgrowths affecting separate parts shall be used for public catering after cleaning. In the presence of white cartilaginous growths and hydremia the fish is sent for disposal.

Viral hemorrhagic septicemia of rainbow trout. The disease is characterized by septic processes with hemorrhages in internal organs and muscular tissue. Infection can be seen in young and two-years-old rainbow trout. In the acute course set anemic gills, multiple hemorrhages in the muscle tissue, swim bladder on the abdomen, heart, sometimes red staining at the base of fins. Due to accumulation of exudate enlarges abdomen, the body "becomes almost black color, exophthalmia is expressed. Gills painted grayish pink or pale gray.

Veterinary and sanitary evaluation. Under insignificant lesions the fish is used for food purposes through public catering. In case of obvious changes the fish is sent for utilization or after cooking it is used as food for animals.

Plague of pikes. This is an acute disease accompanied by skin lesions in the form of red spots, which turn into ulcers. Ulcers are up to 5-10 cm in diameter; their surface is dry and not stained. Etiology of the disease is not found out definitely. Some authors consider B. aeromonaspunctataformapellis to be the causative agent.

Veterinary and sanitary evaluation. Same as in carp rubella.

Lymphocytosis. This is a viral disease of perch, ruff, as well as flounder. In this case, on the fins, skin, gills find flat or nodular cartilaginous overgrowths of gray. This occurs due to overgrowth of epithelial cells.

Veterinary and sanitary evaluation. Diseased fish should be sent for disposal.

Bronchiomycosis (gill rot). The disease affects fish of the family of carp, pike and salmon. The causative agent of the disease - fungus Branchiomycescessanguinis. Fish detected "marbling" gills. Due to impaired circulation decay of the gills (rotting). Pathological changes are only noticed in the gills.

Veterinary and sanitary evaluation. After decapitation fish can be released without restrictions.

Dermatomycosis. The causative agent of the disease is fungus Saprolegnia permanently inhabiting all kinds of water bodies. Affect fish of all species. Affected skin, gills and fins. The disease is characterized by the appearance of fungus hyphae in the affected places in the form of white threads resembling absorbent cotton.

Veterinary and sanitary evaluation. With slight damage the fish can be released after cleaning. With severe damage the fish is sent for disposal.

VETERINARY AND SANITARY EXPERTISE OF FISH IN CASE OF INVASIVE DISEASES

Opisthorchiasis. Fishes of the carp family are affected. The causative agent is Opisthorchisfelineus larvae, which have cat's or anthrax bipeds. Semi-mature stage is parasitized in the permanent host in the liver, gall bladder and ducts of the pancreas. A definitive host is humans and carnivorous animals. Basins of rivers (Ob, Irtysh) and rivers flowing into the Caspian, Azov, and Black Seas are regions where Despis retorchosis occurs. Helminth eggs get into the water with feces; their development up to the cercariae stage takes place in the mollusk. After leaving the mollusk they penetrate into the subcutaneous layers of fish muscles and become

metacercariae. Their size is 0.2-0.3 mm. Examine the crushed pieces of muscle tissue under low magnification microscope. The metacercariae are bent in the cyst, and suction cups and dark excretory bladder are visible under the microscopy of muscles.

Veterinary and sanitary evaluation. In regions unsafe for opistorchosis fish is considered to be conditionally fit. It is necessary to subject it to appropriate technological treatment: boiling for 30 minutes or freezing at -15 °C - 30 days, -28 °C - up to 42 hours and at -35 °C - about 10 hours.

Diphyllobothriosis. Invasive disease of humans and carnivorous animals (dogs, cats, foxes) caused by larval stage of tapeworms. It lives in the intestines of humans and animals, and larvae - plerocercoids - in muscles and organs of pike, burbot, perch and ruff. The causative agent develops with participation of additional and intermediate hosts. Human beings and carnivorous animals infected with Lenticera widespread excrete eggs into the external environment with their feces. Further development occurs in the water, eventually they get into the fish body. In the life cycle of Diphyllobothrium can be present reservoir host - predatory fish (salmon, lake trout, grayling, eel) that can accumulate plerocercoids in large quantities. Lenticular mania lifespan in a host organism is up to 20 years.

Plerocercoids are worm-shaped larvae of milky-white color with transverse wrinkles on their bodies 1-1.5 cm long. The head end of the plerocercoid is wider with two slit-like botryami, through which the larva is attached to the wall of the intestine.

The larvae of the Lesser or narrower tapeworm are found in whitefish, whitefish, omul, grayling, and other fish inhabiting the Lake Baikal and other water bodies of Siberia and the North. The definitive host is man, fish-eating birds. The development cycle of lesser and narrower tapeworms is the same as that of the broader one. The plerocercoids localize on the serous covers of the gastrointestinal tract.

Veterinary and sanitary evaluation. Fish contaminated with plerocercoides is prohibited for food purposes without appropriate treatment. It can be used after decontamination by boiling for not less than 30 minutes or for canned food. Decontamination occurs also after freezing at -18°C for 48 hours and at -12°C for not less than 6 days.

Fish can be decontaminated in a microwave oven. Duration of processing depends on fish weight. So, 3 minutes is enough for 400 g weight, 5 minutes for 500 g weight, 10 minutes for 850-900 g weight and 12 minutes for 1000-1100 g weight.

Placards warning of the need to thoroughly cook fish carcasses should be posted in places where fish is sold in the regions that are not affected by diphyllobotrysosis.

Clonorchiasis. Helminthiasis is a disease of humans and flesh-eating animals associated with liver damage. The causative agent is Clonorchissinensis from Opisthorchide family.

Clonorchiasis is widespread in the Far East and Middle Amur Region (by the consumption of raw fish). It infects the carp family. The development of the

Klonorchis pathogen is similar to that of Opisthorchis. Additional hosts are freshwater fish (more than 70 species).

Veterinary and sanitary evaluation. Same as in opisthorchiasis.

Metagonimosis, the disease is widespread among fish of Amur, Dnieper, Danube, Dniester Rivers. The causative agent is Metagonimus jokogawai. It affects fish of the family of carp and salmon. The helminth develops with the participation of the definitive host, which is a man, flesh-eating animals, and fish-eating birds. The mature stage parasitizes in the intestines, excretes eggs that get into the water with feces. Further development is carried out with the participation of shellfish and fish. Cercariae penetrate into the skin of fish, under the scales, fins, as well as in the gills. Cysts have a globular shape with a diameter of 0.15-0.2 mm. Diagnosis is carried out using a microscope. To do this, take the scales, placed between two slides, treated with 50% glycerol and examined under low magnification.

Veterinary and sanitary evaluation. In regions not affected by the disease the fish is cleaned by removing fins, gills and scales. The fish is then boiled for 30 minutes or frozen at -20°C with further keeping for 8-10 days.

Trienophorosis. This is a disease of freshwater fish that does not participate in the biological cycle of development. The causative agents are Triaenophorus nodulosus and Tr. crassus. Definitive host is pike, mature parasite reaches 30 cm in its intestine. Eggs of mature parasite enter water and coracidium develops from them. They are swallowed by crustaceans. This is the first intermediate host. Later crayfish get into the intestines of perch, burbot, pikeperch, trout, smelt - the second intermediate hosts. From the fish intestine larvae penetrate into the body cavity and settle in the liver or mesentery, turning into plerocercoid.

The development of Tr. crassus is somewhat different. Pike is also a definitive host, but larval stage develops mainly in whitefish, and larvae are localized not in body cavity, but in muscles in pea-sized capsules.

When examining certain pathogens under the microscope the larvae with hooks on the head end are found.

Veterinary and sanitary evaluation. Fish should be released for sale in gutted form. If the fish is infested with plerocercoids, the degree of infestation should be determined; if the infestation is weak, the fish should be used for food purposes. If muscles of whitefish are affected such fish is discarded.

Ligulosis is registered in fishes of the carp family as an intermediate host. The causative agent is Ligulaintestinalis. Definitive hosts are gulls, glossy ibex, ducks. Helminth eggs get into the water, turn into coracidia that are swallowed by crayfish, and procercoid is formed in them. Fish that swallowed such crustaceans develop a larva - plerocercoid, which in a few years in the abdomen reaches a length of up to 1 m. They are called ligules (ramenets). Fish abdomen is heavily swollen, sometimes marked hydraemia.

Veterinary and sanitary evaluation. Considering safety of ligules for humans, the fish after gutting can be sold for food purposes if there is no hydraemia. In case of hydraemia, the fish is to be utilized or fed to animals.

If the fish is affected by leeches and crustaceans, they are removed and the fish is used without restrictions. If emaciation or distortions are detected, the fish is sent for disposal.

VETERINARY AND SANITARY EXPERTISE OF DRIED, SALTED, DRIED, SMOKED FISH AND FISH PRODUCTS

EXPERTISE OF SALTED FISH

The methodology of examination of canned fish does not practically differ from the examination of non-canned or cold-treated fish. Salted good-quality fish is silvery-white or dark-gray in color, the surface is clean. The consistency of the muscle tissue is dense, smell specific, however slight oxidized smell of fat on the surface is allowed. In herring the abdomen in the area of pectoral fins may be weakened. The structure of muscle bundles is preserved. At spoiling of salted fish surface is dull, covered with yellowish-brown stain and unpleasant smell. The consistency is flabby, the skin easily torn, the muscle tissue is dirty gray with a musty odor. The cod-liquor is dirty gray in color with a foul odor.

Flaws in salted fish. They can be different: mechanical damage, burst abdomen, musty smell in the gills, significant oxidation of fat with the presence of ⊒ rust, putrefactive decay surface covers. The initial stage of decomposition of salted fish is called "puffing", with a slight redness of the meat. In some cases on the surface of fish appears red blotch "fuchsin. This is due to the development of halophilic pigment-forming microorganisms. On salted fish can develop larvae cheese fly - "jumpers. In the presence of defects in the fish are noted and spoilage of mash.

Veterinary and sanitary evaluation. Fish with saponification, "fuchsin", surface "rust" is subject to cleaning and hard salting. Fish affected by "saponification" penetrating under the skin, with signs of putrefactive decomposition, the presence of "rust", "fuchsin" penetrating under the skin, is sent for disposal.

EXAMINATION OF DRIED AND DRIED FISH

Good quality dried fish has a clean dry surface, grayish or dark gray color. Slight yellowing of the surface of the muscle cut in the abdominal part is allowed. The consistency of the muscle is dense or firm. The taste and smell are typical for this species. The cut may show a faint odor of oxidized fat. Low-quality dried fish surface is moist, sticky, and smells musty. The cut surface of the cut of the abdominal cavity of fish is yellowish with a sharp smell of oxidized fat. The consistency of the meat is soft and the muscles are not separated into separate bundles. The main pest of dried fish products is the bark beetle (its adult larva is called "shashel"). The beetle spoils only very dehydrated fish, dried, fresh-dried, salted dried (natural and hot dried). The larvae of the dermestid beetle are found in body cavity, gills, subcutaneous layer and deep layers of musculature. With severe damage and penetration into the muscle tissue the fish has an unpleasant ("murine") smell.

Veterinary and sanitary evaluation. Dried and dried fish as to organoleptic quality and affected by beetle is sent for utilization.

EXPERTISE OF SMOKED FISH

Benign cold and hot smoked fish with clean not moistened surface. The color of external coating of fish of different species from light yellow or golden to dark brown. Undressed fish has a whole belly, dense or soft, but not swollen. The consistency of the fleshy parts of fish is juicy or thick, herring may be soft or stiff. The smell and taste of fresh smoked fish is characteristic of the fish of the species. Herring may have a faint odor of oxidized fat on the surface. For hot-smoked fish quality defects associated with the lack of freshness of raw fish used for smoking, or mainly with a delay of realization of this perishable product

(saponification of fish surface, mold contamination, the appearance of stale odor, etc.). Low-quality cold-smoked fish is wet from the surface, dull-golden color. Belly flabby consistency, internal organs lysed, with unpleasant smell. The drawing of muscular tissue indistinct, turbid, meat consistency is weak, flabby, stale or putrid odor.

Flaws in smoked fish are similar to those of salted fish.

When examining smoked fish it is also necessary to identify some of its specific defects: "bubbles" - areas of wrinkled lagging skin due to a long stay of fish in soaking vats; "burns" - areas of dark color formed due to overheating of fish; "paparka" - boiling of fish in the process of smoking; "Scale loss" - dull color and flabbiness of the muscles caused by oxidized fish; "rapist" - crystallization of salt on the fish surface as a result of over-salinity; "belobochka" - non-smoked white spots that contacted each other in the chambers during fish smoking.

Veterinary and sanitary evaluation.

If small bubbles, minor burns and underburning are detected, the fish can be used after cooking. Fish with Rapistosity is soaked with subsequent immediate realization. Fish with "white sided" should be returned for additional processing or immediate realization. The evaluation of hot and cold smoked fish affected by mold is the same as for meat of slaughter animals. Unsatisfactory cold and hot-smoked fish shall be sent for disposal.

Topic 10: HSE and hygiene of canned meat and meat products

Plan:

1. the technology of production of cured meats and salting of meat products

2. Veterinary and sanitary appraisal of smoked sausages

Completely boiled kleidachnye by-products for 5-6 hours at a temperature of 95 ° C. Non-cleiding by-products are boiled for 2-3 hours, sliced and mixed with the broth. The mixture boiled for 40-60 minutes at 90 ° C, poured into bowls and cooled at 3-4 ° C. The content of moisture in jelly is not regulated. The content of salt - 1,8-2,2%. The layer thickness should not exceed 70 mm. Storage period of jelly at the end of the technological process, including transportation and realization at the temperature not lower than 0 ° C and not higher than 6 ° C - no more than 12 hours.

CURED MEAT PRODUCTION TECHNOLOGY

Cured meat refers to natural products made from pork meat, subjected to boiling, smoking and drying after the pre-salt. Smoked meat can be subdivided into ham, baked and cooked. These include brisket, brisket, ham, etc. Making them ─ is composed of two manufacturing operations - this salting and smoking.

MEAT PRODUCTS SALTING

The salting of briskets, bones and hams is done with some differences.

Briskets. Brisket first rubbed with salt mixture, 7-8% of the mixture to the mass of meat. The salt mixture contains 93% salt, 5% sugar and 0,5% sodium nitrate. Meat is placed in a container, and after a day filled with brine density 24 °Bome. Brine is used 50% to the mass of meat, the duration of salting - 12 days. Then the briskets are removed from the container and placed on wooden racks. After one day, after the brisket drips off, the briskets are washed with warm water and sent for smoking. Briskets intended for release in the smoked form, smoked at 30-35 ° C for 24-36 hours; intended for cooking - 5-6 hours. Boil smoked brisket in water cauldrons at 70-72°C for 30-40 minutes. The temperature by the end of cooking in the thickness of the product 64-65 ° C is sufficient.

Krejki. For cooking loins use pork chilled, os¬tivshuyu and thawed. Thickness of a speck in a dorsal part should be not less than 1,5 cm and no more than 6 cm without taking into account the skin.

Salted barks carried out with a thin needle from the end part in the dorsal ⌟ muscle brine (o.p. 1.087) with 0.5% nitrate, 2% salt and 0.03% nitrite. This is done on each side by two pricks and injected 4-5% of the brine to the mass of meat. Then rub rubbed loins salt mixture, consisting of 93% salt, 5% sugar and 0.5% nitrite, and lay the skin down in containers. They are kept for 2-3 days, then prestressed and poured in brine. Keep them in the brine for 10-12 days. Then removed from the brine and kept for 2-3 days for ripening. After ripening are washed with warm water, hung on frames and dried. Ruts intended for smoking, smoked at 30-35 ° C for 36 hours and intended for cooking - 6 hours. Rumps are boiled in water cauldrons at 68-72°C for 45-60 minutes. Hams intended for shipment are dried in smokehouses at 12-15°C for 7-10 days, and for local sale - 3-5 days.

Hams. The salting of hams, as well as bones, begins with brine spraying. After spritzing hams are placed in a container, pouring each row of salt. The top row is covered with wooden grids, a weight is put on top and covered with brine for 3-4 days. After salting the hams are placed on wooden racks for 1-2 days for drainage of brine. Before smoking or cooking, hams soaked in warm water for 2-3 hours and washed.

Smoking can be hot and cold. Cold smoking is carried out at a temperature of smoke 18-22 ° C for 5-7 days, hot - at a temperature of 32-50 ° C for 24-48 hours. Burn sawdust alder, oak, beech in a special smoking chamber, which loaded meat products (hams, breasts, loins).

VETERINARY AND SANITARY EXPERTISE OF SMOKED SAUSAGES

Organoleptic examination. Each batch of sausage products is examined by examining at least 10% of the loaves. For detailed organoleptic study take no less than two samples of 200-250 g. Determine appearance, smell, presence of mucus. Meat loaf cut lengthwise and crosswise, while establishing the color of the stuffing on the cut and under the casing, the consistency of loaf, the presence of air voids, gray ¬ spots. Smell is additionally determined by breaking the loaf.

In good quality cured meats casing surface clean and dry, without spots, the casing fits tightly to the stuffing, the color of the stuffing on the cut homogeneous, corresponds to the color inherent in each type of sausage. Sausages must have an aroma of spices and smoking, a pleasant taste with no signs of mustiness, sourness, foreign flavors and smells.

In the examination of sausages can be detected defects: sour fermentation, putrefaction, rancidity, etc. In the process of storage with violations of temperature and humidity conditions on the skin ─ layer smoked bats formed plaque gray. The cause of this defect ─ is the development of cocci, yeast or mold. On cooked and liveried sausages can appear yellow-gray powder consisting of pigment-forming cocci. Sometimes a sticky slime with an unpleasant odor is found. This mucus usually consists of cocci and Pseudomonas and Achromobacter bacteria. At this stage of deterioration, the bacteria penetrate through the sausage casing into the minced meat. The surface layer of the stuffing is softened.

Mildewing of smoked and semi-smoked sausages is observed when humidity conditions of storage are violated. In the initial stage, it does not affect the quality of sausage, but when the loaf is covered with a solid crust and breaks the casing ¬ ka, there is a musty smell, such ¬ products are not suitable for food purposes. You should not mix salt crystallized on these loaves with mold. Dry patches on dry sausage are not an obstacle to sale.

Bacterial spoilage of sausages is sometimes accompanied by greenish minced meat in the center ¬ or in the form of rings on the periphery of the loaf.

Sausage products in which the cause ─ of discoloration are bacteria, are subject to rejection.

Laboratory tests include chemical analysis for salt, nitrates, nitrites, moisture, starch, and microbial contamination.

Commodity evaluation is based on detection of technological defects. These include products with burst casings, stuffing, large slips, bouillon and fatty swellings. Depending on the changes in the sausage is sent for additional processing, industrial processing¬ or technical utilization. These issues are decided by a veterinarian.

Topic 11: VSE of sausages and smoked meats.

Plan:

1Basics of technology, hygiene and veterinary and sanitary expertise of sausages

2 Production technology for cooked sausages

3. technology of half-smoked sausage production

4.Smoked sausage production technology

Sausage production is an important part of the meat industry. Sausage production should be considered as a thermo-chemical method of meat preservation, carried out with the use of high temperature and chemicals.

Sausage products is a ready high-calorie meat product, which has a specific taste and flavor. The action of high temperature and chemicals added during the manufacturing process helps inactivate microflora and preservation of the finished product. The duration of realization period of sausages depends on a number of technological methods of making them.

Sausage production includes the production of the following groups of products: cooked, semi-smoked, cooked and smoked, raw smoked, stuffed, liver, diet, blood, meat and vegetal, with cheese, meat loaves, burgers, jelly, pates. A special group are sausages made of horse meat, deer and camel meat. They are subdivided into stable and non-stable. Stable ─ raw smoked and semi-smoked sausages, they are preserved for a long time. In recent years, with the use of artificial casings and cooked sausages ¬ boys keep up to 30 days.

For each type of sausage products is a certain manufacturing process, approved technological instructions, recipes. Quality control and evaluation of these products is carried out in accordance with the requirements of GOST or TU.

Compliance with recipes, technological instructions and sanitary regime during the technological process is a prerequisite for high quality sausage products.

RAW MATERIALS AND SUPPLIES

In the production of sausages decisive importance belongs to raw materials. The quality of raw materials directly depends on the quality of the finished product. The main raw material is beef and pork. Much less often used mutton and the meat of other livestock ─. Meat for sausage products must be fresh and of good quality. According to fatness meat is used in any category, but beef preferably with a minimum amount of fatty tissue. According to thermal condition, steamed (cooled), chilled and unfrozen meat is suitable for sausage production. Frozen meat in blocks is also suitable for making sausage.

Burnt beef is used only for cooked sausages, frankfurters and wieners. From this meat are better products. The bottom line is that fresh meat is better able to absorb moisture than chilled or defrosted meat, which is very important in the manufacture of these products. Higher volumidity of fresh meat contributes to obtaining the established yield and humidity ─ the finished product, improves taste and tenderness. The use of fresh meat reduces the cost of production process, because in this case there is no natural loss during cooling.

Animal fats are a necessary raw material for the vast majority of sausage products. Fats are added to increase the caloric value and to give the sausage products a delicate and pleasant taste. When producing sausage products use mostly low-melting fats. Pork fat and bacon fat is used in pieces of various shapes and sizes. When making liver sausages, frankfurters and sausages ¬delki use internal melted fat. Fats used in sausage production must be fresh and good quality. In diet sausages added milk and melange.

When making low-grade cooked and semi-smoked sausages, bologna, jelly beans are used in addition raw materials such as by-products of various categories (liver, lungs, brains, pork skin, etc.), blood, casein.

In production of meat and vegetable sausage products different cereals, starch, soy concentrate and wheat flour are used as a raw material.

According to technology, in addition to the basic raw materials sausage products require components which give sausage products a specific taste and flavor. These components are table salt, nitrite and sugar, as well as spices and spices. To spices and spices include onion, garlic, black, white, red and allspice peppers, nutmeg, cloves, cinnamon, cardamom, cumin, bay leaf, wine, cognac, etc. They are added to the products in the quantities, specified in the recipes. For all materials, spices and spices standard requirements for physical and chemical properties, as well as the degree of their bacterial contamination. It is preferable to use extracts of spices, as they are less contaminated with microorganisms. To improve the quality of products such materials as phosphates, glutaminate and sodium ascorbinate are used.

RAW MATERIALS AND SUPPLIES

In the manufacture of sausages is decisive raw materials. The quality of raw materials directly affects the quality of the finished product. The main raw material is beef and pork. Much more rarely used mutton and other livestock meat. Meat for sausages must be fresh and of good quality. According to fatness use meat of any category, but beef is preferred with minimal fatty tissue. In terms of thermal condition, fresh (chilled), chilled and unfrozen meat is suitable for the production of sausages. Frozen meat in blocks is also suitable for sausage production.

Burnt beef is used only for cooked sausages, frankfurters and wieners. This meat makes better quality products. The point is that fresh meat absorbs moisture better than chilled or defrosted meat, which is very important in the production of these products. The higher moisture absorption capacity of fresh meat contributes to a set yield and humidity ─ of the finished product, improves taste and tenderness. The use of fresh meat reduces the cost of the production process as there are no natural cooling losses.

Animal fats are an essential raw material for the vast majority of sausage products. Fats are added to increase the caloric value and to give the sausage products a delicate and pleasant taste. In the production of sausages use mostly low-melting fats. Pork fat and bacon fat is used in pieces of various shapes and sizes. In the production of liver sausages, frankfurters and wieners, melted internal fat is used. The fats used in sausage production must be fresh and of good quality. Milk and melange are added to diet sausages.

In the manufacture of low-grade cooked and semi-smoked sausages, bologna, jelly, additionally use such raw materials as by-products of various categories (liver, lungs, brains, pig skin, etc.), blood, casein.

In the production of meat and vegetable sausages as raw materials are used various cereals, starch, soy concentrate, wheat flour.

According to the technology, in addition to the main raw materials for the production of sausages, components that give the sausage products a specific taste and aroma are needed. These components are table salt, nitrites and sugar, as well as spices and spices. Spices and spices include onion, garlic, black, white, red and green pepper, nutmeg, cloves, cinnamon, cardamom, cumin, bay leaf, wine, cognac, etc. They are added to the

products in the quantities indicated in the recipes. For all materials, spices and spices have standard requirements for physical and chemical properties, as well as the degree of their bacterial contamination. It is preferable to use spice extracts, since they are less contaminated with microorganisms. Materials such as phosphates, glutaminate and sodium ascorbate are used to improve product quality.

Salting and ripening of meat. After shredding meat laid out in stainless steel or aluminum basins with a capacity of 20 kg or in containers 70-80 kgi subjected to salting. They add cooked salt, sugar and sodium nitrite to the meat, put it in the ripening chamber at 2-4 ° C, kept fresh meat 24 hours, and chilled or defrosted - 48-72 hours. When curing consumed per 100 kg of meat 3 kg of table salt, 100 g of sugar and 7.5 grams of nitrite in a 2.5% aqueous solution prepared directly ╡ in the laboratory. In the process of maturing ground meat becomes sticky, tender, specific smell, his moisture capacity increases, which ensures juiciness of sausages and their high yield.

Secondary grinding. After ripening the meat is subjected to secondary milling on the grinders and cutters. If the meat was subjected to salting and ripening in the form of meal, it is first passed through a spinner with a grating diameter of 2-3 mm,
and then cutted. If the meat is matured after being finely chopped, it is sent directly to the cutter. The cutter is a bowl, inside which knives with thin and wide blades are mounted. The meat is cut more finely in the cutter.

The cutter heats the meat which can impair the quality and increase the bacterial contamination. To avoid this, at cuttering cold water or flake ice is added to the meat (10-20% of the mass of meat) which helps maintain the temperature in the thickness of the processed meat ¬8-10 ° C. Lowering the temperature increases the moisture capacity of the meat and increases the juiciness of the sausage products.

Preparation of minced meat. After secondary meat grinding all other components are added: bacon, spices, spices, spices, mixed thoroughly, add to this mixture the required amount of water or ice. For one-structure sausage products (frankfurters, wieners, doctor sausage) minced meat is prepared in cutters, and for sausages containing pieces of bacon - in mincing machines, which are tubs with a cone-shaped bottom. Stuffing is mixed in them by two mounted S-shaped blades rotating in opposite directions at different speeds. Stir the stuffing for 10-15 minutes. Modern agitators work with the creation of vacuum. Absence of air in the mixers improves the quality of minced meat. High production capacity is distinguished by rotating machines, which combined nodes for grinding, cutting and mixing of minced meat.

Regardless of how the components are mixed minced meat goal of the operation is the same:

1) to obtain a homogeneous mixture in terms of composition;

2) to mix the meat particles with water;

3) Distribute evenly in the minced meat pieces ─ pieces of bacon. Ready minced meat is transferred by pipes to the filling department, where it is syringed into the casing.

Spritzing is filling ready-made stuffing with natural or artificial casings. As a result of sprinkling sausages get their inherent shape of cylindrical loafs or rings. The diameter of casings may be different and depends on the type of sausage being

made. The casing not only provides the shape of the sausage products, but also protects them from contamination and shrinkage. Casing must have strength when filling with ground meat, resistance to heat treatment and the ability to shrink and expand. These requirements are best met by natural casings, ie animal intestines. Of artificial casings in sausage production cutisine, viscose, cellophane and paper are used. All these shells meet the necessary requirements. They are calibrated and most of them are marked, i.e. the name of the sausage product.

Filling the casing with ground meat by machine syringe. Inside the syringe there is a piston or screw, which if necessary is set in motion. Syringe has a tube - chain, through which the movement of the piston or auger leaves the filling and fills the casing at one end stretched to the chain. The piston or auger is set in motion by pressing the pedal. Currently used for syringing automatic syringes that fill the casing minced meat and metal clips are imposed on the ends of the loaf, while separating the loaf. These syringes operate under the control of the worker. Sprinkling force-meat for cooked sausages carried out at a pressure of 8-10 atm.

Stringing sausages. Sausage baton with large diameter is tied crosswise every 3-5 cm. This tying contributes to strength of the casing. Along with tying loaf the same workers hold shtrokovku, ie pierce thick skin ¬ sheaf in places where accumulated ¬ air. Lanterns should be removed, as they degrade the quality of the product. Stuffing in these places is discolored, spoiling the appearance of to¬varishnaya and reduces the durability of the sausage.

Sausage bars made on automatic machines with markings on the casing are not subject to binding. These sausage baton stacked in a cell frame in a semi-horizontal position. They are then sent for upsetting and roasting. Sausages to be suspended from the frames have a hinge tied at one end.

Hanging sausage bars is carried out on the frame rails by 4-12 pieces, depending on the diameter of the bar, in such a way that they do not touch each other. Frames are then moved into the department for the precipitation of sausage cakes. With proper ventilation and temperature of 3-7 ° C, the baton sustained for 2-4 hours and then sent to the roasting chamber, where they treated with smoke from sawdust nesmolystyhnyh species of wood for 40-60 minutes at a temperature of 75-80 ° C. Minced meat temperature by the end of roasting should not exceed 40-45 ° C. In the process of frying skin baton thickens, dries up, gets a specific smell. The smoke has a bactericidal effect, inactivating vegetative forms of microorganisms in the shell and minced meat.

The final operation is boiling in water baths or in steam chambers at temperature of 75-80C. Cooking time is directly depending on the diameter of baton. Sausages boiled for 10-15 minutes, large diameter dough - about 2 hours. Readiness of sausages judged by the temperature in the thickness of the loaf, it should be 70-72 ° C. Overcooking loaf is undesirable, since this breaks the shell, and stuffing become dry and friable. Therefore, by the end of cooking measure the temperature in control bar.

Currently there are units in which the processes of roasting and cooking are combined and there is no need to distill the frames after roasting in the oven for cooking.

After cooking the sausage is cooled under a cold shower to a temperature of 15-18 ° C for 10-15 minutes or indoors at a temperature of 10-12 ° C for 10-12 hours. Most cooked sausages do not keep for a long time and should be sold quickly. Cooked sausages are stored in

production and trade ─ network at 0-6 ° C. Once a decade in the manufacture of research to determine moisture, amounts of salt, nitrite and microbial contamination, in addition, conducted radiological control.

Duration of storage and realization of cooked sausages depends on the applied shell. For example, sausages encased in polyamide, polyvinyl chloride, polyamide-polyolefinil casing (temperature 0-6°C) are stored for not more than 15 days for the highest grades, 10 days for the first grade; 7 days for the second grade.

Sausage products in the same covers, but in a frozen condition at a temperature no higher than -10 ° C up to 30 days, and at -18 ° C - no more than 90 days.

When using the cover "Amitan" sausage first grade kept at 2-6 ° C for no more than 20 days, frankfurters in ¬ cladding "Amipak" - up to 8 days.

Sausages and wieners cooked with food additive "Antibac" are kept up to 5 days, and packed under vacuum - up to 15 days, frozen at -10 ° C - 30 days, at -18 ° C - 90 days.

TECHNOLOGY OF HALF-SMOKED SAUSAGE PRODUCTION

This type of sausage includes Poltava, Krakow, Polish, Ukrainian and some other sausages. Raw materials for these sausages are the same as for cooked sausages, the only difference is that fresh meat is not used.

Technology for making sausages before sprinkling is basically the same as for cooking cooked products. Sprinkling is carried out more tightly. After shpricovki cylinders baton directed to the sediment, which lasts 4 hours at a temperature ¬ temperature of 10-12 ° C. Subsequently, the baton is roasted for 60-90 minutes at 60-90 ° C, and then cooked for 40 to 80 minutes at 75-80 ° C and post¬ cooling at a temperature no higher than 12 ° C for 3-5 hours. The next operation is smoking hot ╡ smoke at a temperature of 35-50 ° C for 12-24 hours. This completes the production of semi-smoked sausages for local sale. Sausages sent for resale are additionally dried for 2-4 days at a temperature no higher than 12 degrees Celsius. The yield of finished semi-smoked sausages is 60-80%. Moisture content of semi-smoked sausages is between 35-60%. At a temperature no higher than 12° C and relative humidity of 75%, semi-smoked sausages can be stored up to 20 days, and at a temperature of -9° C up to three months.

PRODUCTION TECHNOLOGY FOR CURED SMOKED SAUSAGES

This type of sausage includes delicatessen, cevlat, Rostov, Moscow, etc. There are some differences in the technology of producing cooked-smoked sausages. Thus, the sediment continues ¬ kaes 24-48 hours, the primary smoking - 60-120 minutes at 50-60 ° C, and after cooking the secondary smoking - 24 hours at a temperature of 40-50 ° C or 48 hours at a temperature of 32-35 ° C. After the second smoking made drying for 3-7 days at 12 ° C, 75-78% relative humidity. In the ready-made sausage contains 38-43% moisture. The yield is 65%. Sausages can be stored up to 30 days at 4 ° C, and at -7 ... -9 ° C - up to 4 months.

PRODUCTION TECHNOLOGY FOR SMOKED SAUSAGES

This type of sausage includes Moscow, Uglich, Tambov, Maykop, pork, metropolitan, granular and others. For the manufacture of smoked sausages use raw material only the highest grade. Beef must be from adult bulls and bullocks ╡ without fatty deposits, pork - from animals of 1-2 years. Smoked sausage products include sausages made from raw meat and fat, prepared for use as food long-term fermentation and dehydration of meat. Raw

smoked sausages are not cooked. The manufacturing process ─ is long and takes about 50 days.

After careful deboning meat is subjected to salt in slices of 400 grams. For 100 kg of meat used 3,5 kg of salt, 75 grams of nitrite and 200 grams of sugar or glucose. After salting the meat is kept 5-7 days at a temperature of 2-3 ° C. To reduce seasoning period in 2 times meat is ground in grinders through the hob with diameter of 16-24 mm, and then re-grind with holes of diameter of 2-3 mm and mixed with all constituent parts ┘ tioned recipe. Water is not added to the stuffing. The force-meat is spread out in bowls with the layer not more than 25 cm and kept at 3-4 °C for 24 hours. Then stuffing is filled into the casing slowly and very tightly under pressure of 10-13 atm. Tie loops tightly with twine. After tying the batons hinged on frames and transported to the deposition room. Deposition of baton lasts 5-7 days at a temperature of 2-4 ° C and 85-90% relative humidity. After sedimentation loaf processed 5-7 days in smoke chambers with smoke nesmolichnyh tree species at a temperature of 18-22 ° C. After smoking the sausage is dried at 12°C and 75% relative humidity for 25-30 days.

The yield of the finished sausages is 55-70% with a moisture content of 25-35%. This is the reason for the high durability of raw smoked sausages. Raw smoked sausages are kept in boxes in a cool, dry place at 12°C. Shelf life - 12 months.

LIVER SAUSAGES

Liver sausage includes products made from unsalted cooked meat products. For the manufacture of liver sausage raw materials are used that are not suitable in terms of structure for making cooked sausage (liver, lung, tripe), as well as collagen-containing raw materials, which are obtained during deboning and dressing of meat, which require long boiling.

Fat is added to liver sausage filling to give a smeared consistency and increase nutrition, as well as gelling components to give the necessary viscosity.

Raw material is boiled for 2 hours in boiling water. To obtain good quality liver sausage production process should be carried out at a temperature that prevents the development of bacteria. This temperature is "cold" in the range of 0-10 ° C or "hot" in the range of 50-60 ° C and above.

Boiled raw materials in hot form, without cooling is sent for grinding in grinders, cutter, stuffing in the skirt and boiling.

Hot, evaporated broth is added to the cutter and heated to 85-90 degrees centigrade. Stuffing should not be cooled below 50 ° C. Spritten sausages should be immediately transferred for boiling. After cooking the sausage is cooled by shower or immersion in cold water with ice for 25-30 minutes, the final cooling to 6 ° C is carried out in a chamber with a temperature of 0-2 ° C.

Prepare egg liver sausage, boiled, common, liver sausage of the third variety.

Sales period for liver sausages, taking into account and transportation - 48 hours, and for the third grade - 12 hours.

GREENS

Zeltsy refers to products prepared predominantly with the use of meat of the heads of pigs, kleidachnye products ─ and blood.

Zeltsy differ from conventional sausages in that they have an oval shape, compressed on both sides, have a characteristic taste and content of minced meat.

To make them sticky in the filling zeltsy injected kleidayuschih products (pork skin, bellybutton joint, pig legs and other products containing kallogen). To increase the digestibility of bovine meat is subjected to long boiling, as a result of which the collagen dissolves and solidifies when the temperature falls. Broth obtained by boiling is boiled for 2 hours. Pork heads, tripe and other products are boiled for 2-5 hours, then cooled, cut into cubes to a certain size and mixed with finely shredded gluing products, broth and spices. Stuffing is filled in the bubble and boiled. Sign of readiness of headcheese is the appearance of light broth when pricking the bubble and the temperature in the thick not less than 72 ° C. All headcheese are pressed and at the same time are cooled. Delicacy, red, Russian, white headcheese released for sale with temperature ¬ temperature no higher than 10 ° C. Sales period - 24 hours, and for white headcheese - 12 hours.

Topic 12: VSE raw materials obtained after the slaughter of farm animals.

Plan:

1. technology and hygiene of rendering of animal fats
2.Types and kinds of baking fat
3. variation of fats

Morphology and chemistry of raw fat. Raw material for the production of cooking fats for food animals is fatty tissue of slaughter animals, which is called raw fat, which, depending on the type of livestock is divided into beef, mutton, pig, and each type, taking into account specific preparations for processing, into two groups: the first and second. The raw fat of the first group includes glandular, periarenal, mesenteric, dipstick, blubber fat obtained from carcass cleanup, liver, tail, udder, head (from occipital and temporal hollows), fatty udder of young animals; fat trimmings from sausage and canning shops; the second group - from stomach (rumen, book, rennet); fat trimmings received at manual processing of skins, intestinal fat from manual degreasing of intestines. Raw fat consists of pure fat, water and stroma. The composition of raw fat of medium cattle is as follows: clean fat - 88%, water - 9.5%, stroma - 2.5%. The chemical composition of fat depends not only on the fatness of animals but also on the place of its deposition in the body. For example, in cattle of average fatness, intestinal fat contains 65% of pure fat and omentum and kidney fat - 94%. Raw fat - a product not stable, immediately after the collection it is processed ¬ on the melted fat or conserved (freezing or dry salting). The purpose of reburning raw fat is to separate connective tissue and water from it. In clarified fat contains pure fat 99,7-99,8%, water and residual protein 0,3-0,2%. Fats are triglycerides of fatty acids. Animal fats most often contain three acids: stearic,

palmitic and oleic acids. The content of other fatty acids - myristic, linoleic and linolenic - in animal fats is insignificant. Saturated acids predominate in the fats of terrestrial animals, unsaturated acids in the fats of aquatic animals. The lower the melting temperature of fats, the easier they are digested by the body. Especially high digestibility are fats with melting temperature below 37 ° C (dairy, fish and avian). A little worse absorbed by pig fat and even to a lesser extent beef, goat, sheep and deer fat. Fat density depends on its chemical composition: the more stearins, palmitins and other saturated glycerides are in the fat, the harder the fat, the more olein and other glycerides containing unsaturated acids are, the less dense the fat. More dense is internal fat of old, male, poorly fattened animals living in warm areas; softer is subcutaneous fat of young, female, well-fed animals living in cold areas. Significant influence on the composition of fat and its density has a composition of feed. Fats have two thermic points: the melting point, the lowest temperature at which all triglycerides become liquid, and the pour point, the highest temperature at which all triglycerides crystallize. The pouring point of the fat is 10-15 ° C below the melting point. The color of the fat in different kinds of animals varies from pure white to yellow. Fat of goats is intensively white, pigs are white, sheep - slightly yellowish, cattle - light yellow, horses - yellow. Young animals are whiter, older ones are more yellow. In addition, the color of the fat depends on the deposition of pigments of coloring substances contained in feed. Intense yellow coloring of fat as well as other tissues is observed in some diseases (leptospirosis, hemosporidiosis, paratyphus).

Technology and hygiene of melting animal fats. Resmelting of raw fat starts not later than 2 hours after its receipt in the fat shop, and in case of cooling with water (at resmelting in open cauldrons) - not later than 6 hours. If necessary, in the fat shop the raw materials are subjected to additional processing from nonfat scraps. Contaminated raw fat and raw fat of the second group are washed in running water (10-15°C). Raw intestinal fat is washed separately from the rest of raw materials, salted is thoroughly washed from salt, frozen before baking is defrosted in cold water. Drinking water is used for cooling and storing raw fat. It is not allowed to process fresh raw fat together with salted, frozen and with bacon or fat after a long storage; raw frozen fat with salted fat; raw fat of the first group with intestine fat. Melting of fats is carried out by a wet and dry method. The wet method consists in the process of melting raw fat is in direct contact with water or steam in autoclaves and boilers with fire heating. The temperature in the process of melting is maintained at 70-90 ° C, steam pressure - 0,15-0,3 MPa. Dry method is characterized by the fact that the fat-cheese is heated through the heating surface. Water contained in the raw material evaporates during bakeout to the atmosphere or is removed under vacuum. Fat is melted out by dry method on Sharpless machinery, in open double-walled boilers with a stirrer, in horizontal vacuum boilers. The process of melting is carried out at 42-120°C and 0,05-0,4 MPa steam pressure. Fat is left on sediment at 60-65 °C for 5-6 hours. To accelerate sedimentation of suspended protein particles and destruction of emulsion in the process of settling the fat is salted with dry cooking table salt milling number 1 and 2 in an amount of 1-2% by weight of fat. Fats are cooled down to 18-40°C in order to obtain homogeneous structure and to inhibit oxidation processes.

Production of edible fats from bone. Bone of all kinds of slaughter animals permitted for this purpose by the veterinary supervision are used for production of edible bone fats. Bone fat is obtained by two methods; thermal and cold. Receiving fat from the bones by the thermal method is carried out in open boilers or autoclaves at a temperature of 90-95 ° C for 6 hours. Apart from fat, the heat treatment of the bones yields a broth which is evaporated and used for food purposes.

Cold method of fat extraction is carried out on hammer hydrodynamic installations. The whole process lasts for 8 minutes, the fat is of high quality. The yield of the bone fat is 10-12%.

Production of hoof fat (oil) from hoof, gallows, corolla and belly bones is melted at the temperature of 70-75 °C. Duration of melting ─ 4-5 hours. Ungulate fat semi-liquid consistency, of golden color, pleasant taste and smell. Diluted it is added to sausages, from the broth is prepared jelly.

Types and varieties of ghee. Edible animal baked fat, depending on the raw material is subdivided into beef, mutton, pig, horse, bone and prefabricated. All fats, except for prefabricated fat, are produced in two grades: the highest and the first. The fats have to correspond to the technical requirements of the standard according to organoleptic characteristics: color, smell, taste, transparency and consistency. The highest, first and combined fats should have accordingly acid number not more than 1,2, 2,2 and 3,5 and water content - 0,2-0,25%, 0,3% and 0,5%.

Changing fats in the process of production and storage can be conditioned by the action of lipase enzyme, which is contained in the fat tissue, enzymes of fungi and bacteria as well as by the influence of physical and chemical factors. Lipase and enzymes of microorganisms cause spoilage of raw fat, clarified fats decompose due to their reaction with water, oxygen and light. The decomposition of fats may occur in two directions: hydrolysis and oxidation.

Hydrolysis is characterized by attachment of water to the fat molecule, as a result of which it splits into glycerol and fatty acids. The process of hydrolysis of fat begins after the carcass is cut and the fat is extracted. The accumulation of free fatty acids reduces the nutritional value of the fat and accelerates the development of oxidation processes in it, especially with the accumulation of unsaturated fatty acids.

Oxidation is subdivided into rancidity and unsaturated fatty acids. Both processes can occur simultaneously or with the prevalence of one of them.

Burning of fats is a series of interconnected oxidative and hydrolytic reactions. First of all, oxygen oxidizes unsaturated fatty acids in the place of their double bonds, so in the earliest stages of fat oxidation there are already peroxide compounds, and then peroxides are decomposed into aldehydes, aldehyde acids and other compounds. Fats containing more unsaturated acids are less stable during storage. Thus, fish and bird fat is oxidized relatively quickly, pig fat is oxidized more slowly, and lamb and beef fat is oxidized even more slowly.

Sinking is a type of fat deterioration characterized by the accumulation of oxychloric acids in it. Fat that has undergone sulfurization acquires a salty (stearic) taste and smell and its color becomes white. The baking process is often influenced by light. Sedimentation is accelerated by catalysts - copper, iron, lead, cobalt and manganese.

In practice of veterinary and sanitary expertise fats are subjected to technical and chemical examination (determination of organoleptic characteristics, acid number and humidity), to benignity testing (reaction to low-molecular acids, qualitative and quantitative determination of peroxides, reaction to aldehydes and others) and adulteration testing (melting point and iodine number).

Veterinary and sanitary expertise of raw fat and edible fat. For production of dietary fat is permitted fresh raw fat from healthy animals and fat tissue of animals whose slaughter products are subject to use for food purposes with restrictions (with suspicion of disease or tuberculosis, paratuberculosis, listeriosis, Ku fever, plague and swine rust, pasteurellosis, Aujeszky's disease, salmonellosis). Such fats are remelted separately, the temperature in the melted fat is brought to 100°C and kept for at least 20 minutes. Salted raw fat before melting soak. Raw fat obtained from animals suffering from particularly dangerous diseases (anthrax, emphysematous carbuncle, glanders and others) shall be destroyed. Raw fat with pathological changes, with unsatisfactory organoleptic characteristics (with signs of rotting, mold, foreign smell) and mesdr fat from boars' skins are not allowed for processing for food ghee.

The fat is released in a cooled, chilled, frozen and melted. Facilities should strictly monitor the conditions for storage of clarified fat and periodically check its quality.

Topic 13: Concepts of the chemical composition of milk and its components.

Plan:

1. the chemical composition of milk.
2.Physico-chemical properties of milk
3.Personal hygiene of farm workers

Milk consists of more than 300 components, the main of which are water, proteins, fat, lactose, trace elements, vitamins, enzymes, hormones, etc.

Water is the medium in which all the other components of milk are dissolved or distributed and form a stable colloidal system, which allows the milk to undergo various technological processes. 95-97% of the water is in a free state. This water can be removed by heating the milk. Lactose, minerals and acids are dissolved in it. In addition there is bound water (2,0-3,5%), swelling and crystallization water. Proteins, polysaccharides and phosphatides are able to bind water since they have hydrophilic groups. Swelling water is contained in lyophilic colloids with micellar structure (in proteins). Crystallization water is bound to lactose molecules.

When a sample of milk is dried at 103-105°C to a constant mass, a dry matter (solid residue) remains, which includes all the components of milk except water. Components of dry matter determine the nutritional value of milk and its technological properties in the production of dairy products.

Protein. The average protein content of cow milk is 3.3%. 78-85% of proteins are casein, the rest are whey proteins, which include (£-lactalbumin, β-lactoglobulin, albumin, immunoglobulins, proteo-peptons and lactoferrin. Milk proteins also

include enzymes, some hormones (prolactin), proteins of fat globules and protein substances of microbial cells.

Casein [NH2R(COOH)4(COO)2Ca] is 2.7% in colloidal form in milk. It is a heterogeneous protein and can be divided into alpha-, beta-, gamma- and kappa-fractions according to its content of phosphorus, sulphur and coagulation ability with acid or rennet enzyme. Unfractionated casein contains 53% of carbon, 7.1% of hydrogen, 15.6% of nitrogen, 22.6% of oxygen, 0.8% of sulphur and 0.9% of phosphorus. The gamma form of casein does not change under the action of rennet enzyme, whereas the alpha- and beta-forms precipitate with the formation of a clot (paracasein). The kappa fraction is poorly studied.

Casein is negatively charged at the pH of fresh milk. Positive and negative charges become equal (isoelectric state) in acidic conditions at pH 4.6-4.7. Casein belongs to phosphoproteins (contains phosphorus) and has free amine and carboxyl groups. Casein has almost twice as many carboxyl groups as amine groups, and therefore has more acidic properties than basic ones. In milk, casein is combined with calcium salts to form a caseinphosphate-calcium complex.

Casein has amphoteric, acidic and alkaline properties. Casein free amino groups react with aldehydes, for example formaldehyde, which is the basis for determining the content of proteins in milk by formal titration method. Casein can also be isolated by the action of weak acids. In this case case caseinphosphate-calcium complex breaks down into pure casein and acid salt, the reaction with which it was formed. This reaction is observed in the natural souring of milk when, under the influence of lactic acid microorganisms, lactose decomposes to form lactic acid. This reaction can be represented as follows:

NH2- R-(COOH)4(COO)2Ca +
+ 2CN3CN(ON)ION ->
-> (CH3CH(OH)COO)2Ca +
+ NH2-R-(COHON)6.

This method of casein precipitation yields a precipitate in the form of small flakes, sour to the taste.

Whey proteins. After casein has been precipitated from skimmed milk
enzyme or acid, 0.5 to 0.8% of the proteins remain in the whey. The main ones are β-lactoglobulin, £-lactalbumin, serum albumin, immunoglobulins, proteosopeptones, lactoferrin. Serum proteins are biologically more complete in terms of essential amino acids.

β-lactoglobulin accounts for about 50% of all serum proteins. It undergoes denaturation during pasteurization. Its biological role is not clarified.

£-lactalbumin in milk is 2-5% of its total proteins. It is finely dispersed, does not coagulate at the isoelectric point because of its high hydration, does not coagulate under the action of rennet enzyme and is thermostable. It is necessary for the synthesis of lactose from galactose and glucose.

Immune globulins account for 1.9-3.3% of the total milk proteins. In colostrum their number increases and reaches 90% of all serum proteins. They act as antibodies. Three groups of immunoglobulins were isolated from cow milk: I, A and M. Immunoglobulins of group I prevailed in quantitative relation.

Proteosopeptones account for about 24% of whey proteins and 2-6% of all milk proteins and are among the most thermostable whey proteins. They do not precipitate when heated to 100°C for 20 minutes. Their amount increases when milk is stored at low plus temperatures (3-5°C). The biological role of these proteins is not clarified.

Lactoferrin is a red iron-binding protein that by its properties reminds blood transferrin. It has bacteriostatic effect. Cows' milk contains 0.1-0.4 mg/ml, colostrum contains 1-6 mg/ml.

Non-protein nitrogenous substances in milk are intermediate and final products of nitrogen metabolism and enter milk from the blood. These include peptides, amino acids, urea, ammonia, creatine, creatinine, orotic, uric acid and hippuric acid. They make up about 5 % of the total nitrogen content in milk.

Enzymes. More than 20 true enzymes have been isolated from the milk of healthy animals. Some of them are secreted in the mammary gland cells (alkaline phosphatase, lactosintase, lysozyme), others pass into milk from animal blood (aldolase, catalase, proteinase). In addition to the true enzymes in milk there are enzymes produced by microflora of milk. Enzymes in milk and milk products are of great practical value. On the action of class enzymes oxidoreductases, hydrolases, transferases and others is based on the production of dairy products and cheese. Proteolytic and lipolytic enzymes cause changes that reduce nutritional value and defects in milk and dairy products. The activity of some enzymes can be used to judge about the hygienic state of raw milk and pasteurization efficiency. Reductases, oxidases, peroxidase and catalase are oxidoreductases.

Reductases accumulate in raw milk when bacteria multiply in it. Therefore, the bacterial contamination of milk can be determined by the duration of reduction of resazurin or methylene blue added to milk. Oxidases are produced by mammary cells (xanthine oxidase) and milk microflora (amino acid oxidases). Xanthine oxidase catalyzes the oxidation of purine bases - hypoxanthine and xanthine - to uric acid and aldehydes - to carboxylic acids. Peroxidase is synthesized by mammary gland cells and is released from leucocytes hourly; it possesses antibacterial properties and is inactivated at about 80°C, which is used in the dairy industry to control the effectiveness of milk pasteurization.

Catalase enters milk from mammary gland cells and is also produced by microflora of milk and leucocytes. In the milk of healthy animals there is little catalase, and in colostrum and milk of sick animals its quantity is sharply increased. In this connection, determination of catalase activity is used as a method of detecting milk from sick animals (mastitis etc.).

Hydrolases and enzymes of other classes include lipases, phosphatases, β-galactosidase, lysozyme, proteinases, ribonuclease, etc.

Lipases are represented by native and bacterial lipases, A-, B-esterases, cholinesterase, and lipoproteid lipase. They contribute to the hydrolysis of fat and release low-molecular fatty acids, which leads to rancidity of milk. True lipases are destroyed at 74-80 ° C, bacterial - at 85-90 ° C.

Phosphatases: milk contains alkaline phosphatase secreted by mammary gland cells and microorganisms as well as phosphoprotein phosphatase, inorganic

pyrophosphatase and ATPase. Alkaline phosphatase catalyzes hydrolysis of phosphoric acid esters to form inorganic phosphorus. It is inactivated at a temperature of 72-74 ° C and above. This property is the basis for the method of control of milk and cream pasteurization efficiency.

Lactase (β-galactosidase) is synthesized by lactic acid microflora (bacteria and yeast). It catalyzes the hydrolytic cleavage reaction of lactose into monosaccharides - glucose and galactose. Amylase is related to the lactoglobulin fraction of milk protein. Its quantity increases in case of animal diseases. It is inactivated during pasteurization. Lysozyme catalyzes the hydrolysis of polysaccharides of cell walls of some kinds of microbes. It is responsible for the bactericidal properties of milk and is thermostable in sour environments. In cow milk its amount is about 13 micrograms per 100 ml.

Proteinases are apparently transferred into milk from the blood; they are also synthesized by microorganisms and leukocytes. They catalyze the hydrolysis of milk proteins, mainly casein. Microflora of milk (putrefactive bacteria, micrococci) synthesize proteins that cause flaws in the taste of milk and dairy products. Lactic acid bacteria produce acidic proteinases, which are important in the production of dairy products and cheese. Ribonuclease is passed into milk from the blood. It catalyzes the cleavage of ribonucleic acid into nucleotides.

Transferases (true and bacterial) catalyze amino acid reamination in mammary gland cells. Lyases (true and bacterial) in milk are represented by aldolase, which plays an important role in carbohydrate metabolism in milk and microorganisms; carboanhydrase, which catalyzes carbonic acid dehydration; and decarboxylases, which are important in dairy products. Isomerases play an important role in metabolism in mammary cells and in lactose fermentation.

Milk lipids are represented by milk fat and fat-like substances: phospholipids and steroids.

Milk fat is a derivative of the alcohol glycerol and fatty acids. Its average content in milk is 3.8%. About 150 fatty acids with a number of carbon atoms from C4 to C26 (saturated, mono- and polyunsaturated) are found in milk fat.

In steamed or heated milk, the fat is in emulsion form, while in chilled milk it is in suspension form. 1 ml of cow`s milk contains from 1 to 12 billion fat globules with a diameter of 0,1-20 microns. The surface of the fat globules is surrounded by a lecithin-protein shell. Melting temperature of milk fat is 28-36 ° C, freezing temperature - 18-23 ° C, the refractive index - 1,453-1,455.

Of the saturated fatty acids in milk fat, palmitic, myristic and stearic acids are abundant, and of the unsaturated ones - oleic, palmitoleic, linoleic and myristoleic acids.

Of the phospholipids, milk contains lecithin, kephalin, sphingomyelin, and cerebrosides. Their total amount is about 0.06%. Phospholipids are included in the shells of fat globules and are also found in connection with the protein phase and plasma of milk. Of the steroids in milk there are cholesterol (in a complex with proteins and plasma milk) and ergosterol (part of the shells of fat globules). There are 0.01-0.014% steroids in milk.

Lactose in cow milk averages 4.7%, and is in the molecular

state and is a disaccharide consisting of glucose and galactose. Compared to sucrose, lactose is 5 times less sweet and less water soluble.

Mineral substances. The mineral composition of milk depends largely on the mineral composition of feed. Mineral substances in milk contain an average of 0,7%. They are divided into macro-and micronutrients. Macro-nutrients are contained in relatively large amounts of 10-100 mg / kg, their concentration in milk is relatively constant; micro-nutrients - in amounts measured ¬ micrograms, their concentration varies greatly depending on the feeding of animals, the conditions of primary treatment and storage of milk.

Macronutrients include potassium, sodium, calcium, magnesium, phosphorus, chlorine and sulfur. Potassium, sodium, calcium and magnesium are mainly found in milk in the form of salts of phosphoric and citric acids. About 95% of potassium and sodium are in the true solution in the form of easily dissociated salts, and the rest is bound to casein and is in colloidal form. Calcium is present in milk mainly in colloidal form (about 30% - as colloidal calcium phosphate and about 40% - as casein-calcium-phosphate complex). The true solution accounts for about 30% of all calcium.

Magnesium is in milk in true solution (73-82%), the rest of it is part of the colloidal magnesium phosphate and associated with casein.

Phosphorus in milk is represented by the following compounds (%): inorganic salts as a true solution - 37; organic esters as a true solution - 7; casein-calcium-phosphate complex - 20; inorganic salts as a colloidal solution - 38.5; lipids - 1.5. Sulfur is included mainly in the composition of proteins.

Of trace elements in milk contains aluminum, barium, boron, bromine, vanadium, iron, iodine, cadmium, cobalt, silicon, lithium, manganese, copper, molybdenum, nickel, selenium, silver, strontium, antimony, fluorine, chrome and zinc. Their distribution between components of milk has not been studied sufficiently. It is known that aluminum, copper, manganese, molybdenum, nickel, zinc and iodine are connected with milk proteins, and boron - with fat phase. About 90% of all copper in milk is bound to casein and whey proteins, 10% to fat globules (2-3% to enveloped proteins, the remaining 7-8% to phospholipids).

Most of the iron is bound to £-casein, the rest to β-casein and lactotransferrin. Manganese binds to whey proteins and tin binds to β-casein. Proteins in milk bind iodine (about 30%), and about 60% of its amount is in non-protein organic compounds. 40% of iodine is present in the serum of milk in the form of non-organic compounds, and about 5% is associated with the fat.

Vitamins are contained in milk in varying amounts due to their intake with feed, the intensity of synthesis by the rumen microflora and the degree of destruction during processing and storage of milk. The average vitamin content in 100 grams of milk is (mg): fat-soluble - A - 0,02-0,2; D - 0,002; E - 0,06; K - 0,032; water-soluble - B1 - 0,05; B2 - 0,2; B6 - 0,1-0,15; B12 - 0,1-0,3; PP - 0,05-0,4; B3 - 0,28-0,36; C - 0,5-2,8; H - 0,00001-0,00003.

Hormones in milk come from the blood. They are involved in the formation and secretion of milk (prolactin, thyroxine, luterosterone, folliculin, oxytocin, adrenaline, insulin, etc.).

Gases are 60-80 ml in 1 liter of milk, including carbon dioxide (carbon dioxide) - 50-70%, nitrogen - 20-30% and oxygen - 5-10%.

The chemical composition of milk is a complex polydisperse system. Its indicators are influenced by feeding and housing, health, breed and many other factors. All this must be taken into account in veterinary examination of milk and dairy products.

PHYSICAL AND CHEMICAL PROPERTIES OF MILK

The density is the mass of milk at 20°C, contained in a unit volume (kg/m3). For cows it ranges from 1027 to 1033, goats - 1027-1038, sheep - 1034-1038, mares - 1033-1035, buffalo - 1028-1030. This quality of milk is determined by the density of its components (kg/m3): milk fat - 920, lactose - 1610, proteins - 1390, salts - 2860, dry milk residue - 1370, dry skimmed milk residue - 1610, citric acid - 1610. Depends on the density of milk from the temperature (reduces with its increase) and the chemical composition. Immediately after milking the density of milk is lower compared to that determined in a few hours, due to the increased gas content of the milk and the reduced density of fat and proteins due to thermal expansion. Density can be affected by animal nutrition, diseases, etc. Adulteration decreases density by adding water (every 10% of added water decreases density by 0.003 kg/m3) and increases it when cream is raised or diluted with skimmed milk. The density is used to judge whether the milk is natural or not.

The freezing point of milk is in the range 0.51-0.59 ° C.

Boiling point at a pressure of 760 mm Hg is 100.2-100.5 ° C.

Viscosity is a property of the medium to resist relative displacement of its layers. On average, viscosity is 1.8 centipoise at 20 ° C (1.3 to 2.2). It is caused mainly by the content of proteins and salts.

Surface tension is a force that acts along the surface of a liquid. The surface tension is determined by the fact that molecules at the interface between two phases - gas and liquid - feel the attraction of the liquid and very weak attraction of the gas phase. The surface tension of milk has an average value of 0.0439 n/m.

The refractive index reflects the refraction of light (change in direction) when it passes through the interface between the two media. Cow's milk has an index ranging from 1,3440 to 1,3485, whey - 1,34199 to 1,34275, water - 1,33299. The refractive index of milk is determined by indices of refraction of water, lactose, casein, whey proteins, salts and non-protein nitrogenous compounds. According to the value of refraction of milk and whey measured with refractometers (AM-2, RPL-3 and others) it is possible to determine the content of skimmed milk residue, proteins and lactose. When water is added to milk the refraction index of milk whey decreases on the average by 0,2 units per each percent of added water.

Electric conductivity of milk is mainly determined by ions CI-, Na+, K+ and others and is 39,4551,3*10 -4 Ohm. It depends on the health of animals, lactation period, breed, etc.

At mastitis the electrical conductivity of milk increases, at adulteration of milk with water - it decreases.

The redox potential characterizes the oxidizing and reducing ability of milk. Substances capable of oxidation or reduction include vitamin C, lactoflavin,

tocopherol, cystine, pigments, enzymes, products of microorganisms. In fresh raw milk the redox potential is 250-350 mV. It decreases when micro-organisms develop in milk, when milk is heated, when oxygen escapes and when vitamin C is destroyed.

The specific heat capacity of milk is 0,910-0,925 kcal/kg. It is due to its chemical composition. This indicator is needed to determine the cost of heat and cold for heating and cooling milk.

Titratable acidity is expressed in degrees Turner (°T) - the number of milliliters of 0.1 n. sodium (potassium) hydroxide solution, needed to neutralize 100 ml or 100 grams of product (1 ° T corresponds to 0,009% lactic acidity). Acidity of freshly milked milk is 16-18 ° T. Titratable acidity of milk is determined by the presence of proteins (4-5o C), acidic salts (about 11o C) and carbon dioxide (1-2o C). This index depends on the state of health, feeding ration, breed, lactation period, etc. It is a criterion for assessment of milk freshness and naturalness.

pH - active acidity - concentration of free hydrogen ions in milk, numerically equal to the negative decimal logarithm of the concentration of hydrogen ions (H+), expressed in mol/l.

The pH of whole milk is on average 6.7 with hydrogen ion activity of 2*10 -7 mol/l and varies from 6.6 to 6.8, which corresponds to the activity of hydrogen ions (2.51 - 1.58)*10 -7 mol/l. There is no direct correlation between the titratable and the active acidity of milk, but there are average correlations between pH and titratable acidity. Collected whole milk has a pH of 0.053 ° T + 7.58.

The buffering capacity of milk is determined by the amount of alkali or acid that needs to be added to 100 ml of milk to change the pH by one. It is determined by the buffer systems - protein, phosphate, citrate, bicarbonate and others - present in the milk.

To obtain high quality and stable milk all milk equipment (milking machines, coolers, storage tanks, pumps, milk pipes) as well as small tools (buckets, troughs, milking machines, strainers, filters) should be sanitized after the production process. Treatment of dairy equipment includes consecutive carrying out of the following activities: preliminary rinsing with warm water (30 ± 5 ° C) - removal of milk residues, circulating washing with hot (60 ± 5 ° C) detergent solution - removal of protein and fat film; disinfection for destruction of pathogenic microflora and reduction of bacterial semination; acid treatment to remove "milk stone" and final rinsing with tap water of the remaining detergent and disinfectant solutions. When using detergents and disinfectants the circulating washing by a hot solution of detergent and disinfection is combined.

Water used to rinse the dairy equipment, as well as for the preparation of detergent and disinfectant solutions must meet the requirements of GOST for drinking water.

The redox potential characterizes the oxidizing and reducing ability of milk. Substances capable of oxidation or reduction include vitamin C, lactoflavin, tocopherol, cystine, pigments, enzymes, and products of microorganisms. In fresh raw milk the redox potential is 250-350 mV. It decreases when microorganisms

develop in milk, when milk is heated, when oxygen escapes and when vitamin C is destroyed.

The specific heat capacity of milk is 0.910-0.925 kcal/kg. This is due to its chemical composition. This indicator is needed to determine the heat and cold inputs for heating and cooling of milk.

Titratable acidity is expressed in degrees Turner (°T) - the number of milliliters of 0.1 n. sodium (potassium) hydroxide solution required to neutralize 100 ml or 100 grams of product (1 °T corresponds to 0.009% lactic acidity). The acidity of freshly milk is 16-18 °T. The titratable acidity of milk is determined by the presence of proteins (4-5o C), acid salts (about 11o C) and carbon dioxide (1-2o C). This indicator depends on health, feeding ration, breed, lactation period, etc. It is a criterion for judging the freshness and naturalness of the milk.

pH - active acidity - the concentration of free hydrogen ions in milk, numerically equal to the negative decimal logarithm of the concentration of hydrogen ions (H+), expressed in mol/L.

The pH of whole milk averages 6.7 with a hydrogen ion activity of 2*10 -7 mol/L and ranges from 6.6 to 6.8, corresponding to a hydrogen ion activity of (2.51 - 1.58)*10 -7 mol/L. There is no direct correlation between titratable and active acidity of milk, but there are average correlations between pH and titratable acidity. Whole milk collected has a pH of 0.053 ° T + 7.58.

The buffer capacity of milk is determined by the amount of alkali or acid that must be added to 100 ml of milk to change the pH by one. It is determined by the buffer systems present in the milk - protein, phosphate, citrate, bicarbonate and others.

To obtain high quality and stable milk all dairy equipment (milking machines, coolers, storage tanks, pumps, milk pipelines) as well as small equipment (buckets, troughs, milking machines, strainers, filters) must be sanitized after the production process. Dairy equipment processing shall include successive carrying out of the following activities: preliminary rinsing with warm water (30 ± 5 °C) - removal of milk residues; circulating washing with hot (60 ± 5 °C) washing solution - removal of protein and fat film; disinfection for pathogenic microflora destruction and reducing bacterial semination; acid treatment for removing "milk stone" and final rinsing with tap water of the remaining detergents and disinfectants solutions. When using detergents and disinfectants, circulating washing with a hot solution of detergents and disinfectants is combined.

Water used for rinsing dairy equipment as well as for preparing detergent and disinfectant solutions must meet the requirements of GOST for drinking water.

If there is a steam generator on the farm, the cisterns are disinfected by steam for 15 minutes at low pressure boiler or 5-8 minutes by steam at pressure of 2-3 atm. If there is milk lime scale on the working surfaces of the equipment it is treated with 1% solution of hydrochloric, sulfuric, phosphoric, nitric or acetic acids or 0,3-0,5% solution of sulfamic acid.

The presence of detergent, disinfectant or acid solution residue after the final rinsing of the washing equipment is determined by the indicator paper. If necessary, the rinsing is repeated.

PERSONAL HYGIENE OF FARM WORKERS

In accordance with the "Instruction on the obligatory preventive examination of the persons who come to work and work at food enterprises", approved by the Ministry of Health of the country, the farm workers are obliged to pass a medical examination. Individuals with tuberculosis, brucellosis, carriers of intestinal infections and helminths are not allowed to work on dairy farms.

Milkmaids and milking machine operators are trained in hygiene according to approved programs. Additional medical examinations are conducted by the institutions of sanitary and epidemiological service. The workers who do not have documents on medical examinations by the state sanitary supervision institutions are not allowed to work on dairy farms.

On each farm a sanitary station is created from among the farm workers, where they control the implementation of personal hygiene rules by cattlemen of a dairy farm, conduct preventive work on health protection of milking machine operators and milkmaids, daily inspect open parts of their body for the absence of pustular diseases, monitor the cleanliness and order on a farm, control the passage of preventive health examinations of farm workers. The farm manager has a first aid kit for first aid, a journal and personal medical books of employees. All employees are required to follow the rules of personal hygiene, while the milking machine operators, milkmaids and other persons in contact with milk must keep their hands, face, whole body, clothing, shoes, cut the nails short.

If you feel unwell, have a fever, suspect illness or pustular skin lesions, burns or cuts, workers should immediately inform the farm manager, a sanitary post and a health worker. To prevent foreign objects from getting into milk and feed for animals it is prohibited to make sanitary and special clothes with pins and needles, to keep mirrors and other items of personal toilet in their pockets. It is allowed to take food and smoke only in specially allocated places.

Special clothing must be changed by farm workers when it gets dirty, but at least once every 3 days.

Topic 14: Veterinary and sanitary evaluation of milk obtained from sick animals. Sanitary evaluation of milk due to antibiotics and chemicals in its composition.

Plan:

1. **Veterinary and sanitary examination of milk of sick animals**
2. **Effect of antibiotics on the quality and nutritional value of milk**

In accordance with the requirements of "Sanitary and veterinary rules for dairy farms of collective farms, auxiliary and other farms" it is prohibited to use in food and feed to animals milk from cows sick and suspected of being ill with anthrax, Emphysematous carbuncle, rabies, malignant edema, leptospirosis, plague, contagious pleuropneumonia, Q fever, as well as when udder is affected with actinomycosis, necrobacillosis and in other cases provided for by the relevant instructions. Such milk after boiling for 30 minutes shall be destroyed.

Milk of animals quarantined for anthrax may be allowed in food after boiling. In raw form, it is used only after quarantine is lifted.

Milk of mares affected by sap, as well as those positive for malolein, after boiling within 30 minutes shall be destroyed.

Tuberculosis. Bovine tuberculosis agent is dangerous to humans, especially for children, who become ill with tuberculosis in 90-100% of cases when drinking milk from infected cows.

Mycobacterium tuberculosis is acid-resistant. In sour milk they retain their pathogenicity for 20 days, in cheese - over 60 days, in butter - up to 100 days, in frozen butter - up to 6.5 years. In liquid medium at 60°C, mycobacteria are inactivated within 30 minutes.

Milk of cows with tuberculosis differs sharply from the milk of healthy animals in its chemical and physical properties. It has 2 times higher content of protein substances (albumin and globulin) (up to 7,2%), increased viscosity of milk, minerals and water, decreased fat content (up to 0,7%), lactose and titratable acidity. Milk becomes liquid with the presence of flakes, takes on a greenish-yellow color and salty taste. If tuberculosis affects the mammary gland, milk is bluish. Milk from animals with tuberculosis is boiled for 10 minutes and used to fatten animals.

Milk from non-allergic cows from a tuberculosis-infected farm is pasteurized directly on the farm at 90 ° C for 5 minutes or at 85 ° C for 30 minutes. Only pasteurized cream may be transported to a milk collection point, dairy plant or butter factory. Milk from animals positive for tuberculine is decontaminated by boiling with further use on the farm. Processing of such milk into clarified butter is allowed.

Skimmed milk is boiled and used on the farm.

Brucellosis. It seems to be pathogenic for humans for all six species: Br. abortus, Br. melitensis, Br. suis, Br. neotome, Br. ovis, Br. canis, but Br. melitensis is especially dangerous. Brucella bacilli remain in cooled milk up to 80 days, in cream - up to 10, in butter - up to 67, in cheese - up to 42, in cougar with acidity of 120-140°T - up to 3 days. Pasteurization of milk at 60 ° C for 30 minutes kills brucellosis.

Milk from brucellosis animals with clinical signs of the disease is boiled at the farm for 5 minutes or processed into raw butter. Milk from animals positive for serological reactions to brucellosis but without clinical signs of the disease is allowed for consumption after pasteurization at not below 70 ° C for 30 minutes. Milk from unresponsive cows from an unhealthy farm is separated and disinfected by pasteurization directly on the farm. Only pasteurized cream may be taken to a milk collection point, dairy plant or butter factory.

No milking of goats or sheep is allowed in brucellosis-free farms. Milk from vaccinated animals must be pasteurized within 6 months after the last abortion recorded in the herd and the aborted cows are removed from the herd.

Foot and mouth disease. The pathogen is a filtering virus contained in the milk of sick animals. Animals and humans, particularly children, are susceptible to FMD. The virus persists in milk for up to 45 days. Cold preserves it, heating to 60-70 ° C in a liquid medium kills after 15 minutes. In the milk of cows affected by foot and mouth disease increases the number of white blood cells (by 7 times), fat

(by 7-8%), serum proteins, calcium. It is recommended that during processing of milk into butter and cottage cheese it should be pasteurized at temperature of 85-90°C for 30 minutes. Sometimes milk of cows affected by foot and mouth disease has an unpleasant taste and smell, has a slimy consistency and appears flaky. Such milk is discarded or destroyed.

Listeriosis. Animals and humans are susceptible to listeriosis. Listeria in lactating cows, sheep and goats is excreted with milk. It may be used as food after pasteurization at a temperature not lower than 80 ° C for 30 minutes.

Tularaemia. The pathogen is isolated with milk, in which it persists for up to 8 days; in frozen milk - up to 104 days. Human beings are susceptible to the disease. Milk is pasteurized or boiled before being used in farms with registered mass rodent cases and also milk of animals which have positive reaction to tularaemia according to the agglutination reaction.

Infectious agalactia of sheep and goats. The pathogen is excreted with milk during the period of the disease and within 4 months after the disease. Milk with changed organoleptic characteristics and signs of mastitis in animals after boiling should be discarded. Milk of animals with eye and joint forms of the disease after boiling is allowed for food. Milk from sheep and goats not affected by the disease is pasteurized and used on the farm.

Necrobacillosis. If the milk gland is not affected, milk is used after boiling.

Smallpox. Milk obtained from cows, goats and sheep in smallpox-risky farms is boiled or pasteurized and then locally processed. The products of milk processing may be taken out of the farm after quarantine is lifted.

Aujeszky's Disease. Milk is allowed to eat after boiling or pasteurization.

Malignant catarrhal fever. Milk of sick cows is used as food for people or feed for animals after boiling in the place where it is received.

Paratuberculosis. Milk of cows reacting to avian tuberculin can be released as food or in processing after pasteurization at 70 ° C for 30 minutes at temperature below 90 ° C - for 10-15 minutes or after boiling for 5 minutes.

Leukemia. Milk of cows with leukemia is prohibited for human consumption. It is destroyed or after boiling it is used as fattening for calves born of cows with leucosis or as fattening for pigs.

Milk from cows suspected of having leucosis is allowed for human consumption after pasteurization at 85°C for 10 minutes or boiling for 5 minutes. Such milk can be processed into melted milk, ryazhenka, kefir and acidophilus. Milk from healthy cows from a farm unaffected by leukemia is allowed to send to the plant, where it is subjected to pass¬terization.

Radiation sickness. Milk from patients with radiation sickness of mild and moderate degree may have increased bacterial semen. If the content of radioactive substances in such milk does not exceed the maximum permissible levels, it is pasteurized at 95 ° C for 10 minutes and released on a common basis. Pasteurization of milk must be carried out for 30 days after the animals have been affected by radiation.

At the severe and extremely severe degree of the disease milk yield of cows is reduced by 60-90% and then lactation can stop at all. At this stage of disease the

milk is heavily bacterially sated, including pathogens of food toxicoinfections, and significant changes in the biochemical parameters and biological value. After boiling the milk can be used to feed animals or it is destroyed.

Salmonellosis. Salmonellae are excreted with milk during severe infection associated with bacteriemia. Salmonella can enter milk from outside during processing and storage. Milk can also be infected by humans if they are carriers of the disease.

Milk from salmonellosis animals should be boiled for 5 minutes. Milk from farms unsafe for salmonellosis of calves during the outbreak and within 2 months after it is pasteurized at 80 ° C for 30 minutes. Ready dairy products upon detection of Salmonella in them shall be sent for technical utilization.

Mastitis. The causative agents are Streptococcus, often pyogenic infection, Staphylococcus, less often E. coli, Vas. cereus, CI. perfrinqens, fungi and other microorganisms.

The composition and properties of milk of mastitis affected animals change depending on the severity and nature of the disease. Streptococcus and staphylococcus contained in milk can be the cause of food poisoning of bacterial origin, as the used regimes of milk decontamination do not inactivate the toxins. More often the amount of casein, lactose, fat and lean dry matter in the milk of sick cows decreases, as well as density and ability to clotting. Chlorine and albumin content increases, diameter of fat globules decreases. In a pronounced clinical picture of the disease milk gets curd-like consistency, bluish or yellowish color and salty taste. Such milk after boiling is subject to destruction. It is very difficult or impossible to determine organoleptically the milk of cows with chronic (hidden) mastitis. For milking cows with mastitis the portable milking buckets are used that are disinfected after each milking. Milk from these cows from unaffected quarters of the udder are collected into a separate container, pasteurized at 85 ° C for 30 minutes or boiled and used on the farm for feeding the animals. Milk from diseased quarters of udder shall be destroyed.

Gastroenteritis, endometritis. Milk is allowed to eat only inside the farm after boiling for 10 minutes.

Ketosis of cows. The disease disrupts fat and carbohydrate metabolism in lactating animals, resulting in ketone (acetone) bodies in blood and milk. Ketosis is observed in young and old highly productive cows a few days before calving or more often after calving. Milk containing significant amounts of ketone bodies can be toxic for humans and animals, so it should be pasteurized at 72 ° C for 30 minutes or at 85 ° C without dwelling. Individual cows' milk is rejected if it is positive for ketone bodies.

Decontamination of milk from sick animals. High temperature treatment of milk is used to disinfect it from pathogenic microorganisms, to extend shelf life and to ensure technological properties during processing into milk products.

Pasteurization is used more often - heating of milk to temperature not more than 100 °C with or without endurance - here vegetative forms of bacteria are inactivated.

Pasteurize milk on farms if it is sent directly to the trading network, canteens, kindergartens, nurseries, as well as in some diseases or suspected diseases in animals. Pasteurization can be prolonged - milk is heated to a temperature of 63-65 ° C and kept for 30 minutes, short - heating to a temperature of 72-76 ° C with delay for 15-20 seconds and instant - heating milk to a temperature of 85-90 ° C without delay. Pasteurization mode of milk of sick cows is set depending on the nature of the disease, more often it is done at a temperature of 85-90°C with soaking for 30 minutes. For some diseases, milk is boiled for 5 minutes or more.

IMPACT OF ANTIBIOTICS, PESTICIDES AND OTHER INHIBITORS ON QUALITY, NUTRITIONAL VALUE AND TECHNOLOGICAL PROPERTIES OF MILK

Extraneous substances that may be contained in milk and have a negative impact on human health include antibiotics, pesticides, disinfectants, radioactive substances, mycotoxins, nitrates, nitrites and other impurities. Many of these substances contribute to violation of technological processes in the production of dairy products, which reduces their nutritional value.

Antibiotics. Wide use of antibiotics as therapeutic and growth stimulating means has resulted in the fact that products of animal origin, including milk, often contain residual amounts of these preparations. Antibiotic solutions are injected directly into the affected portions of the mammary gland for mastitis. Pasteurization of milk destroys only 6-28% of antibiotics contained in it. Antibiotics worsen the sanitary quality and technological properties of milk, distort the results of reductase test, and overestimate the grade of milk according to bacterial insemination. The presence of antibiotics in milk inhibits the development of lactic acid bacteria used in the production of dairy and other products. Antibiotics disrupt rennet curdling of milk in the manufacture of cheese and cottage cheese, which adversely affects the taste and consistency of these products.

The negative influence of antibiotics residues in milk and dairy products on people's health is that they cause sensitization and risk of allergic reactions, contribute to dysbacteriosis and superinfections, the formation of resistant strains of pathogenic microorganisms and reduce therapeutic effectiveness of antibiotics. Antibiotic residues in milk and milk products can cause toxic, teratogenic and mutagenic effects on the human body.

Pesticides. Pesticides enter milk through feed containing pesticide residues or through the skin when animals are sanitized against insects and their larvae. Residual amounts of pesticides in milk can have a toxic effect on the human body, especially children. Therefore, the presence of the absolute majority of pesticides in milk is not allowed. The content of organochlorine pesticides (hexachlorane, gamma-isomer of HCCH, DDT and its metabolites) should not exceed 0.05 mg/l.

Detergents and disinfectants. They get into milk when not rinsing thoroughly enough water from milking machines and equipment after the use of these products. Their residual quantity in milk causes infringement of fermentation processes in dairy products and cheese production. Substances containing sulphonol, active chlorine, iodine, and four-substituted ammonium compounds are especially dangerous.

Radioactive substances. The most dangerous radioisotopes, which pollute the farmland in nuclear weapons testing and accidents at nuclear plants, are iodine-131, strontium-90 and cesium-137. Radioactive substances enter milk via the chain: soil - plant - animal - milk and plant - animal - milk. They are very dangerous for people, especially children. When milk is polluted with these isotopes it is possible to clean it with the help of ion-exchange resins (by 75-90%). It is recommended to produce butter and clarified butter from contaminated milk (transfer of radioactive substances from milk into butter does not exceed 4%, and into clarified butter - 1%) or cheese and cottage cheese by acid method (transfer of radioisotopes into the final product does not exceed 20% of milk activity).

Mycotoxins. When fodder is affected by microscopic fungi, mycotoxins accumulate in it. Feeding moldy feed to lactating animals can lead to poisoning and excretion of mycotoxins with milk. Among the most studied are aflatoxins, which have a strong carcinogenic effect. They are synthesized by fungi Asp. flavus and Asp. parasiticus. Their quantity decreases insignificantly during pasteurization of milk.

Among the foreign substances in milk there are also heavy metals (lead, mercury, cadmium), arsenic, pollution of which often occurs endogenously, 3,4-benzpyrene in the smoke, car exhaust, as well as bacterial and plant toxins.

Topic 15: Veterinary and sanitary examination of plant food products.

Plan:

1. **Sanitary control of plant food products**
2. **The order of veterinary and sanitary expertise of products of animal origin in food markets**

The nutritional value of plant foods depends on their chemical composition. Plant food products (vegetables, root and tuber crops, fruits, berries, beans and some cereals, mushrooms) take a great place in human nutrition. They are the main source of carbohydrates, vitamins and minerals. Many vegetable foodstuffs are widely used as seasonings (spices, spices) for different meat and fish dishes, increasing their digestibility.

Plant food products in raw, boiled and fermented (salted) form activate excretion of digestive juices, contribute to bile formation and biliary excretion and have a positive effect on emulsification and digestion of fats by human body. Vegetables and fruits contain vitamins B1; B2, B3, B6, PP, folic acid, and choline, and are the main source of vitamin C, while green parts of such plants as spinach, cabbage and cauliflower, nettle, and others are vitamin K.

There are a lot of pectin substances in vegetable food products - glucopolysaccharides, which are the main sources of carbohydrate nutrition for people. The products of the decay of pectin substances in combination with other compounds have bactericidal properties, they contribute to the epithelialization of tissues in the treatment of burns and wounds. Therefore, plant ¬ products are widely used in dietary diets for gastro-intestinal diseases. Root tubers, vegetables,

fruits, berries and mushrooms contain a variety of mineral substances: iron, potassium, calcium, cobalt, magnesium, manganese, phosphorus, fluorine, zinc. Butter mushrooms, mushrooms, chanterelles and chanterelles are rich in copper salts.

It has long been noticed that aromatic substances in fruits and vegetables have the ability to protect the products from decomposition. Therefore from time immemorial peasants widely used garlic, onions, peppers, dill, anise, cloves, marjoram, celery, currant leaves, laurel, cherry, horseradish and other plants not only as seasoning for meat and mushroom dishes, but also for canning meat and meat products (sausages, bacon, ham). Aromatic substances with bacteriostatic and bactericidal properties were called phytoncides. Phytoncides have anti-fermentation and anti-rotting properties and they are successfully used in human dietary foods.

So, plant foods by their composition and physiological role are of vital importance for a healthy diet. However, they, as well as animal food products, are subject to various defects, diseases and damage that reduce their nutritional and sanitary quality. Therefore, plant food products, as well as products of animal origin, should undergo veterinary and sanitary examination.

Sanitary control of plant food products is carried out by the veterinary service only in the food markets. This work is carried out by specialists of veterinary sanitary examination laboratories in accordance with the "Rules of veterinary and sanitary examination of plant food products in veterinary and sanitary examination laboratories in the markets".

Plant food products in the markets are sold both fresh and canned (dried, salted, pickled, etc.). The conclusion about benignity of vegetable products is given on the basis of organoleptic, and in necessary cases (disputable, suspicion of falsification, on the presence of toxic chemicals, etc.) and laboratory examination.

Organoleptically determine appearance, shape, size, color, consistency, transparency, odor, taste, marketability, presence or absence of contamination (by soil, sand, etc.), harmful impurities (ergot, kukol, knotweed, etc.), barn pests in grain products, plant damages and diseases.

It is necessary to take into account that it is prohibited to sell in the markets: all vegetative food products which are not checked up or rejected by the laboratory of veterinary and sanitary expertise; food half-finished products and ready cooked dishes from vegetable raw material of home preparation (cutlets, salads, vinaigrettes, poured dishes, tomato and mushroom paste, sauces, jam and jams from berries and fruits and etc.).); tinned vegetative products in home-made tins, loose tea, plate mushrooms in dried form, salted boiled mushrooms, salted and pickled.

Sale of food half-finished products and ready culinary products from vegetable raw materials in the markets is allowed only to state or cooperative enterprises which have the permission of Sanitary and Epidemiological Station of the region and have stores, pavilions and stalls equipped for trade in the market.

THE PROCEDURE OF VETERINARY AND SANITARY EXAMINATION OF PRODUCTS OF ANIMAL ORIGIN IN FOOD MARKETS

If the laboratory performs more than 350 examinations per day, the staff additionally includes a veterinarian and a laboratory technician. In territories affected by radioactive accidents, the laboratory staff additionally includes a radiologist and a dosimetrist technician. With a small number of studies their duties can be performed by other laboratory specialists.

Laboratory staff are independent of the administration (owner) of the market, traders and purchasers in their work. In carrying out their duties they are under the protection of the State. SLVSE is located in a specially equipped room. There should be a room for registration of delivered food products, a hall for veterinary examination of meat and meat products, fish and other hydrobiotes; a hall for veterinary examination of milk and dairy products; a room for testing plant products and honey; office of laboratory manager or chief veterinary officer; a room for laboratory personnel; a refrigerating room for temporary storage of products; washing room, toilet, storage rooms, etc.

All rooms, especially examination rooms, must be well lit, provided with cold and hot water, sewage system. Meat and other products inspection tables are covered with stainless steel sheet. Tiled tables can be covered with tiles.

Laboratory staff wear protective clothing (gown, cap, apron, sleeves). Veterinary Sanitary Expertise of food products and their veterinary and sanitary evaluation is carried out in accordance with the regulatory documents (rules, instructions, etc.).

Visual aids (posters) on specificity should be hung out in GLVSE as well as the approved norms of sampling of foodstuffs and price list for veterinary services. On the food and wholesale markets of cities and towns delivered a lot of food products of animal and plant origin. According to the Law of Russian Federation "On Veterinary" all food products coming on the market for sale should be obligatory state veterinary control (veterinary examination) to determine their type, preservation of consumer properties and safety in veterinary and sanitary terms. It is strictly prohibited to sell meat, dairy, fish, vegetable and other products on the markets which have not passed veterinary and sanitary expertise.

On markets with small volume of trade there are usually no GLVSE, but in such cases veterinary expertise of food products sold in the market is carried out by specialists of local state veterinary institutions under the agreement of the owner of the market and the chief veterinary doctor of area (city). In district centers, where markets are open only on weekends, veterinary and sanitary expertise is conducted by the most experienced specialists of the district veterinary laboratory or animal disease control station or other institutions of the State Veterinary Service, appointed by order of the Chief Veterinary Officer of the district.

Persons who have graduated from higher or secondary special state educational institutions of Russia and have at least three years of practical work experience in their specialty are allowed to carry out veterinary and sanitary expertise of products on the market. Once in 5 years or when there is a break in work for more

than 1 year veterinary experts must undergo advanced training courses at leading veterinary universities or research institutes of the country according to the program approved by the Department of Veterinary Medicine.

Veterinary and sanitary expertise of all commercial products: meat, fat and by-products of farm animals and birds, meat and fat of wild game animals, carcasses of game birds, meat products, milk and sour-milk products, fish and other hydrobiota, eggs and egg products (melange, etc.), honey and other apicultural products, fresh and preserved vegetable products and so on is the duty of GLVSE specialists. Veterinary laboratory specialists are professionally responsible for timeliness and accuracy of veterinary and sanitary expertise, for selling products of poor quality and dangerous in epidemiological and epizootological aspects.

Specialists of laboratory organize and supervise efficiency of neutralization of conditionally suitable products, not subject to free realization, and also in due time and correctly make out the statement about withdrawal of unfit for food products, carry out branding of meat and by-products, give out receipts or coupons for the permission for sale within the given market, carry out supervision over a sanitary condition; spend veterinary educational work with owners of realized food products. When transporting products on another market within the city or district issue a veterinary certificate (form № 4).

If live cattle or poultry are sold at the market, the laboratory specialists allow them to be sold only after a clinical examination and in the presence of a veterinary certificate (Form № 1 outside the district) or a veterinary certificate (Form № 4 within the district) on the safety of settlements or other places where animals come out on contagious diseases. Upon detection of infectious diseases the sale of animals is prohibited and they are sent to veterinary treatment facilities.

Veterinary specialists of the State Veterinary and Veterinary Sanitary Enterprise during incomplete working week can be involved for inspection of veterinary and sanitary condition of livestock farms, control of veterinary and sanitary conditions of milk production or rendering assistance in organization of forced or preventive veterinary and sanitary measures on different objects of veterinary profile.

At the wholesale markets the State veterinary control is limited to checking the compliance of execution of veterinary and other accompanying documents confirming the origin, quality and safety in veterinary sense of the incoming products, control of containers, packaging, conditions and terms of sale.

The food market is an object of the State Veterinary Service, which performs its inspection functions continuously during all working hours. The State Sanitary and Epidemiological Surveillance bodies control the compliance with sanitary rules for markets at least once a month. Specialists of Gosstandart check the equipment and measuring devices every year. Employees of the Ministry of Internal Affairs control the public order in the market and help the administration and laboratory workers in case of violation of trade rules by some unscrupulous sellers or buyers.

The following daily registers must be properly completed (numbered and numbered pages, signed and stamped by the head of the city or district State Veterinary Service):

1) Journal of meat examination (form No. 23 vet.);

2) journal of registration (registration) of lactic products (form No. 24 by the veterinary service);

3) journal of registration of vegetable products (form No. 25 by the veterinary service);

4) journal of honey examination (veterinary form No. 26);

5) Journal of dosimetric measurements SRP 68.01;

6) Journal of records of gamma-background measurements in the market;

7) Journal of accounting the working hours of the employees;

8) Journal of observation of electrical devices;

9) Journal of the acts of veterinary confiscations;

10) Journal of the record of preparation of solutions;

11) Journal of registration of reports on veterinary expertise.

According to the results of veterinary and sanitary expertise in the market prepare a report in the form № 5 vet. 2 times a year. It indicates the main results of the work with the accompanying text.

Veterinary and sanitary examination of meat and by-products. The category of slaughter animals, the meat of which may be sold in the markets include: cattle (including yaks, sarrels, buffaloes), pigs, sheep, goats, deer, rabbits, horses, donkeys, mules, camels, farm poultry of all species. Their slaughter on meat for realization in the markets is supposed from 2-week age (except rabbits and poultry). In addition, it is allowed to sell meat of wild animals and poultry in the markets.

Meat and meat products received after slaughter or fishery of animals and delivered for realization to markets (including stalls and stores of consumer cooperation irrespective of patterns of their ownership) are subject to obligatory veterinary and sanitary expertise. They must comply not only with veterinary requirements, but also with SanPiN, as well as regional and national traditions of the population that use the services of market vendors.

Meat and meat products of good quality and properly designed, as well as finished meat products, which have passed veterinary and sanitary control at enterprises of meat industry and have signs (stamps) of veterinary inspection of such enterprises and coming for sale on the market in stalls of trade network are not subject to veterinary and sanitary expertise.

Meat and by-products may only be sold at markets from healthy animals and poultry from areas and farms that are free from acute and quarantine contagious diseases.

The owner, who delivers meat and by-products for sale on the market within the administrative district, must submit a veterinary certificate Form 4, signed by the veterinary surgeon (doctor) and certified by the seal of the veterinary office. The certificate states that the animal was examined before slaughtering, after slaughter all products were subjected to veterinary and sanitary examination, and they came from areas that are free from acute and quarantine contagious diseases. The certificate also specifies the age and date of slaughter of animals, the results of diagnostic tests, dates of vaccination and antibiotic therapy.

When exporting meat and by-products for sale outside the administrative district the owner must submit the certificate of veterinary form No 2 in the original.

When meat and by-products of one-legged animals (horses, donkeys, mules) and camels are delivered for sale the certificate or veterinary certificate must also contain a note of negative results of maleleinization carried out not earlier than 3 days before slaughter of these animals. In the absence of such information in the veterinary document the meat and other slaughter products are not subject to sale in the market, they are utilized or destroyed.

When pork, bear meat, wild boar, nutria and other omnivores and carnivores are delivered to the market, trichinelloscopy results must be indicated in the veterinary document.

The owner may deliver a carcass to the market with a head separated or not separated (obligatory for pigs) and with internal organs (spleen, liver, heart, lungs, kidneys). Whole carcasses, half-carcasses, and quarters are allowed to be delivered to the market. Meat, cut into pieces, to examination and sale on the market is not allowed. Meat and by-products are allowed to be delivered to the market in cooled, chilled, frozen, frozen or unfrozen state, as well as in salted state (corned beef).

Twice frozen meat is not allowed for sale at the market. Such meat has color abnormalities, and on the cut between muscle fibers there are ice crystals of different sizes or multiple small cavities between muscle fibers or groups of muscles.

Delivery and realization of dirty meat (earth, manure, etc.), with peeling more than 15 % of surface of a carcass, preliminary chopped up on coarse- and small-pieces on half-finished products, and also meat dried and dried, ready meat half-finished products or ready products of home-made (mince, cutlets, entrecote, stew, aza, shashlik, smoked meat, zelt, jelly and other products) are forbidden.

Allowed to sell on the market meat products and meat products only manufactured industrial (sausages, frankfurters, wieners, smoked meats, minced meat, large-and small lumpy semi-finished products, etc.), including in ground and packaged form. Their sale is supposed in container and packing, meeting the requirements of standards or technical specifications, and upon presentation of documents from the enterprise, confirming their origin and safety in the veterinary and sanitary respect, quality, shelf life and implementation of products. All above-stated meat products are subject to veterinary examination, and if necessary (on testimony or at the end of shelf life) additional laboratory research.

Meat and meat products are allowed to be sold at markets during the terms established by GosSanEpidNadzor for perishable food products. When the terms of realization are expired or the degree of freshness is questionable, they are sent for industrial processing or disposal.

It is not allowed to sell meat and by-products of zoo, circus, experimental laboratory animals, producer animals and animals used for state control of biopreparations.

Meat, meat semi-finished products, sausages and smoked meat which are made on the meat processing enterprise from raw materials of private owners on commission are subject to the veterinary control as products of industrial production.

Meat and meat products which can be recognized as suitable for food after neutralization are not allowed for sale in the market and are not returned to the owner. They are neutralized and processed at meat processing plants authorized by the State Veterinary Service. Allowed to return the owner of meat and meat products only after thermal neutralization, but without the right to sell it, and raw meat, safe in veterinary and sanitary respect, but rejected on sanitary and hygienic indicators in storage or transportation on the market.

Meat and other products rejected as unsuitable for food is kept in the isolation unit of the market before sending for disposal or destruction. Disposal and destruction of market rejected meat, meat and other products are held market administration in compliance with veterinary and sanitary requirements for the contracts and under control of the State Veterinary Service, which is drawn up an act in 3 copies, one of which is given to the owner, the other is left at the enterprise, the third - in GLVSE market.

Meat and meat products are allowed to be sold in the markets within the time limits established by the GosSanEpidNadzor for perishable foodstuffs. Upon expiry of the terms of sale or when the degree of freshness is questionable, they are sent for industrial processing or disposal.

It is not allowed to sell meat and by-products of zoos, circuses, experimental laboratory animals, animals-producers and animals used for state control of biopreparations.

Meat, meat semi-finished products, sausages and smoked products made at a meat processing enterprise from give-and-take raw materials of private owners are subject to veterinary control as products of industrial production.

Meat and meat products that may be considered edible after deactivation are not allowed to be sold in the market and are not returned to the owner. They are neutralized and processed at meat processing enterprises authorized by the state veterinary service. Meat and meat products may be returned to the owner only after thermal deactivation, but without the right to sell it, as well as raw meat, safe in veterinary and sanitary respect, but rejected by sanitary and hygienic indicators during storage or transportation to the market.

Meat and other products rejected as unsuitable for food shall be stored in the market isolation unit before being sent for disposal or destruction. Disposal and destruction of meat, meat and other products rejected at the market shall be performed by the market administration in accordance with veterinary and sanitary requirements by agreement and under control of the state veterinary service, whereof an act in 3 copies is drawn up, one of which is given to the owner, another remains at the enterprise and the third at the market GLVSE.

In some cases a veterinary specialist may require special methods of examination: chemical and physical analysis to determine the origin of meat from diseased and agonized animals, bacteriological examination and determination of the freshness of meat.

For inspection of a carcass (half or quarter carcass) and internal organs, which belong to it, the owner brings to the inspection room and places on a clean table.

Checking the accompanying documents. Veterinary accompanying documents (veterinary certificate or veterinary certificate) are checked for correctness and completeness of their filling, signatures, dates, stamps, etc. The document must contain information that the animal was examined before slaughtering, all slaughter products were subjected to veterinary examination and came from areas that are free from acute contagious diseases. Carcasses (half carcasses, quarters) may bear a veterinary mark "Preliminary Examination" or an oval-shaped mark.

The rectangular stamp "Pre-slaughter inspection" confirms that the meat was obtained from slaughtered animals that passed pre-slaughter examination and post-slaughter veterinary and sanitary inspection of slaughter products (ungulates and camels were examined for sap) and slaughtered in farms that are free from contagious and quarantine diseases. However, this stamp does not give the right to sell the meat without full veterinary expertise in the market.

Oval veterinary stamps (large and small) confirm that veterinary and sanitary expertise of meat and sub¬products was carried out in full and they are released for food purposes without restrictions.

Carcasses and by-products of non-European origin brought to the markets by individuals or legal entities which have passed veterinary and sanitary control not at the enterprise but at place of slaughter in the yard, at animal disease control station or in veterinary laboratory, Having a document (veterinary certificate or certificate) and Gosvetnadzor brands, but without cuts of muscles, lymph nodes and internal organs are liable to obligatory repeated veterinary medical examination in full volume and repeated veterinary branding with removal of the first impressions of the brands.

Meat, which had veterinary stamps, but which has changed its veterinary and sanitary indicators as a result of violation of storage conditions or transportation is subject to re-examination with laboratory analysis and relabeling with removal of previously applied stamps and seals or sent to the enterprises for processing into sausages or canned products accompanied by a representative of the veterinary and sanitary inspection of the market and at the expense of the owner of meat.

Information about pre-slaughter examination of the animal is necessary because some diseases (rabies, tetanus, salmonellosis, malignant catarrhal fever and others) occur with insufficiently clearly expressed pathological anatomical changes. These diseases can be detected by clinical examination of the animal.

If the owner of meat does not have a veterinary certificate, the meat may be accepted for examination only if the head and internal organs (spleen, liver, heart, lungs, kidneys) are delivered together with the carcass. In this case the question of realization of the delivered products must be decided on the basis of data of veterinary and sanitary examination, as well as the results of bacteriological and physicochemical examination. The same applies if the veterinary certificate is not properly drawn up.

When delivering horse and camel meat, the veterinary document must indicate that the animal was examined for sap (ophthalmomalleinization) with negative results three days before slaughter. If this information is missing, the meat and internal organs are subject to disposal or destruction.

Meat and meat products, exported outside the administrative district, delivered for examination and sale only if available a veterinary certificate (Form № 2).

Anamnestic data. Data from accompanying veterinary document shall be supplemented with information obtained by interviewing the owner of the meat. Asked about the conduct of the animal before slaughter. If the animal was sick, clarify signs of disease and names of medicines used. Asked about the place and timing of the slaughter, the fact of pre-slaughter examination of the animal and post-slaughter veterinary and sanitary inspection of the carcass and internal organs, the conditions for storage and transportation of products of slaughter.

Informal questioning of the meat owner in a relaxed atmosphere can sometimes help determine the real reason for the slaughter (for example, forced slaughter) or explain any changes in the organs and tissues during improper storage.

Preliminary (superficial) examination. It is usually performed during anamnestic data collection. The spleen and other internal organs are examined briefly, paying attention to pathologoanatomic changes which can be detected without cutting tissue: changes in color and size of the organ (along the edges), traumatic injuries, bruises, edemas, new growths, etc. Presence of haemorrhages, pustules, necrotic areas are of special concern. Smell of internal organs and carcass, fatness, as well as degree of freshness by organoleptic characteristics are determined.

Bacterioscopy. Bacterioscopic examination of smears is carried out for suspected origin of meat from a diseased animal.

Altered sections of organs and tissues are taken for bacterioscopy. If no changes of organs and tissues are found during the preliminary examination, smear-prints are taken from two lymph nodes: one from the front part of carcass (antecubital), the other - from the back part (iliac medial, hamstring). From pigs, in addition, is taken mandibular lymph node. Smear-prints are also prepared from deep layers of muscles and internal organs (spleen, liver, kidneys). Microscopies are made.

The preparations are stained with 2% safranin solution (2 minutes) or 2% aqueous methylene blue solution (2 minutes) or 1% carbonyl fuchsin solution (1 minute). For preliminary differentiation of microorganisms Gram staining is carried out. During microscopy (under immersion) determine the shape of bacteria, their location and quantity.

If necessary sample samples are sent to the veterinary laboratory or diagnostic department of the station on struggle against animal diseases.

In order to carry out veterinary and sanitary expertise you must have a sharp knife with a 16 cm long blade, a fork or hook for pulling tissue when making cuts and a musat for dressing the blade of the knife. Veterinary specialist must have spare knife and fork to change them, disinfect them and use them in a clean condition during work. The instruments which were dirty during cutting of the damaged tissues are cleaned and treated with 2% boiling soda solution. During examination a magnifying glass must be used to examine sections of diseased organs and tissues in detail.

Veterinary and sanitary examination of carcasses and internal organs at the food market ends with a detailed examination with compulsory dissection of all accessible lymph nodes of the head, carcass, internal organs and additional cuts of

the neck, pectoral, lumbar muscles, ankoneus and muscles of the hindquarter (for cysticercosis).

The methods of veterinary and sanitary examination of slaughter products at markets is based on the knowledge of topography and peculiarities of the lymphatic system of different species of animals as well as the presence of pathologoanatomical changes which are observed in diseases of infectious and non-infectious etiology.

Veterinary and sanitary expertise of carcasses and organs at the markets differs from the same at the slaughterhouses. This is due to the fact that veterinary specialist of the market omits pre-slaughter inspection of animals and meat storage conditions from diagnostic complex. In addition, not only carcasses are delivered to markets, but also half-carcasses and quarters without a complete set of internal organs (stomach, intestines, urethra, etc.). It is considered, that absence of pre-slaughter inspection must be reliably compensated with presentation of the veterinary document (certificate or the veterinary certificate). However, in practice such compensation is not always observed. Therefore the issue of good quality and safe in veterinary respect slaughter products is mainly ensured as a result of qualified veterinary and sanitary inspection and, if necessary, laboratory research.

Boiling test. When examining carcasses and internal organs in the food market it is recommended to conduct boiling test. This test sufficiently clearly determine the smell of medicines (if the animal before the slaughter was treated), the smell of late castrated bulls and boars, the smell of spoiled meat and other extraneous odors, which may allow veterinary experts ¬ reject all slaughter products.

Determination of PSE- and DFD-defects (dystrophies). In recent years, due to the increase in feeding of animals under conditions of hypodynamy meat with signs of PSE- and DFD-defects more often entered the food market. PSE-malformation is more commonly found in pork and characterized by exudative depigmented dystrophy of muscle tissue and visually defined as pale, soft exudative meat. DFD-malformation is usually found in beef and is characterized by a dark, hard and dry state of the transverse striated skeletal muscles. At these defects meat noticeably differs from normal by external signs, biochemical, veterinary and sanitary indicators.

Pork with signs of PSE-failure has pale, grayish-pink, cream or pale color and resembles fish meat or meat with white muscle disease of young animals. Muscles have moist appearance, easily detach from bone, the cut of muscle and speck produce small drops of serous fluid. Affected muscles poorly adjacent to the surrounding tissue. On the carcass poorly formed crust desiccation, it more intense enzymatic and microbiological processes. Such meat has low water-holding capacity and poor culinary properties. In the first hours after slaughter, it has a pH of 5.2-5.4, which then rapidly rises to 6.2-6.6. Therefore, such meat is poorly stored chilled and after 1-2 days of storage has indicators of meat of doubtful freshness or not fresh.

Beef with signs of the DFD defect has a dark red (mature cherry) color up to red-brown. Muscle in the places of contact with tendons and lymph nodes have a crimson-dark color. On the cut the blood in the vessels is dark. Surface of the cut is

brown, sticky and dry. There may be areas of intravital destruction of muscle fibers. Intensive biochemical processes take place in the muscle tissue with DFD defect. Proteins and phosphatides decompose with the accumulation of undesirable unoxidized organic substances. The pH of such meat does not decrease to 6,0-6,2, and remains within 6,4-7,4. The moisture content of the meat is normal, but the water-binding ability of such beef is very high, which is used by unscrupulous processors in the manufacture of sausages (they add 2-3 times more water or ice in the stuffing than prescribed by technical conditions).

Given the rapid development of signs of spoilage meat with signs of PSE-and DFD-vices in many foreign countries it is stored at 10 ° C for not more than 5 hours at 4 ° C - up to 40 hours at 0-2 ° C - not more than 72 hours at -2 ° C - up to 5 days. In our country such meat is kept at 0-4 ° C up to 14-17 days. This sometimes leads to rejection of meat due to development of symptoms of spoilage. Almost all physical and chemical reactions with such meat will have indicators of stale meat.

In foreign countries, meat with PSE-and DFD-defects is 40-60% of the mass produced, in Russia - up to 20-40%. Such pork and beef are usually found after slaughtering animals that were intensively fattened with limited mobility.

The veterinary specialists of the State Veterinary and Phytosanitary Service of the markets must detect meat with PSE and DFD defects by its external signs and results of laboratory analysis, strictly limit the terms of its sale or send it for industrial processing (cooked sausages, canned food).

Veterinary and sanitary examination of fats. It is allowed to sell animal fats at markets: pork fat, raw fat, clarified fat. Fats of commercial animals (badger, marmot, bear, etc.) are subjected to examination and allowed for sale at the market only in clarified form, if the shelf life does not exceed 6 months. It is necessary to take into account that animal fats are subject to decomposition in storage, which may occur in the form of hydrolysis and oxidation. Hydrolysis - is the process of adding water to fat, as a result of which the fat splits into glycerol and free fatty acids. Oxidation is a deeper type of deterioration of fat. During oxidation, oxygen is added to the fat molecule. A variety of fat oxidation is sodium oxidation (stearinization) and rancidity. Baking is the oxidation of fat and the accumulation of stearic acid in it, which provides a high melting point. Oxidative and hydrolytic processes occur during rancidity, as a result of which oxygen is attached to unsaturated fatty acids to form peroxides. Fats are further broken down to aldehydes and ketones. Fats containing triglycerides of unsaturated fatty acids (pork, horse, rabbit, poultry) are soft and easily oxidized. Fats containing predominantly triglycerides of saturated fatty acids (beef, deer, mutton) are harder and more stable in storage.

The chemical composition of fat in different kinds of animals is not the same. It varies even within the same animal and depends on the place of deposition and depth of occurrence in the fat layer.

Raw fat and bacon, when delivered to markets, must have a veterinary document stating that the animal was examined before slaughter and was clinically healthy.

Veterinary expertise of animal fats determines their goodness, possible adulteration or replacement of one type of fat with fat of another, less valuable type of animal. If adulteration is suspected, the melting point and iodine number of the fat shall be determined. Sensory

indicators (color, taste, smell, transparency, consistency) of benign and substandard fat have certain differences.
All pieces of bacon must be branded. Containers of bacon fat and raw fat are labeled with a label with the imprint of the veterinary mark.

Examination of vegetable food products, milk and dairy products, bee honey see the relevant chapters of this textbook.

3.2 MATERIALS FOR THE LABORATORY CLASSES

1. laboratory: Determining the flaws of substances of different tastes and proportions (testers' choice)

Organoleptic assessment of food quality

Methodical instructions are developed on the basis of normative - technical and technological documentation, researches in the given area, and also domestic and foreign experience of an estimation of quality of foodstuff.

Methodical instructions establish the order of organization, carrying out and registration of the results of the organoleptic analysis of catering products.

Methods of organoleptic analysis of products is mandatory and uniform for use; in public catering enterprises, including the quality control service for specialists of food laboratories that control the quality of public catering products, as well as for other organizations, including territorial bodies of Gosstandart, GosSannadzor and law enforcement agencies.

Methodology for organoleptic analysis of products establishes the basic requirements for the room, the instruments used, the materials and experts.

General provisions of the method.

Organoleptic analysis is a study of the quality of products using the senses - vision, smell, taste, touch.

When observing the scientifically based rules, the results of organoleptic assessment of product quality are equal to the results obtained by using instrumental methods of control in terms of accuracy and reproducibility.

Thanks to this method of analysis, you can quickly and easily assess the quality of raw materials, semi-finished products and culinary products to detect violations of recipes, cooking technology.

Accuracy, reproducibility and comparability of results of organoleptic analysis depends on meeting certain requirements, namely :

- The order and conditions of the analysis;
- The qualifications and skills of the specialists;
- Systems for evaluating the results of the analysis.

As mentioned earlier products have quality indicators, the choice of these indicators in the organoleptic analysis depends on the type of products and its characteristics. The main indicators of this analysis are: appearance, color, odor, consistency, taste.

Appearance - a complex indicator, which characterizes the overall visual impression of the product, and includes a number of single indicators, such as shape, surface condition, uniformity in size, etc.

Color (coloration) - indicator of appearance, characterizing the impression caused by reflected light rays of visible color.

Smell is an indicator of quality, determined by the olfactory organs. The intensity of odor depends on the amount of volatile substances emitted from the products and their chemical nature.

Consistency - a measure of food quality, which characterizes the sum of the

properties of the product, visually and tactually reproducible.
In assessing consistency, it is determined:
- Aggregate state (liquid, solid, etc.);
- The degree of its homogeneity (homogeneous, flaky, cottage cheese, etc.);
- Mechanical properties (brittleness, ductility, elasticity, plasticity).

Taste is the most important indicator of product quality, which has a decisive influence on the evaluation of product quality.

Taste is caused by substances soluble in water or saliva. The taste sensation is influenced by the consistency and smell of dishes and products.

In assessing the taste characterize its qualitative characteristics (bitter, sour, sweet, salty taste) and intensity.

Analytical methods of organoleptic analysis are based on quantitative assessment of quality indicators and allow to establish correlation between separate signs. To the analytical methods include methods of paired comparison, triangular, duo-trio, rank, score and others.

Among the analytical methods we can distinguish groups of qualitative and quantitative difference tests.

Methods of qualitative differences allow you to answer the question of whether there is a difference between the evaluated samples on one of the quality indicators (taste, smell, consistency, appearance) or the overall impression of quality, but do not answer the question of what is the difference between the samples. This group includes methods of comparison: paired, triangular, two out of three (duo-trio), two out of five. They are based on comparing two similar samples with weakly pronounced differences. Samples can be presented as a pair (paired method), as samples of three samples (two of which are identical) or as samples of five samples (one sample is repeated in the sample two times, the other is repeated three times). The samples must be coded. The methods are used when it is necessary to verify whether there are differences between the two product samples. These tests are also used in the selection of tasters.

Qualitative differentiation tests include dilution index methods and the scoring method. These methods make it possible to quantify the intensity of a certain property or the level of quality of a product as a whole.

The dilution index method is designed to determine the intensity of odor, taste, coloration of the product by the value of the marginal dilution. The method consists in the fact that the liquid product is subjected to a series of increasing dilutions to obtain a concentration at which individual indicators are not detected organoleptically. The index (index) of taste, smell, color is expressed by the number of dilutions or the percentage of the original substance in the solution.

The scoring method is based on the use of graphical and verbal scales. The taster is offered two samples of the product, for which the evaluated characteristic has a minimum and maximum value, and one sample, for which the intensity of the characteristic is not known.

When comparing the third sample with the first two, the relative value of the characteristic is evaluated and marked on the scale with a perpendicular stroke,

taking into account the distance from both ends.

The scoring method allows quantitative assessment of qualitative features of products and opens up great opportunities for studying the correlation between organoleptic properties of products and objective parameters measured by instrumental methods.

It should be noted, however, that the most objective information can be obtained only by using measuring methods. Compared to organoleptic analysis, they are more time-consuming and complicated, but they are devoid of subjectivity of the expert.

1. LABORATORIES: DETERMINING THE FRESHNESS OF MEAT

Sampling for laboratory analysis

Three samples of at least 200 g each are taken from the carcass:
- 1st sample from the middle of the neck opposite the 4-5 cervical vertebrae;
- 2nd sample from the muscles in the scapula region;
- 3rd sample from the muscles of the hip group.

Samples of meat from frozen blocks and by-products are taken as a whole piece at the rate of 200 g. From a batch of poultry (GOST 31470-2012) select 6 carcasses weighing up to 400 g, 4 carcasses weighing 400-900 g, 3 carcasses weighing over 900 g, 3 longitudinal halves of carcasses weighing over 2.5 kg, pullets - 1 kg, by-products on bone - 300 g. If samples must be transported to the laboratory, each sample is wrapped in autoclaved parchment paper and signed with a simple pencil (name of tissue, carcass number, date and time of sampling, etc.). Samples packed in this way are placed in a hermetically sealed container. The container is sealed or sealed and sent to the laboratory along with a supporting document indicating: date and place of sampling, type of livestock, carcass number, reason and purpose of examination, sender's signature, etc.

Organoleptic methods of examination of meat for freshness.

Determination of the appearance of meat. Examination of meat is carried out in daylight. Assess the condition of the surface of the meat (contamination, blood clots, fly larvae, mold, overgrowth, skin residues, etc.), establish the presence or absence of crusts drying out. Stickiness of meat is determined by palpation, and moistening by filter paper applied to a fresh cut.

Determination of meat odor. Smell is one of the most important organoleptic indicators. If meat has a non-specific smell (putrid, musty, sour, rancid, etc.), even if the other indicators are normal, it is considered unfit for food purposes. Smell is determined at room temperature first on the surface and then on a fresh cut of raw meat. Particular attention is paid to the smell of the muscle tissue adjacent to the bones.

Determining the color of meat. When meat is spoiled, its color changes. The color of meat is determined in daylight on the surface and fresh cut.

Determination of meat consistency. When meat is spoiled, the structure of muscle tissue is disturbed and its turgor decreases, which leads to a change in consistency. To determine consistency, pressure is applied to the meat with a spatula and watch the rate at which the dimple lines up.

Determining the condition of the fat. Oxidation and hydrolysis of fat occurs during spoilage, this is expressed in its rancidity and siltation, manifested by softening, color change and the appearance of a rancid, putrid or stearic odor. To assess the condition of fatty tissue, the appearance, color in daylight on the surface and on the cut, odor on the surface and on the cut, and consistency by pressing with a spatula are determined.

Determination of synovial fluid transparency. In order to

to obtain synovial fluid, one of the major joints is opened on the carcass. The color and transparency of synovial fluid in daylight and its odor are determined.

Determining the condition of the tendons. When determining the freshness of meat

special attention is paid to the state of tendons because they are based on connective tissue, which, unlike muscles, does not contain glycogen, so the pH in the tendon during maturation of meat almost does not change and remains close to neutral, which contributes to their rapid deterioration. To determine the condition of the tendons, assess their elasticity and density, and pay attention to the shine of their surface, color and smell, the presence of mucus.

Determination of bone marrow condition. In the process of spoilage, the bone marrow

decreases in volume, loses its luster, changes color, loses its connection to bone, and liquefies. When assessing the condition of the bone marrow, determine its position in the tubular bone, then extract and determine the color, consistency, and luster on the fracture.

Cooking test. Prepare meat broth 1:3 (a sample of 20-30 grindings of meat with scissors into minced meat, place in a conical flask

(A 100-200 ml conical flask, pour 60-90 ml of distilled water, cover with a watch glass and put it in a boiling water bath for 10 minutes). Then the glass is lifted and the aroma of the broth vapors is determined. After that, attention is paid to the transparency of the broth, the size and number of fat droplets on its surface. Broth transparency is determined by visual observation in a measuring cylinder or colorless glass test tube with a capacity of 25 ml and a diameter of 20 mm. Data on organoleptic characteristics of slaughtered cattle meat are presented in Table 3, poultry meat in Table 4, rabbit meat in Table 5.

Laboratory methods for determining meat freshness. In the meat of slaughtered animals (according to GOST 23392-78) determine the number of volatile fatty acids, products of primary decomposition of protein (the reaction with sulfuric copper) and conduct microscopy of smears-imprints; in the meat of rabbits (according to GOST 20235. 1-74) determine the amount of volatile fatty acids, products of primary protein decay (the reaction with sulfuric copper), ammonia and ammonium salts and conduct a microscopy of smear-prints; in poultry meat (according to GOST 31470-2012) determine the amount of volatile

fatty acids, products of primary protein decay, peroxidase, ammonia and ammonium salts, acid and peroxide number of fat and conduct a microscopy of smear-prints.

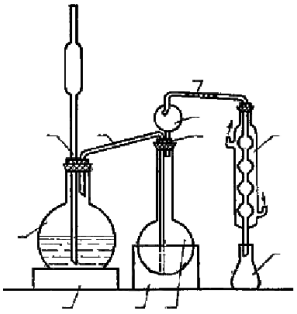
Physicochemical studies

Methods for reactions with sulfuric copper, benzidine and boiling samples, see chapter 3.

Determination of volatile fatty acids. In the process of meat deterioration there is a decomposition of organic compounds.

decomposition of organic compounds, as a result of which volatile fatty acids accumulate in it.

Reaction method. The analysis is carried out on a water-vapor distillation apparatus (figure 19). A weight of minced meat weighing (25 ± 0.01) g was placed in a round bottom flask. 150 ml of 2% sulfuric acid solution was also added. The contents of the flask is stirred and the flask is closed with a stopper. A 250 mL conical flask is placed under the cooler and the volume of 200 mL is marked on it. Distilled water



Pic. 19. Apparatus for distillation of volatile substances with water vapor:
1 - round-bottom flask; 2 - flask heater; 3 - electric hotplate; 4 - flask
1 - round-bottom flask; 2 - round-bottom flask heater; 3 - electric hotplate; 4 - bottom flask; 5 - safety pipe; 6, 9 - vapor-removing tubes; 7 - stopper
8 - drop catcher; 10 - refrigerator; 11 - conical flask

in a flat-bottomed flask is brought to a boil and the volatile fatty acids are distilled off with steam until 200 mL distillate is collected in the flask. During the distillation the flask with the sample is heated. The whole volume of the distillate is titrated with 0.1 n potassium hydroxide (or sodium hydroxide) in a flask with an indicator (1% phenolphthalein solution) until a crimson coloration appears, which does not disappear within a minute. In parallel under the same conditions a control analysis is carried out to determine the alkali consumption for the titration of the distillate with the reagent without meat. The amount of volatile fatty acids (in milligrams of potassium hydroxide in 25 g of meat) is calculated by the formula

$$X = (V - V0) \cdot K \cdot 5{,}61,$$

where V is the amount of 0.1 n potassium hydroxide (or sodium) solution consumed for the titration of 200 ml of meat distillate, ml; V0 is the amount of 0.1 n potassium hydroxide (or sodium) solution consumed for the titration of 200 ml of

control distillate, ml; K - correction to 0.1 n potassium hydroxide (or sodium) titrant solution; 5.61 - amount of potassium hydroxide contained in 1 ml of 0.1 n solution, mg. The arithmetic mean of two parallel determinations shall be taken as the test result. The calculation shall be carried out with an error of not more than 0,01 mg of hydroxide.

Accounting for the reaction. Meat of slaughtered livestock is considered fresh, if 25 g contains volatile fatty acids up to 4 mg KOH (in poultry meat - up to 4.5 mg; in the meat of rabbits chilled - up to 2.25 mg, frozen up to 4.5 mg); meat is considered to be of questionable freshness, if 25 g contains 4 to 9 mg KOH (in poultry meat - from 4.5 to 9 mg, in chilled rabbit meat - from 2.25 to 9 mg, in frozen meat - 4.5-13.5 mg); meat is considered stale if the volatile fatty acids content is more than 9 mg KOH in 1 g of product (in rabbits in frozen meat - more than 13.5 mg).

Determination of the presence of ammonia and ammonium salts. The essence of the reaction is that ammonium salts and ammonia form with Nessler's reagent (double salt of mercury iodide and potassium iodide dissolved in potassium oxide hydrate) mercurammonium iodide of yellow-brown color.

Setting up the reaction. A 1:4 meat extract is prepared. A sample (5 g) of meat, chopped with scissors to mince, is placed in a flask and 20 ml of bidistilled water is added; stirred vigorously for 15 minutes, after which filtered through a paper filter. A test tube is filled with 1 ml of meat extract, 10 drops of Nessler's reagent is added and the mixture is stirred.

Reaction recording. Fresh meat - the extract becomes greenish-yellow and remains clear or slightly cloudy; meat of questionable freshness - the extract becomes intensely yellow, considerable turbidity is observed, and precipitation is typical for frozen meat; stale meat - the extract becomes yellow-orange or orange in color, rapid formation of large flakes precipitating out is observed.

Determination of the acid number of poultry fat. Preparation of the material for the reaction. From each sample at least 20 g of internal fatty tissue is taken, crushed with scissors and melted in a porcelain cup in a water bath, then filtered into a beaker through four layers of gauze and cooled to 20 ° C. For the setup of the reaction, see 6.3.

Recording the reaction. Fat from chilled and frozen carcasses of all types of poultry with an acid number up to 1 mg NaÎÍ is considered fresh; chicken fat from chilled carcasses with an acid number of 1.0-2.5 mg NaÎÍ, goose fat - 1.0-2.0 mg NaÎÍ, duck and turkey fat - 1.0-3.0 mg NaÎÍ, and fat from frozen carcasses of all types of poultry with an acid number of 1.0-1.6 mg NaÎÍ is considered questionable freshness.

Determination of peroxide number of fat. Preparation of material for the reaction. Poultry fatty tissue is crushed with scissors, melted and filtered. Setting up the reaction, see 6.3.

Accounting for the reaction: Fat from chilled and frozen carcasses of all types of poultry is considered fresh if the value of peroxide number does not exceed 0.01 g iodine; chicken fat from chilled carcasses with peroxide number 0.01-0.04 g iodine, goose, duck, turkey - 0.01-0.1 g iodine, fat from frozen carcasses of all

types of poultry with peroxide number 0.01-0.03 g iodine is considered questionable freshness; when these values are exceeded poultry meat is considered as stale.

Luminescent analysis. Meat of different degrees of freshness is known to fluoresce differently under the influence of ultraviolet radiation.

Staging of the reaction. For luminescence analysis of meat freshness, an Owl luminoscope is used (Fig. 20). The device included in the network. Sample of test meat or meat extract 1:4 placed in the working section of the device and viewed in ultraviolet light.

Reaction recording. Fresh cattle meat fluoresces red-arch color, lamb meat - dark brown, pork - light brown. When meat decomposes, a glow in the form of yellow dots on a dirty-dark background is noted.

Pic. 20. Luminoscope
"Owl"

light; of meat of doubtful freshness - pink-violet with a greenish hue; of stale meat - green-blue color.

Microscopy of smear-prints.

Microscopy of smear-prints is carried out to determine the number of bacteria and the degree of decay of muscle tissue. At least 6 smears are prepared from the upper and deep layers of muscle tissue, 3 smears each on two slides, stained by Gram stain (see methodology in Chapter 3). Smear is microscoped under high magnification of microscope (630-900 times). 25 fields of view are examined on a single slide. Record the results of microscopy: fresh meat - no microflora detected in smears-prints or in the field of view of the preparation single cocci and bacilliform bacteria (up to 10 microbial bodies) and no signs of tissue decay; meat of doubtful freshness - no more than 30 microorganisms (average number) are found in smears-prints, and also traces of tissue decay; stale meat - more than 30 microorganisms are found in the field of view of smears-prints, significant tissue decay is observed.

Veterinary and sanitary evaluation of meat depending on the degree of its freshness.

Veterinary and sanitary evaluation of meat:

1) Fresh meat shall be used without restriction;
2) meat of doubtful freshness shall be immediately processed into cooked sausages or boiled after cleaning and technical disposal of altered sections;
3) stale meat shall be technically disposed of or destroyed.

If the meat shows signs of putrefaction or tanning, it shall be technically disposed of. Sometimes if meat is slightly spoiled, it may be used to feed animals after

cooking. If the meat is slimy, discolored or moldy, it is cleaned up and sent for immediate industrial processing.

4. LABORATORY: DETERMINATION OF MEAT OF SICK ANIMALS

Organoleptic studies in determining the meat of sick animals. Degree of exsanguination of the carcass.

Poorly exsanguinated meat has a darker color. To determine the degree of exsanguination of meat, look at the filling of blood vessels, which are particularly visible on the serous membranes. In addition, it is necessary to look at the presence of blood on the surface of a fresh cut of meat; a strip of filter paper is used to determine the moisture content of the cut.

There are four degrees of exsanguination of meat:

- good - no blood in the blood vessels, the surface of the cut is dry, a small amount of meat juice is possible;
- satisfactory - a small amount of blood in small blood vessels, no blood in muscles, surface of a cut is wet;
- bad - blood in small and medium blood vessels is detected, when pressing on the surface of the cut, drops of blood stand out;
- very bad - blood in small, medium and large blood vessels, serous membranes of purple-red color, on the surface of the cut there is blood.

Meat of corpses has a very bad degree of exsanguination, meat of seriously ill animals killed in agonal state - bad or very bad.

Microscopy of smear-prints.

The technique for preparing a smear-print is as follows. Smears are prepared from the upper and deep layers of each sample. A piece of meat at least 1.5×2.0×2.5 cm in size is cut from the proflambulated sample with sterile scissors, and the surfaces of cuts are applied to a sterile slide (three prints on two slides each). The smears are outlined on the back side of the slide with a wax pencil, then air-dried, fixed over a gas torch and stained with Gram stain and Anthrax capsules by Olt.

Gram staining. Carbolic gentian violet is poured over fixed smears through a strip of film paper, after 2 minutes the dye is discarded and the smear is washed with water, then Lugol solution is poured for 2 minutes, then iodinated alcohol is poured for 1 minute, and finally the smear is washed with water and stained with fuchsin for 2 minutes. Then the smear is washed and dried with filter paper.

Olt staining. Fixed smears are stained with freshly prepared heated 2% safranin solution for 1 to 2 minutes (orphan bacteria are stained brick-red, and capsules turn yellow). The smear is microscoped under high magnification (630-900×) under emersion. Twenty-five fields of view are examined on a single slide. Fresh meat from a healthy animal should not contain microflora.

Physicochemical studies

Cooking sample

Staging of the reaction. Prepare meat broth 1 : 3. 20-30 g of meat are weighed on laboratory scales (Fig. 15). Then cut up sample of meat with scissors into minced meat and place into 100 ml conical flask. Using a graduated cylinder measure 60-90 ml of distilled water and add it to the flask with the meat. The flask is covered with a watchglass and placed in a boiling water bath for 10 min.

Recording the reaction. To record the reaction, the glass is lifted up and the aroma of the broth vapors is determined. After that, attention is paid to the transparency of the broth: meat of a healthy animal - the broth remains transparent, aroma is specific; meat of a sick or killed in an agonal state of animal - turbidity of the broth is noted, aroma is weak, foreign odors are possible; medicinal, etc.; meat of a corpse - broth is turbid with flakes, smell is stale or putrefied.

Meat pH determination

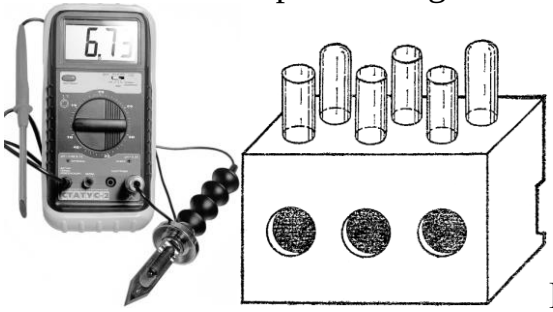
The pH of meat is determined by potentiometric and colorimetric methods.

Potentiometric method. Meat pH is determined using an analog or digital potentiometer (pH-meter) directly in the meat with a special knife electrode (Fig. 17) or in an aqueous extract prepared in a 1:10 ratio. The extract is infused for 15 min with periodic stirring and filtered through a paper filter. Determination of pH is carried out according to the instruction (passport) on operation of potentiometer (pH-meter). In the process of work it is necessary to check periodically the correctness of readings of the device by means of standard buffer solutions.

Colorimetric method (using Michaelis comparator). Setting up the reaction. Prepare meat extract 1 : 4. A sample of 20 g of meat cut with scissors into minced meat is placed in a flask, 80 ml of distilled water is added and stirred vigorously for 15 minutes, after which filtered through a paper filter. pH is determined by using colored standards sealed in tubes and comparator with six sockets (Fig. 18), arranged in 2 rows of 3 in each. The tubes are inserted into the sockets of the comparator and filled as follows

The tubes in the first row are filled as follows: 2 ml of meat extract in each tube, 5 ml of distilled water in the outer tubes and 4 ml of distilled water and 1 ml of indicator (0.1% solution of nitrophenol vapour) in the central tube. In the central tube of the second row, 7 ml of distilled water, and the standards are inserted in the outer sockets, selecting them so that when observed through the horizontal holes, their color coincided with the color of the contents of the middle tube. pH of meat will correspond to the figure indicated on the label of the standard.

Reaction recording. The pH of meat of a healthy animal is 5.6-6.2; the pH of meat of a sick animal is 6.3; the pH of cadaver meat shifts to the alkaline side - above 6.4 and can reach pH 7 or higher.



Pic. 18. Michaelis Comparator

Pic. 17. Digital
pH-meter "Status-2"
and bayonet electrode
for meat pH determination

Veterinary and sanitary evaluation of meat of sick animals and carcasses.

Meat is considered to be obtained from a healthy animal if the carcass has good organoleptic characteristics, no pathogenic microbes in smears, pH within 5.6-6.2, positive peroxidase reaction and negative values of the Formol test and reaction with sulfuric copper.

Meat of sick and overworked animals has insufficient exsanguination, pH in the range of 6.3-6.5, doubtful reaction to peroxidase and flakes are formed in the extract when performing the formol test and reaction with sulfuric copper. Meat of animals killed in agony has poor exsanguination, lilac-pink or blue coloring of lymph nodes, pH of 6.6 and higher, negative reaction to peroxidase, and formol test and reaction with copper sulfate is accompanied by formation of a gelatinous clot. Meat and slaughter products obtained from cadavers and animals killed in agonal state shall be sent for technical utilization.

The use of meat and slaughter products of sick animals shall be determined after establishing the diagnosis in accordance with the "Rules of veterinary inspection of slaughter animals and veterinary examination of meat and meat products" and other effective regulatory documents. Meat of healthy animals shall be used without restrictions.

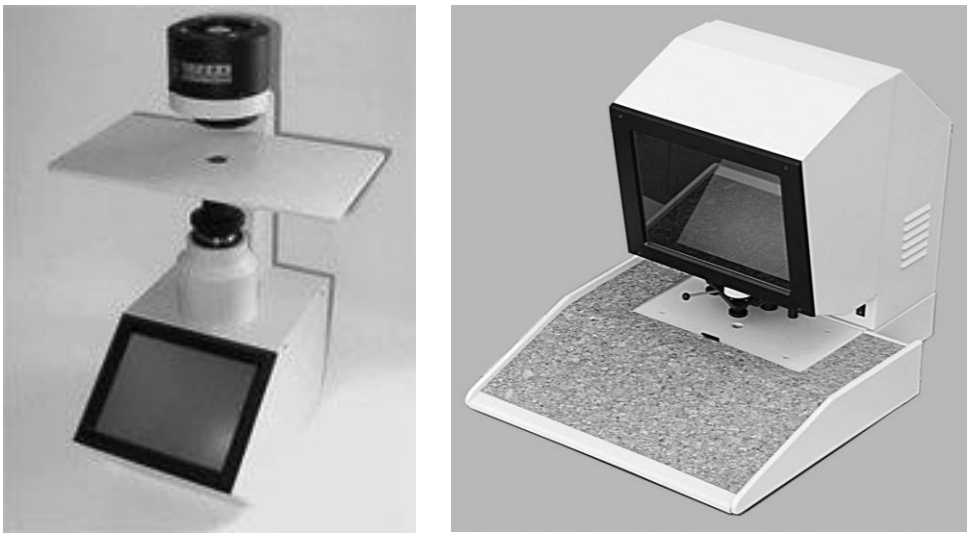
5. LABORATORY: VETERINARY AND SANITARY EXAMINATION OF MEAT FOR INVASIVE DISEASES

Sampling for trichinosis detection

For testing meat for trichinosis, two samples (about 60 g each) are taken from each carcass from the legs of the diaphragm (at the border of the muscle-tendon transition) and, if not available, from the muscular rib part of the diaphragm, intercostal, cervical muscles or masseter. Laboratory methods for detection of trichinellas

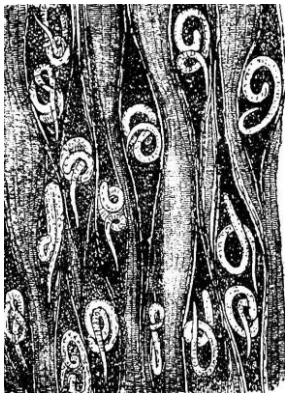
Methodology for trichinella scoping of meat. From each sample at least 12 slices are examined (24 in total). If the meat comes from farms unpreventable for trichinellosis, at least 96 slices are made. Slices are made along the course of the muscle fibres from different parts of the sample with curved eye scissors. The scissors are held with the concave side facing the meat, with the cut on the convex side. The size of the cut should be about the size of a skinny oatmeal grain. Finished slices are placed on the lower glass of the compressorium. Using dissecting needles, the slices are placed in the middle of the free cells (at least 12 slices on each side). After all the slices are placed, the upper glass is placed and the slices are crushed by hand so that the fine newspaper print can be read through them. The compressorium glasses are fastened with screws. Then the slices are

viewed at 50-90 times magnification by optical microscope or projection trichinelloscope "Stack", "Stack-pro" (Fig. 10), etc.



Pic. 10. Projection trichinelloscopes "Steak", "Steak-pro"

Projection trichinelloscopy must be performed in a darkened room. Compressorium is fixed in the moving frame of the trichinelloscope. The principle of operation of the device is that the image of a muscle slice is projected onto a fluorescent or conventional screen by means of prisms and mirrors. The main advantages of projection trichinelloscopy are higher throughput capacity, less fatigue of the researcher and the possibility for several people to look at the same slice simultaneously. Trichinellae are encapsulated inside the muscle fiber under the sarcolemma (Fig. 11). Trichinella larvae are visible as round worms up to 1 mm long with pointed edges, twisted into a spiral, located inside a spindle-shaped, oval, less often round (in bears) capsule.



Pic. 11. Trichinella larvae in meat

Additional slice processing and differential diagnosis in trichinelloscopy. Staining and additional processing of slices is usually not necessary for trichinelloscopy of fresh meat, but in some cases it may be necessary for optimal visibility. If the sections are very dark because of high myoglobin and hemoglobin

content, which is often observed in meat of commercial animals, they are treated with 50% glycerol water solution for 1 minute to brighten them. To improve visibility, a similar treatment can be used in the examination of preserved and thawed meat. Glycerol-treated sections become more transparent and are better crushed in the compressorium.Often sections show calcified areas, which may arise due to calcification of trichinellae, cysticerca that died in the early stages of development, sarcocysts or salt deposits.In such cases it is necessary to make a differential diagnosis. For this purpose, the sections are placed in 10% hydrochloric acid solution for 2-3 hours. After that, the sections are placed back on the compressorium and examined under a microscope or trichinelloscope. If trichinellosis was caused, whole trichinellas or parts of them are found inside the muscle fiber. In case of cysticercosis, a dead cysticerca or its parts are found between the muscle fibers: scolex, segments. The size of the cysticerca is usually much larger than the trichinellosis capsule. In sarcocystosis, oval cysts 0.5-3 mm in size, divided into several chambers, are found in slices inside muscle fibers. When salts are deposited, cavities are found in the sections in the place of calcified areas. When examining preserved, salted and smoked meat, the sections can be stained with methylene blue. For this purpose, slices are placed in an evaporating cup and poured into a small quantity of a 7-8% solution of methylene blue prepared in an 80% solution of acetic acid. After 2-3 min, the dye is drained and the sections are washed with hot (70 °C) water until the dye stops separating. After staining, the sections are crushed in a compressorium and microscopically examined. The trichinella larvae are stained blue and their capsules are stained blue, while the slices themselves are gray. Slices prepared from fresh meat are stained directly on a compressorium. For this purpose, a drop of saturated solution of methylene blue is dropped on each slice, then after 1 minute the upper glass of the compressorium is placed and microscopically stained. The meat is stained blue, while the trichinella capsules and the helminths themselves remain unstained.

Detection of trichinellas by meat digestion with artificial gastric juice using "Gastros", "AVT" or other apparatuses. For detection of trichinellae the method of group or individual enzymatic digestion (3 per cent medical perepsin in 1 per cent hydrochloric acid) in Gastros (Fig. 12) and AVT machines with subsequent microscopy of the sediment can be used. Gastros, Gastros-6, and AVT apparatuses have 1, 3, or 8 reactors, respectively, representing a thermostatic chamber equipped with an electric stirrer and sediment collector with a grid filter.The method is based on digestion of muscle tissue samples taken from one or more animals in artificial gastric juice at 40-42 °C. Trichinella larvae resistant to artificial gastric juice precipitate out.

Pic. 12. Gastros and Gastros 6

After completion of meat digestion and sedimentation of the liquid in the reactor, the sump is opened and a small amount of liquid with sediment is poured out. The sediment is microscoped for detection of trichinellosis. The group method is used only at meat processing plants for examination of pork from areas free from trichinellosis. In this case, a mixed sample of 100 g (5 g from each carcass) is prepared. If at least one trichinella larvae are detected in a group sample, trichinelloscopy of each carcass is performed.

Veterinary and sanitary evaluation of meat for trichinellosis.

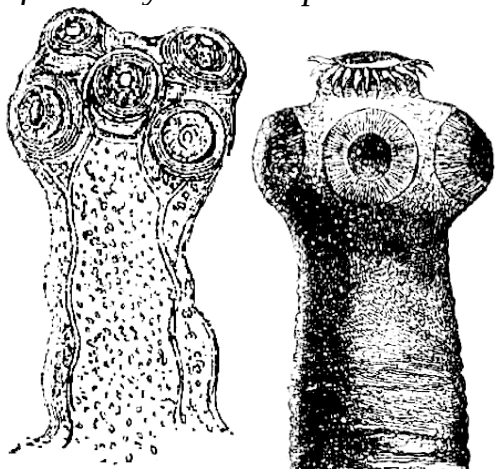
If at least one trichinella is detected in 24 (96) slices or in meat sample during enzymatic digestion (regardless of its viability) the carcass and sub-products with muscle tissue, esophagus, rectum, as well as impoverished meat products shall be sent for technical utilization. The external fat (bacon fat) is removed and reheated. Internal fat is released without restriction. The intestines (except the rectum) after normal processing shall be released without restriction.skins shall be released after stripping them of the remaining muscular tissue. The latter shall be sent for technical disposal.

Organoleptic methods of cysticerca detection

Detection of cysticerca is carried out at the same time as post mortem veterinary sanitary examination of carcasses and organs. Targeted search for cysticerca is carried out in the heart, masseter and tongue. If cysticerca is found on cuts in the head, tongue or heart, two parallel cuts are made in each of the neck, scapulo-elbow, dorsal, pelvic limb and diaphragm muscles.Cysticerca are located mainly in muscles, are 2-10 mm in size and are visible to the naked eye. They represent a two-layer connective-tissue vesicle filled with fluid, inside which there is a scolex with strobils and several proglottids. The largest are bovine cysticerca (they reach the size of 1 cm), while porcine cysticerca are much smaller (they usually do not exceed the size of a millet grain). The vast majority of cysticercalcules are localized in the skeletal musculature, but some cysticercalcules may be localized in the internal organs, brain, and even in the eyeball. Thin-cervical cysticerca reach the size of a chicken egg and are located on thin legs under the serous membranes; in rabbits and hares cysticerca are often found in the liver.

Cysticerca microscopy

As a rule, cysticerca are specific to an intermediate host, but if there are doubts about the species identity of the cysticerca, they can be microscopically examined. A drop of 0.9% sodium chloride solution is placed on a slide. Then the intact cysticerca is carefully extracted from the meat, freed from the capsule, and placed on a slide. Microscopy is performed at low magnification, and special attention is paid to the structure of the scolex (number, location, and shape of the sucker hooks). The bovine cysticerca scolex is unarmed and has only suckers, the scolexes of other cysticerca species are additionally armed with chitinous hooks (Fig. 13).



Pic. 13. Bovine and porcine cysticercus cysticercus.

The sanitary evaluation of carcasses and organs is differentiated according to the degree of infestation. If more than three dead or alive Cysticercus bovis or Cysticercus cellulosae, or five Cysticercus ovis, tarandi, or fewer Cysticercus cysticercus, but with pathological changes in musculature, carcass, head and internal organs (except intestines) shall be sent for technical utilization if more than 40 cm2 of cut in head or heart muscles and at least one of the cuts in carcass muscles is found. The internal and external fat (bacon) is removed and sent for rethermalization for food purposes (for 20 minutes at 100 °C).

If a 40 cm2 cut of the head or heart muscle contains no more than three dead or alive cysticerca and if no more than three cysticerca are present at other cuts of the above mentioned carcass muscles, the head and heart are sent for technical utilization, and the carcase and other organs (except intestines) are decontaminated by boiling, salting, or freezing. At meat processing plants equipped with electric or gas furnaces, meat subject to decontamination by boiling is allowed to be sent for making meat loaves.Decontaminated by freezing or salting carcasses of cattle and pigs are sent for making stuffed sausages or canned stuffing. De-sanitized by-products shall be sent for industrial processing. Bacon may also be decontaminated by freezing or salting under the same regimes as for meat. Intestines and skins, regardless of the degree of cysticercosis, are released without restrictions after normal treatment. If thin-bodied cysticerca are found on serous membranes and liver, they must be removed, after which carcasses and internal organs may be released without restriction. If carcasses and organs of sheep, goats, moose, and deer are only slightly affected (no more than five cysticercosis on a 40 cm2

section), and no changes in musculature, they are sent for processing into cooked sausages or are decontaminated by freezing with subsequent processing into sausages (stuffed products) or canned meat. If cysticercosis affects muscles, rabbit and hare carcasses and organs are sent for technical utilization. If only liver is affected, it is sent for technical disposal, and carcasses with good organoleptic properties are used without restrictions.

Determination of cysticerca viability after decontamination.

Before using the decontaminated meat, you must make sure that the cysticerca is dead. To do this, several undamaged cysticerca are carefully extracted from the meat by pressing them with two fingers, releasing the scolex and placing them in a Petri dish. A small amount of bovine bile or 50% pig bile solution is also poured into the cup. Petri dishes are placed in a thermostat at 37-39 °C for 10-30 minutes. If at least one cysticerca erupted into a scolex (Fig. 14), the decontamination is considered unsatisfactory.

8. LABORATORIES: VETERINARY AND SANITARY EXAMINATION OF EGGS

Poultry eggs are one of the basic foods of animal origin. Eggs are mainly a source of easily digestible protein, rich in essential amino acids and high quality non-saturated fats.

In addition, eggs are rich in vitamins, especially fat-soluble ones. In this case the cost of producing eggs several times lower than that of meat. However, it should be remembered that eggs are perishable products, and if stored incorrectly or for a long time may cause human foodborne illness, and eggs obtained from diseased birds can be a source of human infection zooanthroponoznyh infectious diseases. Therefore, veterinary and sanitary control of eggs at all stages (production, transportation, storage, sale, processing) is one of the important tasks of veterinary services.

The aim of the lesson: to work out the methods of veterinary examination of eggs, give a veterinary and sanitary evaluation and determine the commercial qualities of the eggs examined.

Work plan:

1. to study the accompanying documents for eggs.
2. Carry out organoleptic examination of eggs:

(a) Carry out external examination of eggs;

b) conduct ovoscopy of eggs;

c) conduct luminescent analysis of eggs;

e) conduct an examination of the contents of the eggs;

d) carry out weighing of eggs. 3.

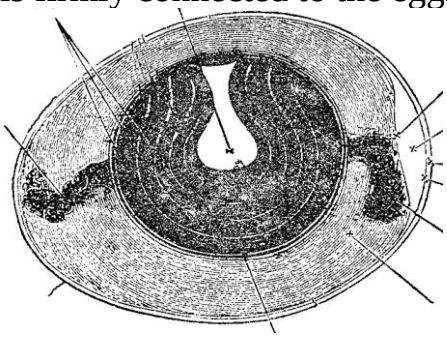
Based on the results of organoleptic and laboratory tests and study of supporting documents, give the veterinary and sanitary evaluation of eggs.

Equipment: eggs fresh, rotten, defects, ovoscope, luminoscope "Owl", egg measuring jig, Petri dishes, scalpel, laboratory scales, tables "Defects of eggs", "Egg structure", "Sampling eggs GOST 31654-2012", "Categories of chicken eggs

GOST 31654-2012", "Characteristics of eggs by type GOST 31654-2012", requirements for eggs according to GOST R 53404-2009.

The structure of eggs.

A bird egg consists of a shell, white and yolk. The shell is a calcareous shell, covered on the outside with a very thin protein suprashell film, and on the inside it is firmly connected to the eggshells (Fig. 51).



Pic. 51. The structure of a chicken egg:

1 — shell; *2* — subshell; *3* — protein envelope; *4* — cougar; *5* — Protein; *6* — yolk sheathing; *7* — Yolk; *8* — hailstone; *9* — germinal disc; *10* — overshell

The over-shell film consists of a mucin-like substance which plugs the holes in the shell and thus prevents the penetration of microorganisms into the egg and also protects it from excessive drying. When washing eggs over the shell film is easily washed off, so such eggs spoil quickly during storage.The shell itself consists of calcium carbonate and is permeated with a large number of small holes (pores), especially numerous at the blunt end of the egg. Through the pores, moisture evaporates from the egg, leading to shrinkage and possible exogenous contamination of the contents by microorganisms. Shell thickness and hardness depend on the species of the bird, nutritional adequacy, season, etc. Thin and not strong enough shells are one of the main causes of broken eggs.

The shell is translucent, which makes it possible to determine the quality of the inner contents of the eggs by transmission (ovoscopy). The brown shell strongly retains the light. In addition, the pigment looks red in the transmitted light and complicates the evaluation of the goodness of the eggs. Sometimes there are many light colored spots in the shell when the eggs are seen through the light. This is due to the uneven accumulation of protein and the higher light permeability of these areas. Consequently, the presence of light spots in the shell is not a sign of spoilage.Under-shell shells: the outer - tightly adheres to the lime shell, the inner (white) - covers the protein. Both shells firmly connected to each other, except for a small area at the blunt end, where between them formed an air chamber (puga).Egg white consists of three layers: outer, middle and inner.Middle layer of protein more dense than the outer and inner. With prolonged storage, the protein liquefies and becomes less viscous.The yolk is supported in the center of the egg by two gradins, which are twisted protein bundles. The contents of the yolk are separated from the white by a thin, transparent yolk membrane. Normally, the yolk is light yellow to orange in color, depending on the amount of carotene, xanthophyll, etc. pigments it contains. On the surface of the yolk there is a germ disk.

Classification of eggs

Eggs are classified according to the species of poultry from which they are obtained. In addition to chicken eggs, turkeys, guinea fowl, quail and ostrich eggs are used for sale in trade networks and markets.Eggs, depending on the terms and conditions of storage are divided into dietary and table eggs.

Diet eggs - are eggs, the shelf life of which, not counting the day of laying and sorting, does not exceed: for hen and turkey eggs - 7 days, guinea hens - 30 days, quail - 11 days, ostrich - 10 days.

Table eggs are eggs stored at temperatures from 0 to 8 ° C for: chicken and turkey eggs - 25 days, guinea hen - 90 days, quail and ostrich eggs - 30 days (in industrial refrigerators at the enterprise-producer at temperature from -2 to +2 ° C chicken eggs can be stored up to 90 days). In this case the accompanying documents are studied, the containers and transport are inspected, samples are taken, organoleptic and laboratory tests are carried out, on the basis of which the veterinary and sanitary evaluation of the eggs is given.

Examination of supporting documents

Upon receipt of eggs it is necessary to carefully examine the veterinary certificate - form No 2 or certificate - form No 4 (issued for transportation within the area) that shall be issued for each batch of eggs. A lot is any quantity of eggs of one kind, category and date of sorting, which are packed into one packing unit of transport containers. For eggs supplied by enterprises the following shall be issued in addition: certificate of quality, bill of lading, hygienic certificate and certificate of conformity.

Inspection of packaging and labeling of eggs

Eggs are packed separately by type and category. For the storage and transportation of eggs use lumpy pads holding 30 eggs, which, in turn, are packed in cardboard boxes of 12 pads each. The containers, lumpy pads, packing materials and fasteners must be undamaged, clean, dry and free from foreign smell. Used containers must be treated with disinfectants in accordance with the current veterinary and sanitary rules. Other types of packaging may be used, including imported containers or those made from imported materials permitted by the authorized bodies in accordance with the established procedure for contact with foodstuffs and ensuring the safety and quality of the eggs during transportation and storage. Labelling

eggs must be clear and easily readable. Eggs shall be marked by stamping, spraying or other method that provides a clear marking. The height of numbers and letters indicating the name, category and date of sorting must be not less than 3 mm. It is allowed to put additional information on the eggs (the name of the producer company or trademark).On the dietary eggs indicate the type of eggs, category and sorting date (date and month), on the table - only the type of eggs and category. Type of eggs is marked: dietary - D, table - C. The category of hen eggs is marked: the highest - B, selected - O, the first - 1, second - 2, third - 3.

Egg sampling

To check the organoleptic characteristics of eggs (determination of foreign odors, condition of the shell and ovoscopy, and if necessary - color and protein density) from a batch of eggs shall be sampled in accordance with the requirements of GOST 31654-2012. Packaging units are selected from different places of the batch (from the top, from the middle, from the bottom). The volume of sampling from standard containers, see. If smaller or larger containers are used, the total number of eggs sampled must be at least as large as specified. Damaged package units are not included in the sampling. Eggs

To determine the content of toxic elements, antibiotics, pesticides and radionuclides, 25% of the eggs are taken from the combined sample. To determine the microbiological indicators from a combined sample 25% of eggs are taken, but not less than 30 eggs. If unsatisfactory results are obtained when controlling a selected sample of eggs by at least one of the indicators, repeat the control of samples taken from the same batch of eggs. The results of the second inspection shall be considered final and shall be applied to the entire batch. 100% of eggs shall be subjected to organoleptic examination in the case of inspection of eggs supplied by individuals to markets. After examination and ovoscopy the eggs are returned to the owner.

Organoleptic and laboratory examination of eggs

When veterinary examination of eggs is carried out their external examination, ovoscopy, weighing, measuring the air chamber, if necessary examine their contents. The results are compared with GOST 31654-2012 for hen eggs and GOST R 53404-2009 for the rest.

Standards for sampling eggs from standard containers

Number of packagings per batchNumber of cartons to be takenNumber of spacers to be taken from each packing unitTotal number of eggs to be taken (sample volume)

Up to and including 10 1 12 360

From 11 to 50 3 6 540

51-100 5 5 750

101-500 12 3 1080

501-1000 24 2 1440

Table 3 6

Standards for taking eggs from non-standard containers

Quantity of eggs in lot, pcs. Sampling volume, %

Up to 360 inclusive 10

361-3600 5

3601-10 800 3

10 801-36 000 1

Over 36 000 0,5

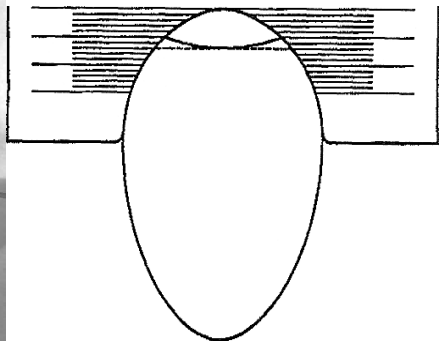
Veterinary and sanitary examination of eggs

External examination

Eggs are inspected externally in daylight. During the necessary examination, attention is paid to the color, dirtiness and integrity of the shell, as well as to the condition of the eggshell above the shell.

Ovoscopy

Using ovoscopy you can define the condition of the air chamber, its height, condition and position of the yolk, shell integrity, embryo disk, the presence or absence of spots using the method of penetrating eggs with ovoscope type I-11A, SMU-A, "Lux" (fig. 52) or others. Ovoscopy should be performed in a darkened room, and all the cells of the ovoscope must be filled (if the number of examined eggs is small, special pads covering free cells are used).



Pic. 52. Ovoscope Lux **Pic. 53.** Egg gauge (millimeters)

The condition of the air chamber and its height, the condition and position of the yolk and the integrity of the shell shall be determined by radiating the eggs with an ovoscope by turning them. The height of the cavity shall be measured by means of a gauge (fig. 53) by scoping the eggs through an ovoscope.

Examination of contents

The technique is used when, after external inspection and ovoscopy, there is suspicion as to the quality of the egg. The shell is broken and the content of the egg is carefully poured onto a smooth surface, after which the color, transparency and consistency of the albumen, yolk and the condition of the germinal disk are determined.

Luminescent analysis

This technique can be used as an additional method of investigation. The essence of the luminescent analysis is that when reflected by a stream of ultraviolet rays fresh and spoiled eggs have different glow: fresh eggs are luminescent crimson, old eggs are pale pink or mauve, and spoiled eggs are violet. For the luminescence analysis, the test egg is placed in the working compartment of the Owl or other instruments and the luminescence of the egg in ultraviolet color is determined.

9. LABORATORY: VETERINARY AND SANITARY EXPERTISE OF FISH

Sampling. During veterinary examination of fish at the markets the entire batch shall be subjected to visual and organoleptic examination of at least 30 specimens of fish. Pathologoanatomic autopsy is carried out on three to five specimens out of the inspected fish. For physico-chemical studies and microscopy an average sample is taken from the batch: From fish up to 100 g - 5-6 specimens, from fish

up to 1 kg 2 samples are taken (in the gill area), from fish 1-3 kg - 2 samples from 1 or 2 fish (if the samples are taken from one fish, one is taken from the anus area and another from the gill area), from fish over 3 kg 2 samples are taken from one fish (one is taken from the anus area and another from the gill area). During veterinary health examination of fish and aquatic invertebrates at food industry enterprises, trade organizations, food bases, etc. sampling is carried out in accordance with the requirements of GOST 31339-2006. For sampling from fish and aquatic invertebrates, packed in containers, a sample is taken, from live fish or raw fish samples are taken not more than 3 %. A point sample is taken from each package. Point samples are mixed into a combined sample. The combined sample is thoroughly examined, and an average sample is sent to the laboratory, with the weight of the average sample not exceeding 3 kg.

From different places of the batch up to 3% of fish by weight are taken without sorting, then a combined sample is compiled. In fish farms and other places of fishing the whole batch of caught fish or its part, but not less than 100 specimens are inspected.

Examination of fish for freshness

Fish is a perishable product and begins to spoil at room temperature within 12-24 hours after capture. There are the following main stages in the postmortem change of fish: separation of mucus on the surface of the body, rigor mortis, autolysis and bacterial decomposition.

Fish meat has a very low glycogen content, so it releases a small amount of lactic acid and pH remains close to neutral - 6.8-7, which is optimal for the development of microflora. For the same reason, post mortem rigor mortis of fish occurs very quickly and just as quickly passes.Post mortem rigor mortis is the result of complex biochemical transformations in the muscles, causing their contraction and tension. The rate of onset and duration of rigor mortis depend on many factors - the type of fish, its condition at catch, method of mortification, temperature and other storage conditions.In a healthy well-fed fish rigor mortis is more pronounced,

than in emaciated and sick fish. In fish quickly taken out of the water and immediately killed, rigor mortis does not set in as quickly as in those killed by suffocation, and lasts longer. The higher the storage temperature, the quicker the onset and duration of rigor mortis. Fish preserved in water have earlier onset, sharper onset and longer duration than fish preserved in air or on ice. The later the onset of rigor mortis and the longer it lasts, the longer the possible shelf life of the fish. After rigor mortis is complete, autolysis of protein and fat begins under the action of proteases and lipases contained in the lysosomes of the cells. Proteins are eventually broken down into polypeptides and individual amino acids, and fats into free fatty acids and glycerides.The products of protein and fat breakdown formed in the early stages of autolysis are benign. Further decomposition produces toxic products. The fish body is covered with mucus, which helps the fish glide better in the water and protects it against the penetration of microflora.After the fish die, the mucus, which is rich in protein, quickly loses its bactericidal properties and becomes a favorable environment for the development of microflora. If it is not removed in time, the bacteria will actively proliferate and penetrate into the muscle

tissue.Fish has an open circulatory system, which opens in the gill area. In addition, fish are usually not exsanguinated. Since blood is a good breeding ground for microorganisms, the latter rapidly spread from the gills along the bloodstream. Fish are cold-blooded animals, so the intestinal microflora is adapted to a low-temperature environment. The intestinal microflora continues to multiply even in
continues to multiply even in the refrigerator at 4-8 °C. Therefore, if the fish are not gutted, the intestinal microflora quickly overcome the intestinal barrier and infest the fish carcass, the impact of microorganisms undergoes a profound breakdown of fish proteins to form foul-smelling and toxic
The microorganisms cause the deep breakdown of fish proteins, producing foul-smelling and toxic substances (hydrogen sulfide, ammonia, cadaverine, indole, scatole, phenol, putrescine, etc.).

Organoleptic and pathological-anatomical examination of fish

To determine the quality and freshness of fish, first of all the organoleptic characteristics are determined. At that, attention is paid to the smell of fish, presence of mucus, its transparency and smell, condition of skin, scales, fins, muscle consistency, separation of muscles from bones, color and smell of gills, condition of eyes (elasticity, transparency of cornea, presence of blood), condition of abdomen, anal opening, internal organs, presence of tumors, abscesses, hemorrhages, ulcers and other pathological anatomical changes on fish carcasses and in internal organs. The smell of fish is the most important indicator of the freshness and quality of fish. It is determined on the surface and in the thickness of the muscles. The presence of an unusual odor in fish is grounds for rejection of fish. To determine the odor in the thickness make a fresh cut or puncture with a wooden needle or probe in the area of the gills and anus and sniff quickly.Inspection of fish is carried out in daylight. After superficial examination of the fish, a pathological and anatomical examination of selected specimens is performed by opening the abdominal cavity and inspecting the liver, heart, kidneys, swim bladder, intestines, spawning and other organs.

Fresh, benign fish must meet the following requirements: Smell specific, mucus is clear, without blood or odor, scales are entire, shiny or slightly pale with a pearlescent sheen, tight to the body, rigor mortis is well expressed or the consistency is elastic (when pressing with a finger the dimple in the dorsal muscles quickly disappears), skin elastic, without extraneous spots, has a natural color for each species of fish, fits tightly to the carcass, fins intact, natural color, gills pale pink or deep red, covered with mucus, no signs of decomposition, Gill covers tightly cover the gill cavity, eyes moderately convex or slightly convex, cornea and lens transparent, the anterior chamber may have some hemorrhages, abdomen has the shape characteristic of the species of fish, moderately elastic, not swollen, not molten, internal organs are well expressed, intestines are not swollen, without putrefactive smell, anal opening is tightly closed, not protruding, without mucus flow, on the cut muscular tissue is elastic, tightly adherent to bones, on transverse section dorsal muscles have color characteristic for each species of fish.

Fish of doubtful freshness is characterized by the following organoleptic characteristics: the mucus is turbid, sticky, sour-smelling, scales are dull, easily pulled out, skin is easily detached from muscles, gill covers do not close gill cavity, they are covered with large quantity of dilute dull mucus of reddish color with odor of dampness and mustiness, their color from light pink to slightly gray, eyes are sunken, somewhat wrinkled, vitreous, cornea is dull Abdomen flat, deformed or swollen; kidneys and liver in decomposition stage; bile stains surrounding tissues yellowish-green; intestines slightly swollen, soft, pinkish in places; consistency less elastic (pits in dorsal muscles slowly disappear under finger pressure); muscular tissue dull, softened, juicy, easily separated into separate fibers on cut.

Stale fish: has pungent putrid smell, slime cloudy, muddy grayish, sticky, disgusting smell, scales wrinkled, weakly separated from skin and easily separable.

skin weakly, easily detached, skin folded, loose, gills from dark brown to muddy gray or green in color, their leaflets are exposed from epithelium and covered with cloudy viscous mucus with a foul putrid odor, gill covers are open, eyes sunken, wrinkled, dried up, iris and the entire cavity of the eye soaked in blood, abdomen is often bloated or becomes soft, saggy, Its surface is often observed dark or greenish stains, internal organs are dirty gray or gray-brown, mixed into a homogeneous mass, emit a pungent putrefactive smell, the anus protrudes, from it flows mucus odor, flabby consistency (pressing the finger hole in the dorsal muscles remains long time or not smooth at all), muscle tissue soft, loose, easily separated from the bone.

Laboratory examination of fish for freshness

Fish freshness is determined by physical and chemical tests (cooking samples, pH, ammonia, hydrogen sulfide) and microscopic examination of smear prints.

Examination of fish broth (cooking test)

Take a sample of fish 20-100 g, grind to mince and place in a flask, add distilled water (so that the ratio of fish and water was 1:2). The flask is closed with a lid and placed in a boiling water bath for 10 min. After that, the flask is removed, the lid is opened and the smell, transparency and size of the droplet are determined in the broth.

Broth from benign fresh fish is transparent, there are large glints of fat on the surface, the smell is specific (pleasant, fishy), the meat is well separated into muscle bundles. Broth from fish of doubtful freshness, cloudy, little fat on the surface, the smell of meat and broth is unpleasant. Broth from low-quality fish is turbid, with flakes of muscle tissue, no fat on the surface, the smell of meat and broth is unpleasant, putrid.

Fish pH determination

The pH of fish is an important laboratory indicator that characterizes the freshness of fish. Normal fish pH is close to neutral, while it shifts to the alkaline side when it is spoiled. Fish pH is determined using a pH meter or a Michaelis comparator (see Ch. 3). If a Michaelis comparator is used, the indicator meta-nitrophenol is used.

Reaction accounting: pH of fresh fish 6.8-7; pH of fish of doubtful freshness 7.1; pH of stale fish 7.2 or higher.

Additional laboratory tests

In marine fish, in addition to the laboratory tests mentioned above, the trimethylamine content can be determined from the trimethylaminoxide present in many marine fish. The other most common type of spoilage of these fish is fat oxidation, which occurs under the influence of air oxygen as well as microorganisms. Researches show that after 10 months of storage at -15 ... -17 °C the fat of mackerel, horse-mackerel, herring and polar codfish due to oxidation accumulates aldehydes (up to 6,7-13,7 mg%), acid number increases (up to 17-40). Therefore, in determining the quality of fish you should always pay attention to the date of catch and shelf life. To determine the degree of oxidation of fats determine the value of peroxide and acid number, as well as the presence of aldehydes. In benign fish the peroxide number is up to 0.1, the acid number up to 2.8, aldehydes up to 5 mg% and trimethylamine up to 2-7 mg%.

Microscopy of smear-prints

When a fish spoils, microflora multiplies intensively in it. Microscopy of smear-prints prepared from fish and stained with Gram, allows to estimate approximately the total microbial contamination of fish (see methodology in chapter 3). Smears prepared from fresh fish should contain up to 20 microorganisms in the field of view, in fish of doubtful freshness - from 20 to 40 microorganisms, in stale fish - more than 40 microorganisms.

Requirements to healthy fish

It is allowed to sell fish with minor wounds on the jaws when hook-fishing, minor reddening of the body surface of amur, bighead, buffalo, carp, bream, sazan, sterlet, bester and trout. With significant traumatic injuries, especially complicated by saprolegniosis, fish is recognized as conditionally fit, cannot be stored and is sent for processing to food products or public catering enterprises, in extreme cases - for feeding animals. Emaciated fish is not allowed to be sold; it is used to feed animals or destroyed. Live fish with no signs of life must be removed and sent for processing. Live sturgeon fish at the first sign of shoveling must be immediately sent for gutting.Tuna, sailfish, mackerel, marlin, swordfish and cartilaginous fish after being caught must be immediately exsanguinated. Sturgeon fish (except sterlet) must be exsanguinated, stripped: their insides and sphincter must be removed.Catfish over 53 cm in length must be made gutted.Pike over 30 cm in length must be made gutted: in the Far East - from May 15 to November 1; in other areas -

from June 1 to December 1; Azov-Black Sea pike - all year round.

Marinka, osman, chromul, and ilisha are made only gutted.

The guts, roe, roe molluscs and black membrane must be thoroughly removed and discarded.

The eggs, roe, milk, and black film must be thoroughly removed and destroyed. The head of the ilisha and chromuli must be removed

head must be removed and destroyed.

10. LABORATORY: INSPECTION OF CANNED MEAT PRODUCTS

Organoleptic examination of canned meat

Organoleptic examination of canned meat consists of two phases: inspection of cans and their contents. when examining cans, pay attention to visible violations of leakage, leaks, buoyancy of cans, which are determined by placing them in a container of water, pay attention to deformation of the body and the bottom, rust, defects and seams rolling jars. The surface of metal cans should be clean, with no black spots, no disturbance of solder on the folds and profile joints, serrations, serrations.Rubber or paste should not protrude from under the folds. Bottoms should be flat, the layer of heat-resistant varnish on the surface of lacquered jars should be continuous. In addition, pay attention to the presence of defects of canned food (bombage, pops, etc.).Jars with vibrating ends (pops) have a permanently raised lid or bottom. When pressed on the convex surface, it is pressed through, but protrudes the opposite.This defect is associated more often with overfilling the can with the contents. If under bacteriological and organoleptic examination no deviations detected, such canned goods are sent for implementation.Bombage (bloating of cans) can be microbiological, chemical and false - physical. In the case of bombage the ends of cans are boiled, which is due to the strong pressure of gases inside the can, resulting from microbiological, chemical and physical processes.Microbiological bombage occurs due to the development of anaerobic microflora in cans, as a result of the vital activity of which various gases are released (carbon dioxide, hydrogen sulfide, etc.).Physical bombage occurs during the expansion of the contents during heating or freezing. Canned with the presence of physical (false) bombage, after eliminating the cause of the deviation, can be sent for sale in the prescribed period.Chemical bombage occurs when the accumulation of hydrogen and other gases due to the reaction of the components of the product with the metal of the container. In these cans detected metal salts of packaging - tin, iron, aluminum, which give the meat a metallic flavor,

Glass jars should be transparent, clean, without bubbles inside and on the surface of the glass, cracks, chips, closures should be tightly sealed, without burrs and dents.After external inspection of jars examine their markings. To prevent loss of information on the metal ends (lid and bottom) of cans by boldface marking or indelible paint applied symbols arranged in several rows.In accordance with the requirements of GOST 13534-89 marking applied in two or three rows.1st row. Date of production: date - two digits up to 9 inclusive, preceded by a zero, month - two digits up to 9 inclusive, preceded by a zero, year of production - the last two digits. Shift number - one digit; assortment number - three digits; for canned food of the highest grade - the letter "B" is added.

3rd row. The index of the system to which the manufacturing company belongs - one or two letters and the number of the manufacturing company - from one to three digits. Thus, the meat industry has the letter "A", food industry - "KP", fruit and vegetable production - "K", consumer cooperation - "CS", agricultural

production - "M", forestry - "LH".On lithographed cans are applied relief marking - only the date of manufacture and shift number, as the rest of the information is applied firmly by lithography. Marking of cans, in addition to the information provided for all meat products, must contain: information about the mass fraction (%, at least) of meat, fat, by-products, components of plant origin; recommendations for cooking (for cans requiring special treatment before consumption) and preparation for consumption.After inspection of cans they are opened, the contents are extracted and its organoleptic characteristics (color, taste, odor and consistency) are determined. Organoleptic evaluation of canned ham, tongues, tourists' breakfast is carried out in chilled condition, stewed meat, goulash - in heated condition, pates - at room temperature. The color of canned products depends on their type; products of uniform consistency must be uniformly colored; the taste and smell must be specific to the type of canned product, without foreign flavors and odors (chemical, medicinal, sour, rancid); the consistency - elastic for stewed meat and goulash, homogeneous, smear-like for pates; sausage stuffing must be evenly mixed. Meat stew must be cut into pieces of a certain mass, with no remaining bones, sinews or fascia, and must not disintegrate when removed. Canned should not be overcooked or overcooked. Broth in the heated state should have a color of yellow to light brown, a slight sediment is possible.The ratio of the components (meat, offal, fat, sauce, broth, jelly, vegetable products) must be defined for each name of canned food.

Determination of mass fraction of moisture

The moisture content in sausage products and canned goods is of great practical importance. The moisture content depends on the group of sausage products. For example, cooked sausages contain 55-75 % water, semi-smoked - 35-55 %, cooked-smoked - 35-43 %, raw-smoked - 25-35 %. Determination of mass fraction of water in sausage or canned products is carried out by drying out the sample to the smallest mass.

Reaction. A sample of sausage or canned food is placed in a burette and weighed on an analytical scale. Placed in a drying oven with a piece of sample and dried at 105 ° C, weighing periodically until you find the lowest mass.

Recording the reaction. The mass fraction of water is determined by the formula

X = [(m - m1)/A] - 100, where X - moisture, %, m - mass of the bump with a sample before drying, g, m1 - mass of the bump with a sample after drying, g, A - weight of the sample before drying, g.

Determination of table salt content

Table salt is one of the main chemical substances used in the preparation and preservation of sausages. Low table salt content in sausages can lead to rapid deterioration. Mohr's method is based on the titration of chlorine ion in a neutral environment with silver ion in the presence of potassium chromate.

Setting up the reaction. In preparation for the analysis of sausage samples are freed from the casing, and with salted bacon and pork products, developed in the skin, remove the skin, canned foods extracted from the can. Samples are ground twice on a meat grinder with a hole diameter of 3-4,5 mm grid and mixed thoroughly.Samples of pates, jelly and potions are ground on the meat grinder once

and thoroughly mixed.5 g of crushed medium sample is weighed in a beaker accurate to ± 0.01 g and add 100 ml of distilled water. The aqueous extract is prepared by stirring for 40 minutes with a magnetic stirrer or by stirring occasionally with a glass rod, then filtered through a paper filter, 5-10 ml of filtrate is pipetted into a conical flask and titrated with 0.05 n silver nitrate solution in the presence of 0.5 ml 10% potassium chloride solution until orange coloration occurs. Recording the reaction. The content of sodium chloride (X, in %) was calculated by
formula
X = [(0,00292 K - V - 100) / (a - m)] - 100 %,
where 0.00292 - quantity of sodium chloride, equivalent to 1 ml of 0.05 n solution of silver nitrate, g; K - correction for titration of 0.05 n solution of silver nitrate; V - quantity of 0.05 n solution of silver nitrate, used for the titration of the test solution, ml; a - quantity of water extract, taken for titration, ml; m - suspension, g; 100 - quantity of prepared water extract, ml. The discrepancy between the results of parallel determinations should not exceed 0.1%. As the final result is the arithmetic mean of the results of two parallel determinations.
Mass fraction of table salt shall be: in canned meat -1.2-2%, in cooked sausages 1.5-2.5%, in semi-smoked and cooked smoked sausages 3-4%, in raw smoked sausages 3-6%.

11. LABORATORY: VETERINARY AND SANITARY EXPERTISE OF SAUSAGES

Organoleptic examination of sausages and canned meat.

When carrying out veterinary and sanitary examination of sausages and canned meat the important importance is given to determining their organoleptic characteristics.

Organoleptic examination of sausages

During external inspection of sausage products attention is paid to the appearance of sausage products, shape and size of sausage bars, the presence of defects (slips, sticking of sausage stuffing, etc.), the presence of external contaminants (tar, grease, etc.). Organoleptic examination must be carried out outside of the workshop, as the sausage workshop smells of smoking smoke, spices and it is impossible to determine the smell of a particular sample. To be more reliable, the organoleptic examination must be carried out by a commission.Selected samples are freed from packaging. The casings are inspected first. The sausage casing must be clean, undamaged, and fit tightly to the sausage loaf. Its surface should not be sticky, with no signs of mold and putrefaction. Then loosen the sausage loaf from the twine or cut off the clips, cut off the ends of the sausage casing, and cut it with a longitudinal cut. The casing is removed from one side of the loaf. On the surface and on the cut of sausage products determine: smell, taste, consistency, color, uniformity of color, structure, etc. For reliable determination of taste and smell researcher should not be hungry and not satiated. When examining samples of varieties of sausage products, first examine cooked sausages, then semi-smoked, cooked-smoked, and finish with delicatessen products

and raw-smoked sausages. Smell is determined on the surface of the sausage product and in its depth immediately after cutting.

When examining

In the examination of hams and smoked meats the smell of the layers of muscle tissue adjacent to the bone is additionally determined. The smell of whole uncut hams, smoked meats and sausages is determined by the smell of a special wooden or metal spike or probe which has just been removed from the thickness of the product. To determine the taste of sausages cut into slices of thickness (in mm): cooked and stuffed - 3-4, half-smoked - 2-3, raw-smoked - 1,5-2, liveried - 5, put it in your mouth, carefully chewed and moved into the mouth for optimal contact with the taste receptors. After determining all the flavors, the sample is spit out. After each tasting it is necessary to restore (refresh) the taste buds with tea or coffee.Taste and smell of sausages and wieners are established in the heated state, for which they are dipped in cold water and heated to boiling. The consistency is determined by lightly pressing a spatula on a fresh cut of the sausage product. The structure of the minced sausage meat is determined on the cut, paying attention to the size, shape and placement of the various elements of the minced meat (speck, meal, etc.), the presence of voids, etc. Organoleptic characteristics of fresh quality sausages and smoked meats are as follows. The casing is dry, strong, elastic, without mold, tightly attached to the stuffing (except for cellophane casings). The casing of raw smoked sausages may have a white dry layer of mold, which has not penetrated through the casing into the sausage stuffing. The surface of smoked sausages must be dry, clean, without stains or mold.Smell and taste must be specific to the type of sausage, with an aroma of spices, without signs of stale, sour, foreign flavors and odors (chemical, medicinal, etc.). Coloring of sausage products must be uniform pink for unstructured cooked sausages (doctor, diabetic, milk, etc.); for structured sausages the base of minced meat pink color, the meal red color, the speck white color. Sausage elements must be the same size and evenly mixed.Smoked meats should be pink to red color, evenly colored, no gray spots, fat white or with a pinkish hue, without yellowing.Raw smoked sausage must have a firm consistency, blood and liver - smear-like, the rest - the elastic and elastic consistency. Sausages of questionable freshness have a moist, sticky casing, possibly with the presence of mold. The casing separates easily from the stuffing, and the casing of raw intestine and protein should not tear. The cross section at the periphery shows a dark gray rim; the rest of the loaf retains its natural color. In the surface layers of the loaf minced meat slightly softened. Smell on the surface of sour, in the thickness - specific, aroma of spices is felt slightly.Stale sausages have casings with signs of sloughing and mold, which can penetrate deep, falls behind the surface of the stuffing, casings of intestinal raw materials and proteins easily torn. Color of minced meat from the surface gray or greenish, on the cut reveals gray and green areas. The consistency of minced meat loose, smell - musty, rancid, putrid, sour.

Determination of sodium nitrite content

Sodium nitrite is used in the production of most types of sausages as a preservative and to give them a pink or red color. Sodium nitrite in large doses is quite toxic, so careful control of its content in sausages and canned products is necessary. Determination of nitrate content in sausage products with Griess reagent is carried out in accordance with GOST 8558.1-78.

Reaction setup. Griss reagent is prepared immediately before the study of the two solutions by mixing them in a ratio of 1:1. Solution 1: 5 g sulfanic acid dissolved in 150 ml of 12% solution of acetic acid.

Solution 2: 0.2 g alpha-naphthylamine dissolved in 20 ml of hot distilled water, followed by the addition of 180 ml of 12% acetic acid solution.Prepare a standard solution of sodium nitrite concentration of 0.005% (or 0.003% for dry sausages). Grind sausage or canned sausage (5 g) into minced meat, pour 100 ml of distilled water, extract for 40 min and filter through a paper filter.Take two cylinders of 100 ml. The first cylinder is filled with 10 ml of the extract and the second with 10 ml of standard solution of sodium nitrite. Then 15 ml of Griess reagent and 75 ml of distilled water are added to each cylinder. The contents of both cylinders are stirred and placed in a dark place for 15 min.

Recording the reaction. A visual assessment of the staining intensity of the contents of both cylinders is carried out, which is coloured pink. The intensity of the coloring of the contents of the cylinder must be lower than in the cylinder with a standard solution of sodium nitrite, equivalent to the maximum allowable concentration for this type of product (3 mg/100 g for smoked sausages, 5 mg for others). For more accurate determination of the amount of sodium nitrite determine the optical density of the contents of the cylinder with the sample with a photoelectric colorimeter or spectrophotometer, comparing the results with the calibration curve (table), pre-prepared for standard solutions of sodium nitrite of different concentrations.

Veterinary and sanitary evaluation of sausages and canned meat

Laboratory examination of sausages for freshness

If when conducting organoleptic indicators of sausages there is suspicion of their freshness, then conduct a microscopy of smear-prints, stained by Gram, determine pH (methods see in Chapter 3), puttvatkachestvennye reactions to ammonia and hydrogen sulfide (methods see in Chapter 12).

In fresh sausages microscopy of smear-prints in the surface layers reveal up to 20 microorganisms in the microscope field of view, in deep layers - single; qualitative reactions to ammonia hydrogen sulfide are negative, pH 5-6.8. Sausages of doubtful freshness have 20-30 microorganisms in surface layers, 10-20 in deep layers, reactions to ammonia hydrogen sulfide are weakly positive, pH 6.9-7.Unfresh sausages have more than 30 microorganisms in surface layers, 20-30 in deep layers, reactions to ammonia and hydrogen sulfide are positive, pH 7.1 and higher.

Microbiological examination of sausage products and canned meat

Samples taken are sent to the microbiological department of the city or regional veterinary laboratory. In sausage products and canned meat they determine CMAF NM, S. aureus, E. coli, the number of pathogenic bacteria, including Salmonella, Listeria monocytogenes. The number of these bacteria in the sausage products must not exceed

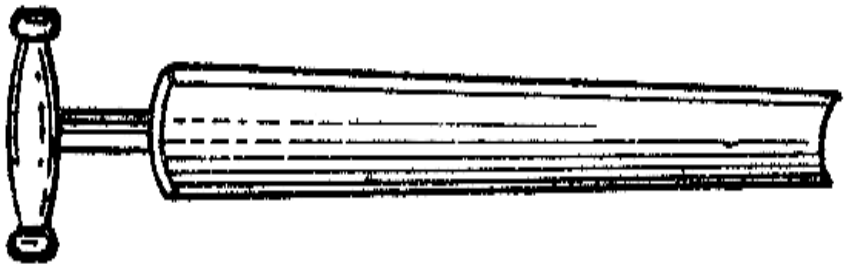
standards established by TR CU 034/2013; thus, the quantity of CMA PhanM in sausages of the highest and the first type must not exceed 1 - 10-3, and 2 - 10-3 in headcheese, liverwurst and blood sausages, in 25 g of sausages no pathogenic bacteria must be detected, in 1 g of sausages no. aureus, E. coli, in 0.01 g - sulfite-reducing clostridia. Canned products must meet the requirements of industrial sterility.

12.LABORATORY: DETERMINATION OF THE QUALITY OF FATS OBTAINED FROM ANIMALS AND THEIR SORTING

Veterinary and sanitary examination of food baked animal fats. Veterinary expert examination of FTZH is carried out in a comprehensive manner and consists of the study of supporting documents, inspection of containers and transport, organoleptic and laboratory research. The following tasks are solved during the veterinary sanitary and epidemiological examination of FFG: determination of fat content, determination of the quality (freshness) of the fat and determination of the species of the fat.

Sampling

To conduct organoleptic and physico-chemical studies from each batch of cooking fats taken an average sample of not less than 600 grams. The sample is taken from 10% of the container units, but not less than from 5 container units. If the fat is of a solid consistency, the samples are taken with a dipstick (Figure 21) which is screwed into the full depth of the container. The fat is taken from the top, middle and bottom of the removed column, and then the fat taken from the different units of the container is mixed to obtain an average sample reflecting the condition of the entire batch of fat. If the fat is of a liquid consistency, it is taken with a tube sampler with a diameter of 25 mm. From a batch of fat packed in consumer containers, one unit of the container is taken as a whole.



Pic. 21. Stylus for fat sampling

Determination of varieties of food baked animal fats

When determining the grade of fat it is necessary to determine its taste, color, odor, consistency and transparency, the acid number of fat and the mass fraction of moisture.

Organoleptic methods

Taste and smell determined at 20 ° C. Fat consistency is determined by pressing the fat with a spatula at 20 °C. To determine the color, fat is smeared in a thin layer (approximately 5 mm) on a glass and viewed in indirect daylight. To determine transparency, a 15-mm test tube of transparent glass is filled with fat and placed in a water bath at 70 ° C until the fat melts. Transparency of fat is determined in transmitted daylight. The results of organoleptic examination of the fat are compared with the data.

Laboratory methods

Determination of the mass fraction of water. Mass fraction of water is one of the main grade indicators of fat, because with a high content of water, clarified fats are prone to hydrolysis and quickly spoiled.

Methods of determination. Empty bag is weighed on an analytical scales to within 0,0002 g, then placed in the bag a sample of clarified fat (about 5 g) and re-weighed. After weighing the bux with a sample of fat put in a desiccator and evaporate the moisture at 102-105 ° C. Periodically the bux with a sample of fat is weighed on the analytical scales with the accuracy of 0,0002 g until the

the smallest mass. The mass fraction of water is calculated by the formula

X = [(M - M1)/A]-100%,

where X is the mass fraction of water, %; M is the mass of the bump with the fat before evaporation of water, g; M1 is the mass of the bump with the fat after evaporation of water, g; A is the mass of fat, g.

Accounting for the reaction. Depending on the mass fraction of water in the food ghee obtained from slaughter animals are divided into varieties.

Determination of the acid number of fat. Fat acid number is the amount of mg NaOH (KOH) required to neutralize free fatty acids contained in 1 g of fat. The acid number indicates the degree of hydrolysis of fat into free fatty acids and glycerol.

Setting up the reaction. In a flask or beaker weigh about 3-5 g of test clarified fat (to within 0.001 g), put in a water bath and add 30-50 ml of neutralized mixture of alcohol with ether in a 1:2 ratio. To the obtained solution was added 3-5 drops of 1% alcohol solution of phenolphthalein, after which it was quickly titrated with 0.1 n caustic soda until the appearance of pink coloring, which does not disappear within a minute. When the mixture becomes turbid during titration, 10 ml of alcohol and ether mixture is added to the flask, stirred until the turbidity disappears and the titration is completed. The calculation is carried out according to the formula

X = a - K - 5,61 / m,

where X - acid number; a - amount of 0,1N caustic soda used for titration, ml; 5,61 - amount of caustic soda contained in 1ml of 0,1N solution, ml; m - fat weighting, g; K - correction for titration of 0,1N NaON solution.

Note. A mixture of alcohol with ether shall be preliminary neutralized, a few drops of 1% solution of phenolphthalein shall be added and titrated with 0.1 n potassium hydroxide (or caustic soda) until slightly pink color.The calculation is done with an error not exceeding 0.01 mg NaOH.

Accounting for the reaction. Depending on the value of the acid number of the food ghee obtained from slaughter animals are divided into grades (see Table 6).

Determination of benignity of food baked animal fats

During storage, fats can undergo deterioration. As a result of this deterioration the commercial properties of fat, in addition, it can become dangerous for the consumer. Two chemical processes dominate during deterioration of fat - hydrolysis (saponification) and oxidation. Hydrolysis takes place mainly in fat which contains a lot of moisture. Therefore, hydrolysis is more often observed in raw fat. Free water combines with triglycerides, displacing free fatty acids. Oxidation (rancidation) is a process of deep fat decomposition, which results in high molecular weight fatty acids being broken down to simpler compounds (aldehydes, esters, ketones, volatile fatty acids, peroxide compounds, etc.). Many of these compounds are toxic and can penetrate deeply into the still unoxidized fat, degrading its organoleptic properties. Another, more benign kind of oxidative deterioration of fat, sulfation is characterized by the formation of oxyacids and products of polymerization and condensation of high-molecular fatty acids on the surface of the fat.

Organoleptic methods

In the vast majority of cases, deterioration of fat can be determined by organoleptic methods. Spoiled fat has a relatively softer consistency, altered color (special attention is paid to the uneven color), color and odor which are not typical of good fat. When fat goes rancid, a thick yellow coating (staple) with a stearic (greasy) smell forms on its surface; the fat itself becomes discolored. When rancid, the fat softens, takes on a yellow-greenish, brown or gray hue, a bitter taste and rancid smell.

Laboratory methods

Not only do laboratory methods allow you to more accurately determine fat deposition, they also allow you to determine the degree of freshness of the fat.

Determination of the peroxide number of fat. When fat is oxidized, large amounts of peroxide compounds and atomic oxygen are released. These substances are stronger oxidizers than iodine.

Oxygen displaces iodine from potassium iodide. The presence of free iodine is determined with starch. To determine the amount of free iodine, the amount of sodium sulfate used to neutralize it is determined. (Peroxide number is the number of grams of iodine extracted from potassium iodide peroxides contained in 100 grams of fat.)

Staging the reaction. A test sample of clarified fat (weighing 1 g) is weighed on a balance of

1 g) was weighed in a conical flask with an error not exceeding 0.0002 g, and dissolved in 20 ml of a mixture of glacial acetic acid and chloroform (1:1). To the solution, add 0.5 ml of freshly prepared saturated solution of potassium iodide and incubate in a dark place for 3 min. Then 100 ml of distilled water is added to the solution, in which 1 ml of 1% starch solution is added beforehand. The

extracted iodotite is given with 0.01 n sodium sulfate solution until the blue color disappears. Simultaneously, under the same conditions, a control determination is carried out, in which the same amounts of reagents are taken, but without fat.

Peroxide number of fat X (in %) is calculated by the formula

X = K - (V - V1) - 0,00127 - 100,

Where K is a correction to the titration of 0.01 n sodium hydroxide solution, V is the amount of 0.01 n sodium hydroxide solution consumed for the titration of the test solution, ml; V1 - the amount of 0.01 n sodium sulfate solution consumed for the titration of the test solution, ml; 0.00127 - the amount of iodine corresponding to 1 ml of 0.01 n sodium sulfate solution, g; m - mass of fat, g.

Recording the reaction. Food ghee obtained from slaughter cattle,

depending on the value of peroxide number is considered: fresh - up to 0.03, fresh, but not subject to storage - from 0.03 to 0.06, doubtful-fresh - from 0.06 to 0.1, stale - above 0.1.

Reaction with neutral red. The hydrolysis of fats produces large amounts of free fatty acids, and the products of fat oxidation

can be volatile fatty acids. The accumulation of these products in the fat leads to an increase in its acidity. Neutral red oxidizes in an acidic environment and turns red. In addition, neutral red can be oxidized by peroxide compounds, atomic oxygen, and a number of other oxidizing agents formed during the oxidation of fats.

Reaction setup. 1 g of the fat under study is placed into a porcelain mortar and 1 ml of working (0,01 %) aqueous neutral red solution is added. After this, the contents of the mortar are rubbed intensively with a pestle for 1 min. The aqueous solution of neutral red is not mixed with grease, therefore the rest of the paint must be poured off.

Reaction recording. Fresh fat is colored yellow or beige, pig and mutton fat may have a greenish tint. Fat of doubtful freshness colors from brown to pink.

Spoiled fat is colored from bright pink to red.

Qualitative reaction to aldehydes. Aldehydes are one of the main oxidation products of fats, so their presence in fat is an indication of spoilage. The essence of the qualitative reaction on aldehydes is their ability in an acidic environment to form color compounds with polyatomic phenol.

Setting up the reaction. In a test tube 2 ml of tested fat, previously melted in a water bath, 2 ml of hydrochloric acid, density 1190 kg/m3 and 2 ml of saturated resorcinol solution in benzene are added. Then the test tube is closed with a rubber stopper and its contents is stirred.

Recording the reaction. If the test fat contains aldehydes, the contents of the test tube turns lilac-red. If the color of the test tube contents has not changed, the reaction for aldehydes is considered negative.

Determining the species identity of the fat

Determining the species identity of fats is especially relevant in determining the naturalness of fats and in veterinary-legal practice.

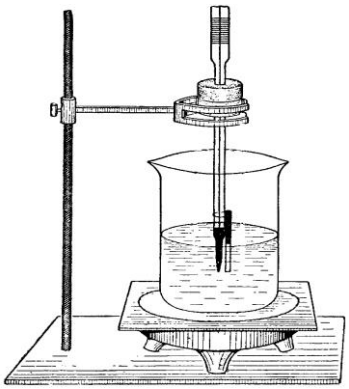
Organoleptic methods

To determine the species identity of the fat in the organoleptic study, special attention is paid to the specific smell and taste peculiar to a particular species of animals. The consistency of the fat is also important which is directly related to

It also has an important role in the consistency of the fat which is directly related to its melting point.

Laboratory methods

To determine the specificity of fats, various laboratory tests are carried out: determining the melting point of fat, the refractive index, the composition of fatty acids (by chromatography), etc. Determination of the melting point is the simplest and most accessible method for determining the species identity of the fat. The method is based on the fact that the melting temperature of external and internal fats of animals of different species is a strictly specific and stable indicator. The analyzed fat is melted and collected in transparent glass capillaries with a diameter of 1.5 mm. The height of the fat column should be 5-7 mm. The capillaries with fat are placed in the refrigerator for 1-2 hours. After cooling the capillary with fat is fixed on the thermometer with an elastic band so that the fat column is level with the head of the thermometer. After this the thermometer with the capillary is fixed on a stand and lowered into a transparent beaker of water on an electric hotplate so that the upper part of the capillary is above the water surface (Fig. 22). Then the water is heated by stirring it with a glass rod. The heating continues until the column of fat becomes transparent and the pressure of the water begins to rise up the capillary. At this point the reading of the thermometer is taken. The measurement is repeated five times, and the arithmetic mean is found. The result is considered to be the melting temperature of the fat under study.



Pic. 22. Installation for determining the melting temperature of fat

Veterinary and sanitary evaluation of edible baked animal fats.

Benign edible animal fats which by their organoleptic and laboratory characteristics comply with the highest or first grade according to GOST 25292 can be used without restrictions. Fats of doubtful freshness and fats with signs of salting are sent for immediate industrial processing after cleaning up and removing defects. Spoiled or rancid fats shall be sent for technical recycling.

13. LABORATORY: DETERMINATION OF THE ACIDITY AND PURITY OF MILK

All milk must be obtained from healthy animals in farms that are free from infectious diseases in accordance with applicable veterinary and sanitary regulations and the International Veterinary Code. All purchased milk is divided into three varieties depending on its organoleptic and laboratory indices. The basic all-Russian standards for fat and protein content in milk are 3%, 4% and 3%, respectively. Milk used for children's food production shall have indices (at least): purity group 1, heat stability group 3 (72 °C), total microbial load - up to 300 000 CFU, the number of somatic cells - 500 000.It is prohibited to use for food purposes milk from cows in the last 5 days before start and first 7 days after calving. If you receive unsatisfactory results at least one indicator, repeat the analysis by doubling the volume of the sample from the same batch of milk. The results of the repeat analysis are final. Milk after milking should be filtered and cooled to a temperature of (4 ± 2) °C for two hours. Raw milk should be stored at the delivery person (taking into account the time of transportation) at 4°C for not more than 36 hours. When shipping the milk they prepare Veterinary Certificate No. 2 (certificate of district form No. 4), certificate of quality and safety and consignment note (for organizations and enterprises). Milk is transported by specialized vehicles (in tanks for edible liquids, metal flasks or other containers approved by Sanepidnadzor of Russia) in accordance with the rules of perishable goods transportation at temperatures from +2 to +10 °Ñ no longer than 12 hours. If the transportation conditions are violated, the milk is classified as non-perishable.

Veterinary and sanitary expertise

Veterinary and sanitary expertise of milk should be carried out comprehensively. To determine the quality and safety of milk it is necessary to study the supporting documents, assess the sanitary condition of containers and transport and conduct a complex of organoleptic, physico-chemical and microbiological studies.

Examination of accompanying documents

When dairy products are delivered to the market by private individuals they should present a veterinary certificate (Form No 2) or a veterinary certificate (Form No 4) when transported within the district. When studying this document, special attention should be paid to the epizootic state of the locality from which the milk was received, the timing and results of routine diagnostic tests (for tuberculosis, brucellosis, etc.), vaccinations and tests for latent mastitis. The period of validity of this document is 1 month. In addition the person selling milk on the market shall have a sanitary booklet of the established form. If the supplier is an organization, then on each batch of milk a veterinary certificate (form No 2) or a veterinary certificate (form No 4) (when transported within the region) of 3 days, a consignment note and a certificate on quality in which the results of milk testing are specified, shall be issued.11.1 Veterinary and sanitary expertise of milk169
received in the farm's dairy laboratory. When supplying dairy, dairy compound and milk-containing products and pasteurized milk, a certificate of compliance and a hygienic certificate or certified copies thereof are additionally required.

Inspection of containers and transport

Most often, special milk tankers are used to transport raw milk. Isothermal vans and refrigerated trucks should be used for transporting milk and dairy products in containers. When transporting flasks of milk in open trucks, they should be covered with a tarpaulin. Milk must not be transported in the same way as strong-smelling, poisonous or dusty products. A health passport should be drawn up for all vehicles used to transport milk and milk products.

Milk flasks made of aluminum and stainless steel, enamelware without chips, containers made of glass, food plastic, etc. are used for transportation of milk.

and food plastic, etc. All milk containers must be made of food material approved by the Sanitary and Epidemiological Surveillance of the Russian Federation. The containers must be clean in terms of sanitation. Milk and dairy products are easily contaminated and adsorb strong-smelling substances, so milk containers must be hermetically sealed.

Labelling of raw milk

Raw milk delivered by individuals and organizations for processing shall be accompanied by transport marking and documents which contain the following information: product name; indices of identification; producer name - surname, name, patronymic of an individual, legal name of an agricultural enterprise, farm; address; volume (l), weight (kg); date and time (h, min) of shipment; milk temperature; lot number.

Sampling of milk and its preparation for analysis

Sampling of raw milk is performed at the place of acceptance in accordance with GOST 13928-84. An average sample of 500 ml is taken from a batch of milk for testing. Before taking a sample, the milk is thoroughly mixed by whisking up and down in flasks 8-10 times, in road and rail tankers with

of mechanical agitators - 3-4 min and 15-20 min respectively.

Veterinary and sanitary examination of milk and milk products

When taking spot milk samples use mugs with elongated handles, or samplers (cylindrical tubes with an inner diameter of 9 mm in stainless steel, aluminium and aluminium).

or 0.5 l bottles or samplers (cylindrical tubes with inner diameter of 9 mm made of stainless steel, aluminum or food plastic).

or food plastic). When taking samples with the sampler it should be lowered into the container slowly, with the upper end open. The sampled samples are placed in a clean container (with a hermetically sealed lid) made of material approved by the Russian Sanitary and Epidemiological Surveillance. For preservation of samples, 1 ml of a 10% solution of potassium dichromate, 1-2 drops of a 40% solution of formalin or 2-3 drops of a 33% solution of hydrogen peroxide are used per 100 ml of milk.

Organoleptic examination of milk

Determination of the organoleptic characteristics of milk is important for veterinary and sanitary examination of milk. Organoleptic characteristics of milk largely determine its quality and safety.

The taste, color, smell and consistency of the milk are determined. Assessment of taste

(GOST 28283-89) is conducted selectively after sample boiling, and odour assessment - in 10-20 ml milk heated to 35 °C. For maximum efficiency it is recommended to determine taste and smell at the same time.
Milk must have a specific taste and smell, without foreign tastes and odors (fodder, medicine, chemical, etc.).Determination of appearance, color and consistency is carried out according to GOST 52054-2003. Color of milk is determined in a cylinder of colorless glass in daylight in reflected light. The consistency of the milk is determined by pouring the milk sample into a colorless glass cylinder
Colorless glass cylinder and the shaking of the measuring cylinder. The consistency of the milk is determined by
How fast the milk flows off the cylinder walls, and whether there are clots and flakes
and flakes remain on the walls of the cylinder. The cow's milk should be a thick, homogeneous liquid without lumps or clots. Milk from cows with mastitis can be slimy and contain clots and flakes. Clots and flakes can form in sour milk or when fatty milk is cooled quickly. To find out what is causing the formation of flakes and clots the milk is heated
In order to find out what is causing the formation of flakes and lumps the milk is heated to 30-40 ° C. In this case, the flakes of fat, unlike the clots formed
In contrast to the clots that form in mastitis milk, the fat flakes melt completely and the milk becomes
homogeneous consistency.
Milk defects are any deviations of the organoleptic characteristics of milk from the norm. The presence of defects in the milk, indicates that it is from sick animals
They are also indicative of poor quality, or that sanitary and technological conditions have been violated during production, initial processing and storage.
Determining the laboratory characteristics of the milk
In each milk lot, the following physico-chemical parameters are determined: titratable acidity, temperature, mass fraction of fat, density or freezing point, purity group and heat stability group, COMBO. At least once a decade in the studied milk bacterial contamination, the content of somatic
At least once a ten-day period the milk is examined for: bacterial infestation, content of somatic cells and presence of inhibitory substances, and twice a month the protein content is determined. If it is suspected that the milk has been
heat treated, the presence of alkaline phosphatase in the milk is checked. According to the results of organoleptic and laboratory tests
milk is subdivided into highest, first, second, and non-grade.

14.LAB: DETERMINATION OF THE FAT CONTENT OF MILK.

Determination of milk temperature (GOST 26754-85). At low temperature, bacterial growth and the rate of chemical reactions in milk
slow down and its storage time increases. To avoid
to avoid spoilage, the milk should be stored at 0-4 °C. The temperature of the raw milk is determined when the milk is taken to the dairy plant for processing. The

temperature of the milk should not exceed 10° C. The method for measuring the temperature of the milk with a liquid glass thermometer is based on a change in the volume of liquid in the glass container depending on the temperature of the measuring medium. The method of milk temperature measurement with a digital thermometer TC-101 (or other) is based on the change of electrical conductivity of the semiconductor material depending on the temperature of the measured medium.

The temperature of milk is measured directly in the tank, flask, bottle, bag. When receiving milk directly in farms, the temperature is measured in transport tanks immediately after they are filled.

Before measuring the temperature, the milk in the tanks and flasks is stirred.

Glass liquid thermometers in frames according to GOST 28498 are used to measure the temperature of milk. The thermometer is immersed into the milk to the bottom digitized mark and kept at least 2 minutes.

Readings are taken without removing the thermometer from the milk. When measuring

When measuring the temperature of the milk with a liquid glass thermometer, the result of the thermometer reading is rounded to a whole number. And the results of digital thermometers are determined by the digital indicator of the measuring unit with an accuracy of 0.1 ° C. The arithmetic mean value of measurements is taken as the final result of milk temperature measurement in flasks and consumer containers.

Determination of the titratable acidity of milk (GOST R 54669-2011).

Acidity of milk reflects its freshness. The sourness of milk is determined by the presence of lactic acid which is formed due to

Lactic acid fermentation as well as other acids. The method is based on the neutralization of acids contained in the product with a solution of sodium hydroxide in the presence of the indicator phenolphthalein.

In a 100 or 250 ml flask (cm3) measure 20 ml of distilled water, 10 ml of test milk and three drops of 1% phenolphthalein

phenolphthalein solution. When analyzing sour cream, cream, cottage cheese in a flask

When testing sour cream, cream and cottage cheese, 5 g of the product under test and 30-40 ml of distilled water

(50 ml of warm water for cottage cheese) and three drops of 1% phenolphthalein solution. The mixture is stirred thoroughly and titrated with 0.1 N sodium hydroxide solution until a faint pink coloration, corresponding to the reference color standard, does not disappear within 1 minute.To prepare the reference standard in a flask of capacity of 100

For the preparation of the control standard 10 ml of milk (5 g of milk products) and 20 ml (30-50 ml for milk products) of 100 ml or 250 ml are measured.

(30-50 ml for milk products) distilled water and 1 ml

2.5% cobalt sulfate solution. The mixture is mixed thoroughly. Shelf life of the standard is no more than 8 hours at room temperature. Acidity of milk and milk

products (in degrees Turner, °T) - is the amount of 0.1 N sodium hydroxide solution, needed to neutralize acids contained in 100 grams of the test product.
The acidity of milk is calculated by the formula
K = V - 10,
And the acidity of dairy products by the formula:
K = V - 20,
where V is the amount of 0.1 n sodium hydroxide solution used for neutralization of acids.
Determination of milk pH (GOST R 53359-2009). Since the titratable acidity is directly proportional to the active acidity (pH), it is now possible to use pH meters. The resulting milk pH is converted to degrees Turner using a special calibration table. Some modern pH meters, such as the Status, are calibrated specifically to determine acidity in degrees Turner. Special combination electrodes are available for this instrument
Special combined electrodes for measuring the acidity of milk and cheese (Fig. 24).

Pic. 24. pH-meter "Status" and combined electrodes to determine the acidity of milk and cheese
The determination of milk acidity using the pH-meter "Status" is carried out as follows. A thermocompensation sensor and a combined electrode for measuring the acidity of milk are connected to the device. The device is plugged into the network. The electrode and the device are calibrated using specially prepared buffer solutions by pressing the "calibration" button. The electrode calibration results are recorded in the non-volatile memory of the instrument. The prepared electrode is rinsed with distilled water and wiped with filter paper. To measure the acidity of the milk by pressing the
mode" button to select the measurement of acidity in °T. Dip the electrode into the tested milk, the indicator of milk acidity in °T is displayed
on the indicator of the device.

15. laboratory. DETERMINATION OF MILK DENSITY

Determination of the density of milk (GOST R 54758-2011). The density of milk is determined by its dry matter content. A lower density of milk indicates that the milk is diluted with water or changes in its

The density of cow's milk is high (above 1033 kg/m3). Increased density (above 1033 kg/m3 for cow's milk) indicates

Low fat content. A sample of 0.25 or 0.50 dm3 is thoroughly

A 0.25 or 0.50 dm3 sample is thoroughly mixed and carefully poured over the wall into a dry cylinder, which should be kept at a slight angle to avoid foaming.

If foam forms on the surface of the sample in the cylinder, it is removed with an agitator. The cylinder with the test sample is placed on a flat

horizontal surface, measure the temperature of the sample. Readout of temperature readings is carried out not earlier than 2-3 minutes after dipping the thermometer into the sample.

Dry and clean areometer (lacto densimeter) is lowered slowly into the sample under study, immersing it until 3-4 mm remain to the expected mark of the areometer scale, then leave it in a free-floating state. The instrument should not touch the walls of the cylinder. The location of the cylinder with the sample on the horizontal surface

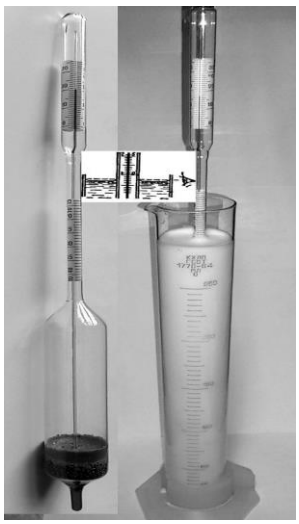
The position of the cylinder on a horizontal surface should be, with respect to the light source, convenient for reading the density scale and the thermometer scale. The first reading of the density reading is made visually from the areometer scale after it has been set in a stationary position. After that the areometer is gently lifted up to the level of the ballast in it and then lowered again, leaving it in a free-floating state. After the areometer is in the stationary position the second reading of the density readings is made. The eye should be at the level of the meniscus when counting the density readings and the readings are taken from the upper edge of the meniscus (Fig. 25).

The readout of the readings in areometers of AM and AMT types is carried out to the half of the scale division value.

In areometers of AON-1 and AON-2 types the readout of indications is carried out to the price of the name of division, then the temperature of a sample is measured.

The measurement of the temperature of the sample by areometers of AM, AMT, AO, AON-2 types is done with the help of mercury and nercury glass

The average value of the temperature and density of the studied sample is the arithmetic mean of the results of two readings. Milk density is measured at a temperature of



Pic. 25. Determining the density of milk

15-25 °C. If the sample during the determination of density had a temperature above or below 20 ° C, the results of determining the density had a temperature above or below 20 ° C, the results of density determination should be brought to 20 ° C in accordance with the data in Table.

3.3 WORKSHOP MATERIALS

1. Practical training: Determination of species and varieties of meat in the slaughterhouse and in the markets

Operation of the state veterinary and sanitary expertise laboratory in the food market

In accordance with the Regulation on State Veterinary Surveillance Units at livestock processing and storage facilities, veterinary and sanitary expertise laboratories must operate in all food markets. The main function of these laboratories is to control the safety and quality of food products produced by private individuals and enterprises and sold at markets. Veterinary and sanitary expertise laboratories in the food market are not independent institutions and are part of the district or city station for the control of animal diseases. Nevertheless, veterinary and sanitary expertise laboratories

Nevertheless, veterinary and sanitary expertise laboratories in the food market have their own forms, stamps and seals.

Premises for the laboratory and funds to pay for utilities must be provided by the market administration.

Laboratory structure

The laboratory of veterinary and sanitary expertise in the food market should have two departments: meat and food. Each department should have an independent entrance and a window for receiving samples. The meat department should have three rooms: a meat inspection room, an inspection room with meat inspection tables, and a meat laboratory. It is desirable that the meat department is adjoined by a refrigerator-isolator and market refrigerators.

The food department is divided into two rooms: inspection hall and laboratory. Equipment, utensils and reagents used for veterinary and sanitary expertise of milk, honey and plant products should be concentrated on different tables. The division of the laboratory into two sections is necessary to ensure that meat, fish and eggs do not come into contact with foods that are eaten raw (honey, dairy products, plant products). In addition to the two sections, the laboratory must have staff quarters, a bathroom, a room for washing dishes and sterilizing instruments, etc.

Staffing and organization of the laboratory

The number of laboratory staff depends on the number of examinations. In small markets the laboratory staff includes the head of the laboratory (veterinarian) and veterinary sanitary technician. Medium markets have an additional laboratory technician on staff. In large markets, the staff includes a laboratory manager (veterinarian), a veterinarian, two laboratory assistants, two veterinary technicians, in addition to which the staff may include a trichinelloscopist and a dosimetrist. All staff are on the staff of the district or city veterinary station and are independent of the market administration in solving professional issues. All products before being sold must be tested in the laboratory of veterinary and sanitary expertise of the market. The results of all laboratory tests are recorded in the registers of a standard pattern, which are kept for each group of products. The examination of products in the laboratories of veterinary and sanitary expertise in the markets is paid. Residual

samples and rejected products must be disposed of in accordance with the instructions for the disposal of biological waste.

8.2. The procedure and features of the examination of products in the state laboratory of veterinary and sanitary expertise in the markets

Individuals may sell non-industrial products at food markets only in natural, unprocessed form (fresh meat, fish, honey, plant products). Homemade cream, sour milk, cottage cheese, sour cream, pickled and pickled cucumbers, tomatoes and cabbage, dried tubular mushrooms are allowed for sale at markets. Products produced industrially are allowed for sale at markets without restrictions, provided they are properly packaged and labeled, have not expired shelf life and have all the necessary supporting documents. Veterinary and sanitary examination of meat, fish and eggs is conducted in the meat department, and of honey, milk, dairy and plant products - in the food department. All products are checked for radioactivity upon arrival at the market.

Peculiarities of meat examination

Individuals must deliver meat and slaughter products complete (carcasses cut into half carcasses or quarters, liver, kidneys, spleen, heads of large animals and other by-products). When rabbit carcasses are delivered, one of their hind legs must be preserved. Bird carcasses are delivered gutted, the giblets are delivered in a plastic bag. Carcasses and slaughter products must be labeled with veterinary marks. A properly completed and unexpired veterinary certificate Form No. 2 or certificate Form No. 4 must be available. When delivering meat to the market, attention should be paid to the sanitary condition of containers and vehicles, their compliance with the transported cargo. After checking the accompanying documents and labels and inspection of transport the owner or loaders transfer the meat and co-products to the hall of preliminary examination. In the pre-inspection hall the veterinarian examines the meat for radioactivity, conducts a superficial examination for pathological and anatomical changes characteristic of infectious diseases; if detected, a sample is taken for microbiological examination and the carcass and all slaughter products are placed in an isolator refrigerator. If no pathological and anatomical changes are found during superficial examination, the carcasses with internal organs and head one by one are transferred to the examination room of the meat department for painful examination. When examining the carcass, attention shall be paid to the fatness, degree of exsanguination, condition of the slaughter place, presence of hypostases, color and size of lymph nodes, presence of pathoanatomic changes, etc. The veterinarian conducting veterinary and sanitary examination of meat at market shall pay attention to quality of post-mortem examination (whether main lymph nodes are opened, whether cuts on masseteres and internal organs are made, etc.). After organoleptic examination of the carcass and internal organs, meat samples are taken for cooking samples, physico-chemical examinations, microscopy and trichinelloscopy (for pigs, carnivores and omnivorous mammals). Laboratory examination of meat

are conducted in a meat laboratory. At the same time the pH, products of primary protein decomposition (formol test, reaction with sulfuric copper), peroxidase, the presence and amount of microflora, etc. are determined in the meat (for details see Ch. 3, 5). The results of organoleptic and laboratory tests shall be recorded in a special log. If the meat is deemed fit for sale by the results of the accompanying documents, organoleptic and laboratory tests, the carcass (and by-products) are stamped with an oval mark of the market veterinary expertise laboratory, and the owner is given a certificate of veterinary expertise, on the basis of which he can sell the meat on the market. For meat subject to technical utilization or disinfection, a certificate specifying the reason for rejection is drawn up. Meat on the market must be sold in the butcher's rows separately from other products. Sellers of meat must wear white coats and headgear and have a neat appearance. Meat not sold during the day shall be weighed and transferred for storage to a cold room of the market. In the morning, the meat is examined for freshness oranoleptically without sampling. If the meat is not sold within 72 hours, it is returned to the owner without the right to further sale.

2. Practical training: Inspection of milk and dairy products in dairy enterprises and markets

Peculiarities of veterinary examination and veterinary and sanitary evaluation of dairy products of industrial production at food markets

Home-produced traditional dairy products: cream, sour cream, sour cream, jam, cottage cheese are allowed for sale at markets. Dairy products must be produced according to classical technology (without the use of microbiological starters, enzymes, colorants, food additives and preservatives).Veterinary and sanitary examination of dairy products produced at home must be carried out in accordance with the Rules of veterinary and sanitary examination of milk and dairy products at markets.Dairy products admitted for sale at markets must have the following organoleptic and laboratory indicators.

Sour cream. Taste and smell clean, delicate, sour milk, without foreign, sharply expressed, inherent to sour cream flavors and smell.Consistency - homogeneous, moderately thick, without grains of fat and protein (cottage cheese), the appearance is glossy. Color white to light yellow, uniform throughout the mass, without extraneous colors. Fat content not less than 25%. Acidity varies from 60-100 °T.

Cream. Taste and smell peculiar to this product, without extraneous tastes and odors, taste slightly sweet. Consistency and appearance - homogeneous, without whipped lumps of fat and casein flakes.Color white with a yellowish tinge. Fat content not less than 20%.Acidity 17-19 ° T.Smetona and cream checked organoleptically, as well as for the absence of impurity curds and selectively - for fat content, starch impurity and acidity.

Cottage cheese. The taste and smell is sour, clean, delicate, without excessive acidity, foreign flavors and odors. Consistency and appearance - homogeneous mass, without lumps, non-friable and noncrumbly.Color - white to slightly

yellowish, uniform throughout the mass of curd and no extraneous shades. Acidity - 240 ° T or less. Cottage cheese containing 18% fat is considered fat, and containing 9% fat - extra fat. Moisture content: in fat cottage cheese not more than 65% and in nonfat cottage cheese not more than 80% (there are no restrictions on fat content at markets).Microbiological, toxicological and radiological parameters of dairy products sold at markets must meet the requirements of technical regulations "Requirements for milk, processed products, their production and circulation".

Protein and jam. Taste and smell specific sour milk without inherent tastes and smells of benign products. Consistency - viscous liquid or clot moderately thick, glossy, with no signs of gas formation and significant whey secretion on the surface of the product. For dumplings allowed the presence of milk foam. Color - milky-white, for dumplings - with reddish tint. Fat content not less than 2.8%, acidity - 70-130 ° C.

Examination of accompanying documents

When conducting vet examination of dairy products, study the accompanying documents. Private persons shall provide a veterinary certificate (Form No 2) or certificate (Form No 4) when supplying dairy products to the market when transported within the region. Dairy plants shall supply dairy products with the following supporting documents: certificate of quality, bill of lading, certificate of conformity and hygienic certificate.

Inspection of packaging and transport

For storage and transportation of most dairy products, the same containers are used as for milk. The containers must be hermetically sealed. Cottage cheese may be packaged in plastic bags, and butter in parchment paper. Dairy products produced by dairies are packaged in disposable (bags, boxes, etc.) or, less frequently, in reusable (glass bottles) consumer packaging authorized by the Sanitary Epidemiological Surveillance of the Russian Federation. Consumer packaging for dairy products must be hermetically sealed and have no visible damage.Containers (and transport) in which dairy products are delivered must be clean in sanitary terms. Covered vans are used to transport dairy products; if transported over long distances, refrigerators or iceboxes should be used. Dairy products should not be shipped with strong smelling or dusty cargoes.

Labeling of processed milk products

When accepting and veterinary examination of milk special attention should be paid to the correctness of the marking and its compliance with the contents of the package.Milk and milk products packaged in consumer packaging sold on the territory of the Russian Federation in wholesale and retail trade should have the following information

The milk products packaged in consumer packaging sold in the Russian Federation on wholesale and retail trade should be labelled with the following information:

- the name of the product in accordance with the requirements of the Technical Regulation of the Customs Union "On safety of milk and dairy products" from 09.10.2013 and TC TP 022/2011.Indication of the type of farm animals, except for cows from which milk is obtained, should be placed on the package labels before

or after the term "milk".The terms relating to the method of heat treatment of milk or its products are placed after the names of such products, such as "pasteurized milk", "sterilized cream".Pos
"The term "bio-product" on the labels, packages of such dairy products shall be placed in any convenient place in the form of a single word or compound words using the first part of the compound word "bio..." and the names of such products, for example, "biokefir", "bio-juice".
Notions used to characterize methods of production of such product or specific composition of raw materials or composition of starter are indicated in its name - "milk drink", "whole milk", "recombined cream", "dairy drink". information on partial use of dried milk products, except when dried milk products are used for normalization purposes, is placed together with information on components of the finished product in the form of an inscription: "Made with dried milk (cream, whey)".H
The names of milk and milk products must not include terms or definitions if they do not correspond to them. For example: the name "Farmer's butter" or "Rustic butter" shall not be applied to packages with spreads; - Mass fraction of fat (in %) - may be indicated only in the information on nutritional value;
- mass fraction of milk fat (in %) in the fat phase
for lactiferous products;
- name and location of the manufacturer (legal address, including the country, and, if different from the legal address, the production address) and the organization in the Russian Federation authorized to
The manufacturer has the right to accept claims from consumers on its territory (if any);
- the manufacturer's trademark (if any);
- the net weight or volume of the product.
Net weight is indicated for products with loose, solid, pasty or viscoplastic consistency, gas or air cavities, as well as for products for which there are no standardized methods for density measurement;
- product composition. The list of ingredients is given in descending order of mass fraction at the time of manufacture of the product. If an ingredient is a product consisting, in turn, of two or more ingredients, such a product may be included in the composition under its own name. Dairy products included in a milk composite product are listed under their own name in the list of ingredients.
Processing aids, functionally necessary for the production process, not included in the finished product, are indicated after the words "with the use of";
- food additives, flavorings, ingredients of unconventional products, genetically modified sources
(if any). Ingredients included in the composition of the glaze are listed separately;
- nutritional value;
- content in the finished product of microorganisms (lactic acid, bifidobacteria, probiotic cultures, yeast - CFU in 1 g
product), if these requirements are available in the regulatory or technical documents for the manufacture of a particular product;

- The content in the finished enriched product of micro- and macroelements, vitamins and other components used for enrichment, with information about the ratio of the introduced quantity to the daily dose and, if necessary, the specifics of consumption;
- Storage conditions (including perishable products (with a shelf life of up to 30 days) and baby food products before and after opening the package);
- date of manufacture and date of packaging (in case these dates do not coincide) in two digits: for perishable products - number, month, year; for non-perishable (not in need of special temperature regimes in compliance with other established rules of storage) - month, year;
- shelf life (except cheese): for perishable products - number, month; for non-perishable - month, year. Expiration dates
are to be indicated after the words "Fit until" or "Use until", "Use until". It is allowed to indicate expiration date in days, months:
"Shelf life 14 days", "Shelf life 6 months". Shelf life of the component ready-made product should not exceed the shelf life of the components used in its manufacture;
- methods and conditions of use (if applicable);
- the designation of the document, according to which the product may be identified;
- information on the confirmation of conformity.

3. Practical training: Veterinary and sanitary expertise of honey and plant food products in the markets

Veterinary examination of honey should be carried out comprehensively. First of all, it is necessary to study the accompanying documents, check the sanitary condition of containers and transport, inspect the entire batch of honey, then it is necessary to take samples of honey and conduct its organoleptic and laboratory examination. Veterinary examination of honey in the market is carried out in accordance with the Rules of veterinary and sanitary examination of honey for sale in markets. During veterinary and sanitary expertise of honey in the market the following indicators must be determined: color, aroma, taste, consistency, crystallization, mass fraction of water, presence of oxymethylfurfural (OMF), diathesis (amylase) number, total acidity, mass fraction of reducing sugar, determination of flower pollen (for flower honey), sucrose content (when indicated), presence of mechanical impurities (when indicated), content of radioactive substances. At certification of honey its research is conducted in accordance with the requirements of GOST R 54644-2011 and GOST R 52451-2005.

Examination of accompanying documents

Honey is accepted for veterinary and sanitary expertise if the owner has a veterinary and sanitary passport of the apiary and a veterinary certificate - form № 4 or a veterinary certificate - form № 2 (when selling honey outside the area). The validity of the veterinary certificate or certificate - three days from the date of issue. The apiary must be located in an area free from infectious animal diseases. For commercially produced honey, a bill of lading, a quality certificate, a

certificate of compliance and a hygienic certificate must be issued in addition. All documents shall be properly drawn up and have an unexpired term of validity.

Inspection of containers and transport

Honey is transported in closed transport in hermetically sealed and clean containers made of materials approved by Gossanepidnadzor RF (stainless steel, aluminum alloys, glass, enamelware and wood deciduous species, except oak, food plastic). Honey can be delivered in honeycomb and honeypacks - not more than 5 honeycombs each. Honey delivered in contaminated containers or in containers not conforming to the above requirements is not subject to examination. containers with honey that has passed vet examination must be labeled with green labels for floral honey and yellow labels for podadic honey.

Sampling

To determine the organoleptic, physico-chemical and physical properties of honey, the veterinarian in the presence of the owner shall take a sample of 100 grams from each package (when testing for moisture with a hydrometer, the weight of the sample is 200 grams). When conducting additional tests of honey in the veterinary laboratory (determination of antibiotics, toxic elements, pesticides, radionuclides, pathogens of infectious diseases of bees) the sample must be at least 500 grams. At the same sample of honey is sealed, one half sent to the veterinary laboratory, and the other stored until the results of research (as a control).Samples of honey is selected tubular sampler of stainless steel, aluminum or aluminum alloys, a diameter of 10-12 mm, immersing it to the bottom or the entire length of the working volume. The sampler is removed, honey is allowed to drain from the outer surface, and then honey is drained from the sampler into a specially prepared clean and dry container. crystallized honey from the container is selected with a conical stylus with a length of at least 500 mm with a slit along its entire length. The stylus is dipped at an angle from the edge of the container deep into the container and removed with simultaneous rotation. Using a clean dry spatula, select the upper, middle and lower parts of the stylus content.

Honeycomb honey is accepted for examination if at least two thirds of the honeycomb area is sealed and the honey is not crystallized. Honeycomb must be homogeneous white or yellow color. Samples of honey measuring 5×5 cm are taken from every fifth honeycomb or package. Samples of honey from the frames are cut with a knife. After removing the wax caps (zabrusa) sample is placed on a mesh filter with a diameter of 1-2 mm, which is placed over a chemical beaker and placed in a thermostat at 40-45 °C, with honey flowing out of the honeycomb cells and collected in the chemical beaker.

Topic 8: Determination of the number of microorganisms in milk

Determination of the purity group of milk (GOST 8218-89). Mechanical contamination of milk is caused by the presence of particles of manure, bedding, sand, feed, etc. The correlation between the mechanical pollution of milk and its microbiological contamination is proved. The main causes of the mechanical contamination are poor sanitary conditions of the containers and transport and

violation of the milk filtration technology.The purity group of milk is determined using the "Record" (Fig. 26) or other devices with a diameter of the filtering surface

The purity group of milk is determined using the device "Record" (Fig. 26) or others with a filtering surface diameter of 27-30 mm and filters made of needle-punched thermally stapled fibers**.**

Pic. 26. Instrument "Record"

The filter is inserted into the device with the smooth side up. A sample of 250 ml of thoroughly mixed milk heated to 35 °C and poured into

into a vessel of the device. At the end of the filtration remove the filter, lay it on a sheet of parchment paper and compare it with the standard.

Milk is divided into three groups according to purity (Table 23).

Determination of the mass fraction of fat in milk (GOST R ISO 2446-2011).

Milk fat is one of the most valuable components of milk,

largely determines its nutritional and technological value.

The essence of the sulfuric acid method is that concentrated sulfuric acid dissolves milk proteins, including the shells of fat globules, and the released fat is centrifuged into the fat meter scale. Determination of the fat content is carried out as follows. Clean milk fat meter (butyrometer) (Fig. 27) is set in a rack or hold in your hand with a towel or napkin. Then, without wetting the neck, pour into it 10 ml of sulfuric acid (density 1810-1820 kg/m3) and carefully using a special milk pipette (Fig. 27) add 10.77 ml of milk, putting its tip to the wall of the neck of the grometer at an angle (milk level in the pipette is set by the lower level of the meniscus).

Topic 11: Veterinary and sanitary examination of honey

Honey is the main product of beekeeping and is a sweet, viscous liquid produced by the processing of flower nectar or molasses by bees. During the honey harvesting period, bees suck a small amount of nectar (the sweet juice produced by flower nectaries), molasses, or other sucrose-containing fluids with their proboscis. In the honey proboscis, the nectar is mixed with acids and enzymes produced by the bee, and then the bees deposit it in the wax cells of the honeycomb.

Honey maturation takes place in the honeycomb. This is a complex process in which the disaccharide sucrose is inverted into monosaccharides - glucose and fructose. Simultaneously with the breakdown of sugars, the synthesis of polysaccharides takes place during honey maturation. Sugars are broken down and synthesized by the action of carbohydrate enzymes (invertase, amylase, etc.),

which are produced in the bee's body and pass into honey. During the ripening of honey, other complex biochemical reactions occur, which synthesize protein components, vitamins, biologically active, bactericidal and other substances, which determine medicinal and nutritional properties. In addition, the ripening of honey evaporates a lot of moisture from it. When honey

The chemical composition of natural bee honey is complex and fluctuates widely. It contains more than 25 different sugars, dextrins, water, proteins, non-protein nitrogenous substances, vitamins, minerals and other constituents of honey contained in different types of nectar or honeydew. The main carbohydrates in honey are the monosaccharides glucose and fructose, which account for about 90 percent of all sugars in honey. Fructose usually exceeds glucose. These monosaccharides determine the main qualities of honey: the sweet taste, high nutritional value, crystallization, hygroscopicity, etc. Fresh honey is a viscous syrup-like liquid with a large specific weight of 1420-1440 kg/m3. After 1 to 3 months, syrupy honey changes to a crystalline state.

Classification of honey

Depending on its origin, honey can be classified as natural, artificially produced, or adulterated.

Natural honey is divided into flower honey and honeydew honey, depending on the source from which the bees extracted the sugar-containing liquid.

Floral honey is subdivided into monofloral and polyfloral depending on whether the honey was collected from one or more specific species of honey bearing plants. Depending on the dominant honey source, monofloral honey may be linden, maple, white-acacacia, buckwheat, mustard, sunflower, raspberry, chestnut, etc. Polyfloral honey depending on where the bees collect nectar is meadow, field, steppe, forest, mountain, etc.

Fallen honey, depending on the origin of honey is divided into honey of animal origin (sweet excrement of aphids, caterpillars and other insects) and honey of plant origin (sweet excreta of plants other than nectar, such as honeydew, tree sap, etc.).

Artificial honey - a product, which in its composition and properties resembles the natural bee honey, and is made without the participation of bees.Counterfeit honey - a natural honey, which in order to

Increased its volume and other properties added various extraneous components: beet molasses or starch, sugar syrup, starch, etc. Falsification is also an attempt to pass off as natural honey sugar honey (honey obtained by feeding sugar syrup to the bees) or artificial honey, as well as an attempt to pass off honey from a flower honey.

12-Topic: Organoleptic characteristics of natural honey

Any quantity of honey of the same botanical origin and year of collection, homogeneous by organoleptic and physicochemical characteristics, of the same technological processing and simultaneously delivered to a harvesting station or for sale on the market is considered as a batch [1].

One of the organoleptic characteristics is the color of honey. The color index is not an indicator of honey adulteration, adulterated honey may be of different colors. The color of honey is determined in daylight, it varies from light transparent to dark brown. The color of honey depends on the time of harvesting and the plants from whose nectar the honey was obtained (Table 1).

Table 1.

Dependence of honey color on the type of plant

The color of honey	Plants from which nectar is obtained
Transparent, white	White Acacia, Cypress, Cottonwood, Raspberry, White Clover, Belladonna.
Light Amber	Lime, yellow clover, cloverleaf, sage.
Amber (yellow)	Mustard, sunflower, pumpkin, cucumber, alfalfa, meadow grasses.
Dark Amber	Buckwheat, heather, chestnut, tobacco, cherry, forest herbs, citrus fruits [14].

The next organoleptic characteristic is the aroma of honey. The product must have a pleasant aroma, the degree of expressiveness of which depends on the content of impurities in honey, nectaronose, terms and conditions of storage. The aroma of honey depends on the presence in it of essential oils that were contained in the nectar of the plant. Each variety of honey has only one, individual flavor. Old honey is characterized by the presence of a faint aroma. By determining the aroma of honey can be detected adulteration - will be detected not intrinsic smells of honey. It should be noted that honey with honeydew most often has an unpleasant odor. When identifying adulterated honey, you should consider that the product loses flavor with fermentation and prolonged heating, as well as in the presence of additives - cane sugar, molasses, inverted sugar.

Assessment of the aroma of honey is carried out as follows: 30 - 40 g of the product is placed in a glass container, closed with a lid and heated in a water bath, the temperature is 40 - 45 ° C, exposure time - 10 minutes. Flavor is evaluated twice: before and during the determination of taste. Double examination is carried out because the aroma of honey in the mouth increases. If the aroma is absent or insufficiently expressed, the honey is heated [4].

Organoleptic evaluation of honey aroma shows that the product can be weak, strong, delicate, subtle, with a pleasant and unpleasant smell. Clover and heather honey smells of the flowers from whose nectar the honey was made [17].
Such an organoleptic property of honey as taste is determined by specialists after preheating to 300C. All types of honey have a sweet taste, some with a slightly

sour taste. Some types of honey (chestnut, tobacco, honeydew) have a slightly bitter taste. A product with a sour or bitter aftertaste is not allowed for sale. Evaluation of taste is used to determine adulteration of the product [6].

Organoleptic evaluation is also given to the consistency of honey. The consistency of liquid honey reveals its water content and maturity. As is known, liquid honey becomes crystallized in 1.5 to 2 months after pumping. Crystallization is classified as follows:

- Saline - no crystals can be seen;
- Fine-grained - crystals less than 0.5 mm in size can be seen;
- Coarse-grained - crystals larger than 0.5 mm are clearly visible.

Crystallization and its degree is not a negative property of honey and does not affect its quality and properties.

To determine the consistency of honey, you use a spatula, which is immersed in a product that has a temperature of 200 C, and then assess the nature of the flow of honey. Depending on the degree of flow, honey can be liquid, viscous, very viscous and dense consistency.

- Liquid honey is a small amount of honey on a spatula, flowing in small, frequent drops. Liquid consistency is characteristic of honey from white acacia, clover honey, and when its water content is over 21%;
- Viscous honey - a significant amount of honey on a spatula, flowing down in large sparse elongated drops. Viscous consistency is common to most types of flower honey;
- Very viscous honey - there is a significant amount of honey on the spatula, which forms long pulls when flowing down. Very viscous consistency is characteristic of honey from podalic honey and flower honey during crystallization;
- dense consistency - the spatula is dipped in honey under pressure[15].

Sometimes immature honey is delivered to the market, but with signs of crystallization. In this case it is divided into two layers: liquid and dense, and the ratio of layers is unequal - liquid more than dense. The water content of unripe honey is higher than the permitted value and it is not allowed for sale. If the liquid layer of sediment is significantly less than the solid layer, this indicates storage of honey in a hermetically sealed container. Such honey, after stirring, is released for sale [4].

Thus, the main organoleptic indicators of natural honey are color (from light-transparent to dark-brown), flavor (weak, strong, delicate, subtle, with a pleasant or unpleasant odor), taste, consistency (liquid, viscous, very viscous, dense consistency).

13-Theme: Laboratory examination of honey.

Determination of physicochemical parameters of honey

Determination of the main physico-chemical parameters see below, and radiological examination of honey is carried out in the same way as for other products.

Determination of the mass fraction of water in honey

Honey moisture is one of its main physical indicators. High moisture is characteristic of immature and adulterated honey. With high moisture content honey begins to ferment and spoils quickly. In addition, knowledge of the moisture mass fraction of honey is necessary for other physico-chemical studies, since the working solutions of honey are prepared according to the dry substance, so the determination of the moisture mass fraction of honey should be carried out first. Determination of the mass fraction of water in honey can be carried out in two ways: by determining its density with a areometer or by determining the refractive index with a refractometer.

Determination of the mass fraction of water in honey by the density of its aqueous solution. Setting up the reaction. 100 g of honey dissolved in 200 cm3 distilled water at a temperature of 30-40 ° C, and then cooled to 15-25 ° C. In a cylinder of 250 cm3 on the wall, without allowing the formation of foam, poured 200 cm3 solution of honey 1: 2 and determine the temperature by

thermometer. If the temperature of the solution is above 25 °C or below 15 °C, it is cooled or heated. Then the areometer is lowered into the cylinder, avoiding contact with the walls. Recording the reaction. After 10-15 seconds count the readings of the device and use the table to find the mass fraction of water.

Determination of the mass fraction of water by the refractive index. Setting the reaction. The method is based on the dependence of the refractive index of honey on the mass fraction of water. To determine the refractive index syrup-like honey is used. The crystallized honey is placed in a glass vial, sealed tightly with a lid and heated in a water bath at 60 °C until liquid. A drop of syrupy honey is applied to the lower prism of the refractometer (Fig. 56), the upper prism is lowered over it, the instrument illuminating system is set so that light passes through the prisms and a drop of honey. Then look into the eyepiece and, by moving the handle of the instrument, align the boundary of the light and dark fields with the center line of the eyepiece, which will indicate the refractive index value on the scale of the instrument. At the same time as the refractive index is determined, the temperature of the honey in question is determined with a thermometer.

Recording the reaction. The resulting refractive index (refractive index) is recalculated by the mass fraction of water according to Table 40. If the temperature of honey is higher or lower than 20 ° C, the refractive index is multiplied by the correction factor.

Pic. 56. IFR 454 2VM refractometer, portable refractometer and enlarged scale, digital refractometer ALR-3

Amylase (diastase) activity determination

Amylase activity is one of the most important indicators of honey, confirming its quality and naturalness. The enzyme amylase enters the honey from the bees' saliva and is also found in flower nectar. Therefore, the presence of sufficient amylase indicates the natural origin of honey. In old honey the amount of amylase decreases, in addition, amylase breaks down when heated.The determination of amylase (diastase) activity is based on the ability of this enzyme to break down starch, which is determined by an iodine reaction. This indicator is expressed by the amylase (diastase) number in units of Gauthe. Amylase number in Gauthe - is the number of milliliters1% solution of starch, split diastase contained in 1 g anhydrous honey for 1 hour at 40 ° C. The tubes were closed stoppers, stirring their contents thoroughly, placed in a water bath for 1 hour at 40 ° C. Remove from the water bath, cooled under cold running water to room temperature (to stop the reaction of starch cleavage), then in each tube one drop of Lugol's solution with iodine content of 0.5% was added.

Determination of total acidity

Honey contains a significant amount of various acids (formic, citric, malic, lactic, etc.) and acid salts that are found in the flower nectar and saliva of bees. Normal degree acidity (milliequivalents) is the number of milliliters of 1N sodium hydroxide solution that have been used to neutralize acids and acidic salts in 100 grams of anhydrous honey.

Setting up the reaction. Pour 100 ml of 10% anhydrous honey into a 250 ml flask, add 5 drops of 1% alcoholic phenolphthalein solution and titrate with 0,1 n sodium hydroxide solution until slightly pinkish coloration, which does not disappear during the minute.

Recording the reaction. The number of milliliters of 0.1 n sodium hydroxide solution, consumed by the titration of 100 cm3 of 10% anhydrous solution of honey, equal to the number of normal degrees of acidity. The discrepancy between parallel determinations should not exceed ± 0.02 normal degree. Acidity less than one is characteristic of honeys fed sugar syrup to the bees, more than four is characteristic of artificial sugar inversion or fermentation and spoilage of honey.

Determination of flower pollen

Flower pollen is determined only in flower honey. The quantity and the botanical species are determined. Thus, by determining the pollen species it is possible to determine the type of honey.

Reaction setting. Prepare a solution of honey 1:2 (20 grams of honey dissolved in 40 cm3 distilled water). Mix well, transfer into centrifuge tubes and centrifuge for 15 minutes at 10-50 sec-1. After centrifugation the supernatant is discarded and a drop of precipitate is transferred using a platinum bacteriological loop onto a slide. The glass is either covered with a coverslip or, after drying, the contents are fixed with a drop of alcohol and examined under a microscope at 320-1000× magnification at low magnification.

Recording the reaction. Determine the number of pollen grains and identify them by their appearance according to Fig. 57. There is no pollen in padevomi and artificial honey. In adulterated honey

The amount of pollen can be reduced. Monofloral honey must contain pollen of the same botanical species, but linden, sunflower and buckwheat honeys must contain at least 30 % pollen.

Determination of mechanical impurities

A violation of technology and hygiene in the production of honey may contain When breaching the technology and hygiene of honey production it is possible that mechanical impurities: sand, wax, corpses of bees, their larvae, plants and others.

Staging the reaction. On a metal mesh with a diameter of 1-2 mm, placed on a beaker, place 50 grams of honey. The glass is placed in a drying cup, heated to 60 °C (in the absence of a cupboard, honey can be heated to 60 ° C. in a water bath).

Reaction recording. Honey should pass through the mesh with no visible residue. If mechanical particles are found, if they are not dangerous, honey should be purified by sedimentation.

Determination of reducing (inverted) sugars

Mature natural bee honey consists of 80% or more reducing sugars. Reducing (inverted) sugars are glucose and fructose, which are formed by the decomposition of sucrose under the action of enzymes contained in the bees' saliva. Currently, the Fehling reagent reaction is used as the main technique. The method is based on the reduction of Feling reductant sugars in honey and their subsequent determination by iodometric titration.

Determination of the mass fraction of sucrose

If you suspect adulteration of honey with sugar syrup, with a low content of reducing sugars in honey determine the mass fraction of sucrose. The method consists in determining the difference of percentage content of reducing sugar before and after acid hydrolysis.

Setting up the reaction. 50 cm3 of 1% honey solution is placed in a 100 cm3 volumetric flask, heated in a water bath for 2-3 minutes to a temperature of 65-70 °C, 5 cm3 of concentrated hydrochloric acid is added. The temperature is maintained for 5 min. Then the solution is quickly cooled down and neutralized by 0.1 N sodium hydroxide solution with a mass concentration of 400 g/dm3 in the

presence of 1% alcoholic phenolphthalein solution with a mass concentration of 10 g/dm3 as an indicator - until a slightly pink color, which does not disappear within 1 minute. The volume of the solution is brought to 100 cm3 with distilled water and mixed thoroughly. From the resulting solution is taken with a pipette 20 cm3 and determine the content of reducing sugar using Feling reagents (see above). In parallel a control experiment with 50 cm3 distilled water is carried out.
Reaction recording. The percentage of sucrose content is calculated by multiplying the difference of reducing sugar content before and after acid hydrolysis by a factor of 0.95.

14-theme: The main types of adulteration of honey.

Methods of determination of sugar honey

Despite the fact that sugar honey is produced by bees, its organoleptic and consumer qualities are rather poor and its sale is not allowed. When detecting sugar honey, special attention should be paid to its organoleptic characteristics: taste - sweet, without sour and astringent aftertaste (empty); consistency - when freshly pumped honey is liquid, but when stored - thick, sticky, sticky, and jelly; crystallization - fatty. Sugar honey may differ little from flower and honeydew honey in physicochemical parameters. However, when analyzing the physico-chemical indicators indicate a low amylase number - 5-10 units. Gauthe, low acidity - below 1 normal degree, a little increased sucrose content - above 5 %, pollen is absent or its quantity is small, with usually no dominant pollen of one plant species, low mineral content - ash content below 0.1 %.
Methods for determination of decomposed honey
Honey is subjected to heating (dissolving) in order to give it a syrup-like consistency to stop the fermentation in it and in various adulterations. Remember that in honey heated above
Remember that honey heated above 60 ° C, destroys enzymes (amylase, etc.), worsens organoleptic characteristics: honey darkens, weakening flavor, there is a taste of taramel. In laboratory tests in disintegrated honey a positive reaction to oxymethylfurfuroly the absence of amylase is detected.
Methods for determining immature honey
Immature honey is obtained by pumping it from unsealed honeycombs (insufficiently mature honey). This honey is usually very liquid, containing more than 20 % water, poorly crystallized, and has a high acidity. If you turn a spoon full of honey around its axis, immature honey flows freely from it, but ripe honey is coiled on the spoon folds like a ribbon, and flows from it unbreakable strands.

Methods for Detecting Fallen Honey

Fallen honey is natural and is permitted for use in food. However, in Russia, honey is less highly regarded than flower honey, so some suppliers try to pass off the honey as flower honey or dilute flower honey with honey from flower honey, which is adulteration. There are several reactions that can identify honey with honeydew. The essence of these reactions is that a substance that precipitates honeydew is added to the honey solution.

Alcohol reaction. In a test tube, 1 cm3 of 1:1 aqueous solution of honey and 8-10 cm3 of ethanol with a mass fraction of 96% are mixed. The contents of the test tube is stirred. Turbidity of the liquid and flaking out indicate the presence of pada in the honey.

Reaction with lead acetate. In a test tube, 2 cm3 of an aqueous solution of honey at a 1:1 ratio, add 2 cm3 of distilled water and 5 drops of 25% lead acetate solution, mix thoroughly and place in a water bath at 80-100 °C for 3 min. The formation of friable flakes that precipitate out indicates a positive reaction to the honeydew.

Lime reaction. Place 1 ml of a 1:1 solution of honey and 4 ml of a 50% aqueous solution of quicklime (lime water) in a test tube and bring to a boil. If the solution contains radium, brown flakes will form and precipitate.

Definition of artificial honey

Artificial honey is an adulterated product made without the participation of bees. The most common way to make artificial honey is to heat sugar syrup, in which acid is added. This process splits saccharose into glucose and fructose, and produces a product that is similar to natural honey in organoleptic, physical and chemical properties. Artificial honey often has a dark color, caramel-like consistency, and a weakened flavor, but its main features are a positive reaction to ximethylfurfural and lack of amylase.

Determination of beet (sugar) molasses admixture

Beet molasses is a by-product of sugar production. Due to its low cost it is often used for the dilution of honey. The essence of the reaction is that silver nitrate precipitates the raffinose and chlorides contained in the beet syrup.

Setting up the reaction. In a test tube, 2 cm3 of 1:2 aqueous solution of honey was poured and 5-10 drops of 5% silver nitrate solution were added.

Recording the reaction. Turbidity of the mixture and the appearance of a precipitate after the addition of silver nitrate indicates the presence of beet molasses in honey.

Determination of starch treacle

Treacle is a byproduct of the production of sugar and is often used to adulterate honey. The essence of the reaction is that barium chloride forms an insoluble compound with calcium carbonate.

Setting up the reaction. A 10% solution of barium chloride is added drop by drop to 5 cm3 of filter-filtered aqueous honey solution prepared at a 1:2 ratio.

Recording the reaction. Turbidity and white precipitation after adding barium chloride solution indicates the presence of starchy molasses.

Determination of starch and flour

Often flour or starch is added to honey to give a thicker consistency and to imitate crystallization. The essence of the reaction is that iodine forms with a polysaccharide starch compound blue.

Setting up the reaction. In a test tube is taken 5 cm3 of a solution of honey 1:2, heated in a test tube to boiling, cooled to room temperature and added 3-5 drops of 0.1 n iodine solution.

Recording the reaction. The blue coloring indicates the presence of starch or flour in the honey.

Determining the addition of sugar syrup

The addition of sugar syrup significantly increases the sucrose content in honey by more than 10%. When examining crystallized honey pay attention to the shape of the crystals.

Staging the reaction. A thin layer of honey is smeared on a slide and examined under a microscope, paying attention to the shape of the crystals and their ratio.

Recording the reaction. Glucose and fructose crystals are needle-shaped, while sucrose crystals are cubic. The presence of a large number of cubic crystals indicates the dilution of honey with sugar syrup.

Determination of the addition of gelatin

Gelatin is added to honey to increase its viscosity and simulate crystallization.

Staging the reaction. In a test tube to 2-3 ml of a 1:2 solution of honey, 3-5 drops of a 5% solution of tannin are added.

Recording the reaction. In the presence of gelatin white flakes form, falling out as a precipitate. In solutions of natural honey only
slight turbidity.

15-Topic: Determination of nitrate salts in vegetable food products

Classification of plant foods

Plant products are extremely diverse in nature and properties. They are commonly subdivided into the following:

- Fruits, vegetables, berries.
- Root crops.
- Greens.
- Dried fruits.
- Pickles and marinades.
- Mushrooms.
- Dried vegetable products (grains, cereals, flour, starch).
- Vegetable oils.
- Fruit wines.

Basic principles of sanitary examination of vegetable products

In the sanitary examination of plant products the most important is to determine their organoleptic characteristics. It is necessary to define their appearance, shape, size, color, consistency, smell and taste. And these indicators must be determined not only on the surface, but also in the thickness of a fresh cut. If a vegetable product, such as potatoes, is not eaten raw, before determining the taste it must be boiled.When determining the organoleptic characteristics of plant foods to determine their naturalness, degree of freshness, maturity, mechanical contamination, the presence of plant diseases and pests.

Naturality and identification of plant products

During the organoleptic examination of plant products determine their naturalness, that is, plant products must be of the botanical species for which they are presented, have the appropriate form, color and size. When in doubt when

determining the naturalness of a product its characteristics are compared with the requirements of the normative documents for this product.

Degree of freshness

Vegetable products supplied to the market must be fresh, not wilted. Plant products must not show signs of spoilage, rot, mold. If there is suspicion of mold, a fluorescent diagnostic test can be made.

Grade of maturity

There are three degrees of maturity of plant products: immature, mature and overripe. Plant foods on the market must be at a level of maturity at which they are suitable for human consumption. For example, fruits, berries and most vegetables must be ripe, herbs and cucumbers must be immature. Overripe fruits, vegetables and berries should not be allowed in the sale, since they have a flabby consistency, quickly subjected to spoilage and are easily contaminated with microflora. When ripening, fruits and berries soften and acquire a sweet taste, as the starch, which forms their basis, splits into sucrose, glucose and fructose. Therefore, when in doubt about the degree of ripeness of fruit, such as apples, in addition to determining the organoleptic indicators, you can drop a solution of iodine on the surface of a fresh cut. In this case, immature fruits, which contain a lot of starch, will turn blue.

Determination of mechanical contamination

Vegetable products supplied to the market must be relatively clean. Root crops, fruits, vegetables, mushrooms must not contain large amounts of dust, soil, sand. Grain, cereals, flour should not contain impurities of sand, soil, weed seeds, ergot, smut, heads, glass fragments, metal fragments.

Identification of plant diseases and pests

Plant diseases are not dangerous to humans, but they significantly worsen the quality of plant products, their commercial appearance, and sometimes even make them unfit for food. Therefore, when a lot of diseased fruits are found in a batch of plant products, it is sent for sorting, and the diseased fruits are discarded, and the rest are used without restrictions. In the spring period, the sale of plant products that can be used as planting material, such as potatoes affected by infectious diseases, is restricted. If plant products with particularly dangerous infectious diseases, such as potato cancer, are found, the plant health quarantine service must be informed. Therefore the sanitary evaluation of plant products depends on their influence on the marketable appearance and quality of the plant products. The presence of a small amount of fruits, vegetables, berries, affected by agricultural pests in the batch is allowed. With a significant number of infested fruits, the batch of products shall be sent for sorting.

The presence of barn pests in flour, cereals or grain in any quantities is not allowed, because dry vegetable products are designed for long-term storage, and barn pests can spread around the room and affect other products.

Laboratory tests of plant products at markets

If during organoleptic inspection there is a suspicion that the products are contaminated with pesticides and other harmful and toxic substances (strange smell or taste, film or deposit on the surface, etc.), it is necessary to take samples and

send them to the chemical and toxicological department of the city or interregional veterinary laboratory, and if there is a suspicion of contamination with pesticides or other harmful and toxic substances, it is necessary to take samples and send them to the chemical and toxicological department of the city or interregional veterinary laboratory. If there is a suspicion of pathogenic microorganisms in the plant products, the samples should be taken and sent to the chemical toxicological department of a city or interregional veterinary laboratory, and if there is a suspicion of pathogenic microorganisms in the plant products, the samples should be sent to the microbiological department of a city or interregional veterinary laboratory. A decision on the use of these plant products shall be taken after the results of the tests have been obtained. The content of denitrite, radioactive isotopes, pesticides, salts of heavy metals, pathogens and other harmful substances must be below the maximum permissible concentrations set by SanPiN 2.3.2.1078-01.

Determination of nitrates

Excess nitrates may accumulate in plant foods due to improper application of nitrogen fertilizers. Consumption of such products may lead to serious health problems.

Setting up the reaction. Plant product (10 g) is ground on a grater, placed in a beaker and poured 50 ml of 5% solution of alum alum, then extracted nitrates for 15 minutes, stirring the contents with a glass rod or with a magnetic stirrer. Then the electrode of the universal ionometer or nitratometer (Fig. 58) is lowered into the extract and the values from the scale of the device are read (turn on and operate the device in accordance with the operating instructions of the ionometer model used).

Pic. 58. Universal ionometer "I-160" and nitratometer "Nitrate-test

Reaction recording. The instrument scale readings with the help of a calibration table are translated into nitrate content and compared with the maximum allowable concentrations of nitrates (in mg/kg):

Potatoes. 250
Early white cabbage (before September 1) 900
Late white cabbage 500
Early carrots 400
Late carrots 250
Beets.. 1400

Cucumbers (open/closed ground) 150/400
Tomatoes (outdoor/indoor) 150/300
Sweet peppers (outdoor/indoor) 200/400
Zucchini 400
Onions. 80
Green onions (outdoor/indoor) 600/800
Green 2000
Watermelons 60
Melons 90
Grapes, pears, apples and other fruits 60

3.4 Independent work

Topics of independent works, flowchart and timetable work plans.

№	Topics of independent work	Assignments	Deadline completion date deadline	Col. Hours
1	Preparing animals for transportation	Literature preparation and writing an essay	1-2 weeks	6
2	General understanding of meat plants	Literature preparation and writing an essay	3-4 weeks	6
3	Storage facilities for livestock (cattle barns)	Literature preparation and writing an essay	5-6 weeks	6
4	Processing of carcasses of calves, pigs and rabbits	Literature preparation and writing an essay	7 week	6
5	Swine Fever	Literature preparation and writing an essay	8 week	6
6	Swine rot	Literature preparation and writing an essay	9 week	6
7	Technology and expertise of dairy products	Literature preparation and writing an essay	10 week	8
8	Veterinary and sanitary examination of milk of sick animals	Literature preparation and writing an essay	11 week	6
9	Sanitary inspection of pickled vegetables	Preparing the literature and completing the assignment	12 week	6
10	Veterinary and sanitary examination of mushrooms	Preparing the literature and completing the assignment	13 week	6
11	Veterinary and sanitary examination of butter	Preparing the literature and completing the assignment	14 week	6
12	Veterinary and sanitary expertise in noncontagious diseases	Preparing the literature and completing the assignment	15 week	8
13	Lymph nodes and their significance in the examination of meat	Preparing the literature and completing the assignment	16 week	6
14	Veterinary and sanitary examination of plant products	Preparing the literature and completing the assignment	17 week	8
	Total			**90**

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3.5 GLOSSARY

- **food safety** - compliance of products with veterinary and sanitary rules, other safety requirements, regulated by the current regulatory documentation;

- **veterinary and sanitary expertise** - a complex of investigations on safety indicators carried out by the veterinary service in accordance with existing rules and other normative documents;

- **veterinary branding of meat** - imprinting of a veterinary brand or veterinary stamp on meat by a specialist of the State Veterinary Service after the veterinary examination;

- **veterinary certificate** (veterinary certificate) - a document issued by the institutions of the State Veterinary Service for all types of goods subject to Gosvetnadzor control, confirming that they have been subjected to veterinary examination (animals), veterinary and sanitary examination (animal products) and comply with regulatory documents, coming from areas that are safe for particularly dangerous and quarantine diseases of animals;

- **The state veterinary supervision** - activities of state veterinary service in the field of animal health and safety;

- **State veterinary supervision** - activities of management bodies, institutions and organizations of the State Veterinary Service of the Russian Federation, aimed at preventing animal diseases and ensuring the safety of animal products in veterinary respect;

- **tanning of meat** - a non-microbial deterioration of meat arising from improper cooling of a steamed carcass under the influence of tissue enzymes, characterized by an unusual (sour) smell, softened consistency and color change;

- **skinning of carcass** - removing from the outer and inner surface of the carcass the remains of internal organs, blood clots, diaphragm, fringes, bruises, abscesses, contamination;

- **isolator** - an isolated room at the abattoir for placing the slaughtered animals with acute contagious diseases;

- **quarantine of slaughtered animals** - holding animals at the slaughterhouse in case of incorrect execution of veterinary certificate, as well as in case of suspicion of infectious disease (death during transportation, increase in temperature of animals, etc.) by taking measures to prevent the emergence or spread of diseases;

- **quarantine yard** (quarantine room) - an isolated room (yard) of a livestock depot for receiving and keeping animals suspected of having infectious diseases;

- **confiscations** - carcasses, parts of carcasses and organs of animals, recognized by veterinary and sanitary supervision as unsuitable for food purposes and allowed to produce fodder and technical products;

- **animal fodder meal** is a product obtained from non-food protein waste, confiscated products, low-value sub-products, carcasses of slaughtered animals approved by the veterinary sanitary inspection for processing into fodder meal;

- **carcass hemorrhages** - carcass defect representing an accumulation of blood in the thickness of tissues or natural cavities as a result of violations of the integrity of the wall of the blood vessel or its
permeability;

- **bruising on** a carcass is a carcass defect that is
blood-soaked skin or mucous membrane as a result of disruption of the integrity of the wall of a blood vessel or its permeability;

- **liver** - the heart, lungs, trachea, liver, and diaphragm removed from the carcass in their natural union. In pigs, in addition, the tongue with the pharynx and larynx are extracted;

- **carcass mechanical trauma** - A carcass defect, which is an area with tissue disruption and hemorrhage as a result of a lifetime of mechanical damage or mutilation;

- **meat** - a carcass or carcass part representing a combination of muscle, fat, connective tissue, skin and bones or without them;

- **forced slaughter** meat means meat derived from slaughtered animals to be rendered harmless and used under the control of the veterinary service;

- **meat subject to deactivation (conditional meat)** - meat which may be used for food purposes after deactivation by exposure to high or negative temperatures under the supervision of a veterinarian;

- **poultry meat** - parts of a carcass intended for consumption for food purposes;

- Non-food processing waste of slaughter animals - raw materials obtained after processing of carcasses and organs of animals, which are not used for food and special purposes, and used for production of feed and technical products;

- **Normative documents** - the state standards, sanitary and veterinary rules and the norms establishing requirements to quality and safety of foodstuff, materials and products, control over their quality, conditions of manufacturing, storage, transportation, realisation and use;

- **maintenance of safety of foodstuff** - observance of a complex of measures, conditions and the requirements established to process of manufacturing, storage, transportation, use and realisation of foodstuff and guaranteeing, subject to observance of these requirements at all stages of circulation of foodstuff, absence of dangerous influence of such products on life and health of consumers;

- **batch of animals** - any quantity of animals received in one vehicle and accompanied by veterinary documents of the established form;

- **batch of meat** is a quantity of meat, poultry carcasses included in the veterinary certificate

- **food products of animal origin** - meat, meat and other slaughter products of all types of farm and commercial animals, beaten poultry and feathered game, fish, milk, eggs, honey and products of their processing;

- **giblets after slaughter of poultry** - liver without gallbladder, heart with or without pericardium, muscular stomach without contents and cuticle;

- **pre-slaughter holding** - keeping animals without food for a certain period of time before slaughtering in order to free the gastrointestinal tract from contents;

- **sanitary slaughterhouse** - a complex of premises designed for isolated slaughter of animals (poultry) with infectious as well as diseases of unexplained aetiology;
- **slaughterhouse** - a separate premise (area) on the territory of a meat-packing plant for accommodation before slaughtering, veterinary inspection, sorting and rest of slaughtered animals;
- **offal** - internal organs, heads, tails, legs, udders, meat trimmings obtained in the processing of livestock;
- **technical waste from poultry processing** - trachea, goiter, esophagus, intestine with cloaca, gallbladder, oviduct;
- **petechial haemorrhages** - defect in the carcass representing bleeding in the tissue near the capillaries in the form of dots or
specks up to 3 mm in diameter;
- **half-gutted carcass** - a bird carcass after bleeding, plucking with intestine and cloaca removed;
- **poultry carcass** - whole bird carcass after bleeding, plucking and gutting, with optional removal of lungs, kidneys, tarsal legs, head;
- **slaughtered animals** - farm animals (poultry) intended for slaughter and processing;
- **quality certificate** - a document in which the manufacturer (supplier) of food products certifies that the quality and safety of specific batches of food products, materials and products comply with the requirements of regulatory documents;
- **meat and meat products destruction** - incineration or burial in biotermic pits;
- **utilization** - sanitary processing of boar confiscations and animal carcasses into neutralized technical (technical fat, glue) and fodder products - meat and bone meal.

1. Subject matter questions for certification:

1.1 Oral questions for 1 PC (120 pcs.)

1. 1. VSE in case of poisoning of farm animals
2. 2. Methods for the study of eggs
3. 3. Determination of milk acidity
4. 4. Biochemical change during meat maturation
5. 5. Determination of the density of milk in adulteration
6. 6. Bacteriological examination of canned meat
7. 7. VSE for foot and mouth disease
8. 8. Differentiation of trichinella from cysticercosis.
9. 9. Organoleptic study of honey.
10. 10. VSE for TB
11. 11. Examination of meat for cysticercosis (finnosis).
12. 12. Determination of the acidity of milk.
13. 13. ECE for anthrax
14. 14. Chemical composition of milk.
15. 15. Gram smear staining.
16. 16. VSE for brucellosis
17. 17. Rules for working in the laboratory.
18. 18. Relationship of WSE with other subjects
19. 19. Selection of average milk samples for analysis
20. 20. Sanitary examination of plant foods
21. 21. VSE for trichinosis
22. 22. Determination of the number and determination of the diameter of fat globules
23. 23. Familiarization with the structure of the meat plant and slaughterhouse
24. 24. Primary processing of cattle
25. 25. Determination of nitrite and nitrate in vegetables
26. 26. Determination of the degree of purity of milk
27. 27. Veterinary and sanitary examination of eggs
28. 28. Method for the study of pork for trichinosis
29. 29. Organoleptic examination of fish and fish products
30. 30. Laboratory research of honey
31. 31. Determination of the meat of sick animals by laboratory methods
32. 32. Methods for determining the fat content of milk
33. 33. Morphology of meat and chemical composition of animal meat
34. 34. Determination of the good quality of sausages
35. 35. Study of cheese and cheese
36. 36. Differentiation of trichinella from cysticercosis
37. 37. Definition of adulteration of honey
38. 38. Nutritional value and classification of eggs
39. 39. Determination of the acidity of milk
40. 40. WSE Dairy Products
41. 41. Determination of the good quality of sausages
42. 42. Chemical composition of milk
43. 43. Biochemical changes during maturation of meat
44. 44. Determination of contamination of milk with microorganisms
45. 45. Determination of the good quality of edible animal fats
46. 46. Sanitary examination of plant foods
47. 47. Determination of fat content in milk
48. 48. Organoleptic study of honey
49. 49. VSE in foot and mouth disease
50. 50. Determination of good quality sausage products.
51. 51. Definition of adulteration of milk
52. 52. Bacteriological examination of meat
53. 53. Research methods for eggs
54. 54. VSE of milk of sick animals
55. 55. Determination of nitrite and nitrate in vegetables
56. 56. Determination of the degree of purity of milk
57. 57. VSE for anthrax
58. 58. Organoleptic examination of dairy products
59. 59. Primary processing of animals
60. 60. Definition of meat of various types of animals
61. 61. Veterinary and sanitary examination of canned meat
62. 62. WSE Dairy Products
63. 63. Study of honeydew honey
64. 64. Determination of the meat of sick animals
65. 65. Relationship of VSE with other subjects
66. 66. Determination of acidity of milk
67. 67. Bacteriological examination of meat
68. 68. VSE of intestinal raw materials
69. 69. Veterinary and sanitary examination of canned meat
70. 70. Meat pH determination
71. 71. VSE in brucellosis
72. 72. Rules for working in the laboratory.
73. 73. Relationship of VSE with other subjects
74. 74. Selection of average milk samples for analysis
75. 75. Sanitary examination of plant foods
76. 76. VSE in trichinosis
77. 77. Determination of the number and determination of the diameter of fat globules
78. 78. Familiarization with the structure of the meat plant and slaughterhouse

79. 79. Determination of nitrite and nitrate in vegetables
80. 80. Determination of the degree of purity of milk
81. 81. Method for the study of pork for trichinosis
82. 82. Organoleptic examination of fish and fish products
83. 83. Useful properties of fish meat for the human body?
84. 84. What activities should be carried out to increase the productivity of artificial reservoirs?
85. 85. What is the best natural canned fish?
86. 86. What percentage is usually the mass fraction of salmon fat?%,
87. 87. What determines the ratio of nutrients in fish?
88. 88. Tell us about the rules for the selection of live fish, methods of sampling and testing?
89. 89. Transportation and storage of live fish?
90. 90. When evaluating the quality of live fish, what indicators are paid attention to?
91. 91. Where do trematodes parasitize in fish, causing opisthorchiasis disease?
92. 92. VSE in case of poisoning of farm animals
93. 93. Methods for the study of eggs
94. 94. Determination of acidity of milk
95. 95. Biochemical changes during maturation of meat
96. 96. Determination of the density of milk in adulteration
97. 97. Bacteriological examination of canned meat
98. 98. VSE in foot and mouth disease
99. 99. Differentiation of trichinella from cysticercosis.
100. 100. Organoleptic study of honey.ВСЭ при туберкулезе

101. Study of meat for cysticercosis (finnosis).

102. Determination of the acidity of milk.

103. ECE for anthrax

104. Chemical composition of milk.

105. Gram smear staining.

106. VSE in brucellosis

107. Rules for working in the laboratory.

108. Connection of VSE with other subjects

109. Selection of average milk samples for analysis

110. Sanitary examination of plant foods

111. ECE in trichinosis

112. Determination of the number and determination of the diameter of fat globules

113. Acquaintance with the structure of the meat plant and slaughterhouse

114. Primary processing of cattle

115. Determination of nitrite and nitrate in vegetables

116. Determination of the degree of purity of milk

117. Veterinary and sanitary examination of eggs

118. Method for the study of pork for trichinosis

1.1 119. Organoleptic examination of fish and fish products

1.2 Oral questions for 2 pcs (120 pcs.)

101. EVERYTHING with poisoning of farm animals
102. Methods of egg research
103. Determination of milk acidity
104. Biochemical changes during meat maturation
105. Determination of milk density during adulteration
106. Bacteriological study of canned meat
107. EVERYTHING with foot-and-mouth disease
108. Differentiation of trichinella from cysticercosis.
109. Organoleptic study of honey.
110. EVERYTHING with tuberculosis
111. Examination of meat for cysticercosis (finnosis).
112. Determination of milk acidity.
113. ALL with anthrax
114. Chemical composition of milk.
115. Coloring of smears by gram.
116. VSE in brucellosis

117. Rules of work in the laboratory.
118. The connection of the VSE with other subjects
119. Selection of average milk samples for analysis
120. Sanitary research of plant foods
121. VSE in trichinosis
122. Determination of the number and diameter of fat balls
123. Familiarization with the structure of the meat processing plant and the slaughterhouse
124. Primary processing of cattle
125. Determination of nitrite and nitrate in vegetables
126. Determination of the degree of purity of milk
127. Veterinary and sanitary examination of eggs
128. Method of pork examination for trichinosis
129. Organoleptic examination of fish and fish products
130. Laboratory examination of honey
131. Determination of meat of sick animals by laboratory methods
132. Methods for determining the fat content of milk
133. Morphology of meat and chemical composition of animal meat
134. Determination of the quality of sausage products
135. Cheese and cheese research
136. Differentiation of trichinella from cysticercosis
137. Definition of honey adulteration
138. Nutritional value and classification of eggs
139. Determination of milk acidity
140. VSE of Dairy products
141. Determination of the quality of sausage products
142. Chemical composition of milk
143. Biochemical changes during meat maturation
144. Determination of contamination of milk with microorganisms
145. Determination of the good quality of food animal fats
146. Sanitary examination of plant foods
147. Determination of fat content in milk
148. Organoleptic study of honey
149. VSE in case of foot-and-mouth disease
150. Determination of the quality of sausage products.
151. Definition of milk adulteration
152. Bacteriological examination of meat
153. Methods of research of eggs
154. VSE milk of sick animals
155. Determination of nitrite and nitrates in vegetables
156. Determination of the degree of purity of milk
157. VSE for anthrax
158. Organoleptic study of dairy products
159. Primary processing of animals
160. Definition of meat of various types of animals
161. Veterinary and sanitary examination of canned meat
162. VSE of Dairy products
163. Research of honeydew
164. Determination of meat of sick animals
165. The connection of the VSE with other subjects
166. Determination of milk acidity
167. Bacteriological examination of meat
168. VSE of intestinal raw materials
169. Veterinary and sanitary research of canned meat
170. Determination of the pH of meat
171. VSE in brucellosis
172. Rules of work in the laboratory.
173. Connection of the VSE with other subjects
174. Selection of average milk samples for analysis
175. Sanitary research of plant foods
176. VSE in trichinosis
177. Determination of the number and diameter of fat balls
178. Familiarization with the structure of the meat processing plant and the slaughterhouse
179. Determination of nitrite and nitrate in vegetables
180. Determination of the degree of purity of milk
181. Method of pork examination for trichinosis
182. Organoleptic examination of fish and fish products
183. Useful properties of fish meat for the human body?
184. What measures should be taken to increase the productivity of artificial reservoirs?
185. What kind of fish is the best natural canned food made from?
186. How many percent is usually the mass fraction of salmon fat?%,
187. What determines the ratio of nutrients in fish?
188. Tell us about the rules for the selection of live fish, sampling and testing methods?
189. Transportation and storage of live fish?
190. When assessing the quality of live fish, what indicators do they pay attention to?
191. Where do trematodes that cause opisthorchiasis disease parasitize in fish?
192. VSE when poisoning farm animals
193. Methods of egg research
194. Determination of milk acidity
195. Biochemical changes during the maturation of meat

196. Determination of milk density during adulteration
197. Bacteriological study of canned meat
198. VSE in case of foot-and-mouth disease
199. Differentiation of trichinella from cysticercosis.
200. Organoleptic study of honey.
201. VSE in tuberculosis
202. Examination of meat for cysticercosis (finnosis).
203. Determination of milk acidity.
204. VSE for anthrax
205. Chemical composition of milk.
206. Coloring of smears by gram.
207. VSE in brucellosis
208. Rules of work in the laboratory.
209. The connection of the VSE with other subjects
210. Selection of average milk samples for analysis
211. Sanitary research of plant foods
212. VSE in trichinosis
213. Determination of the number and diameter of fat balls
214. Familiarization with the structure of the meat processing plant and the slaughterhouse
215. Primary processing of cattle
216. Determination of nitrite and nitrate in vegetables
217. Determination of the degree of purity of milk
218. Veterinary and sanitary examination of eggs
219. Method of pork examination for trichinosis
220. Organoleptic examination of fish and fish products

1. VSE in case of poisoning of farm animals
2. Methods of egg research
3. Determination of milk acidity
4. Biochemical changes during the maturation of meat
5. Determination of milk density during adulteration
6. Bacteriological study of canned meat
7. VSE in case of foot-and-mouth disease
8. Differentiation of trichinella from cysticercosis.
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16. VSE in brucellosis
17. Rules of work in the laboratory.
18. The connection of the VSE with other subjects
19. Selection of average milk samples for analysis
20. Sanitary research of plant foods
21. VSE in trichinosis
22. Determination of the number and diameter of fat balls
23. Familiarization with the structure of the meat processing plant and the slaughterhouse
24. Primary processing of cattle
25. Determination of nitrite and nitrate in vegetables
26. Determination of the degree of purity of milk
27. Veterinary and sanitary examination of eggs
28. The method of studying pork for trichinosis
29. Organoleptic examination of fish and fish products
30. Laboratory examination of honey
31. Determination of meat of sick animals by laboratory methods
32. Methods for determining the fat content of milk
33. Morphology of meat and chemical composition of animal meat
34. Determination of the quality of sausage products
35. Cheese and cheese research
36. Differentiation of trichinella from cysticercosis
37. Definition of honey adulteration
38. Nutritional value and classification of eggs
39. Determination of milk acidity
40. VSE of Dairy products
41. Determination of the quality of sausage products
42. Chemical composition of milk
43. Biochemical changes during the maturation of meat
44. Determination of contamination of milk with microorganisms
45. Determination of the good quality of food animal fats
46. Sanitary examination of plant foods
47. Determination of fat content in milk
48. Organoleptic study of honey
49. VSE in case of foot-and-mouth disease
50. Determination of the quality of sausage products.
51. Definition of milk adulteration

52. Bacteriological examination of meat
53. Methods of research of eggs
54. VSE milk of sick animals
55. Determination of nitrite and nitrates in vegetables
56. Determination of the degree of purity of milk
57. VSE for anthrax
58. Organoleptic study of dairy products
59. Primary processing of animals
60. Definition of meat of various animal species
61. Veterinary and sanitary research of canned meat
62. VSE of Dairy products
63. Research of honeydew
64. Determination of meat of sick animals
65. The connection of the VSE with other subjects
66. Determination of milk acidity
67. Bacteriological examination of meat
68. VSE of intestinal raw
materials 69. Veterinary and sanitary research of canned meat
70. Determination of the pH of meat
71. VSE in brucellosis
72. Rules of work in the laboratory.
73. The connection of the VSE with other subjects
74. Selection of average milk samples for analysis
75. Sanitary research of plant foods
76. VSE in trichinosis
77. Determination of the number and diameter of fat balls

78. Familiarization with the structure of the meat processing plant and the slaughterhouse
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96. Determination of milk density during adulteration
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164. Determination of contamination of milk with microorganisms
165. Determination of the good quality of food animal fats
166. Sanitary examination of plant foods
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182. VSE of Dairy products
183. Research of honeydew
184. Determination of meat of sick animals
185. The connection of the VSE with other subjects
186. Determination of milk acidity
187. Bacteriological examination of meat
188. VSE of intestinal raw materials
189. Veterinary and sanitary research of canned meat
190. Determination of the pH of meat
191. VSE in brucellosis
192. Rules of work in the laboratory.
193. Connection of the VSE with other subjects
194. Selection of average milk samples for analysis
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212. VSE when poisoning farm animals
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216. Determination of milk density during adulteration
217. Bacteriological study of canned meat
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220. Organoleptic study of honey.
221. VSE in tuberculosis
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223. Determination of milk acidity.
224. VSE for anthrax
225. Chemical composition of milk.
226. Coloring of smears by gram.
227. VSE in brucellosis
228. Rules of work in the laboratory.
229. The connection of the VSE with other subjects
230. Selection of average milk samples for analysis
231. Sanitary research of plant foods
232. VSE in trichinosis
233. Determination of the number and diameter of fat balls
234. Familiarization with the structure of the meat processing plant and the slaughterhouse
235. Primary processing of cattle
236. Determination of nitrite and nitrate in vegetables
237. Determination of the degree of purity of milk
238. Veterinary and sanitary examination of eggs
239. Method of testing pork for trichinosis
240. Organoleptic examination of fish and fish products
241. VSE in case of poisoning of farm animals
242. Methods of egg research
243. Determination of milk acidity
244. Biochemical changes during the maturation of meat
245. Determination of milk density during adulteration
246. Bacteriological study of canned meat
247. VSE in case of foot-and-mouth disease
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249. Organoleptic study of honey.
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274. Determination of the quality of sausage products
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280. VSE of Dairy products
281. Determination of the quality of sausage products
282. Chemical composition of milk
283. Biochemical changes during meat maturation
284. Determination of contamination of milk with microorganisms
285. Determination of the good quality of food animal fats
286. Sanitary examination of plant foods

287. Determination of fat content in milk
288. Organoleptic study of honey
289. VSE in case of foot-and-mouth disease
290. Determination of the quality of sausage products.
291. Definition of milk adulteration
292. Bacteriological examination of meat
293. Methods of egg research
294. VSE of milk of sick animals
295. Determination of nitrite and nitrates in vegetables
296. Determination of the degree of purity of milk
297. VSE for anthrax
298. Organoleptic examination of dairy products
299. Primary processing of animals
300. Definition of meat of various types of animals

1. ВСЭ при отравление сельскохозяйственных животных
2. Методы исследование яиц
3. Определение кислотности молока
4. Биохимические изменение при созревания мяса
5. Определение плотность молока при фальсификации
6. Бактериологическое исследование мясных баночных консервов
7. ВСЭ при ящуре
8. Дифференциация трихинелл от цистицеркоза.
9. Органолептическое исследование меда.
10. ВСЭ при туберкулезе
11. Исследование мяса на цистицеркоз (финноз).
12. Определение кислотности молока.
13. ВСЭ при сибирской язвы
14. Химический состав молока.
15. Окраска мазков по грамму.
16. ВСЭ при бруцеллёзе
17. Правила работы в лаборатории.
18. Связь ВСЭ с другими предметами
19. Отбор средних проб молока для анализа
20. Санитарное исследование растительных пищевых продуктов
21. ВСЭ при трихинеллёзе
22. Определение количества и установление диаметра жировых шариков
23. Ознакомление со структурой мясо комбината и убойного пункта
24. Первичная переработка КРС
25. Определение нитрита и нитрата в овощах
26. Определение степени чистоты молока
27. Ветеринарно-санитарная экспертиза яиц
28. Метод исследования свинины на трихинеллёз
29. Органолептическое исследование рыбы и рыбных продукт
30. Лабораторное исследование меда
31. Определение мяса больных животных лабораторными методами
32. Способы определение жирности молока
33. Морфология мяса и химический состав мяса животных
34. Определение доброкачественности колбасных изделий
35. Исследование сыра и брынзы
36. Дифференциация трихинелл от цистицеркоза
37. Определение фальсификации меда
38. Пищевая ценность и классификация яиц
39. Определение кислотности молока
40. ВСЭ Молочных продуктов
41. Определение доброкачественности колбасных изделий
42. Химический состав молока
43. Биохимические изменение при созревания мяса
44. Определение зараженность молока с микроорганизмами
45. Определение добро качественности пищевых животных жиров
46. Санитарная экспертиза растительных пищевых продуктов
47. Определение содержания жира в молоке
48. Органолептическое исследование меда
49. ВСЭ при ящуре
50. Определение доброкачественности колбасных изделии.
51. Определение фальсификации молока
52. Бактериологическое исследование мяса
53. Методы исследований яиц
54. ВСЭ молока больных животных
55. Определение нитрита и нитратов в овощи
56. Определение степени чистоты молока
57. ВСЭ при сибирской язвы
58. Органолептическое исследование молочных продуктов
59. Первичная переработка животных
60. Определение мясо различных видов животных
61. Ветеринарно-санитарное исследование мясных баночных консервов
62. ВСЭ Молочных продуктов
63. Исследование падевого меда
64. Определение мяса больных животных
65. Связь ВСЭ с другими предметами

66. Определение кислотности молока
67. Бактериологическое исследование мяса
68. ВСЭ кишечного сырья
69. Ветеринарно-санитарное исследование мясных баночных консервов
70. Определение pH мяса
71. ВСЭ при бруцеллёзе
72. Правила работы в лаборатории.
73. Связь ВСЭ с другими предметами
74. Отбор средних проб молока для анализа
75. Санитарное исследование растительных пищевых продуктов
76. ВСЭ при трихинеллёзе
77. Определение количества и установление диаметра жировых шариков
78. Familiarization with the structure of the meat processing plant and the slaughterhouse
79. Determination of nitrite and nitrate in vegetables
80. Determination of the degree of purity of milk
81. Method of pork examination for trichinosis
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93. Methods of egg research
94. Determination of milk acidity
95. Biochemical changes during the maturation of meat
96. Determination of milk density during adulteration
97. Bacteriological study of canned meat
98. VSE in case of foot-and-mouth disease
99. Differentiation of trichinella from cysticercosis.
100. Organoleptic study of honey.
101. VSE in tuberculosis
102. Examination of meat for cysticercosis (finnosis).
103. Determination of milk acidity.
104. VSE for anthrax
105. Chemical composition of milk.
106. Coloring of smears by gram.
107. VSE in brucellosis
108. Rules of work in the laboratory.
109. The connection of the VSE with other subjects
110. Selection of average milk samples for analysis
111. Sanitary research of plant foods
112. VSE in trichinosis
113. Determination of the number and diameter of fat balls
114. Familiarization with the structure of the meat plant and the slaughterhouse
115. Primary processing of cattle
116. Determination of nitrite and nitrate in vegetables
117. Determination of the degree of purity of milk
118. Veterinary and sanitary examination of eggs
119. Method of pork examination for trichinosis
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142. Determination of the number and diameter of fat balls
143. Familiarization with the structure of the meat processing plant and the slaughterhouse
144. Primary processing of cattle

145. Determination of nitrite and nitrate in vegetables
146. Determination of the degree of purity of milk
147. Veterinary and sanitary examination of eggs
148. Method of pork examination for trichinosis
149. Organoleptic examination of fish and fish products
150. Laboratory examination of honey
1. Determination of meat of sick animals by laboratory methods
2. Methods for determining the fat content of milk
3. Morphology of meat and chemical composition of animal meat
4. Determination of the quality of sausage products
5. Cheese and cheese research
6. Differentiation of trichinella from cysticercosis
7. Definition of honey adulteration
8. Nutritional value and classification of eggs
9. Determination of milk acidity
10. VSE of Dairy products
11. Determination of the quality of sausage products
12. Chemical composition of milk
13. Biochemical changes during the maturation of meat
14. Determination of contamination of milk with microorganisms
15. Determination of the good quality of food animal fats
16. Sanitary examination of plant foods
17. Determination of fat content in milk
18. Organoleptic study of honey
19. VSE in case of foot-and-mouth disease
20. Determination of the quality of sausage products.
21. Definition of milk adulteration
22. Bacteriological examination of meat
23. Methods of egg research
24. VSE of milk of sick animals
25. Determination of nitrite and nitrates in vegetables
26. Determination of the degree of purity of milk
27. VSE for anthrax
28. Organoleptic examination of dairy products
29. Primary processing of animals
30. Definition of meat of various animal species
31. Veterinary and sanitary research of canned meat
32. VSE of Dairy products
33. Research of honeydew
34. Determination of meat of sick animals
35. The connection of the VSE with other subjects
36. Determination of milk acidity
37. Bacteriological examination of meat
38. VSE of intestinal raw
materials 39. Veterinary and sanitary research of canned meat
40. Determination of the pH of meat
41. VSE in brucellosis
42. Rules of work in the laboratory.
43. The connection of the VSE with other subjects
44. Selection of average milk samples for analysis
45. Sanitary research of plant foods
46. VSE in trichinosis
47. Determination of the number and diameter of fat balls
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66. Determination of milk density during adulteration
67. Bacteriological study of canned meat
68. VSE in FMD
69. Differentiation of trichinella from cysticercosis.
70. Organoleptic study of honey.
71. VSE in tuberculosis
72. Examination of meat for cysticercosis (finnosis).
73. Determination of milk acidity.

74. VSE for anthrax
75. Chemical composition of milk.
76. Coloring of smears by gram.
77. VSE in brucellosis
78. Rules of work in the laboratory.
79. The connection of the VSE with other subjects
80. Selection of average milk samples for analysis
81. Sanitary research of plant foods
82. VSE in trichinosis
83. Determination of the number and diameter of fat balls
84. Familiarization with the structure of the meat processing plant and the slaughterhouse
85. Primary processing of cattle
86. Determination of nitrite and nitrate in vegetables
87. Determination of the degree of purity of milk
88. Veterinary and sanitary examination of eggs
89. Method of pork examination for trichinosis
90. Organoleptic examination of fish and fish products
91. VSE for poisoning of farm animals
92. Methods of egg research
93. Determination of milk acidity
94. Biochemical changes during the maturation of meat
95. Determination of milk density during adulteration
96. Bacteriological study of canned meat
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100. VSE in tuberculosis
101. Examination of meat for cysticercosis (finnosis).
102. Determination of milk acidity.
103. VSE for anthrax
104. Chemical composition of milk.
105. Color of smears by gram.
106. VSE in brucellosis
107. Rules of work in the laboratory.
108. The connection of the VSE with other subjects
109. Selection of average milk samples for analysis
110. Sanitary research of plant foods
111. VSE in trichinosis
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114. Primary processing of cattle
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119. Organoleptic examination of fish and fish products
120. Laboratory examination of honey
121. Determination of meat of sick animals by laboratory methods
122. Methods for determining the fat content of milk
123. Morphology of meat and chemical composition of animal meat
124. Determination of the quality of sausage products
125. Cheese and cheese research
126. Differentiation of trichinella from cysticercosis
127. Definition of honey adulteration
128. Nutritional value and classification of eggs
129. Determination of milk acidity
130. VSE of Dairy products
131. Determination of the quality of sausage products
132. Chemical composition of milk
133. Biochemical changes during the maturation of meat
134. Determination of contamination of milk with microorganisms
135. Determination of the good quality of food animal fats
136. Sanitary examination of plant foods
137. Determination of fat content in milk
138. Organoleptic study of honey
139. VSE in case of foot-and-mouth disease
140. Determination of the quality of sausage products.
141. Definition of milk adulteration
142. Bacteriological examination of meat
143. Methods of egg research
144. VSE of milk of sick animals
145. Determination of nitrite and nitrates in vegetables
146. Determination of the degree of purity of milk
147. VSE for anthrax
148. Organoleptic examination of dairy products
149. Primary processing of animals
150. Definition of meat of various types of animals
1. VSE in case of poisoning of farm animals
2. Methods of egg research

3. Determination of milk acidity
4. Biochemical changes during the maturation of meat
5. Determination of milk density during adulteration
6. Bacteriological study of canned meat
7. VSE in case of foot-and-mouth disease
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16. VSE in brucellosis
17. Rules of work in the laboratory.
18. The connection of the VSE with other subjects
19. Selection of average milk samples for analysis
20. Sanitary research of plant foods
21. VSE in trichinosis
22. Determination of the number and diameter of fat balls
23. Familiarization with the structure of the meat processing plant and the slaughterhouse
24. Primary processing of cattle
25. Determination of nitrite and nitrate in vegetables
26. Determination of the degree of purity of milk
27. Veterinary and sanitary examination of eggs
28. The method of studying pork for trichinosis
29. Organoleptic examination of fish and fish products
30. Laboratory examination of honey
31. Determination of meat of sick animals by laboratory methods
32. Methods for determining the fat content of milk
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52. Bacteriological examination of meat
53. Methods of research of eggs
54. VSE milk of sick animals
55. Determination of nitrite and nitrates in vegetables
56. Determination of the degree of purity of milk
57. VSE for anthrax
58. Organoleptic study of dairy products
59. Primary processing of animals
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61. Veterinary and sanitary research of canned meat
62. VSE of Dairy products
63. Research of honeydew
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66. Determination of milk acidity
67. Bacteriological examination of meat
68. VSE of intestinal raw
materials 69. Veterinary and sanitary research of canned meat
70. Determination of the pH of meat
71. VSE in brucellosis
72. Rules of work in the laboratory.
73. The connection of the VSE with other subjects
74. Selection of average milk samples for analysis
75. Sanitary research of plant foods
76. VSE in trichinosis
77. Determination of the number and diameter of fat balls
78. Familiarization with the structure of the meat processing plant and the slaughterhouse
79. Determination of nitrite and nitrate in vegetables
80. Determination of the degree of purity of milk
81. Method of pork examination for trichinosis

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93. Methods of egg research
94. Determination of milk acidity
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96. Determination of milk density during adulteration
97. Bacteriological study of canned meat
98. VSE in FMD
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107. VSE in brucellosis
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160. VSE of Dairy products

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164. Determination of contamination of milk with microorganisms
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182. VSE of Dairy products
183. Research of honeydew
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185. The connection of the VSE with other subjects
186. Determination of milk acidity
187. Bacteriological examination of meat
188. VSE of intestinal raw materials
189. Veterinary and sanitary research of canned meat
190. Determination of the pH of meat
191. VSE in brucellosis
192. Rules of work in the laboratory.
193. Connection of the VSE with other subjects
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237. Determination of the degree of purity of milk
238. Veterinary and sanitary examination of eggs
239. Method of testing pork for trichinosis

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312. Determination of milk acidity.
313. VSE in anthrax
314. Chemical composition of milk.
315. Staining of smears by gram.
316. VSE in brucellosis
317. Rules of work in the laboratory.
318. The connection of the VSE with other subjects

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354. VSE of milk of sick animals
355. Determination of nitrite and nitrates in vegetables
356. Determination of the degree of purity of milk
357. VSE for anthrax
358. Organoleptic study of dairy products
359. Primary processing of animals
360. Definition of meat of various types of animals
361. Veterinary and sanitary examination of canned meat
362. VSE of Dairy products
363. Research of honeydew
364. Determination of meat of sick animals
365. The connection of the VSE with other subjects
366. Determination of milk acidity
367. Bacteriological examination of meat
368. VSE of intestinal raw materials
369. Veterinary and sanitary research of canned meat
370. Determination of the pH of meat
371. VSE in brucellosis
372. Rules of work in the laboratory.
373. Connection of the VSE with other subjects
374. Selection of average milk samples for analysis
375. Sanitary research of plant foods
376. VSE in trichinosis
377. Determination of the number and diameter of fat balls
378. Familiarization with the structure of the meat processing plant and the slaughterhouse
379. Determination of nitrite and nitrate in vegetables
380. Determination of the degree of purity of milk
381. Method of pork examination for trichinosis
382. Organoleptic examination of fish and fish products
383. Useful properties of fish meat for the human body?
384. What measures should be taken to increase the productivity of artificial reservoirs?
385. From which fish do the best natural canned food?
386. How many percent is usually the mass fraction of salmon fat?%,
387. What determines the ratio of nutrients in fish?
388. Tell us about the rules for the selection of live fish, sampling and testing methods?
389. Transportation and storage of live fish?
390. When assessing the quality of live fish, what indicators do they pay attention to?
391. Where do trematodes that cause opisthorchiasis disease parasitize in fish?
392. VSE when poisoning farm animals
393. Methods of egg research
394. Determination of milk acidity
395. Biochemical changes during the maturation of meat
396. Determination of milk density during adulteration
397. Bacteriological study of canned meat

398. VSE in case of foot-and-mouth disease
399. Differentiation of trichinella from cysticercosis.
400. Organoleptic study of honey.
401. VSE in tuberculosis
402. Examination of meat for cysticercosis (finnosis).
403. Determination of milk acidity.
404. VSE in anthrax
405. Chemical composition of milk.
406. Coloring of smears by gram.
407. VSE in brucellosis
408. Rules of work in the laboratory.
409. The connection of the VSE with other subjects
410. Selection of average milk samples for analysis
411. Sanitary research of plant foods
412. VSE in trichinosis
413. Determination of the number and diameter of fat balls
414. Familiarization with the structure of the meat processing plant and the slaughterhouse
415. Primary processing of cattle
416. Determination of nitrite and nitrate in vegetables
417. Determination of the degree of purity of milk
418. Veterinary and sanitary examination of eggs
419. Method of pork examination for trichinosis
420. Organoleptic examination of fish and fish products
421. VSE in case of poisoning of farm animals
422. Methods of egg research
423. Determination of milk acidity
424. Biochemical changes during the maturation of meat
425. Determination of milk density during adulteration
426. Bacteriological study of canned meat
427. VSE in case of foot-and-mouth disease
428. Differentiation of trichinella from cysticercosis.
429. Organoleptic study of honey.
430. VSE in tuberculosis
431. Examination of meat for cysticercosis (finnosis).
432. Determination of milk acidity.
433. VSE for anthrax
434. Chemical composition of milk.
435. Staining of smears by gram.
436. VSE in brucellosis
437. Rules of work in the laboratory.
438. The connection of the VSE with other subjects
439. Selection of average milk samples for analysis
440. Sanitary research of plant foods
441. VSE in trichinosis
442. Determination of the number and diameter of fat balls
443. Familiarization with the structure of the meat processing plant and the slaughterhouse
444. Primary processing of cattle
445. Determination of nitrite and nitrate in vegetables
446. Determination of the degree of purity of milk
447. Veterinary and sanitary examination of eggs
448. Method of pork examination for trichinosis
449. Organoleptic examination of fish and fish products
450. Laboratory examination of honey
451. Determination of meat of sick animals by laboratory methods
452. Methods for determining the fat content of milk
453. Morphology of meat and chemical composition of animal meat
454. Determination of the quality of sausage products
455. Cheese and cheese research
456. Differentiation of trichinella from cysticercosis
457. Definition of honey adulteration
458. Nutritional value and classification of eggs
459. Determination of milk acidity
460. VSE of Dairy products
461. Determination of the quality of sausage products
462. Chemical composition of milk
463. Biochemical changes during meat maturation
464. Determination of contamination of milk with microorganisms
465. Determination of the good quality of food animal fats
466. Sanitary examination of plant foods
467. Determination of fat content in milk
468. Organoleptic study of honey
469. VSE in case of foot-and-mouth disease
470. Determination of the quality of sausage products.
471. Definition of milk adulteration
472. Bacteriological examination of meat
473. Methods of research of eggs
474. VSE milk of sick animals
475. Determination of nitrite and nitrates in vegetables
476. Determination of the degree of purity of milk

477. VSE for anthrax
478. Organoleptic examination of dairy products
479. Primary processing of animals
480. Definition of meat of various animal species
481. Veterinary and sanitary examination of canned meat
482. VSE of Dairy products
483. Research of honeydew
484. Determination of meat of sick animals
485. The connection of the VSE with other subjects
486. Determination of milk acidity
487. Bacteriological examination of meat
488. VSE of intestinal raw materials
489. Veterinary and sanitary examination of canned meat
490. Determination of the pH of meat
491. VSE in brucellosis
492. Rules of work in the laboratory.
493. Connection of the VSE with other subjects
494. Selection of average milk samples for analysis
495. Sanitary research of plant foods
496. VSE in trichinosis
497. Determination of the number and diameter of fat balls
498. Familiarization with the structure of the meat processing plant and the slaughterhouse
499. Determination of nitrite and nitrate in vegetables
500. Determination of the degree of purity of milk
1. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

2. How many percent is the yield of cattle meat?
A. *58-65%
B. 50-60%
B. 65-70%
G. 40-50%

3. How to determine the fatness of slaughter cattle?
A. * By appearance and touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

4. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

5. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

6. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

7. What are the means used to transport slaughtered animals to the meat industry?
A. * Rail, air and water transport
B. By car, railway (in wagons)
B. Driven along highways or roads
G. By cars

8. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

9. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature rise, temperature decrease, noise
B. Temperature rise
B. Temperature reduction
G. Noise

10. Which animals are more sensitive to stress factors?

A. * Pigs
B. Cattle
B. Sheep
G. Horses

11. Clinical changes caused by stress:
A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of the mucous membranes
B. Changes in blood composition
D. Increase in body temperature

12. What types of products are produced by meat processing plants?
A. * Food, medicinal and technical products
B. Food
B. Canned food
G. Fertilizer for the earth

13. How many percent of animals can accommodate the quarantine department of the meat enterprise
A. *10%
B. 8%
B. 6%
G. 4%
14. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

15. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. * 60 l
B. 50 l
B. 80 l
G . 100 l

16. Which objects are included in the primary processing enterprises?
A. *Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
V. Slaughterhouses
G. Slaughterhouses

17. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

18. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%

19. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

20. What should be taken into account when checking cattle?
A. * Temperature, general condition, leakage of fluid from natural openings, condition of external mucous membranes, udder condition
B. Breathing, heartbeat
B. In general condition
G. Palpitation

21. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In doubt

22. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

23. Where is the slaughter of animals without clinical signs when bitten by a rabid dog?
A. * On a farm
B. In meat enterprises

B. In a slaughterhouse
G. Outside the farm

24. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
B. It is possible after examination by a veterinarian
G. Partially possible

25. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

26. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass without skin, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin
27. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

28. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

29. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscles and fat
G. Muscles

30. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

31. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

32. What task do the enzymes contained in meat perform?
A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

33. How does poultry meat differ from the meat of other animals?
A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

34. What are the classifications of meat in meat processing enterprises based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

35. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. * At the same place
B. Meat enterprises
V. In the slaughterhouse
G. In the slaughterhouse

36. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

37. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of the masticatory muscles
B. On the muscles of the tongue
G. On the skin

38. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

39. What changes are detected on the carcass with anthrax?
A. * Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes
40. Which organ of cattle is most damaged in tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

41. How does a person become infected with brucellosis?
A. * When in contact with sick animals and eating milk and dairy products taken from sick animals
B. Only when eating infected milk and dairy products
B. When eating goat's milk
G. When eating infected sausage

42. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is prepared from meat
G. Canned

43. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

44. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

45. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

46. Cases when forced slaughter of animals is prohibited:
A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
V. In infectious diseases
, In case of bone fracture

47. In which types of meat does tanning occur?
A. * In pork
B. Meat of cattle
B. In sick animals
G. With poisoning

48. The purpose of preserving meat:
A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes
B. For long-term storage
G. To increase the activity of enzymes

49. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

50. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

51. What are the causes of bombage?
A. * Physical, chemical and microbiological processes
B. Different physical influences
B. Chemical influences
G. Reproduction of microbes

52. In which canned food does chemical bombage occur more?
A. * In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

53. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

54. For what purposes is blood used?
A. * For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

55. Chemical composition of milk:
A. * Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements

56. Has it been fully studied how milk appears in the udder?
A. *Not studied
B. Studied
B. Partially studied
G. Studied in cattle

57. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?
A. *400-500 l
B. 400-450 L
V. 300-350 L
G . 200 l

58. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5%
G. 7 %

59. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%

60. What factors influence the physico-chemical properties of milk?
A. *Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

61. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
V. 1,026-1,027
G. 1,028-1,034

62. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

63. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. * 1,027
B. 1,028
V. 1,030
G. 1,025

64. To determine the fat content of milk, what is the density of sulfuric acid?
A. * 1.81-1.82
B. 1.30-1.31
B. 1.60-1.65
G. 1.50-1.55

65. How many ml of milk is needed to determine the fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

66. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
g. 0.810-0.820

67. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes

68. By what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

69. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

70. What methods are used to test milk and dairy products in the markets?
A. *Organoleptic and laboratory
B. Microbiological
B. Laboratory
G. Organoleptic

71. How are taste abilities determined?
A. * Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

72. What methods determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods
B. Organoleptic
B. Laboratory methods
G. By touch

73. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis
B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

74. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

75. What colors are used for bacterioscopic studies?
A. *Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

76. In what cases is a bacteriological study carried out?

A. * For infectious diseases
B. For invasive diseases
B. For poisoning
G. For the death of an animal

77. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

78. What methods are used to check the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

79. What methods are potatoes tested by?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical

80. What methods are carrots tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

81. What methods are starch tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

82. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

83. What methods are melon tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

84. Are there microbes in honey?
A. *No
B. Available
B. Partially available
G. There are salmonella

85. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter
V. Macro Michaelis
G. Micro Michaelis

86. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible
B. Partially possible
G. Not at all possible

87. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, microbiology
B. Therapy, hygiene
G. Surgery, Zoology

88. The purpose of studying the subject of VSE?
A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

89. Are there fat globules in milk?
A. * Are there

B. No there
are B. There are partially
G. Not at all

90. Are plant products checked for the presence of nitrites?
A. *Are they checked
B. Are not checked
B. In doubt are checked
D . Partially checked

91. From what composition of milk is the fat content of milk determined?
A. * From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

92. What is the significance of amino acids in meat?
A. *Participates in biochemical processes in tissue cells
B. Manage metabolism
B. Improves salt metabolism
G. Does not participate in any process

93. Are dried fruits checked in the markets?
A. *Are they checked
B. Not checked
B. Partially checked
G. Checked if freshness is suspected

94. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long-term aging
B. To determine the viscosity of sausages
G. To determine the quality of sausage

95. Are animals fed when kept in slaughterhouses?
A. *No, they are kept hungry
B. They are fattened
B. Only sick animals are fed
D. Not allowed

96. In which part of the carrot are nitrites dropped?
A. * Carrot trunk
B. Carrot bark
B. In the separated surface
G. In the root of carrots

97. In which part of the cabbage are nitrites dropped?
A. * The trunk of cabbage
B. The bark of cabbage
B. In the surface
G. In the root of cabbage

98. Is honey collected from cotton flowers?
A. * Collected
B. Not collected
B. Collected only from the first flowers
of G. Can be obtained after processing cotton

99. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of protein, it is possible
B. After separation of serum, it is possible
D. After the separation of red blood cells , you can

100. What methods are used to test fruits?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

101. How much percentage is discounted for the second half of pregnancy?
A. *10%
B. 5%
B. 8 %
G. 12 %

102. After how many days is the slaughter of animals vaccinated against anthrax allowed?
A. *14-15
B. 5-10

Q. 12-15
G. 15-20

103. With the help of what reaction Is the species of animal meat determined?
A. *Precipitation
B. Cooking test
B. Formal test
G. Neutralization reaction

104. How many categories of primary animal processing enterprises are there?
A. *6
B. 4
V. 2
G. 3

105. How many ways are there to stun animals?
A. *5
B. 2
V. 3
G. 4

106. What is the Wolfers knife used for?
A. * For obtaining sterilized blood and preparing food products
B. For obtaining blood
B. For obtaining sterilized blood
G. For exsanguination

107. After how many minutes does nutrovka begin?
A. *30
B. 60
V. 45
G. 15

108. How many ways are there to process a pig's body?
A. *3
B. 2
V. 4
G. 1

109. How many methods are used to exsanguinate birds?
A. *2
B. 1
V. 3
G. 4

110. The concept of the word meat in veterinary and sanitary examination?
A. *The separated part from the skin, the tips of the limbs, from the head
B. Muscle tissue
B. Separated part from skin
G. Separated part from skin, and head

111. Which organs should be examined regularly?
A. *Head, liver, spleen, kidneys, stomach, intestines, mammary glands
B. Liver and lungs
B. Liver and body
G. Liver, lungs, spleen, kidneys

112. What role do lymph nodes play?
A. *Biological filter
B. Cleanses the body
B. Removes toxins
G. Disinfects the causative agent of infectious diseases

113. What changes occur in meat with anthrax?
a. * Poorly exsanguinated, there is no rigor mortis and slightly bends in the joints
B. Unchanged
B. Partial change
G. Well exsanguinated

114. What changes are visible in the spleen with anthrax?
A. * The organ is enlarged two or three times and crushed
B. Unchanged
B. Partially enlarged
G. It will be enlarged and crushed

115. What diseases should be differentiated from when diagnosing anthrax?
A. *Emkar, pasteurellosis, pyroplasmosis
B. Plague and smallpox
V. Pulmonary tuberculosis

G. Blood diseases

116. Which of the following agricultural slaughter animals are infected with trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Sheep, goats

117. Which organs of birds are most affected by tuberculosis?
A. * Liver
B. Lung
B. Intestine
G. Spleen

118. Sanitary assessment of poultry meat in salmonellosis?
A. *The meat is boiled
B. Meat and internal organs are disposed
of B. Meat is not cooked
G. Meat bacteriological is checked

119. Is it a tan?
A. * Change in the color and smell of meat
B. Microbial contamination of meat
B. Meat rot
G. Slime

120. What kind of animal meat is "tan"?
A. * Pork
B. Sick
V. Poisoned
G. Tired

121. What causes meat to turn yellow?
A. * For food poisoning and parasitic diseases
B. For invasive diseases
B. For infectious diseases
G. In case of poisoning

122. What determines the fat density obtained from animals?
A. *From saturated fatty acids
B. From tri glycerin
B. From unsaturated fatty acids
G. From saturated and unsaturated fatty acids

123. What percentage of protein is contained in fish meat?
A. *26
B. 2
B. 3
G. 10

124. What percentage of carbohydrates is contained in fish meat?
A. * 0.003
B. 1
B. 2
G. 0.5

125. Types of smoked fish?
A. *2
B. 3
V. 1
G. 4

126. Is it possible to eat fish meat with furunculosis?
A. *Can be used as feed for pigs after cooking.
B. Can
be B. Canned
G. Can be after smoking

127. What elements does the composition of milk consist of?
A. * From, proteins, fats, vitamins, sugar
B. From complex substances
B. From salts
G. From enzymes, mineral salts and trace elements

128. What is the percentage of dry matter in cow's milk?
A. *12.5
B. 5
V. 7
G. 7.5

129. What should be the average density of cow's milk?
A. *1,027 - 1,033
B. 1,022 - 1,023
B. 1,024 -1.025
G. 1,026 -1.027

130. Which protein is the main protein in milk?
A. *Casein
B. Albumin
V. Globulin
G. Albulin, globulin

131. What is the percentage of albumin in milk?
A. * 0.4-0.5
B. 0.1
V. 0.2
G 0.3

132. At what degree is albumin denatured when milk is heated?
A. *80
B. 50
V. 60
G. 70

133. What is the fat content of kefir?
A. *3.2
B. 1
V. 2
G. 2.5

134. What animal's milk is used to make koumiss?
A. *Mare
B. Camel
V. Goat
G. Sheep

135. What method was used for the examination of butter on the market?
A. *Organoleptically
B. Laboratory
V. Chemical-toxic
G. Microbiological

136. How many parts are in the egg?
A. *3
B. 1
B. 2
G. 4

137. By what method are carcasses checked at the farmer's market?
A. *Organoleptic
B. Biochemical
V. Laboratory
G. Bacterioscopic

138. In which organ do echinococcal vesicles occur most often?
A. * In the liver
B. In the lungs
B. In the brain
G. In the spleen

139. How does a person become infected with echinococcosis?
A. * When in contact with a dog
B. When eating meat
B. When eating lungs
G. When eating the spleen

140. What is detected by the ionomer?
A. * Nitrates
B. Alkali
V. Sugar
G. Honey

141. How many ml should the cylinder be to determine the density of milk?
A. * 200 - 250
B. 200 – 300
V. 400 – 500
G. 500 – 600

142. In the body of which animal, 3-4 cm of skin is left on one of the hind limbs?
A. *Rabbit
B. Pig
V. Deer
G. Cattle

143. Is malleination carried out before the slaughter of horses?
A. *Conducted
B. Not carried
out B. Partially carried out
D . Is performed under suspicion

144. When the skin of animals is poorly separated?
A. * When losing weight
B. When poisoning
B. When phosphorus poisoning
G. When the disease

145. Duration of salting during dry salting of meat?
A. *20 days
B. 30 days
B. 15 days
G. 17 days

146. Sanitary assessment of meat during "tanning"?
A. * Cut into small pieces and ventilate
B. Dispose
of B. Freeze
G. Boil

147. What is the purpose of preserving meat?
A. * Reduce tissue intensity by limiting the growth of microorganisms
B. Long-term storage
B. Destruction of microbes
G. Reduces the growth of microorganisms

148. How many ways to smoke meat?
A. *2
B. 3
V. 1
G. 4

149. What should be the temperature for cold smoking?
A. * 18-22
B. 20-25
Q. 25-30
G. 30-35

150. What is used for honey sampling?
A. *Shup
B. Spoon
V. Fork
G. Special tube

151. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

152. How many percent is the yield of cattle meat?
A. * 58-65%
B. 50-60%
B. 65-70%
G. 40-50%

153. How to determine the fatness of slaughter cattle?
A. * By appearance and touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

154. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

155. What category of fatness are pigs divided into according to state standards?

A. *5
B. 6
V. 4
G. 3

156. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

157. What means are used to transport slaughtered animals to the meat industry?
A. * Railway, air and water transport
B. By car, railway (in wagons)
B. Are driven along highways or roads
G. By cars

158. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

159. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature increase, temperature decrease, noise
B. Temperature increase
B. Temperature reduction
G. Noise

160. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
B. Sheep
G. Horses

161. Clinical changes caused by stress:
A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of mucous membranes
B. Changes in blood composition
D. Increase in body temperature

162. What types of products do meat factories produce?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

163. How many percent of animals can the quarantine department of the meat enterprise accommodate
A. *10%
B. 8%
B. 6%
G. 4%

164. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

165. How many liters of water per day is consumed for keeping cattle per day at a meat processing plant?
A. *60 l
B. 50 l
B. 80 l
G . 100 l

166. Which objects are included in the primary processing enterprises?
A. *Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
B. Slaughterhouses
G. Slaughterhouses

167. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

168. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%

B. 12%
B. 15%
of G. 8%

169. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

170. What should be considered when checking cattle?
A. *Temperature, general condition, fluid leakage from natural openings, condition of external mucous membranes, udder condition
B. Respiration, palpitation
B. In general condition
G. Palpitation

171. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In case of doubt

172. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

173. Where is the slaughter of animals without clinical signs when a rabid dog is bitten?
A. * On a farm
B. In meat enterprises
V. In a slaughterhouse
G. Outside the farm

174. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
B. It is possible after examination by a veterinarian
G. Partially possible

175. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

176. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass without skin, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin

177. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

178. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

179. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscles and fat
G. Muscles

180. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

181. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %

B. 21-22 %
G. 22-24 %

182. What task do the enzymes contained in meat perform?
A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

183. How does poultry meat differ from meat of other animals?
A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

184. What are the classifications of meat in meat processing enterprises based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

185. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. * At the same place
B. Meat enterprises
B. In the slaughterhouse
G. In the slaughterhouse

186. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

187. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of masticatory muscles
B. For the muscles of the tongue
G. For the skin

188. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

189. What changes are detected on carcasses with anthrax?
A. * Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

190. Which organ of cattle is most damaged by tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

191. How does a person become infected with brucellosis?
A. * When contacting sick animals and using milk and dairy products taken from sick animals
B. Only when using infected milk and dairy products
B. When using goat's milk
G. When using infected sausage

192. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is prepared from meat
G. Canned

193. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

194. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis

B. Alveococcosis
G. Trichinosis

195. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

196. Cases when forced slaughter of animals is prohibited:
A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
V. In infectious diseases
, In case of bone fracture

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A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes
B. For long-term storage
G. To increase the activity of enzymes

199. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

200. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

Tests for 2 pcs (200 pcs.)

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B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

50. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

51. What are the causes of bombage?
A. * Physical, chemical and microbiological processes
B. Different physical influences
B. Chemical influences
G. Reproduction of microbes

52. In which canned food does chemical bombage occur more?
A. * In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

53. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

54. For what purposes is blood used?
A. * For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

55. Chemical composition of milk:
A. * Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements

56. Has it been fully studied how milk appears in the udder?
A. *Not studied

Studied
V. Partially studied
G. Studied in cattle

57. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?

A. *400-500 l
B. 400-450 L
V. 300-350 L
G . 200 l

58. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5%
G. 7 %

59. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%

60. What factors influence the physico-chemical properties of milk?
A. * Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

61. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
V. 1,026-1,027
G. 1,028-1,034

62. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

63. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. * 1,027
B. 1,028
V. 1,030
G. 1,025

64. To determine the fat content of milk, what is the density of sulfuric acid?
A. *1.81-1.82
B. 1.30-1.31
V. 1.60-1.65
g. 1.50-1.55

65. How many ml of milk is needed to determine the fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

66. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
g. 0.810-0.820

67. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes

68. By what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

69. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

70. What methods are used to test milk and dairy products in the markets?
A. *Organoleptic and laboratory

B. Microbiological
B. Laboratory
G. Organoleptic

71. How are taste abilities determined?
A. * Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

72. What methods determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods
B. Organoleptic
B. Laboratory methods
G. By touch

73. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis
B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

74. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

75. What colors are used for bacterioscopic studies?
A. * Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

76. In which cases is a bacteriological study carried out?
A. *With infectious diseases
B. With invasive diseases
B. With poisoning
G. With the death of an animal

77. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

78. What methods are used to check the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

79. What methods are potatoes tested by?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical
80. What methods are carrots tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

81. What methods are starch tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

82. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

83. What methods are melon tested?
A. *Organoleptic
B. Laboratory
B. Biochemical

G. Bacteriological

84. Are there microbes in honey?
A. *No
B. Available
B. There is a partial
G. There are salmonella

85. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter
V. Macro Michaelis
G. Micro Michaelis

86. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible
B. Partially possible
G. Not at all possible

87. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, Microbiology
B. Therapy, hygiene
G. Surgery, Zoology

88. The purpose of studying the subject of VSE?
A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

89. Are there fat globules in milk?
A. * Are there
B. No there
are B. There are partially
G. Not at all

90. Are plant products checked for the presence of nitrites?
A. *Are they checked
B. Are not checked
B. In case of doubt are checked
G. Partially checked

91. From what composition of milk is the fat content of milk determined?
A. *From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

92. What is the significance of amino acids in meat?
A. *Participates in biochemical processes in tissue cells
B. Control metabolism
B. Improves salt metabolism
G. Does not participate in any process

93. Are dried fruits checked in the markets?
A. *Are they checked
B. Not checked
B. Partially checked
G. Checked if freshness is suspected

94. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long-term aging
B. To determine the viscosity of sausages
D. To determine the quality of the sausage

95. Are animals fed when kept in slaughterhouses?
A. * No, they are kept hungry
B. They are fattened
up B. Only sick animals are fed
G. It is not allowed

96. In which part of the carrot are nitrites dropped?
A. * Carrot trunk
B. Carrot bark
B. In the separated surface
G. In the root of carrots

97. In which part of the cabbage are nitrites dropped?
A. * The trunk of cabbage
B. The bark of cabbage
B. In the surface
G. In the root of cabbage

98. Do they collect honey from cotton flowers?
A. * Collect
B. Do not collect
B. Collect only from the first flowers
G. Can be obtained after processing cotton

99. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of proteins, it is possible
B. After separation of serum, it is possible
G. After separation of erythrocytes, it is possible

100. What methods are used to test fruits?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

101. What are the causes of the bombing?
A. * Physical, chemical and microbiological processes
B. Different physical influences
B. Chemical influences
G. Reproduction of microbes

102. In which canned foods is chemical bombing more common?
A. *In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

103. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

104. For what purposes is blood used?
A. * For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

105. Chemical composition of milk:
A. *Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements
106. Has it been fully studied how milk appears in the udder?
A. *Not studied
B. Studied
B. Partially studied
G. Studied in cattle

107. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?
A. *400-500 l
B. 400-450 L
V. 300-350 L
G . 200 l

108. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5 %
G. 7 %

109. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%

110. What factors influence the physico-chemical properties of milk?

A. *Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

111. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
V. 1,026-1,027
G. 1,028-1,034

112. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

113. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. * 1,027
B. 1,028
V. 1,030
G. 1,025

114. To determine the fat content of milk, what is the density of sulfuric acid?
A. * 1.81-1.82
B. 1.30-1.31
B. 1.60-1.65
G. 1.50-1.55

115. How many ml of milk is needed to determine the fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

116. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
g. 0.810-0.820

117. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes

118. According to what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

119. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

120. What methods are milk and dairy products tested on the markets?
A. *Organoleptic and laboratory
B. Microbiological
B. Laboratory
G. Organoleptic

121. How are taste abilities determined?
A. *Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

122. What methods determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods
B. Organoleptic
B. Laboratory methods
G. By touch

123. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis

B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

124. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

125. What colors are used for bacterioscopic studies?
A. *Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

126. In what cases is a bacteriological study carried out?
A. * For infectious diseases
B. For invasive diseases
B. For poisoning
G. For the death of an animal

127. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

128. What methods are used to check the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

129. What methods are potatoes tested by?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical

130. What methods are used to test carrots?
A. * Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

131. What methods are starch tested by?
a * Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

132. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

133. What methods are used to check the melon?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

134. Are there microbes in honey?
A. *No
B. Available
B. Partially available
G. There are salmonella

135. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter
V. Macro Michaelis
G. Micro Michaelis

136. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible

B. Partially possible
G. Not at all possible

137. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, microbiology
B. Therapy, hygiene
G. Surgery, Zoology

138. The purpose of studying the subject of VSE?
A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

139. Are there fat globules in milk?
A. * Are there
B. No there
are B. There are partially
G. Not at all

140. Are plant products checked for the presence of nitrites?
A. * Are they checked
B. Are not checked
B. In doubt are checked
D . Partially checked

141. From what composition of milk is the fat content of milk determined?
A. * From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

142. What is the significance of amino acids in meat?
A. *Participates in biochemical processes in tissue cells
B. Control metabolism
B. Improves salt metabolism
G. Does not participate in any process

143. Are dried fruits checked in the markets?
A. *Are they checked
B. Not checked
B. Partially checked
G. Checked if freshness is suspected

144. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long-lasting aging
B. To determine the viscosity of sausages
G. To determine the quality of sausage
145. Are animals fed when kept in slaughterhouses?
A. * No, they are kept hungry
B. They are fattened
up B. Only sick animals are fed
G. It is not allowed

146. In which part of the carrot are nitrites dropped?
A. * Carrot trunk
B. Carrot bark
B. In the separated surface
G. In the root of carrots

147. In which part of the cabbage are nitrites dropped?
A. * The trunk of cabbage
B. The bark of cabbage
B. In the surface
G. In the root of cabbage

148. Is honey collected from cotton flowers?
A. * Collected
B. Not collected
B. Collected only from the first flowers
of G. Can be obtained after processing cotton

149. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of protein, it is possible
B. After separation of serum, it is possible
G. After separation of erythrocytes, it is possible

150. By what methods are fruits tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

151. How much percentage is discounted for the second half of pregnancy?
A. *10%
B. 5%
B. 8 %
G. 12 %

152. After how many days is the slaughter of animals vaccinated against anthrax allowed?
A. *14-15
B. 5-10
Q. 12-15
G. 15-20

153. By what reaction Is the species of animal meat determined?
A. *Precipitation
B. Cooking test
B. Formal test
G. Neutralization reaction

154. How many categories of primary animal processing enterprises are there?
A. *6
B. 4
V. 2
G. 3

155. How many ways are there to stun animals?
A. *5
B. 2
V. 3
G. 4

156. What is the Wolfers knife used for?
A. * For obtaining sterilized blood and preparing food products
B. For obtaining blood
B. For obtaining sterilized blood
G. For exsanguination

157. After how many minutes does nutrovka begin?
A. *30
B. 60
V. 45
G. 15

158. How many ways are there to process a pig's body?
A. *3
B. 2
V. 4
G. 1

159. How many methods are used to exsanguinate birds?
A. *2
B.1
V. 3
G. 4

160. The concept of the word meat in veterinary and sanitary examination?
A. *The separated part from the skin, the tips of the limbs, from the head
B. Muscle tissue
B. Separated part from skin
G. Separated part from skin, and head

161. Which organs should be examined regularly?
A. *Head, liver, spleen, kidneys, stomach, intestines, mammary glands
B. Liver and lungs
B. Liver and body
G. Liver, lungs, spleen, kidneys

162. What role do lymph nodes play?
A. * Biological filter
B. Cleanses the body
B. Removes toxins
G. Disinfects the causative agent of infectious diseases

163. What changes occur in meat with anthrax?
a. * Poorly exsanguinated, there is no rigor mortis and slightly bends in the joints
B. Unchanged
B. Partial change
G. Well exsanguinated

164. What changes are visible in the spleen with anthrax?
A. * The organ is enlarged two or three times and crushed
B. Unchanged
B. Partially enlarged
G. It will be enlarged and crushed

165. From which diseases should be differentiated in the diagnosis of anthrax?
A. *Emcar, pasteurellosis, pyroplasmosis
B. Plague and smallpox
B. Pulmonary tuberculosis
G. Blood diseases

166. Which of the following agricultural slaughter animals are infected with trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Sheep, goats

167. Which organs of birds are most affected by tuberculosis?
A. * Liver
B. Lung
B. Intestine
G. Spleen

168. Sanitary assessment of poultry meat in salmonellosis?
A. *The meat is boiled
B. Meat and internal organs are disposed
of B. Meat is not cooked
G. Meat bacteriological is checked

169. Is a tan?
A. * Change in the color and smell of meat
B. Microbial contamination of meat
B. Meat rot
G. Slime

170. The meat of which animals is "tan"?
A. * Pork
B. Sick
V. Poisoned
G. Tired

171. Why does meat turn yellow?
A. * In food poisoning and parasitic diseases
B. In invasive diseases
B. In infectious diseases
G. In case of poisoning

172. What determines the fat density obtained from animals?
A. *From saturated fatty acids
B. From tri glycerin
B. From unsaturated fatty acids
G. From saturated and unsaturated fatty acids

173. What percentage of protein is contained in fish meat?
A. *26
B. 2
B. 3
G. 10

174. What percentage of carbohydrates is contained in fish meat?
A. * 0.003
B. 1
B. 2
G. 0.5

175. Types of smoked fish?
A. *2
B. 3
V. 1
G. 4

176. Is it possible to eat fish meat with furunculosis?

A. *Can be used as feed for pigs after cooking.
B. Can
be canned.
G. It is possible after smoking

177. What elements does the composition of milk consist of?
A. * From, proteins, fats, vitamins, sugar
B. From complex substances
B. From salts
G. From enzymes, mineral salts and trace elements

178. What is the percentage of dry matter in cow's milk?
A. *12.5
B. 5
V. 7
G. 7.5

179. What should be the average density of cow's milk?
A. *1,027 - 1,033
B. 1,022 - 1,023
B. 1,024 -1.025
G. 1,026 -1.027

180. Which protein is the main protein in milk?
A. *Casein
B. Albumin
V. Globulin
G. Albulin, globulin

181. What is the percentage of albumin in milk?
A. * 0.4-0.5
B. 0.1
V. 0.2
G 0.3

182. At what degree is albumin denatured when milk is heated?
A. *80
B. 50
V. 60
G. 70

183. What is the fat content of kefir?
A. *3.2
B. 1
V. 2
G. 2.5

184. What animal's milk is used to make koumiss?
A. *Mare
B. Camel
V. Goat
G. Sheep

185. What method was used for the examination of butter on the market?
A. *Organoleptically
B. Laboratory
V. Chemical-toxic
G. Microbiological

186. How many parts are in the egg?
A. *3
B. 1
B. 2
G. 4

187. By what method are carcasses checked at the farmer's market?
A. *Organoleptic
B. Biochemical
V. Laboratory
G. Bacterioscopic

188. In which organ do echinococcal vesicles occur most often?
A. * In the liver
B. In the lungs
B. In the brain
G. In the spleen

189. How does a person become infected with echinococcosis?
A. * When in contact with a dog

B. When eating meat
B. When eating lungs
G. When eating the spleen

190. What is detected by the ionomer?
A. * Nitrates
B. Alkali
V. Sugar
G. Honey

191. How many ml should a cylinder be in order to determine the density of milk?
A. *200 - 250
B. 200 – 300
V. 400 – 500
G. 500 – 600

192. In the body of which animal is 3-4 cm of skin left on one of the hind limbs?
A. *Rabbit
B. Pig
V. Deer
G. Cattle

193. Is malleination carried out before the slaughter of horses?
A. *Conducted
B. Not carried
out B. Partially carried out
D . Is performed under suspicion

194. When the skin of animals is poorly separated?
A. * With weight
loss B. With poisoning
B. With phosphorus poisoning
G. With disease

195. Duration of salting during dry salting of meat?
A. *20 days
B. 30 days
B. 15 days
G. 17 days

196. Sanitary assessment of meat with a "tan"?
A. * Cut into small pieces and ventilated
B. Disposed
of B. Frozen
G. Boiled

197. What is the purpose of preserving meat?
A. * Reduce tissue intensity by limiting the growth of microorganisms
B. Long-term storage
B. Destruction of microbes
G. Reduces the growth of microorganisms
198. How many ways to smoke meat?
A. *2
B. 3
V. 1
G. 4

199. What should be the temperature for cold smoking?
A. *18-22
B. 20-25
Q. 25-30
G. 30-35

200. What is used for honey sampling?
A. *Shup
B. Spoon
V. Fork
G. Special tube

Tests for IR (500 pcs.)

1. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

2. How many percent is the yield of cattle meat?
A. *58-65%
B. 50-60%
B. 65-70%
G. 40-50%

3. How to determine the fatness of slaughter cattle?
A. * By appearance and touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

4. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

5. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

6. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

7. What are the means used to transport slaughtered animals to the meat industry?
A. * Rail, air and water transport
B. By car, railway (in wagons)
B. Driven along highways or roads
G. By cars

8. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

9. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature rise, temperature decrease, noise
B. Temperature rise
B. Temperature reduction
G. Noise

10. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
B. Sheep
G. Horses

11. Clinical changes caused by stress:
A. * Increased body temperature, the appearance of black spots on the skin
B. Redness of the mucous membranes
B. Changes in blood composition
D. Increase in body temperature

12. What types of products do meat processing plants produce?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

13. How many percent of animals can the quarantine department of the meat enterprise
A. *10%
B. 8%
B. 6%

G. 4 accommodate%

14. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

15. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. * 60 l
B. 50 l
B. 80 l
G . 100 l

16. Which objects are included in the primary processing enterprises?
A. *Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
B. Slaughterhouses
G. Slaughterhouses

17. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

18. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%

19. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

20. What should be taken into account when checking cattle?
A. * Temperature, general condition, leakage of fluid from natural openings, condition of external mucous membranes, udder condition
B. Respiration, palpitation
B. In general condition
G. Palpitation

21. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In doubt

22. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

23. Where is the slaughter of animals without clinical signs when bitten by a rabid dog?
A. * On a farm
B. In meat enterprises
B. In a slaughterhouse
G. Outside the farm

24. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
B. It is possible after examination by a veterinarian
G. Partially possible

25. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

26. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass is skinless, the tips of the legs, head and internal organs
B. The rest of the carcass is skinless and headless
B. Muscle and bone
G. The rest of the skin

27. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

28. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, sex, nutrition
G. Age, gender

29. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscles and fat
G. Muscles

30. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

31. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

32. What task do the enzymes contained in meat perform?
A. *Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses it to determine the freshness of meat
G. Meat matures

33. How does poultry meat differ from the meat of other animals?
A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

34. What are the classifications of meat in meat processing enterprises based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

35. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. *At the same place
B. Meat enterprises
V. In the slaughterhouse
G. In the slaughterhouse

36. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

37. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of the masticatory muscles
B. On the muscles of the tongue
G. On the skin

38. What should I pay attention to when examining the carcass?
A. * On the degree of exsanguination
B. On subcutaneous tissue
B. On the lymph nodes
G. Not the fat layer

39. What changes are detected on carcasses with anthrax?
A. * Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

40. Which organ of cattle is most damaged in tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

41. How does a person become infected with brucellosis?
A. * When in contact with sick animals and eating milk and dairy products taken from sick animals
B. Only when eating infected milk and dairy products
B. When eating goat's milk
G. When eating infected sausage

42. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is prepared from meat
G. Canned

43. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

44. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

45. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

46. Cases when forced slaughter of animals is prohibited:
A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
V. In infectious diseases
, In case of bone fracture

47. In which types of meat does tanning occur?
A. * In pork
B. Meat of cattle
B. In sick animals
G. With poisoning

48. The purpose of preserving meat:
A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes
B. For long-term storage
G. To increase the activity of enzymes

49. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

50. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

51. What are the causes of bombage?
A. * Physical, chemical and microbiological processes
B. Different physical influences

B. Chemical influences
G. Reproduction of microbes

52. In which canned food does chemical bombage occur more?
A. * In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

53. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

54. For what purposes is blood used?
A. * For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

55. Chemical composition of milk:
A. * Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements

56. Has it been fully studied how milk appears in the udder?
A. *Not studied
B. Studied
B. Partially studied
G. Studied in cattle

57. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?
A. *400-500 l
B. 400-450 L
V. 300-350 L
G . 200 l

58. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5%
G. 7 %

59. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%

60. What factors influence the physico-chemical properties of milk?
A. *Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

61. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
V. 1,026-1,027
G. 1,028-1,034

62. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

63. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. * 1,027
B. 1,028
V. 1,030
G. 1,025

64. To determine the fat content of milk, what is the density of sulfuric acid?
A. * 1.81-1.82
B. 1.30-1.31
B. 1.60-1.65

G. 1.50-1.55

65. How many ml of milk is needed to determine the fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

66. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
g. 0.810-0.820

67. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes

68. By what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

69. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

70. What methods are used to test milk and dairy products in the markets?
A. *Organoleptic and laboratory
B. Microbiological
B. Laboratory
G. Organoleptic

71. How are taste abilities determined?
A. * Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

72. What methods determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods
B. Organoleptic
B. Laboratory methods
G. By touch

73. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis
B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

74. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

75. What colors are used for bacterioscopic studies?
A. *Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

76. In what cases is a bacteriological study carried out?
A. * For infectious diseases
B. For invasive diseases
B. For poisoning
G. For the death of an animal

77. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

78. What methods are used to check the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

79. What methods are potatoes tested by?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical

80. What methods are carrots tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

81. What methods are starch tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

82. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

83. What methods are melon tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

84. Are there microbes in honey?
A. *No
B. Available
B. Partially available
G. There are salmonella

85. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter
V. Macro Michaelis
G. Micro Michaelis

86. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible
B. Partially possible
G. Not at all possible

87. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, microbiology
B. Therapy, hygiene
G. Surgery, Zoology

88. The purpose of studying the subject of VSE?
A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

89. Are there fat globules in milk?
A. * Are there
B. No there
are B. There are partially
G. Not at all

90. Are plant products checked for the presence of nitrites?
A. *Are they checked
B. Are not checked
B. In doubt are checked
D . Partially checked

91. From what composition of milk is the fat content of milk determined?
A. * From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

92. What is the significance of amino acids in meat?
A. *Participates in biochemical processes in tissue cells
B. Control metabolism
B. Improves salt metabolism
G. Does not participate in any process

93. Are dried fruits checked in the markets?
A. *Are they checked
B. Not checked
B. Partially checked
G. Checked if freshness is suspected

94. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long-term aging
B. To determine the viscosity of sausages
G. To determine the quality of sausage

95. Are animals fed when kept in slaughterhouses?
A. * No, they are kept hungry
B. They are fattened
up B. Only sick animals are fed
G. It is not allowed

96. In which part of the carrot are nitrites dropped?
A. * Carrot trunk
B. Carrot bark
V. In the separated surface
G. In the root of carrots

97. In which part of the cabbage are nitrites dropped?
A. * The trunk of cabbage
B. The bark of cabbage
B. In the surface
G. In the root of cabbage

98. Is honey collected from cotton flowers?
A. * Collected
B. Not collected
B. Collected only from the first flowers
of G. Can be obtained after processing cotton

99. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of proteins, it is possible
B. After separation of serum, it is possible
G. After separation of erythrocytes, it is possible

100. What methods are fruits tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

101. How much percentage is discounted for the second half of pregnancy?
A. *10%
B. 5%
B. 8 %
G. 12 %

102. After how many days is the slaughter of animals vaccinated against anthrax allowed?
A. *14-15
B. 5-10
Q. 12-15
G. 15-20

103. With the help of what reaction Is the species of animal meat determined?
A. *Precipitation
B. Cooking test
B. Formal test
G. Neutralization reaction

104. How many categories of primary animal processing enterprises are there?

A. *6
B. 4
V. 2
G. 3

105. How many ways are there to stun animals?
A. *5
B. 2
V. 3
G. 4

106. What is the Wolfers knife used for?
A. * For obtaining sterilized blood and preparing food products
B. For obtaining blood
B. For obtaining sterilized blood
G. For exsanguination

107. After how many minutes does nutrovka begin?
A. *30
B. 60
V. 45
G. 15

108. How many ways are there to process a pig's body?
A. *3
B. 2
V. 4
G. 1

109. How many methods are used to exsanguinate birds?
A. *2
B. 1
V. 3
G. 4

110. The concept of the word meat in veterinary and sanitary examination?
A. *The separated part from the skin, the tips of the limbs, from the head
B. Muscle tissue
B. Separated part from skin
G. Separated part from skin, and head

111. Which organs should be examined regularly?
A. *Head, liver, spleen, kidneys, stomach, intestines, mammary glands
B. Liver and lungs
B. Liver and body
G. Liver, lungs, spleen, kidneys

112. What role do lymph nodes play?
A. * Biological filter
B. Cleanses the body
B. Removes toxins
G. Disinfects the causative agent of infectious diseases

113. What changes occur in meat with anthrax?
a. * Poorly exsanguinated, there is no rigor mortis and slightly bends in the joints
B. Unchanged
B. Partial change
G. Well exsanguinated

114. What changes are visible in the spleen with anthrax?
A. * The organ is enlarged two or three times and crushed
B. Unchanged
B. Partially enlarged
G. It will be enlarged and crushed

115. From which diseases should be differentiated in the diagnosis of anthrax?
A. *Emcar, pasteurellosis, pyroplasmosis
B. Plague and smallpox
B. Pulmonary tuberculosis
G. Blood diseases

116. Which of the following agricultural slaughter animals are infected with trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Sheep, goats

117. Which organs of birds are most affected by tuberculosis?
A. * Liver

B. Lung
B. Intestine
G. Spleen

118. Sanitary assessment of poultry meat in salmonellosis?
A. *The meat is boiled
B. Meat and internal organs are disposed
of B. Meat is not cooked
G. Meat bacteriological is checked

119. Is it a tan?
A. * Change in the color and smell of meat
B. Microbial contamination of meat
B. Meat rot
G. Slime

120. What kind of animal meat is "tan"?
A. * Pork
B. Sick
V. Poisoned
G. Tired

121. What causes meat to turn yellow?
A. * For food poisoning and parasitic diseases
B. For invasive diseases
B. For infectious diseases
G. In case of poisoning

122. What determines the fat density obtained from animals?
A. *From saturated fatty acids
B. From tri glycerin
B. From unsaturated fatty acids
G. From saturated and unsaturated fatty acids

123. What percentage of protein is contained in fish meat?
A. *26
B. 2
B. 3
G. 10

124. What percentage of carbohydrates is contained in fish meat?
A. * 0.003
B. 1
B. 2
G. 0.5

125. Types of smoked fish?
A. *2
B. 3
V. 1
G. 4

126. Is it possible to eat fish meat with furunculosis?
A. *Can be used as feed for pigs after cooking.
B. Can
be B. Canned
G. Can be after smoking

127. What elements does the composition of milk consist of?
A. * From, proteins, fats, vitamins, sugar
B. From complex substances
B. From salts
G. From enzymes, mineral salts and trace elements

128. What is the percentage of dry matter in cow's milk?
A. *12.5
B. 5
V. 7
G. 7.5

129. What should be the average density of cow's milk?
A. *1,027 - 1,033
B. 1,022 - 1,023
B. 1,024 -1.025
G. 1,026 -1.027

130. Which protein is the main protein in milk?
A. *Casein
B. Albumin

V. Globulin
G. Albulin, globulin

131. What is the percentage of albumin in milk?
A. * 0.4-0.5
B. 0.1
V. 0.2
G 0.3

132. At what degree is albumin denatured when milk is heated?
A. *80
B. 50
V. 60
G. 70

133. What is the fat content of kefir?
A. * 3.2
B. 1
V. 2
G. 2.5

134. Which animal's milk is used to make koumiss?
A. *Mare
B. Camel
V. Goat
G. Sheep

135. What method was used for the examination of butter on the market?
A. *Organoleptically
B. Laboratory
V. Chemical-toxic
G. Microbiological

136. How many parts are in the egg?
A. *3
B. 1
B. 2
G. 4

137. By what method are carcasses checked at the farmer's market?
A. *Organoleptic
B. Biochemical
V. Laboratory
G. Bacterioscopic

138. In which organ do echinococcal vesicles occur most often?
A. * In the liver
B. In the lungs
B. In the brain
G. In the spleen

139. How does a person get infected with echinococcosis?
A. *In contact with a dog
B. When eating meat
B. When eating lungs
G. When eating spleen

140. What is detected by the ionomer?
A. * Nitrates
B. Alkali
V. Sugar
G. Honey

141. How many ml should the cylinder be to determine the density of milk?
A. * 200 - 250
B. 200 – 300
V. 400 – 500
G. 500 – 600

142. In the body of which animal, 3-4 cm of skin is left on one of the hind limbs?
A. *Rabbit
B. Pig
V. Deer
G. Cattle

143. Is malleination carried out before the slaughter of horses?
A. *Conducted
B. Not carried
out B. Partially carried out

D . Is performed under suspicion

144. When the skin of animals is poorly separated?
A. * When losing weight
B. When poisoning
B. When phosphorus poisoning
G. When the disease

145. Duration of salting during dry salting of meat?
A. *20 days
B. 30 days
B. 15 days
G. 17 days

146. Sanitary assessment of meat during "tanning"?
A. * Cut into small pieces and ventilate
B. Dispose
of B. Freeze
G. Boil

147. What is the purpose of preserving meat?
A. *Reduce tissue intensity by limiting the growth of microorganisms
B. Long-term storage
B. Destruction of microbes
G. Reduces the growth of microorganisms

148. How many ways to smoke meat?
A. *2
B. 3
V. 1
G. 4

149. What should be the temperature for cold smoking?
A. * 18-22
B. 20-25
Q. 25-30
G. 30-35

150. What is used for honey sampling?
A. *Shup
B. Spoon
V. Fork
G. Special tube

151. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

152. How many percent is the yield of cattle meat?
A. * 58-65%
B. 50-60%
B. 65-70%
G. 40-50%

153. How to determine the fatness of slaughter cattle?
A. * By appearance and touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

154. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

155. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

156. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

157. What means are used to transport slaughtered animals to the meat industry?
A. * Railway, air and water transport
B. By car, railway (in wagons)
B. Are driven along highways or roads
G. By cars

158. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5
159. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature increase, temperature decrease, noise
B. Temperature increase
B. Temperature reduction
G. Noise

160. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
B. Sheep
G. Horses

161. Clinical changes caused by stress:
A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of mucous membranes
B. Changes in blood composition
D. Increase in body temperature

162. What types of products are produced by meat processing plants?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

163. How many percent of animals can the quarantine department of the meat enterprise accommodate
A. *10%
B. 8%
B. 6%
G. 4%

164. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

165. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. * 60 l
B. 50 l
B. 80 l
G . 100 l

166. Which objects are included in the primary processing enterprises?
A. *Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
B. Slaughterhouses
G. Slaughterhouses

167. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

168. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%

169. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

170. What should be taken into account when checking cattle?

A. * Temperature, general condition, leakage of fluid from natural openings, condition of external mucous membranes, udder condition
B. Respiration, palpitation
B. In general condition
G. Palpitation

171. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In case of doubt

172. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

173. Where is the slaughter of animals without clinical signs when bitten by a rabid dog?
A. * On a farm
B. In meat enterprises
B. In a slaughterhouse
G. Outside the farm

174. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
B. It is possible after examination by a veterinarian
G. Partially possible

175. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

176. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass is skinless, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin

177. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

178. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

179. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscle and fat
G. Muscles

180. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

181. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

182. What task do the enzymes contained in meat perform?
A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

183. How does poultry meat differ from meat of other animals?
A. *With a low amount of connective tissue

B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

184. What are the classifications of meat in meat processing enterprises based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

185. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. * At the same place
B. Meat enterprises
B. In the slaughterhouse
G. In the slaughterhouse

186. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

187. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of masticatory muscles
B. For the muscles of the tongue
G. For the skin

188. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

189. What changes are detected on carcasses with anthrax?
A. *Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

190. Which organ of cattle is most damaged by tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

191. How does a person become infected with brucellosis?
A. * When contacting sick animals and using milk and dairy products taken from sick animals
B. Only when using infected milk and dairy products
B. When using goat's milk
D. When eating infected sausage

192. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is prepared from meat
G. Canned

193. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

194. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

195. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

196. Cases when forced slaughter of animals is prohibited:

A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
V. In infectious diseases
, In case of bone fracture

197. In which types of meat does tanning occur?
A. * In pork
B. Meat of cattle
B. In sick animals
G. With poisoning

198. The purpose of preserving meat:
A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes
B. For long-term storage
G. To increase the activity of enzymes

199. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

200. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

201. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

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A. *58-65%
B. 50-60%
B. 65-70%
G. 40-50%

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A. * By appearance and by touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

204. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

205. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

206. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

207. What are the means used to transport slaughtered animals to the meat industry?
A. * Railway, air and water transport
B. By car, railway (in wagons)
B. Are driven along highways or roads
G. By cars

208. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

209. What stress factors affect animals during their transportation to meat processing plants?

A. * Temperature increase, temperature decrease, noise
B. Temperature increase
B. Temperature reduction
G. Noise

210. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
V. Sheep
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A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of mucous membranes
B. Changes in blood composition
D. Increase in body temperature

212. What types of products are produced by meat processing plants?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

213. How many percent of animals can accommodate the quarantine department of the meat enterprise
A. *10%
B. 8%
B. 6%
G. 4%

214. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

215. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. * 60 l
B. 50 l
B. 80 l
G . 100 l

216. Which objects are included in the primary processing enterprises?
A. * Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
V. Slaughterhouses
G. Slaughterhouses

217. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

218. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%

219. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

220. What should be taken into account when checking cattle?
A. * Temperature, general condition, leakage of fluid from natural openings, condition of external mucous membranes, udder condition
B. Breathing, heartbeat
B. In general condition
G. Palpitation

221. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In case of doubt

222. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15

B. 15-20
G. 20-30

223. Where is the slaughter of animals without clinical signs when a rabid dog is bitten?
A. * On the farm
B. In meat enterprises
V. In the slaughterhouse
G. Outside the farm

224. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
V. It is possible after the vet's examination
G. Partially possible

225. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

226. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass without skin, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin

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A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

228. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

229. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscles and fat
G. Muscles

230. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

231. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

232. What task do the enzymes contained in meat perform?
A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

233. How does poultry meat differ from the meat of other animals?
A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

234. What are the classifications of meat in meat processing enterprises based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

235. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. * At the same place
B. Meat enterprises
V. In the slaughterhouse

G. In the slaughterhouse

236. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

237. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of masticatory muscles
B. On the muscles of the tongue
G. On the skin

238. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

239. What changes are detected on carcasses with anthrax?
A. * Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

240. Which organ of cattle is most damaged in tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

241. How does a person become infected with brucellosis?
A. * When contacting sick animals and using milk and dairy products taken from sick animals
B. Only when using infected milk and dairy products
B. When using goat's milk
G. When using infected sausage

242. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is made from meat
G. Canned

243. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

244. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

245. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

246. Cases when forced slaughter of animals is prohibited:
A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
B. In infectious diseases
G. In bone fractures

247. In what types of meat does tanning occur?
A. * In pork
B. Meat of cattle
B. In sick animals
G. With poisoning

248. The purpose of preserving meat:
A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes

B. For long-term storage
G. To increase the activity of enzymes

249. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

250. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

251. What are the causes of bombage?
A. *Physical, chemical and microbiological processes
B. Various physical influences
B. Chemical influences
G. Reproduction of microbes

252. In which canned food chemical bombage is more common?
A. * In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

253. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

254. For what purposes is blood used?
A. *For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

255. Chemical composition of milk:
A. *Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements

256. Has it been fully studied how milk appears in the udder?
A. *Not studied
B. Studied
B. Partially studied
G. Studied in cattle

257. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?
A. *400-500 L
B. 400-450 l
B. 300-350 l
G . 200 l

258. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5 %
G. 7 %

259. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%

260. What factors influence the physico-chemical properties of milk?
A. * Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

261. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
V. 1,026-1,027

G. 1,028-1,034

262. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

263. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. *1,027
B. 1,028
V. 1,030
G. 1,025

264. To determine the fat content of milk, what is the density of sulfuric acid?
A. *1.81-1.82
B. 1.30-1.31
V. 1.60-1.65
g. 1.50-1.55

265. How many ml of milk is needed to determine fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

266. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
G. 0.810-0.820

267. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes
268. By what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

269. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

270. What methods are used to test milk and dairy products in the markets?
A. *Organoleptic and laboratory
B. Microbiological
B. Laboratory
G. Organoleptic

271. How are taste abilities determined?
A. * Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

272. What methods are used to determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods
B. Organoleptic
B. Laboratory methods
G. By touch

273. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis
B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

274. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

275. What colors are used for bacterioscopic studies?
A. *Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

276. In what cases is a bacteriological study carried out?
A. *For infectious diseases
B. For invasive diseases
B. For poisoning
G. For the death of an animal

277. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

278. What methods are used to check the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

279. What methods are used to check potatoes?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical

280. What methods are carrots tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

281. What methods are starch tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

282. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

283. By what methods is the melon tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

284. Are there microbes in honey?
A. *No
B. Available
B. Partially available
G. There are salmonella

285. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter
V. Macro Michaelis
G. Micro Michaelis

286. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible
B. Partially possible
G. Not at all possible

287. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, Microbiology
B. Therapy, hygiene
G. Surgery, Zoology

288. The purpose of studying the subject of VSE?

A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

289. Are there fat globules in milk?
A. *Are there
B. No there
are B. There are partially
G. Not at all

290. Are plant products checked for the presence of nitrites?
A. *Are they checked
B. Are not checked
B. In case of doubt are checked
G. Partially checked

291. From what composition of milk is the fat content of milk determined?
A. * From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

292. What is the significance of amino acids in meat?
A. *Participates in biochemical processes in tissue cells
B. Control metabolism
B. Improves salt metabolism
G. Does not participate in any process

293. Are dried fruits checked in the markets?
A. *Are they checked
B. Not checked
B. Partially checked
G. Checked if freshness is suspected

294. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long-lasting aging
B. To determine the viscosity of sausages
G. To determine the quality of sausage

295. Are animals fed when kept in slaughterhouses?
A. * No, they are kept hungry
B. They are fattened
up B. Only sick animals are fed
G. It is not allowed

296. In which part of the carrot are nitrites deposited?
A. *Carrot trunk
B. Carrot bark
B. In the separated surface
G. In the root of carrots

297. In which part of cabbage are nitrites buried?
A. *Cabbage trunk
B. Cabbage bark
B. In the surface
G. In the root of cabbage

298. Is honey collected from cotton flowers?
A. * Collected
B. Not collected
B. Collected only from the first flowers
of G. Can be obtained after processing cotton

299. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of proteins, it is possible
B. After separation of serum, it is possible
G. After separation of erythrocytes, it is possible

300. By what methods are fruits tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

301. How much percentage is discounted for the second half of pregnancy?
A. *10%

B. 5%
B. 8 %
G. 12 %

302. After how many days is the slaughter of animals vaccinated against anthrax allowed?
A. *14-15
B. 5-10
Q. 12-15
G. 15-20

303. By what reaction Is the species of animal meat determined?
A. *Precipitation
B. Cooking test
B. Formal test
G. Neutralization reaction

304. How many categories of primary animal processing enterprises are there?
A. *6
B. 4
V. 2
G. 3

305. How many ways are there to stun animals?
A. *5
B. 2
V. 3
G. 4

306. What is the Wolfers knife used for?
A. * For obtaining sterilized blood and preparing food products
B. For obtaining blood
B. For obtaining sterilized blood
G. For exsanguination

307. After how many minutes does nutrovka begin?
A. *30
B. 60
V. 45
G. 15

308. How many ways are there to process a pig's body?
A. *3
B. 2
V. 4
G. 1

309. How many methods are used to exsanguinate birds?
A. *2
B.1
V. 3
G. 4

310. The concept of the word meat in veterinary and sanitary examination?
A. *The separated part from the skin, the tips of the limbs, from the head
B. Muscle tissue
B. Separated part from skin
G. Separated part from skin, and head

311. Which organs should be examined regularly?
A. *Head, liver, spleen, kidneys, stomach, intestines, mammary glands
B. Liver and lungs
B. Liver and body
G. Liver, lungs, spleen, kidneys

312. What role do the lymph nodes play?
A. *Biological filter
B. Cleanses the body
B. Removes toxins
G. Disinfects the causative agent of infectious diseases

313. What changes occur in meat with anthrax?
A. *It exsanguinates badly, there is no rigor mortis and slightly bends in the joints
B. No changes
B. Partial change
G. It exsanguinates well

314. What changes are visible in the spleen with anthrax?
a * The organ is enlarged two or three times and crushed
B. Unchanged

B. Partially enlarged
G. It will be enlarged and crushed

315. From which disease should be differentiated in the diagnosis of anthrax?
A. * Emkar, pasteurellosis, pyroplasmosis
B. Plague and smallpox
V. Pulmonary tuberculosis
G. Blood diseases
316. Which of the following agricultural slaughter animals are infected with trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Sheep, goats

317. Which organs of birds are most affected by tuberculosis?
A. * Liver
B. Lung
B. Intestine
G. Spleen

318. Sanitary assessment of poultry meat in salmonellosis?
A. *The meat is boiled
B. Meat and internal organs are disposed
of B. Meat is not cooked
G. Meat bacteriological is checked

319. Is it a tan?
A. * Change in the color and smell of meat
B. Microbial contamination of meat
B. Meat rot
G. Slime

320. What kind of animal meat is "tan"?
A. * Pork
B. Sick
V. Poisoned
G. Tired

321. Why does meat turn yellow?
A. * In case of food poisoning and parasitic diseases
B. In case of invasive diseases
B. In case of infectious diseases
G. In case of poisoning

322. What determines the fat density obtained from animals?
A. *From saturated fatty acids
B. From tri glycerin
B. From unsaturated fatty acids
G. From saturated and unsaturated fatty acids

323. What percentage of protein is contained in fish meat?
A. *26
B. 2
B. 3
G. 10

324. What percentage of carbohydrates is contained in fish meat?
A. * 0.003
B. 1
V. 2
G. 0.5

325. Types of smoked fish?
A. *2
B. 3
V. 1
G. 4

326. Is it possible to eat fish meat with furunculosis?
A. *Can be used as feed for pigs after cooking.
B. Can
be B. Canned
G. Can be after smoking

327. What elements does the composition of milk consist of?
A. * From, proteins, fats, vitamins, sugar
B. From complex substances
B. From salts
G. From enzymes, mineral salts and trace elements

328. What is the percentage of dry matter in cow's milk?
A. *12.5
B. 5
V. 7
G. 7.5

329. What should be the average density of cow's milk?
A. *1,027 - 1,033
B. 1,022 - 1,023
B. 1,024 -1.025
G. 1,026 -1.027

330. Which protein is the main protein in milk?
A. *Casein
B. Albumin
V. Globulin
G. Albulin, globulin

331. What is the percentage of albumin in milk?
A. * 0.4-0.5
B. 0.1
V. 0.2
G 0.3

332. At what degree is albumin denatured when milk is heated?
A. *80
B. 50
V. 60
G. 70

333. What is the fat content of kefir?
A. *3.2
B. 1
V. 2
G. 2.5

334. What animal's milk is used to make kumis?
A. *Mare
B. Camel
V. Goat
G. Sheep

335. What method was used for the examination of butter on the market?
A. *Organoleptic
B. Laboratory
B. Chemical-toxic
G. Microbiological

336. How many parts are in the composition of the egg?
A. *3
B.1
V. 2
G. 4

337. By what method are carcasses checked at the farmer's market?
A. *Organoleptic
B. Biochemical
V. Laboratory
G. Bacterioscopic

338. In which organ do echinococcal vesicles occur most often?
A. * In the liver
B. In the lungs
B. In the brain
G. In the spleen

339. How does a person get infected with echinococcosis?
A. *In contact with a dog
B. When eating meat
B. When eating lungs
G. When eating spleen

340. What is detected by the ionomer?
A. * Nitrates
B. Alkali
V. Sugar
G. Honey

341. How many ml should the cylinder be to determine the density of milk?
A. *200 - 250
B. 200 – 300
V. 400 – 500
G. 500 – 600

342. In the body of which animal 3-4 cm of skin is left on one of the hind limbs?
A. *Rabbit
B. Pig
V. Deer
G. Cattle

343. Is malleination carried out before the slaughter of horses?
A. *Conducted
B. Not carried
out B. Partially carried out
D . Is performed under suspicion

344. When the skin of animals is poorly separated?
A. * With weight
loss B. With poisoning
B. With phosphorus poisoning
G. With disease

345. Duration of salting during dry salting of meat?
A. *20 days
B. 30 days
B. 15 days
G. 17 days

346. Sanitary assessment of meat at "tan"?
A. * Cut into small pieces and ventilate
B. Dispose
of B. Freeze
G. Boil

347. What is the purpose of preserving meat?
A. *Reduce tissue intensity by limiting the growth of microorganisms
B. Long-term storage
B. Destruction of microbes
G. Reduces the growth of microorganisms

348. How many ways to smoke meat?
A. *2
B. 3
V. 1
G. 4

349. What should be the temperature for cold smoking?
A. *18-22
B. 20-25
Q. 25-30
G. 30-35

350. What is used for honey sampling?
A. *Shup
B. Spoon
V. Fork
G. Special tube

351. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

352. How many percent is the yield of cattle meat?
A. *58-65%
B. 50-60%
B. 65-70%
G. 40-50%

353. How to determine the fatness of slaughter cattle?
A. * By appearance and touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

354. What categories of fatness are cattle divided into in accordance with state standards?

A. *3
B. 2
V. 4
G. 5

355. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

356. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered
D. Feed with different feeds

357. What means are used to transport slaughtered animals to the meat industry?
A. * Railway, air and water transport
B. By car, railway (in wagons)
B. Are driven along highways or roads
G. By cars

358. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

359. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature rise, temperature decrease, noise
B. Temperature rise
B. Temperature reduction
G. Noise

360. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
B. Sheep
G. Horses

361. Clinical changes caused by stress:
A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of mucous membranes
B. Changes in blood composition
D. Increase in body temperature

362. What types of products do meat factories produce?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

363. How many percent of animals can the quarantine department of the meat enterprise
A. *10%
B. 8%
B. 6%
G. 4 accommodate%

364. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

365. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. *60 l
B. 50 l
B. 80 l
G . 100 l

366. Which objects are included in the primary processing enterprises?
A. *Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
B. Slaughterhouses
G. Slaughterhouses

367. How many percent do they make a discount when accepting animals?
A. *3%

B. 2%
B. 8%
G. 10%

368. How many percent do they make a discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%
369. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

370. What should be taken into account when checking cattle?
A. *Temperature, general condition, leakage of fluid from natural openings, condition of external mucous membranes, udder condition
B. Respiration, palpitation
B. In general condition
G. Palpitation

371. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In case of doubt

372. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

373. Where is the slaughter of animals without clinical signs when bitten by a rabid dog?
A. * On a farm
B. In meat enterprises
B. In a slaughterhouse
G. Outside the farm

374. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
B. It is possible after examination by a veterinarian
G. Partially possible

375. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

376. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass is skinless, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin

377. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

378. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

379. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscle and fat
G. Muscles

380. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals

G. Proteins, carbohydrates

381. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

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A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

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A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

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A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

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A. * At the same place
B. Meat enterprises
V. In the slaughterhouse
G. In the slaughterhouse

386. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

387. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of masticatory muscles
B. For the muscles of the tongue
G. For the skin

388. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

389. What changes are detected on carcasses with anthrax?
A. *Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

390. Which organ of cattle is most damaged by tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

391. How does a person become infected with brucellosis?
A. * When in contact with sick animals and using milk and dairy products taken from sick animals
B. Only when using infected milk and dairy products
B. When using goat's milk
D. When eating infected sausage

392. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is prepared from meat
G. Canned

393. Sanitary assessment of meat with foot-and-mouth disease:
A. * Various types of sausages are prepared from carcasses and internal organs
B. They are disposed
of B. They are boiled

G. They are disposed of after boiling

394. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

395. Which farm animals get trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

396. Cases when forced slaughter of animals is prohibited:
A. *In an agonal state, animals under the age of two weeks, with pesticide poisoning, the first 14 days of vaccination against rabies and anthrax, with doubt for anthrax, emcar and plague.
B. In acute diseases
V. In infectious diseases
, In case of bone fracture

397. In what types of meat does tanning occur?
A. * In pork
B. Meat of cattle
B. In sick animals
G. With poisoning

398. The purpose of preserving meat:
A. *Limiting the growth of microorganisms, reducing the intensity of tissue enzymes
B. Disinfecting microbes
B. For long-term storage
G. To increase the activity of enzymes

399. What will be determined during the examination of canned meat?
A. * Color, broth, meat, fat, appearance of the jar
B. Tightness of the jar
B. On the broth
G. On pieces of meat and broth

400. Bombage is:
A. * Swelling from the formation of gas in the jar
B. Accumulation of a lot of water
B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

401. Which animals are raw materials for meat production?
A. * All farm animals and birds
B. Cattle, small cattle, pig
B. Birds, horse, camel, deer
G. Farm animals

402. How many percent is the yield of cattle meat?
A. *58-65%
B. 50-60%
B. 65-70%
G. 40-50%

403. How to determine the fatness of slaughter cattle?
A. * By appearance and by touch
B. How muscles develop
B. By the presence or absence of subcutaneous fat
G. By appearance

404. What categories of fatness are cattle divided into in accordance with state standards?
A. *3
B. 2
V. 4
G. 5

405. What category of fatness are pigs divided into according to state standards?
A. *5
B. 6
V. 4
G. 3

406. Types of maintenance of fattening slaughter animals:
A. *Tethered and free maintenance
B. Grazing on pasture
B. Feed separately tethered

D. Feed with different feeds

407. What are the means used to transport slaughtered animals to the meat industry?
A. * Railway, air and water transport
B. By car, railway (in wagons)
B. Are driven along highways or roads
G. By cars

408. How many times do animals feed on the way?
A. *2
B. 3
V. 4
G. 5

409. What stress factors affect animals during their transportation to meat processing plants?
A. * Temperature increase, temperature decrease, noise
B. Temperature increase
B. Temperature reduction
G. Noise

410. Which animals are more sensitive to stress factors?
A. * Pigs
B. Cattle
V. Sheep
G. Horses

411. Clinical changes caused by stress:
A. * Increase in body temperature, the appearance of black spots on the skin
B. Redness of mucous membranes
B. Changes in blood composition
D. Increase in body temperature

412. What types of products do meat factories produce?
A. * Food, medicinal and technical products
B. Food products
B. Canned food
G. Fertilizer for the earth

413. How many percent of animals can accommodate the quarantine department of the meat enterprise
A. *10%
B. 8%
B. 6%
G. 4%

414. Why are farm animals processed at meat processing plants?
A. *To avoid air pollution, improve the appearance of meat and prevent diseases
B. To get more meat and meat products
B. To prevent the spread of disease
G. To have a good presentation

415. How many liters of water per day is consumed for the maintenance of cattle per day at the meat processing plant?
A. * 60 l
B. 50 l
B. 80 l
G . 100 l

416. Which objects are included in the primary processing enterprises?
A. * Meat enterprise, slaughterhouses, slaughterhouses
B. Meat enterprise
V. Slaughterhouses
G. Slaughterhouses

417. How many percent do they make a discount when accepting animals?
A. *3%
B. 2%
B. 8%
G. 10%

418. How many percent do they discount during the second period of pregnancy of animals?
A. *10%
B. 12%
B. 15%
of G. 8%

419. How many hours should cattle be kept hungry?
A. *24
B. 18
V. 16
G. 20

420. What should be taken into account when checking cattle?
A. * Temperature, general condition, leakage of fluid from natural openings, the condition of the external mucous membranes, the condition of the udder
B. Breathing, heartbeat
B. In general condition
G. Palpitation

421. Do they carry out malleination before slaughtering horses?
A. *Yes
B. No
V. Partially
G. In case of doubt

422. After how many days are animals vaccinated against anthrax allowed to be slaughtered?
A. *14-15
B. 12-15
B. 15-20
G. 20-30

423. Where is the slaughter of animals without clinical signs when bitten by a rabid dog?
A. *On a farm
B. In meat enterprises
B. In a slaughterhouse
G. Outside the farm

424. Is it possible to slaughter animals with yashur disease?
A. *Not allowed
B. It is allowed
V. It is possible after the vet's examination
G. Partially possible
425. After how many kilograms, the carcass is divided into two parts along the vertebra?
A. * 50 kg
B. 30 kg
B. 80 kg
G. 45 kg

426. What does the word meat mean in the meat industry and trade?
A. * The rest of the carcass without skin, the tips of the legs, head and internal organs
B. The rest of the carcass without skin and head
B. Muscle and bone tissue
G. The rest of the skin

427. What texture is the main structure of meat?
A. *Muscle tissue
B. Adipose tissue
B. Adipose and muscle tissue
G. Bone and muscle tissue

428. What factors influence the color of meat?
A. *Type of animal, age, sex, nutrition, temperature and degree of exsanguination
B. Nutrition and degree of exsanguination
B. Age, gender, nutrition
G. Age, gender

429. What tissues does the morphological structure of meat consist of?
A. *Muscles, bones, tendons, fat, etc
. B. Muscles, bone and tendon
B. Muscles and fat
G. Muscles

430. Chemical composition of meat:
A. *Water, proteins, fatty substances, nitrogenous and non-nitrogenous extracts, minerals
B. Proteins, fatty substances
B. Fats and minerals
G. Proteins, carbohydrates

431. How much protein is contained in meat?
A. *18-21 %
B. 15-20 %
B. 21-22 %
G. 22-24 %

432. What task do the enzymes contained in meat perform?
A. * Participates in the maturation of meat
B. Determines the meat of sick animals
B. Uses in determining the freshness of meat
G. Meat matures

433. How does poultry meat differ from meat of other animals?
A. *With a low amount of connective tissue
B. With a large amount of tendon
B. With a low amount of protein and fat
G. With softness

434. What are the classifications of meat in meat processing plants based on?
A. *Age, gender, type, obesity, thermal status
B. On fatness and thermal condition
V. Type
G. By age

435. Where is the examination of organs and carcasses of farm animals carried out after slaughter?
A. * At the same place
B. Meat enterprises
V. In the slaughterhouse
G. In the slaughterhouse

436. Which organs should always be checked?
A. *Carcass, head, liver, spleen, kidneys, stomach, intestines and mammary gland
B. Carcass and head
B. Kidney and head
G. Liver and carcass

437. What do they pay attention to when examining the head of cattle?
A. * For the presence of cysticerci in the masticatory muscles
B. For the development of masticatory muscles
B. On the muscles of the tongue
G. On the skin

438. What should I pay attention to when examining the carcass?
A. *To the degree of exsanguination
B. To subcutaneous tissue
B. To lymph nodes
G. Not the fat layer

439. What changes are detected on carcasses with anthrax?
A. * Poor exsanguination, not complete rigor mortis and easily bends over the joints
B. Good exsanguination
B. Partial changes are manifested
G. There are no changes

440. Which organ of cattle is most damaged by tuberculosis?
A. *Lungs
B. Intestines
B. Spleen
G. Lymph nodes

441. How does a person become infected with brucellosis?
A. * When contacting sick animals and using milk and dairy products taken from sick animals
B. Only when using infected milk and dairy products
B. When using goat's milk
G. When using infected sausage

442. If an allergic reaction to brucellosis is positive in cattle and pigs, but clinical signs and pathological changes are not visible, how can meat be used?
A. *Used without restrictions
B. Used after cooking
B. Sausage is made from meat
G. Canned

443. Sanitary assessment of meat in case of foot-and-mouth disease:
A. * Various types of sausages are prepared from the carcass and internal organs
B. They are disposed
of B. They are boiled
G. They are disposed of after boiling

444. What invasive diseases are transmitted to people from meat and meat products?
A. *Trichinosis, cysticercosis of cattle and pigs
B. Cysticercosis
B. Alveococcosis
G. Trichinosis

445. Which farm animals get sick with trichinosis?
A. *Pigs
B. All farm animals
B. Cattle
G. Goats, horses, deer

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B. Reproduction of microbes
G. Cracking of cans from the influence of temperature

451. What are the causes of bombing?
A. *Physical, chemical and microbiological processes
B. Various physical influences
B. Chemical influences
G. Reproduction of microbes

452. In which canned food chemical bombage is more common?
A. * In vegetable canned food
B. In canned beef
B. In all kinds of canned
G. In canned horse meat

453. For smoking meat products, the composition of the smoke includes:
A. *Formic, capronic and acetic acid, phenols, alcohols, formaldehydes and other substances
B. All types of flavors
B. Formic and acetic acid
G. Capron and alcohol

454. For what purposes is blood used?
A. *For food, medicinal and technical purposes
B. For soil fertilization and technical purposes
B. For soil fertilization
G. For food purposes

455. Chemical composition of milk:
A. *Water, milk fats, enzymes and vitamin, mineral salts, casein, albumin, globulin
B. Ingredients
B. Proteins and fats
G. Trace elements

456. Has it been fully studied how milk appears in the udder?
A. *Not studied
B. Studied
B. Partially studied
G. Studied in cattle

457. To give one liter of milk in the udder of a cow, how much blood does it need to pass through the mammary gland?
A. *400-500 L
B. 400-450 l
B. 300-350 l
G . 200 l

458. What is the percentage of dry matter in cows' milk?
A. *12-13%
B. 8-9%
B. 7.5 %
G. 7 %

459. What is the percentage of fat in cows' milk?
A. *3.2-4.0%
B. 2.5%
B. 1.5%
G. 2.2%
460. What factors influence the physico-chemical properties of milk?
A. * Type of livestock, health, living conditions, nutrition
B. Changes in normal physiological state
B. Eating disorders
G. Health

461. What is the average density of cow's milk?
A. *1,027-1,033
B. 1,022-1,023
B. 1,026-1,027
G. 1,028-1,034

462. What device measures the density of milk?
A. * Hydrometer
B. Fat
V. Measuring cylinder
G. Sulfuric acid

463. According to the GOST of the country, what should be the holder of the hydrometer in milk?
A. * 1,027
B. 1,028
V. 1,030
G. 1,025

464. To determine the fat content of milk, what is the density of sulfuric acid?
A. *1.81-1.82
B. 1.30-1.31
V. 1.60-1.65
g. 1.50-1.55

465. How many ml of milk is needed to determine the fat content?
A. *10.77
B. 20,5
B. 11.0
G. 10.5

466. To determine the fat content of milk, what is the density of isoamyl alcohol?
A. *0.810-0.812
B. 0.815-0.816
B. 0.812-0.814
g. 0.810-0.820

467. What substances are there in honey that are useful for the human body?
A. *More than 100 components
B. Organic acids
B. Nitric acids
G. Enzymes

468. By what system did A.V. Aganin propose to evaluate honey?
A. *100
B. 60
V. 70
G. 80

469. In what concentrations are solutions prepared to determine the acidity of honey?
A. *1:2
B. 3:4
B. 4:1
G. 5:3

470. What methods are used to test milk and dairy products in the markets?
A. *Organoleptic and laboratory
B. Microbiological
B. Laboratory
G. Organoleptic

471. How are taste abilities determined?
A. *Relying on sensory senses
B. Consuming products
B. Determined by organoleptic methods
G. Determined by taste buds

472. What methods are used to determine the freshness of meat?
A. *Organoleptic, laboratory, biochemical and bacteriological methods

B. Organoleptic
B. Laboratory methods
G. By touch

473. How is the concentration of hydrogen ions in meat determined?
A. *Devices of Macro and Micro Michaelis
B. Fluorescent method
B. Biochemical methods
G. Bacteriological method

474. How is the meat of sick animals determined?
A. *According to the degree of decontamination
B. By changing the lymph nodes
B. By cutouts
G. Luminescent method

475. What colors are used for bacterioscopic studies?
A. *Lugol, fuchsin, gentian violet
B. Methylene blue
V. Lugol
G. Formalin

476. In what cases is a bacteriological examination carried out?
A. *For infectious diseases
B. For invasive diseases
B. For poisoning
G. For animal death

477. When checking which types of animal meat, a reaction to glycogen is put?
A. *Dog and horse meat
B. Meat of young animals
B. Meat of cattle
G. Goat meat

478. What methods are used to test the sausage?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. The amount of salt is determined

479. What methods are used to check potatoes?
A. *Organoleptic
B. Sensory
B. Laboratory
G. Biochemical

480. What methods are carrots tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

481. What methods are starch tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

482. What methods are dill tested by?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

483. By what methods is the melon tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

484. Are there microbes in honey?
A. *No
B. Available
B. Partially available
G. There are salmonella

485. What device determines the proportion of water in honey?
A. *Refractometer
B. pH meter

V. Macro Michaelis
G. Micro Michaelis

486. Is it possible to collect honey from flower nectar?
A. *Possible
B. Not possible
B. Partially possible
G. Not at all possible

487. What clinical subjects is the subject of VSE related to?
A. *Anatomy, Parasitology, Epizootology
B. Physiology, microbiology
B. Therapy, hygiene
G. Surgery, Zoology

488. The purpose of studying the subject of VSE?
A. *Prevent the spread of various diseases through food
B. To prevent the spread of infectious diseases among people
B. To prevent the spread of parasitic diseases among people
G. Prevention of non-communicable diseases

489. Are there fat globules in milk?
A. *Are there
B. No there
are B. There are partially
G. Not at all

490. Are plant products checked for the presence of nitrites?
A. *Are they checked
B. Are not checked
B. In doubt are checked
D . Partially checked

491. From what composition of milk is the fat content of milk determined?
A. * From fat balls
B. From milk protein
B. From casein
G. From albumin and globulin

492. What is the significance of amino acids in meat?
A. * Participates in biochemical processes in tissue cells
B. Control metabolism
B. Improves salt metabolism
G. Does not participate in any process

493. Are dried fruits checked in the markets?
A. *Are they checked
B. Are not checked
B. Are partially checked
G. Are checked if freshness is suspected

494. For what purposes are nitrites added to sausage products?
A. * To preserve the pink color of the product
B. For long aging
B. To determine the viscosity of sausages
G. To determine the quality of sausage

495. Are animals fed when kept in slaughterhouses?
A. * No, they are kept hungry
B. They are fattened
up B. Only sick animals are fed
G. It is not allowed

496. In which part of the carrot are nitrites dropped?
A. * Carrot trunk
B. Carrot bark
B. In the separated surface
G. In the root of carrots

497. In which part of the cabbage are nitrites dropped?
A. *Cabbage trunk
B. Cabbage bark
B. In the surface
G. In the root of cabbage

498. Is honey collected from cotton flowers?
A. *Collect
B. Do not collect
B. Collect only from the first flowers

G. Can be obtained after processing cotton

499. Is it possible to use blood in medicine?
A. * It is possible
B. After separation of protein, it is possible
B. After separation of serum, it is possible
G. After separation of erythrocytes, it is possible

500. By what methods are fruits tested?
A. *Organoleptic
B. Laboratory
B. Biochemical
G. Bacteriological

5. Grading Criteria

Students' progress is evaluated on a 5-point scale.

5 (excellent) grade:

Conclusion and decision making;

Getting creative ideas;

Ability to observe independently;

Being able to apply the acquired knowledge in practice;

Comprehension;

Knowing; Storytelling;

Imagination;

4 (good) grade:

Ability to observe independently;

Ability to apply knowledge in practice;

Comprehension;

Knowing; Storytelling;

Imagination;

3 (satisfactory) grade;

Understanding of essence;

Knowing, Storytelling;

Imagination;

2 (unsatisfactory) grade:

Failure to master the program;

Ignorance of the essence of science;

Not having a clear idea;

Inability to think independently.

6. Handouts on the subject


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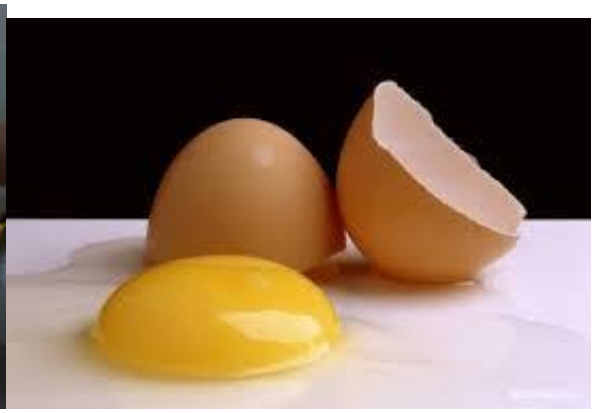
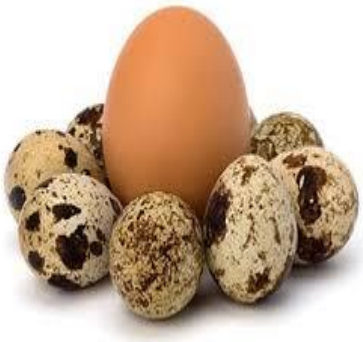


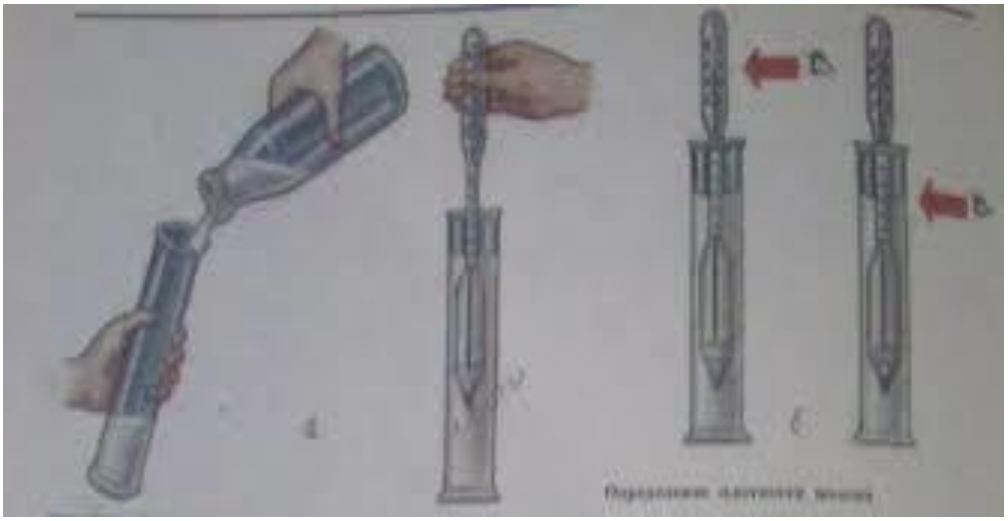



Говядина
ТУШЕНАЯ
ГОСТ 5284-84


ГОВЯДИНА


Язвенная болезнь судака
Геморрагическая септицемия линя


СМЕТАНА
КЕФИР
РЯЖЕНКА
МОЛОКО
3,5%

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Melek
Smetanasi
Melek
SMETANA
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SMETANA

7. O‘UMning elektron varianti