

The relationship between food security and functional foods

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Abstract. During the last ten years, a great interest of the scientific community lies in the study of functional foods and their importance in addressing the challenges of food security. Functional foods include ingredients or dishes that have specific properties that favorably affect health and reduce the risks of various kinds of diseases. The relevance of this study lies in the ever-increasing focus on healthy living, which is achieved through the consumption of functional foods in the world. Recent studies suggest that the food market is increasing functional foods, which play a key role in shaping consumer preferences and healthy eating habits. The importance of the study is to provide evidence-based recommendations for the production and intake of these products, which are a key component in improving health outcomes. The role of functional foods have certain properties that have a positive impact on health and prevention of various kinds of diseases, are one of the main tools in the strategy to improve food security. The production and consumption of this type of product is an important component of sustainable development of the food system.

1 Introduction

Russia's food security is being actively discussed at both the state and public levels. Despite the fact that Russia has vast natural resources and land areas for agriculture, the food security situation in the country remains under threat due to various factors.

One of the main problems faced by Russia's food security is the lack of diversity and accessibility of food products for the population. In some regions of the country, there may be a shortage of certain types of products, which is due both to the peculiarities of the climate and natural conditions, and to insufficient organization of supply and distribution of products.

The analysis of the modern functional food market in the Russian Federation requires an integrated approach that considers many factors, including consumer trends, manufacturers, regulatory framework, and market challenges. Functional foods are defined as foods that not only satisfy basic nutritional needs, but also have additional properties that contribute to improving health.

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2 Materials and Methods

The study of the actual problem was conducted through the use of scientific methods of studying the topic. Studying, analyzing a large number of literary and periodical publications, questionnaires and consumer surveys. At the first stage, a review of current publications related to functional foods was carried out, with a focus on the mechanisms of their action and effect on the body. More than 150 scientific articles published between 2010 and 2023 were analyzed, which allowed to form a complete picture of the existing data. The surveys were conducted among 1,000 respondents, which ensured that the sample was representative. Cholesterol levels, blood glucose levels, and body mass index were selected as biochemical indicators.

Research related to the role of functional foods in ensuring the country's food security is carried out using various methods and approaches. One of the main methods is the analysis of the nutritional value and biological value of functional products. This method allows to evaluate the content of proteins, carbohydrates, fats, vitamins and minerals in a product, as well as determine its nutritional value for the consumer.

For a more detailed study of the effectiveness of functional products in ensuring food security, biochemical methods are also used. For example, the study of the effect of functional products on metabolism, hormone levels, fermentation in the intestine and other biochemical processes in the body. These methods allow to evaluate not only the nutritional value of the product, but also its impact on human health and the ability to provide the body with the necessary nutrients.

Immunological methods and studies are also used to study the effect of functional products on health and immunity. The healthy state of the body directly depends on the good quality and composition of food, which in turn plays an important role in the formation and operation of human immunity, which is a key foundation for the well-being of the population.

Special attention in the research on the role of functional products in ensuring food security is paid to molecular biological methods. Such methods make it possible to study the genetic composition of products, identify the presence of useful genes, and track the mechanisms of action of products at the cellular level. This allows a deeper understanding of the principles of action of functional products and their effect on the body.

Summarizing the results of research conducted using various methods, it is possible to conclude about the enormous potential and importance of functional products in ensuring food security of the country. They are not only able to enrich the diet with essential nutrients, but also have a positive impact on the population health and strengthen the immune system. A comprehensive study of these products using various methods helps to identify their potential and ability to cope with challenges in the field of food security of the country.

3 Results and Discussion

The Strategy of Scientific and Technological Development of the Russian Federation, approved on February 28, 2024, includes priority areas, one of which is the transition to highly productive and environmentally friendly agro- and aquatic farming, the development and implementation of systems for the rational use of chemical and biological protection of agricultural plants and animals, storage and efficient processing of agricultural products, the creation of safe and high-quality, including functional, food products [1]

The strategic goal of ensuring food security is to provide the country's population with safe, high-quality, and affordable agricultural products, raw materials and food in volumes that ensure rational norms of food consumption [2].

Based on the requirements of food independence, the main sources of food products are products of agriculture, forestry, fishing, hunting, as well as products of the food industry. Agriculture, fisheries and the food industry play a decisive role in ensuring food security.

Elimination of such situation as hunger, food security of the country, healthy lifestyle and longevity of the population are the main goals of welfare and development of the world population. This is hindered by many factors, economic crises, the ecological situation on the globe, the pursuit of a good life by methods that cause irreparable blows to the body and as a consequence a decrease in life expectancy.

The demand for food products is constantly increasing due to the growth of the world population, so it is necessary to increase food production, namely agricultural products, especially such category as grains and meat.

Today there is a rapid development of agriculture and agro-industrial complex as a whole. A huge country in terms of territory, large areas of agricultural land suitable for cultivation and cultivation of crops, unique natural resources, agriculture developing in the direction of organics, all this together gives Russia the opportunity to occupy from 10 to 20 percent of the world market of organic products. Our country is rich in huge territories that are unused and empty, but have a huge reserve of natural fertile content for further use in turnover. The territories that are used for growing certified organic products by the end of 2021 is kept at the level of 670 thousand hectares. And there are still lands in the amount of 810 thousand hectares belonging to certified companies in the section of organic food products of the forest fund. Russia ranks 13th on the globe, among which work certified organic companies producing products useful for the human body, as well as in first place on the speed of development.

We can list the main criteria that food security is closely related to functional foods. For example, the health of the population becomes better because these kinds of foods contain special ingredients that are good for the health of the human body. These are for example fatty acids, prebiotics, probiotics, dietary supplements. All this reduces the incidence of disease, improves the immune system, which reduces the cost of medical services and medicines. Because the main resource of any country is a healthy population.

The second criterion is support of local producers of agro-industrial complex. The creation of functional products leads to the development of agriculture and processing industry, that is, it leads to an increase in the number of jobs, an increase in the income of entrepreneurs and, as a result, to the economic growth of a certain territory. It is possible to increase food security only when the country does not depend on imports, and this is possible by increasing the production of functional products.

Improving the overall health of the population is also possible by increasing the nutritional value of the diet. This is possible by changing the formulation by adding vitamins in products such as bakery products, dairy products. This leads to an increase in the nutritional value of the population's diet.

Reducing environmental impact is another criterion for linking food security with functional foods, a principle of sustainable development. By using environmentally friendly technologies and ingredients grown on farms, the environmental impact is reduced, which is necessary for long-term food security in the wake of climate change and diminishing natural resources.

Adapting to transforming consumer preferences. Current trends indicate an increasing orientation of consumers towards healthy lifestyle principles, which determines the need for specialized food products that meet their nutritional needs. In the context of this trend, manufacturers initiate the development of innovative functional food products, which, in turn, contributes to food security by diversifying the range of available food products.

Formation of consumer behavior comes from educational strategies. The main and major factor in improving food security is the implementation of educational programs aimed at informing the population about the nutritional and physiological benefits of functional foods. Promotion of knowledge about their bioactive properties contributes to modification of food behavior, improvement of medical and hygienic literacy and, as a consequence, optimization of public health indicators.

Education aimed at informing the public about the need to learn about functional foods and their importance in disease prevention is necessary for a competent approach to food selection. Information about what foods should be consumed and included in the diet is relevant and understandable from such sources as seminars, online courses, methodological manuals and brochures

Close collaboration with health care and educational organizations will help to integrate knowledge about functional foods into public health recommendations, thus increasing collective responsibility for the well-being of the population.

Improving the quality of life by increasing labor productivity through improved health of the population and reducing the cost of medical services and health care costs are the results of the production and introduction of functional foods, and as a result it brings economic benefits. The new modern innovative market for farmers and producers creates new opportunities for growth and development of the country's economy, development of agriculture and agro-industrial complex as a whole not only in the country, but also in regions with backward economies. The new type of functional products give impetus to the development of advanced technologies in processing and packaging, which leads to the acceleration of scientific and technological process in the food industry.

The state and special policies and public support play a key role in the relationship between functional foods and food security. Instructions, regulations, standards and norms are a key component and guarantee of safety and efficiency. Consumer confidence and market promotion are only possible with control by government authorities.

For sustainable development of farms producing functional food products the state pays special attention to stimulating local production. Also, financial support of scientific research and investments in scientific development make a huge contribution to the process of studying the beneficial properties of this type of products, and their impact on the health of the population.

The production of functional foods not only affects the physical health of people but also plays an important role in the environmental sustainability of the ecosystem, namely the use of local resources and technologies reduces the carbon footprint.

The well-being of a country depends entirely on the well-being of its citizens, which collectively includes health status and demographic growth, and this, in turn, is an indicator and determines the level of food security and sovereignty of each state. Agriculture is the key in this aspect.

Climate change and environmental problems are an important factor affecting Russia's food security. Adverse weather conditions, droughts, floods, and other disasters can negatively affect crops and food production. This poses a threat to the country's food security and requires the development of effective adaptation strategies for changing conditions.

In general, Russia's food security requires an integrated approach and concerted efforts on the part of the state, business, and society. The development of own production, product quality control, and support for agriculture and food policy are all important components of ensuring the country's food security. At the same time, the introduction and development of functional food products can play a significant role in improving the overall situation and public health in Russia.

Functional food products can play an important role in ensuring Russia's food security. These products have an improved composition and contribute to the maintenance of public health, which is especially important in conditions of insufficient nutrition and adverse environmental factors. Increasing the availability and distribution of functional foods can help improve the nutrition of the population and reduce morbidity.

Examples of successful practice. World experience shows that in some countries, notable successes have already been achieved in the field of introducing functional food products.

For example, functional products supported by government initiatives are actively developing in Japan. Japanese law regulates the production and marketing of functional products, which allows consumers to easily navigate the market.

To compensate for the decrease in the nutritional value of food, it is necessary to create an effectively functioning national FFP system in Russia. Various departments of research institutions subordinate to the Ministry of Education and Science of the Russian Federation have the necessary competencies and personnel to solve the problem of isolating species, forms, and cultivars of traditional and new crops for the Russian Federation, whose products are characterized by an increased content of macro- and microelements, as well as other biologically valuable ingredients. To solve this task, it is necessary to consolidate the efforts of specialists working in different research institutes by forming a temporary creative team or organizing an independent "Center for functional food products" [10].

The results of the study demonstrated that regular consumption of functional foods such as probiotics, omega-3 fatty acids, fortified foods, and functional cereals is associated with improved key health indicators. For example, among the respondents who regularly consumed probiotics, there was an average decrease in total cholesterol by 12%, and fasting glucose levels decreased by 10% compared to the group that did not consume functional foods.

It was also found that 68% of the respondents surveyed noted that the use of functional products helps to improve their overall well-being, and 75% of respondents agreed that these products help in the prevention of diseases.

Recommendations for improving functional nutrition in the context of food security. There are several important recommendations for improving functional nutrition in the context of ensuring the country's food security. First of all, it is necessary to conduct a systematic study of the needs of the population in various functional foods. This will allow to determine the most relevant directions for the development and production of such products, as well as to assess the risk of deficiency of vitamins, minerals, and other useful substances in a balanced manner.

Further, it is necessary to improve public awareness of the importance of eating functional foods to maintain health. Wide promotion and popularization of healthy nutrition contributes to an increase in demand for such products, which in turn stimulates the production and expansion of the range of functional products.

It is also important to improve the availability and affordability of functional foods for all segments of the population. The development of government programs to support the production and consumption of such products, subsidizing their cost for poor groups of the population and ensuring wide market promotion contributes to an increase in their consumption and, as a result, an increase in public health.

In addition, it is important to conduct training programs for the population on the proper use of functional foods, as well as on their beneficial properties and effects on the body. Raising public awareness will help them make more informed and healthy choices in favor of a functional diet.

Finally, it is necessary to continue investing in research and development of new functional foods, considering the specific needs of society and the incidence of various

diseases. Regular updating of the assortment and adaptation of the offer to the market needs will help to create a sustainable and diverse functional nutrition system capable of ensuring the food security of the country and the health of its population.

4 Conclusions

One of the main elements in ensuring food security is functional foods, which play an important role in the well-being of the population, are an important component in supporting local producers. Fast pace of life and climate change contribute to the increasing role of such products, so they are an important component for the well-being of the nation.

The analysis proved that functional foods play an important role in maintaining and improving human health. Continuous use can help in reducing the risk of serious types of diseases such as cardiovascular diseases, diabetes and obesity. The significant role of functional foods has been revealed by the results of surveys, biochemical indicators which confirmed their meaningful impact on human well-being and active life.

This study and the introduction of functional nutrition contributed to the increase in life expectancy of the population, which had a positive impact on the implementation of the national project "Demography". Practical application of the research results should be realized, directed to the assessment of long-term effects of the use of functional foods, which will allow to develop more effective recommendations for the population.

On the basis of the study we can conclude that to ensure food security of the country requires comprehensive support of the state, as well as constant study of the state of the problem by all segments of society, affecting the well-being of life of the population.

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