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БИОЛОГО-ТЕХНИЧЕСКИЙ ФАКУЛЬТЕТ**

Principles forming quality of meat production

Методические разработки по выполнению лабораторных работ

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Методические разработки по выполнению лабораторных работ предназначены для бакалавров очной и заочной форм обучения Биолого-технологического факультета, обучающихся по направлению подготовки 19.03.04. Технология продукции и организация общественного питания, 38.03.07. Товароведение, 27.03.01 Стандартизация и метрология, 19.03.03. Продукты питания животного происхождения, 35.03.07. Технология производства и переработки сельскохозяйственной продукции.

Представлены лабораторные работы по основным разделам курса «Principles forming quality of meat production», вопросы для контроля и библиографический список.

Методические разработки по выполнению лабораторных работ утверждены и рекомендованы к изданию на заседании учебно-методического совета БТФ (протокол № 2 от 1.03.2017)

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1. ISOLATION PROTEINS OF MUSCLE TISSUE

Muscle proteins can be divided into several fractions by sequential extraction with water, salt and alkali solutions.

Table 1.

Organic matter of muscle

Proteins			Non-protein nitrogenous extractive matter	Nitrogen-free substance
sarcolemma	sarcoplasm	myofibrils		
Collagen Elastin Neyrokeratin	Myogen Myoglobin Globulin "x"	Myosin Actin Tropomyosin Troponin	Amino acids Polypeptides Urea Creatine and Creatinine, Phosphocreatine etc.	Carbohydrates Lipids Intermediate products of metabolism of carbohydrates and lipids

It is known that in an extract from fresh meat goes from 41.5 to 51.5 g / L protein, and if the product is not fresh, it was only from 34.5 to 35.5 g / l (according to Avshalumovoy AD (1971)).

Noted that the storage of meat is gradually changing, the absolute content of protein fractions. Their number is greatly reduced in the various categories of meat freshness, it's probably due to the collapse of the protein fractions under the action of enzymes putrefactive microorganisms.

It should be noted that the biochemical composition of meat depends not only on its quality, but also on the condition of the animals before slaughter. Decrease the solubility of proteins is a characteristic indicator of the meat of sick animals. Thus, in the meat of healthy pigs of total protein in the extract contains about 45 grams per liter, and in meat cases - 24,0-37,3 g / liter.

Biochemical changes in some pathological conditions in muscle tissue associated with the violation of their contractile function (progressive atrophy, paralysis of muscles on the basis of denervation, necrosis, etc.), are characterized by a sharp decrease in muscle myosin and actomyosin,

In addition, the increase of proteins of the stroma and some sarcoplasmic proteins, in particular, mioalbumina, as well as reducing the concentration in muscle ATP and phosphocreatine, reduction of ATPase activity of proteins, low levels of dipeptides - carnosine and anserina, etc.

Lab №1. Isolation of albumin fraction

Instruments: Shuthelah-machine, glasses, chemical, scissors, funnel, test tubes, glass, chemical, pipette 2 mL, gauze.

Reagents: 10% solution of sodium hydroxide, 1% solution of copper sulphate, crystalline ammonium sulfate, 6% solution of trichloroacetic acid.

Proceedings. In a beaker placed 8-10 g of ground muscle, pour a triple volume of distilled water and shaking at Shuthelah pan for 20 minutes and extracted.

Extract was separated by filtration through three layers of cheesecloth into another beaker, and the remaining muscle pulp stored for later extraction of salt. In the aqueous extract of proteins transferred sarcoplasm - Myogit, mioalbumin and myoglobin, which carry out these reactions.

Poured into four test tubes with 2 ml of the resulting extract. In the first test tube for determination of protein in the extract, carried out biuret reaction (ie, 2 ml of the liquid is added 4 ml 10% solution of sodium hydroxide, mixed and then add 2-3 drops of 1% solution of copper sulfate) . The appearance of blue-purple staining indicates the presence of the protein.

In the second tube is added to saturation of ammonium sulfate powder. In the sediment with the fall of albumin. In the third test tube was reacted to precipitation of proteins with salts tezhelyh metals (2 ml test liquid was added dropwise 1% solution of copper sulfate and observe the precipitation of proteins).

For a complete removal of proteins from biological fluids using trichloroacetic acid, so in the fourth tube to 2 ml of extract was added 2-3 drops of 6% solution of trichloroacetic acid, shaken and observed precipitation of the protein.

Remember! Trichloroacetic acid can precipitate only proteins and their degradation products (urea, uric acid, amino acid amides, amino acids, low molecular weight peptides, etc.) remain in solution. It is necessary for a separate determination of protein and nonprotein (residual) nitrogen in the tissues.

Lab №2. Isolation of globulin fraction

Instruments: Shuthelah-machine, glasses, chemical, funnel, tripod with test tubes, test tubes at 2 ml gauze.

Reagents: a saturated solution of ammonium sulfate, 10% solution of ammonium chloride, 10% solution of sodium hydroxide, 1% solution of copper sulphate.

Proceedings. After extraction, water balance muscle slurry is placed in a glass and pour 20 ml of 10% solution of ammonium chloride, then extracted by shaking for 30 minutes.

Through three layers of gauze filtered saline extract. Keep in mind that it pass globulin fraction proteins - myosin and actomyosin. For further investigation, preserve muscle tissue residue on the filter.

The resulting saline extract of muscle poured into three vials of 2 ml. In order to establish the presence of protein in the first test tube conducting biuret reaction (ie, 2 ml of the liquid is added 4 ml 10% solution of sodium hydroxide, mixed and then add 2-3 drops of 1% solution of copper sulfate).

The appearance of blue-purple staining indicates the presence of protein. To 2

ml of saline extract of the second test tube add 2 ml of saturated ammonium sulfate solution. Celebrate the precipitation of myosin and actomyosin. The third tube is gradually poured distilled water until the water-insoluble precipitation of myosin and actomyosin.

Lab №3. Isolation of skleroproteins

Products: tiles, glasses, chemical, stand with test tubes, funnels, muslin.

Reagents: 10% solution of sodium hydroxide, 1% solution of copper sulfate, 6% solution of trichloroacetic acid.

Proceedings. After extraction with water and brine in the remainder of the muscle tissue contains skleroproteins (collagen and elastin). In a beaker place the remainder of muscle tissue, which is poured triple the amount of water and boil for 30 minutes, keeping the volume of liquid in a glass of periodic addition of hot water.

Collagen by boiling exposed shallow hydrolysis and converted into water-soluble gelatin. Filtered hot solution into a test tube and using biuret reaction in the filtrate establish the presence of gelatin.

To 2 ml of the liquid is added 4 ml 10% solution of sodium hydroxide, mixed and then add 2-3 drops of 1% solution of copper sulphate. The appearance of blue-purple staining indicates the presence of protein. Gelatin does not give a positive reaction to the tryptophan and tyrosine. Thin films of elastin fibers and remain on the filter.

Test questions.

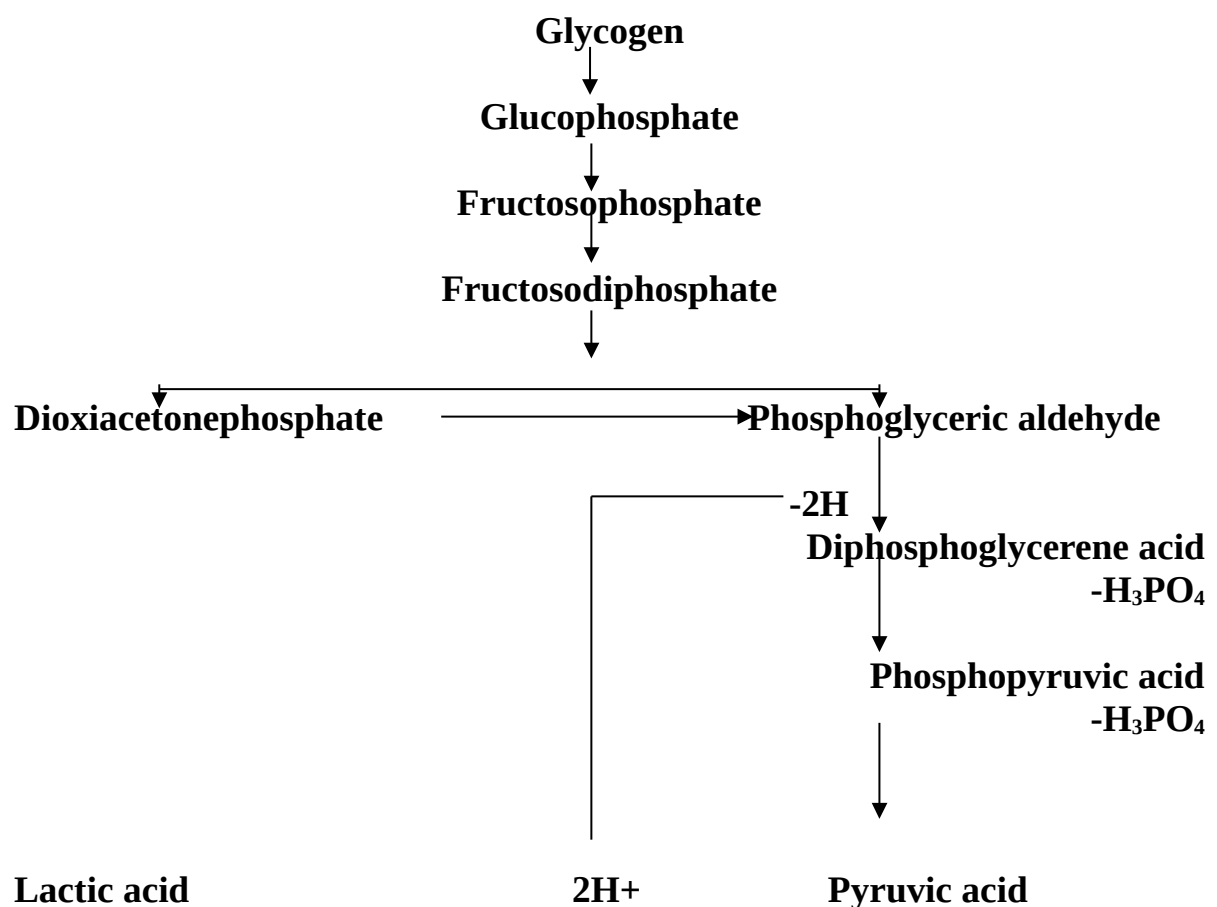
1. Name proteins included in the sarcoplasm.
2. What percent is muscle tissue from the total body mass of the animal?
3. Fraction of sarcoplasm proteins separated during electrophoresis.
4. What are myofibrillar proteins.
5. Protein is what muscle has adenosine triphosphatase activity?
6. How does the content of protein fractions in meat during storage and their dependence on physiological state of the animals before slaughter?
7. The ratio of any amino acids judged on the presence of complete and incomplete proteins in meat?

2. CARBOHYDRATES OF MUSCLE TISSUE

Glycogen is a major reserve of carbohydrates of muscle tissue. Its content ranges from 0.5 to 2 % and often depends on the nutritional and functional status and degree of organism fitness.

The amount of this polysaccharide determines function capacity and power resources of live organism. It should be noted that undernutrition, overtension of metabolic processes in tissues influence the content of glycogen in tissues resulting in this polysaccharide concentration decline.

During meat maturation changes in carbohydrate system take place, they are caused by the effect of glycogenolysis enzymes whereas proteinases are not active. The process can be depicted in the pattern:



At meat maturation the process of carbohydrates transformation is irreversible. Due to intermediary reactions glycogen transforms to lactic acid that is accumulated in muscle tissue.

Table 2.

Changes in the content of glycogen, glucose, lactic and phosphoric acids during meat maturation

Maturation duration, h	pH	Content, mg %			
		glycogen	glucose	Lactic acid	Inorganic phosphorus
1	6.2	634	160	319	52
12	5,9	462	171	609	92
24	5,6	274	202	700	107
48	5,6	183	222	692	114
120	5,6	121	219	661	137

Lab №4. Determination of glycogen (qualitative reaction)

Equipment: supporter with test-tubes, 100-150 ml flask, scales graded 2 and 5 ml, filter paper, tiles.

Reagents: fresh muscle, distilled water, Lugol's solution.

The lab course: Take a meat sample of about 15 g, chop it, place in the flask and pour 60 ml of the distilled water. The mixture is boiled for 30 minutes. The broth obtained is filtered through the paper filter and cooled. A test-tube is poured with 5 ml of the filtrate and added to with 5-10 drops of Lugol's solution.

If the reaction is positive, then, the solution acquires a cherry-red color. If negative, the solution becomes yellow. Orange color indicates that positiveness of the reaction is under question. The reaction makes it possible to identify glycogen in the meat when its concentration is about 1%.

The reaction for glycogen is positive mostly in meat of dogs, horses, camels, bears and cats (feline meat extract can get both cherry-red and orange coloring). Meat of sheep, goats, cattle, rabbits and pigs yields negative reactions.

It should be remembered that the meat of young animals give a positive response regardless of an animal species, health status (old and sick animals are noted to have negative reactions to glycogen) therefore, it is necessary to conduct additional identification.

Lab № 5. Qualitative detection of lactic acid in extracts from skeletal muscles (Uffelman reaction)

Equipment: supporter with test-tubes, pipettes.

Reagents: phenol, extract of muscle tissue, saturated solution of ferric chloride.

The lab course. First prepare the process reagent. To do this, a test-tube is poured with 15 ml of the phenol solution and added to with a few drops of ferric chloride. A violet color of the liquid is marked. Then, the first test-tube is poured with 2 ml of the prepared reagent and dropped by the extract of the muscle tissue. The 2 ml reagent solution of lactic acid is introduced into the second test-tube.

Emergence of green-yellow coloring in the both test-tubes is observed. This can be explained by the fact that by mixing ferric chloride with phenol there appears

a violet color due to the formation of the complex of ferric phenol. If lactic acid is present in the examined liquid, ferric salt forms and the color becomes green-yellow in the both test-tubes.

Test questions.

1. What are the main carbohydrates of muscle tissue.
2. How do they change in ripening process of meat?
3. What are the distinctive features of the content of glycogen in the meat of different animal species?
4. Is it possible, knowing the quantitative content of glycogen in muscle tissue, set her belonging to a particular animal? Will these correct or need additional clarification?

3. DEFINITION OF MEAT FRESHNESS

Sampling

In accordance with the requirements of GOST 7269-79, which applies to the meat of all kinds of beef cattle (excluding the liver, brain, lungs, spleen and kidneys) samples were collected from the carcass or part thereof, as well as frozen or refrigerated units of meat in one piece weighing not less than 200 grams of the following locations:

- desperately, against the 4 th and 5 th cervical vertebrae;
- in the shoulder;
- at the hip and the thickest part of muscles.

Each sample was packed in parchment (GOST 1341-97), a cellulose film (GOST 7730-89) or in polyethylene film (GOST 10354-82). The name of the selected sample and the number of carcasses indicate pencil on vellum or parchment label, embedded under the film. The samples were then packed into a paper bag (brown paper, GOST 8273-75) and placed in a metal box that is sealed and sealed.

Sending samples to the laboratory, they supply the accompanying document (act selection) including:

- date and place of sampling;
- kind of cattle;
- non carcasses assigned upon acceptance;
- the reasons and purpose of the test;
- signature.

Organoleptic evaluation of fresh meat

Methods for sensory studies provide a definition:

- appearance and color;
- consistency;
- smell;
- the state of fat;
- state of tendons;

- transparency and flavor the broth.

Appearance and color of the surface of meat is determined by natural light.

Assessing the muscles, their look at the fresh cut of meat, as well as in deeper layers of muscle tissue. To determine the stickiness of the meat touches. By applying to a sample of meat pieces of filter paper, estimate its moisture. Texture of meat set pressure on the surface of his finger, and then watch the alignment holes.

Determine the odor sniffing test sample at a temperature of 15 ... 20 ° C because at lower temperatures is more difficult to establish the smell of meat. There are kinds of meat smell: normal (specific for meat), the smell of damp or musty, putrid, rancid, ostrokisly.

Spoiled meat becomes very pronounced insane, most putrid smell due to accumulation of products of putrefaction. Rancid odor indicates that the decay of body fat and accumulation of aldehydes and ketones. Sometimes the meat acquires a sharp deterioration in the sour smell of sour cabbage or cucumbers.

Very often, the study of large numbers of samples of meat on the smell could be wrong. Therefore, to avoid them, you must first sort the sample by examining the first less corrupt, and then the more corrupt. In assessing the odor may be an analysis of at least three samples, and then make a break for 10 minutes. If doubts arise in determining the odor, then use the techniques to strengthen it.

Sample pin. Smoothly planed sharp pin, made from wood of hardwood, stick to the meat, removed and immediately determine the odor.

The sample is heated with a knife. Net pointed knife or a scalpel heated by immersion in hot water, quickly stuck into the meat, take out and identify the smell.

Sample boiling. Thinly sliced pieces of meat (preferably beef, obtained by passing the meat through a meat grinder with holes lattices diameter 2 mm) of 20 g placed in a flask (100 ml) and pour 60 ml of distilled water in a ratio of 1:3.

After this close watch glass flask and the contents heated to boiling. When the broth boils, sniffing the glass up and steam. Flavor of the broth to better identify at the time the vapor (80 ... 85oS). Transparency set visually, by pouring 20 ml of broth in a measuring cylinder 25 ml of 20 mm in diameter.

For fresh meat is characterized by fragrant, clear broth, on which surface in the form of large sequins floating fat. Broth from the meat in the initial stage of deterioration has no specific fragrant smell, the color of muddy, fat droplets on the surface ones. From spoiled meat broth musty, dirty-muddy, with flakes of fat droplets on the surface of the broth is almost absent.

In the study of meat on the detection of odor of drugs or disinfectants are also using a sample of cooking.

Determine the state of tendon palpation to determine the elasticity, density and condition of the articular surface.

Organoleptic evaluation of fresh meat (GOST 7269-79)

Index	Characteristic feature of meat and offal		
	fresh	questionable freshness	stale
1	2	3	4
Appearance and color of the surface	Has a crust of drying pale pink or pale red in color, have thawed carcasses - red, fat is soft, partly painted in bright red	Mostly wet, slightly sticky, darkened	Strongly dried up, covered with slime grayish-brown or moldy
Muscle on the cut	Slightly damp, do not leave wet spots on filter paper, the color, characteristic of this type of meat: for beef - from light to dark red, for pork - from light pink to red for lamb - from red to red-cherry, for Lambs - Pink	Wet, wet spot left on the filter paper, slightly sticky, dark red, with defrosted meat on the cut surface drains juice, a little muddy	Wet, wet spot left on the filter paper, sticky, reddish-brown color; have defrosted meat from the surface of the cut meat juice dripping muddy
Consistency	On a section of flesh is dense, elastic, caused by pressure finger hole quickly equalized	On a section of meat is less dense and less elastic, which is formed by pressing a finger hole is aligned slowly (within 1 min), fat is soft, the meat thawed slightly loosened	To cut the meat flabby and the image when pressed a finger hole is not aligned, soft fat, the defrosted meat fat loose, laid siege to
Odor	Specific, peculiar to this type of fresh meat	Slightly sour with a hint of mustiness or	The sour or musty, putrid, or weakly
State of fat	Beef - a white, yellowish or yellow color, consistency is hard, when crushing crumbles, pork - white or pale pink, soft elastic, lamb - is white in color, texture dense.	Has a grayish-matte finish, slightly sticky to the fingers, can have a slight odor osalivaniya	Has a grayish-matte finish, with crushing greasy. Lard can be covered by a small amount of mold. Rancid smell

	Fat should not have odor or rancid osalivaniya		
State of the tendons	Tendons are elastic, dense, the surface of the joints smooth and shiny. We defrosted meat sinews soft, friable, painted in bright red	Tendons are less dense, dull-white color. Articular surface lightly covered with slime	Tendons are softened, grayish color. Articular surfaces are covered with slime
Transparency and flavor the broth	Transparent, aromatic	Clear or cloudy, with a smell, unusual for a fresh broth	Cloudy, with a large number of flakes, with a sharp, unpleasant smell

Keep in mind that if one of the indicators of organoleptic analysis indicates questionable freshness, the product is directed to a chemical or microbiological research.

PRACTICAL WORK FOR DETERMINING FRESHNESS OF MEAT

Lab № 6 . Formalin test

Products: porcelain mortar with pestle, curved scissors, 2 flasks of 150 ml, chemical cups of 25 ml, scales, hoppers, gauze, paper filters, tripod with test tubes, pipettes, glass rod.

Reagents: muscle tissue, saline (0.85 g of salt dissolved in 100 ml distilled water), 0,1 n. sodium hydroxide solution, 5% solution of oxalic acid, neutral formalin (since formalin is acidic, it is neutralized with 0.1 N. sodium hydroxide solution on the indicator, consisting of an equal mixture of 0.2% aqueous solutions of x and neytralrota methylene blue for the transition of color from purple to green, to a pH of 7 or over several days in formalin to make a clean chalk on 1 / 3 column height of formalin in the container).

Proceedings. Prepare the aqueous extract of meat in a 1:1 ratio. Take 10 grams of lean muscle tissue, freed from fat and connective tissue, ground curved scissors and placed in a mortar, where triturated, the tide gradually 10 ml of saline solution and 10 drops of 0.1 N. sodium hydroxide solution.

With the help of a glass rod resulting slurry is transferred into a flask and heated to boiling to precipitate proteins. Then the flask was cooled under running cold water and neutralized its contents, adding 5 drops of 5% solution of oxalic acid. The mixture was filtered through filter paper. If the resulting filtrate is cloudy, then it is filtered or centrifuged again.

Pour 2 ml of extract in a test tube and poured 1 ml of neutral formalin. Watch

the reaction.

Hood into a dense cluster if it is obtained from meat of animals killed in agony, a seriously ill or after the split case. Flocculating observed in an extract from a sick animal meat. If the meat is obtained from a healthy animal, the hood remains a liquid and transparent or slightly cloudy.

The essence of the Formalin test is that difficult the case of an animal in the muscles of significant quantities nakaplivayutsya intermediate and end products of protein metabolism - polypeptides, peptides, amino acids, etc. These metabolites are deposited with formaldehyde.

Lab № 7 . Determination of the primary products of protein breakdown in the broth (the reaction with copper sulphate)

Products: stand with test tubes, 2 conical flasks of 100-150 ml, funnels, paper filters, a beaker of 500 ml, absorbent cotton, a water bath.

Reagents: minced meat, distilled water, 5% solution of copper sulfate.

Proceedings. Of the studied samples of meat cooked 20 grams of minced meat and place it in a conical flask at 100 ml, add 60 ml of water, stir, then cover the watch glass and heated for 10 min in a boiling water bath. Filtered hot broth through a dense layer of absorbent cotton (0.5 cm) or 3-4 layer paper filter in the flask, placed in a beaker with cold water. In the presence of the filtrate broth cereal protein to further filtered through filter paper.

Pour 2 ml of the filtrate into a test tube and add 3 drops of 5% copper sulfate solution, stirred and left for 5 min. After the specified time to read the reaction.

If the broth remains clear when you add copper sulfate, then the meat and meat products are fresh. Clouding of the broth indicates questionable freshness of meat products, and intensive lowering of the formation of flakes observed in the broth from defrosted meat.

Considered stale meat when, after adding a solution of copper sulfate in the broth gelatinous precipitate is formed, and the broth from defrosted meat appear large flakes.

The purpose of this method is the deposition of proteins by heating and the formation of complexes in the leachate copper sulfate to the remaining products of the primary decomposition of proteins that precipitate.

Lab № 8. Determining the degree of bloodless carcasses (for Zagaevskommu)

Products: gemometr Sali, a tripod with test tubes, pipettes, porcelain mortar with quartz sand and gauze.

Reagents: muscle tissue, 0,5 n. hydrochloric acid.

Proceedings. Take 25 grams of muscle tissue from the bottom of the back muscles of the carcasses, shredded and ground in a mortar with quartz sand. Then poured 5 ml of 0.5 N. hydrochloric acid and triturated until the extraction of brick-red color. The contents of the squeeze through gauze and 0.5 ml of extract is poured into a graduated tube gemometra Sali. Gradually added dropwise 0.5 N. hydrochloric acid solution as long as the color of the solution will not be the same as the color standard

solution standard scale gemometra. Percentage of hemoglobin in 0.5 ml of meat extract recorded on the testimony of the scale in vitro:

- 30-40 units. - the output of blood 4,2-4,5% by weight of a live animal, other than bleeding;
- 41-50 units. - the output of blood 3,6-4,1%, good bleeding;
- 51-65 units. - the output of blood 2,5-3,5%, satisfactory bleeding;
- 85 units. and above - the output of blood below 1.5%, improper bleeding (internally dead animals);
- 100. and above - in the meat of dead animals.

Please be aware that the meat of young animals up to 3 years, rates for 8-12 units. below, and old (more than 10 years) - 5-10 higher than the average data.

Test questions.

1. Produce the sampling of meat for research?
2. That includes organoleptic evaluation of meat?
3. As meat varies according to the degree of freshness?
4. Some laboratory studies performed to determine the indicator of freshness of meat?

4. METHODS Animal Fat (GOST 8285 -74).

Animal fats, obtained in an industrial environment: beef, lamb, pork and bone - a mixture of triglycerides of higher fatty acids, which contain a number of other fats Substances: phosphatides, sterols, tocopherols, pigments, and the products of hydrolysis of glycerides and other complex compounds .

Table 4.

Indicators of edible animal fats

Indecsis	The type and grade fat					
	beef		mutton		pork	
	top	first	top	first	top	first
Color when 15-20°C	From pale yellow to yellow		From white to pale yellow		White, admits the pale of the blue battle	White, admits a yellowish or grayish shades
Smell and taste	Characteristic of this type of fat rendered from fresh raw materials. For higher grades – without foreign smell, first allowed for a nice crispy					
Transparency in the molten state	Transparent		Transparent		Transparent	

Consistence 15...20°C	Dense or solid		Dense or solid, for tail – buttery		Pasty or granular, dense	
Moisture content, % (max)	0,20	0,30	0,20	0,30	0,25	0,30
Acid number (maximum)	1,1	1,2	1,2	2,2	1,1	2,2

Some physico-chemical parameters of different types of food rendered fat

Fat	The melting point, °C	Density, g/cm ³ (at a temperature of, °C)	The coefficient of refraction (temperature, °C)	Iodine number
Beef	48...50	0,937-0,953, 20	1,451-1,458, 40	32-47
Lamb	49...54	0,932-0,961, 20	1,450-1,452, 60	31-46
Pork	37...45	0,915-0,938, 20	1,458-1,461, 40	46-66
Horse	28...32	0,916-0,920, 15	1,459-1,466, 20	74-84
Camel	36...48		1,447	
Elk	46...48			62-66
Bear	30...36		1,454, 20	
Badger	8...9	0,903, 20	1,456-1,466, 40	92-102
Natievy			1,458-1,461, 40	60-74
Hare			1,454, 20	
Rabbit	20...25		1,462, 40	70
Surovy	9...10	0,901, 20	1,467-1,468, 40	
Goat	46...48			
Canine	23...27		1,451, 20	56-67
Deer	48...52			
Goose			1,451, 20	59-71
Chicken			1,451, 20	58-80
Rat				
Whale		0,922-0,923, 15	1,456-1,458, 20	94-145
Cat	39			
Duck	35...36			
Turkey	32...33			
Saiga	43...44			
Wild boar	30...35			

Lab № 9. Qualitative reaction for peroxide (by Vintilesku and Ponesku)

Products: stand with test tubes, pipettes, water bath, thermometer.

Reagents: fat, 5% aqueous solution of fresh blood, 5% alcoholic solution of guaiac resin, distilled water.

Proceedings. 3-5 g of melted fat (the temperature is above 50 ... 55oS) placed in the tube and add 5 drops successively with 5% aqueous solution of blood (you can undiluted blood), 6-8 drops of 5% alcoholic solution of guaiac resin and 5 ml of warm water. Stirred and monitored for changes in color mixture in vitro. Intensity of blue color indicates the presence of peroxides in fat.

Lab № 10. Reaction with neutral red (in the presence of free fatty acids)

Products: porcelain mortar with pestle, beaker, tripod with test tubes, pipettes.

Reagents: fat, 0.01% aqueous solution of neutral red (pH 7,0-7,2).

Proceedings. Take 0,5-1,0 g fat researched and put it in a porcelain mortar, pour in 0.01% aqueous solution of freshly prepared neutral red (pH 7,0-7,2), rubbed with a pestle for 1 min, then solution is decanted and the remaining liquid droplets wash water and determine the color of fat on Table.

Table 5.

Indicators of fresh fat from the reaction of neutral red

Fat pork and mutton		Fat beef	
coloring	freshness	coloring	freshness
From yellow to greenish white to yellow	Fresh	From yellow to brown	Fresh
From dark yellow to brown	Fresh, not storage	From brown to brown-pink	Fresh, not storage
From brown to pink	Questionable freshness	From brown-pink to pink	Questionable freshness
From pink to red	Spoiled	From pink to red	Spoiled

It should be noted that the neutral acid - is the acid-base and redox indicator. In acidic medium the color red in alkaline - yellow, in the oxidized state - red-purple, in rehabilitation – colorless. Noted that the spoiled fat accumulates a significant amount of acidic products: peroxides, free high-and low-molecular fatty acids, carbon dioxide, etc. Namely low molecular weight fatty acids readily dissociate and shift the pH of the fat in the sour side. However, other compounds (peroxides, hydroperoxides, free radicals, etc.) are able to translate the neutral red in the oxidized state, causing a

corresponding change in its color.

Test questions.

1. List the main features of fat of different species.
2. What are the methods for installing the species of animal meat?
3. How to distinguish a benign product of the corrupt?

Principles forming quality of meat production

методические разработки по выполнению лабораторных работ

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