

**INNOVATIVE TECHNOLOGY
OF NON-ALCOHOLIC HEALTH BEVERAGES**

Tkachenko L. V., Vitriak O. P., Martsyn T. O.
DOI <https://doi.org/10.30525/978-9934-26-697-3-7>

INTRODUCTION

Scientists in many countries are working to create food products and beverages that have health-promoting properties, that is, they contribute to improving human health by enriching food products and beverages with biologically active substances (BAS)¹. In the modern world, due to unfavorable environmental conditions, stress, extreme loads, and malnutrition, the human body does not have enough internal reserves to maintain homeostasis of the main functional organs and systems.

Some plant components, in particular alkaloids, have a positive effect on the central and autonomic nervous systems, this property is used both for treatment and for prevention. This effect can be stimulating, toning or calming, relaxing. A significant amount of BAS is contained in natural plant raw materials: vegetables, fruits, medicinal plants, nuts.

The Ukrainian market of non-alcoholic health drinks is mainly represented by herbal and fruit herbal teas, to a lesser extent by drinks and syrups based on fruits, berries, and vegetables. Traditional herbal teas do not contain black and green tea leaves, but only local herbs, fruits, and berries. The high demand for herbal teas is due to their combination of nutritional, taste, and healing properties, and their consumption is associated with a healthy lifestyle². Consuming herbal extracts with tea helps increase the body's protective functions and reduce the impact of negative environmental factors on human health.

It is worth noting that the menu of restaurant establishments is almost devoid of non-alcoholic drinks for health purposes. In view of this, a rather relevant direction for scientists is the development of technologies for non-alcoholic

¹ Мірзоева Т.В. Аналіз сучасного стану виробництва лікарських рослин в Україні. *Приазовський економічний вісник*. 2018. № 6 (11). С. 62–67.

² Федько Л. Фіточай у профілактиці та лікуванні захворювань обміну речовин. *Вісник Львівського університету. Серія біологічна*. 2016. № 73. С. 442–445.

drinks for health purposes using extracts of medicinal plants. Modern beverage production has a tendency towards the development of craft productions that have local use and quickly implement the latest technologies.

1. Characteristics of herbal medicinal raw materials in the technology of non-alcoholic health beverages

Among the raw materials used in the technology of non-alcoholic drinks, extracts of medicinal plants are promising. Most often, calendula, plantain and nettle leaves, yarrow roots, thyme grass, mint, viburnum, blackthorn are used in drinks³.

The following plant raw materials were selected for use in the technology of non-alcoholic health drinks: rose hips, linden blossom, St. John's wort, calendula flowers, mint, lemon balm, valerian root, plantain leaves, and chamomile flowers.

Linden blossom (*Flores Tiliae*) contains saponins, flavonoids, ascorbic acid, carotene, essential oil. Linden blossom enhances the secretion of gastric juice, increases bile formation, has pathogenic, antimicrobial, anti-inflammatory properties. Promotes the elimination of toxins and metabolites.

Rosehip (*Rosa majalis Herrm.*) is a “treasure trove” of vitamins. Rosehip fruits contain vitamins A, B₁, B₂, E, K and P, ascorbic acid, pectins, tannins, organic acids, fatty oil, flavonoids, carotene, glycosides, kaempferol and quercetin, salts of manganese, iron, magnesium, calcium and phosphorus. Rosehip fruits are used as an astringent, firming agent, they are prescribed for liver diseases, malaria, urolithiasis, colds. Decoctions and syrups from rosehip fruits are used for preventive and therapeutic purposes for scurvy, bleeding, anemia⁴.

St. John's wort (*Hypericum perforatum L*) is a perennial herbaceous plant that grows in Ukraine. Contains flavonoids, tannins, carotene, essential oil, nicotinic and ascorbic acids, vitamins P and PP, choline, anthocyanins, alcohols, traces of alkaloids and other compounds. St. John's wort is characterized by antispasmodic, capillary-strengthening, anti-inflammatory and antibacterial properties.

Calendula officinalis or marigolds (*Calendula officinalis*) is an annual herbaceous plant. The flowers of the plants contain: carotene, rubixanthin, flavochrome, flavoxanthin, glycosides, resins, mucous and bitter substances,

³ Vitriak O., Tkachenko L. Spicy and aromatic raw materials in the technology of healthy desserts and drinks // Sustainable food chain and safety through science, knowledge and business : Scientific monograph. Riga, Latvia : Baltija Publishing, 2023. P. 381–395. DOI: 10.30525/978-9934-26-328-6-17

⁴ Лікарські рослини: традиції та перспективи досліджень. Бюро Президії НААН. URL: http://naas.gov.ua/news/?ELEMENT_ID=2829 (дата звернення: 01.06.2026).

organic acids, ascorbic acid, vitamins. Calendula has anti-inflammatory, wound healing, bactericidal, properties⁵.

Mint (*Mentha*) is a genus of plants in the family *Stinging nettle*. Mint is rich in essential oil (not less than 2% menthol), contains organic acids, tannins, flavonoids, carotene, trace elements (copper, manganese, strontium, etc.). Mint has sedative, choleric, antiseptic properties, and also enhances the secretion of digestive glands, improves appetite, and has an antispasmodic effect. Peppermint is mainly used for herbal teas, and in vitro studies have proven that this plant has significant antimicrobial and antiviral activity, strong antioxidant and antitumor effects, as well as some antiallergenic potential⁶.

Lemon balm (*Melissa officinalis* L.) (lemon mint, lemon grass, lemon balm) is a perennial herbaceous plant. Lemon balm leaves contain essential oil (up to 0.3%), ascorbic acid, carotene, resins, tannins, caffeic, oleanolic and ursolic acids. Lemon balm water is a part of anticonvulsant mixtures, the oil has a sedative effect, the leaves have antibacterial properties. Lemon balm essential oil contains citral, citronellal, geraniol, and has a lemon aroma. It is part of herbal preparations used for insomnia and as a sedative⁷.

Valerian (*Valeriana officinalis* L.) is a perennial herb with a bunch of numerous thin roots that have a strong odor. The rhizome and roots of valerian contain essential oil, free isovaleric acid, borneol, terpenoids, alkaloids (valerine, hatinine, actinidin), glycosides (valeride), sugars, tannins. The roots of the plant have a calming effect on the nervous system, are used as an antispasmodic, tonic, for nervous excitement, hysteria, dizziness, insomnia, heart neuroses, nervous palpitations, asthma, migraines⁸.

Plantain (*Plantago major* L., *Plantago borysthena* Rogow) is a perennial herbaceous plant of the plantain family. Plantain extract has an antisclerotic effect, reduces cholesterol in the blood. Plantain seeds contain aucubin, protein and tannins, fatty oil, enzymes, resins. In folk medicine, they are used for inflammatory processes in the stomach, intestines and chronic constipation.

Chamomile (*Matricaria recutita* L.), its flowers contain essential oils (chamazulene), organic acids, coumarins, mineral salts, glycosides, vitamins.

⁵ Лікарські рослини: традиції та перспективи досліджень. Бюро Президії НААН. URL: http://naas.gov.ua/news/?ELEMENT_ID=2829 (дата звернення: 01.06.2026).

⁶ Switalski M., Rybowska A. Non-alcoholic beverages with plant additives as a case of product innovation – A systematic review of scientific articles. *Humanities & Social Sciences Reviews*. 2022. Vol. 10. P. 34–45. DOI: 10.18510/hssr.2022.1015.

⁷ Shakeri A., Sahebkar A., Javadi B. *Melissa officinalis* L. – A review of its traditional uses, phytochemistry and pharmacology. *Journal of Ethnopharmacology*. 2016. Vol. 188. P. 204–228. DOI: 10.1016/j.jep.2016.05.010

⁸ Shakeri A., Sahebkar A., Javadi B. *Melissa officinalis* L. – A review of its traditional uses, phytochemistry and pharmacology. *Journal of Ethnopharmacology*. 2016. Vol. 188. P. 204–228. DOI: 10.1016/j.jep.2016.05.010.

Chamomile decoctions have a choleretic effect, exhibit painkilling, and sedative properties. Chamomile preparations are used for gastritis, hepatitis, cholecystitis, colitis, cystitis, and gastric and duodenal ulcers⁹.

Below is a detailed analysis of the beneficial properties and chemical composition of the selected raw materials (Table 1)¹⁰.

Table 1

Useful properties of medicinal plant raw materials

Plant name	Consumer form	Biologically active substances (BAS)	Health benefits from use
1	2	3	4
Rosehip May (<i>Rosa majalis</i> <i>Herrm.</i>)	Dried fruits	Ascorbic acid; carotene; vitamins B ₁ , B ₂ , PP, K; pantothenic acid; flavonoids; pectin substances; organic acids; salts of iron, manganese, magnesium, potassium	Antisclerotic and anti- inflammatory effect; activation of enzyme systems and redox processes in the body; elimination of vitamin C deficiency; normalization of carbohydrate metabolism; reduction of capillary fragility and permeability
Mint (<i>Mentha</i>)	Fresh and dried leaves	Menthol, carotene, organic acids; vitamin C; rutin; flavonoids; trace elements; tannins; cineole	Sedative, hypotensive, antiseptic, analgesic and antiemetic effects; antihypoxic and weak antispasmodic effect; stimulation of bile secretion; thinning and removal of phlegm from the bronchi and lungs
Melissa officinalis (<i>Lemon balm</i>) (<i>Melissa</i> <i>officinalis</i> L.)	Fresh and dried leaves	Vitamins: C and B vitamins; minerals: potassium, iron, magnesium; essential oils	Overcoming insomnia; sedative; improving the functioning of the nervous system; lowering blood pressure in hypertension; analgesic effect; improving the functioning of the gastrointestinal tract
St. John's wort (<i>Hypericum</i> <i>perforatum</i> L.)	Dried twigs with inflores- cences and leaves	Flavonoids, tannins, carotene, vitamins P, PP, choline, essential oils	Antispasmodic, capillary- strengthening, antibacterial and anti-inflammatory effects
Calendula officinalis (<i>Calendula</i> <i>officinalis</i>)	Flowers	Carotenoids, flavochrome, glycosides, resins, mucilages, organic and ascorbic acids	Anti-inflammatory, bactericidal, wound healing effect

⁹ Лікарські рослини: традиції та перспективи досліджень. Бюро Президії НААН. URL: http://naas.gov.ua/news/?ELEMENT_ID=2829 (дата звернення: 01.06.2026).

¹⁰ Shaik M., Hamdi I. H., Sarbon N. A comprehensive review on traditional herbal drinks: Physicochemical, phytochemicals and pharmacology properties. *Food Chemistry Advances*. 2023. Vol. 3. Article 100460. DOI: 10.1016/j.focha.2023.100460.

Continuation of table 1

1	2	3	4
Valerian root (<i>Valeriana officinalis</i> L.)	Roots	Essential oil, isovaleric acid, borneol, alkaloids (valerenic), glycosides	Pronounced sedative effect; antispasmodic effect in heart neuroses and insomnia
Plantain (<i>Plantago major</i> L.)	Fresh and dried leaves	Glycoside aucubin, polysaccharides, tannins, enzymes, organic acids	Anti-sclerotic effect; cholesterol reduction; anti-inflammatory effect in gastritis
Chamomile (<i>Matricaria recutita</i> L.)	Flowers	Essential oil (chamazulene), organic acids, coumarins, glycosides, vitamins	Choleretic, antispasmodic, sedative effect; used for peptic ulcer disease
Linden blossom (<i>Flores Tiliae</i>)	Flowers	Saponins, flavonoids, ascorbic acid, carotene, essential oil	Antimicrobial, diaphoretic effect; increased secretion of gastric juice; elimination of toxins

Source: developed by the authors based on Shakeri A. et al (2016), Shaik M. et al (2023) and B. II. HAAH (2025).

The chemical composition of medicinal plants is represented by the main groups of physiologically active substances: flavonoids, tannins, vitamins, macro – and microelements, organic acids, essential oils (Table 2).

Table 2

Chemical composition of medicinal plants

Plant raw materials	Mass fraction, %			
	extractive substances	essential oils	tannins	ascorbic acid, mg %
Chamomile	42.3	0.85	3.8	18
Calendula	42.1	0.02	2.5	100
St. John's Wort	43.0	0.35	13.0	120
Mint	34.3	2.75	12.1	260
Plantago	37.8	0.01	5.0	300
Linden	40.7	0.05	6.8	25
Rosehip	38.4	0.01	4.5	2900
Lemon balm	45.7	0.33	5.0	150
Valerian	36.8	1.50	2.3	5

Source: developed by the authors based on Shakeri A. et al (2016) and B. II. HAAH (2025).

2. Technology and comprehensive quality assessment of new non-alcoholic beverages

As a control sample for the research, non-alcoholic drinks typical of Ukrainian cuisine “Rosehip Drink” and “Linden Blossom Tea” were chosen¹¹.

Extracts from medicinal plants were prepared in a ratio of 1:10 by keeping a portion of each plant in distilled water at a temperature of 75°C for 30 minutes with constant stirring. The obtained aqueous extracts of mint, chamomile, St. John's wort, calendula, lemon balm (melissa), valerian, and plantain were filtered and compositions were created by organoleptic analysis. The best results in terms of taste and aromatic qualities were obtained by composition A, which included: extracts of plantain, calendula, mint, and St. John's wort in a ratio of 1:0.5:2:1, respectively. The second composition D consisted of extracts of lemon balm (melissa), valerian, and calendula in a ratio of 2:1:0.5 (Fig. 1).

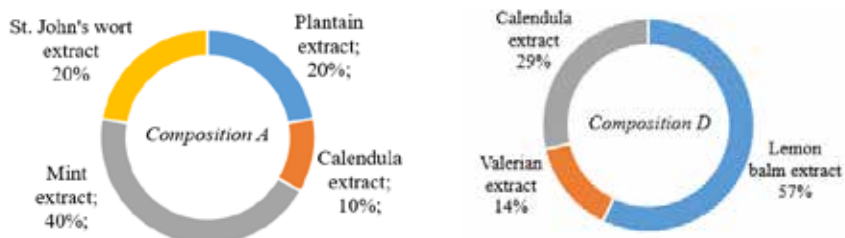


Fig. 1. Structural model of the prescription composition of herbal extracts (Composition A and Composition D)

Source: developed by the authors.

Rosehip and linden blossom, as a base, were brewed separately according to the recipe of these drinks “Rosehip Drink” and “Linden Blossom Tea”. According to the results of organoleptic studies, it was found that composition A is the most successful for a rosehip drink, since its refreshing and tonic properties are harmoniously combined with the sweet and sour taste of rosehip fruits. Composition D turned out to be optimal for linden blossom tea, the components of which form a soft aromatic bouquet and emphasize the delicate honey-herbal taste of linden blossom.

The amount of composite solutions of herbal extracts in the experiments (% of water content according to the recipe) was 5, 10, 15, 20%. The organoleptic evaluation of the drinks “Rosehip drink with herbal extracts”

¹¹ Лапицька Н. В. Технологія напоїв, екстрактів та концентратів : навч. посіб. Чернівці : НУЧК імені Т. Г. Шевченка, 2021. 217 с.

(based on composition A) and “Linden blossom drink with herbal extracts” (based on composition D) was carried out on a 5-point scale (Table 3).

Table 3

Organoleptic characteristics of non-alcoholic health drinks

Experiment options	Organoleptic evaluation of indicators, points					Overall organoleptic assessment
	Appearance	Smell	Color	Taste	Consistence	
	Коефіцієнт вагомості					
	2	1.5	1.5	3	2	
“Rosehip drink with herbal extracts”						
Control	4.8	4.7	4.6	4.8	4.9	4.6
Experiment 1 (5%)	4.8	4.8	4.6	4.8	4.9	4.7
Experiment 2 (10%)	4.8	4.8	4.6	4.9	4.9	4.8
Experiment 3 (15%)	4.8	4.8	4.6	4.6	4.9	4.6
Experiment 4 (20%)	4.8	4.7	4.6	4.5	4.9	4.4
“Linden blossom drink with herbal extracts”						
Control	4.8	4.7	4.6	4.8	4.9	4.6
Experiment 1 (5%)	4.8	4.8	4.6	4.6	4.9	4.6
Experiment 2 (10%)	4.8	4.8	4.6	4.8	4.9	4.7
Experiment 3 (15%)	4.8	4.8	4.6	4.9	4.9	4.8
Experiment 4 (20%)	4.8	4.7	4.6	4.5	4.9	4.5

Source: developed by the authors.

When the content of the herbal extract composition is increased to 20% in a non-alcoholic drink based on rose hips, a deterioration in taste and the appearance of excessive bitterness are observed. According to the results of the study, it was found that the most optimal option for the “Rose hip drink with herbal extracts” is Experiment 2 using the herbal extract composition A in an amount of 10% of the total volume of the drink. The developed drink is characterized by a refreshing sweet-sour taste and pleasant spicy-herbal shades of aroma, which are harmoniously combined with the natural taste of rose hips.

According to the results of organoleptic studies of the drink “Linden blossom drink with herbal extracts”, the optimal option for the content of herbal extracts of composition D is 15% (Experiment 3). Flavor components of the drink: refreshing, spicy, sour, herbal. The aroma of the drink is formed from spicy and fruity shades. The intensity of the aroma is well expressed in two samples of health drinks.

The developed technology of the drink using linden blossom and spicy-aromatic plant raw materials is presented in Fig. 2.

The technological process of preparing “Rosehip Drink with Herbal Extracts” includes preparing plant raw materials, extracting medicinal herbs,

preparing rosehip infusion, and mixing components in certain proportions (Fig. 3).

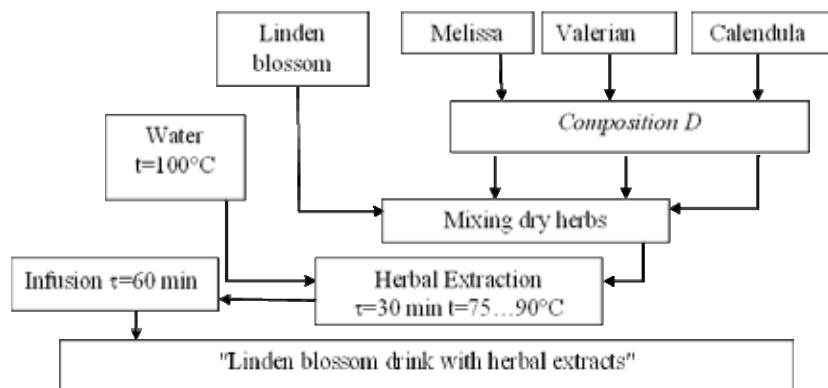


Fig. 2. Technological scheme for preparing "Linden blossom drink with herbal extracts"

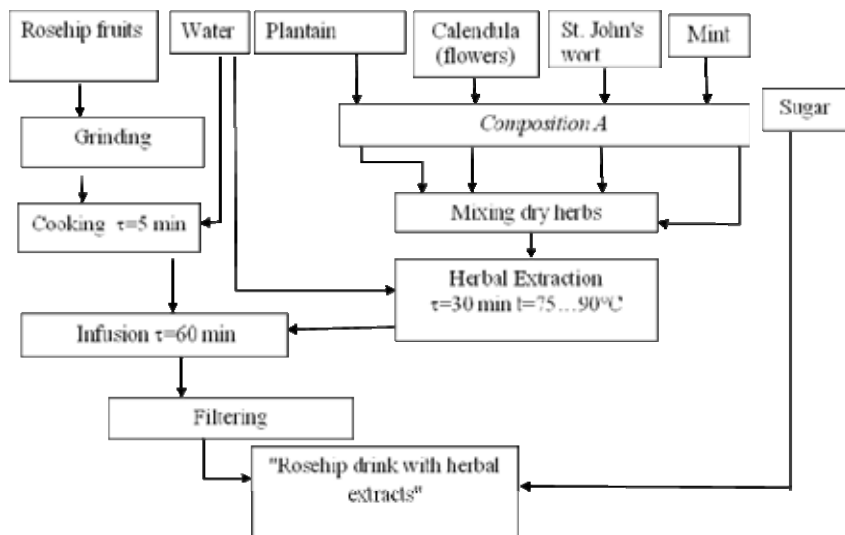
Source: developed by the authors.

An important stage of the comprehensive evaluation of the developed non-alcoholic product "Rosehip drink with herbal extracts" (using the optimally defined composition A in an amount of 10% of the total volume) was the study of the chemical composition. Since the purpose of the innovative technology is to provide the drink with health-improving properties¹², key attention was paid to the analysis of the transition of biologically active substances (BAS) from plant raw materials (rosehip, plantain, calendula, mint and St. John's wort) to the finished product (Table 4).

Since linden blossom has a moderate content of nutrients, the addition of a balanced complex of medicinal herbs increases the biological value of the drink and enhances its therapeutic and prophylactic properties due to the synergistic interaction of the components of composition D. The content of Pectin substances, Vitamin C (Ascorbic acid), and minerals (Iron, Phosphorus, Sodium, Magnesium, Calcium) increased (Table 5).

To summarize the results of experimental studies and conduct an objective assessment of the developed non-alcoholic health drinks, a complex quality indicator was calculated. For the calculation, key descriptors were selected that

¹² Жеплінська М., Муштрук М., Василів В., Горенков К. Напої з використанням екстрактів лікарської рослинної сировини. *Здоров'я людини та нації*. 2023. № 1. С. 37–48. DOI: 10.31548/humanhealth.1.2023.37.



**Fig. 3 Technological scheme for preparing
"Rosehip drink with herbal extracts"**

Source: developed by the authors.

Table 4

Chemical composition of "Rosehip drink with herbal extracts" (per 100 g)

Chemical composition	Substance content				Difference (g/mg) +/-	Deviation,%
	Rosehip drink		Rosehip drink with herbal extracts			
	Control	% of daily requirement	Experiment	% of daily requirement		
1	2	3	4	5	6	7
Ascorbic acid (Vitamin C)	0.8	0.9	1.20	1.30	+0.40	+150.0
Beta-carotene	0.02	0.36	0.03	0.60	+0.01	+150.0
Calcium	0.23	0.03	0.37	0.05	+0.14	+160.9
Iron	0.30	3.00	0.60	6.00	+0.3	+200.0
Magnesium	0.70	0.18	0.80	0.20	+0.10	+28.6
Phosphorus	0.70	0.09	0.70	0.09	0.00	0.00
Potassium	1.90	0.08	2.00	0.08	+0.10	+105.2
Sodium	0.40	0.03	0.60	0.05	+0.20	+150.0
Manganese	0.20	4.00	0.40	8.00	+0.20	+200.0
Zinc	0.30	2.50	0.70	5.80	+0.40	+233.3

Continuation of table 4

1	2	3	4	5	6	7
Pectin substances	0.12	0.05	0.23	0.09	+0.11	+191.7
Tannins	0.02	–	0.03	–	0.01	+150.0
Organic acids	0.37	–	0.40	–	0.03	+108.1
Energy value, kcal	6.09	0.38	8.14	0.51	+2.05	+133.7

Source: developed by the authors.

are crucial for ensuring high quality of restaurant products and providing drinks with clearly expressed functional properties. Since drinks have a different raw material base, the nomenclature of determining parameters for each of them was formed individually. For the “Rosehip drink with herbal extracts”, the list

Table 5

**Chemical composition of “Linden blossom drink with herbal extracts”
(per 100 g)**

Chemical composition	Substance content				Difference (g/mg) /+/-	Deviation,%
	Linden blossom tea		Linden blossom drink with herbal extracts			
	Control	% of daily requirement	Experiment	% of daily requirement		
Ascorbic acid (Vitamin C)	0.40	0.44	0.50	0.56	+0.10	+125.0
Beta-carotene	0.02	0.40	0.05	1.00	+0.03	+250.0
Calcium	0.14	0.02	0.20	0.03	+0.06	+142.8
Iron	0.20	2.00	0.40	4.00	+0.20	+200.0
Magnesium	0.60	0.15	0.90	0.26	+0.30	+150.0
Phosphorus	0.40	0.05	0.70	0.09	+0.30	+175.0
Potassium	1.20	0.05	1.50	0.06	+0.30	+125.0
Sodium	0.50	0.04	0.80	0.06	+0.30	+160.0
Zinc	0.23	1.92	0.23	1.92	0.00	0.00
Aluminum	0.60	1.71	0.70	2.00	+0.10	+116.7
Pectin substances	0.60	0.25	0.90	0.38	+0.30	+150.0
Tannins	0.04	—	0.05	—	+0.01	+125.0
Organic acids	0.46	—	0.50	—	+0.04	+108.7
Energy value, kcal	5.42	0.31	7.51	0.45	+2.09	+138.6

Source: developed by the authors.

included organoleptic assessment, content of Ascorbic acid (Vitamin C), Iron, Magnesium, Pectin substances and Beta-carotene. For the “Linden blossom drink with herbal extracts”, the organoleptic assessment, Beta-carotene (Provitamin A), Phosphorus, Calcium, Pectin substances, Sodium were selected as determining criteria. During the assessment, the real significance of each individual parameter in their totality was taken into account by determining the corresponding weight coefficients. The results of mathematical calculation of single and complex quality indicators for control and experimental samples of both drinks are given in Table 6.

Table 6

Calculation of a comprehensive quality indicator for non-alcoholic health beverages

Indicator	Weighting coefficient, units	Control	Experiment
1	2	3	4
“Rosehip drink with herbal extracts”			
Organoleptic assessment, points	0.2	4.60	4.80
Ascorbic acid (Vitamin C)	0.2	0.80	1.20
Iron	0.1	0.30	0.60
Magnesium	0.2	0.70	0.80
Pectin substances	0.2	0.12	0.23
Beta-carotene	0.1	0.40	0.05
<i>Single quality indicators</i>			
Organoleptic assessment, points	κ_1	0.225	0.614
Ascorbic acid (Vitamin C)	κ_2	0.225	0.614
Iron	κ_3	0.112	0.307
Magnesium	κ_4	0.225	0.614
Pectin substances	κ_5	0.225	0.614
Beta-carotene	κ_6	0.112	0.307
<i>Comprehensive quality indicator, units</i>		1.124	3.07
“Linden blossom drink with herbal extracts”			
Organoleptic assessment, points	0.2	4.6	4.8
Beta-carotene (Provitamin A)	0.2	0.3	0.4
Phosphorus	0.1	0.4	0.5
Calcium	0.2	0.6	0.7
Pectin substances	0.2	0.12	0.9
Sodium	0.1	0.5	0.8

Continuation of table 6

1	2	3	4
<i>Single quality indicators</i>			
Organoleptic assessment, points	κ_1	0.215	0.334
Beta-carotene (Provitamin A)	κ_2	0.215	0.334
Phosphorus	κ_3	0.103	0.206
Calcium	κ_4	0.215	0.334
Pectin substances	κ_5	0.215	0.334
Sodium	κ_6	0.103	0.206
<i>Comprehensive quality indicator, units</i>		1.12	2.05

Source: developed by the authors.

According to the calculation results, the complex quality indicator for the “Rosehip drink with herbal extracts” increased from 1.124 (control) to 3.07 units (experiment), and for the “Linden blossom drink with herbal extracts” – from 1.12 (control) to 2.05 units (experiment). In order to clearly visualize the results obtained and model the consumer value of non-alcoholic health drinks, quality profile graphs were constructed (Fig. 4).

CONCLUSIONS

The relevance of developing health drinks, which corresponds to the current trends of increasing consumer demand for functional products, has been substantiated. The feasibility of using extracts of medicinal plants for enriching drinks has been proven. Consumption of drinks based on extracts of medicinal plants is aimed at increasing the protective functions of the body by enriching the diet with biologically active substances.

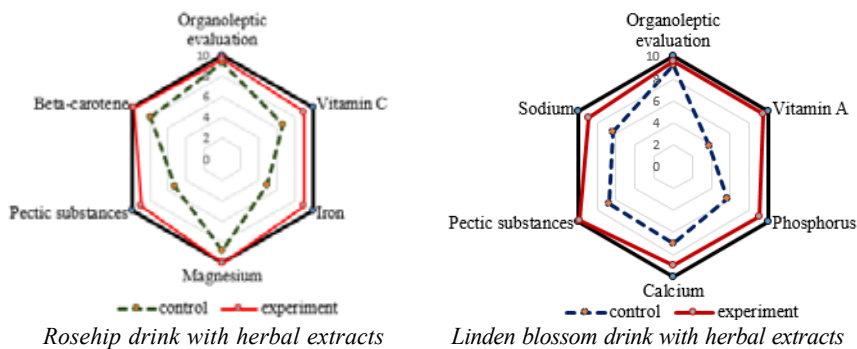


Fig. 4. Quality profiles of non-alcoholic health beverages

9 types of plant raw materials were selected and analyzed, including rosehip fruits; mint, plantain, lemon balm leaves; chamomile, calendula flowers; linden blossom, St. John's wort grass, valerian roots. The beneficial properties of the raw materials were determined in terms of the presence of biologically active substances, as well as the health-improving effect on the human body. The chemical composition of plant raw materials was analyzed for the content of extractive substances, essential oils, tannins and ascorbic acid. The value of these indicators was taken into account when creating compositions of extracts of medicinal plants. Rosehip and linden blossom extracts were proposed as the basis for non-alcoholic health drinks. Various compositions of plant extracts were tested. The best results in terms of taste and aroma were shown by: composition A, which consists of extracts of plantain, calendula, mint, St. John's wort in a ratio of 1:0.5:2:1, and composition D, which consists of extracts of lemon balm, valerian, and calendula in a ratio of 2:1:0.5. "Rosehip drink with herbal extracts" (based on composition A) and "Linden blossom drink with herbal extracts" (based on composition D) were developed, and an organoleptic assessment of the drinks was carried out. Based on the tasting assessment, rational amounts of plant extract compositions in the composition of health drinks were determined. Technological schemes of drinks were developed, calculations of chemical composition, complex quality indicators were carried out, quality profiles of non-alcoholic drinks for health purposes were built.

Technologies of new health drinks were developed, which have improved taste properties, increased content of biologically active substances, and also have a positive effect on the human body. The prospects of introducing the developed drinks in restaurant establishments, as well as in fitness clubs, SPA centers and health-improving establishments were substantiated. The technology of the developed soft drinks can be recommended for craft productions that are focused on the rapid introduction of innovations and meeting local demand for non-alcoholic health beverages.

SUMMARY

The article reveals an innovative technology of non-alcoholic health drinks based on plant raw materials and compositions of herbal extracts. The relevance of the study is due to the need to expand the range of functional products enriched with biologically active substances (BAS) in the conditions of an unfavorable environmental situation and growing demand for a healthy lifestyle, as well as the need to introduce such drinks into the menus of restaurant establishments and craft industries. The chemical composition and beneficial properties of promising medicinal raw materials (rose hips, linden blossom, mint, lemon balm, St. John's wort, calendula, etc.) are analyzed. The process of creating

prescription compositions of extracts is characterized and their effect on the organoleptic indicators of finished products is determined. The optimal doses of herbal complexes were substantiated: 10% of the composition of plantain, calendula, mint and St. John's wort for the "Rosehip Drink" and 15% of the composition of lemon balm, valerian and calendula for the "Linden Blossom Drink".

The chemical composition of the developed drinks was studied and a significant increase in their biological value (in particular, the content of vitamin C, vitamin A, pectin substances and mineral elements) was proven due to the synergistic effect of the components. A complex quality indicator was mathematically calculated, which confirmed the superiority of the experimental samples over the control ones. The results of the study confirm that the developed craft technology is an effective tool for increasing the consumer value of drinks and can be successfully recommended for implementation in restaurant establishments.

Bibliography

1. Жеплінська М., Муштрук М., Василів В., Горенков К. Напої з використанням екстрактів лікарської рослинної сировини. *Здоров'я людини та нації*. 2023. № 1. С. 37–48. DOI: 10.31548/humanhealth.1.2023.37.
2. Лапицька Н. В. Технологія напоїв, екстрактів та концентратів : навч. посіб. Чернівці : НУЧК імені Т. Г. Шевченка, 2021. 217 с.
3. Лікарські рослини: традиції та перспективи досліджень. Бюро Президії НААН. URL: http://naas.gov.ua/news/?ELEMENT_ID=2829 (дата звернення: 01.06.2026).
4. Мірзоева Т. В. Аналіз сучасного стану виробництва лікарських рослин в Україні. *Приазовський економічний вісник*. 2018. № 6 (11). С. 62–67.
5. Федько Л. Фіточай у профілактиці та лікуванні захворювань обміну речовин. *Вісник Львівського університету. Серія біологічна*. 2016. № 73. С. 445.
6. Shaik M., Hamdi I. H., Sarbon N. A comprehensive review on traditional herbal drinks: Physicochemical, phytochemicals and pharmacology properties. *Food Chemistry Advances*. 2023. Vol. 3. Article 100460. DOI: 10.1016/j.focha.2023.100460.
7. Shakeri A., Sahebkar A., Javadi B. Melissa officinalis L. – A review of its traditional uses, phytochemistry and pharmacology. *Journal of Ethnopharmacology*. 2016. Vol. 188. P. 204–228. DOI: 10.1016/j.jep.2016.05.010.

8. Świtalski M., Rybowska A. Non-alcoholic beverages with plant additives as a case of product innovation – A systematic review of scientific articles. *Humanities & Social Sciences Reviews*. 2022. Vol. 10. P. 34–45. DOI: 10.18510/hssr.2022.1015.

9. Vitriak O., Tkachenko L. Spicy and aromatic raw materials in the technology of healthy desserts and drinks // *Sustainable food chain and safety through science, knowledge and business : Scientific monograph*. Riga, Latvia : Baltija Publishing, 2023. P. 381–395. DOI: 10.30525/978-9934-26-328-6-17.

Information about the authors:

Tkachenko Liubov Volodymyrivna,

Candidate of Technical Sciences,

Associate Professor at the Meat, Fish and Seafood Technology
National University of Life and Environmental Sciences of Ukraine
16 Vystavkova Street, 16, Kyiv, Ukraine

Vitriak Oksana Pavlivna,

Candidate of Technical Sciences,

Associate Professor at the Department
of Restaurant and Craft Technologies
State University of Trade and Economics
19 Kyoto Street, Kyiv, Ukraine

Martsyn Tetiana Oleksandrivna,

Candidate of Technical Sciences,

Associate Professor at the Department
of Restaurant and Craft Technologies
State University of Trade and Economics
19 Kyoto Street, Kyiv, Ukraine