UDC 664:664.1;664.2

ECONOMIC EFFICIENCY OF PRODUCTION OF FUNCTIONAL DRINKS BASED ON PEAR PECTIN

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Annotation. This article discusses the advantages and economic efficiency of obtaining pectin extract from pear waste produced in Uzbekistan and the production of functional juice from its extract. It also presents the physicochemical characteristics of apple and pear juice produced with the addition of pear pectin extract. In addition, the cost and economic efficiency of juice production are substantiated by figures.

Key words: pear, pectin, functional drink, fruit juice, economic efficiency.

The diversity of pectin substances determines their use in the production of a wide range of food and non-food (therapeutic and prophylactic) products.

As a result of anthropogenic factors and industrial development, the level of environmental pollution is increasing, causing negative effects on human health. Therefore, there is a growing need to produce functional food products, including functional soft drinks.

Because pectin has an immunomodulatory effect on the human body and detoxification properties, more attention is being paid to the production of soft drinks enriched with pectin substances obtained from various raw materials [1, 2, 3].

It is known that the ability of pectin extracts isolated from raw materials to form complex compounds with harmful metals present in the human body is higher than that of dry pectin solutions [4, 5, 6].

Several raw materials are used in the production of juices. Among them, pear juices stand out from other juices with their pleasant aroma. In addition, pear juice contains more pectin and sweeteners, and biogenic metals such as iron and copper. The sugar content in it is between 5-12%, and the acidity is low. Pear juice is sweet in taste and transparent in

appearance according to its organoleptic characteristics.

Taking into account the advantages and pleasantness of pear fruit and juice, as well as the fact that several local varieties of pear are widespread in the mountainous regions of Uzbekistan, we developed drinks based on pear pectin, pear juice and apple juice with added pear pectin extract [7].

Pectin substances in the composition of the drink improve its organoleptic properties, bind aromatic compounds and increase the palatability of the juice. Therefore, we conducted studies to determine the amount of pectin extract required for the production of functional drinks and to study the effect of pectin extract concentration on the organoleptic properties of soft drinks [7].

The optimal ratios of pectin substances and fruit juice for the preparation of functional beverages based on pear pectin extract were determined.

In developing the functional beverage recipe, we used the evaluation of the organoleptic parameters of the juice to determine the mutual ratios of juice and pectin. In addition, attention was paid to the stability of the juice composition and consistency, a property that determines the organoleptic parameters of juices. Since juices with the addition of fruit pulp require the presence of stabilizing additives to ensure that the composition is uniform throughout the volume of the beverage [8, 9, 10].

When determining the optimal ratios for the preparation of a functional beverage based on pear and apple juice with pear pectin isolated from pear waste, the required amount of pear pectin was taken into account. It was found that it is technologically more convenient to use pectin extract, rather than powdered pectin, as a pectin additive.

Increasing the amount of pectin extract in the composition of the produced beverage also increases the physiological benefits and taste characteristics of the beverage, but this increases the price of the product and reduces economic benefits.

The harmony of the taste of the juice is ensured by the inclusion of sugar and fruit acids in an optimal amount [11, 12].

The sugar included in the juice not only gives a sweet taste to the drink, but also has a positive effect on the assimilation of the aromatic substances contained in it. Citric acid is used in the preparation of the juice, which helps to harmonize the taste.

The quality indicators of apple and pear juices with the addition of pear pectin extract are presented in Tables 1 and 2.

Table 1 – Physicochemical parameters of apple juice produced with the addition of pear pectin extract

Parameters	Amount
Carbohydrates, %	11,6
Titratable acidity (as malic acid), %	0,8
Mass fraction of dry matter, % not less than	13,5
Mass fraction of pulp, %	30
pH index	4,3
Mass fraction of pectin substances, %	1,2
Energy value, kcal	47,6

Table 2 – Physicochemical parameters of pear juice prepared with the addition of pear pectin extract

Parameters	Amount
Carbohydrates, %	12,8
Titratable acidity (as malic acid), %	0,5
Mass fraction of dry matter, % not less than	12,9
Mass fraction of pulp, %	30
pH index	4,7
Mass fraction of pectin substances, %	1,0
Energy value, kcal	52,5

According to organoleptic parameters, juices obtained with pulp have evenly distributed fine pulp and a pleasant aroma characteristic of these fruits.

The economic efficiency of agricultural production is generally expressed as the ratio of the result of production, living and material labor costs. The objective need to increase the economic efficiency of agricultural production depends on a number of features of the current stage of the country's economic development and the sum of factors in constant motion. On the one hand, increasing the efficiency of agricultural production indicates the growth and difficulty of demand for food and raw materials, increased demands for product quality, the limitation of some production resources, changes in the cost of means of production, etc.

On the other hand, the development of society at the current stage expands the possibilities for increasing the economic efficiency of agricultural production.

When determining economic efficiency in agricultural production, it is recommended to use a system of indicators that reflect the forms of manifestation of objective economic laws in this branch of material production. The practical significance of the system of indicators of economic efficiency requires the use of methods for calculating the absolute and relative indicators of its criterion, as well as a generalized reflection of the efficiency of production resources.

Fruit processing enterprises often dispose of fruit waste, usually as animal feed or fertilizer for agriculture. Since this secondary raw material has not been processed to date, it is sold mainly to the population and other farms for livestock at a price of 150 Uzbek sum per kilogram.

According to the method we propose, if fruit waste is processed as a secondary raw material and turned into a product, there will be a demand for it not only in the country, but also abroad.

Gross income part. If pear waste is used as a secondary raw material and processed, 550 kilograms of secondary raw materials are consumed for 1 ton of functional drink. This means that if 100 tons of fruit waste produced by the enterprise during one season is processed, 181 tons of functional drink can be obtained. If 1 kilogram of the resulting product is sold for 10,000 Uzbek sum, the gross income will be 18,100,000 Uzbek sum.

Cost part. If each kilogram of processed pear waste costs 150 Uzbek sum, 15,000,000 Uzbek sum will be spent on 100 tons of raw materials, 325,800,000 Uzbek sum on sugar, and 81,450,000 Uzbek sum on fruits, for a total of 408,750,000 Uzbek sum (Table 3, 4).

Table 3 – The expense part

N	Raw materials	Amount consumed in production, tons	Expected purchase price, Uzbek sum	Price, Uzbek sum
1	Pear waste	100	150	15000000
2	Sugar	72,4	4500	325800000
3	Fruits	9,05	9000	81450000
Total				422250000

Table 4 – Economic efficiency table

Indicators	By enterprise	
Product sales price, Uzbek sum	7 500	10 000
Purchase price of pear waste, Uzbek sum/kg	15 000 000	15 000 000
Depreciation cost (equipment), Uzbek sum	2 010 910	2 010 910
Organizational costs (salaries, etc.)	266 400 000	266 400 000
Packaging material cost, Uzbek sum	228 000 000	228 000 000
Income tax, Uzbek sum	162 900 000	162 900 000
Fruits (for juice), Uzbek sum	40 875 000	40 875 000
Electricity, Uzbek sum	324 498 055	324 498 055
Total expenses, Uzbek sum	1 025 165 965	1 025 165 965
Gross income, Uzbek sum	1 357 500 000	1 357 500 000
Net income, Uzbek sum	332 334 035	332 334 035
Profitability, %	32	32

The enterprise received 1,357,500,000 Uzbek sum in gross income from secondary raw material processing and paid 162,900,000 Uzbek sum in single tax, after deducting 40,875,000 Uzbek sum for juice, 324,498,055 Uzbek sum for electricity, 2,010,910 Uzbek sum for depreciation, 266,400,000 Uzbek sum for wages, 34,632,000 Uzbek sum for single social payment and 13% deduction, the net profit was 332,334,035 Uzbek sum.

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