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ГЕОЛОГИЯ ЖӘНЕ ТЕХНИКАЛЫҚ ҒЫЛЫМДАР СЕРИЯСЫ

♦

СЕРИЯ ГЕОЛОГИИ И ТЕХНИЧЕСКИХ НАУК

♦

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RESEARCH TO IMPROVE THE QUALITY OF FOOD PRODUCTS

Abstract. The article presents the results of research to improve the quality of food products, namely the results of the study of the restructured meat product. It is established that preliminary processing of raw materials by starter cultures promotes an increase in proteolytic activity and active accumulation of amine nitrogen, thus accelerates the ripening of meat. Adding to experimental samples raw plant materials, balanced carbohydrate and vitamin composition, has a positive effect on the balance of the finished product and increases their biological value. The findings are promising trend in improving meats technology.

Key words: meat, beef, mutton, restructure meat product, lactic acid bacteria, propionic acid bacteria, starter cultures, grain crops, corn, proteolytic activity.

Introduction. Supplying the population with high quality meat products is one of the main and urgent task facing the processing industry. To solve this problem a great role belongs to intensification of technological processes, using modern achievements of biochemistry and meat industry, using enzyme preparations [1].

In the Republic of Kazakhstan, the production of meat and meat products is traditionally considered one of the priority. The modern conditions of production associated with the transition to low-waste processing of raw materials, the desire to reduce the cost of finished products, to define the constant expansion of the range by improving meat production technology. The solution to this problem is connected with control of biochemical, physical, chemical and microbiological processes in the technology of production of meat products, which are formed as a result of qualitative indicators of the finished product [2].

It is known that beef is different from meat of other species of animals by quality and technological parameters. At the same time, the process of production of beef products, characterized by a fairly rigid consistency, is long. In this regard, there is a need to find ways to intensify production and develop new recipes for beef meat products [3].

One of the promising directions of production of meat products is the creation of technologies for restructured products, the advantage of which is the ability to recreate the structure of whole-piece raw materials, by the organoleptic properties close to whole-muscle meat (i.e. compound by a variety of individual pieces of meat components into one solid, which, when cutting into slices will have a uniform shape and size) [4].

Great interest for industrial applications represents culture of propionic acid and lactic acid bacteria. It was proved that certain strains of propionic acid bacteria have a high biotechnological potential and adaptive properties, which is important when salting and maturation of meat from the intact cell structure, where the processes are associated with a high concentration of salt and low temperature [5].

It is proved that cultures of lactic acid bacteria have antagonistic activity against pathogenic and opportunistic pathogens of various diseases, as well as capable of forming biologically active substances (vitamins, essential amino acids, hydrolytic enzymes) regulating metabolic processes in the body. Some of their representatives in the process of vital activity produce substances that impart a specific taste and aroma to the product, promote the acceleration and stabilization of the process of its maturation, improve the sanitary and hygienic conditions of production. The available data of the using of lactic acid bacteria in the meat processing industry indicate the possibility of their using in the technology of production of meat products in order to increase production by reducing the time of the ripening process with raw material salting, as well as improving the quality of finished products and increasing their yield [6].

One of the ways to improve the quality of products and improve the structure of the population's nutrition is the introduction of new non-traditional types of plant raw materials into the diet. The products created must contain a balanced complex of proteins, lipids, minerals, vitamins, ballast substances and have high nutritional and taste properties.

One of these directions is the possibility of using cereal crops in the composition of meat products subjected to various modification methods due to their high nutritional value and functional and technological properties. These cultures, being a source of dietary fiber, significantly contribute to increasing the human body's resistance to harmful environmental influences. Grain contains almost all the basic substances necessary for normal human life. Research local and foreign authors have shown promising using in the technology of combined meat products processed grain products that provide high nutritional and biological value of the product, enhance the flexibility of formulations, sustainable and uniform distribution of the ingredients, to minimize losses in the manufacturing process, which ultimately leads to create a product of stable quality.

The using of plant raw materials in meat can be considered as one of the ways to produce high-quality meat products with controlled properties. For example, tocopherols contained in cereals and oilseed plants, are natural fat-soluble antioxidants possess vitamin E activity, and are widely used in the meat industry as antioxidants. To increase the amount of antioxidants in plant raw materials, the method of germination of grains [7].

Germinated grain is a useful, easily digestible product containing vitamins A, C, B_1, B_2, B_6, PP, E, as well as dietary fibers necessary for normal digestion. When germination in grains increases the content of certain B vitamins (for example, vitamins B, B_2 and PP - an average of 1.5-2 times), vitamin E, appears in the germ and vitamin C, which does not contain in ungerminated grain. The germinated seeds are partially destroyed phytates that block the absorption of calcium, magnesium, zinc and other mineral elements. Also in the germinated grains are a lot of sugar and fiber, which in this form is easily digested [8].

Ready-made meat products are rarely considered as a basic source of vitamins, because In the process of processing most of the vitamins are destroyed, and the remaining quantities do not satisfy the physiological needs of the human body. In the meat there is no vitamin C, and vitamin E is contained in it in trace amounts. In the regulation of carbohydrate and fat metabolism involved vitamins: B_1 (thiamine), B_2 (riboflavin), B_3 (pantothenic acid), H (biotin). An effective way to solve this problem is to develop affordable meat products of a functional purpose, which is expedient to carry out based on the enrichment of plant materials. The using of plant raw materials is considered very relevant and timely, because this is accompanied by enrichment of products dietary fiber, minerals, vitamins [9].

In connection with the improvement of meat production technology using bacterial starter and cereal is actual and perspective.

Materials and methods. As objects of research have been chosen lamb and beef of 1st category of fatness in the ratio of 1:1, to ensure rational using of the resources provided for the using of meat chopped germinated corn, to accelerate the ripening process and stabilization using starter cultures.

Technological process. *Preparation of a control sample.* Raw meat was ground on a top with a hole diameter of 25-35 mm. Further, dry salt was produced by salt at the rate of 3.0 kg of salt per 100 kg of raw material. Stirring was carried out in a minced stirrer for 5-10 min. Then the raw material was left in the refrigerator for 20 h at + 5 °C. After 20 hours, the raw materials were fed to a stirrer by adding the necessary spices according to the recipe. Stir until cooked for 10 minutes. Then raw meat materials are injected. The formulation of the control and experimental samples is given in table 1.

Table 1 – Main components of a control and experimental meat products

Name of raw materials, spice and materials	Restructure meat product
Unsalted raw materials, kg on 100 kg	
Mutton of 1 category	51,0
Beef of 1 category	49,0
Spices and materials, g on 100 kg	
Sodium salt	3000
Granulated sugar	120
Black pepper	120

Preparation of experimental sample. Meat raw was ground on a top with a hole diameter of 25-35 mm. To activate the growth of propionic acid bacteria *Propionibacterium freudenreichii* and lactic acid bacteria *Leuconostoc lactis* in a ratio of 1:1 in meat, a preliminary exposure of the meat chopped to slices at a temperature of (20 ± 2) ^{0}C for 2 hours, 4 hours, 8 hours, 12 hours, 16 and 20 hours adding 1 unit of activity and 5 units of activity selected dose of starter cultures.

For the enrichment of the meat product, germinated corn was used, which improves the moisture-binding properties of meat raw materials. The germination technology was based on the existing patented technology of germination of wheat, as well as scientific research on processing maize.

After aging the sliced meat in the serum, plant raw materials were added in a ratio of 1% and the above spices.

The objects of research were 3 samples:

No. 1 - control sample;

No. 2 – experimental sample processed with 1 UA of pure cultures;

No. 3 - experimental sample processed with 5 UA pure cultures and enriched with 1% plant material.

In research were determined the following indices: Amine nitrogen content by the method of titration; Determination of the protein in accordance to Kjeldahl on the device "UDK-129" (Italy), Determination of fat on the device Soxlet "SER-148" (Italy), Determination of carbohydrates in accordance with State standard 10574-91, The content of fat-soluble vitamins in accordance with State standard 32307-2013 on the high-performance liquid chromatograph "Agilent-1200" (USA); The content of water-soluble vitamins by the method of capillary electrophoresis using the capillary electrophoresis system "Kapel" (RF), on the device M-04-38-2009; Determination of the content of vitamins B1 and B2 - fluorimetric method on the analyzer "Fluorate-02-3M" (RF).

The definition of fat-soluble vitamins were conducted in “V.M. Gorbatov Federal Research Center for Food Systems of RAS” in Moscow, the rest of the research was carried out at the Scientific Research Institute of Almaty Technological University “Food Safety”.

Results and discussion. The importance of meat is determined by the chemical composition and biological value of muscle tissue, primarily the protein content and essential amino ajcids, their ratio, the balance of the composition, compatibility with other food substances [10].

The taste qualities of meat products depend in many respects on the products of hydrolytic splitting of milk protein and fat, as a result of which various soluble nitrogenous compounds, free amino acids and fatty acids, which are the precursors of many flavors and aromatic substances, accumulate. In the formation of these compounds, the decisive role is played by enzymes of lactic acid bacteria.

With the development of our knowledge in the field of the mechanism for the formation of organoleptic properties of restructured meat products, the role of proteolytic processes carried out by propionic acid bacteria in the formation of its qualitative indices, biological value as a food product and intensification of the maturation process.

It is widely known that lactic acid and propionic acid microorganisms play an important role in most fermentation processes. Many strains are used in the production of dairy, meat, vegetable and bakery products. These microorganisms can suppress undesirable microflora by synthesizing various antibacterial metabolites, such as organic acids (lactic and propionic acid), carbon dioxide, hydrogen peroxide, diacetyl and bacteriocins [11].

The development of biochemical processes that contribute to the maturation and tenderization of meat during fermentation can be judged from the dynamics of proteolytic processes.

The proteolytic activity is one of the most important properties of lactic and propionic acid bacteria, which characterizes their ability to break down proteins to form more simple nitrogenous compounds. However, information concerning the proteolytic enzyme system in propionic acid bacteria during cultivation in the meat substrate and the influence of various factors on their activity is extremely scarce, therefore further studies have been devoted to the study of the influence of the conditions of biotechnological processing on the proteolytic activity of starter cultures. An informative indicator of protein proteolysis can be amine nitrogen. It is scientifically justified that the content of amine nitrogen, which contributes to the ripening of meat is 0.2 mg [5,12].

The obtained results, shown in figure 1, show that in the experimental samples a faster accumulation of amine nitrogen is observed in comparison with the control sample. Thus, in the experimental sample No. 3 the accumulation of amine nitrogen is observed 4 hours after ripening, in the experimental sample No. 2 of the same value reaches 16 hours, and in the control sample after 20 hours.

Thus, due to the introduction of starter of lactic acid and propionic acid bacteria, where the dose of the ferment is 5 units of activity, physico-chemical and biochemical processes are accelerated substantially, as a result of which the duration of salting is shortened to 16 h.

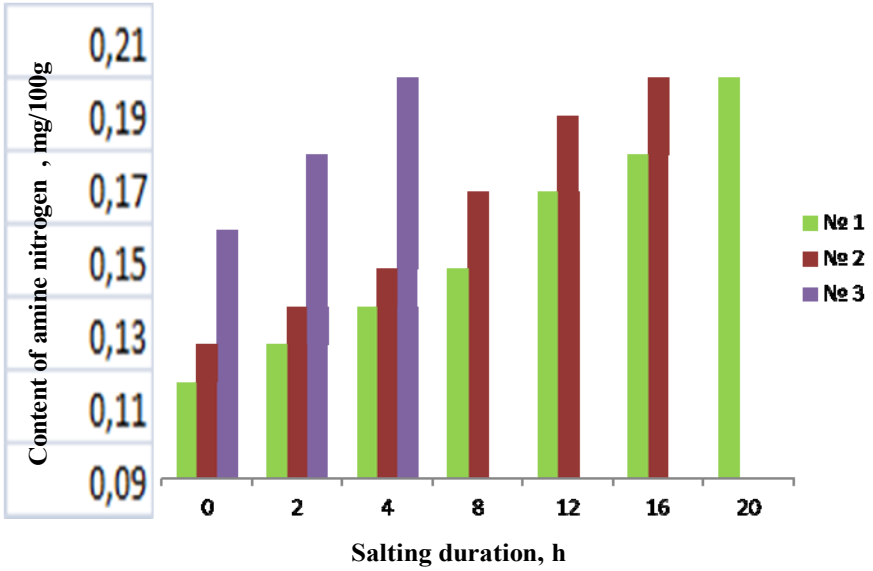

Figure 1 – Dynamics of accumulation of amine nitrogen in the process of salting

Analysis of published data on the chemical composition showed that the processing of meat products of bacterial starter culture and the enrichment of milled corn germ leads to increased concentrations of nutritional value, i.e. carbohydrates and vitamins. The results of the control and experimental samples are given in table 2.

Table 2 – Nutritional value of experimental samples of meat products

#	Nutritional value, %	The experimental samples		
		# 1	# 2	# 3
1	Mass fraction of protein	10,64±0,04	9,56±0,02	10,07±0,02
2	Mass fraction of fat	4,49±0,01	5,17±0,02	6,24±0,01
3	Mass fraction of carbohydrates	It isn't revealed	It isn't revealed	0,75±0,01
n=10.				

Based on the results of the studies, it can be judged that the presence of protein in the control and experimental samples remains unchanged. fat concentration in experimental samples is increased to 2% compared to the control. The results of the experimental sample No. 3 in which the carbohydrate content is increasing shows that the enrichment of meat with plant raw materials leads to the presence of carbohydrates in the composition of the finished meat product.

It is widely known that vitamins are irreplaceable substances necessary for growth, development and vital activity of a person. They contribute to the regulation of the metabolism in the human body. Vitamins are not formed in the body, so a person should receive them with food.

Further research was directed to the study of the vitamin composition of finished meat products. The results of the control and experimental samples are given in table 3.

Table 3 – Vitamin composition of samples of meat products

#	Vitamins, mg/100 g	The experimental samples		
		# 1	# 2	# 3
1	E (tocopherol)	0,84	0,91	1,88
2	C (ascorbic acid)	It isn't revealed	It isn't revealed	0,06
3	B1 (thiamin)	4,2	6,1	19,1
4	B2 (riboflavinum)	0,2	0,4	1,4
5	B6 (pyridoxine)	0,96	0,47	0,63
6	B3 (pantothenic acid)	5,53	5,94	38,28
7	B5 (nicotinic acid)	0,154	0,183	1,306
8	Bc (folic acid)	0,0266	0,0272	0,0269

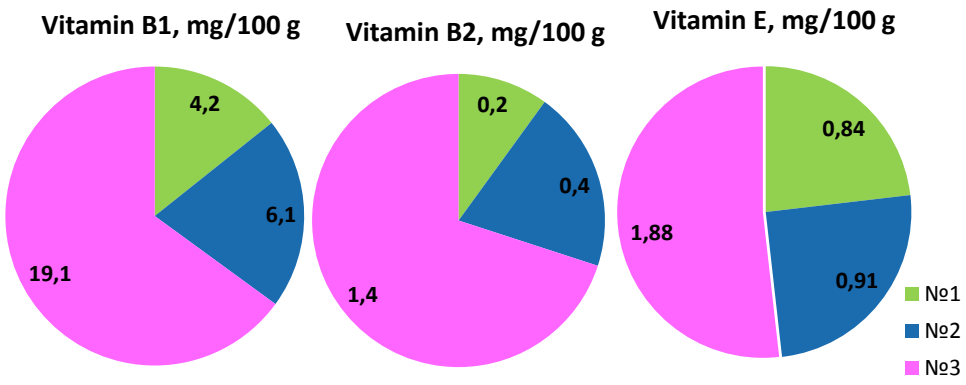

Figure 2 – Diagram of vitamins B1, B2 and E in the samples of meat products

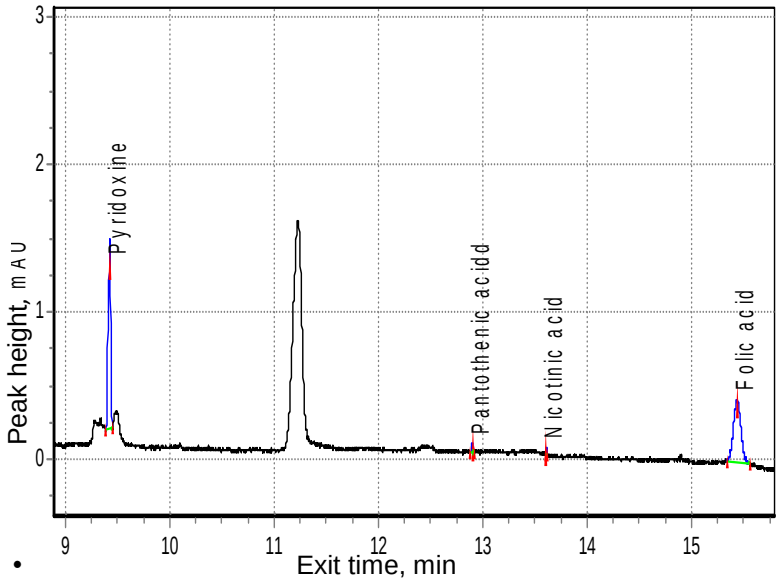

Figure 3 – Chromatogram of water-soluble vitamins in the control sample meat product № 1

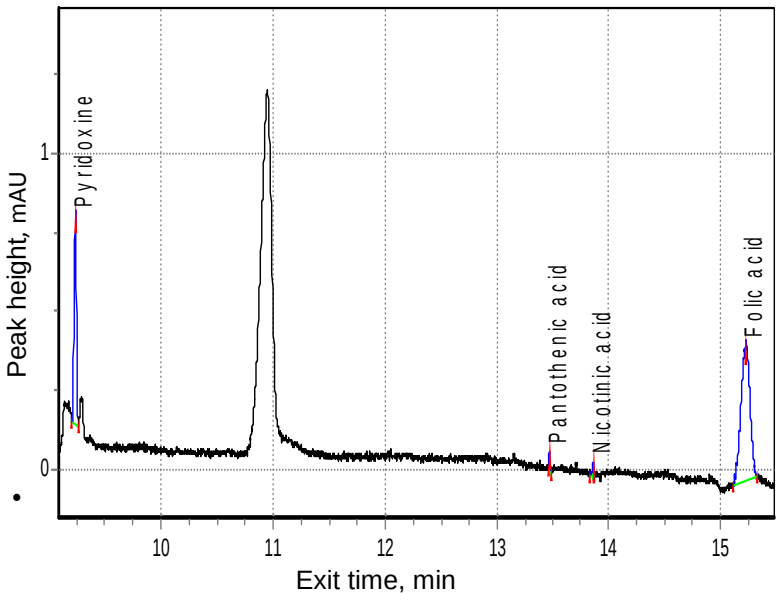

Figure 4 – The chromatogram of water-soluble vitamins in experimental sample meat product № 2

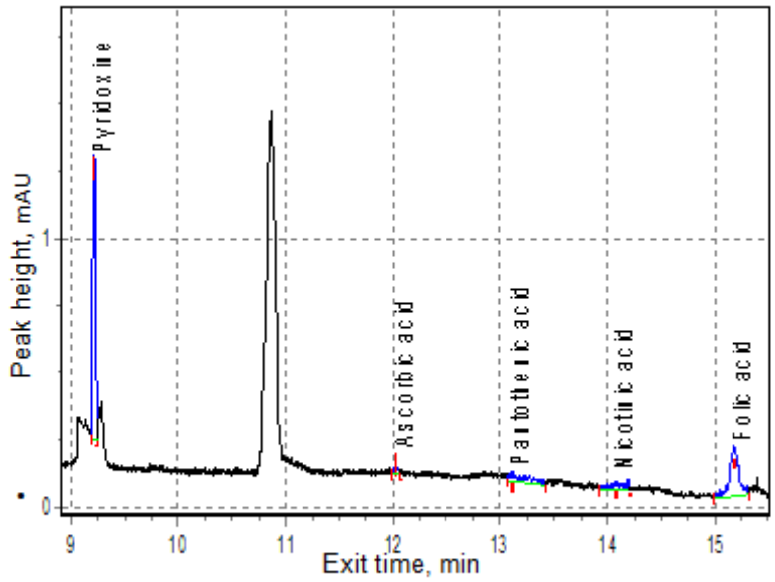

Figure 5 – The chromatogram of water-soluble vitamins in experimental sample of meat product № 3

According to the results of the vitamin composition of the studied meat samples, it can be judged that the presence of fat-soluble vitamin E in the experimental samples is significantly higher compared to the control one. If in the control samples the concentration of tocopherol is 0.84 mg/100 g, in experimental samples it is 0.91 and 1.88 mg/100 g. It has been proven that tocopherol is present in large quantities in green plants and germinated grain. This causes an increase in the concentration of vitamin E in the experimental sample number 3 with the addition of germinated corn. The importance of tocopherol in the human body plays a huge role. Vitamin E is characterized by high antioxidant activity, which promotes immunity and disease prevention.

The experimental data show that the concentration of vitamin B1 in the experimental sample №3 4.5 times, and in the experimental sample №2 1.4 times higher compared to the control. If the content of vitamin B_3 in the control sample is 38.28 mg/100 g, in experimental samples it is 5.53 and 5.94 mg/100 g. In experimental sample №3 the concentrations of vitamins B_5 is 8.48 times and Bc is 1.01 times higher than in control sample. In experimental sample №2 the concentration of vitamins B5 is 1.18 times, and Bc is 1.02 times higher than in control sample.

In addition, in the experimental sample №3, the concentration of vitamin C increased by 0.06% compared to samples №1 and №2 in which this vitamin is absent. It is widely known that vitamin C plays an important role in the oxidation-reduction processes in the body. Ascorbic acid has a specific impact on capillary walls, on the regeneration processes in the functional state of the central nervous system, cholesterol metabolism, immune biological reactions.

The vitamin B_2, if in the control sample it is 0.2 mg/100 g, then in the experimental samples 0.4 and 1.4 mg/100 g. Only vitamin B_6 concentration in the control sample №1 equal to 0.96 mg/100 g, whereas in the experimental samples №2 – 0.47 and №3- 0.63 mg/100 g.

Summarizing the results obtained, it can be concluded that adding 1 unit activity of starter cultures contributes to a slight increase in the concentration of vitamins, and the addition 5 units activity of starter cultures and 1% of crushed germinated maize contributes to the enrichment of meat products and has a positive effect on balanced vitamin content.

Conclusions. Based on the studies carried out to improve the quality of meat used as the main raw material for improving the technology of restructured meat products, the following technological solutions have been established:

- Using of starter cultures in a ratio of 1: 1, with a selected dose of starter - 5 units of activity, contributes to the intensification of physicochemical and biochemical processes of salting, maturation of meat and creation of optimal functional and technological properties in a shorter period;

- It is proved that the enrichment of meat with cereals with 1% of crushed germinated corn, leads to the presence of carbohydrates in the finished meat product and to an increase in the concentration of such vitamins as E, C, B_1, B_3, B_5 and Bc;

- The possibility of using of plant raw materials for the creation of restructured semi-smoked meat products has been substantiated.

Thus, revealed high biochemical activity of bacteria contributing to an increase in the proteolytic activity and the accumulation of the active amine nitrogen. It is established that preliminary processing of raw materials by the leaven of starter cultures and enrichment with crushed corn germ allows not only to intensify the salting process, but also to increase the biological and nutritional value of the finished product.

REFERENCES

[1] Ospanova D.A., Uzakov Ya.M. Research of chemical and amino-acid composition of the complex cutting of carcass // Bulgarian Journal of Agricultural Science. 2014. 20 (N 5). P. 1090-1093.

[2] Uzakov Ya.M. Slaughter of the cattle and production of meat products on «Halal» technology. Almaty: Ewer, 2014. 268 p.

[3] Uzakov Ya.M., Shukesheva S.E. (2016) Rational use of raw materials when improving the technology of meat products of functional purpose. X Intern. science praktical conference young academic and special department of agricultural sciences "Modern approaches to the preparation and processing of agricultural products – guarantee food independence of Russia". Moscow. P. 446-448.

[4] Chernukha I.M., Uzakov Ya.M., Shukesheva S.E. (2016) Improvement the technology of restructure cooked and smoked meat products mutton and beef. The 19th international scientific and practical conference devote V. M. Gorbatov's memories "Practical and theoretical aspects of complex conversion of food staples and creation of competitive products of food – a basis of ensuring import substitution and food security of Russia of" FGBNU "of VNIIMP of V. M. Gorbatov"". Moscow. P. 81-83.

[5] Shukesheva S.E., Uzakov Ya.M., Chernukha I.M., Nabiyeva Zh.S. The use of starter cultures in the production of restructure meat products // Bulletin of the ATU. 2017. N 4(117). P. 23-26.

[6] Mohammed Salim Ammor, Baltasar Mayo. Selection criteria for lactic acid bacteria to be used as functional starter cultures in dry sausage production: An update // Meat Science. 2007. Issue 1. P. 138-146.

[7] Uzakov Ya.M., Taeva A.M. Processing of camel meat for the production of meat products: Mon. PH "Profession", 2017. 158 p.

[8] Nabiyeva Zh., Kizatova M., Merdzhanov, P. Angelova-Romova M., Zlatanov M., Antova G., Stoyanova A., Karadzhov G. Lipid Composition during the germination of Kazakhstan maize hybrid // Bulgarian Journal of Agricultural Science, Thomson Reuters 0,136. ISSN: 1310-0351, 19 (No 4) 2013. P. 780-784.

[9] Esteve M.J., Farre R., Frıgola A., Pilamunga C. Contents of vitamins B1, B2, B6, and B12 in pork and meat products // Meat Science. 2002. Vol. 62, Issue 1. P. 73-78.

[10] Bulambaeva A.A., Uzakov Ya.M., Vlahova-Vangelova D.B., Dragoev S.G., Balev D.K. Development of New Functional Cooked Sauseges by Addition of Goji Berry and Pumpkin Powder // American Journal of Food Technology. 2014. 9(4). P.180-189.

[11] Uzakov Ya.M. The production of meat products Halal. Profession PH, 2018. 176 p.

[12] Khamagaeva I.S., Khankhalaeva I.A., Zaigrayeva L.I. Use of probiotic cultures for production of sausages. Ulan-Ude, 2006. 203 p.

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ТАҒАМ ӨНІМДЕРІНІҢ САПАСЫН АРТТЫРУ БОЙЫНША ЗЕРТТЕУЛЕР

Аннотация. Мақалада тағам өнімдерінің сапасын арттыру бойынша зерттеулер нәтижесі, нақтылап айтқанда, қайта құрылымдалған ет өнімдерінің зерттеулер нәтижесі берілген. Шикізат алдын-ала бактериалды старттық дақылдармен өңделсе, протеолиттік белсенділік артып, аминді азоттың белсенді жинақталуына себеп болады, нәтижесінде еттің жетілуін жылдамдатады. Зерттеу үлгілеріне дәрумендік және көмірсу құрамы бойынша байытылған өсімдік шикізатын енгізу – дайын ет өнімінің теңгерімділігіне оң әсер

беріп, биологиялық құндылығын арттырады. Болашақта алынған нәтижелерді ет технологиясын жетілдіру кезінде пайдалануға болады.

Түйін сөздер: ет, қой еті, сиыр еті, қайта құрылымдалған ет өнімі, сүтқышқылды бактериялар, пропион-қышқылды бактериялар, старттық дақылдар, дәнді дақылдар, жүгері, протеолиттік белсенділік.

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ИССЛЕДОВАНИЯ ПО ПОВЫШЕНИЮ КАЧЕСТВА ПРОДУКТОВ ПИТАНИЯ

Аннотация. В статье приведены результаты исследований по повышению качества продуктов питания, а именно результаты исследования реструктурированного мясного продукта. Установлено, что предварительная обработка сырья стартовыми культурами способствует увеличению протеолитической активности и активному накоплению аминного азота, соответственно ускоряет созревание мяса. Введение в опытные образцы растительного сырья, хорошо сбалансированного по углеводному и витаминному составу, оказывает позитивное влияние на сбалансированность готового продукта и повышает их биологическую ценность. Полученные данные являются перспективным направлением при совершенствовании технологии мяса.

Ключевые слова: мясо, говядина, баранина, реструктурированный мясной продукт, молочнокислые бактерии, пропионовокислые бактерии, стартовые культуры, зерновые культуры, кукуруза, протеолитическая активность.

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