

A systematic approach to the production of functional food products using medicinal plant raw materials

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Abstract. A systematic approach to the production of functional food products using medicinal plant materials, including four stages, is proposed. At each stage, goals and objectives are formulated, for the solution of which legal acts (orders) are issued by the heads of the Departments of Forestry, Health, Industry and Trade at the regional level. The Forestry Department controls the procurement of food forest resources and the collection of medicinal plants. The Department of Health resolves fundamentally important issues related to the detection and prevention of non-communicable diseases, and the conduct of clinical trials. The Department of Industry and Trade selects food industry enterprises in the region, organizes and introduces functional food products into production. The necessity of using medicinal plant raw materials as a valuable source of biologically active substances in functional food technologies is substantiated. The regulatory framework regulating the production, procurement and storage of plant raw materials is presented, the goals and objectives of individual Departments responsible for the quality of life of the population are formulated, and a systematic approach is proposed for the development and promotion of functional food products at enterprises in accordance with the needs of the regions.

1 Introduction

One of the socially significant problems in Russia is providing the population with high-quality and safe food. To maintain health, performance and an active lifestyle, a complete and regular supply of the human body with nutrients, including biologically active ones, is of particular importance. Many nutrients are not synthesized by the human body and are essential substances that ensure the vital functions of the human body and protection from

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diseases and adverse environmental factors. To analyze the nutritional status of the population, an observation system has been created, which includes the Russian Academy of Medical Sciences (RAMS), the Ministry of Health of the Russian Federation, the Federal State Statistics Service Rosstat and others (Federal Law “On the Quality and Safety of Food Products” dated January 2, 2000 No. 29-FZ).

The report on the state of sanitary and epidemiological well-being of the population in the Russian Federation noted that in the structure of per capita consumption of food products of the population of the Russian Federation since 2011, there has been a positive trend in the consumption of vegetables and fruits, dairy products and fish. At the same time, consumption of basic food groups remained at an insufficient level and did not meet standards.

At the same time, monitoring the safety of food raw materials and food products, as noted in the report, showed that during the period 2011-2020 there was a decrease in the proportion of product samples that did not meet sanitary and epidemiological requirements for sanitary-chemical and microbiological indicators (On the state of sanitary epidemiological well-being of the population in the Russian Federation until 2020: State report (Federal Service for Surveillance in the Sphere of Consumer Rights Protection and Human Welfare, Moscow, 2021).

Food choice directly affects the health status of consumers [1]. Eating certain types of foods can help reduce your risk of a number of diseases. Functional foods are developed to promote consumer health beyond basic nutritional needs [2].

A balanced diet is an important factor in preventing the progression of many diseases. Changes in the structure and quantity of food consumed lead to a deficiency in the human body of a number of biologically active micronutrients.

In order to overcome the existing shortcomings of traditional food products, the food industry is currently working to minimize artificial food additives and develop food products that include nutritional elements. Due to consumer awareness of the connection between a healthy diet and lifestyle and a decrease in the prevalence of chronic diseases among the population, there is interest in products containing beneficial medicinal plant materials in their formulations [3].

For several decades, food and pharmaceutical companies have been researching and creating functional foods (FFPs) that provide additional health benefits in addition to basic nutrition [4].

The reasons for inadequate provision of micronutrients are not only unbalanced diets, but also the quality of the products themselves, the nutritional value of which is reduced as a result of the use of intensive technologies.

Some traditional food products do not provide beneficial effects on consumer health due to nutritional and compositional deficiencies. As a rule, they contain small amounts of protein, fiber and microelements, with a high content of sodium and unhealthy fats [5]. Not having enough protein can lead to muscle weakness, fatigue, and impaired immune function. Lack of fiber can cause digestive problems and increase the risk of gastrointestinal diseases [6]. In addition, many foods lack vital vitamins and minerals, potentially leading to nutritional deficiencies and various health problems. Their high sodium content may increase blood pressure, heart disease and stroke risk. In addition, the presence of unhealthy fats can contribute to the development of cardiovascular problems.

Problems of micronutrient deficiency among the population are observed in all countries, including economically developed ones.

2 Materials and methods

The article uses methods of information analysis and sociological observation.

When developing functional food products, it is preferable to use vitamin-mineral complexes as a functional ingredient, the administration of which should not exceed the daily requirement. According to Rosstat, only 20% of the adult population took IUDs during the year. At the same time, men took them 2.2 times less often than women, and respondents with the lowest incomes - 1.7 times less often. A promising way to improve the vitamin status of the population is the fortification of industrially produced food products for mass consumption [7-11].

In Europe, back in the 90s of the 20th century, nutrition experts reached an agreement on the definition of functional foods within the framework of the European Consensus Document [12]. The introduction of functional products directly depends on their perception by consumers [13].

In recent decades, scientists in the field of food technology have been actively studying the composition and properties of raw materials, developing recipes and technologies for functional food products using medicinal plant raw materials [14, 15].

Medicinal herbs and their essential oils have been used to promote human health and prevent diseases since ancient times. Over the past two decades, many studies have been carried out both to identify bioactive compounds in medicinal herbs and essential oils derived from them, and to study their biological effects in experimental models [16].

Dozens of methods for the production of functional food products have been patented, where medicinal plants are used as physiologically functional ingredients [17, 18]. It has been proven that medicinal plants, compared to synthetic drugs, have a number of advantages:

- wider than that of drugs, the range of doses used in the absence of toxic and side effects;
- the possibility of using herbal medicines for the prevention of a number of diseases;
- act as auxiliary substances in complex therapy;
- absence of intolerance and allergization compared to synthetic drugs;
- the possibility of creating dietary supplements and pharmaceutical supplements based on medicines.

Despite all the variety of positive effects, the implementation of scientific developments in production is very slow, although the regulatory framework is quite extensive.

The general legislative framework for healthy food products is Federal Law No. 29 "On the quality and safety of food products." This law specifies the principles of healthy nutrition, including conducting scientific research in the field of nutrition of the population, preventing the most common non-communicable diseases, and stimulating manufacturers to produce food products that meet the principles of healthy nutrition.

The reason for the poor implementation of developments in production is the lack of a systematic approach to this issue, the solution of which should involve specialists at the regional level - the Departments of Forestry, Health, Industry and Trade. The regulatory framework of the ministries is aimed at its implementation in the constituent entities of the Russian Federation with the interaction of departments at the regional level.

The Forestry Department in relation to medicinal plants must be guided by the Forest Code of the Russian Federation (as amended on August 4, 2023, with amendments and additions, entered into force on September 1, 2023), Order of the Ministry of Natural Resources No. 494 dated July 28, 2020, which provides rules for harvesting food forest resources and collecting medicinal plants. When procuring pharmaceutical products, state standards GOST 59425-2021 and GOST 24027.0-80 apply.

Harvesting food forest resources and collecting medicinal products is a business activity. According to Federal Law No. 200 (Article 34), in small areas it is possible to build non-permanent structures for drying and storing pharmaceutical products. The state register contains a list, including medicines and medicinal products, which includes herbal

preparations, crushed powders, herbs and others (State Register of Medicines (Medical Council, Moscow, 2009). Thus, to ensure the necessary procurement of medicinal products there is sufficient regulatory framework, but there is no systematization of the production of functional food products using medicinal plant raw materials.

3 Results and discussion

A systematic approach to the production of functional food products using medicinal plant raw materials, consisting of four stages, is proposed.

At the first stage of the formation of a systematic approach, the goal of the Forestry Department, according to the legislative framework, is to improve the system of procurement of medicinal products. In accordance with the goal, the objectives of the department are: studying the resources of the pharmaceutical industry; formation of a database on stocks and volumes of procurement; stock inventory; cultivation of medicinal plants adapted to the climate of the region; drug safety control; preferential taxation of producers involved in the procurement of pharmaceutical products.

At the second stage, a systematic approach involves the participation of the Department of Health. The program “Health Development until 2025” indicates the main goal of increasing the population’s life expectancy to 76 years of age while maintaining a healthy lifestyle, including disease prevention through dietary nutrition.

Federal Law No. 323 “On the fundamentals of protecting the health of citizens in the Russian Federation” states that the criterion of public health is the dynamics of the morbidity level of the population. This requires preventive measures, including the consumption of functional and specialized foods. In this regard, the goal of the Department of Health is to identify and prevent non-communicable diseases. To achieve this goal, it is necessary to solve the following problems: analysis of morbidity dynamics; adoption of laws at the regional level on disease prevention; conducting clinical trials of FPP; development of recommendations for the Departments of Industry and Trade on the fortification of food products with medicinal products and dietary supplements and recommendations to the population through the media about the properties of medicinal products and dietary supplements.

At the third stage of the systematic approach, the goal is to organize and implement FPP into production at food industry enterprises. This is the most critical stage of the systematic approach, where the following tasks are set: the selection of enterprises for the processing of medicinal products and the production of pharmaceutical products; development of pharmaceutical products and dietary supplements based on medicinal plants; organization of production of pharmaceutical products and dietary supplements; FPP and dietary supplement certification.

At this stage, the Department of Industry must interact with the Department of Health in order to identify the main areas of morbidity among the population of the region in order to plan the production of pharmaceutical products using drugs of a certain direction, to ensure preventive measures to reduce the risk of these diseases.

The final stage of the systemic approach is the participation of the Department of Trade, the purpose of which is to organize specialized departments for the implementation of the FPP at trading enterprises. The objectives of the trade department are: analysis of supply and demand for pharmaceutical products and dietary supplements in the regional consumer market; advertising of pharmaceutical products and dietary supplements; organization of sales exhibitions; carrying out actions.

A systematic approach should include a regional regulatory framework. Each Department must issue orders that reflect the main tasks and deadlines. Interaction and coordination of the Departments of Forestry and Health must be ensured in order to

establish the types and volumes of procurement of medicinal products to ensure the production of dietary supplements and pharmaceutical products. The Department of Health should interact with the Department of Food Industry on issues of analyzing the dynamics of population morbidity and measures to prevent it, including through the introduction of FPP into the diet. To implement a systematic approach to the production of pharmaceutical products, it is necessary to develop and implement a regional program “Development and promotion of functional food products to the consumer market” with the participation of these Departments with control at each stage.

4 Conclusion

Based on the above, in order to form a systematic approach when introducing FPP into production using medicinal products, the following is necessary:

- be guided by four stages, involving the participation at the regional level of the Departments of Forestry, Health, Industry and Trade;
- to formulate goals and objectives by the Departments at each stage and formalize them with orders;
- to form, with the participation of four Departments at the regional level, the program “Development and promotion of functional food products to the consumer market”;

Departments have to develop measures aimed at introducing functional food products and supporting domestic producers specializing in the production of food products using physiologically functional ingredients and medicinal plant materials.

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