

The production of organic food is an urgent direction in the implementation of healthy nutrition for the population of Russia

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For citation: Zakrevskii V. V. The production of organic food is an urgent direction in the implementation of healthy nutrition for the population of Russia. *Vestnik of Saint Petersburg University. Medicine*, 2021, vol. 16, issue 2, pp. 134–143. <https://doi.org/10.21638/spbu11.2021.207>

The article analyzes the legislation of the European Union and Russia on the production of organic food products and the current state of the world and Russian markets for organic products. In the world, 179 countries are engaged in organic agriculture, 93 of them have their own laws in the field of production and circulation of organic products. The area of agricultural land in the Russian Federation, occupied by crops of organic crops, is the lowest percentage in comparison with the rest of Europe. Russia is actually the last developed country to adopt a law on organic products. Organic products, in comparison with traditional ones, are less contaminated with pesticides, nitrates, toxic metal compounds, mycotoxins. Organic vegetables and fruits contain more vitamins, a number of minerals and antioxidants, milk — polyunsaturated fatty acids, mainly due to the omega-3 pool. Organic beef has less cholesterol, fat, fatty acids, but more α -linolenic acid, α -tocopherol, β -carotene, coenzyme Q10 and taurine than regular beef. The advantages of using organic food products in the nutrition of the population are substantiated. In conclusion, the government proposes measures to support Russian farmers interested in organic production.

Keywords: organic food, organic farming, safety, nutritional value, legislation.

Introduction

Economic well-being achieved through environmental degradation threatens the existence of humans as a biological species, their physical and mental health, and the health of future generations. In the XIX–XX centuries, it was due to the degradation of the environment that the world's agriculture developed, actively using the achievements of chemistry, genetics, mechanical engineering, etc. pesticides and agrochemicals in agriculture, leading to the contamination of food raw materials and food products, have contributed to the creation of a number of systems of “sustainable” agriculture, the most common of which has become organic farming. The United Nations Environment and Trade and Development Program states that “Organic agriculture can be more conducive to food safety than traditional production methods and is more sustainable in the long term.” In the countries of the European Union (EU), the production of organic food products began to develop intensively more than 40 years ago, and 30 years have passed since the adoption of legislation in this segment of agricultural production. In Russia, the production of organic products started in the early 2000s. Organic food in Russia is not as popular as in the European Union

(EU) or the United States. The area of agricultural land in the Russian Federation, occupied by crops of organic crops, is the lowest percentage in comparison with the rest of Europe and the United States. Russia is actually the last developed country to adopt a law on organic products. Nevertheless, the increase in the production of organic food products in the Russian Federation with the support of the state is a promising direction not only in reducing the anthropogenic load on the surrounding ecosystems and increasing natural biodiversity, but also in the implementation of healthy nutrition for the population.

Purpose of the study

Analyze the legislation of Russia on the production of organic food products. To summarize the data of domestic and foreign literature on xenobiotic contamination and nutritional value of organic and traditional food products. Substantiate the benefits of organic food products in the nutrition of the population.

Methods

The work used the method of literary research and analysis of modern domestic and foreign scientific literature and the regulatory framework on the research topic, as well as generalization and comparison of the information received.

Research results

Organic agriculture is a production system that improves the ecosystem, preserves soil fertility, protects human health and, taking into account local conditions and relying on ecological cycles, preserves biodiversity without using components that can harm the environment. Organic agriculture applies many of the methods used in other approaches to sustainable agriculture (e. g. intercropping, crop rotation, mulching, crop-livestock integration). However, the use of natural resources (non-synthetic), improvement of soil structure and fertility, as well as the use of crop rotation are the basic rules that make organic farming a unique system for organizing agricultural production. Several countries are already establishing agricultural enterprises to produce organic food products with a closed nutrient cycle that is based on local and renewable resources and helps to reduce nitrogen emissions by more than 50 %, significantly reduce sulfur emissions, eliminate synthetic pesticides and increase natural control pests through crop rotation, reducing greenhouse gas emissions by introducing small amounts of substances from the outside and increasing carbon sequestration, increasing soil fertility and increasing natural nitrogen reserves through growing legumes, protecting biodiversity, expanding the use of regional food, strengthening rural development in the region.

“Organic product” means a product arising from organic production, excluding products produced during the transition period. Products originating from wildlife hunting or fishing are not considered organic¹. In accordance with², an organic food product is

¹ Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and labelling of organic products and repealing Council Regulation (EC) no. 834/2007.

² Federal Law “On organic products and on amendments to certain legislative acts of the Russian Federation” dated 03.08.2018 no. 280-FZ. Available at: <https://fzrf.su/zakon/2018-08-03-n-280-fz/> (accessed: 25.04.2021). (In Russian)

a product in natural or processed form produced from raw materials of plant and animal origin grown in zones for conducting organic agricultural production, as well as forest, bee and fish products grown, produced, processed, certified, labeled, stored and sold in accordance with the rules of organic production, intended for consumption in food in processed or unprocessed form.

The term “organic products” reflects not only the “environmental safety” of products, which is controlled at all stages of production, but also the physicochemical, organoleptic properties of products and other characteristics that meet the principles of organic agriculture.

Different countries use different options to denote agricultural practices that are consistent with the principles of organic farming:

- “organic” (organic) — English-speaking countries, Ukraine;
- “ecological” (eco-products) — Hungary, Denmark, Spain, Lithuania, Poland, Slovakia, Ukraine, Czech Republic, Sweden;
- “biological” (biological products) — Germany, Greece, Georgia, Italy, Latvia, Netherlands, Portugal, France;
- “natural” (natural products) — Finland.

In 1972, the International Federation of Organic Agriculture Movements (IFOAM) was formed — a non-governmental organization that operates through international interaction and promotes organic agriculture, which is the founder of the legal regulation of organic agricultural production and brings together structures from 108 countries of the world. IFOAM has developed guidelines that are widely used by organic growers for organic food production and processing.

Currently, organic farming and organic production have become one of the new agricultural and consumer markets in Europe, the USA, Japan, Australia and the UK. In the world, 179 countries are engaged in organic agriculture, 93 of them have their own laws in the field of production and turnover of organic products, more than 2 million producers are employed in it (Table) [1]. Markets with high purchasing power for organic products are the EU countries, the USA, China, Japan. From 1999 to 2017, the global market for organic products more than quadrupled. In recent years, the increase in the production of this product is 12–15 % and, according to forecasts, such rates will continue until 2025 [2].

In recent years, the organic agriculture sector in the European Union has developed rapidly, not only in terms of acreage used for organic agriculture, but also the number of holdings and the total number of organic operators registered in the European Union¹. The crisis in the world economy did not lead to a decline in production, consumption and foreign trade in the organic market, which was typical for almost all other industries.

In Russia, the organic market has doubled from 2010 to 2017. However, compared to other countries, the organic market in Russia has a low level of development. Certified 290 thousand hectares of land — 23rd place in the world in terms of the amount of certified land. However, unlike many countries, at least 30 % of this amount is certified for future projects. According to the Union of Organic Agriculture, the number of certified organic agricultural producers in Russia is 92 ± 6 companies, of which 46 are certified according to international organic standards in the EU and the USA. No more than 40 producers give positive balances due to their core activities. The rest did not go beyond certification or, having tried to work, stopped. Of the 90 enterprises operating on the domestic organic

Table. Organic agriculture: Key indicators and leading countries [1]

Indicator	Peace	Leading countries
Organic Farming Countries	179 countries	New Countries: Brunei Darussalam, Cape Verde, Hong Kong, Cuveit, Monaco, Sierra Leone, Somalia
Organic agricultural land	50.9 million hectares	Australia (22.7 million ha) Argentina (3.1 million ha) USA (2 million ha)
Organic growers	2.4 million	India (582.2 thousand) Ethiopia (203602) Mexico (200039)
Organic market	81.6 million \$	United States (\$ 39.7 million) Germany (\$ 9.5 million) France (\$ 6.1 million)
Consumption of organic products per capita	11.1 \$	Switzerland (\$ 291) Denmark (\$ 212) Sweden (\$ 196)

market, only 24 % of enterprises are engaged in animal husbandry and 13 % in the production of dairy products [3].

Legislation in foreign countries

According to the Research Institute of Organic Agriculture (FiBL), 87 countries have their own laws on the production and circulation of organic products, 17 are in the process of developing and adopting a regulatory framework in the field of organic farming, 20 countries use standards instead of laws. The most advanced systems for regulating organic agriculture exist in Europe, the United States, Japan, India, Canada and China. A number of CIS countries have also adopted laws on organic agriculture (Moldova, Georgia, Armenia, Ukraine). In October 2015, a similar law was adopted in Kazakhstan, and legislation is being prepared in Belarus. Currently, there are more than 700 organizations in the world that control and certify organic products.

The largest number of standards in this area are adopted in the USA, Japan, South Korea, China and Germany. There are three main international systems of standards:

- IFOAM Basic Standards (IBS). Basic standards for sustainable production and recycling, approved by the IFOAM General Assembly in Basel (Switzerland) in September 2000;
- Codex Alimentarius Commission Standard CAC / GL 32–1999 “Guidelines for the manufacture, processing, labeling and marketing of organic food” (CAC / GL 32–1999, REV.1–2001). On its basis, national norms and rules for organic food production are created, which makes it possible to take into account the physical, geographical, social and economic characteristics of different states;
- EU Regulation no. 834/2007 and subsequent regulations EC no. 889/2008, no. 1235/2008, no. 1254/2008, no. 2018/848.

On May 30, 2018, the new Regulation EU no. 2018/848 on the production and labeling of organic products was adopted (effective from 1 January 2021), which replaced the previous Regulation 834/2007. The new document provides for tougher control of the supply chain and rules for the import of products; strengthening measures to prevent accidental contamination of products with pesticides; expanding the list of products that can be certified as organic; prohibition of the use of hydroponic production method; preventing the use of artificial nanomaterials in the manufacture of products; the ability to apply group certification to small businesses.

Despite different standards and directives, the products are manufactured according to similar rules and are the result of inspection activities of equal efficiency. Most countries, including the EU, use IFOAM standards as the basis for their legislation. They create the most common, universal framework conditions for environmental standards around the world. The main importing countries for organic products are the European Union and the United States. Thus, their standards have a significant impact on the global trade in organic products and the development of such standards in other countries.

Legislation on organic food in the Russian Federation.

Requirements for the production and isolation of such a category of food products as organic were first formulated in Russia in SanPiN 2.3.2.2354–08³.

The first regulatory document, which is the terminological basis in the field of organic food production, was GOST R 56104–2014 “Organic food products. Terms and definitions”⁴, entered into force on March 1, 2015. The national standard establishes terms and definitions in the field of production, composition and properties of organic food products and their processed products that meet the requirements of organic production. GOST R 57022–2016 “Organic products. The procedure for conducting voluntary certification”⁵, entered into force on January 1, 2017, establishes the procedure for voluntary certification of organic production.

Interstate standard GOST 33980–2016 “Organic products. Rules for production, processing, labeling and sale”⁶ operates on the territory of Russia, Armenia, Georgia, Kyrgyzstan, Tajikistan and Uzbekistan since January 1, 2018. The standard has been developed in accordance with the recommendations of the Codex Alimentarius CAC / GL 32–1999 “Guide for the production, Processing, Labeling and Marketing of Organic Foods” and the IFOAM Core Standards to ensure a consistent approach to the requirements governing organic production, labeling and related product information.

From January 1, 2020, the Federal Law of the Russian Federation of 03.08.2018 no. 280-FZ “On organic products and on amendments to certain legislative acts of the Russian Federation” was put into effect. Article 4 (paragraph 1) of this Federal Law sets out the basic requirements for the production of organic products.

³ SanPiN 2.3.2.1078–01 “Hygienic requirements for the safety and nutritional value of food products (as amended on July 6, 2011)”. Available at: <http://docs.cntd.ru/document/901806306> (accessed: 25.04.2021). (In Russian)

⁴ GOST R 56104–2014 “Organic food products. Terms and Definitions”. Available at: <https://docs.cntd.ru/document/1200113488> (accessed: 10.07.2019). (In Russian).

⁵ GOST R 57022–2016 “Organic products. The procedure for conducting voluntary certification”. Available at: <http://docs.cntd.ru/document/1200138287> (accessed: 10.07.2019). (In Russian)

⁶ GOST 33980–2016 “Organic products. Rules for production, processing, labeling and sale”. Available at: <http://docs.cntd.ru/document/1200141713> (accessed: 10.07.2019). (In Russian)

In addition, since January 1, 2020, the Orders of the Ministry of Agriculture of Russia no. 6337 and 6348 of 11/19/2019 are in force, approving the procedure for maintaining the unified state register of organic producers, as well as the forms and procedure for using a graphic image (sign) organic products of a single sample. Organic production can only be trusted if it is accompanied by effective verification and control at all stages of production, processing and distribution.

When an agricultural producer decides to start producing organic products, he needs to notify the competent authorities, and his farm will come under the supervision of the control system. This stage is called a transitional (conversion) period, during which the manufacturer must adhere to the rules determined by law.

To confirm the organic production process, enterprises need to go through a certification procedure. The certification body exercises strict control over each stage of production, and then certifies compliance with the requirements and standards of organic production by issuing a corresponding certificate. Since 2020, a prerequisite for certifiers in the Russian Federation has become accreditation in the national body — Rosaccreditation.

Basic principles and benefits of organic farming methods are based on the following principles.

1. The principle of health. The role of organic agriculture, whether in the production, processing, distribution or consumption of agricultural products, is to maintain and improve the health of ecosystems and organisms, from the smallest living in the soil to humans. In this regard, when conducting such agricultural production, it is necessary to avoid the use of fertilizers, pesticides, veterinary drugs and food additives that can adversely affect health.
2. The principle of ecology. Organic agriculture must build on, work with, model, and conserve living ecological systems and cycles. Organic production must be adapted to local conditions, ecology, culture and scale. Reducing the input of resources through reuse, as well as the resource-saving use of materials and energy, will help to improve the quality of the environment and conserve resources.
3. The principle of justice. This principle emphasizes that individuals associated with organic farming must build their relationships with others in such a way as to ensure fairness at all levels and for all parties — farmers, workers, processors, distributors, traders and consumers. Also, in accordance with this principle, for the life of animals, such conditions and opportunities must be created that correspond to their physiology, lifestyle in natural conditions and well-being. Natural and ecological resources used for production and consumption must be spent in

⁷ Order of the Ministry of Agriculture of Russia dated November 19, 2019 no. 633 “On approval of the procedure for maintaining a unified state register of producers of organic products, including the procedure for providing certification bodies with information provided for by part 3 of Article 6 of the Federal Law ‘On organic products and on amendments to certain legislative acts of the Russian Federation», as well as the procedure for providing information on the presence or absence of information about producers of organic products in the unified state register of producers of organic products”. Available at: <https://docs.cntd.ru/document/563956478> (accessed: 10.07.2019). (In Russian)

⁸ Order of the Ministry of Agriculture of Russia dated November 19, 2019 no. 634 “On approval of the form and procedure for using a graphic image (sign) of organic products of a single sample”. Available at: <https://docs.cntd.ru/document/563956477> (accessed: 10.07.2019). (In Russian)

a socially and environmentally fair manner and be managed in trust for the benefit of future generations. The principle of equity requires systems of production, distribution and trade to be open, inclusive and responsive to real environmental and social costs.

4. The principle of care. This principle indicates that prudence and responsibility are key issues to be addressed when making choices regarding management, development and technology in organic agriculture. Science is needed to ensure the health, safety and environmental viability of organic farming. However, it must take into account actionable solutions derived from practical experience, accumulated traditional and local knowledge, and avoid significant risks by introducing appropriate technologies and avoiding the use of technologies with unpredictable consequences, such as genetic engineering.

The main advantages of organic agricultural production in comparison with traditional (or, as it is called in the EU countries, conventional), are positive indicators for the environment and biodiversity of territories, preservation of the cultural landscape, and better and safer food raw materials and food products for human health.

Organic foods are safer and more valuable than traditional foods.

The health benefits of eating organic food in comparison with traditional ones are provided by a lower impact on the body of pollutants [4–8] and a higher nutritional value [7; 8]. At the same time, consumers consider it more important to maintain health less contamination of food than a higher content of nutrients.

Organic products, in comparison with traditional ones, have a lower content of chemical-synthetic plant protection products — pesticides, nitrates, toxic metal compounds, as well as mycotoxins [9–13]. Thus, in organic potatoes, beets, carrots, potatoes, white and red cabbage, red pepper, the content of nitrates and cadmium is 1.5–2 times less than in similar products grown using traditional technology [14; 15].

Pesticides in organic vegetables and fruits are also found in much lower concentrations than in conventionally grown foods. Stolz Peter, Weber Annette, Strube Jürgen [16] commissioned by German retail chains, studies have been carried out on the content of pesticide residues in organic and traditional vegetables and fruits sold in Germany in 1994–2002. It was found that pesticide residues were not detected in 96.9 % of samples of organic products and 65.0 % of samples of non-ecological products. At the same time, in 3.1 % of organic products, pesticides were found on average in an amount of 0.0023 mg / kg, while in 35.0 % of vegetables and fruits grown by the traditional method, pesticides were detected on average in an amount of 0.0554 mg / kg, those. in concentrations 24.1 times more. In addition, two or more pesticides were found in 0.48 % of ecologically declared samples and in 13.59 % of samples grown in a traditional way. The difference in the levels of contamination of products of organic and conventional origin with pesticides was 28.3 times.

Vegetables and fruits obtained in organic farming (potatoes, tomatoes, lettuce, cabbage, red peppers, apples, etc.) contain 10–20 % more vitamin C, bioflavonoids and other antioxidant substances, and carrots — carotenoids compared to similar traditional products [14; 15; 17].

Organic milk surpasses ordinary milk in nutritional value due to the increased content of polyunsaturated fatty acids, mainly due to the omega-3 pool [18; 19]. For example, a meta-analysis based on 170 published studies comparing the nutrient content of organic

and regular cow's milk [19] showed that organic cow's milk has a more desirable fatty acid composition than regular milk. The concentrations of total polyunsaturated fatty acids (PUFAs) and omega-3 PUFAs in organic milk were significantly higher (by 7 % and 56 %, respectively). The concentrations of α -linolenic acid, very long-chain omega-3 fatty acids and conjugated linoleic acid were also significantly higher in organic milk at 69 %, 57 % and 41 %, respectively. Since there were no significant differences in total concentrations of omega-6 PUFA and linoleic acid, the ratios of omega-6 to omega-3 and linolenic acid to α -linolenic acid were lower in organic milk by about 71 % and 93 %. The meta-analysis also showed that organic milk has significantly higher levels of α -tocopherol and iron, but lower concentrations of iodine and selenium. At the same time, there were no significant differences in the total concentrations of saturated fatty acids (SFA) and monounsaturated fatty acids (MUFA) between organic and regular milk. The main reasons for the differences in milk composition, as noted by the authors, were the longer use of pastures and the use of feed in organic agricultural enterprises.

Over-the-counter organic beef has a higher nutritional value than regular beef due to its more balanced lipid and bioactive content [20]. So, the authors found that organic beef contains less cholesterol (17 %), fat (32 %), fatty acids (16 %), MUFA (24 %), but more α -linolenic acid (170 %), α -tocopherol (24 %), β -carotene (53 %), coenzyme Q10 (34 %) and taurine (72 %) than in regular beef.

Smith-Spangler C. et al. [11] in a systematic review showed that the phosphorus levels in organic foods were significantly higher and the pesticide content was 30 % lower than in conventional foods.

Industrial hydrogenation of fats is prohibited in biological production; as a result, these products do not contain trans isomers of fatty acids, which pose a serious risk for the development of cardiovascular and oncological diseases, obesity, diabetes mellitus and others. The use of most food additives is also prohibited by EU regulations in the production of organic products, which has a positive effect on the quality of food.

Organic foods can reduce the risk of developing a number of chronic diseases [9; 12; 21; 22]. Thus, the systematic review "A Systematic Review of Organic Versus Conventional Food Consumption: Is There a Measurable Benefit on Human Health?", Published in the journal *Nutrients* in 2020 [22], noted significant positive results, in which increased consumption of organic products was associated with a decrease in the incidence of infertility, birth defects, allergic sensitization, otitis media, preeclampsia, metabolic syndrome, obesity.

Conclusion

There is no doubt that the world's agriculture will never become completely organic, but it will continue to develop in this direction. This is due, first of all, to the benefits of organic food products for public health and minimal harm to the environment during their production. Oncological, cardiovascular diseases, diseases of the digestive system and a number of others occur when food contaminated with various xenobiotics is used in food. In this regard, the transition to organic agricultural products should be carried out on a national scale as soon as possible. There are more than 20 million hectares of agricultural land in Russia, where no agricultural chemicals have been used for the past few years. It is on these lands that organic agricultural production needs to be introduced.

For the further development of organic agriculture in Russia, the state must actively support farmers who plan to produce organic products. This can happen through various targeted programs, subsidies and subsidies, concessional lending, a public procurement system, tax incentives, partial reimbursement of costs, which will stimulate producers to pass the required certification of their products, as well as to develop the market for organic products and increase demand for it, making local products are more competitive than other similar products. In addition, it is necessary to intensify scientific research in this area, in universities to train certified specialists in organic agriculture, and to inform consumers about the benefits of organic products. With the support of the state, the number of organic producers in Russia may increase 5–6 times in the coming years. In the future, in the Russian Federation, as well as in other countries, it is possible to create agricultural enterprises for the production of organic food products with a closed cycle of nutrients.

I would like to hope that this “promised land” called “organic agriculture”, in contrast to the Biblical scenario, along with a new generation of Russian agricultural producers, will also include farmers who have been tested for strength in the last two decades in the complete absence of state support. clear rules in the market, low consumer awareness of organic products.

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Received: April 28, 2021

Accepted: May 18, 2021

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