Quality rating of desserts based on fruit and berry raw materials

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Abstract

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Introduction. The aim of the study is to study the rating of the quality of desserts based on a fruit and berry blended semi-finished product with an increased antioxidant capacity and improved sensory indicators.

Materials and methods. Fruit and berry blended semi-finished product based on apple and banana. Research methods: expert evaluation method; rating method of 20 flavor profile portrait descriptors; profile method on a 10-point scale of correspondence of intensities of sensation of aromatic and taste properties; redoxmetry – determination of antioxidant capacity; *pH*-metry.

Results and discussion. The article presents the results of the influence of decisive factors for the formation of qualitative characteristics of innovative desserts – such as sambuk. The analysis of the system approach on increase of quality of production is carried out. A model of the technological system has been developed. An explanation of the values of each subsystem, its components and functions.

Evaluation of dessert quality indicators is determined by obtaining the average value of individual descriptors. Sensory characteristics of the innovative dessert: homogeneous semi-thick consistency; the color corresponds to the fruit and berry raw material, uniform over the entire surface; the taste and smell are clean. Based on the obtained results, the rating of innovative desserts was calculated. The sample of dessert «Apple-banana» has a higher rating – 96.815 points compared to the control sample «Apple» – 91.195 points, which is a value that is 5.8% more than the control.

The minimum theoretical value of redox potential (*RP*) for water-alcohol infusions was obtained, which has a value (Eh_{min}) from 277.2 mV («Apple-banana») to 412.8 mV («Apple»). The actual measured value of *RP* infusions (Eh_{act}) – from 126 mV («Apple-banana») to 318 mV («Apple»). The hydrogen index for water-alcohol infusions has a value of 4.12 *pH* units («Apple») to 6.38 *pH* units («Apple-banana»). Water-alcohol infusions from plant raw materials have values of regenerative capacity (reduction energy – *RE*) in the range from *RE* – 94.8 mV («Apple») to *RE* – 151.2 mV («Apple-banana»). For the restaurant business in the production of desserts is promising apple-banana composition, which received increased antioxidant characteristics.

Conclusion. The use of fruit and berry raw materials for expanding the quality of desserts using the method of a comprehensive quality criterion and calculation of the rating of desserts is substantiated.

Introduction

In modern conditions, consumers of restaurants recognize the quality of food (Shimmura et al., 2019) as a determining criterion (Matsuoka et al., 2020). «Food quality» means a set of characteristics that meet the identified or probable needs of the consumer. (Shimmura et al., 2020; Tanizaki et al., 2020). This involves the creation of new food that are in demand (Shimmura et al., 2020) by generating new ideas (Kim et al., 2018), taking into account the views of employees on business processes (development of innovative food, development of innovative drinks, improvement of existing technologies) (Shimmura et al., 2019).

To assess consumer quality of the restaurant's food, it is proposed to use indicators of the composition of the product range, its uniqueness, as well as the taste and appearance of food (Kuzmin et al., 2016; Muñoz-Leiva, Gómez-Carmona, 2019).

One of the directions of development of desserts (Saunders, 2020), in restaurants is the production of sweet food (Nepovinnyykh et al., 2019) with the addition of vegetable raw materials and a high content of biologically active substances (Ferrante et al., 2020).

Currently, the use of vegetable raw materials (Andreou et al., 2018; Belemets et al., 2016; Fotakis et al., 2016; Hrabovska et al., 2018; Iannitti, Palmieri, 2009; Kochubei-Lytvynenko et al., 2017) in restaurant business is very relevant (Gubskiy et al., 2015; Deinychenko et al., 2020; Ianchyk et al., 2018; Niemirich et al., 2017; Sylchuk et al., 2017).

Current demand for high-quality vegetable raw materials involves the development of new technological methods for its preparation, with increased quality control, environmental friendliness, higher energy efficiency, lower cost and safer operation (Dainelli et al., 2008; Mujumdar, Law, 2010). These methods will allow to preserve biologically active substances (Swasdisevi et al., 2009) – volatile aromatic substances, phenolic compounds, reduce their losses (Pavlyuk et al., 2018), increase sensory properties (Mayor, Sereno, 2004).

Vegetable raw materials contain different chemical substances that display a broad spectrum of biological activities (Frolova et al., 2019; Gerolis et al., 2017; Kamdem et al., 2013; Pyrzynska, Sentkowska, 2019; Sentkowska, Pyrzynska, 2018; Siddiqui et al., 2018; Steenkamp et al., 2004; Wong et al., 2020).

They have gained growing interest among scientists and consumers due to their antioxidant properties (Breiter et al., 2011; Dube et al., 2017). The ability of plant phenolics to act as free radical scavengers has led to increased interest in their ability to act as antioxidants (Herrera et al., 2018; Humia et al., 2020; Keating et al., 2014; Oh et al., 2013). Antioxidants are able to reduce the output of oxidation products: hydroperoxides, alcohols, aldehydes, ketones, fatty acids.

At present, the antioxidant characteristics of all prescription components, food additives, biologically active substances and their combinations have not been sufficiently studied (Buglass et al., 2012; Grunert et al., 2018; Gullón et al., 2018; Gulua et al., 2018; Joubert, Beer, 2012; Kuzmin et al., 2020).

The most promising, due to high taste, tender, airy texture and attractive appearance, are jelly sweet food – «sambuk». Unfortunately, these products are high in calories – low in nutrients (Polyovyk et al., 2021).

Therefore, the issue of expanding the range, the search for new prescription components and processing modes, in order to meet not only the taste preferences of consumers, but also the growing demand for functional products for restaurants (Kim et al., 2018).

«Sambuk» as an independent dessert is an effective dish for targeted enrichment with vitamins, minerals, dietary fiber and natural antioxidants (Koretska et al., 2020).

«Sambuk» dessert has a low nutritional value due to the fact that the largest share in the

recipe is sugar, apple puree and egg white. These components provide strength and stability of the foam system and, due to the presence of apple pectin, promote the excretion of harmful substances from the human body. Sugar shows its technological properties, but gives the product excessive sweetness and high caloric content of the finished dessert (Alija, Talens, 2012; Koretska et al., 2020).

These circumstances determine the relevance of this work, which consists in the development of sweet food based on fruit and berry raw materials (Kurzer et al., 2020; Walrand et al., 2020) in the technology of restaurant business. Creating desserts with high antioxidant properties and improved sensory performance allows restaurants to create new food (Alija, Talens, 2012; García et al., 2015; Koretska et al., 2020), which distinguishes them from competitors, creating a favorable image of the institution, which cares about consumer protection.

The aim of the study is to study the rating of the quality of desserts based on a fruit and berry blended semi-finished product with an increased antioxidant capacity and improved sensory indicators.

To achieve this goal, the following research goals were set:

- Determine the minimum theoretical value of RP (Eh_{min}), the actual measured value of RP (Eh_{act}), the hydrogen index of water-alcoholic infusions.
- Determine the values of the antioxidant capacity of fruit and berry raw materials in water-alcohol systems.
- To study the profile criterion of quality and rating of desserts.

Materials and methods

Materials

The object of research – technology of desserts.

The subject of research: protein model samples with sugary foods; puree from fruit and berry raw materials; desserts.

The study used protein model samples with sugary foods; puree from fruit and berry raw materials: apple, banana; desserts based on fruit and berry puree.

To prepare extracts from fruits and berries raw, use the following main raw materials: ethanol, alcohol, water, cardboard filter.

Description of research procedure

Preparation of infusions. Fruit and berry raw materials weighing 4 g were placed into the glass bottles, were filled by 100 ml of alcohol solvent with volume fraction of rectified ethyl alcohol 40 %. The resulting infusions were cooled to 20 °C for 7 days, stirring periodically.

Next, the infusions were filtered and studies were performed to determine the indicators of active acidity, which was measured on a pH meter in the mode of pH measurement with a combined glass electrode. The redox potential (RP) was measured in the potential measurement mode with a combined redoxmetric platinum electrode.

Description of methods

Methods for determining antioxidant capacity

RP is an important indicator of the biological activity of solutions (Kuzmin O. et al., 2016; Merwe et al., 2017). It characterizes the deviation from the ionic balance of free electrons in a liquid medium. Changing the concentration of free electrons leads to a change in its electron charge and, accordingly, the *RP*. If the *RP* is positive, it indicates the oxidizing ability of the solution, negative indicates recovery ability. The value of *RP* allows to estimate the energy of processes, that is, characterizes the activity of ions in redox reactions (Bahir, 1999; Priluckij, 1997). Therefore, in order for the human body to optimally use in the exchange processes water-alcohol solutions and food, the *RP* values must correspond to the *RP* values of the internal environment of the organism, or have more negative values (Bahir, 1999).

To evaluate the antioxidant properties of the obtained water-alcoholic plant extracts, the method (Priluckij, 1997), based on the difference of *RP* in inactivated inorganic solutions and complex biochemical media. The main criteria of this method were its clarity, simplicity, specificity, reproducibility of results and efficiency. A number of researchers also emphasize that method allows to determine the total antioxidant activity of liquid products, including in total in a complex mixture, and multifunctional antioxidants (Kuzmin et al., 2016).

Formula (1) holds for inactivated inorganic solutions in equilibrium. This formula links the active acidity of the *pH* and the *RP* (Priluckij, 1997):

$$Eh_{min}=660-60 \cdot pH, \text{ mV}, \quad (1)$$

where Eh_{min} – the minimum theoretically expected value of the *RP*;
pH – active acidity of the test solution.

Acquired *RP* values were compared with actual measurements of Eh_{act} solution. The change of the *RP* toward the recovery energy (*RE*) was determined by the formula (Priluckij, 1997):

$$RE = Eh_{min} - Eh_{act}, \text{ mV}, \quad (2)$$

where *RE* – the shift of *RP* to the side of recovered meanings (resilience);

Eh_{min} – minimal theoretically expected meaning of *RP*;

Eh_{act} – actual measured *RP*.

Expert method of sensory evaluation

The expert method of determination of values of indexes of quality is based on the account of opinions of group highly skilled specialists-experts. (The expert of – it a specialist on the certain type of object which owns the increased sensitiveness to properties of this object) (Kuzmin et al., 2016).

Sensory imaging method

Determination of quality indicators of desserts was carried out by visualization of sensory properties, taking into account the difference in descriptors. The assessment of the

influence of plant materials on the quality indicators of desserts was carried out using the criterion in the form of the sum of the products of the constituent indicators. An important feature of this criterion is that samples are rejected (through the established critical limit) in which at least one of the quality indicators has a false representation (characterized by a small value that is undesirable for desserts). The criterion for the quality of desserts in a geometric interpretation determines the optimal variant with the largest area of the quality polygon, built using normalized dimensionless quality indicators:

$$S = \sin \frac{2\pi}{N} \cdot \sum_{j=1}^N (f_j \cdot f_{j+1}), \quad (3)$$

where f_i – the value of a specific indicator; N – the number of samples.

The determination of the weighting coefficients of individual indicators and their descriptors was carried out using the Delphi method, an expert method for each group of indicators according to the average values of the descriptors of this group, provided that the sum of the indicators of the group is 10 points.

Determination of the rating of desserts was carried out as the sum of the sets of values of the average indicators of the descriptors by the product by the weight coefficient for each descriptor.

Determination of the priority (rating) of desserts is possible provided that weighting factors are used (according to a 10-point system) and the main indicators are recalculated into rating values:

$$P = \sum_{i=1}^n (m_i \cdot p_i), \quad (4)$$

where m_i – the value of the weighting factor;
 p_i – value of the main indicator.

Results and discussions

The complex of theoretical and experimental studies made it possible to determine the direction and approaches to the development of scientifically based technologies of desserts such as «sambuk» prophylactic direction (Ferrante et al., 2020; Polyovyk et al., 2021).

The general characteristics of obtaining a complex indicator of the quality of a new product – a sweet dessert of the «sambuk» type have been substantiated (Table 1).

The creation of new prophylactic «sambuk» desserts provides for the following:

- scientific and technological substantiation of the recipe composition of desserts;
- determination of the main subsystems of dessert technologies that are being developed and their interrelationships;
- conducting an analysis of the functioning of the system and its effectiveness;
- research of quality indicators of the developed desserts;
- determination of the shelf life of finished products.

Dessert production technologies were formed on the basis of a system analysis, which provides for the branching of the production process as a system into subsystems, which makes it possible to obtain finished products with predictable properties.

Table 1

Innovation structure of a new product

Index	Characteristic
Object of study	Dessert technology
Urgency of the problem	<ul style="list-style-type: none"> – Improving the consumer properties of desserts; – Increasing nutritional value; – Increase/expansion of the existing assortment
Problematic element of the system	Physicochemical indicators (pH level, redox potential, renewal energy), sensory indicators
Solution option	Use of fruit and berry raw materials for the technology of sweet desserts
Product name	Blended semi-finished products from fruit and berry raw materials for the technology of sweet desserts
Product concept	Blended semi-finished products are ready-made semi-finished products, the technological properties of which allow them to be used as a basis for sweet desserts. The use of mixed semi-finished products is based on the enrichment of sweet desserts with useful nutrients, which leads to an improvement in sensory indicators, an increase in nutritional and biological value
Target segment	For use by a wide range of consumers
Competitive advantages	A multifunctional product with a balanced composition of biologically active substances
Sensory characteristics of the product	<ul style="list-style-type: none"> – Blended semi-finished product has a homogeneous half-thick consistency; – The color corresponds to the plant material, uniform over the entire surface; – Taste and smell are clean
Range	Formed due to the variable components of the fruit and berry raw materials of the blend

Taking into account the purpose of desserts, during the development of the technology, it became necessary to analyze the technological functions of the main components and adjust the recipe composition, which will make it possible to create a sweet dessert with an enriched composition presented in Table 2.

Table 2

Functions of structure-forming components and systems

The composition of the stabilization system	Technological function
Blended semi-finished product	Foam stabilization, gelation
Egg white powder	Foaming
Glucose-fructose syrup	Sweetener, foam stabilization
Water	Recovery, dissolution

In modern conditions, in the development of new types of food products, the profile method of sensory assessment and computer modeling are widely used. At the same time, using model samples with different content of the innovative component, researchers try to take into account all possible positive and negative aspects of the created product.

Formation of the quality of the dessert

The production of desserts requires quality control throughout the entire technological process of making a dish. The quality of the products of the establishments of the restaurant industry is formed at the stage of its development and is laid down in the regulatory documents. At the production stage, the necessary conditions are provided for preserving the properties of raw materials, imparting the desired technological and sensory indicators to the product, and neutralizing inedible components. Ensuring a given level of product quality depends on many factors, and above all on the clarity of the parameters formulated in the technological maps.

We analyzed (using the Ishikawa diagram) (Figure 1) the main factors that form the quality of a sweet dessert. This approach is a graphical way of researching and determining significant causal relationships and makes it possible to identify key relationships between various factors of the first order: raw materials and materials, manufacturing technology and process modes, equipment used, personnel qualifications and the duration of the technological process.

Figure 1. Causal diagram of the formation of dessert quality (Ishikawa diagram), second-order factors:

- 1.1 – compliance with the recipe; 1.2 – the sequence of introduction of components;
- 1.3 – compliance with the dosage of components; 1.4 – parameters of technological processes;
- 1.5 – sanitary and hygienic conditions; 2.1 – quality of basic raw materials;
- 2.2 – quality of blended semi-finished product; 2.3 – quality of auxiliary raw materials;
- 2.4 – compliance with the conditions of storage of raw materials;
- 3.1 – technical equipment of the enterprise; 3.2 – line performance; 3.3 – serviceability of equipment;
- 3.4 – the presence of control points; 4.1 – staff qualifications; 4.2 – experience of employees;
- 4.3 – diligence of staff; 4.4 – working conditions; 5.1 – timely preparation of components;
- 5.2 – timeliness of order acceptance (for restaurants) or availability of sales schedule (for sanatoriums); 5.3 – the presence of apples; 5.4 – the presence of berry raw materials;
- 5.5 – the presence of glucose-fructose syrup

For certain factors of the first level, we have established the factors of the second level, which are given under the main ones with the corresponding code. A number of factors are common in the manufacturing technologies of any culinary product and their effect is taken into account even at the stage of enterprise design. In order to improve the quality for ready-made desserts, it is necessary to take into account the effect of all factors in the technological process. Second-order factors that are specific in the manufacture of a certain dessert provide for the features of the technologies being developed.

Taking into account such approaches to the creation of a new product, the authors proposed a model of the technological scheme (Figure 2).

Figure 2. Model of the technological system «Production of whipped fruit and berry desserts of the «sambuk» type»

Functions of the subsystems of the models of the technological system «Production of innovative desserts of the foamy structure of the sambuk type»:

Subsystems A-F: obtaining a fruit and berry dessert of a frothy structure such as a whipped sambuk with specified quality indicators.

Technological operations are performed within the A-E subsystems. Subsystem F leads to the realization of the dessert.

Subsystem A performs the following technological operations: mechanical culinary processing, baking, rubbing, mixing, freezing, storage of blended semi-finished product. Subsystem A: search for the necessary basis for desserts by consistency, chemical composition and glycemic index; preparation and formation of recipe composition. Subsystem A can have several alternative solutions. For example, mashed from cranberries, dogwood and other berry raw materials can be made next to the apple puree shown in the principle technological scheme. In the given model, each of the subsystems has certain functions and tasks.

The developed technology for making desserts in the formation of subsystem A provides, first of all, the preparation of a blended semi-finished product from apples and other vegetable raw materials, which includes a number of technological operations to bring it to readiness.

Subsystem B performs the following technological operations: preheating glucose-fructose syrup and dosing it for subsystem A.

Subsystem C: an overview of technological approaches for creating a foamy base for the consistency of a dessert; obtaining a foamy consistency by determining the type and amount of the mass fraction of technological components, whipping time and mixing modes. In subsystem C the developed technology provides for the combination of vegetable fillers (blended semi-finished product, egg white, glucose-fructose syrup, water) and further whipping of the mixture.

Subsystem C: search for valuable plant raw materials from the point of view of chemical composition; study of the possible shape or consistency by introducing fruit and berry semi-finished products as part of desserts; development of a technology for the production of mixed semi-finished products; research of the desired component composition, the change or composition of which will make it possible to form an assortment of desserts.

Subsystem D: the study of the quality of egg white. Subsystem D provides for the use of egg white, which is used to replace the native one in desserts. At the stage of subsystem C, mixing of egg white with fruit and berry puree is provided (Precup et al., 2020; Seçmeler, Sevimli, 2020) and mixing with subsystem E (gelatin dissolved in water) and creation of a recipe mixture (Zeeb et al., 2020).

It is proposed to add blended puree from fruit and berry raw materials to the composition of the dessert in the form of a blended semi-finished product as a biologically active component that compensates for the lack of trace elements and vitamins necessary for the full functioning of the body (González-Herrera et al, 2016; Jatav et al, 2018; Kalinowska et al., 2014; Koutsos, Lovegrove, 2015; Marcus, 2019; Massini et al, 2018; Nitcheu Ngemakwe et al., 2017).

On the basis of the developed model of the technological system «Production of fruit and berry desserts of a frothy mixture», basic technological schemes for the production of fruit and berry desserts of a foamy consistency were developed.

Sensory evaluation

Based on the sensory assessment of sambuk samples, a quality criterion was calculated (based on the area of profilograms), which determines the overall comprehensive assessment of new desserts, and profilograms of the quality of sensory indicators for each dessert were constructed (Figure 3).

Figure 3. Dessert sensory profilograms:

a – apple; b – apple-banana; 1 – appearance; 2 – homogeneity of inclusions; 3 – naturalness; 4 – color; 5 – purity; 6 – uniformity of color; 7 – naturalness; 8 – taste; 9 – sweetness; 10 – intensity of the taste; 11 – uniformity; 12 – naturalness; 13 – smell; 14 – clean, 15 – expressive; 16 – balance; 17 – consistency; 18 – density; 19 – viscosity; 20 – fluidity

The quality of desserts was assessed by the following indicators: appearance (including color), taste, smell, and consistency. The value of the descriptors was taken into account when calculating the main indicator.

The weighting coefficients of individual indicators and their descriptors were determined by the Delphi method, by the expert method, for each group of indicators, according to the average values of the descriptors of this group and subject to the condition that the sum of the indicators of each group is 10 points (Table 3).

The final assessment of the quality indicators of desserts was determined by obtaining the average value of individual descriptors, which were used to determine this indicator by dividing the sum of the scores of all descriptors by their number. Using the results obtained, the desserts rating value was calculated.

The analysis of the rating of desserts showed that the sample «Apple-banana» has a higher rating indicator of 96.815 points compared to the control sample «Apple» (91.195 points).

The social effect of the new composition was confirmed – the preservation and protection of human health. This presupposes a more complete use of the nutritional potential of the raw materials used, an expansion of the assortment of desserts, an increase in their quality, an improvement in consumer properties, a decrease in the deficiency of vitamins, mineral elements and dietary fiber. This will ensure the normal functioning of the human body, satisfy consumer demand for desserts of functional importance.

Table 3

Indicators of the rating of desserts

Indicators, points	Significance factor	The value of individual indicators		Rating value	
		«Apple» (control)	«Apple-banana»	«Apple» (control)	«Apple-banana»
Appearance	3.0	9.20	9.80	27.600	29.400
Color	2.0	9.07	9.63	18.140	19.260
Taste	2.0	9.25	9.70	18.500	19.400
Smell	1.5	9.07	9.70	13.605	14.550
Consistency	1.5	8.90	9.47	13.350	14.205
Rating, points				91.195	96.815
Quality criterion, point ²				1656.04	1860.56

Now at the international level there is an urgent problem of the production of desserts containing a high content of biologically active substances. Considering the dietary and functional purpose of desserts, it is advisable to introduce them into production, despite the increased selling price. New desserts can be consumed by all segments of the population, including those with diabetes mellitus.

Antioxidant capacity

Physicochemical studies, namely determination of the *pH* level and *RP* (Nicoli et al., 2004; Prévost, Brillet-Viel, 2014), were performed according to the method (Priluckij, 1997) and calculations given above (Kuzmin et al., 2016). As a result of extraction received infusions (Andreou et al., 2018; Iannitti, Palmieri, 2009; Kawa-Rygielska et al., 2019), physicochemical indicators (Breiter et al., 2011; Dube et al., 2017) of which are presented in the Table 4.

Table 4

Quality indicators of extracts on extractant

Plant raw materials	<i>t</i> , °C	<i>pH</i>	<i>Eh_{min}</i> , mV	<i>Eh_{act}</i> , mV	<i>RE</i> , mV
1. Apple (control)	20	4.12	412.8	318	94.8
2. Apple-banana	20	6.38	277.2	126	151.2

where: *t* – temperature of infusion; *pH* – active acidity of the test solution; *Eh_{min}* – minimal theoretically expected meaning of *RP*; *Eh_{act}* – actual measured *RP*; *RE* – recovery energy

Figure 4 shows graphically the change in the physicochemical indicators of the quality of extracts of raw materials on the extractant.

The minimum theoretical value of *RP* (*Eh_{min}*) for plant water-alcohol infusions (Priluckij, 1997) was obtained, which has a value from 277.2 mV («Apple-banana») to 412.8 mV («Apple»). The actual measured *RP* of infusions (*Eh_{act}*) was established – from 126 mV («Apple-banana») to 318 mV («Apple»). The hydrogen index for water-alcohol infusions

from raw materials has a value of 4.12 units pH («Apple») to 6.38 units pH («Apple-banana»).

Water-alcohol infusions from vegetable raw materials and a volume fraction of ethanol of 40% have the value of regenerative capacity (recovery energy – RE) in the range from RE – 94.8 mV («Apple») to RE – 151.2 mV («Apple-banana»). For the restaurant business in the manufacture of desserts, the apple-banana composition is promising, which has received increased antioxidant characteristics of RE – 151.2 mV.

Figure 4. Physicochemical indicators of the infusions of the studied raw materials:
 pH – active acidity of the test solution; E_{hmin} – minimal theoretically expected meaning of RP ;
 E_{hact} – actual measured RP ; RE – recovery energy

The data obtained are correlated with the basic scientific concepts which are displayed in the works (Buglass et al., 2012; Frolova, Ukrayinets, 2018; Gerolis et al., 2017; Gullón et al., 2018; Gulua et al., 2018; Imark et al., 2000; Naithani et al., 2006; Naumenko et al., 2015; Pyrzynska, Sentkowska, 2019; Sentkowska, Pyrzynska, 2018), regarding the processes of extracting of plant materials. It allows to increase the antioxidant properties of the product (Breiter et al., 2011; Dube et al., 2017; Herrera et al., 2018; Keating et al., 2014; Vergun et al., 2019), will help to increase the immunity of the human body, improve the metabolism, positively affect the cardiovascular system, in addition it increases the consumer properties and will allow to reduce the cost of the finished product (Kumar et al., 2018; Peschel et al., 2006; Tan et al., 2020).

The development of a fruit and berry blended semi-finished product is a promising direction for increasing the nutritional value in the technology of desserts, expanding the assortment of the dessert group with predicted quality indicators. Its use ensures technological stability and high quality indicators of the finished product. The social effectiveness of the developments lies in the expansion of the assortment of desserts with a balanced dietary nutritional value and improved consumer properties.

Conclusions

1. Determined the minimum theoretical value of $RP (Eh_{min})$ for aqueous-alcoholic infusions, which ranges from 277.2 mV («Apple-banana») to 412.8 mV («Apple»). The actual measured value $RP (Eh_{act})$ is set – from 126 mV («Apple-banana») to 318 mV («Apple»). The hydrogen index for aqueous-alcoholic infusions ranges from 4.12 pH units («Apple») to 6.38 pH units («Apple-banana»).
2. The values of the antioxidant capacity of fruit and berry raw materials in water-alcohol systems have been determined. For the restaurant business in the production of desserts, the apple-banana composition is promising, which has received increased antioxidant characteristics of $RE - 151.2$ mV.
3. The profile criterion of quality and rating of desserts has been studied. An analysis of the dessert rating showed that the apple-banana sample had a higher rating score of 96.815 points compared to the apple control sample of 91.195 points.

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