

## PRODUCTION OF MELON-BASED JUICES WITH ENRICHING HERBAL SUPPLEMENTS

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### Abstract

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Cucurbits crops, in particular melons, watermelons and pumpkins, thanks to their rich chemical composition and pleasant flavor and aroma, deserve special attention and require a careful approach to the processing and extension of the range of juices. The article describes the technological scheme of juice producing based on the melon enriched by plant additions, medical herbs and honey. The article presents results of determination of organoleptic characteristics, food and biological value of the juice of a functional purpose on the basis of melon with enriching plant additions – “Zdorovye”, “Radost”, “Bodrost”, “Lyogkost” and “Svezhest”. In developing the melon-based juice formula, a special attention was paid to the selection of enriching ingredients of plant origin, subject to and depending on the functional orientation/ destination of juices. For each juice type there were set up different ratios of components on order to find the optimal option. First of all there were tested an organoleptic indicators as general appearance, taste, aroma, color and consistency. After setting up of technological modes and parameters of blended juices on the lemon basis, there were provided research works to determine next quality parameters: the mass fraction of protein, fat, pectin, carbohydrate, vitamin C, carotenoids, potassium, magnesium, iron, and the antioxidant activity. The technology presented in the article allows the expanding the blended juice assortment for functional usage, which will made on the basis of lemon and will have balanced chemical structure. The usage of juice from raspberry, guelder rose, cranberry, lingonberry, sea-buckthorn, lemon and apple as an enrichment allowed getting the blended juices with high food and biological value. The use of the formulated herbal extracts – calendula (*Calendula officinalis*), tutsan (*Hypericum*), chamomile (*Matricaria*), Melissa (*Melissa officinalis*) or spearmint (*Méntha*), motherwort (*Leonurus*) and honey determined the functional properties of blended juices. It was found that high organoleptical properties, rich vitamin and mineral composition and easy carbohydrates digestibility of the newly developed melon-based blended juices with enriching herbal supplements will allow us to recommend them for mass consumption.

*Key word:* cucurbits crops, melons, enriching herbal supplements, herbal extracts, honey, blended juices, organoleptic, nutritional and biological value.

*Abbreviations:* AAS – atomic absorption spectroscopy, HPLC – high performance liquid chromatography, Ltd. – a limited liability partnership

### Introduction

Currently, there is a certain flurry of activity of producers, scientists and researchers of the world community as concerns settlement of the deficit in the food products with

high biological value, in this connection it is important to extend the range of products made from non-traditional and less traditional edible raw materials of plant origin (Kapetanaki et al., 2014; Sedibe et al., 2014; Lim et al., 2012; Mozaffarian et al., 2014; Ashtonetal, 2015).

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One of the ways to solve this problem is to extend the range of juice products. Wide and regular use of non-alcoholic beverages and fruit and vegetable juices in diet is one of the important principles of adequate and balanced diet promoting the human health, improving the human general bodily well-being and increasing the human physical and mental capacity (Heuer et al., 2009; Leopold et al., 2012; Admaeva et al., 2015; Nikolaeva, 2012.). Cucurbits crops, in particular melons, watermelons and pumpkins, thanks to their rich chemical composition and pleasant flavor and aroma, deserve special attention and require a careful approach to the processing and extension of the range of juices (Kantureeva et al., 2011; Yerenova et al., 2015; Yerenova and Pronina, 2014; Joshietal, 2014.). Functional orientation of blended juices will be ensured by enriching herbal supplements and herbal extracts (Namiesniketal, 2013; Bazarnova, 2013; Ochmian et al., 2015). Therefore, the research works on development and creation of juices and beverages based on melons with the addition of vegetable raw materials and herbal extracts are very interesting and deserve special attention (Heuer et al., 2009; Leopold et al., 2012; Admaeva et al., 2015; Nikolaeva, 2012; Kantureeva et al., 2011; Yerenova et al., 2015; Yerenova and Pronina, 2014; Joshietal, 2014; Namiesniketal, 2013).

**Purpose of the work** – the extension of the range of functional melon-based juices and beverages with enriching herbal supplements.

## Materials and Methods

**Materials:** the juice from “Torpedo” melons, blended juices with enriching herbal supplements (apple and lemon juices, as well as juices from raspberry, guelder rose, cranberry, lingonberry and sea buckthorn) with extracts from medicinal herbs: calendula (*Calendula officinalis*), tutsan (*Hypericum*), chamomile (*Matricaria*), Melissa (*Melissa officinalis*) or spearmint (*Méntha*), motherwort (*Leonurus*) and with honey.

Organoleptic characteristics were determined by the sensor method in the tasting room of the Almaty Technological University.

The research of the food and biological value of melon-based juices with enriching herbal supplements was conducted on the base of the accredited testing laboratory “Food Security” of the Almaty Technological University.

Antioxidants activity of juices was determined with the use of the instrument “TsvetYauza 01-AA”, the action/operation of which is based on measuring the content of antioxidants in food products and beverages, dietary supplements, herbal extracts by the amperometric method (Yashchin,

2008; Nabyeva et al., 2012).

Content of carotenoids was measured with the use of spectrophotometry (GOSTR51443-99).

Weight fractions of potassium, magnesium and ferrum were determined by the atomic absorption spectroscopy method (AAS), using the electrical atomization spectrometer “QUANTUM-ZETA-T” with software (GOST 30178-96).

Weight fractions of sucrose, glucose, fructose and lactose were determined by the method of high performance liquid chromatography (HPLC), using a refractometric detector and a thermostatic chromatographic column (GOST 31669-2012).

The weight fractions of proteins, fats, pectins and vitamin C were determined by the well-known standard methods.

### Technological process

The technological process of juices blending is carried out as follows: melons, fruit, berries are sorted or graded by and inspected for quality on inspection table or belts. During the inspection the fruit and berries that do not meet the requirements, as well as impurities are removed.

As a rule, freshly picked berries with tender flesh, such as raspberry, are not washed. Only where the berries are dirty they are rinsed under water. Pome fruits are washed in drum or ventilator washers.

The rest of the fruit and berries are washed in ventilator washers and are rinsed under water.

Melons, pumpkins and water-melons are rinsed under water at the water pressure not exceeding 50 kPa.

After washing, the fruit and berries are subjected to a secondary inspection and separation of stalks. After washing the melons and pumpkin peeled and deseeded. Watermelons are peeled, cut into large pieces and rubbed through a sieve to separate seeds.

The peeled melons and pumpkins are cut into pieces of 15–20 × 30–50 mm, or into cubes of 20–30 × 20–30 mm. To facilitate the juice extraction, the fruit and berries are crushed.

The apples are crushed using a general purpose mill “KPD-ZM”, the Ismailov system crusher, a attrition grinder and grating blades.

The berries such as cranberries, bilberries, raspberries, guelders, sea-buckthorn are crushed using the roller mills.

With the purpose to extract more juice, fruit, berries and cucurbits crops (watermelons, melon, pumpkins) are frozen at the temperature of  $-25 \div -35^{\circ}\text{C}$  for one hour, after that they are rapidly defrosted in air at the temperature of 20–25°C, for 30–40 minutes.

Melon, watermelon and pumpkin juice is extracted in a centrifuge with a sieve with round holes of  $d = 0.06\text{--}0.1$  mm or slot-like orifices of  $d = 0.1 \times 2.0$  mm.

For pulp juice fruits and berries are pressed on presses of different systems: hydraulic, screw, pneumatic. We recommend using the hydraulic batch press type GP-4 or ROCK.

For juice production, the pulp of fruit and berries is pressed by the presses of different systems, including hydraulic, expeller and pneumatic ones. It is recommended to use the hydraulic batch presses of the GP-4 or ROK type.

The juice free running from a press juice will be passed through a stainless steel sieve with holes of 0.75 mm or capron №18 sieve for removing from juice any bits and pieces of pulp, branches, seeds or other impurities.

Juices with too acid/sour or bland taste and with a low content of dry solids are subjected to blending.

Medicinal herbs, authorized for use in food products, and used in accordance with the formula (calendula (*Calendula officinalis*), tutsan (*Hypericum*), chamomile (*Matricaria*), Melissa (*Melissa officinalis*) or spearmint (*Méntha*), motherwort (*Leonurus*)), are inspected for infestation or spoilage on the inspection table. After that they are watered (the water must comply with the existing GOST standards) at the temperature of 90°C in the ratio of 1:20, held for 1 hour and passed through the sieve.

The homogenization process conducted for thorough mixing of all components and blending of juice until a uniform mass, is carried out with the use of homogenizers at  $P = 15\text{--}17$  MPa.

Prior to packaging the homogenized juices are deaerated and heated in deaerators-pasteurizers at  $t = 35\text{--}40^\circ\text{C}$ ,  $P_{\text{res.}} = 6\text{--}8$  kPa, for 10 minutes, and in vacuum apparatuses at  $t = 45\text{--}50^\circ\text{C}$ ,  $P_{\text{res.}} = 11\text{--}17$  kPa for 10 min and thereafter they are warmed to  $t = 70\text{--}80^\circ\text{C}$ .

In the absence of deaerators, juice will only be heated in tube or plate heaters.

Juices are bottled in glass containers with a capacity of no more than 3 liters at the juice temperature of 80°C. The containers must comply with the current state standards. Bottles, cans and bottles with hot juice are immediately closed with self-exhaustible caps, placed in a container with hot water having the temperature of 70–80°C and subjected to heat treatment without creating any counterpressure in open-type apparatuses for 20 minutes at the temperature of 80°C, for 20 minutes at 100°C and for 20 minutes at 80°C, and cooled with water at the water temperature of 40°C for 20 minutes.

After the control check and inspection the juices are placed in the warehouse where they are stored until sale. Dark-colored juices should not be stored in the light. The optimum storage temperature of blended juices shall be 0–15°C.

The technological scheme of production of blended melon-based juices is presented in Figure 1.

In addition to the sterilization, we have proposed another process method. After completion of the process of homogenization and deaeration, the blended juice is bottled in Tetrapaks. Freeze Juices in Tetrapaks are frosted in freezers at the temperature of  $-30 \div -40^\circ\text{C}$  for one hour. After freezing, the Tetrapaks are fed into cooling chambers where they can be stored at the temperature of  $-18^\circ\text{C}$  for 12 months.

According to the results of our research, we have found out that the frozen juices in Tetra Pak cartons ensure the safety of biologically active substances contained therein. The use of heat treatment in the process of production of blended juices ensures reduction in the duration of the process and improvement of quality of the finished products due to removal of air from the cans.

This technology has been tested on the shop floor of the fruit-processing plant of LLP “Yuzhny”, Belbulak Village, Talgar, Almaty Oblast.

#### Results and Discussion

In the course of accomplishment of the objective, the technology of production of melon-based juices with enriching herbal supplements and herbal extracts, including such juices as “Zdorovye” (Health), “Radost” (Pleasure), “Bodrost” (Energy), “Lyogkost” (Lightness) and “Svezhest” (Freshness).

To ensure functional properties, the blended juice formula is added with extracts from herbs (calendula, tutsan, chamomile, melissa or spearmint, motherwort) (Bazarnova, 2013; Ochmian, 2015).

In developing the melon-based juice formula, a special attention was paid to the selection of enriching ingredients of plant origin, subject to and depending on the functional orientation/ destination of juices. During the literature review concerning the health properties of vegetable raw materials, the composition of plant components for the enrichment of melon-based juice was determined as the melon juice has a specific sweet taste with a pronounced flavour and a low acidity level. For each type of juice of functional orientation we have made different versions of components ratio in order to determine the optimal composition. First of all, the focus was placed on organoleptic characteristics, such as appearance, taste, aroma, color and body.

In the tasting room of the Almaty Technological University the organoleptic evaluation of the optimum formula composition of the developed blended melon-based juices was made (Table 1).

Inclusion in the juice “Zdorovye” of a calendula extract in combination with the raspberry and guelder rose juice has allowed us to recommend it for prevention of catarrhal diseases because the calendula extract has a high anti-inflammatory and antibacterial effect/action. Raspberry

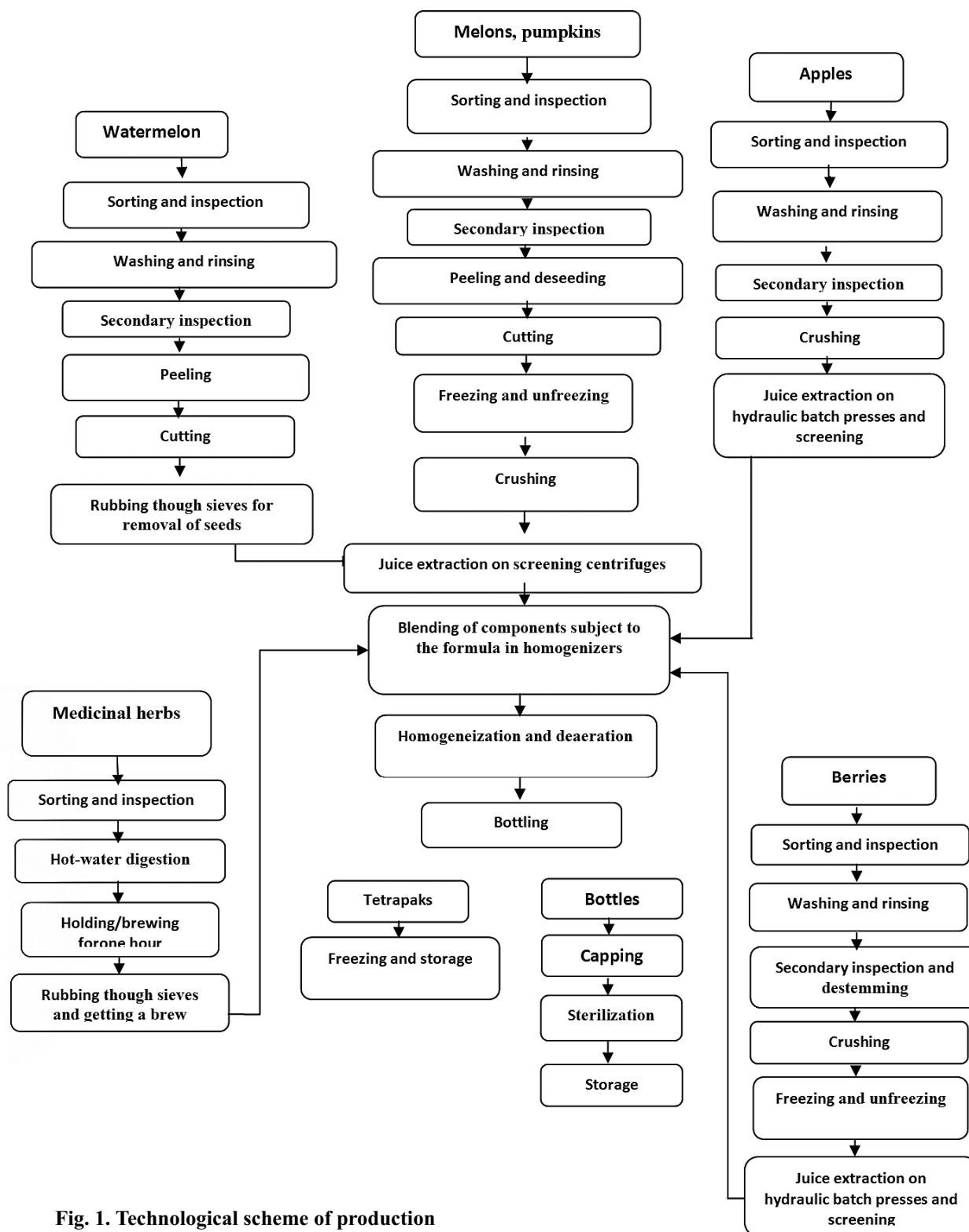


Fig. 1. Technological scheme of production of blended melon-based juices

**Table 1**  
**Results of organoleptic evaluation of blended melon-based juices (using the five-point rating system)**

Blended Juice Name	Blended Juice Description	Overall Tasting Assessment
“Zdorovye”	The homogeneous mixture of saturated deep red (crimson) color, having a pleasant and sweet taste typical for these materials with a slight predominance of raspberry and honey flavors, being odorless and tender, with a pronounced flavour of raspberry and melon.	4.8
“Radost”	The homogeneous mixture of saturated strong reddish-orange color tinged with light brown, where a slight separation can be observed, having a pleasant and sweet taste typical for these materials with a slight predominance of raspberry and honey flavors, being odorless and tender, with a pronounced flavour of melon tinged with honey.	4.9
“Bodrost”	The homogeneous mixture of saturated reddish-orange color tinged with light brown, where a slight separation can be observed, having a pleasant sweet-acid and melon- and cranberry flavored taste typical for these materials, being odorless and tender, with a pronounced flavour of melon tinged with honey.	4.8
“Lyogkost”	The homogeneous mixture of pink color tinged with light brown, where a slight separation can be observed, having a pleasant sweet-acid and clusterberry flavored taste typical for these materials, being odorless and tender, with a pronounced flavour of melon and honey tinged with clusterberry.	4.7
“Svezhest”	The homogeneous mixture of light-green color tinged with yellow, where a slight separation can be observed, having a pleasant sweet-acid and lemon- and melon flavored taste typical for these materials, being odorless and tender, with a pronounced flavour of mint, lemon and honey.	4.7

contains sugars, organic acids, pectin, tannins, dietary fibre, flavonoids, dietary minerals, anthocyanins, vitamins B<sub>1</sub>, B<sub>2</sub>, PP, folic acid, provitamin A. Raspberry does not contain much vitamin C, but it has much ferrum, which, in its turn, will make it possible to fight against ferrum deficiency anemia (Medina-Meza et al., 2015). The guelder rose berries include carbohydrates, tannins, organic acids, pectins, essential oils, phytosterols, tannins, retinoid esters, vinburnines, vitamin A, vitamin E, vitamin P, vitamin K, magnesium, iron, zinc and other minerals (Cametal, 2007).

Adding to melon juice of hypericum extract, which has choleric action, of an apple juice containing pectin (pectin has a wholesome effect on the gastrointestinal tract and removes toxins), of a sea-buckthorn juice (source of vitamins, macro- and micronutrients) and natural preservatives and sweeteners such as honey has allowed us to produce the blended juice “Radost” with high nutritional and biological value and with health-promoting and choleric action (Medina-Meza et al., 2015; Ruoff et al., 2007; Gutzeit et al., 2008).

The advantage of the blended juice “Bodrost” is that it contains valuable components, such as melon juice, pumpkin juice (which has a cleansing effect thanks to pectin and other biologically active substances), cranberry juice (a natural antioxidant), chamomile extract (which has bactericidal and cleansing action) and honey (Sedov et al., 2010; Karaaslanand, 2015).

The blended juice “Lyogkost” contains natural ingredients, having an overt diuretic action, such as melon juice, watermelon juice, lingonberry juice and extract of motherwort. Lingonberry juice is chiefly valued for its rich content of the necessary vitamins A, B, C, E. Also, it contains carbohydrates, carotene, tannins, and organic acids vital for human organism (citric, salicylic, malic acids), micro and macro elements (calcium, potassium, phosphorus, magnesium and manganese). Lingonberry juice normalizes metabolism, has a disinfectant and diuretic action, and promotes the excretion of salts of heavy metals (Rafra et al., 2015).

The unique composition of the juice “Svezhest” imparts to it refreshing and toning properties. The blend includes melon and lemon juices, producing an invigorating effect and serving as a source of vitamin C, the spinach juice is a source of B vitamins, which are super fat reducer, while a melissa extract has a sedative action, and honey is the source of macro- and microelements (Timoshok, 2000).

After the development and final adjustment of processing methods and parameters of the blended melon-based juices, the research has been conducted to determine their nutrition and biological value (Table 2)

According to the results of the laboratory tests it has been found that in comparison with the control sample (melon juice) the mass fraction of the protein is increased in the newly developed juices: by 0.525 g/l in the Juice “Zdorovye”, by 0.35 g/l in the Juice “Bodrost”

**Table 2**  
**Nutrition and biological value of blended melon-based juices**

Parameters	(control sample) Melon Juice	Juice “Zdorovyevye”	Juice “Radost”	Juice “Bodrost”	Juice “Lyogkost”	Juice “Svezhest”
Weight fraction of protein, g/l	0.875	1.4	1.05	1.225	1.05	1.05
Weight fraction of fat, g/l	12.95	11.05	2.5	11.05	12.25	8.95
Weight fraction of pectic substances, g/l	0.6	2	1	1.1	0.7	0.64
Antioxidative activity, g/l	0.002	0.0762	0.21	0.048	0.057	0.0882
Content of carotinoids, g/l	$0.33 \cdot 10^{-3}$	$0.444 \cdot 10^{-3}$	$0.978 \cdot 10^{-3}$	$1.003 \cdot 10^{-3}$	$0.531 \cdot 10^{-3}$	$0.208 \cdot 10^{-3}$
Vitamin C, g/l	0.0046	0.0096	27.5	0.5	0.5	0.193
Potassium, g/l	None	0.0086	0.0015	0.03711	0.01739	None
Magnesium, g/l	0.00706	0.0085	0.00815	0.00854	0.00842	0.00824
Ferrum, g/l	0.00148	0.000833	0.000342	0.000069	0.000329	0.000057
Content of carbohydrates, g/l:						
– sucrose	0.851	0.104	0.117	0.967	0.569	0.801
– maltose	None	None	None	None	None	None
– glucose	0.803	2.225	2.665	2.435	2.6	3.11
– fructose	1.281	2.21	2.748	2.196	2.794	3.106

and by 0.175 g/l in the Juices “Radost”, “Lyogkost” and “Svezhest”. Protein is the basic organism building material and, in addition, it is the basis for antibodies, enzymes and hormones. Without the participation of proteins, no processes of growth, digestion, reproduction, and the human immune system functioning will be possible. Vegetable proteins have a pronounced anti-sclerotic action and effect.

By the fat content, the leader is the control sample (12.95 g/l), followed by the Juices “Bodrost” (12.25 g/l), “Zdorovyevye” and “Bodrost” (11.05 g/l), rounded out by the Juices “Svezhest” (8.95 g/l) and “Radost” (2.5 g/l).

The minimum quantity of pectin substances was found in the control sample (0.6 g/l), while the increased quantity thereof was found in the newly developed juices. The maximum content of pectin substances has been found in the Juice “Zdorovyevye” where the weight fraction is 2.0 g/l, followed by the Juices “Bodrost”, “Radost”, “Lyogkost” and “Svezhest”, which weight fractions are less than that of the Juice “Zdorovyevye” by just 0.9 g/l, 1.0 g/l, 1.3 g/l and 1.36 g/l respectively. Presence of pectin in many fruit- berry and vegetable juices determines their radionuclide-protection and antitoxic action due to the pectin ability to bind and remove radioactive elements, heavy metals and toxins from the human body.

The highest antioxidative activity is found in the Juice “Radost” – 0.210 g/l, or by 99% higher than in the control sample (0.002 g/l). The middle position is held by the Juices “Svezhest” and “Zdorovyevye” differing from each

other by 0.012 g/l. Much lower antioxidative activity is found in the Juices “Lyogkost” (0.057 g/l) and “Bodrost” (0.048 g/l). The biological action of vitamins in the human body consists in active participation of such substances in the metabolic process. The vitamins participate in the protein, fat and carbohydrate metabolism either directly or as the components of the complex enzyme systems. The vitamins participate in oxidation processes, as a result of which, many substances are formed from fats and carbohydrates, to be used by the human organism as energy and constructive material. The vitamins play an important role in sustenance of the human organism immunobiological reactions ensuring the organism resistance to environmental hazards, which is important for prevention of infectious diseases and environmental impact. The vitamins mitigate or eliminate any adverse action of many medicaments on the human organism (McGill et al., 2004; Kahkonen et al., 2001; Zafra-Stone et al., 2007; Carlsen et al., 2010).

The highest content of carotenoids is in the Juice “Bodrost” reaching  $1.003 \cdot 10^{-3}$  g/l, and the content thereof in the Juices “Lyogkost”, “Zdorovyevye” and “Svezhest” is  $0.978 \cdot 10^{-3}$ ,  $0.531 \cdot 10^{-3}$ ,  $0.444 \cdot 10^{-3}$  and  $0.208 \cdot 10^{-3}$  g/l, respectively, while the content thereof in the control sample is only  $0.33 \cdot 10^{-3}$  g/l. Carotenoids foster the human growth, improve the skin health and strengthen the human organism resistance to infection.

The content of vitamin C in the control sample and in the Juices “Zdorovyevye” and “Svezhest” has turned out to be

rather low, reaching 0.0046 g/l, 0.0096 g/l and 0.193 g/l respectively. While the content of vitamin C in the Juice “Radost” is 27.5 g/l, and in the Juices “Bodrost” and “Lyogkost” is 0.5g/l for each. Vitamin C strengthens the human body immune defenses, restrains any respiratory tract diseases, improves the vessel wall elasticity (normalizes the capillary permeability). Also the vitamin C has a favorable effect on the central nervous functions, promotes activity of endocrine glands, contributes to the better absorption of ferrum and normal hematogenesis, and prevents from formation of carcinogens (Plonka et al, 2012; Weber, 2006).

No potassium was found in the control sample and in the Juice “Zdorovyе”. The content thereof in the Juice “Bodrost” is 0.03711 mg/l, which is 2.13 times more than in the Juice “Lyogkost”, 4.3 times more than in the Juice “Zdorovyе” and 24.7 times more than in the Juice “Radost”.

The content of magnesium in all the juice samples is at the same level with the lowest content thereof in the control sample, reaching 0.00706 g/l, followed by Juices “Svezhest” (0.00824 g/l) and “Radost” (0.00815 g/l), and the highest content of magnesium is found in the Juices “Bodrost”, “Zdorovyе” and “Lyogkost” – 0.00854 g/l, 0.0085 g/l and 0.00842 g/l respectively.

The physiologic value of the juices is ensured by mineral substances that play an important role in maintenance of the blood plasma acid-alkali balance. Out of the macro elements, the juices mainly contain potassium and magnesium. Potassium and magnesium are absolutely necessary and vital for human organism functioning. Both of them are macro elements, that is, the level of their consumption a day is 3.5 g for potassium and 0.8 g for magnesium. Both the magnesium and potassium cannot exist and exert their functional properties without each other. The main duty of potassium is to maintain and support the concentration and physiological functions of magnesium – the substance vital for the human heart; if the blood level of one of such mineral is low, there is every likelihood that the blood level of the other mineral is low, too.

As concern the content of ferrum, in this case the highest one is found in the control sample, which is 0.00148 g/l, followed by Juice “Zdorovyе” where the ferrum content is 0.000833 g/l. The Juices “Zdorovyе” and “Lyogkost” contain ferrum in the quantities of 0.000342 and 0.000329 g/l respectively. The lowest content of ferrum is found in the Juices “Bodrost” (0.000069 g/l) and “Svezhest” (0.000057 g/l). Ferrum is irreplaceable metal vital for human organism functioning. It is a part of hemoglobin, myoglobin and different enzymes, and it reversibly binds oxygen and participates in a number of oxidation-reduction reactions and plays an important role in the

hematogenesis processes (Weber, 2006).

The energy value and taste/flavor properties of the juices are determined by a high content therein of easily digested carbohydrates.

Out of carbohydrates, the control sample mainly contains fructose (1.281 g/l), followed by sucrose (0.851 g/l) and glucose (0.803 g/l). At the same time, sucrose exceeds glucose by 0.048 g/l.

No maltose has been found in all the samples. The contents of glucose (2.225 g/l) and fructose (2.210 g/l) in the Juice “Zdorovyе” are much the same, and the difference between them is 0.015 g/l. The lowest content in the Juice “Zdorovyе” is that of sucrose (0.104 g/l).

The content of fructose in the Juice “Radost” (2.748 g/l) is higher than the content of glucose and sucrose by 0.083 g/l and 2.631 g/l respectively.

The Juice “Bodrost” contains more glucose (2.435) than fructose and sucrose by 0.239 and 1.468 g/l respectively.

The Juice “Lyogkost” contains more fructose (2.794 g/l), than glucose and sucrose by 0.194 and 2.225 g/l respectively.

The contents of glucose (3.110 g/l) and fructose (3.106 g/l) in the Juice “Svezhest” are much the same, and the difference between them is 0.004 g/l. While the content of sucrose therein is 0.801 g/l.

## Conclusion

The use of the above described technology will make it possible to extend the range of melon-based functional blended juices with a balanced chemical composition. The usage of juice from raspberry, guelder rose, cranberry, lingonberry, sea-buckthorn, lemon and apple as an enrichment allowed to get the blended juices with high food and biological value. The use of the formulated herbal extracts – calendula (*Calendula officinalis*), tutsan (*Hypericum*), chamomile (*Matricaria*), Melissa (*Melissa officinalis*) or spearmint (*Mentha*), motherwort (*Leonurus*) and honey determined the functional properties of blended juices.

The high organoleptical properties, rich vitamin and mineral composition and easy carbohydrates digestibility of the newly developed melon-based blended juices with enriching herbal supplements will allow us to recommend them for mass consumption.

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