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UDC 10167

DEVELOPMENT OF NEW TYPES OF VEGETABLE JUICES AND BEVERAGES TECHNOLOGY

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Abstract:

Objective. In this article, vegetables such as cucumbers, carrots, and cabbage are given in different amounts The effect of enzymes such as Pectomaserin, Pectinex Ultra SP-L, Pectomaserin G10X, Fructozyme M and increased juice output in juice production. The effect of the type of vegetables was determined, it was studied the development of original technologies of cucumber, carrot, cabbage juices and drinks .

Methods. In our republic, vegetable juices are produced in a much smaller volume and assortment than fruit and vegetable juices, and modern methods such as enzymatic processing and targeted lactic acid fermentation are practically not used to obtain them. The prospects of these methods allow not only the use of cost-effective technological modes and the saving of energy resources, reduction of losses and waste, but also the possibility of "soft" modification of the components of raw materials to obtain quality products . Cucumbers, cabbage and carrots were used as the main raw materials for laboratory work for scientific research. The main chemical composition of these raw materials was determined.

Results. Cucumbers, carrots, and cabbage are selected raw materials under the influence of Polygalacturonase, which breaks down pectin and reduces the viscosity of the juice. It increased 10-15 times when using Fructozyme M and Pectomaserin G10X, and only 7 times when using Pectinex Ultra SP-L. At the end of exposures with FP Fructozyme M and Pectomaserin, the viscosity increased 4-6 times, and with Pectinex Ultra SP-L, others showed that the activity of the enzyme in sample 1 was from 8 to 13, and the activity of the second sample was from 11 to 14 it has been.

Conclusion. It was determined that it is expedient to use enzymatic methods to obtain juices and drinks with high nutritional value from cucumbers, carrots and white cabbage, Pectomaserin G10X and Fructozyme M - to obtain purees and juices with stable pulp, Pectinex Ultra SP-L - from finely ground pulp

to better separate the juice; improved the classification of macerating preparations. In the market economy of production and finished products, it was calculated that 1 ton of finished products is equal to 2,497,225 soums

Keywords: Pectomaserin, Pectinex Ultra SP-L, Pectomaserin G10X, Fructozyme M, cucumber, carrot, cabbage, juice.

Introduction. The development of food industry, safety, and product processing technologies is of great importance in satisfying human needs. These products include vegetable juices and drinks, which are part of many diets, have a low calorie content and contain a complex of biologically active substances: vitamins, minerals, prebiotics, dietary fiber, natural antioxidants.[1-3] However, the analysis of the domestic juice market and practical technologies shows that vegetable juices are produced in a much smaller volume and range than fruit juices, and modern methods such as enzymatic processing and targeted lactic acid fermentation are practically not used to obtain them. The prospects of these methods are related not only to the use of cost-effective technological modes and the saving of energy resources, the reduction of losses and waste, but also the possibility of "soft" modification of the components of raw materials to obtain quality products . In this regard, the improvement of technological processes and the creation of new formulations of vegetable juices and drinks that provide high nutritional value, functional activity and organoleptic qualities are among the priorities of scientific research.

Since the beginning of the 21st century[4,5], the physiological norms of annual consumption of vegetables per capita in Uzbekistan (total 113.3 kg; of which cabbage 2.1, tomatoes 25.6, cucumbers 5.5, onions and garlic 18.3, carrots 18 ,3, beets 5.5, other vegetables 20.0 kg), vegetable growing is being developed rapidly. Districts around large cities and industrial centers mainly deal with S. In the company, dekhdon and farms, the cultivation of fairy vegetables in the open field under polyethylene films has been started. Gen. of the Republic. the cultivation of vegetables was not developed in the regions. Foreign varieties and experiences are widely used in S. In 2000, the area of vegetable crops in Uzbekistan was 130.4 thousand ha, the gross harvest was 2637.3 thousand tons, and the yield was 173.1 s/ha.

The following methods are used to extract fruit and vegetable juices: 1. Physical methods - the chemical composition and properties of the product do not change. These methods include settling, filtering, centrifugation, electroseparation, lighting with bentonite clay.

In colloid-chemical methods, the colloidal system of juices is destroyed. Such methods include gluing (gluing), coupling, thermomethods (rapid heating, freezing and melting), working with coagulants (alcohol), adding bentonite clay [5].

Chemical methods are based on the combination of natural substances in the juice with each other or with an added chemical reagent. Some lighting methods are combinatorial. For example, when juices are cooled, chemical reactions occur between additives and proteins, along with a process of self-lightening under the influence of enzymes.

The use of enzymes that increase the amount of juice in juice production, the following enzyme preparations are used in all countries: pectavamorin, pectofoetidin, bostrin PEP-1 (Bulgaria), ultrazym (Romania), filazim (Hungary), pectinol (USA), panzym (Germany) and others [6].

Working with electricity. The method was developed by Flaumenbaum and is based on the destruction of protoplasm when an electric current is passed from fruits and vegetables or pulp. As a result, cell permeability and juice output increases.

Methods. *[7-10]* In order to quickly and easily achieve the intended goal in carrying out scientific research and performing experiments, first of all, it is necessary to know how to correctly choose the methods of analysis. In particular, it is desirable to use fast, modern and, of course, highly accurate analysis methods to develop new types of vegetable juice and beverage technology and to determine various physico-chemical parameters of finished products.

Cucumbers, cabbage and carrots were used as the main raw materials for laboratory work for scientific research. The main chemical composition of these raw materials is presented in Table 1.

Table 1

The chemical composition of vegetables selected for the experiment is compared to 100g

Type of vegetable	Oils *g*	Proteins *g*	Carbohydrates *g*	Water *g*	Ash *g*	A common shaker *g*	Dietary fiber *g*
Cucumber	0.11	0.65	3.63	95.23	0.38	1.7	0.3
Carrot	0.1	1.3	6.9	88	0.2	1.5	2.4
Cabbage	0.2	1.8	4.7	90	0.12	1.42	2

Results. The results obtained by us were first conducted in Namangan region processing enterprises, including "Namangan Sharbat", "Yangikurgan Agro Invest", "Chust Agromir" during the season and the types and sizes of juices produced in Namangan region. Juice samples were taken from studied industries (carrots, cucumbers and cabbage) with the help of enzymes, and the macronutrients and micronutrients contained in them were determined in the scientific laboratory of the Department of Food Technology. For laboratory research, we observed the rate of juice release and the state of cell coagulation in the form of Pectomaserin , Pectinex Ultra SP-L , Pectomaserin G10X, Fructozyme M type enzymes of the vegetables listed in Table 1.

Table 2

Enzyme activity, %

Raw materials	Name of enzymes			
	Pectomaserin	Pectinex Ultra SP-L	Pectomaserin G10X	Fructozyme M
Cucumber juice	5	3-7	5-10	from 11 high
Carrot juice	7	5-10	7-13	from 14 high
Cabbage juice	4	6 - 9	9-12	from 13 high

Protopectinase contained in enzyme preparations breaks down protopectin in plant tissues. As a result, the cells are separated from each other, the tissues become soft. In addition, protopectin, which is a part of cell shells, also breaks down and reduces their mechanical strength. The strength of the protoplasmic membrane also decreases.

Under the action of polygalacturonase, pectin is broken down and juice viscosity decreases.

It increased 10-15 times when using Fructozyme M and Pectomaserin G10X, and only 7 times when using Pectinex Ultra SP-L. At the end of exposures with FP Fructozyme M and Pectomaserin, viscosity

increased 4-6 times, and others with Pectinex Ultra SP-L.

As can be seen from Table 2, the enzyme activity of sample 1 was from 8 to -13, and the activity of the second sample was from 11 to -14.

Charges of juice colloids are neutralized. In water suspensions, bentonite forms a hydrophilic colloidal solution, the charge of the solution changes due to the negative charge of its particles.

Discussion. Thus, the characteristics of the effect of Pectinex Ultra SP-L put it in an intermediate position between preparations intended for tissue maceration - Fructozyme M and Pectomaserin G 10X, and Fructozyme R, intended for increasing the yield of juice. As a result, we can observe the changes in the chemical composition of cucumber and carrot juices in Tables 3-4 .

Table 3

Chemical composition of fermented cucumber juice

Components in cucumber juice 100 grams	Calories, kcal: 14 quantity	In addition, components
Proteins g	0.8	beta-carotene, choline, vitamins A, B1, B2 , B5 , B6 , B9, B12 , C, E, K, H and PP, as well as potassium, calcium, magnesium , zinc, selenium, copper and manganese, iron, chlorine and sulfur, iodine, chromium, fluorine, molybdenum, boron and vanadium, tin and titanium, silicon, cobalt, nickel and aluminum, phosphorus and sodium.
Fats, g:	0.1	
Carbohydrates, g	2.5	

Table 4

Chemical composition of fermented carrot juice

Components of carrot juice 100 grams	Calories, kcal: 56 quantity	In addition, components
Proteins g	1.1 g	A 39% , b-vitamins 42% , IN 1 - 0.7% , B2 - 1.1% , Choline - B5 , B6 , B9 , B12 , C - 3.3% , D , E - 2% , H , vit. K , PP - 1.5% , Potassium - 5.2% , Ca - 1.9% , Si , Mg - 1.8% , Na - 2% , P - 3.3% , Cl , Fe - 3, 3% ,
Fats, g:	0.1	
Carbohydrates, g	12.6 g	
Dietary fiber	1	
Water	85	

Development of recipes and technologies of obtained new types of vegetable drinks

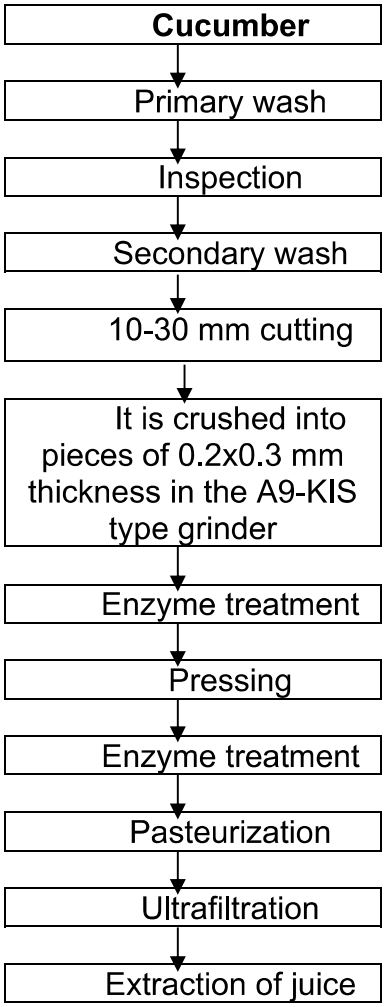
In accordance with the modern principles of creating functional food products and the information obtained in the research process, the production of fruit and vegetable juices based on cucumber juice includes the following operations: reception and preparation of raw materials, preparation of semi-finished products and materials, mixing , packaging, sterilization or aseptic. Packaging in tetra-brick-aseptic.

Preparation of raw materials

Carrots are sorted, washed in A9-KLAL and A9-KM-2 drum washing machines installed in series, checked with cutting tips, rinsed, cleaned. Peeling of carrots is carried out by the steam-thermal method - in a device of the type A9-KChYA at a steam pressure of 0.35-0.40 MPa, and then by cleaning the skin in an A9-KM-2 drum washing machine or another type. Baking time and temperature are set at each plant based on the characteristics of the heat device, steam pressure, carrot type and size, as well as other factors specific to the plant, so the cake will soften a little. possible resulting in pulp. After burning, the temperature inside the carrot should not be lower than 80C. In this mode, carrots are additionally bleached before fermentation.

Cucumbers are sorted, washed, checked and washed. The stalks are removed, cut into pieces 10-20 mm thick, cleaned of seeds and inner film, re-examined, cleaned, rinsed. Cucumber segments are cut into pieces 0.2x0.3 mm thick in an A9-KIS type grinder and fed for enzymatic processing, as can be seen in the above scheme

TECHNOLOGICAL SCHEME OF PROCESSING PRIMARY CUCUMBER JUICE



As for the economic efficiency of the obtained new types of cucumber juices, juice from vegetables is being produced in one enterprise.

We prepared the economic calculation books for the development of technology of new types of vegetable juices and beverages as follows .

Table 5

1 ton the price of raw materials for the production of cucumber juice

No	Cucumber juice	The price of raw materials, soum	1 ton of cucumber juice , raw material , kg/l	1 ton of cucumber juice (1000 kg)
1	Cucumber	1000	1 200	1,200,000
2	fermets	24,000	10	240,000
3	Common components that enrich the composition	8 400	25	210,000
4	H_2O	15	1 500	22,500
		Total		**1,672,500**

Based on the given data, we calculate the economic efficiency:

1. Price of raw materials.

For 1 kg of cucumbers: 1,200 soums; For 1 *kg* of enzyme (M) : 24 000 soums; General components enriching the composition of 1 *l* : 8 400 soums and 1 *l* For H_2O: 15 soums were set

2. Total consumption of raw materials: $S_{(b+f+tbk+water)} = G_b \cdot N_b + G_f \cdot N_f + G_{tbk} \cdot N_{tbk} + G_{water} \cdot N_{water} = 1200 \cdot 1000 + 10 \cdot 24{,}000 + 25 \cdot 8400 + 1500 \cdot 15 = 1{,}672{,}500$ soums.

Table 6

The total cost of production of 1 ton of cucumber juice

No	Naming	Price, soum
1	Workers' wages	160 000
2	Single social contribution 15%	24 000
3	Raw material price	1,672,500
4	Additional costs	125 000
5	Unforeseen expenses	50,000
6	Profit 10%	1 40 000
Total		**2 171 500**
7	VAT 15%	325 725
General		**2 497 225**

All costs for the production of cucumber juice presented in Table 6 were calculated to be 2,497,225 soums for 1 ton of finished product in the market economy of production and finished product.

Conclusion. The feasibility of using enzymatic methods to obtain juices and drinks with high nutritional value from cucumber, carrot and white cabbage was determined, theoretically based and experimentally confirmed. Enzymatic maceration of vegetables increases the yield of juice with pulp, enriches it with soluble pectin, preserves vitamin C and p-carotene. A comparative analysis of the effectiveness of various enzyme preparations with a maceration effect was carried out, as a result: ways of their rational use were determined: Pectomaserin G10X and Fructozyme M - for obtaining purees and juices with a stable pulp, Pectinex Ultra SP-L - for small to better separate the juice from the crushed pulp; improved the classification of

macerating preparations. It was calculated that 1 ton of finished product is worth 2,497,225 soums in the market economy of production and finished products.

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