

# Assessment of quality and safety indicators of beverages made from vegetable raw materials

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**Abstract.** Organoleptic and physical and chemical parameters of new pectin-containing beverages based on vegetable juices are given. Their compliance with the requirements of the technical regulations of the Customs Union in terms of safety indicators was confirmed. The conclusion about the feasibility of setting up new types of beverages for production was made.

Nutrition is one of the most important factors that determines a person's health. Most of the products consumed are of natural origin: animal or vegetable, in some cases mineral. Ensuring the safety of food raw materials and food products is one of the most important tasks of modern society, which determines the health of the nation [1].

Food quality is a set of properties that reflect the ability of a product to provide the human body with vital substances, meet state standards, be safe for the consumer, reliable in terms of the stability of the composition and preservation of consumer properties of the product [2].

The quality of food products is characterized by organoleptic and chemical indicators (color, taste, smell, consistency, appearance, chemical composition), the absence of toxins, pathogenic microbes, harmful compounds and foreign impurities.

Pectin in a hydrated form was used as an added preventive component when developing vegetable drinks for specialized purposes (Fig.1).

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**Fig. 1.** Hydratopectin.

Pectin is called the "keeper" of our body, because it has the ability to adsorb harmful substances on its surface: heavy metals and radioactive elements, while not disturbing the natural bacteriological balance of the body. It also helps to enhance the taste, allows you to get a more uniform product, preventing the settling of the pulp, supports the natural flavor, provides a taste perception of the juice [3]. Drinks are developed on the basis of tomato juice with the addition of cucumber juice, sweet pepper puree, beetroot pectin extract, salt, sugar, black pepper extract and bay leaf (Fig. 2).



**Fig. 2.** Tomatoes – main raw material for developed beverage.

To implement the developed vegetable drinks for production, the product quality was evaluated [4]. Drinks "Lightness" and "Spice" have the following organoleptic and physico-chemical indicators, which are presented in tables 1 and 2.

**Table 1.** Organoleptic indicators.

Title of the indicator	Characteristics of drinks
Appearance and consistency	Homogeneous opaque liquid
Colour	Homogeneous throughout the whole mass, it corresponds to the applied juices

**Table 2.** Physico-chemical indicators.

Indicators	Content in the samples	
	«Lightness»	«Spice»
Mass fraction of dry substances, %	8,15	8,2
Titrateable acidity, %	2,8	2,7
Pectin, %	0,95	0,9

Based on the data obtained from the research of quality indicators, we have developed a project of Technical Specifications, TI and RC.

Potentially dangerous to human health, biological, chemical, toxic and radioactive substances enter products and accumulate there, passing through the food chain, which includes all stages of agricultural production: storage, transportation, preparation of products and auxiliary materials, technological operations, packaging and packaging of finished products [5,6].

In accordance with the "Technical Regulations for juice products from fruits and vegetables" 023/2011, Tables 3 and 4 show the safety requirements to vegetable beverages.

**Table 3.** Microbiological indicators of the beverage «Lightness».

Title of the indicator		PS RC	According to the regulation of tests
KMAFAnM, KOE/cm <sup>3</sup> , no more		5*10 <sup>3</sup>	1,1*10 <sup>2</sup>
Mass of the product (1 cm <sup>3</sup> ), in which it is not allowed	BGKP (coliforms)	not allowed	not detected
Yeast, COE/cm <sup>3</sup> , no more		2*10 <sup>3</sup>	<10
Molds, COE/cm <sup>3</sup> , no more		5*10 <sup>2</sup>	<10

**Table 4.** Microbiological indicators of the beverage «Spice».

Title of the indicator		TS TC	According to the regulation of tests
KMAFAnM, KOE/cm <sup>3</sup> , no more		5*10 <sup>3</sup>	1,5*10 <sup>2</sup>
Mass of the product (1 cm <sup>3</sup> ), in which it is not allowed	BGKP (coliforms)	not allowed	not detected
Yeast, COE/cm <sup>3</sup> , no more		2*10 <sup>3</sup>	<10
Molds, COE/cm <sup>3</sup> , no more		5*10 <sup>2</sup>	<10

In accordance with the technical regulation of the customs Union "On food safety" 021/2011, tables 5 and 6 show the safety requirements to vegetable beverages.

**Table 5.** Indicators of the safety of the beverage «Lightness».

Product group	Indicators	Admissible levels, mg/dm <sup>3</sup> , no more	According to the regulation of tests
Vegetable juices	Arsenic mg/kg	0,2	<0,001
	Cadmium mg/kg	0,03	0,01±0,001
	Mercury mg/kg	0,02	<0,002
	Lead mg/kg	0,5	0,05±0,001
	Mycotoxins: patulin, mg/cm <sup>3</sup>	0,005	<0,003
	Nitrates, ,mg/dm <sup>3</sup>	150	<36
	Alfa, beta, gamma – isomers	0,5	<0,001
	DDT and its metabolites	0,1	<0,005

**Table 6.** Indicators of the safety of the beverage «Spice».

Product group	Indicators	Admissible levels, mg/dm <sup>3</sup> , no more	According to the regulation of tests
Vegetable juices	Arsenic mg/kg	0,2	<0,001
	Cadmium mg/kg	0,03	<0,01
	Mercury mg/kg	0,02	<0,002
	Lead mg/kg	0,5	0,08±0,002
	Mycotoxins: patulin, mg/cm <sup>3</sup>	0,005	<0,003
	Nitrates, ,mg/dm <sup>3</sup>	150	<36
	Alfa, beta, gamma – isomers	0,5	<0,001
	DDT and its metabolites	0,1	<0,005

The research was conducted in the research Institute "Biotechnology and food certification", (testing laboratory "Center of food quality", Center of collective use of scientific equipment of KubSAU) [1],[2],[7].

From the research conducted, it can be concluded that the safety indicators of vegetable drinks meet all the requirements of TS TC 023/2011 and TR TC 021/2011. Vegetable drinks "Lightness" and "Spice", taking into account their daily consumption in the amount of 200 ml, are recommended as a functional source of pectin. Projects of technical and technological documentation have been developed for the production of beverages.

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