

PROVISION OF FOOD SAFETY FOR GLUTEN-FREE BREAD WITH UTILIZATION OF COMPOSITE FLOUR

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Abstract

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

The relevance of the research. The President of Kazakhstan K. Tokayev in his Message to the people of the Republic of Kazakhstan about "Constructive public dialogue - the basis of stability and prosperity of Kazakhstan" paid special attention to the agro-industrial complex (AIC).

The program for the development of the agro-industrial complex of the Republic of Kazakhstan was developed in accordance with the instructions of the Head of State, in accordance with the strategic development goals of the Republic of Kazakhstan, outlined in the Plan of the Nation "100 concrete steps" and the Strategy "Kazakhstan-2050". Thus, this program will be aimed on provision of the internal needs of the population for popular types of agricultural products.

The issue of ensuring food safety includes political, social, technical, economic, medical and other aspects. There are many practical tools for food safety. One of them is technical regulation. Technical regulation serves as a legal basis for regulating relations arising from the formation of mandatory and voluntary requirements for products and processes, as well as for assessing the compliance of objects of regulation with established requirements. The quality of food products is checked for compliance with the requirements of certain technical regulations, standards, indicators. The reason for this is the main requirement which always be food safety.

Nutrition is one of the most important factors that determines the health of the population. Right nutrition contributes to the prevention of various diseases, prolongation the life of people, increase their efficiency. Bread occupies a special place in the nutrition of the population of Kazakhstan, as it is a product of daily consumption. It has been established that only at the expense of bakery products, up to 30% of energy needs, up to 20-30% of the needs for plant proteins, up to 30% for carbohydrates are covered.

However, traditional varieties of bread have a negative effect on the human organism, causing celiac disease. In the last decade, the attention of researchers has been increasingly attracted to the problem of intolerance to cereal protein - gluten. An increasing number of people are suffering from allergies due to the consumption of any food containing gluten. According to statistics, 1 out of 262 people was diagnosed with celiac disease. Unlike many other types of allergies, gluten allergy can cause serious disruption of gastrointestinal work.

The results of a study of the health status of residents suffering from celiac disease showed need of gluten-free foods for a large group of people. Based on this, we can assume there will be a high demand for gluten-free bakery products, in other words, for

the production of healthy food products by including various types of gluten-free raw materials in the recipe.

Object of study: new composite flour, gluten-free bread.

Purpose and objectives of the study. The purpose of the work is to study the food safety of gluten-free bread using composite flour.

To achieve the goal, the following tasks were set:

- substantiation of raw materials included in the composition of composite flour;
- development of recipes and technology of new composite flour and the study of its nutritional and biological value;
- development of recipes and technology for the preparation of gluten-free bread and the study of its nutritional and biological value;
- food safety studies of new composite flour and gluten-free bread;
- bringing the production of gluten-free bread in accordance with the HACCP principles, approving the normative and technical documentation for gluten-free bread, carrying out work on introducing it into production.

The main content of the work. The dissertation consists of an introduction, a review of the literature, steps, objects and methods of research, the development of a recipe and technology for the production of composite flour and gluten-free bread, the calculation of economic efficiency, the results of a study of food safety, the application of HACCP principles, a list of references and an appendix.

In the review of scientific and technical literature topical problems of ensuring the quality and safety of bread products are considered; an analysis of scientific works in the field of preserving the quality indicators of products for people suffering from gluten intolerance and obtaining gluten-free bread products was carried out.

Research methods. Experimental studies were carried out 5-6 times. When developing a new product, complex and standard studies were carried out to determine the physicochemical, microbiological, structural, mechanical, and organoleptic parameters. The research results were processed by statistical analysis and mathematical optimization.

Theoretical and experimental part. In the 3rd chapter, the composition of the composite flour was determined by mathematical modeling and optimization criteria. Based on the results of marketing research, it has been determined that gluten-free bread is a popular product. A recipe for a new composite flour and gluten-free bread has been developed. Physico-chemical indicators, nutritional and biological value have been studied. The economic efficiency of the production of composite flour and gluten-free bread has been determined.

The 4th chapter presents the results of a study on the food safety of a new composite flour and gluten-free bread. The results of the study prove that the new composite flour and gluten-free bread are safe for people suffering from gluten intolerance. Clinical trials of the developed gluten-free bread were carried out.

In the 5th chapter a comprehensive study of the safety of gluten-free bread using a new composite flour was carried out, and in order to improve the quality of gluten-free bread, critical control points were identified using the HACCP system.

The appendix contains test reports, acts of industrial approbation and implementation of the technology for the production of new composite flour and gluten-free bread, regulatory and technical documentation.

Scientific novelty. The effectiveness of the use of composite flour, which includes amaranth and chickpea flour, wheat starch, has been developed and substantiated. In addition, the amount of composite flour in the composition of gluten-free bread for people suffering from celiac disease has been theoretically and experimentally substantiated.

Scope: the results of the research can be used at bakeries, in specialized nutrition, for therapeutic and prophylactic purposes, and at public catering establishments.

The practical value of the work. At the enterprise JSC "East-Kazakhstan flour-grinding and mixed fodder plant" has introduced the production of fortified flour of the highest and first grades under production conditions for baking bread using the technology for the production of composite flour. SemNan LLP, which produces bakery products, has introduced a technology for the production of gluten-free bread under production conditions.

The author's personal contribution consists of setting the scientific goal and objectives of the study, conduction of theoretical and experimental studies and processing the results; conduction of pilot tests and practical implementation of the results.

Approbation of work. The main results of the dissertation work were reported in the scientific journals of the Republic of Kazakhstan in the Herald of the Almaty Technological University "Studying food safety in bread production technology", in the Herald of the Shakarim University of Semey "Analysis of the quality of gluten-free bread", International Journal of Recent Technology and Engineering "Technology of production, nutritional value and food safety of gluten free bread", Indian Journal of Public Health Research and Development "Gluten-Free Diet: Positive and Negative Effect on Human Health", Food Science and Technology "Composite flour production and assessment of the safety quality of gluten-free bread" were published and discussed in scientific journals with an impact factor, in international scientific and practical conferences: "Food safety of gluten-free Bread With the use of Composite Flour", Germany, Berlin, Science, Research, Development; "Studies of amaranth flour for the production of bakery products", RF, Kemerovo, XV All-Russian scientific and practical international conference "Science and production: state and prospects"; XVI International scientific and practical conference "Food. Ecology. Quality"; "Advantages of using of wheat starch in the baking industry and its food safety" Russian Federation, Barnaul, XVI International Scientific and Practical Conference "Quality of products, technologies and education"; "Production of wheat starch for inclusion in the formulation of bread ensuring food safety of the product", Russian Federation, Magnitogorsk.

Publications. On the topic of the dissertation 14 scientific papers were published, including 3 articles in journals recommended by the Committee for Quality Assurance in Science of the Ministry of Science and Higher Education of the Republic of Kazakhstan; 3 articles in journals included in the Web of Science and Scopus database and having a non-zero impact factor; in 8 documents of international scientific and practical conferences; 1 utility model patent of the Republic of Kazakhstan.

The structure and scope of the dissertation. The dissertation work is presented on 137 pages of computer text, consists of a review of scientific and technical literature and

patent search, experimental research methods, discussion of the research results, outcomes and conclusions, a list of references, including 161 titles, 36 tables, 31 figures and 6 appendixes.