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COMPARISON OF NATIONAL AND INTERNATIONAL QUALITY REQUIREMENTS FOR PEARS

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Abstract. *This paper analyzes the current requirements of national and international standards for pears. Analysis of the quality and range of fruits in retail chains revealed differences in marketing approaches to the sale of these products. Samples with high organoleptic characteristics were detected.*

Key words: *fruits, pear, indicators, standard, quality.*

Pear is the most common crop after apple. Cultivated varieties come from the most famous species of pears that grow in Europe, namely the common, Ussuri and Caucasian. Pear trees are durable and high-yielding, and they do not have a pronounced tendency to periodic fruiting. Bad years are observed only after severe winters due to freezing of fruit wood or the whole tree. Compared to apple trees, pears are less winter-hardy [1].

World pear plantations are over 1,5 million hectares. This is due to the fact that the pear is less winter-hardy and frost-resistant than the apple. The largest pear-producing countries are China (19388,1 thousand tons), Argentina (905,6 thousand tons), USA (738,8 thousand tons), Italy (701,9 thousand tons), Turkey (472,3 thousand tons). In Ukraine, as of 2019, the area of pear plantations was 1.2 thousand hectares, and the gross harvest was over – 5,6 thousand tons. The largest areas of plantations are in Chernivtsi, Kharkiv and Vinnytsia regions [2].

Pear is valued primarily for its taste, culinary and medicinal properties. Pear fruits contain carbohydrates, namely glucose, fructose, sucrose, as well as organic acids, tannins, nitrogenous, aromatic and pectin substances, vitamins A, B, C, enzymes and a number of inorganic compounds (table 1) [3, 4].

The value of pear fruits is determined by their marketability, taste and texture of the flesh, as well as the possibility of consumption over a long period of time. Indicators of marketability are weight and homogeneity, color, length and flexibility of the stalk, the absence of disease or its degree.

The consumer value of fruits is characterized by their biochemical composition. The ratio of its components determines their taste in both fresh and processed form, as well as nutritional prophylactic and therapeutic value. The taste range in most varieties of pears is dominated by a combination of sugar content and a certain type



of aroma (nutmeg, almond and rose). But the presence of light acidity in the taste is especially appreciated.

The consistency of the flesh is an integral feature of the taste of the fruit. Oily juicy flesh is optimal for pears. Dessert pear varieties are highly valued for their tender and juicy flesh, for a pleasant combination of sugars and acids. The coarse-grained structure with significant inclusions of stony nodules has a negative taste and is a physiological disorder of some varieties.

Table 1.

Biochemical composition of fresh pears

Content of valuable nutrients in 100 g of crude substance			
	vitamins	macronutrients	microelement
Carbohydrates - 10,3 g	Vitamin B ₁ - 0,02 mg	Iron - 2,3 mg	Chlorine - 1,0 mg
Fats - 0,3 g	Vitamin B ₂ - 0,03 mg	Potassium - 155,0	Vanadium - 5,0 mkg
Proteins - 0,4 g	Vitamin B ₃ - 0,05 mg	mg Calcium - 19,0	Iodine - 1,0 mgk
Water - 85,0 g	Vitamin B ₆ - 0,03 mg	mg Magnesium -	Cobalt - 10,0 mkg
Mono- and	Vitamin B ₉ - 2,0 mg	12,0 mg Natrium -	Manganese - 65,0 mkg
disaccharides - 9,8 g	Vitamin C - 5,0 mg	14,0 mg	Cuprum - 120,0 mkg
Starch - 0,5 g	Vitamin E - 0,4 mg	Sulfur - 6,0 mg	Molybdenum - 5,0 mkg
Dietary fiber - 2,8 g	Vitamin H - 0,1 mg	Phosphorus - 16,0	Nickel - 17,0 mkg
Organic acids - 0,5 g	Vitamin PP - 0,1 mg	mg	

Of the products of technical processing, dried pear fruits, pastilles, marmalades, bekmes and drinks are especially delicious. Pears are also used in folk medicine. They are characterized mainly by diuretic, disinfectant and antipyretic action. These properties have fresh, dried fruits, as well as juice, decoctions (fresh and dried fruits), jelly. However, in the exacerbation of diseases of the digestive system, pears should not be eaten due to the presence of a significant amount of fiber in them [5].

Research methods.

The research was conducted in NULES of Ukraine at the Department of Technology of Storage, Processing and Standardization of Crop Products named after B.V. Lesika. Fruits for testing were selected in the Auchan, Silpo and ATB retail chains. Products were evaluated in accordance with UNECE DSTU FFV-51: 2007 Pears. Guidelines for supply and quality control and DSTU 8326: 2015 Fresh pears of medium and late ripening. Technical conditions [6].

Research results.

After analyzing the current requirements in the current regulations, it was found that the quality of DSTU UNECE FFV-51:2007 Pears. Guidelines for supply and quality control and DSTU 8326:2015 Fresh pears of medium and late ripening. Specifications of fresh pear fruit are divided into 3 commodity varieties (higher, first and second). Both standards do not specify the degree of maturity. At the same time, the European document states that the degree of ripeness must be such that the fruit can withstand the appropriate conditions of transportation, and in the destination had such an appearance and taste that corresponds to the characteristic of this pomological variety. Also, the national standard specifies in more detail the permissibility of mechanical damage to commercial varieties and the inadmissibility of pest damage, ie pressure. DSTU 8326 details control methods. The difference in indicators is shown in table 2.

**Table 2.**

The difference in the current requirements for fresh pears

Indicator	ЕЭК ООХ FFV-51	ДСТУ 33499-2015
Appearance, smell, taste	detailed	detailed
Degree of maturity	not described	detailed
Size	detailed	detailed
Mechanical damage	detailed	detailed
Pest damage	not described	not described

The biochemical composition of pear fruits of different varieties of domestic origin available in supermarkets in the autumn is analyzed (Table 3).

Table 3.

Characteristics of important consumer components of pear fruit

Sort	Contents				Tasting assessment, score
	DSS, %	The amount of sugars, %	Pectin substances, %	Titrated acids, %	
Conference	17,1	9,6	1,2	0,16	4,4
Vitchiznyana	17,0	10,7	1,0	0,22	4,7
Pretty	16,0	8,3	0,8	0,15	4,5
Chinese	15,4	7,5	1,0	0,31	4,6

Dry matter to a certain extent determines the content of sugars and acids in fruits. Among the samples studied, the highest rate of dry soluble substances (SSR) was recorded in the fruits of the pear variety Conference and Vitchiznyana, in other varieties this figure was lower.

The main types of sugars in pears are glucose and fructose. The ratio between them depends on the degree of maturity. Among the studied varieties, the highest content of sugars is characterized by the variety Domestic and Conference. It should be noted that the taste perception of fruit sugar does not always depend on the amount of sugar in the flesh. This indicator is significantly affected by the ratio between sugars and acids. Although pears are classified as sweet fruits, some varieties contain significant amounts of malic and citric acids, which make pear pulp sweet and sour.

Among the studied varieties, the highest content of organic acids was observed in the fruits of the Chinese variety (0,31%), in other varieties this figure was 0,15-0,22%. The content of vitamin C in pears depends on the variety and degree of maturity and is 3-5 mg%.

The taste of pears is the most important feature, which depends on the variety, time and conditions of collection and storage, the ratio of sugars to acids, as well as the strength and type of aroma and other components of the chemical composition. The fruits of the above varieties are characterized by high chemical properties, which makes them especially tasty and competitive. The most harmonious in taste were the fruits of the pear Vitchiznyana.

Conclusions.

The presence of two current regulations for one type of product will create conditions for the manipulation of suppliers to supply products to intermediate wholesale companies. The lack of unambiguous interpretation of permissible damage



in the European standard creates conditions for the emergence of controversial quality issues. Commodity analysis of pear fruits in retail chains in Kyiv showed that the products meet the requirements of both standards. The best sample of the analyzed were the fruits of domestic and Chinese pears. Retailers are recommended to show quality certificates, safety indicators and product grades in order to maximize consumer information about quality.

References:

1. Gorodniy N.M., Gorodnyaya M.Ya., Volkodav V.V. and set. (2002). Plodoovoshhnie resursi i ih mediko-biologicheskaya otsenka [Fruit and vegetable resources and their medical and biological assessment]. – K.: Alefa. – 468 c.
2. Podpryatov G.I., Skaletska L.F., Voitsekhivskii V.I. (2005). Tovaroznavstvo produktsiyi roslinnitstva [Commodity of plant products]. – K.: Aristey. – 256 p.
3. Pochitskaya I.M., Roslyakov Yu.F., Komarova N.V. and set. Sensory Components of Fruits and Berries // Food Processing: Techniques and Technology. 2019. – Vol. 49(1). – P. 50–61.
4. Roslyakov Yu.F., Pochytskaya I.M., Litvyak V.V. Theoretical bases of formation of taste sensations in the use of food. News of Institutes of higher education // Food Technology. – 2016. – V. 352(4). – P. 109–115.
5. Bayramov, L.A. Variability of the chemical composition of pear fruits of native varieties of the Nakhichevan Autonomous Republic during storage // Bulletin of Science and Practice. – 2018. – Vol. 4. – №5. – C. 172-178.
6. Skaletska L.F., Podpryatov G.I., Zavadska O.V. (2014). Metodi naukovih doslidzhen zi zberigannya ta pererobki produktsiyi roslinnitstva [Metody naukovykh doslidzhen zi zberigannya ta pererobki produktsii raslinnitsva], Komprint. – 416 p.

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