






Study of Zoned Fruit and Vegetable Products for the Development of Products with Functional and Bioecological Properties

Masimzhan Velyamov¹^a, Lyudmila Kurasova¹^b, Shukhrat Velyamov¹^c, Sanavar Azimova²^d
and Aziza Tagaeva¹^e

¹LLP "Kazakh Research Institute of Processing and Food Industry" Almaty, Republic of Kazakhstan

²Almaty Technological University, Almaty, Republic of Kazakhstan

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Abstract: Fruit and vegetable products are of great importance in human nutrition. They are a source of easily digestible carbohydrates, vitamins, minerals, flavoring and aromatic substances, contain biologically active compounds that determine the effectiveness of their use for the prevention and treatment of diseases of the cardiovascular system, diseases of the blood, digestive organs, nervous system, metabolic disorders, etc.

As a result of the research carried out, 4 zoned apple varieties were selected for the development of technology for the production of jam, puree and juices with functional, bioecological and natural health properties, in particular, Golden Delicious, Star-Crimson, Idared, Zarya Alatau, 2 carrot varieties: Alau, Shantane, 2- beet varieties: "Bordeaux", Kyzyl-Konyr", 1 plum variety: "Stanley" and 2 varieties of currants: "Golden", "Altai", which, according to the content of the pectin extract, will make it possible to make more acceptable compositions of them to achieve an effective balanced composition of the target product for biologically active substances. The nutritional value of the resulting fruit and vegetable products (jams, purees and juices), due to selected raw material sources, is characterized by a high content of nutrients and will balance their composition to obtain products with functional, bioecological and natural health properties. To develop acceptable technologies from the specified fruit and vegetable products, etc., with functional, bioecological and natural health properties, the indicators of the quantitative yield of the liquid phase and pomace were also studied, only in selected varieties, based on physicochemical studies.

The purpose of the work. Expanding the range of functional food products by developing a resource-saving technology for processing fruits (apples) and vegetables (beets, carrots) for the production of fruit and vegetable jams, purees and juices enriched with pectin-containing extract extracted from sugar beet pomace and obtaining functional products with natural health properties.


1 INTRODUCTION


The Republic of Kazakhstan has significant production and climatic potential for the production of fruit and vegetable products.


According to statistics, the level of dependence on imports of fruit and vegetable products is 84.57%, in addition, losses during storage of domestic products reach up to 30% or more (Kusainova, 2015).


At the same time, the above drawbacks in the storage and deep processing of vegetable products are noted not only in the Republic of Kazakhstan but also


in the CIS countries (Russia, Belarus, Ukraine, Uzbekistan, Kyrgyzstan, etc.) and foreign countries (Bulgaria, Poland, etc.). As seen the importance of the project aimed at processing of fruit and vegetable products, in particular, the development of efficient resource-saving technology for integrated and deep processing of fruits (apples) and vegetables (beet, carrots, etc.) for the production of fruit and vegetable products. The objective of the project is to produce fruit and vegetable jams, purees and juices enriched with pectin extract extracted from sugar beet extracts for the production of functional products with

^a <https://orcid.org/0000-0002-9248-5951>

^b <https://orcid.org/0000-0002-8479-9045>

^c <https://orcid.org/0000-0002-5997-5182>

^d <https://orcid.org/0000-0002-8992-8889>

^e <https://orcid.org/0000-0001-5126-3773>

naturally-healthy properties for mass consumption on a national and international scale, due to the possibility of setting up new production for processing perishable fruit and vegetable raw materials available in the country, as well as the possibility of expanding the range of naturally-healthy products.

Processing of fruit and vegetable products (apples, carrots, beets, etc.) in the republic in the world and Kazakhstan, is very relevant since 30% or more of the obtained products during storage are lost. However, this problem, in conditions remains unresolved and extremely topical, because there is still no effective processing technology of the above fruit and vegetable products (Lebedev, 2009).

Products derived from apples, table beets and carrots, etc., because of the carbohydrates, vitamins, pectin (0.6 -1.1 g per 100 g), and other vital compounds contained in them are very useful in the prevention and treatment of hypertension, atherosclerosis, diseases of the cardiovascular system, favoring the process of hematopoiesis, in the treatment of malignant tumors, treatment of eye diseases, liver, polyarthritis, mineral metabolism disorders, dysbacteriosis of the bowels, nephritis, etc. (Elaine, 2009).

In this case, it is well known that pectin, as a natural polysaccharide of plant origin, has gelling, gel-forming and sorption properties and due to this is widely used in the food industry. Besides, pectins and their derivatives show antimicrobial properties against certain microflora: *E. coli*, Flesner's dysentery bacteria, paratyphoid bacteria, and also Coke's bacteria (Azimova et al., 2017). Pectin solutions are good plasma substitutes. Pectin is known to be beneficial when used in food to stabilize metabolism. It can reduce cholesterol content in the body, improve intestinal peristalsis and peripheral circulation (Machneva and Bondarenko, 2016).

But its most valuable property can be safely called the ability to clean living organisms from harmful substances (radioactive elements, pesticides and ions of toxic heavy metals) (Avidzba et al., 2013). Therefore, many specialists call this substance a sanitizer of the organism or in our case give products (means) bioecological properties (Ogai et al., 2018).

In addition, pectin substances are, like polysaccharides, good probiotics in the body and thus contribute to the restoration and normalization of the natural composition of the consortium of microorganisms in the gastrointestinal tract and thus help to restore and raise the natural resistance and immune status of the body, which is very important

in the current pandemic of coronavirus infection, SARS, etc. (Hertog, 2015.).

In this case, the most effective is the processing of these products and the use in the form of juices, purees, jams, in combination with other juices of vegetables and fruits (apples, table beets, carrots, plums, currants), etc. (Kanner et al., 2019).

As can be seen, the development of effective resource-saving technology for the complex and deep processing of fruits (apples) and vegetables (beets, carrots, etc.) for the production of fruit and vegetable jams, purees, juices enriched with a pectin-containing extract from sugar beet extracts for the production of functional purpose. The development of an efficient resource-saving technology for the production of fruit and vegetable jams, purees and juices enriched with pectin containing extract, extracted from sugar beet pulp, to obtain products of functional purpose, with natural health properties, for mass consumption in the Republic of Kazakhstan, is new, very cost-effective and economically beneficial, and as a result of which the developed technology and products will undoubtedly have a positive impact in addressing the strategic important national problem in the processing of perishable food products.

Based on the above, we can conclude that the development of efficient resource-saving technology for complex and deep processing of fruits (apples) and vegetables (beets, carrots, etc.) to obtain fruit and vegetable jams, purees and juices, with the addition of pectin containing extract extracted from sugar beet pulp, to obtain products of functional purpose, with natural health properties, for mass consumption in the Republic of Kazakhstan, is very relevant (Lee et al., 2009).

The novelty of research development of efficient resource-saving technology for complex and deep processing of fruits (apples) and vegetables (beets, carrots, etc.) to produce fruit and vegetable jams, purees and juices, with the addition of pectin containing extract extracted from sugar beet pulp, to obtain products of functional purpose, with natural and health properties, for mass consumption in the Republic of Kazakhstan, is new, very cost-effective and economically beneficial.

Scientific and practical significance of the research: Deep and complex processing of fruit and vegetable raw materials, allowing maximum preservation of functional properties and ensuring long-term storage is necessary to ensure the health of the nation by expanding the range of products with a natural-health effect. The above information indicates that the developed technologies in this project, undoubtedly, have scientific novelty and practical

importance in the branch of the processing and food industry of fruit and vegetable products in the country.

Purpose of work: Expanding the range of functional foods by developing a resource-saving technology for processing fruits (apples) and vegetables (beets, carrots) for the manufacture of fruit and vegetable jams, purees and juices enriched with pectin containing extract extracted from sugar beet extracts and obtaining functional products, with natural-health properties.

This article deals with the evaluation of zoned varieties of fruits and vegetables (beets, carrots, apples) for the development of production technologies of juices, purees, jams with functional, bio-ecological and natural health-improving properties.

2 RESEARCH METHODS

Patent and information research was conducted by studying scientific and technical literature of domestic and foreign researchers, reviewing materials of Internet resources, available statistical data on processing and development of technologies for obtaining fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets, etc.) enriched with pectin extract from sugar industry secondary raw materials, and available scientific and experimental data of KazNIPV and KazNIIKiO. At the same time, the depth of search will be not less than 15 years. Based on the conducted research and their analysis the report on patent research will be prepared. According to the research program of the project, the calendar plan of scientific research NIR for 2021 was developed.

In this case, evaluation and Physico-chemical analysis of selected zoned varieties of apples, carrots, beets, plums and currants, which based on the results obtained will be further used to develop technologies for obtaining fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets) and others, enriched with pectin extract, from secondary raw materials of the sugar industry, having functional, bio-ecological and natural health-enhancing properties. The main attention was paid to the degree of varieties zoning, suitability for technological processing and mainly pectin content, which should not be below the level: 0.6-0.8% or more.

In this case, the study of physical and chemical properties of zoned varieties of fruits and vegetables (table beets, carrots, apples, etc.) to develop technologies for the production of juices, purees, jams

were carried out by analyzing fruits and vegetables (table beets, carrots, apples, etc.), according to the following GOSTs: soluble solids, GOST 28562-90; total sugar - GOST 8756.13 - 87; vitamin C - GOST 24556-89; carotene - GOST 8756.22-80; pectin - "Methods of biochemical research of plants", A.I. Ermakov et al. p.174.

3 RESULTS AND DISCUSSION

Preliminary monitoring and patent information search on the production of fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets), enriched with pectin extract from secondary raw materials of the sugar industry by studying scientific and technical literature of domestic and foreign researchers on specified directions, by studying materials of Internet resources, available statistical data, and also available scientific - experimental data Kazakh NIIPiV and Kazakh NIIKiO and own research. At the same time, the depth of the search was 18 years.

The scientific and technical literature, domestic and foreign researchers on the development of effective techniques for the production of fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets) and selected works of similar direction, but which differ significantly in technological mode from the developed technologies and thereby established the absolute novelty of the chosen direction of research.

Based on the analysis of the results of monitoring and patent information search on the technology of production of fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets), according to the requirements and per the terms of reference of the research program prepared by the working program and schedule of the calendar plan for conducting scientific research on the project NIR in 2021.

To conduct scientific and experimental research NIR, according to the schedule of the calendar plan, the selection of necessary analytical equipment, a set of chemical reagents and materials for the development of technology was made.

The study, also available in the world technologies of production of fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets), enriched with pectin extract from secondary raw materials of the sugar industry.

At the same time, it is established that products derived from fruit and vegetable products have tremendous therapeutic properties. Their usefulness

lies in the fact that they are a source of easily digestible carbohydrates, or otherwise sugars - glucose, fructose and sucrose, vitamins, trace elements, etc.

Based on the study and analysis of available literature, electronic and other information, it was established that both in the country and at the world level, natural fruit and vegetable products, in particular juices, jams and purees, are not always prepared technologically correctly.

At the same time, it was found out that fruit and vegetable products such as apples, table beets, carrots, etc. contain relatively large amounts of pectin substances (0.5-1.8%), which in natural conditions in their fruits contribute to the preservation in the biologically active form of vitamins and trace elements, etc.

Existing in Kazakhstan, CIS countries (Russia, Belarus, Ukraine, Uzbekistan, Kyrgyzstan, etc.) and foreign countries (Bulgaria, Poland, etc.) technologies of production of juice products, jams and purees due to the use of harsh technological regimes (high temperatures, pH - environment, aggressive chemical additives, etc.) in the technological process of manufacturing juice products, purees and jams, preservation in the finished product, technologically a very valuable component, such as pectin, in the composition of manufactured products, as a consequence, often observed obtained products without content or with very little preservation in the finished product, biologically important to maintain in the active digestible form of vitamins and others, natural biological pectin protective substance.

In this case, often in a short time in the products obtained (juices, purees and jams), contained in their composition in an active digestible form of vitamins and mineral compounds, due to the lack of a favorable protective environment of pectins, from use in the manufacture of these products, especially at the stage of pasteurization, from high-temperature factors, change their active state to non-assimilable for the body forms (Skripnikov, 2011).

Consequently, according to our analytical data, both in the republic and in foreign countries, processed fruit and vegetable products (juices, jams, purees, etc.) are often prepared, seemingly in the analysis contain the main useful biologically active compounds, such as vitamins, trace elements, etc., but because of their biological peculiarities of preservation conditions in fruit and vegetable raw sources during technological processes of their processing, they become indigestible and make the

final processed fruit and vegetable products with useless, allergenic and negative properties.

In addition, we found that very useful are not only mono compound fruit and vegetable products, in particular juices, purees, jams, etc., and multi-compound, as it becomes more enriched in active useful constituents, balanced and complete.

At the same time, it is proved that vegetables contain more (table or sugar beet, etc.) pectin substance providing both functional and preservation in the biologically active form of vitamins, microelements, etc., and thus contribute to obtaining biologically active, useful, functional, with bio-ecological and with natural - health properties of products.

The above noted, quite proves that proposed in the project directions on receiving a new generation, with functional properties, bio-ecological products, in particular, juice products, purees and jams, from fruit and vegetable raw sources (apples, beets, carrots, etc.), are relevant and very important, both for the Republic of Kazakhstan and in CIS countries (Russia, Belarus, Ukraine, Uzbekistan, Kyrgyzstan and others) and abroad (Bulgaria, Poland and others).

Based on the above, it can be noted that very significantly different from existing technologies of processing fruit and vegetable products, our research is proposed, the development of effective technologies for obtaining jams, purees and juices by using aspects of deep processing, aimed at developing efficient resource-saving technology for processing fruits and vegetables, in particular, table beets, apples and carrots, etc, for manufacturing with mono- or poly-compound recipes for their production, enriched with pectin extract, extracted by gentle fermentative method from secondary raw materials of the sugar industry and obtaining products of functional purpose, with natural-health properties, for food purposes (Golubev and Shelukhina, 2015).

The traditional technology of pectin production is based on acid-thermal hydrolysis and subsequent alcohol precipitation from the hydrolysate. Foreign companies currently produce pectin based on this technology.

The most modern and environmentally friendly is the biotechnological method based on the action of enzymes of microbial origin used as hydrolyzing agents. Enzymatic hydrolysis has several undeniable technological advantages, the main of which is low esterified pectin while preserving its jelly-forming properties.

In the future, the physical and chemical properties of zoned varieties of fruits and vegetables (beets, carrots, apples.), for the development of

production technologies of juices, purees, jams were studied.

At the same time, it was found that the products derived from fruit and vegetable products have very useful, with functional and naturally - health-improving properties. The value of fruits and vegetables is largely measured by the level of accumulation in them not only vitamins but also other physiologically active substances: sugars, organic acids, mineral salts, carotenoids, pectins, etc. Depending on the variety and growing conditions, these indicators change.

In addition, we found that not only mono-compound fruit and vegetable products, in particular juices, purees, jams, etc., are very useful, but multi-compound, as it becomes more enriched in active useful constituents, balanced and complete. At the same time, it is proved that vegetables contain more (table or sugar beet, etc.) pectin substance providing both functional and preserving vitamins, microelements, etc. in biologically active form, thus contributing to obtain biologically active, useful, with functional, bio-ecological and naturally - health-improving properties. Consequently, the production of jams, purees and juices, etc., with multi-compound compositions, combined with fruit and vegetable products, etc., are the most useful and economically profitable.

By collecting and analyzing scientific and analytical information and own research results were selected zoned varieties of apples, carrots, beets, plums, currants, suitable for the development of technologies for juices, purees, jams, with effective multi-compound recipes, and what, they become more enriched in active useful components, balanced and full.

In this case, evaluation and physical and chemical analyses of selected zoned varieties of apples, carrots, beets, plums and currants, which based on the results obtained will be further used to develop technologies for obtaining fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets) and others, enriched with pectin extract, from sugar industry secondary raw materials, with functional, bioecological and naturally - health improving properties.

The work was used standard methods of research, in particular, the generally accepted physical-chemical and biochemical analyses.

The focus was mainly on the degree of zoning varieties, suitability for technological processing and mainly on the content of pectin, which should not be below the level: 0.6-0.8% or more. The arithmetic mean of three parallel determinations was taken as the

final result of the tests. The results of the studies are presented in Table 1.

Table 1: The results of the study of Physico-chemical parameters in raw materials of zoned varieties: carrots: "Alau" and "Shantane", beets: "Bordeaux", "Kyzyl-Konyr", apples: "Golden Delicious", "AlatauZarya" "Star-Krimson", "Aidared", "Stanley" plums and currants: "Golden", "Altai".

№	Product name	Vitamin "C", mg%	Total sugar, %	Soluble solids, %	Total pectin, %	Carotene, mg/kg
Raw materials						
1	Carrots "Alau"	5,66±0,1	8,93±0,2	12,93±0,2	0,84±0,2	9,8±0,2
2	Carrots "Shantane"	5,86±0,1	6,90±0,2	11,83	0,78±0,1	9,6±0,2
3	Beets "Bordeaux"	-	18,02±0,3	18,4±0,3	1,18±0,2	-
4	Beet "Kyzyl-Konyr"	-	16,67±0,3	21,8±0,5	1,11±0,2	-
5	Apple "Golden Delicious"	12,16±0,2	10,83±0,2	14,0±0,3	1,68±0,2	-
6	Apple "Alatau Zarya"	8,36±0,2	8,50±0,2	12,2±0,2	1,50±0,1	-
7	Apple "Idared"	11,6±0,2	11,5±0,3	12,0±0,2	1,45±0,1	-
8	Apple "Star-crimson"	10,5±0,2	11,10±0,3	13,50±0,2	1,47±0,1	-
9	Stanley Plum	8,5±0,2	10,1±0,3	14,0±0,3	5,73±0,1	-
10	Edinburgh plum	6,57±0,1	6,18±0,2	18,5±0,2	5,12±0,1	-
11	Blackcurrant "Golden"	129,816±0,9	8,15±0,2	14,0±0,3	5,07±0,1	-
12	Redcurrant "Altayskaya"	34,2±0,6	5,38±0,1	8,0±0,2	7,74±0,2	-

As shown in Table 1, the content of total pectin in the released varieties of carrots was at the level of: 0,78±0,1% - 0,84±0,2%; in beets - 1,11-1,18±0,2%, in apples - 1,45±0,1-1,68±0,2%, in plums - 5,12-5,73±0,1%, in currants - 5,07±0,1-7,74±0,2%. The content of vitamin C in selected apple varieties was

8.36-12.16 mg/%, in prunes - 6.57-8.50 mg/%, in currants - 34.2-129.816 mg/%, and carotene in carrots - 9.6-9.8 mg/kg.

In addition, evaluation and physico-chemical analyses of selected zoned varieties of apples, carrots, beets, plums, currants, which based on the results obtained in the future will be used to develop technology for obtaining fruit and vegetable jams, purees, juices from fruits and vegetables with functional, bioecological and natural - health properties were conducted.

As a result of the research work, for the development of technology for making jam, puree and juice with functional, bio-ecological and naturally healthful properties, selected 4 zoned varieties of apples, in particular, "Golden Delicious", "Star Crimson", "Idared", "ZaryaAlatau", 2 - varieties of carrots: "Alau", "Shantane", 2 - beet varieties: "Bordeaux", "Kyzyl-Konir", 2 plum varieties: "Stanley", "Edinburgh" and 2 current varieties: "Golden" and "Altai".

Based on, the analysis of the obtained results of research, we allocated: 3 released varieties of apples: "Golden Delicious", "Star-crimson", "Idared", carrots - "Alau", on the content of pectin and carotene and beet varieties: "Bordeaux", on pectin content which in the future will be further studied and further used to develop technology for obtaining fruit and vegetable jams, purees, juices from fruits and vegetables (apples, carrots, beets, etc.), enriched with pectin extract, from secondary raw materials of the sugar industry, with functional, bioecological and natural health-improving properties.

For the development of production technology of jam, selected different plant components in the form of zoned varieties of apples, carrots, beets, plums, currants, which, as seen from Table 1, on the content of pectin extract will make more acceptable their compositions to achieve an effective balanced composition of the target product of biologically active substances.

The nutritional value of the puree is characterized by the high content of nutrients contained in the original raw materials. Therefore, the indicated selected raw material components will allow balancing their composition, to obtain products with functional, bio-ecological and naturally-healthy properties (Lakin, 2015).

For the development of acceptable technologies from the specified fruit and vegetable products, etc., with functional, bio-ecological and naturally-healthy properties, we also studied the indicators of the quantitative yield of the liquid phase and squeeze, only in the selected varieties, based on

physicochemical studies. The results of the study of the marked indicators are presented in Table 2.

Table 2: Results of determination of quantitative yield of liquid phase and squeeze of zoned varieties of apples, carrots and beets at the stage of technical ripeness.

Product Name	Total weight, g	Weight of the squeeze, g	Extracts %	Juice mass, g	Juice %	Total Losses, %
Apple variety "Star-Crimson"	1317,0±1,0	547-556±2,0	41,53±4,0	580-592±2,0	44,04±1,0	10,4-14,43±2,0
Golden Delicious apples	1257,0±1,0	591-620±2,0	47,02±4,0	550-592±2,0	43,76±1,0	9,22-12,5±1,0
Apple variety	1240±1,5	595-584±2,0	47,98±4,0	580-598±2,0	46,77±2,0	5,25-7,45±2,0
Idared	1000,0±1,0	547-546 ±2,0	54,5±4,0	388-400±2,0	41,12±3,0	3,0-8,0±1,0
Carrot variety	1000,0±1,0	519-535 ±2,0	51,87±4,0	395-309±2,0	39,75±3,0	3,0-8,0±1,0

According to the data of Table 2 we can see that the yield of juice in zoned varieties of apples is at the level of 43,76±0,1% - 46,77±0,2%, and pomace: 547 - 620±2,0g, in carrots the juice is 41,12 ±0,3%, pomace is 517 - 546±2,0g, in beets the juice is 39,75 ± 3,0% and the pomace is 463 - 535 g±2,0g, of the total mass of the product.

The results obtained are very important in the development of rational technological regimes of the above products.

4 CONCLUSIONS

It has been established, based on study and analysis of available literature, electronic and other information, that both in the republic and at the world level natural fruit and vegetable products, in

particular juices, jams and purees are not always prepared technologically correctly.

It has been determined that fruit and vegetable products such as apples, table beets, carrots, etc. contain a relatively large amount of pectin substances (0.5-1.8%), which in natural conditions in their fruits contribute to the preservation in a biologically active form of vitamins and trace elements, etc.

It was found that vegetables contain more (table or sugar beet, etc.) pectin substance providing both functional and preservation in the biologically active form of vitamins, minerals, etc., and thus contribute to obtaining biologically active, useful, functional, with bio-ecological and with natural health-improving properties of products.

It is established, based on the above mentioned, that the directions proposed in the project for obtaining a new generation, with functional properties, bioecological products, in particular, juice products, purees and jams, from fruit and vegetable raw sources (apples, table beets, carrots, etc.), are relevant and very important, both for the Republic of Kazakhstan and in CIS countries (Russia, Belarus, Ukraine, Uzbekistan, Kyrgyzstan and others) and abroad (Bulgaria, Poland and others).

It has been established that not only mono-compound fruit and vegetable products are very useful, in particular juices, purees, jams, etc., but also poly-compound, as it becomes more enriched in active useful constituents, balanced and full-fledged. At the same time, it is proved that vegetables contain more (table or sugar beet, etc.) pectin substance providing both functional and preserving in biologically active form vitamins, microelements, etc., thus contributing to obtaining biologically active, useful, with functional, bio-ecological and natural health-improving properties. Consequently, the production of jams, purees and juices, etc., with poly-compound compositions, in combination with fruit and vegetable products, etc., are the most useful and economically profitable.

Selected, by collecting and analyzing scientific and analytical information and own research results zoned varieties of apples, carrots, beets, plums, currants, suitable for the development of technologies for juices, purees, jams, with effective poly-compound recipes, and for what, they become more enriched in active useful components, balanced and complete.

Evaluation and physical and chemical analyses of selected zoned varieties of apples, carrots, beets, plums and currants, which based on the results obtained will be further used to develop technologies for producing fruit and vegetable jams, purees, juices

from fruits and vegetables (apples, carrots, beets) and others, enriched with pectin extract, from secondary raw materials of the sugar industry, with functional, bioecological and naturally - health-improving properties. The focus was mainly on the degree of refinement of varieties, suitability for technological processing and mainly on the pectin content, which should not be below the level: 0.6-0.8% or more.

Selected for the development of technology of jam, puree and juices with functional, bioecological and natural health properties, 4 zoned varieties of apples, in particular, "Golden Delicious", "Star-Krimson", "Aidared", "ZaryaAlatau", 2 - varieties of carrots: "Alau", "Shantane", 2 varieties of beets: "Bordeaux", Kyzyl-Konir", 1 variety of plums: "Stanley" and 2 varieties of currants: "Golden", "Altai".

Given the evaluation, based on physico-chemical and biochemical studies, of zoned varieties of fruit and vegetable products, in this case, the content of total pectin in zoned carrots variety was at the level of: 0.78% - 0.84%; in beets - 1.11-1.18%, in apples - 1.45-1.68%, in plums - 5.12-5.73%, in currants - 5.07-7.74%, vitamin "C" in regionalized varieties of apples was at the level of: 8.36 - 12.16mg/%, plum 6.57-8.50 mg/%, in currants - 34.2-129.816 mg/%, and - carotene in carrots, at the level of: 9.6-9.8 mg/kg.

Based on analytical studies, three released apple varieties were selected: "Golden Delicious", "Star-Krimson", "Idared", carrots - "Alau", by pectin and carotene content, and beet variety: "Bordeaux", in terms of pectin content, which in the future will be further studied and will be used to develop the technology for obtaining fruit and vegetable jams, purees, and juices from fruits and vegetables (apples, carrots, beets, etc.), enriched with pectin extract, from secondary raw materials of the sugar industry, with functional, bioecological and natural health-improving properties.

Selected, for the development of jam production technology, various plant components in the form of zoned varieties of apples, carrots, beets, plums, currants, which by physical and chemical parameters, in particular, the content of pectin will allow to compose more acceptable their compositions to achieve the effective balanced composition of the target product of biologically active substances and contribute to obtaining products with functional, bioecological and naturally - health-promoting properties.

Their quantitative indices of the liquid phase and pomace yield were studied for the development of acceptable technology from the specified fruit and

vegetable products, with functional, bioecological and natural health properties. It was established that the yield of juice in released apple varieties was as follows: 43.76%-44.81%, and 547-620±2.0 g in pomace, 41.12-43.20% in carrot, 517-546±2.0 g in pomace, 39.75-41.79% in beet, 463-535 g±2.0 g in pomace of total product weight.

The obtained results are very important in the development of rational technological regimes of the above products.

The results obtained were subjected to mathematical processing, according to the biometric method of Lakin G.F., later they were analytically studied and subjected to cameral processing.

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Economic efficiency of work: The development of resource-saving technology for integrated and deep processing of fruits (apples) and vegetables (beets, carrots) for the production of fruit and vegetable jams, purees and juices enriched with pectin containing extract extracted from sugar beet extracts and obtaining functional products, with naturally - health properties, for food purposes and their implementation, has a great social and economic importance, as safe, with naturally - health-improving effect functional products have a beneficial effect on people's health, labor productivity and provide an effective basis for the development and enhancement of the state economy.

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