

ABSTRACT

of the dissertation work by Almaganbetova Aigul on the topic “Regulatory support of the technology for the production of co-extruded products from poly-cereal flour raw materials” submitted for the degree of Doctor of Philosophy (PhD) under the education programme 8D07501– “Standardization and certification (by industry)”

Relevance of the research work.

To increase nutritional value of multigrain products of high degree readiness is possible by combining diverse cereal and leguminous crops, which contain maximum amount of nutrients and minerals and introduction into the structure of the filler – filling, which has high nutritional and energy value.

The more perspective way of increasing nutritional value of grain products is making polycereal mixtures of whole grain, which are more balanced by amino acid, mineral and vitamin composition.

Such cereal products will meet contemporary demands to food products, which coincide contemporary scientific concepts of rational and healthy nutrition made of whole or sprouted grain, also polycereal mixtures prepared according to scientifically based recipe and enriched with natural nutrients.

Along with strategic objectives of agri-food market there is a problem of increasing the quality and expanding the range of processed and food products, due to new technologies of food production with high price, high nutritional value, and with therapeutic and prophylactic effect.

In Southern regions of Kazakhstan grow a big amount of leguminous crops (beans, peas, chickpeas, lentils, also soybeans), but there is no industrial processing. The same problem have the main grain species: corn and wheat are processed mainly into flour and cereals, and oats have recently been partially processed into the production of oat flakes, and other grains aren't used at all, except producing regular crops.

Also fast food products changed nutrition habits and became one of the traditional nutrition forms worldwide. They are used by the population of many countries as ready-made breakfasts and healthy nutrition. In the USA, for instance, the ready-made food products and snacks' market is annually increasing for 3%. Domestic market can satisfy this and demand for protein food only thanks to import.

High degree readiness products production, also coextrusion food made of leguminous raw materials, which have energy and nutrition value is undoubtedly, relevant and timely solving the problem of expanding the range of therapeutic and prophylactic food products grain and cereal crops of domestic selection.

As a result of dissertation research work deeper scientific-technical and practical knowledge was gained about biological active substances coextruded polycereal products of high degree readiness, about physiological functional ingredients enrichment of products, which have therapeutic and prophylactic

properties which leads to a positive socio-economic effect and justifies the expenditure of budget funds.

Currently, due to the active development of entrepreneurship and business the diet of population highly contain fast food products (ready-made products), also dietary, therapeutic and prophylactic, health-improving based on grain crops. The demand of fast food with high in protein and dietary fiber is also increased.

Lately individual entrepreneurs in Kazakhstan attempt to establish the production of high degree ready food products. One of the features of these small industries is that the composition of the ingredients of their products is poor and contains only corn, salt and sugar. That is why the range of it is limited.

The production of high degree ready food products, as well as coextruded ones mode of polycereal and leguminous raw materials, which have energy and nutrition value is undoubtedly relevant and timely solving the problem of expanding the range of therapeutic and prophylactic food products cereal crops of domestic selection

Accordingly, the main scientific concept of this dissertation is scientific-practical generalization of research results of the production process of extruded polycereal food products with high degree readiness with fruit and berry filling which have nutrition and energy value and balanced by amino acid and vitamin composition.

The aim of the research work is to expand the range of extruded polycereal food products with high degree readiness with fruit and berry filling by developing and compiling scientifically based recipes, balanced by amino acid and vitamin composition.

Research objectives:

- Monitoring of the polycereal production market with high degree of readiness (analysis of the high degree readiness products highlighting the main product categories and the developing the range of new products);
- Analysis of problems of regulatory support of food products in Republic of Kazakhstan;
- Analysis of technological line of polycereal products' production process with high degree of readiness depending on the range of the product (analysis of scientific- theoretical basis of technological process flow, establishing performance indicators for individual processes);
- Study of the chemical composition (protein, carbohydrates, fat, vitamin and amino acid compositions) and food safety indicators (pathogenic microflora, residual content of heavy metal salts) of the objects of study (domestic varieties of cereal crops, fruit and berry raw materials);
- Formation of a technological line for the production of polycereal products depending on the range of finished products (process flow diagram and recommendations for equipping with modern samples of technological equipment);
- Selection and analysis of functional fillings for the enrichment of highly prepared products, development of thermostable fillings based on plant raw materials, intended for the production of highly prepared products with a

filler with functional properties (components based on nutritional value and therapeutic and prophylactic properties, selection of valuable components for the production of recipes for thermostable fillings based on plant raw materials);

- Development and scientific substantiation of a method for preparing extruded food products with filling (experimental studies to establish the main dependencies of the flow of technological processes);
- Development of measures for regulatory and technical support for the production of extruded polycereal products of a high degree of readiness with fruit and berry filling.

Justification for novelty and practical value of research results

Scientific novelty:

- recommendations are given on innovative directions for the development of the food concentrate industry in the field of production of coextruded products;
- a diagram of the technological line for the production of multigrain products has been developed depending on the range of finished products;
- functional fillings based on plant raw materials were selected and analyzed to enrich highly prepared products;
- thermostable fillings based on plant raw materials have been developed, intended for the production of highly prepared products with fillers that have therapeutic and prophylactic properties.

Practical value.

Expanding the range of new food products, improving the nutritional structure, improving health, increasing the immune defense of the human body.

The author's personal contribution lies in setting the necessary tasks, planning and conducting experiments, statistical processing of the results obtained and their publication, conducting industrial testing of the proposed high-grade food products from non-traditional polycereal raw materials with fruit and berry fillings; participation in the development of regulatory and technical documentation.

Compliance with directions of scientific development or government programs:

Some results of the dissertation work were obtained with partial use of the results within the framework of grant research work funded by MES of RK on topic No. 0112PK01528 "Development of technology for the production of high degree of readiness products from domestic polycereal raw materials" (2012-2014) and on topic No. 0115RK00719 "Development of technology for the production of extruded multi-grain products of a high degree of readiness with fruit, berry and meat and dairy filling" (2015-2017). The doctoral student participated in these projects as a performer.

Scientific provisions submitted for defense:

- scientific basis for the use of polycereal flour mixture to improve the nutritional structure of coextruded food products of a high degree of readiness;

- scientific basis of regulatory and technical support for the production of coextruded food products of a high degree of readiness.

Approbation of the work.

The research results were tested in laboratory and industrial conditions.

Standard and modern methods of statistical data processing were used, which show the reliability of the results of the work.

The research results were published in scientific journals with a non-zero impact factor and reported at international scientific and practical conferences.

Description of the doctoral student's contribution to the preparation of each publication: all results and conclusions presented in the dissertation work were obtained and formulated with the direct participation of the applicant in accordance with the doctoral student's individual research plan. The doctoral student mastered modern research methods, took an active part in the discussion and publication of the results obtained, preparation and design of scientific articles for publication in domestic and foreign scientific journals.

Publications. On the topic of the dissertation, 6 scientific works were published, 1 - in a journal included in the Scopus information resources (45th percentile); 4 - in scientific publications recommended by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan and 1 – in materials of international scientific and practical conferences.

Structure and scope of the dissertation. The dissertation consists of an introduction, four chapters, a conclusion, a list of used sources of 150 titles and appendices. The dissertation is presented on 135 pages, contains 14 tables, 57 pictures.