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EVALUATION OF RAW MATERIALS FOR THE DEVELOPMENT OF HONEY HEALTHY DESSERT RECIPES

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Abstract. In today's food market, the demand for delectable taste, product safety, and health benefits is paramount. Health-focused desserts present an opportunity to tap into new market segments, catering to specific groups such as individuals with health conditions, athletes, and the general consumer populace.

The objective of this study was to evaluate the safety and quality of the raw materials utilized in crafting these desserts.

The initial phase involved scouring international science papers to investigate the components utilized in creating honey-based health desserts. This review delved into various dessert formulations devised by researchers, shedding light on the advantageous properties of such treats.

The findings underscore that honey and other beekeeping byproducts serve as excellent bases for crafting desserts rich in nutrients and beneficial substances. Honey, in particular, assumes a pivotal role in defining the dessert's primary flavor profile and imparting viscosity to its texture.

Further enrichment of these desserts is achieved through ingredients like freeze-dried raspberry berries, sea buckthorn, dried pumpkin, and spirulina, which contribute plant-based carbohydrates and lend distinctive organoleptic characteristics—taste, color, and aroma. These additions also bolster the dessert's vitamin and biologically active substance content. Moreover, the incorporation of pumpkin, fenugreek, and sesame seeds elevates the dessert's protein and fat content, augmenting its nutritional value.

In the subsequent phase, researchers scrutinized the sensory and physicochemical attributes of the raw materials employed in crafting these health-oriented desserts, employing standardized methodologies. Key quality benchmarks encompassed sensory traits, physicochemical attributes, and nutritional profiles. Safety assessments encompassed microbiological parameters, pesticide and antibiotic residues, and radioactive isotopes.

These findings underscore the vast array of possibilities inherent in leveraging beekeeping products, berries, seeds, fruits, vegetables, and other ingredients in health-focused honey desserts. Adherence to rigorous organoleptic, physicochemical, and safety standards is imperative for the successful development of novel dessert technologies that seamlessly blend delightful taste with health-enhancing benefits.

Keywords: *beekeeping products, honey, berries, raspberries, sea buckthorn, spirulina, healthy food, pumpkin seeds*

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ОЦІНЮВАННЯ СИРОВИНИ ДЛЯ РОЗРОБЛЕННЯ РЕЦЕПТУР ДЕСЕРТУ МЕДОВОГО ОЗДОРОВЧОГО ПРИЗНАЧЕННЯ

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Анотація. *Сучасний ринок харчування висуває вимоги не тільки до смакових властивостей, а також до безпечності продукту, і його дію на здоров'я людини. Оздоровчі десерти розширюють ринок збуту і стають доступними як для спеціалізованих груп населення, таких як, люди з захворюваннями, спортсмени, так і для звичайного споживача.*

Метою роботи була оцінка сировини за показниками безпечності та якості для розроблення десерту.

На першому етапі дослідження проведено огляд міжнародних публікацій вчених стосовно компонентів, які будуть використані при розробці рецептур десерту медового оздоровчого призначення. Сфокусовано увагу на різні рецептури десертів які були розроблені цими вченими і корисні властивості таких десертів.

Результати дослідження свідчать, що мед та інші продукти бджільництва є придатними для розроблення десерту з високим вмістом поживних і корисних речовин. Мед забезпечує створення основної смакової композиції та може надавати в'язкості консистенції десерту.

Сублімовані ягоди малини, обліпихи, сушені гарбуз, спіруліна збагатять десерт рослинними вуглеводами та додадуть продукту унікальні органолептичні властивості: смак, колір, запах. Додавання перелічених інгредієнтів може сприяти збагаченню десерту вітамінами та іншими біологічно-активними речовинами. Насіння гарбуза, пажитника та кунжуту збагатить десерт білками та жирами, що підвищить поживну цінність.

На другому етапі вивчали органолептичні та фізико-хімічні показники сировини для розроблення десертів оздоровчого призначення. Дослідження здійснювали стандартизованими методами. До основних показників якості віднесли: органолептичні, фізико-хімічні показники та харчову цінність. До показників безпеки сировини віднесли: мікробіологічні показники, вміст шкідливих залишків пестицидів, антибіотиків, радіоактивних ізотопів..

Загалом, ці результати демонструють широкий спектр можливостей використання продуктів бджільництва, ягід, насіння, плодово-овочевої продукції та інших інгредієнтів у десертах медових оздоровчого призначення. Дотримання вимог стандартів щодо відповідності органолептичним і фізико-хімічним критеріям є ключовими аспектами успішного розроблення нових технологій десертів, що поєднують приємний смак та оздоровчий ефект.

Ключові слова: *продукти бджільництва, мед, ягоди, малина, обліпиха, спіруліна, здорове харчування, насіння гарбуза*

INTRODUCTION. In today's world, people are increasingly prioritizing their health, with a balanced diet emerging as a cornerstone of wellness. Shifts in eating patterns and a more sedentary lifestyle have fueled a global rise in obesity rates. According to the World Health Organization, 12% of adults are now classified as obese. Projections from the Food and Agriculture Organization indicate a steady increase in daily calorie intake, expected to reach 3050 kcal per person by 2030, up from 2803 kcal in the late 1990s. To tackle this issue, various methods have been devised to transform traditional recipes into low-fat or low-sugar alternatives for the food industry. These approaches often involve reducing ingredient quantities or substituting with alternatives that mimic their functional properties. However, retaining the authentic taste and texture of beloved desserts while reducing calorie content and enhancing nutritional value remains a significant challenge for food technologists.

Crafting desserts that indulge the sweet tooth while also benefiting the body can play a pivotal role in promoting a wholesome lifestyle and offering alternative products tailored to contemporary consumer demands. This holds promising potential in addressing various modern nutrition challenges, such as combating obesity, heart disease, diabetes, and other chronic conditions linked to dietary habits.

To devise recipes for such desserts, the initial step involves carefully selecting raw ingredients and assessing their quality and nutritional properties.

LITERATURE REVIEW. Sunflower honey reigns as the most prevalent variety in Ukraine, produced in substantial quantities. Research by (Balkanska and Shumkova, 2022) indicates that sunflower honey exhibits heightened antioxidant activity compared to polyfloral honey. Additionally, findings from (Emin Duru et al., 2023) underscore the robust antiuretic and anti-inflammatory properties of sunflower honey. Furthermore, (Şahin, 2021) discovered that honey showcases anticholinesterase and butyrylcholinesterase enzyme activity, offering potential against Alzheimer's disease.

Honey features prominently in dessert formulations. (Petridis et al., 2020) devised a technology for crafting a dairy fermented frozen dessert incorporating yogurt, honey, and pomegranate juice, boasting reduced fat content. Similarly, (Sumardi, 2020) introduced a pudding dessert recipe based on aloe vera, lemon, and honey, abundant in soluble plant fibers. Meanwhile, (Tahmaz et al., 2020) explored honey's application in the production of high-viscosity baby food. Conversely, (Kamboj et al., 2019) observed that elevated temperatures and pH levels contribute to increased hydroxymethylfurfural (HMF) content in honey, coupled with diminished diastase activity, emphasizing the importance of utilizing minimally processed honey.

Royal jelly is renowned as a functional food for its numerous health benefits. According to (Collazo et al. 2021), it boasts anti-lipidemic, antioxidant, antimicrobial, and anti-inflammatory properties. Additionally, (Hassan et al., 2022) discovered that incorporating royal jelly can shorten fermentation time, enhance viscosity and water retention, and boost antioxidant levels in fermented milk. For instance, (Cinar et al., 2021) introduced a method for infusing royal jelly into probiotic dairy desserts.

Propolis, on the other hand, holds promise in creating functional foods and food preservatives. As noted by (Liaudanskas et al., 2021), aqueous propolis extract exhibits potent antioxidant activity, making it suitable for a wider consumer base and potentially easing symptoms of oxidative stress, unlike traditional propolis.

(Kabakci, 2023) demonstrated that crushed beehive debris possesses antioxidant, anti-inflammatory, and antimicrobial properties. Research by (Li et al., 2023) has highlighted the anti-inflammatory and therapeutic effects of bee pollen in combating colitis. Bread formulations enriched with crushed bee pollen to enhance nutritional content are well-documented (Antoniv et al., 2022; da Silva et al., 2024).

Pumpkin, being rich in nutrients, serves as an excellent ingredient for health-oriented desserts. (Kaur et al., 2020) discovered that pumpkin exhibits anti-diabetic, antioxidant, anticarcinogenic, and hyperprotective properties. Moreover, (Vinayashree and Vasu, 2021) confirmed the presence of high-quality, well-balanced proteins in pumpkin seeds.

Research by (Leichtweis et al., 2022) revealed that pumpkin peel and seeds boast the highest antioxidant effect. Meanwhile, (Márquez-Cardozo et al., 2021) noted a significant decrease in carbohydrates and fiber during pumpkin drying, yet antioxidant activity surged with rising drying temperatures. The technique for crafting a pumpkin-based dessert known as halva, highlighted by (Bali et al., 2023), enhances the absorption of bioactive molecules through the lymphatic system, bolstering the immune, cardiovascular, and respiratory systems with phytochemicals.

(Rakhymzhanova, 2020) devised a method for producing sugar-free desserts using pumpkin, beets, and carrots rich in vitamin C and pectin, a natural sorbent and metabolism regulator. (Szydłowska et al., 2022) demonstrated pumpkin's ability to reduce sugar content, boost antioxidant properties, and enhance probiotic survival in non-dairy frozen desserts. Furthermore, (Karli & Banu, 2023) pioneered the creation of alternative milk and dairy products from melon and pumpkin seeds, leading to antioxidant-rich pudding production.

Fenugreek seeds are highly regarded for both their culinary allure and medicinal prowess. Research conducted by (Alu'datt et al., 2024) has unveiled a plethora of benefits, including hypoglycemic, antihyperlipidemic, antioxidant, anti-inflammatory, antihypertensive, anticarcinogenic, and immunomodulatory effects, with potential organ-protective effects spanning the cardiovascular, digestive, hepatic, endocrine, and central nervous systems.

(Ahmad et al., 2022) delved into the nutritional, antioxidant, and sensory aspects of noodles enriched with fenugreek seed powder, revealing enhancements in mineral, protein, and fiber content. Meanwhile, studies by (Medeiros et al., 2020) showcased fenugreek seeds' ability to synergize with starch, milk protein, and sucrose, thereby improving the gel structure of a milk-based dessert.

Sesame seeds play a pivotal role in the food industry, offering protective benefits for bone health and hormone balance in menopausal women, as noted by (Arooj et al., 2023). (Li et al., 2024) further solidified sesame's health potential, highlighting its antioxidant, antimutagenic, estrogenic, anti-inflammatory, antimicrobial, and hypolipidemic properties.

Additionally, (Ali & BATU, 2020) elucidated the utilization of sesame seeds in crafting halva and tahini. Furthermore, (Sheikh et al., 2023) engineered a composite gel derived from gelatinous sesame protein, applicable in desserts and various other products.

Spirulina, an algae renowned for its functional attributes, holds promise in food production. (Lafarga et al., 2020) demonstrated its potential in preventing or treating metabolic syndrome-related disorders. Moreover, (Almeida et al., 2021) showcased the enhancement of antioxidant and nutritional value in a functional sauce with spirulina incorporation. Notably, (Papadimitriou et al., 2021) reassured the safety of spirulina supplements for adult consumption, indicating that low concentrations of cyanobacterial toxins pose no significant risk.

Raspberry cultivation thrives in Ukraine, with (Baenas et al., 2020) showcasing how raspberry dietary fiber serves as a functional and prebiotic ingredient, enhancing the nutritional profile of foods. (Vara et al., 2020) underscored the nutritional value of raspberries, advocating for their inclusion in daily diets to glean essential nutrients and antioxidants. Additionally Cielecka-Piontek et al., (2020) unveiled the technique of incorporating freeze-dried raspberries into chocolate snacks, while (Kurzer et al., 2020) pioneered numerous dessert recipes featuring nuts, fruits, and berries, including raspberries.

Sea buckthorn stands out for its rich nutrient and bioactive compound content. (Wang et al., 2022) demonstrated the cardiovascular benefits, antidiabetic effects, and anti-obesity properties of sea buckthorn consumption. Moreover, (Ciesarová et al., 2020) affirmed its abundance in antioxidants, tannins, and ascorbic acid, while (Dong et al., 2022) highlighted its anti-inflammatory and skin healing attributes, along with its role in reducing cardiovascular disease risk. Furthermore,

(Nistor et al., 2020) devised a technology for crafting vegan ice cream infused with cherries, apples, lemon, and sea buckthorn.

Freeze-dried apples stand out for their high levels of ascorbic acid and polyphenols, boasting impressive antioxidant potential, as highlighted by (Dragomir et al., 2021). These findings prompted the development of a dessert technology incorporating hulled hemp seeds and apple powder, particularly in macarons.

Furthermore, (Altay et al., 2021) demonstrated that integrating fruit powders, such as apple powder, into dough formulations led to decreased moisture content in cakes.

Given the pronounced preventive and therapeutic effects of the aforementioned ingredients, they hold promise as raw materials for crafting health-oriented honey desserts. Consequently, further research aims to delineate the primary physicochemical parameters of these raw materials, paving the way for the formulation of recipes tailored to the creation of health-conscious honey desserts.

MATERIALS AND METHODS. The following materials were used: sunflower honey, pumpkin, dried apples, pumpkin solution, fenugreek solution, sesame solution, spirulina, sublimated raspberry berries, sea buckthorn, aqueous propolis extract, beebread, bee honey, sublimation of milk and royal jelly.

Quality and safety indicators of beekeeping products were determined using standardized methods specified in DSTU 4497:2005; DSTU 7074:2009; DSTU 3127–95; DSTU 4666:2006. Physicochemical parameters of dried pumpkin and pumpkin seeds were determined using standardized methods specified in TU U 10.3–41941689–001:2018, TU U 10.3–41941689–002:2019. The indicators of freeze-dried raspberries were determined using standardized methods specified in TU U 10.3–42888815–002:2019; sea buckthorn - in TU U 15,3–34838293–001:2009; fenugreek and sesame seeds - in TU U 10.8–3474701915–001:2023. Microbiological indicators were determined using standardized methods specified in DSTU 8446:2015; 8447:2015; DSTU EN 12824:2004. Radiological parameters were determined according to the methods specified in GN 6,6,1,1–130–2006. The content of pesticides was established in accordance with DSanPiN 8,8,1,2,3,4–000–2001.

The research was carried out in two repetitions, taking into account the standard errors, in the conditions of the laboratory of the Faculty of Food Technologies of the National University of Life and Environmental Sciences of Ukraine and the laboratory of methods for assessing the quality and safety of beekeeping products National Science Center».

Results and discussion. The results of the organoleptic research of beekeeping products as components of health-improving honey desserts are shown in Table 1.

Table 1. Organoleptic assessment of beekeeping products as ingredients for the production of health dessert

Indicator	Characteristic				
	honey[1]	**beebread[2]**	**bee pollen[3]**	**water extract of propolis[4]**	**adsorbed royal jelly[5]**
Appearance	thick, viscous substance	hexagonal granules	lumps in the shape of a kidney	liquid	powder
Consistence	very viscous, dense	dense, solid	dense, not too hard	liquid	homogeneous, without lumps
Color	light yellow	dark yellow	yellow, green, brown	dark brown	light cream
Taste	sweet, pleasant	sweet and sour	tart, slightly sweet	bitter, astringent,	sour cream

				with a resinous aftertaste	
Scent	specific, pleasant, strong	bread, floral	floral	resinous, woody	pleasant, with a slight acidity
Signs of mold/fermentation	NF				

Notes: 1 – according to DSTU 4497:2005, sunflower honey was used; 2 – according to DSTU 7074:2009; 3 – according to DSTU 3127–95; 4 – TU U 15.8-30180024-009:2009; 5 – according to DSTU 4666:2006; NF – not found.

The organoleptic evaluation of beekeeping products allows us to draw the following conclusions. Honey can give the finished dessert thickness, viscosity, sweet taste, and a pleasant honey aroma. Beebread adds a grainy texture, a sour-sweet taste, and a smell with light floral notes. Beeswax also adds texture and a pleasant astringency with floral aromas. Water extract of propolis dilutes the texture, adds a bitter, slightly resinous taste and smell, and royal jelly increases the creaminess, adds a sour-creamy taste and aroma. Adding different beekeeping products to honey allows for changes in the tastes and aromas of ready-made desserts of different consistencies, which provides for an increase in the assortment and, accordingly, the product's attractiveness for consumers.

Table 2 shows the main physicochemical parameters of beekeeping products, which will be used as components in the development of recipes for the health-improving honey dessert.

Table 2. Basic physicochemical parameters of beekeeping products as ingredients for the production of health dessert

Indicator	**Characteristic**				
	honey[1]	**beebread[2]**	**bee pollen[3]**	**water extract of propolis[4]**	**adsorbed royal jelly[5]**
Moisture, %	18	5	10	90	3
Mass fraction of impurities, %	NF				
pH	3,5	4	4,5	4,6	ND
Flavonoid compounds, %	2,0	2,5	4,5	10	ND
Reducing sugars, %	85	ND			30
Mass fraction of crude protein, %	ND	30	25	ND	30
Lipids, %	ND				15
Mass fraction of sucrose, %	3	ND			2
HMF, mg/kg	5	ND			ND
Proline, mg/kg	300	ND			ND

Notes: 1 – according to DSTU 4497:2005, sunflower honey was used; 2 – according to DSTU 7074:2009; 3 – according to DSTU 3127–95; 4 – TU U 15.8-30180024-009:2009; 4 – according to DSTU 4666:2006; NF – not found, ND – not defined.

The basic physicochemical parameters of beekeeping products, which will be monitored during the production of honey desserts, include moisture, impurities, for all; pH and flavonoid compounds for honey, Beebread, honey, and water extract of propolis; reducing sugars for honey and royal jelly; mass fraction of raw protein for beebread, bee pollen and royal jelly; percentage of lipids only for royal jelly; mass fraction of sucrose for bee pollen and royal jelly; HMF and proline only for honey.

Control of safety indicators is a key factor when using beekeeping products and other natural components in honey desserts for health purposes. The health of consumers and their trust in the product depend on guaranteeing the safety of the ingredients. Tables 3–6 show the safety indicators of the ingredients of the future dessert.

All natural components used in such a dessert can be subject to microbiological contamination if they are not processed and stored properly. Microbiological safety controls help prevent the growth of harmful microorganisms such as bacteria, yeast, and mold that can cause food poisoning or product spoilage.

Also, natural ingredients may contain traces of chemicals such as pesticides, heavy metals, or other toxic elements. Chemical safety control ensures that these substances do not exceed maximum permissible levels and do not pose a risk to consumers.

Table 3. Safety indicators of beekeeping and berry products as ingredients for the production of health dessert

Indicator	**Beekeeping products[1]**	**Berries[2]**
microbiological[3]		
The number of mesophilic anaerobic and facultatively anaerobic microorganisms, CFU in 1 g, no more	$2{,}0 \times 10^4$	$2{,}0 \times 10^4$
Yeast, CFU in 1 g	40	5×10^2
Mold mushrooms, CFU in 1 g	10	ND
S. aureus, Sal. enterica	NF	
content of toxic elements, mg/kg[4]		
Lead, Cadmium, Arsenic, Mercury	NF	
pesticide content, mg/kg[4]		
DDT, Hexachloran	NF	
antibiotics (per dry matter) [4]		
Levomycetin, mg/kg	NF	ND
Nitrofuran, μg/kg	NF	ND
radionuclides, Bq/kg[5]		
Cesium-137, Strontium-90	NF	

Note: 1 – honey, beebread, bee pollen, water extract of propolis, sublimated royal jelly; 2 – raspberry and sea buckthorn berries; 3 – according to DSTU 8446:2015; 8447:2015; 4 – DSanPiN 8,8,1,2,3,4–000–2001; 5 – GN 6,6,1,1–130–2006; ND – not defined; NF – not found.

Table 4. Safety indicators of fenugreek and sesame seeds and pumpkin as ingredients for the production of health dessert

Indicator	**Seeds[1]**	**Pumpkin[2]**
microbiological[3]		
The number of mesophilic anaerobic and facultatively anaerobic microorganisms, CFU in 1 g, no more	2×10^5	1×10^6
Mold mushrooms, CFU in 1 g	1×10^3	ND
content of toxic elements, mg/kg[4]		

Lead, Cadmium, Arsenic, Mercury, Copper, Zinc	NF
pesticide content, mg/kg[4]	
DDT, Hexachloran, Bayleton, Phosphamide, Actellik, Treflan, Topaz, Karbofos	NF
antibiotics (per dry matter) [4]	
Levomycetin, mg/kg	NF
Nitrofuran µg/kg	NF
radionuclides, Bq/kg[5]	
Cesium-137, Strontium-90	NF

Note: 1 – according to TU U 10.8–3474701915–001:2023; 2 – according to TU U 10.3–41941689–001:2018; 3 – according to DSTU 8446:2015; 8447:2015; 4 – DSanPiN 8,8,1,2,3,4–000–2001; 5 – GN 6,6,1,1–130–2006; ND – not defined; NF – not found.

Control of safety indicators is fundamental for the production of honey desserts for health purposes. Ensuring the microbiological, chemical, and technological safety of the ingredients ensures that the manufactured product will be safe for consumption and meet quality standards.

The use of different natural components that contain biologically active substances can help increase the nutritional value of the product, enhance the taste and aroma, provide an attractive color and texture, and increase the health effect. It should be noted that the use of different combinations of natural components contributes to the creation of an assortment of such desserts, which in turn expands the sales market, as well as the audience of consumption.

Tables 7–10 show the main indicators of the products that will be used in the development of different recipes for health-improving honey desserts.

Table 6. Main indicators of powder from dried pumpkin and apple ingredients for the production of health dessert

Indicator	**Pumpkin***	**Apple***
organoleptic		
Appearance	powder	powder
Color	from yellow-orange to brown	from pale yellow to light cream
Taste	sweet, specific, spicy	sweet, slightly sour
Scent	pumpkin-like aroma, without extraneous odors	apple-like aroma, without extraneous odors
physical and chemical		
Moisture, %	14	5
Mechanical impurities, %	NF	
nutritious and energetic value		
Proteins, %	11	2
Fats, %	1	1
Carbohydrates, %	49	85
Dietary fiber, %	22	4
kcal per 100 g.	297	322
kJ per 100 g.	1251	1361

*** Note:** according to ¬ TU U 10.3–41941689–001:2018, TU U 10.3-41941689-002: 2019; NF – not foun.

The authors (Ahmad et al., 2022) assessed the quality indicators of fenugreek seeds according to their antioxidant properties. The authors (Leichtweis et al., 2022) evaluated pumpkin quality indicators by the content of phenolic compounds. In the study (Dragomir et al., 2021), the assessment of the quality indicators of apples in the dessert was determined by the organoleptic indicators of the finished product and by the content of ascorbic acid and polyphenols. The authors (Arooj et al., 2023) determined indicators of the quality and safety of sesame seeds based on the content of bioactive lignans and calcium content. The authors (Li et al., 2024) evaluated the quality of vegetable milk based on pumpkin seeds using indicators of phenolic content and antioxidant activity. A study by (Sheikh et al., 2023) evaluated sesame as a component of sesame seed jelly using oleosome content and viscosity. The authors (Márquez et al., 2021) evaluated pumpkin quality indicators based on cellulose, solubility, and water-absorbing capacity.

Table 7. Main indicators of pumpkin seeds, fenugreek seeds, and sesame seeds as ingredients for the production of health dessert

Indicator	Pumpkin seeds[1]	Fenugreek seeds[2]	Sesame seeds[3]
organoleptic			
Texture	hard, not hard, slightly crispy	firm, not hard	firm, not hard
Color	creamy, greenish	light brown, yellow	light brown, dark brown
Taste	characteristic of a pumpkin, without bitterness	slightly bitter, with sweet notes	slightly nutty
Scent	pleasant, characteristic of a pumpkin	pleasant, sweet	characteristic of sesame
physical and chemical			
Moisture, %	6	12	10
Mechanical impurities, %	NF		
nutritious and energetic value			
Proteins, %	30	30	20
Fats, %	50	5	15
Carbohydrates, %	15	50	20
kcal per 100 g.	559	323	573
kJ per 100 g.	2340	1350	2398

Note: 1 – according to DSTU 5046:2008 2, 3 – according to TU U 10.8-3474701915-001:2023; NF – not found.

Table 8. Main indicators of sublimated raspberries, sea buckthorn and spirulina as ingredients for the production of health dessert

Indicator	Raspberry[1]	Sea buckthorn[2]	Spirulina
organoleptic			
Appearance	powder	powder	powder
Color	red	yellow	green
Taste	sour-sweet, characteristic of raspberries	characteristic of sea buckthorn	grassy, without excessive bitterness
Scent	sweet, fruity, characteristic of raspberries	characteristic of sea buckthorn	fresh, slightly marine, grassy

physical and chemical			
Moisture, %	5	5	10
Mechanical impurities, %	NF		
nutritional and energy value per 100 g			
Proteins, g	8	5	70
Carbohydrates, g	79	27	10
Fats, g	4	14	20
kcal per 100 g.	333	183	315
kJ per 100 g.	1394	765	1319

Note: 1 – according to TU U 10.3–42888815–002:2019; 2 – according to TU U 15.3–34838293–001:2009; NF – not found.

Almeida, L et al. (2021) investigated the effect of spirulina on the pH values of food products. The authors (Baenas et al., 2020) carried out quality control and the content of soluble and insoluble fractions of dietary fiber of raspberries. In the study (Dong et al., 2021), the quality indicators of sea buckthorn berries were evaluated taking into account vitamin C, flavonoids, free fatty acids, and carotenoids. In the study (Papadimitriou et al., 2021), safety indicators were evaluated based on the content of cyanobacteria in spirulina. The authors (Lafarga et al., 2020) evaluated the quality and safety indicators of spirulina based on the content of bioactive pigments, such as chlorophylls, carotenoids, and phycobiliproteins. The authors (Papadimitriou et al., 2021) evaluated the safety of spirulina based on the content of cylindrospermopsin, saxitoxins, and microcystin.

CONCLUSIONS. Evaluating the quality and compatibility of raw materials for crafting recipes of honey-based health desserts using an array of ingredients stands as a pivotal stage in concocting a product that seamlessly blends taste with wellness benefits. Honey and bee products take center stage as primary ingredients, infusing sweetness and nutritional richness while defining the dessert's texture. Honey, renowned for its antimicrobial prowess, doubles as a preservative, extending the dessert's shelf life.

The process of freeze-drying plant-based ingredients serves to safeguard their nutrients, hues, and flavors. Opting for freeze-dried raw materials ensures their potency in terms of vitamins, antioxidants, and other vital nutrients, alongside facilitating convenient transportation and prolonged storage. Among the vegetable components, dried pumpkin, apple, spirulina, freeze-dried raspberries, and sea buckthorn were carefully selected. Spirulina emerges as a potent reservoir of proteins, vitamins, minerals, and antioxidants, rendering it a prized addition to honey-infused desserts tailored for health-conscious consumers. Its incorporation not only lends a distinctive hue to the dessert but also amplifies its nutritional profile while imparting notable health advantages.

In our selection for dessert ingredients, we opted for pumpkin, fenugreek, and sesame seeds. These seeds contribute a wealth of nutritious proteins, wholesome fats, fiber, and essential minerals to the desserts, enriching both their texture and flavor with an added crunchy element.

When assessing raw materials for formulating recipes of honey-based health desserts, we prioritized several factors. These include ensuring microbiological safety, absence of pesticide residues and heavy metals, adherence to organoleptic and physicochemical standards, as well as evaluating their nutritional and energy values.

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