Economic justification of the use of bicomponent beverages based on pectin substances on the example of vegetable juices

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Abstract. Modern food technologies are not able to preserve the healthy components of original natural raw materials in finished products. The example is the production of industrial juices. It is known that freshly squeezed juices quickly deteriorate. In order to preserve their vitamins, useful components and increase the shelf life, water is immediately removed from freshly squeezed juices in a vacuum at a temperature of 30 °C. It is known that water is not only an environment favorable for the bacteria reproduction, but also a strong chemical reagent that easily decomposes all the useful components contained in food. In addition, chemical interactions occur in the water, that is, decomposition reactions, and they can only be stopped by removing water from the food system. When sterilized by heating, the chemical processes of decomposition of healthy aromatic components are accelerated. As a result, the nutritional value of such drinks is reduced. The main trend in food market is the expansion of range and volume of production of functional beverages containing the necessary nutrients.

The research is carried out in the continuation of the problem of the completed Master's thesis: "Development of technology for bicomponent functional drinks" [1].

Bicomponent drinks are drinks consisting of two components - water and concentrated juice. It is almost impossible to find them in the food market. Unusual consumption of such products makes them more interesting and attractive, and therefore cost-effective for the manufacturer at the first stages of production. To maintain demand over time, it will be necessary to expand the range of products.

In modern conditions, one of the most characteristic features of the development of Russian economy is the tightening of competition, the availability of which contributes to improving the quality of goods and services produced, allows the most effective use of existing knowledge and experience, and provides the most complete satisfaction of human needs through the rational behavior of enterprises in the market. The development of practical recommendations for improving the competitiveness of the enterprise and increasing its competitive advantages based on the justification of the enterprise competitiveness model will allow us to formulate recommendations for improving the competitiveness of positions. The efficiency of production expresses the degree of

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achievement of main goals characteristic for extended reproduction. Economic efficiency is determined by comparing the resulting effect (result) with resources or costs used to obtain it [2]

Manufacturers of such analogues in the market of this product are the following:

- The LLC “Zelena Sova”, production of drinks on apple juice without added sugar, citric acid, preservatives, E-additives, without pasteurization and sterilization, special drinks for athletes.
- The LLC “Amway”, therapeutic drinks.
- The LLC “Triel”, dehydrated compositions of concentrated juices, plant extracts.

The formula of competitiveness of food products is as follows

$$K_{pr.} = B \sum m_i \, g_i / C \quad (1)$$

where $\sum m_i \, g_i$ – the total complex indicator of quality level, expressed in points (m_i – weighting coefficient and g_i - the quality indicator of the i-th property);

C – price per unit of a product;

B – product safety.

Product safety when calculating competitiveness takes into account the absence or presence of clinical trials. As a result, the fraction is multiplied by 0 (the product is not competitive), or by 1 (the product is competitive), or by 2 (the product has functional properties and is highly competitive).

The quality rating scale includes three levels:

- good products (4 points) - competitive products;
- satisfactory (3 points) – products that can compete with best samples for a while;
- bad products (2 points) – products that can compete with the best analogues only in the near future, but not in the future.

It should be noted that some indicators are fundamental, while others can be classified as secondary. In this regard, the weighting coefficient is introduced for an objective assessment. As a result of summation, it should be a multiple of 10 for convenience when calculating [3, 4].

When evaluating the competitiveness of beverages developed by us, the sum of points was made up of values of standard indicators: appearance, color, taste, aroma, mass fraction of dry substances, nutritional value, warranty period of storage. Thus, when constructing the rating scale, first of all, we took into account standard indicators that characterize harmlessness, as well as new indicators with advanced characteristics, with stricter requirements for the quality of the product, packaging, design and storage, as well as such novelty in the market of juice products as bicomponent drinks. As the objects of evaluation, we selected the drinks “Light vegetable” and “Spicy vegetable”

Table 1 shows the scale of assessing the competitiveness of studied vegetable drinks.

Taking into account the developed scale of competitiveness of the developed beverages, we have evaluated it. The results of the study are presented in Table 2.

Thus, competitiveness implies the need to expand production to enter the Russian market, as well as abroad. Expanding the product range will attract potential buyers of any age.

Table 1. Competitiveness assessment scale

Rate	Weight ratio	Quality level			Characteristics of the quality level		
		4 points	3 points	2 points	Good (4)	Satisfactory (3)	Unsatisfactory (2)
Standard indicators							
Taste	3	12	9	6	harmonious	Ordinary	Extraneous tones (colors)
Color	2	8	6	4	Bright, characteristic of raw materials	Not bright	Dirty tones in coloring
Smell	10	40	30	20	Well-developed, characteristic of raw materials	Underdeveloped	With extraneous tones (colors)
Consistency	5	20	15	10	Homogeneous, semi-liquid	Inhomogeneous, semi-liquid	Too thick or too liquid
Appearance	5	20	15	10	Clear or / and cloudy liquid	With sediments	With the formation of sediments
Mass fraction of soluble solids,%	3	12	9	6	Complies with GOST (from 5 to 18)	3-5	Less 3
Mass fraction of titrated acids per citric acid,%	3	12	9	6	More 0,2	0,2	Less 0,2
Mass fraction of pectin substances, %	10	40	30	20	0,9-1,5	0,5-0,9	0,2-0,5
Market research indicators							
New packaging for drinks	10	40	30	20	Protected by patent	Not protected by patent	Absent
Novelty in the market of juice products	10	40	30	20	Rarely found on sale	Available only in specialty stores	In free sale
Shelf life	10	40	30	20	more a year	Year	Less a year
Trademark	5	20	15	10	Protected	Not proptected	Absent
Information content of the label	5	20	15	10	Full information	The information is shown in small print	There is no turnover sign on the market
Market analysis, demand	10	40	30	20	No competitors, high demand	Weak competition and demand	Strong competition demand is not set
Comprehensive indicator	100	400	300	200			
Harmlessness	10	40	30	20	There are hygienic conclusions and the conclusion of the health authorities	There are hygienic conclusions of the developed drink	There are no hygienic conclusions

Table 2. Competitiveness of developed vegetable drinks

Rate	Weight ratio	Quality level			Evaluation of beverage samples	
		4 points	3 points	2 points	"Light vegetable"	"Spicy vegetable"
Taste	3	12	9	6	12	12
Color	2	8	6	4	8	8
Smell	10	40	30	20	30	40
Constency	5	20	15	10	20	20
Appearance	5	20	15	10	15	15
Mass fraction of SV	3	12	9	6	12	12
Mass fraction of titrated acids	3	12	9	6	12	12
Mass fraction of pectin substances, %	10	40	30	20	40	40
New packaging for drinks	10	40	30	20	40	40
Novelty in the market of juice products	10	40	30	20	40	40
Shelf life	10	40	30	20	40	40
Trademark	5	20	15	10	20	20
Informative content of the label	5	20	15	10	15	15
Market analysis, demand	10	40	30	20	30	30
Comprehensive indicator	100	400	300	200	334	344
Harmlessness					2	2
Price for 1 piece, rub					40	40
Competitiveness, %					16,7	17,2

References

1. Belousova A. I. Development of agricultural processes in modern economic conditions Belousova A. I., Belousov S. V. In the proceedings: Scientific support of the agro-industrial complex. Collection of articles based on the materials of the 73rd scientific and practical conference of students on the results of researches in 2017. Chief editor A.G.Koshchaev. 2018. pp. 344-346.
2. Poznyakovsky V. M., Kiselev V. M., Schmidt V. V. Assortment of functional drinks on the regional market / / Beer and beverages, 2009. - No.5.
3. Technical regulations of the Customs Union TP CU 021/2011 "On food safety", approved by the Decision of the Customs Union Commission dated 09.12.2011. No. 880. - 242 p.
4. Technical regulations of the Customs Union TP CU 023/2011 "Technical regulations for fruit and vegetable juice products", approved by the Decision of the Customs Union Commission dated 09.12.2011. No. 882. - 242 s