

ANNOTATION

for the dissertation work of Rysgul Ashakayeva

on the topic: "**DEVELOPMENT OF A SYSTEM FOR ENSURING THE QUALITY AND FOOD SAFETY OF MEAT RAW IN THE TECHNOLOGY OF SAUSAGE PRODUCTS**"

submitted for the degree of Doctor of Philosophy (PhD) in the specialty
6D073500 – "Food Safety"

Relevance of the work: In the message of the President of the Republic of Kazakhstan Kassym-Jomart Tokayev to the people of Kazakhstan on September 1, 2023 "A fair state. One nation. Blessed Society" highlighted the directions of development of our country, including the development of the agro-industrial complex, the production of new food products, as the most important tasks facing Kazakhstan.

Satisfying the needs of the population in high-quality food and ensuring food safety of products is directly related to the production of environmentally friendly meat products and compliance with food safety conditions in the workplace.

The safety of products from high-quality meat raw materials produced in the country is ensured by the use in production of modern equipment and technologies, security systems based on the principles of HACCP.

The effective use of local meat raw materials, increasing the nutritional value in the production of semi-smoked sausage products enriched with protein-fat emulsion, meeting the principles of healthy nutrition by adding plant components, is an urgent problem in food production.

The main relevance of the research work is to develop the technology of semi-smoked horse meat sausage products with protein-fat emulsion, to study the quality and safety of the finished product.

Object of research: semi-smoked horsemeat sausage enriched with protein-fat emulsion with the addition of dried pumpkin pulp powder.

The aim of the work is to create a system for ensuring food safety of semi-smoked sausage products enriched with protein-fat emulsion, based on the principles of HACCP.

In accordance with the dissertation's objective, the following tasks were solved:

- Determination of the composition and safety of protein-fat emulsion to increase the biological and nutritional value of semi-smoked sausages;
- Development of the formulation and technology of semi-smoked sausage products enriched with protein-fat emulsion;
- Determination of critical control points in the production of semi-smoked sausage products, prevention of dangerous factors and ensuring product quality and food safety, based on the HACCP system;
- Determination of food, biological value and food safety of finished products;
- Approval of regulatory and technical documentation for semi-smoked sausage enriched with protein-fat emulsion, industrial testing in production conditions.

The main content of the work: The dissertation consists of an introduction, a literature review, the definition of objects, methods and stages of research, the development of the formulation and technology of semi-smoked sausage enriched with protein-fat emulsion, the study of food safety and quality indicators of semi-smoked sausage using the principles of HACCP, calculation of economic efficiency, bibliography and applications.

The literature review analyzes the scientific and technical literature on the current state of food safety and the importance of the production of semi-smoked sausages enriched with protein-fat emulsion.

Research methods. When developing a new product, complex and standard studies were carried out using modern methods to determine physico-chemical, microbiological, structural-mechanical, organoleptic indicators. The research results were processed by methods of statistical analysis and mathematical modeling. Experimental studies with a repetition of 5-6 times.

Theoretical and experimental part. Chapter 3 presents the results of the study of food safety and microbiological indicators of horse meat. The effect of protein-fat emulsion on the quality of semi-smoked sausage made of horse meat has been established and the optimal formulation and technology of semi-smoked sausage "Narli" has been developed. The structural and mechanical properties of the finished product are investigated, the results of the study of moisture-binding and moisture-retaining ability, physico-chemical parameters, nutritional and biological value are presented.

In chapter 4, the organoleptic, physico-chemical and microbiological parameters of the semi-smoked sausage "Narli" are investigated, the content of macro- and microelements, vitamins and amino acids in the finished product is analyzed, and control critical points in the production of semi-smoked sausage are determined. The recipe of semi-smoked sausage is presented by the method of mathematical modeling.

Chapter 5 shows the calculation of the economic efficiency of the production technology of semi-smoked sausage "Narli", enriched with protein-fat emulsion.

Scientific novelty of the research. To ensure product quality and food safety by preventing dangerous factors, the HACCP system is used in the production technology of semi-smoked sausages enriched with protein-fat emulsion, as products useful for the human body.

Smoked sausage product enriched with protein-fat emulsion has been tested in production, regulatory and technical documents have been prepared. The nutritional value of the finished product was determined by its food safety.

"The method of production of semi-smoked sausage" is confirmed by the patent of the Republic of Kazakhstan for a utility model (№5235 dated 30.07.2020).

Scope of application: The research results can be widely used in catering technology and in sausage production.

The practical value of the scientific results. The optimal formulation and technology of semi-smoked sausage "Narli" enriched with protein-fat emulsion has been developed. Food safety, nutritional and biological value of semi-smoked sausage "Narli" has been determined.

Approbation of the scientific results. The main results of the dissertation work were reported at International scientific and practical conferences: "HACCP zhuyesin paidalanu kezinde shuzhyk onimderinin sapasy men kauipsizdigi" (Pavlodar, 2019); "Tagamdyk kauipsizdik et shikizatyn sapasy" (Semey, September 27, 2019); "Askabaktyn zhumsak untakty kospasyn paidalanu zhane zhylyky eti negizindegi zhartylai ystalghan shuzhyktardy ondiru technolohiyasy" (Pavlodar, 2020); "Et onimderi ushin bayytylgan akuyzdy-maily emulsiyasyn zhasau" (Nur-Sultan, April 2020); "Quality control and safety of meat products" (Omsk, April 2020); "Akuizdy-maily emulsiyany et shikizatyndagy shuzhyk onimderinin sapasy na aseri" (Kyzylorda, April 23, 2020); "Requirements for the quality and safety of raw materials for sausage products" (Meleuz, April 17, 2020); "HACCP kagidattary negizinde management zhuyesin paidalanu zholy men shuzhyk onimderinin sapasyn kamtamasyz etu" (April 2020); "Food safety and quality of meat raw materials" (Vancouver, Canada, February 15, 2019).

Publications. 15 papers have been published on the topic of the dissertation, revealing the basis of the research. 1 (one) in the journal "A Pumpkin-Based Emulsion Gel as a Texture Improvement of Mixed Horsemeat Semi-Smoked Sauces" (Basel, Switzerland, Foods 2022, 11(23), 3886, Q1) with an impact factor greater than zero in an article in Web of Science scientific journals recommended by the Control Committee in the field of education and science of the Ministry of Education and Science of the Republic of Kazakhstan: "Et onimderinin sapa zhane kauipsizdik korsetkishti" (Bulletin of the Semey State University named after Shakarim, No.3-87 September 2019), "Shuzhyk onimderinin tagamdyk kundylygy" (Bulletin of the Semey State University named after Shakarima, No.4-92 December 2020), "Kazakstandagy et onimderinin kauipsizdigin kamtamasyz etu juyeleri" (Bulletin of the Semey State University named after Shakarim, No. 4-92 December 2020), Semey State University named after Shakarim The main indicators of the quality of horses meat Semey State University named after Shakarim (Bulletin of the Semey State University named after Shakarim No. 2-90, 2020) 4 (four) articles, 8 (eight) articles in the materials of the international scientific and practical conference, 1 (one) article in the scientific and practical conference of the far abroad, 1 (one) article on the utility model of the Republic of Kazakhstan (Patent No. 5235 of 30.07.2020) received a positive conclusion.

The structure and scope of the dissertation. The dissertation work consists of an introduction, five chapters, a conclusion, a list of references and appendices. The main text is presented on 93 pages of typewritten text, contains 26 tables, 15 figures, the list of references includes 149 sources and appendices.

Assessment of the completeness of solutions to the tasks. The data obtained allow us to assume that all the tasks set in the dissertation work have been completed and the purpose of the dissertation has been achieved. In conclusion, the author presents the main conclusions and results:

1. A protein-fat emulsion has been prepared, designed to increase the biological and nutritional value of horse semi-smoked sausage. The chemical composition of the emulsion: protein – 17.51%, fat content – 21.90%, humidity – 59.90%, ash content – 0.69%.

2. The technology of semi-smoked sausage product enriched with protein-fat emulsion with optimal formulation has been developed. Semey State University named after Shakarim Method of semi-smoked sausage production Semey State University named after Shakarim No. 5235 of 30.07.2020 is confirmed by the patent of the Republic of Kazakhstan for a utility model.

3. Based on the HACCP system of semi-smoked sausage products, critical control points have been identified in order to prevent dangerous factors in production, ensure product quality and food safety.

4. The nutritional and biological value of the finished product was determined, food safety: humidity – 58.80%, fat content – 17.40%, protein – 22.90%, ash content – 0.90%, the amount of macro- and microelements in it: magnesium – 1.7 times, potassium – 1.4 times, calcium – 2.03 times, iron – 1.3 times higher than in the control. Compared with the control sample, the amino acid content showed a higher content of glutamic acid, proline and glycine. In order to determine microbiological parameters, a microbiological study of raw horse meat, minced sausage with the addition of protein-fat emulsion and the finished product was carried out.

5. The standard (C 31786-02-2020) and the technical manual (TN 31786-01-2020) for semi-smoked sausages enriched with protein-fat emulsion have been approved. The production certification of semi-smoked sausage was carried out in the sausage shops of JSC "Tyumenbayev", Semey city (Abay district) and JSC "DARIA", "Masayeva A.T".