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DEVELOPMENT OF A TECHNOLOGY FOR PRODUCING RAW SAUSAGES WITH ENRICHED FOOD ADDITIVES BASED ON VEGETABLE RAW MATERIALS

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ABSTRACT

The aim of the study is to improve the technology for the production of sausages based on food additives. To achieve the assigned task, it was necessary to complete the following research tasks: study and use of starter cultures as a factor in the formation of the quality of sausages; analysis of the physiological and biochemical properties of bifidobacteria for sausage production, as well as the choice and justification of the dose of starter culture introduced into the sausage meat; the influence of starter cultures on the dose of sodium nitrite introduced; l laboratory testing of bacterial starter cultures in the production of boiled-smoked sausages; improved technology for the production of cooked-smoked sausages using starter cultures. The scientific novelty consists in the following: the use of starter cultures as a factor in the formation of the quality of sausages has been studied; analyzed the physiological and biochemical properties of bifidobacteria for sausage production; selected and substantiated the dose of sourdough introduced into the sausage mince; investigated the influence of starter cultures on the dose of sodium nitrite introduced; laboratory testing of bacterial starter cultures in the production of boiled-smoked sausages was carried out; the technology for the production of boiled-smoked sausages using starter cultures and food additives has been improved. The practical significance of the research consists in the following: selected and justified the doses of the starter culture introduced into the sausage mince; investigated the effect of starter cultures on the dose of sodium nitrite introduced; laboratory testing of bacterial starter cultures in the production of boiled-smoked sausages was carried out; the technology of production of cooked - smoked sausages with the use of starter cultures and food additives has been improved. Subject of research: quality indicators (organoleptic and physico-chemical), food and energy value of products. The object of the research is the technology of sausage production based on food additives.

KEYWORDS: *vegetable raw materials, production technology, development of raw smoked sausages, enriched with food additives,*

INTRODUCTION

At any level of economic development of the meat industry, sausages are in high consumer demand. Reducing their cost with guaranteed preservation of standard quality is the most important condition for expanding the range and increasing the output of this type of product. One of the real ways to solve this problem at the present time, with the constantly growing competition, is the development and implementation of new technologies focused on the intensification of a complex of complex biochemical transformations that occur in meat raw materials in the process of salting, precipitation in the production of sausages.

Research , carried out for the implementation of tasks set by the strategy for the further development of the Republic of Uzbekistan (number UP - 4947 from February 7, 2017) " ... sokrashenie energy consumption and resource intensity of the economy, the widespread introduction in the production of energy saving ut their technologies " [1] aimed at development of the

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introduction of new technologies focused on the intensification of a complex of complex biochemical transformations that occur in the process of salting, precipitation in the production of sausages ..

This dissertation, to a certain extent, will serve to fulfill the tasks provided for in the decrees and decrees of the President of the Republic of Uzbekistan No. UP - 4707 dated March 4, 2015 "On the program of measures to ensure structural transformations, modernization and diversification of production for 2015-2019" and No. UP - 4947 of February 7, 2017 "On the strategy of actions for the further development of the Republic of Uzbekistan" and the implementation of the tasks noted in other regulatory documents.

One of the ways to solve this problem is associated with the biotechnological principle of modifying meat raw materials - directed regulation of the course of biotechnological, physicochemical and microbiological processes, as a result of which the structure, color and taste of the aromatic characteristics of the finished product are formed. Purposeful use of microorganisms contributes to obtaining a stable quality of the finished product.

According to the literature, bifidobacteria play an important role in maintaining a person's health at an optimal level in life. In 1 g of the contents of the large intestine of an adult, several billion cells of bifidobacteria are found. These microorganisms destroy carcinogenic substances formed by some representatives of the intestinal microflora during nitrogen metabolism, thus playing the role of a "second liver". It is precisely because of these properties that bifidobacteria were selected by us as one of the representatives of the consortium [2,3].

The technological action of microorganisms is associated with the formation of specific biologically active components: organic acids, bacteriocins, enzymes, vitamins and others, which improves the sanitary, microbiological, organoleptic characteristics of the finished product, and also allows to intensify the production process [4,5,6].

Despite the fairly extensive theoretical and experimental material currently accumulated by researchers on the use of starter cultures in the production of meat products, the study of microorganisms with probiotic properties is of scientific and practical interest. Such crops include bifidobacteria and propionic acid bacteria. When administered naturally, they have beneficial effects on physiological functions and biochemical reactions of the body through the optimization of its microecological status [7, 8]. Bifidobacteria possess high antagonistic activity, the ability to destroy toxic metabolites, grow under anaerobic conditions, accumulate aromatic compounds, reducing substances, which is very attractive for use in sausage production. Propionic acid bacteria are able to grow at low temperatures, accumulate aromatic compounds, produce antimutagenic substances, vitamin B12, amino acids, have antagonistic activity against pathogenic and opportunistic microflora, are weak acid formers [9].

The data on the positive effect of these crops as starting crops for the production of sausages are insufficiently studied and require a systematic approach to research. In this regard, when developing the research program, we chose two methodological approaches that take into account the ultimate goal, which is the intensification of processes, improvement of quality.

This is, firstly, the study of the biotechnological properties of bifidobacteria bacteria in the meat system to substantiate their use as starter cultures [10].

Secondly, the study of the physicochemical, biochemical, biotechnological properties of meat fermented by these cultures during the technological operations of the production of sausages, and the assessment of the quality of finished products.

The research is based on developments in the field of theory and practice of using biotechnological methods for intensifying the production of meat products.

METHODOLOGY

The scientific solution to the problem of developing a technology for a meat product enriched with iodine is based on a systematic approach, including theoretical and experimental substantiation of the use of innovative dietary supplements based on probiotic microorganisms. The solution of the formulated problems allows us to conduct research and develop a technology for the production of iodized high-quality chopped semi-finished products from the meat of Mongolian sheep; to develop measures for the implementation and quality management of the developed product. To achieve this goal and objectives, standard and special methods for determining the physicochemical, structural-mechanical, functional-technological and microbiological indicators of the objects under study were used.

LITERATURE REVIEW

From literary sources it is known that during salting of meat products the microflora plays an active role in at least three technologically important phenomena: stabilization of color, improvement of

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organoleptic characteristics of meat products and increase of storage [11].

Studies conducted by W. Danner, P. Hammes have shown that fermentation in raw sausages during ripening is accelerated if the strain of Lactobacillus plantarum NRRL - B-5461 is added as a source of the formation of "soft" lactic acid. To improve its action, they recommend using a mixture with the cultures of Pediococcus cerevisiae, Streptococcus lactis, Leuconostoc citrovorum, Streptococcus diacetilactis.

In the studies of V.V.Khorolsky and co-authors, the mushroom Penicillium canescens was tested in order to improve the quality of dry-cured sausages . The surface of the sausages was treated with a suspension of the mushroom, and a sufficiently dense layer of white mycelium was obtained, which favorably affects the quality of the finished product [12].

A new bacterial culture, Lactobacillus pentosus, was tested in the laboratory of R. Muller (Germany) in the production of dry sausages. To compare the technological effect, several other cultures were used: Petrostreptococcus paru-bus, Lactobacillus plantarum, Pediococcus acidilactici, as well as their combinations with Streptococcus carnosus MIII. In all variants of testing microorganisms, the best results are obtained with the use of Lactobacillus pentosus. The effect was expressed in a rapid decrease in pH, obtaining sausages of an attractive color, mildly sour taste and with a well-defined meat aroma [13].

Thus, studies have shown that the level of nitrite added to sausage meat in order to inhibit the growth of Clos-tridium botulinum can be reduced by introducing lactic acid bacteria. In addition, bacterial cultures exhibit an antagonistic effect in meat products against microorganisms such as Salmonella, Clostridium botulinum, and Staphilococcus aureus [14].

FINDINGS AND DISCUSSIONS

The rational combination of proteins of plant and animal Human O - Niya to compensate for the growing deficit of muscular protein and secu - Chiva reduction of production costs with high organoleptic characteristics, stability of quality products, including during storage, reduced calorie products, increase the yield and output of finished products, improvement of food and biological value of products due to enrichment with natural vitamins, dietary fiber, macro- and microelements, which makes it acceptable for special types of food, including dietary and children's. Of the known plant sources of dietary protein, the most widely used products and to ingredients - you from soybean seeds.

The world market for edible soy proteins is actively developing. Every year, new brands of soy proteins with improved functional and technological properties appear, the range of products that use soy proteins is expanding.

The approximate composition of soy protein products submitted tips soybean th proteins when - is led in Table 1.

Table 1. Chemical composition of soy products, % on dry matter

Indicators	Low fat flour and cereals	Concentrates Squirrel	Isolates squirrel
Protein	56-59	65-72	90-92
Fats	0.5 1.1	0.5 1.0	0.5-1
Ash	5.4-6.5	4.0-6.5	4.0-5.0
Carbohydrates (by difference)	32-34	20-22	3-4
Cellulose	2.7-3.8	3.5-5.0	0 , 1 - 0.2

In the Institute of Meat Industry, the functional - technological properties of soy flour: water binding and zhirosvyazyvayuschaya capacity, emulsifying capacity and emulsion stability. Average zna - cheniya functional and technological properties of the soy flour are shown in Table 2.

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Table 2. Functional and technological properties of defatted soy flour

Product	ARIA, oxen g to 1 g pro - THE PRODUCT	LSC, grams of fat per 1 g pro - THE PRODUCT	Gelling capacity, g of product per 100 ml of water	Emulsifying - schaya method - Nosta%	The stability of the emulsion - these,%
Low fat soy flour	3.0	2.45	38.0	60	71

The most common products deep processing of soybean YaV - lyayutsya soy protein concentrate. Modern industry produces soy protein concentrates are three main types: traditional, combined - ny and highly functional. The functional and technological properties of the concentrates are given in Table 3.

Table 3. Functional and technological properties of soy concentrates

Product	VUS, g of water per 1 g of product	ZhUS, g of fat per 1 g of product	Gelling - schaya method - Nosta, %
Traditional concentrates	3.5	0.8	16.8
Combined concentrates	6.8	0.8	17.0
Highly functional concentrates	7.9	0.8	12.2

When studying emulsion properties of soy concentrates SET - Leno that the ratio drug: water: oil 1: 5: 5 for all the investigated concentrates were obtained emulsion stable both at a temperature of 20 ^{0}C and after heat treatment at 72 ^{0}C for 15 min.

When developing combined products based on the principle of replacing raw meat with protein preparations, it is necessary to take into account that heat treatment of products containing protein preparations with a large amount of carbohydrates leads to an increase in the Maillard reaction and the formation of inaccessible forms of some amino acids that are not utilized by the body for the synthesis of its own proteins. in which lysine suffers the most. For this reason, the use of concentrated soybean protein, containing - boiling carbohydrates in an amount of 15-23%, when designing formulations cooked minced meat products are certain complexity.

The isolate is characterized by a low fat content - 0.5-1.0% and Carbs - rows 3-4%, has a high amount of calcium and magnesium ions, which are respectively 0.15% or 0, 00 %. Modern extraction methods used in the production of soy protein isolate ensure it is completely odorless and neutral in taste.

According to studies water binding method - NOSTA soy protein isolate is 5.97 g water per 1 g of the product. When ADD - lenii 1.5% of salt is increased to 6.26, which confirms the polo - zhitelnoe effect of sodium chloride on the water holding capacity of iso - lyata and provides irreversible binding of isolate 5-6.5 parts of water. Fe - komendatsii manufacturers use efficiency isolate compris - ve protein-fat emulsions confirmed data zhirosvyazyvayuschey capacity (of 2.10 grams of fat per 1 g of product), the results of studies - Nij zhiroemulgiruyuschey ability soy isolate (100 %) and determining emulsion stability (100%). Functional and technological properties with - evyh protein isolates are given in Table 4.

Table 4. Functional and technological properties of soy protein isolates

Product	ARIA, r in - rows on 1 g of the product	CSH, r Ms - pa to 1 g prod ucts	Gsl-forming capacity, g of product per 100 ml of water	Emulgi - ruyuschaya method - Nosta, %	Stabil ness emulsions, %
Soy isolate	5.57-5.97	1.79-2.10	16-19	100	100

The main technological advantages of soy protein isolates is the fact that their use allows for flexible, depending on the not - necessity to adjust to the emulsion and the finished product relation - of fat: protein. Reduces the fat content of the finished product while maintaining the protein level.

The optimal level of administration to isolate various types of formulation mja - byproduct is: for

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cooked sausages, frankfurters, wieners - 2-4% product ham type cladding - 2-4% for salted pork products (with the Introduction - Denia composed brines) - 12 %, for pates (molded, coated, and con - served) - 3-6%, for chopped semi - up to 7%, for the dry fer - mental type sausages - 2-3%. The introduction of significant amounts of soy isolate - comrade in emulsified meat products can lead to a reduction intensively - STI flavor characteristics of the product, which is easily compensated by the addition of minced salt and spices (especially garlic). A possible problem of "diluting" the color is achieved using whole blood or odds - variables elements (0.6%) and sodium ascorbate (0.05%).

The safety of imported soybean and processed products, you - raises doubts and concerns, as there is no guarantee that doing - present on the import of raw materials is not a product of genetic modification.

Gene technology allows varieties of fruit and vegetables, character - binder higher resistance to pesticides, pests, diseases - proach microorganisms, providing reduced losses during growth and storage of products. Creating GM plants contributes significantly express check - rhenium selection process, and the process becomes more purposeful - lennym. Such plants are classified as transgenic organisms of the first generation and are currently grown on an industrial scale. Currently, the GM material had many problems due to lack of knowledge and lack of experimentally-based responses in relation to its environmental, bio - logical, food, feed and health security taking into account the possibility - governmental long-term negative effects and consequences of its constant and length - tion of application for public catering organisms of different levels of organi - tion. Therefore, the use of soy protein products of foreign pro - duction in food technology, including meat products, raises fears and serious concerns.

In addition, limiting the use of the seeds in legume foodstuff - SRI of human and animal nutrition is associated with content of a number of antinutrients (antinutritive) and partly toxic substances. These from - union or reduce digestibility of the products (tannins, inhibitors trip - sina, phytohemagglutinin - lectins, phytin, saponins) or at high con - centrations exhibit toxic effects (alkaloids, cyanogenic glycosides). From the entire spectrum of anti-nutritional factors, the most interesting sight - stavlyayut proteinase inhibitors because of their wide distribution and high - of the contents in storage parts of plants - the seeds. According to the chemical structure - round, they are low molecular weight proteins with the majority uncharacteristic - stvu compounds of this class of relatively high thermal stability - Stu and resistance against the action of proteolytic enzymes.

The physiological functions of proteinase inhibitors are well known: they can play the role of storage proteins, regulate the activity of proteolytic processes, preventing premature breakdown of reserve proteins; filing - lyat proteinase activity of a number of harmful insects and pathogenic micro - organisms, thereby protecting plants against attack. However, ingibi - tori proteinases have the property of substantially lower the catalytic activity of proteolytic enzymes (trypsin, chymotrypsin, elastase), the gastrointestinal tract of animal organisms, forming with them inactive - nye resistant complexes, thereby inhibiting their activity. Furthermore, the formation of complexes trypsin inhibitor causing intense synthesis of enzymes in the pancreas, resulting in an increase in the transformation of methionine into cysteine, which increases the need for sulfur aminokis - lots, which cannot be compensated proteins coming from pi - boiling. Intake of increased amounts of data antinutrients leads to suppression of hydrolysis of food proteins process, reducing the efficiency of their absorption and, consequently, hypertrophy podzhel - zling gland, liver function disturbance, etc. stunting [15, 16].

RECOMMENDATIONS

The culture is mainly cultivated pumpkin three varieties: large - fetal, tverdokorymi and muscat.

Large-fruited pumpkin is the most cold-resistant, but later ripening than hard-bored pumpkin. The fruits are large in size, long-term keeping quality, high palatability and multi-seededness (100-300 g). Seme - to large (small are rare), a milky-white or brown in dependence - ing on the grade, smooth, with a clear bezel around the edges.

Tverdokorymi pumpkin is well adapted to sharp fluctuations in tempera - tours. The fruits are small, with woody bark and prickly subulate pubescent - eat. Seeds are usually medium-sized or small, rarely large, light - lo-yellow or yellowish color, with a rim of the same color.

Butternut squash is the most thermophilic and late ripening. Fruits are small and medium, elongated, narrowed in the middle. The flesh is orange, with the ICC - Katni aroma. Seeds elongated, medium or fine, creamy or ce - swarm coloration with wound or fleece rim whose color is darker coloring seed. A scar is often pronounced.

In the State Register of Breeding Achievements Approved for use include the following varieties of pumpkin: Marble, Dining

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Room Winter A-5, Lazur - naya, vitamins, Prikubanskaya. Muscat.

Recently, especially for seeds and producing tyk - venous grown pumpkin oil, which seeds have no hard shell - gymnosperms - is Danaus, gymnosperms, Sonia. The seeds of the pumpkin have a dark color (from dark green to black), which is caused by high urs - it chlorophyll.

Unlike other crops, and melons, in particular - NOSTA, pumpkin characterized universal application. She agricultu - etsya to canning factories, used in medicine and pharmacology.

Due to the high content of sugars and dietary ve - societies, good taste characteristics, easy digestibility pumpkin pulp has a high nutritional and medicinal properties. The fruit pulp contains 70-94% water and 6-30% dry matter, containing 1.5-15% sugars; 4-23% klet - Kamchatka and hemicellulose; up to 24% starch; from 0.3 to 1.5% of pectin: 1-3% azo - TIST substances; 0.5-0.7% crude fat, 0.1% acids; 0.4-1.4% ash; 25-40 mg% ascorbic acid; 2-28 mg% carotene. Pumpkin pulp and juice improves salt metabolism in the body, promotes bile secretion, it is recommended to use in cardiovascular diseases, gout, liver and kidney diseases, gastro-intestinal tract.

For processing plants pumpkin is easy to use, since thanks to the thick pulp and biochemical features amounted - Islands, it can be stored without deterioration for 3-6 months. This makes it possible to reduce the seasonality of the work of enterprises and to load production in the autumn-winter period. During storage pumpkin ripen, thus prois - walks starch hydrolysis increases sugar content, improving its taste and nutritional properties.

Pumpkin is processed into puree-like canned food for baby food and general purpose. Produce semi-finished products of pumpkin, I represent - boiling a boiled mashed potato; used for juice production; pumpkin on - Pitka blended with apricot, apple juice, orange flavored butter, etc. A byproduct of the production of the above-mentioned products are pumpkin seeds, which, at best, be used to feed standard deviation - the. At the same time, the pumpkin seeds have a unique chemical composition and headlights - makologicheskie properties that they give oil containing seeds. Pumpkin seed oil in the 30s was recognized as a table product of industrial importance.

The chemical composition of seeds (% in terms of dry matter): water - 6.02-6.50; lipids - 34.08-38.0; protein (N * 6.25) - 31.0-32.5; cellulose - 13.58-18.10; soluble carbohydrates - 9.00-10.38. The oil content in the kernel (in hulled seeds without a shell) 47.43-54.56%. In oil detected kukurbitol phyto sterol, a hydrocarbon Melen oksitserotinovaya ki - slot.

The oil is rich in biologically active ve - stances, it contained 53 micros and macroelements, carotene (provitamin A), tocopherols (vitamin E), vitamin B, PP and F. Of these: iron - 13-15 mg%, magnesium - 3-4 mg%, zinc - 8-10 mg%. selenium - 5-6 mg%. Provita - m A in the oil is represented as the sum of the different carotenoid content of from 10 to 15 mg%. Vitamin *E* in the pumpkin seeds contain oil - zhitsya in an amount of 94 mg%, and it is represented by substantially a-tocopherol (76%). Vitamin E is one of the most powerful natural antioxidant - Dante's are important for the living body and provides you - sokuyu bioactivity and rather good resistance to oxide - NIJ oils during storage.

Biologically active substances such as sterols and squalene deserve special attention. Squalene unsaturated acyclic hydrocarbon group of - iCal griterpenov. The biological significance is the cyclization of squalene in cycloartenol, from which subsequently formed steroids: sterols, steroid hormones, vitamin D. The main direction of the biochemical evolution steroi - poisons - their specialization as biological regulators. Sterols are tetracyclic alcohols. The main biochemical role of sterols is their participation in the formation of cell membranes and their transformation into various bioregulators (sex hormones, corticosteroids, vitamins of group D) that regulate the vital processes of the human and animal organism. Synthesis of steroid hormones from the sterols carried out through a series of successively occurring processes hydroxylation mole - molecules occurring in mitochondria and microsomes cells. Synthesized steroid hormones contained in the composition of lipid droplets in the cytoplasm in its - Bodnya form. Due to the high lyophilic steroids, steroid hormyl - us relatively freely diffuse across the plasma membrane into the blood and, subsequently act on target cells.

Today found that steroid hormones may have a polo - zhitelnoe action not only in violation of the functions of the body, but also in les - chenii some forms of cancer (prostate, breast), as well - as for the treatment of inflammation, asthma, and from rheumatoid - GOVERNMENTAL arthritis. It should be noted that the action of said BIOL - cally active substances does not cause adverse effects in Otley - Chie from animal's steroids.

CONCLUSION

1. The choice and justification of the dose of the starter culture introduced into the sausage meat during the sedimentation period with the introduction

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of 3% pH reaches 5.4 in 10 hours, with 5% - in 6 hours. When studying the dynamics of acid formation in the process of biomodification of raw materials at different temperatures of the environment. 2. When studying and changing the content of free amino acids in minced meat in the process of precipitation, a significant increase was observed in experimental samples. So, in the sample with B. bifudum - 23%, while in the control - only 11%. In quantitative terms, such amino acids as lysine, histidine, glutamic acid, and alanine prevailed. 3. The influence of herbal supplements from pumpkin seeds on the physicochemical, functional and technological properties of model minced meat systems and organoleptic characteristics of the finished product has been investigated. The optimal content of additives (5-10%) has been determined, at which good organoleptic characteristics of the finished products are provided. For basic formulations, balanced in amino acid composition, compositions with the introduction of 5 and 8% of herbal supplements are taken. 4. Was created a technological scheme for the production of cooked - smoked sausages using starter cultures. 5. Revealed the positive influence of the proposed biotechnological method of processing raw materials on the organoleptic, physicochemical, structural and mechanical, microbiological characteristics and biological value of the finished product.

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