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**SCIENTIFIC
SUBSTANTIATION OF
THE TECHNOLOGY
OF THE FUNCTIONAL
BEVERAGE, BASED ON
THE ROWAN JUICE
WITH VEGETATIVE
EXTRACTS USE**

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Topicality. Modern manufacturers of foodstuff and beverages are faced with the task of creating the new generation nutritive – sanative and functional, including drinks, that can have a positive impact on consumers' health condition. Functional beverages are intended for systematic usage in the diet compound for all healthy population age groups; they are able to reduce the risk of diseases development, caused by nutrition, maintain and improve health state due to the presence of physiologically functional ingredients in their complement (vitamins, phenolic compounds, dietary fibers, carotenoids, organic acids, minerals). **Aim and methods.** The aim of this article is to substantiate the rowan juice choice for the functional meaning drink creation, to determine its composition and physico-chemical indicators, the selection of effective formula components with antioxidant effect, and the working of the non-alcoholic drink with sanative qualities technology. In this work standard organoleptic, physico-chemical and calculated research methods are used. **Results.** It was proved that the rowan juice should be used as the basis for the juice-containing beverage of functional meaning. For maximal juice extraction, it is necessary to pre-freeze the raw material, followed by its grinding and enzymatic preparation machining. Green tea and sage extracts, which are sources of antioxidant effect substances, were chosen as a supplement to the rowan juice. **Discussion and conclusions.** It is established that the non-alcoholic juice-containing beverage belongs to the category of functional foodstuff, as during its using the level of daily needs providing of ascorbic acid, β -carotene, pectin, bioflavonoids, catechins is within 10...50%. The scientific novelty of this research lies in the technology development of the juice-containing functional beverage on the basis of rowan juice with vegetative extracts use. The practical significance of the received results is in their usage at enterprises, producing non-alcoholic beverages, in restaurant industry and sanatorium-resort catering establishments.

Keywords: juice-containing beverage; rowan juice; functional beverage; biological value; antioxidant effects.

The topicality of the problem

The problem formulation. Recently, the attitude of people, especially the socially active population segments, to their own health has changed significantly. The desire to lead a healthy lifestyle creates consumers' interest in a balanced diet, increases demands for products with natural ingredients, and dictates the abandonment of artificial supplement. However, lack of time, change of healthy daily routine patterns, heavy workload do not always allow a person to pay proper attention to his health, physical condition and even nutrition. The change of the rhythmic intake of nutrients by human organism has led to qualitative and quantitative violations of the diet, and, consequently, to energy imbalance. The deficiency of essential biologically active substances is increasingly becoming the reason of various non-communicable diseases, which are called "civilization diseases".

A new approach to food choices is gradually forming in the modern consumer's mind: nowadays, people want to eat and, at the same time, get not only essential proteins, fats, carbohydrates, necessary for their organisms, but also to maintain and strengthen their health, reduce the risk of diseases growth, improve vitality, and even lose weight. Thus, manufacturers are faced with the task of finding new technological and product solutions, one of which is the creation of the new generation nutritive – health and functional products and beverages. The production of foodstuff and beverages with health properties is one of the most important areas of nutrition science development, which reflects the latest trends in food industry in general, and technological production processes in particular.

Healthy nutrition aims to consume products that increase the body's resistance to diseases, and improve various physiological processes in the human body, which allows a person to maintain an active lifestyle for some time and support longevity. Drinks are the most significant technological basis for creating new types of functional products. While the domestic market of these products is in its infancy, other countries have already offered a wide range of soft drinks, which, in addition to quenching thirst, have extra benefits for human health. The medicine of many countries defines the non-alcoholic drink as an optimal form of nutritive, that should be used for enriching the human body with biologically active substances, necessary for any contingent of consumers (Osypova et al., 2007).

Functional drinks are intended for systematic use in the diet of all healthy population age groups, they are able to reduce the risk of food caused diseases growth, maintain and improve health condition due to the presence of physiologically functional ingredients in their composition (vitamins, phenolic compounds), dietary fibers, carotenoids, organic acids, minerals) (Hoiko et al., 2012).

The state of the problem study. The modern world functional beverage industry includes the production of dairy and soy drinks, juices, carbonated drinks, energy and sport drinks, iced tea, powdered semi-finished products etc. All this is reflected in the scientific works of K. Menrad (2003), D. Finnegan (2003) et al.

In Ukraine, V. Domaretsky, V. Prybylsky and M. Mykhaliov (2005) made a significant contribution to the study of the recipe composition and technologies development of beverages and extracts from vegetative raw stuff. They thoroughly described the main types of raw materials and modern methods of their processing in the production of soft drinks, extracts and concentrates. Subsequently, the direction of creating health and functional drinks gained its development. Its basics were presented in scientific works of specialists from Odessa National Academy of Food Technologies, in particular, L. Osypova, L. Kaprelyants, O. Burdo (2007), National University of Food Technologies –

H. Simakhina, N. Stetsenko, N. Naumenko (2016), I. Hoiko, N. Stetsenko, N. Schneider (2012). Recently, scientists have been paying considerable attention to the creation of functional drinks for special contingents (Stetsenko et al., 2019).

Many scientists continue to work actively in this direction, as the problem of creating functional drinks for all population segments has not lost its relevance till nowadays.

Unresolved issues. Adding juice to beverages, even in a low percentage, gives the product a pleasant taste and aroma, which is characteristic of vegetables, berries or fruits. Juices help to enrich the diet with a set of vitamins, micro- and macronutrients, polyphenols, organic acids etc. Especially valuable are the juices of wild fruits and berries, including mountain ash. Rowan juice has a higher content of vitamins C and P, compared to traditional fruit crops. In addition, it contains physiologically functional ingredients, in particular, β -carotene, pectins, flavonoids. The juice-containing drinks with mountain ash juice are not presented in the Ukrainian market, so the creating of recipes and technologies of such beverages is an urgent task.

Aim and research methods

The aim of this article is to substantiate the choice of the rowan juice in making a functional beverage, determine its composition and physico-chemical parameters, selection of effective prescription components with antioxidant effects, and create the non-alcoholic beverage with health properties recipe.

The methodological basis of this research is the process of studying the composition and properties of raw materials, as well as determining the recipe compound of juice-containing drink, the use of which will provide daily human needs in substances-antioxidants at 10... to 50%.

Research methods – standard organoleptic, physico-chemical, calculational, methods of mathematical processing of experimental data, using modern computer programmes.

Information base of the study – scientific articles, materials of international congresses and symposiums, scientific practical conferences, normative technical documentation, patents.

The object of research is the method of production of non-alcoholic juice-containing beverage of functional meaning, made using the rowan juice with the plant extracts adding.

The subject of research is the composition and properties of the mountain ash juice, extracts of green tea and sage, as well as a soft functional drink, made with their using.

The scientific novelty of the obtained results lies in the improvement of the method of rowan juice production by pre-freezing raw materials with subsequent grinding, enzymatic preparation machining with pectolytic product Fructocim P before pressing juice, which increased juice yield to 19%, volatile compounds content – to 6,3%; and also in the technology of the functional drink on the basis of mountain ash juice with use of vegetative extracts development.

Research results

The raw material for juice-containing drinks production is red rowan. Fruits and berries play an important role as rich sources of natural antioxidants: vitamins C, E, carotenoids, bioflavonoids, pectins etc., which increase the resilience of living organisms in conditions of environmental pollution, radiation, stress factors. Organoleptic properties of fresh rowan berries are presented in Table 1.

Table 1. Organoleptic properties of rowan berries

Indicator	Characteristic
Look	Spherical fruits measuring 9...11 mm
Colour	Equitable orange-red
Aroma	Characteristic to rowan, weak
Taste	Tart, with a slight bitterness

Source: own working

This raw material is a source of many functional ingredients, including ascorbic acid, β -carotene, bioflavonoids, polyphenolic compounds, organic acids etc. The results of experimental determination of these components content in rowan berries are given in Table 2.

From the obtained results we can conclude that rowan berries contain a complex of substances with antioxidant properties, the quantitative content of which is quite high. As they are practically not used in food, due to their specific taste qualities, it is necessary to work on the methods of their preservation and processing, as well as technologies for the use of received semi-finished products in health foodstuff.

Table 2. Biochemical composition of rowan berries

Indicator	Meaning
Humidity, %	$86,6 \pm 1,10$
The content of titrated acids, %	$0,84 \pm 0,08$
The content of pectin substances, %	$0,72 \pm 0,06$
The content of polyphenolic compounds, g/100 g	$2,51 \pm 0,11$
The content of ascorbic acid, mg/100 g	$159,1 \pm 2,12$
The content of β -carotene, mg/100 g	$8,8 \pm 0,54$
The content of catechins, mg/100 g	$83,3 \pm 2,20$
The content of bioflavonoids, mg/100 g	$298,1 \pm 3,12$

Source: own working

One of the simplest and most affordable may be the option of obtaining juice from rowan berries, and combining it with other enrichments in the process of making health drinks. The quantity and quality of juices depend on the pre-treatment of the fruit, as well as the methods of extracting the juice. The ability of fruit tissue to produce juice depends on the resistance of cytoplasmic membranes to mechanical influences, their viscosity and elasticity. The cytological and anatomical structure of cell tissue and the content of pectins are also important. In rowan berries, the cytoplasmic membranes are elastic, and have a high viscosity, so one mechanical action is not enough to extract the juice. In this regard, it is offered to evaluate the effect of different methods of processing rowan berries on the yield of juice and its volatile compounds content, in comparison with the control sample, for which the juice was obtained by mechanical

pressing without processing (Table 3). Heat treatment with hot steam was carried out at the temperature 100 ± 2 °C during 5... 10 min. When processing rowan berries, with pectolytic product Fructocim P was used in the amount of 0,02% to weight of raw materials at the temperature 31... 37 °C during 120 min. Freezing of the rowan berries was performed at the temperature of -18 °C.

Table 3. Juice yield from rowan berries and volatile compounds content, depending on the method of processing raw materials

Method of processing	Juice yield, %	Volatile compounds content, %
Control sample without processing	$61,1 \pm 0,5$	$9,8 \pm 0,04$
Microwave irradiation	$65,6 \pm 0,8$	$12,3 \pm 0,11$
Steam heat processing	$69,3 \pm 0,5$	$13,1 \pm 0,14$
Enzyme preparation Fructocim P	$78,6 \pm 0,7$	$15,9 \pm 0,12$
Freezing	$74,3 \pm 0,4$	$16,1 \pm 0,06$

Source: own making

It was found that the most effective methods, which caused an increase of mountain ash juice yield to 17,5% and 13,2%, is the enzymic preparation machining and freezing. The highest content of dry matter is observed in the juice, obtained from frozen fruits. Also, it is important to figure out the fact, that the taste qualities of this juice have improved significantly, because the bitter taste disappeared. Therefore, it was offered to carry out pre-freezing of raw materials with further grinding in the first stage, and, afterwards, enzymatic preparation machining with pectolytic product Fructocim P before pressing the rowan juice. At the same time, the juice yield increases to 19%, organoleptic properties and the content of extractives improve. The optimal modes of enzymatic preparation machining of rowan berries, providing the high juice yield and preservation of natural colour, appeared to be pH 4,0... 5,0; temperature 31... 37 °C; duration 120 min. The discharge of the enzymatic product is 0,02% to the weight of raw materials. After pressing the juice, it is necessary to deaerate and pasteurize it. The composition and quality indicators of the mountain ash juice are given in Tables 4 and 5.

Table 4. Biochemical composition of the rowan juice

Indicator	Meaning
Humidity, %	$83,8 \pm 0,4$
The amount of titrated acids, %	$0,54 \pm 0,2$
The content of polyphenolic compounds, mg/100 g	$1129,32 \pm 1,162$
The content of ascorbic acid, mg/100 g	$102,5 \pm 0,04$
The content of bioflavonoids, mg/100 g	$678,2 \pm 0,2$
The content of catechins, mg/100 g	$64,1 \pm 0,1$
The content of β -carotene, mg/100 g	$7,5 \pm 0,09$
Mass fraction of tannins, %	$0,59 \pm 0,01$

Source: own making

Table 5. Organoleptic properties of the rowan juice

Indicator	Characteristic
Look	Juice with very fine suspended particles of pulp
Colour	Equitable orange-yellow satiated
Aroma	Characteristic to rowan, weak
Taste	Slightly tart, the taste of bitterness is absent

Source: own making

Thus, the rowan juice has a high biological value, and a significant content of biologically active substances with antioxidant effect, that determines the feasibility of its use in health drinks content.

Table 6. Physico-chemical properties of the rowan juice

Indicator	Meaning
Mass fraction of volatile compounds, %	16,1 ± 0,06
pH	5,12 ± 0,02
Density, kg/m ³	1023 ± 1,2

Source: own making

The juice, obtained from rowan berries, has antioxidant properties, because it contains a significant content of polyphenolic compounds, bioflavonoids, catechins, ascorbic acid, and β -carotene. But, in order to improve its taste qualities in the production of non-alcohol drinks, it is advisable to combine it with vegetative extracts, such as green tea and sage.

Green tea is a source of flavonoids. Flavonoids are substances of natural origin, that have powerful antioxidant properties. Accepted by the human body, flavonoids perform a number of important functions, such as protecting blood vessels walls in heart diseases and diabetes, relieving allergy symptoms, preventing certain types of cancer appearance (Simakhina et al., 2016).

One of the types of flavonoids are catechins – a complex of polyphenols in tea content, which promote digestion, and strengthen the walls of blood vessels. It is well-known, that unfermented sorts of tea have a high content of catechins. These substances are mostly present in green tea. In addition, green tea contains a huge number of vitamins and trace elements, so the inclusion of its extract in the health drink compound is advisable.

Vitamin P is the main one in tea compound, which, in combination with vitamin C, significantly enhances the effectiveness of ascorbic acid, promotes its accumulation and retention in the body. This vitamin strengthens the walls of blood vessels, prevents internal bleeding. In terms of vitamin P content, tea has no equal in the plant world, especially when we talk about green tea.

The organoleptic properties of this drink are largely determined by tannins and caffeine, present in this plant. The aroma and color of tea, which depend on tannins,

change according to the degree of their oxidation. Tannins also play an important role in providing the drink health properties. Therefore, the optimal conditions for obtaining the green tea extract were determined. In experimental studies the kinetics of tannin and caffeine concentration changes in extracts have been determined. The results were obtained at the temperature not lower than 90 °C at the same ratio of tea and extractant during 40 min. (Figure 1).

The presented data show that the equilibrium concentration of caffeine in the extract is established in 10 min., and tannin in 30 min., but after 15 min. of contact with the extractant, the tannin content increases slightly. It is known that the tannin content affects the extract taste. As its content increases, the astringency and bitterness of the extract become more intensive as well. Therefore, the results of organoleptic evaluation allowed to establish the duration of the extraction process of green tea with water – no more than 15 min.

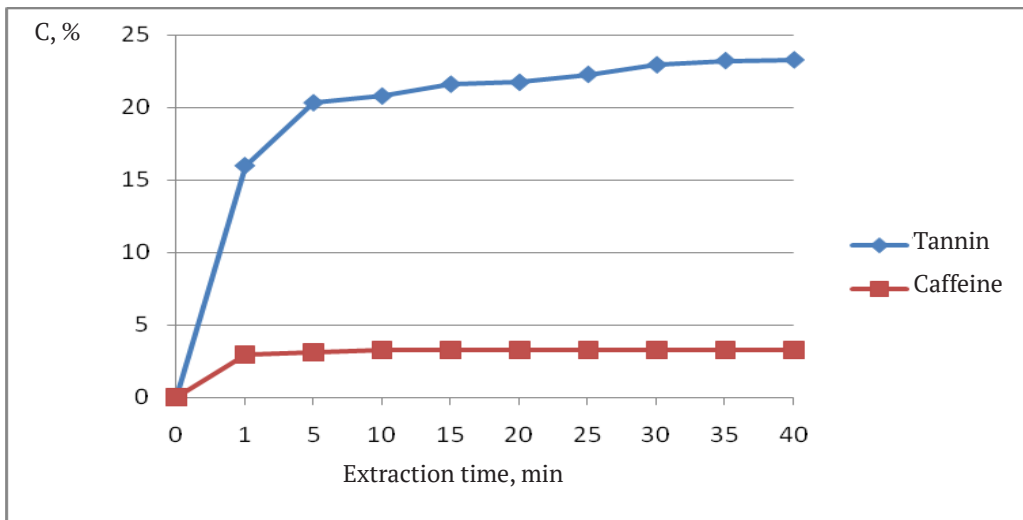


Fig. 1. Kinetics of tannin and caffeine removal during green tea extraction

Source: own making

The dependence of the volatile compounds content of green tea extract on the hydromodule is presented in Table 7. The analysis of the obtained data shows that when extracting green tea with water for 40 min. at the temperature of 90 °C, the optimal ratio of raw material to extractant, taking into account the mass fraction of raw materials, is 1:15.

Thus, such are the optimal conditions for green tea extraction: the use of water as an extractant, duration of infusion – 15 min., process temperature – 90 ± 5 °C, hydromodule – 1:15. The biochemical composition of the extracts is given in Table 8, and their physical and chemical parameters are presented in Table 9.

The presented data indicate the high quality and prospects of using selected raw materials types for health drinks production.

Table 7. The effect of the hydromodule on the volatile compounds content in green tea extract

Hydromodule	Volatile compounds content, %
1 : 5	7,2
1 : 10	4,5
1 : 15	3,2
1 : 20	2,4

Source: own making

Table 8. Biochemical composition of green tea and sage extracts

Substances, mg/100 g	Green tea extract	Sage extract
The content of polyphenolic compounds	1488,4	1287,3
The content of ascorbic acid	9,8	18,3
The content of bioflavonoids	410,4	612,4
The content of catechins	110,5	68,7

Source: own making

Tabl. 9. Physico-chemical properties of green tea and sage extracts

Indicator	Green tea extract	Sage extract
Volatile compounds content, %	3,2	2,6
pH	5,21	5,44
Density, kg/m ³	1003,4	1002,2

Source: own making

The optimal ratio between the amount of vegetative extracts was established by analyzing the organoleptic properties of the drink from mountain ash juice, in which the mass fraction of plant extracts varied from 1 to 9%, their total content did not exceed 10%. The made analysis revealed that the green tea extract did not impair the taste, colour and aroma of the drink. The addition of sage extract in amounts of more than 3% caused the appearance of a brown colour of the drink, and with an increase of its mass fraction of more than 6%, a bitter taste was felt. Thus, the optimal dosage of extracts was established: 3% sage extract and 6% green tea extract, which allows not only to provide pleasant organoleptic properties of the drink, but also its antioxidant effect.

Taking into account the fact that the rowan juice contains a certain amount of suspended particles of fruit pulp, in the process of storing such juice and drinks based on it, there may appear be a loss of stability, stratification of the system and precipitation. This can impair the consumer qualities of the drink. In such cases, it is recommended to include stabilizing substances, such as pectin, in the composition of juice-containing beverages. In order not to complicate the technological process by

dissolving pectin powder, the option of using liquid pectin extract in the composition of the functional beverage was chosen. Pectin will not only stabilize the system, but also act as a functional ingredient, that will help improve digestion and excrete toxins, radionuclides and heavy metal ions from the human organism. When developing recipes of functional drinks, it is recommended to make 5,0% of pectin extract, as this concentration provides a prophylactic dose of pectin substances (Rodionova, 2004).

When creating health juice-containing beverages, the mass fraction of juice can be in the range from 1 to 9,9%. It was found that the increasing of the mountain ash juice mass fraction leads to deterioration of organoleptic properties of the drink, which acquires bitter and astringent notes of taste. The authors L. Dogaieva and N. Pekhtereva (2011) found the necessity to provide human daily needs in vitamin C from 10... to 15% for 250 g of drink, the dose of the rowan juice should be 3,0... 4,5 g per 100 g drink. Since we aim to provide 30% of the daily vitamin C requirement, the optimal dose of the rowan juice adding is 9 g per 100 g of juice, then the concentration of juice in the drink is 9%, which follows the requirements for juice-containing drinks. To test this hypothesis, calculations of the effect of the rowan juice mass fraction on the indicators of the drink biological values were performed (Table 10). At the same time, in the calculations the level of daily needs in such substances as ascorbic acid, β -carotene, pectin substances, bioflavonoids, catechins was determined.

Table 10. The integral score of nutrients for 250 g of drink, %

Juice mass fraction, %	Vitamin C	β -carotene	Pectin	Bioflavonoids	Catechins
5,0	19,57	20,28	10,42	37,41	29,10
6,0	22,77	24,03	10,42	40,49	30,58
7,0	25,98	27,78	10,42	43,57	32,05
8,0	29,18	31,53	10,42	46,65	33,53
9,0	32,38	35,28	10,42	49,73	35,00

Source: own making

It is found that the juice-containing drink, made on the basis of rowan juice with the addition of pectin, green tea and sage extracts of, is a functional foodstuff. When consumed in the amount of 1 glass per day (250 g), daily needs in mentioned above nutrients are met at the following level, %: ascorbic acid – 32,4; β -carotene – 35,3; pectin – 10,4; bioflavonoids – 49,7; catechins – 35,0. These results are provided by the recipe with the following ratio of components,%: rowan juice – 9,0; green tea extract – 6,0; sage extract – 3,0; pectin extract – 5,0; sugar syrup – 12,0; water – 65,0. Physico-chemical parameters of the ready to use non-alcoholic juice drink are given in Table 11.

According to DSTU 4069: 2015 Soft drinks. In non-alcoholic beverages general technical conditions control the volatile compounds mass fraction, acidity, mass fraction of alcohol, mass fraction of carbon dioxide. The results of these indicators determining of the discussed juice-containing drink confirmed that it has a high level of quality, and can be recommended for production.

Table 11. Physico-chemical parameters of the juice-containing drink

Indicator	Meaning
Mass fraction of volatile compounds, %	6,8
Mass fraction of alcohol, %	0,0
Mass fraction of carbon dioxide, %	0,35
Titrated acidity, %	0,6
pH	5,73

Source: own making

The studied juice-containing drink has an orange-yellow colour, light opalescence, which is caused by raw materials characteristics. The taste of the drink is rich, slightly tart and sweet.

The technological process of this juice-containing drink preparation includes the following stages: storage and preparation of raw materials, preparation of blended syrup, creation of carbonated drink, its bottling and design. Drinking water, entering the production, is softened in an ion exchange filter, disinfected and sent to production. To obtain sugar syrup, the water is heated to 55 ... 60 °C, the calculated amount of sugar is loaded, and after its complete dissolution, the obtained substance is heated to boiling, and the foam formed on the surface is removed. The rowan juice and vegetative extracts are filtered before blending. 50% of juice is added to the blending apparatus, heated to 50 ± 2 °C, and sugar syrup is added with stirring. The blend is heated, boiled for 30 min., then filtered, cooled to 20 °C. Then 50% of juice and all other components according to the recipe are added. To saturate the drink with carbon dioxide, the process is carried out on the synchronous mixing plant. The ready to use drink is served in bottles, labeled and sent for storage.

Conclusions and results discussion

Thus, the following conclusions can be made:

1. Rowan berries have a valuable biochemical composition, in which the substances with antioxidant properties are the dominant ones, so the rowan juice can be the basis of a juice-containing beverage of functional meaning. Mechanical exposure alone is not enough to extract juice from rowan berries, so it is offered to pre-freeze the raw material with subsequent grinding, enzymatic preparation machining, separation of juice, its deaeration and pasteurization. The biochemical composition, organoleptic and physico-chemical parameters of the mountain ash juice, which should be combined with plant extracts in the production of juice-containing drinks, have been determined.

2. Extracts of green tea and sage were chosen to be combined with the mountain ash juice. The optimal conditions for the extraction process, as well as the content of biologically active substances in the extracts, were defined. The concentration of polyphenolic compounds appears to be the highest one.

3. It is determined that the optimal amount of rowan juice in a juice-containing drink should be 9%, the amount of sage extract needs to be not more than 3%, and green tea extract takes 6%.

4. It has been established that a non-alcoholic juice-containing drink, based on the rowan juice with the addition of pectin, green tea and sage extracts, is a functional foodstuff. When consumed in the amount of 250 g, the daily needs for the studied nutrients are provided at the following level, %: ascorbic acid – 32,4; β -carotene – 35,3; pectin – 10,4; bioflavonoids – 49,7; catechins – 35,0.

The scientific novelty of the obtained results lies in the improvement of the method of the rowan juice production by pre-freezing raw materials with further grinding, enzymatic preparation machining with the pectolytic product Fructocim P before pressing the juice, which increased the juice yield to 19,0%, dry matter content – to 6,3%; in development of the functional drink technology, made on the basis of the rowan juice with vegetative extracts use.

The practical significance of the obtained results is that they can be used in the production of the juice-containing drink with vegetative extracts at enterprises, producing soft drinks, in restaurant industry and sanatorium-resort catering establishments.

Prospects for further research are lie in expanding the range of juice-containing drinks, based on the rowan juice with the addition of plant extracts from other raw materials, which allows to vary the functional focus of the beverage, and give it adaptogenic, immunomodulatory, cardioprotective, tonic or sedative properties.

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НАУКОВЕ ОБҐРУНТУВАННЯ ТЕХНОЛОГІЇ НАПОЮ ФУНКЦІОНАЛЬНОГО ПРИЗНАЧЕННЯ НА ОСНОВІ СОКУ ГОРОБИНИ З ВИКОРИСТАННЯМ РОСЛИННИХ ЕКСТРАКТІВ

Актуальність. Перед сучасними виробниками харчових продуктів і напоїв стоїть завдання створення харчових продуктів нового покоління – оздоровчих та функціональних, у тому числі напоїв, здатних позитивно впливати на стан здоров'я споживачів. Функціональні напої призначені для систематичного вживання у складі харчових раціонів усіма віковими групами здорового населення; вони здатні знижувати ризик розвитку захворювань, пов'язаних із харчуванням, зберігати і поліпшувати стан здоров'я за рахунок наявності в їхньому складі фізіологічно функціональних інгредієнтів (вітамінів, фенольних сполук, харчових волокон, каротиноїдів, органічних кислот, мінеральних речовин). **Мета і методи.** Метою роботи є обґрунтування вибору соку горобини для розроблення напою функціонального призначення, визначення його складу та фізико-хімічних показників, підбір ефективних рецептурних компонентів антиоксидантної дії і розроблення технології безалкогольного напою з оздоровчими властивостями. У роботі використані стандартні органолептичні, фізико-хімічні та розрахункові методи досліджень. **Результати.** Було обґрунтовано, що сік горобини доцільно використовувати як основу соковмісного напою функціонального призначення. Для максимального вилучення соку необхідно проводити попереднє заморожування сировини з подальшим її подрібненням та обробкою ферментним препаратом. Для комбінування із соком горобини обрано екстракти зеленого чаю та шавлії, які є джерелами речовин з антиоксидантними властивостями. **Висновки та обговорення.** Встановлено, що безалкогольний соковмісний напій належить до категорії функціональних харчових продуктів, оскільки при його вживанні рівень забезпечення добових потреб у аскорбіновій кислоті, β-каротині, пектині, біофлавоноїдах, катехінах перебуває у межах 10...50 %. Наукова новизна одержаних результатів полягає у розробленні технології соковмісного функціонального напою на основі соку горобини з використанням рослинних екстрактів. Практичне значення одержаних результатів виявляється у тому, що їх можна використовувати на підприємствах, що випускають безалкогольні напої, у підприємствах ресторанного господарства та санаторно-курортних закладах.

Ключові слова: соковмісний напій; сік горобини; функціональний напій; біологічна цінність; антиоксидантні властивості.

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НАУЧНОЕ ОБОСНОВАНИЕ ТЕХНОЛОГИИ НАПИТКА ФУНКЦИОНАЛЬНОГО НАЗНАЧЕНИЯ НА ОСНОВЕ СОКА РЯБИНЫ С ИСПОЛЬЗОВАНИЕМ РАСТИТЕЛЬНЫХ ЭКСТРАКТОВ

Актуальность. Перед современными производителями пищевых продуктов и напитков стоит задача создания пищевых продуктов нового поколения – оздоровительных и функциональных, в том числе напитков, способных положительно влиять на состояние здоровья потребителей. Функциональные напитки предназначены для систематического употребления в составе пищевых рационов всеми возрастными группами здорового населения; они способны снижать риск развития заболеваний, связанных с питанием, сохранять и улучшать состояние здоровья за счет наличия в их составе физиологически функциональных ингредиентов (витаминов, фенольных соединений, пищевых волокон, каротиноидов, органических кислот, минеральных веществ). **Цель и методы.** Целью работы является обоснование выбора сока рябины для разработки напитка функционального назначения, определения его состава и физико-химических показателей, подбор эффективных рецептурных компонентов антиоксидантного действия и разработка технологии безалкогольного напитка с оздоровительными свойствами. В работе использованы стандартные органолептические, физико-химические и расчетные методы исследований.

Результаты. Было обосновано, что сок рябины целесообразно использовать как основу сокосодержащих напитков функционального назначения. Для максимального извлечения сока необходимо проводить предварительное замораживание сырья с последующим его дроблением и обработкой ферментным препаратом. Для комбинирования с соком рябины выбраны экстракты зеленого чая и шалфея, которые являются источниками веществ с антиоксидантными свойствами. **Выводы и обсуждение.** Установлено, что безалкогольный сокосодержащий напиток относится к категории функциональных пищевых продуктов, поскольку при его употреблении уровень обеспечения суточных потребностей в аскорбиновой кислоте, β-каротине, пектине, биофлавоноидах, катехинах находится в пределах 10...50 %. Научная новизна исследования заключается в разработке технологии сокосодержащего функционального напитка на основе сока рябины с добавлением растительных экстрактов. Практическое значение полученных результатов выражается в том, что их можно использовать на предприятиях, выпускающих безалкогольные напитки, в учреждениях ресторанного хозяйства и санаторно-курортных заведениях.

Ключевые слова: сокосодержащий напиток; сок рябины; функциональный напиток; биологическая ценность; антиоксидантные свойства.