Research Article

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2024.56.008861

Hygienic Features of Production of Organic Plant Food Products and Control of them by Supervisor Authorities in Russia

VV Zakrevskii[1]* and Podorvanov AA[2]

[1]*Head of the department of Higiene of Nutrition of the State Budgetary Educational Institution for Higher Professional Training, North-Western State Medical University named after I.I. Mechnikov, 191015, Russia*

[2]*Assistant of the department of Higiene of Nutrition of the State Budgetary Educational Institution for Higher Professional Training, North-Western State Medical University named after I.I. Mechnikov, Russia*

***Corresponding author:** Zakrevskii Viktor Veniaminovich, Professor, head of the department of Higiene of Nutrition of the State Budgetary Educational Institution for Higher Professional Training, North-Western State Medical University named after I.I. Mechnikov, 191015, Sankt-Petersburg, Kirochnaya str., 41, Russia

ARTICLE INFO

Received: April 24, 2024

Published: May 07, 2024

Citation: VV Zakrevskii and Podorvanov AA. Hygienic Features of Production of Organic Plant Food Products and Control of them by Supervisor Authorities in Russia. Biomed J Sci & Tech Res 56(3)-2024. BJSTR. MS.ID.008861.

ABSTRACT

This work is devoted to a promising direction in the agricultural production of food products - hygienic aspects in the production of organic plant food products, as well as supervision over their quality and safety. The purpose of the research was to study the problems arising in the production of organic vegetable products, supervision of their safety in the Russian Federation by Rospotrebnadzor, as well as to determine some indicators of the safety and nutritional value of organic vegetables from the 2023 harvest, grown in 2 peasant farms (peasant farms) of the Novgorod region and Leningrad regions. A number of hygienic problems have been identified in the production and supervision of the quality and safety of organic plant food products, associated with the lack of plant protection products on the Russian market that are permitted in organic farming, their standardization, correct use and dosage, not using methods for identifying plant protection products, and also the lack of data on sanitary and chemical indicators of organic food products in the reporting forms of Rospotrebnadzor. As a result of a study of organic vegetables grown in peasant farms in the Novgorod and Leningrad regions, data were obtained confirming that the studied organic vegetables are safer in terms of the content of a number of pesticides, toxic metal compounds, nitrates compared to similar products grown using traditional intensive technology, and also had higher nutritional values for some nutrients.

Keywords: Organic Food Products; Organic Production; Nutritional Value; Safety

Introduction

Currently, three segments have clearly taken shape and are functioning in world agriculture and the world food market: the industrial sectoral system, called conventional in the West, dominant and based on intensive technologies; the production of genetically modified crops is a new direction that has already been introduced into the agricultural sector of many countries, and organic agriculture, which at the present stage acts as an alternative to the first two segments that dominate the global food market. 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 biological diversity, does not use components that can harm the environment. Organic products are products grown, harvested, processed and packaged in accordance with the standards of organic farming and agricultural production adopted in Europe, the USA, Japan, Russia and other countries.

The requirements for organic food differ from those for conventional agricultural products. The process of their production is an integral part of their identification, labeling and filing a claim [1]. The production of organic food products that are safer for human health is ensured by compliance with the principles of organic production and a complex and expensive procedure for certification of produc-

tion and products. At the same time, in the process of production, preparation and circulation of organic products, both socio-economic, organizational, legislative problems and hygienic problems arise, which ultimately have a negative impact on the quality and safety of products.

Materials and Methods

The purpose of the research was to study the problems arising in the production of organic vegetable products, supervision of their safety in the Russian Federation by Rospotrebnadzor, as well as to determine some safety indicators and nutritional value in organic vegetables grown in 2 peasant farms in the Novgorod and Leningrad regions. The work uses the method of literary research and analysis of domestic and foreign legislation in the segment of organic food production, as well as standard laboratory methods for determining a number of pesticides, toxic metal compounds, nitrates, potassium, vitamin C and в-carotene in food products.

Results and Discussion

An analysis of the legislation of the EU and the Russian Federation [2-4] allowed us to state that it does not provide for specific distances from sources of pollution to cultivated fields and the regulation of permitted plant protection products (PPPs) in organic food products. A serious problem for organic vegetable growing is dependence on imports of a number of components used in the production of organic products. Organic seeds are practically not produced in Russia. Plant protection preparations and components for the production of products are also mainly imported and are not available to most manufacturers of organic food products [5]. When using biopesticides, the question of their correct use and dosage remains open, mainly due to their selective action. Plant protection products allowed in organic production - preparations based on pyrethrins and rotenone, spinosad, azadirachtin, etc., can be found in food products in concentrations from minimal to maximum values, and methods for their determination and identification have been developed abroad and in the Russian Federation [6,7], are not used in our country. In organic farming, where, in comparison with traditional crop rotations, the use of synthetic mineral fertilizers, chemical plant protection products and other techniques characteristic of conventional farming is prohibited, agricultural technologies for obtaining high yields of various crops have not yet been developed [5,8].

It should also be noted that, due to general environmental pollution, organic production methods alone are not always able to ensure the complete absence of pesticide residues and other xenobiotics in food products. Analysis of the reporting forms of Rospotrebnadzor allowed us to state that organic food products are not distinguished when examining food products based on sanitary-chemical, parasitological, microbiological indicators and specific activity of radioactive substances. Due to the small volumes of organic products on the Russian market, it is not economically efficient for Rospotrebnadzor to develop and implement methods for determining plant protection products in them, since the development of such methods is a complex and expensive process. At the same time, in St. Petersburg the Office of Rospotrebnadzor for 2019-2023. 130 samples of organic products were selected for the content of pesticides, antibiotics, GMOs and compliance with labeling. All organic food products complied with TR CU 021/2011 for the studied indicators, with the exception of 1 sample, which did not comply with TR CU 022/2011 "Food products in terms of their labeling."

After studying the problems arising during the production of organic vegetable products and the supervision of their safety by Rospotrebnadzor, we, together with specialists from the sanitary-chemical laboratory of the Federal State Budgetary Institution "Center for Hygiene and Epidemiology in the city of St. Petersburg and the Leningrad Region", conducted studies on the content of 34 pesticides, nitrates, lead, arsenic, cadmium, mercury, as well as a number of nutrients in organic vegetables grown in 2 peasant farms in the Novgorod and Leningrad regions. Laboratory studies used standard methods for determining the above substances. 0.1, which is not typical for similar products grown according to As a result of the research, it can be stated that the quantitative content of all studied pesticides, toxic metal compounds and nitrates in potatoes, carrots and beets, harvested in 2023, is many times lower than the permissible level of traditional intensive technology (Table 1). Studies of the nutritional value of organic vegetables grown in 2 peasant farms in the Novgorod and Leningrad regions also indicate that the quantitative content of в-carotene in red carrots is 1.8 times more, and vitamin C in potatoes is 1.1 times more than in appropriate vegetables grown using traditional technology. However, the content of vitamin potassium in the vegetables studied turned out to be less than in their traditional counterparts [9-11].

Table 1: Content of xenobiotics in organic vegetables harvested in 2023, grown on peasant farms in the Novgorod and Leningrad regions.

Indicators	Name of vegetables			Acceptable level
	Potatoes	Carrots	Beets	
Pesticides, mg/kg:				
DDT and its metabolites	<0,007	<0,007	<0,007	≤0,1
HCH (ά, β, γ-isomers)	<0,001	<0,001	<0,001	≤0,1
Toxic elements, mg/kg:				
plumbum	<0,04	<0,04	<0,04	≤0,5
arsenic	<0,01	<0,01	<0,01	≤0,2
cadmium	<0,01	<0,03	<0,015	≤0,03
mercury	<0,002	<0,002	<0,002	≤0,02
Nitrates, mg/kg	<30	<30	<40	≤250 (potatoes, carrots), ≤1400 (beets)

Conclusion

Thus, the conducted research revealed a number of hygienic problems in the production and supervision of the quality and safety of organic plant food products associated with the lack of regulation, proper use and dosage of plant protection products approved for use in organic farming. In the practical activities of Rospotrebnadzor, organic food products are not highlighted in statistical reporting, and methods for determining and identifying biopesticides are not used due to the small volume of organic products on the Russian market. At the same time, as a result of a study of organic vegetables from the 2023 harvest, grown in peasant farms in the Novgorod and Leningrad regions, data were obtained confirming that the studied organic vegetables were safer in terms of the content of a number of pesticides, toxic metal compounds, nitrates, and also had higher nutritional value in terms of some nutrients than similar products grown using traditional intensive technology.

References

1. GB 23200.73-2016. National food safety standards - Determination of rotenone and azadirachtin residues in foods Liquid chromatography - mass spectrometry.
2. GOST 33980-2016 «Organic products. Rules for production, processing, labeling and sales».
3. Regulation (EU) 2018/848 of the European Parliament and of the Council of 30 May 2018 on organic production and on the labeling of organic products, and repealing Council Regulation (EC) 834/2007.
4. Federal Law of the Russian Federation dated August 3, 2018 No. 280-FZ «On organic products and on amendments to certain legislative acts of the Russian Federation».
5. (2022) Promising technologies for the production of organic vegetable products: analyte. review. / N.P. Tinsel [and others], p. 72.
6. Guidelines MUK 4.1.1434-03 «Determination of residual amounts of Spinosin A and Spinosin D in water, soil, cucumbers, apples, peppers, potato tubers and cabbage using high-performance liquid chromatography».
7. Li Qing Peng, Li Hong Ye, Jun Cao, Yan Xu Chang, Qin Li, et al. (2017) Cyclodextrin-based miniaturized solid phase extraction for biopesticides analysis in water and vegetable juices samples analyzed by ultra-high-performance liquid chromatography coupled with quadrupole time-of-flight mass spectrometry. Food Chem 226: 141-148.
8. Guidelines for the Production, Processing, Labelling and Marketing of Organically Produced Foods (CAC/GL 32-1999).
9. E Barcanu, O Agapie, I Gherase, B Tanase, G Dobre (2023) Evaluating cultivars for organic farming: tomatoes, peppers and aubergine in south Romania. Agriculture & Food 11: 366-380.
10. Zakrevskii VV (2021) The production of organic food is an urgent direction in the implementation of healthy nutrition for the population of Russia. Bulletin of St. Petersburg State University, Medicine 16(2): 134-143.
11. Zakrevskii VV (2021) Organic food: benefits for health and the natural environment. - Environmental protection of urban and suburban settlements. 14 Eco-Conference materials. Novi Sad, Serbia, pp. 313-320.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2024.56.008861

Zakrevskii Viktor Veniaminovich. Biomed J Sci & Tech Res