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ВЕСТНИК

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FORMULATION OF COLD DRINKS ON THE BASIS OF DECOCTION OF DRUG PLANTS

Abstract. It is proposed to use natural supplements using drug plants of South Kazakhstan region (Turkestan region) in this paper. Such composition of cold drinks allows not only to allay thirst, but also to compensate necessary vitamins and other useful substances in a human body. There are more than 20,000 plant species in Kazakhstan, 6,000 of which contain biologically active substances. But there are other compounds in the composition of plants that are not desirable in the composition of drinks. Therefore, it is very important to separate and obtain necessary biologically active compounds, which positively influence the useful and organoleptic properties of drinks. We have studied trends and prospects of the market of various soft drinks in Kazakhstan and abroad. The developed recipes for enriched cold drinks using dietary supplements derived from Turkestan region drug plants have high biological activity. The obtained cold drinks will be the first domestic products, obtained with the use of Turkestan region drug plants.

Keywords: biologically active substances, medicinal plants, flavones, flavonoids, flavonols, alkaloids, electrochemical synthesis.

Introduction. The growth in the production and consumption of soft drinks in Kazakhstan is mainly due to increase in the share of drinks based on artificial flavors, dyes and sweeteners. Recently, along with increase in output of products, changes have been observed in the direction of their quality, expansion of assortment, increase in the share of production of drinks based on natural juices, sugar, as well as new types of special-purpose drinks, including low-caloric and energy drinks.

In the segment of the world sweet carbonated drink market, reduction of sugar and artificial ingredients became the main trend. About 40% of the market of soft drinks is sweet carbonated drinks, but sweet soda loses its position, giving way to sports and functional drinks. According to experts' forecasts in 2016, about a quarter of all sales will fall at the share of sports and energy drinks [1].

The share of dietary and low-caloric drinks in the market can reach 15%. Now the market is dominated by such tastes as cola, orange and lemon, but the modern consumer is looking for novelties and is ready to perceive new tastes, including mixed ones.

The key trends in the world market are reflected in the Russian reality. According to Inteso Research Group experts, the segment of "healthy" drinks with a low content of sugar and calories, which includes natural ingredients, is actively developing in the Russian and Kazakh markets. Most producers of mineral water expand the assortment through lemonades based on natural components [2].

As for tastes, two opposite tendencies are observed: return to traditions and revival of classical tastes (which are considered by consumers as healthier and more natural), and the second direction is expansion

of the assortment due to new, unexpected, exotic tastes (for example, coffee, rose). First of all, the growth of supply in this category is aimed at young people who are willing to try new things. As a rule, these are drinks of the middle and upper price category. Drinks made on natural raw materials (juices, syrups, extracts, tinctures), are characterized by a significant content of sugar (10-12%, and recently 5-6%).

Tonic (refreshing) drinks contain tonic infusions and extracts, owing to that these drinks can relieve fatigue and have a thirst-quenching effect. Thus, "Sayana" drink contains infusions of magnolia vine, leuzea. Composition of "Baikal" drink includes infusions of eucalyptus, laurel and some other plants. "Stepnoy" drink is prepared on the basis of infusions of walnut of milk-wax maturity, hypericum, milfoil, liquorice, orange, vanilla grass.

The assortment of "tonics" is increasing every year. Composition of the tonic series drinks includes infusion of cola nuts rich in caffeine and theobromine, which have specific bitter-resinous taste and odor that are close to muscattaste. In the formation of sensor characteristics of the drink, floral attars of citrus added to it are also involved. The sugariness of the drink is 5-6%. The added color gives it dark brown color. In addition, instead of sugar (sucrose), sugar substitutes are introduced. These drinks are provided only for patients with diabetes, and for other categories of population are strictly prohibited, because they disrupt the work of the gastrointestinal tract [3].

Vitaminized drinks have increased content of vitamin C, introduced as an ascorbic acid or as a part of high vitamin extracts of juices and infusions (lemon, orange, blackcurrant). When using fruit and berryhalf-finished products, drinks are simultaneously enriched with vitamin P.

Experimental part. It is proposed to use natural supplements using Turkestan region drug plants in this paper. Such composition of cold drinks allows not only to allay thirst, but also to compensate necessary vitamins and other useful substances in a human body. There are more than 20,000 plant species in Kazakhstan, 6,000 of which contain biologically active substances [4]. But there are other compounds in the composition of plants that are not desirable in the composition of drinks. Therefore, it is very important to separate and obtain necessary biologically active compounds, which positively influence the useful and organoleptic properties of drinks. We have studied trends and prospects of the market of various soft drinks in Kazakhstan and abroad. The assortment of vitaminized drinks or as they are called "tonics" is increasing every year, since these drinks can relieve fatigue, have a thirst-quenching effect, and also have other medical properties.

It is established that a man is adapted to the consumption of a large number of biologically active substances, the sources of which are representatives of more than 300 plant genera [5]. With plant food, a man receives necessary nutrients, as well as vitamins and minor elements, and not only that. Studies in recent years have identified the need for many minor components of plant food to preserve health and, to a greater extent, reduce the risk of developing a number of chronic diseases. These components are called chemoprotectors or chemopreventers. Among the most intensively studied natural chemopreventive compounds are flavonoids, food indoles andisothiocyanates, dietary fibers, etc. Although the clinical picture of phyto-compounds' insufficiency is not established, their low concentration in the diet is accompanied by a significant increase in the risk of developing cardiovascular, oncological diseases, diabetes. Some researchers even consider such diseases as manifestations of the state of maladaptation as a result of the constantly low intake of components with food that are absolutely necessary to ensure the protective-adaptive capabilities of a human body. Exceptionally important and the only reliable means of improving the structure of nutrition and achieving the optimal balance of the diet of the population is use in daily diet of healthy and sick people the biologically active additives to food (dietary supplements). In our work we tried to analyze advantages and disadvantages of biologically active additives, and also reflect state of the dietary supplements in Kazakhstan and the most pressing problems associated with production and sale of this product through the pharmacy network.

For production of dietary supplements, food and drug plants are used that contain a rich complex of biologically active substances such as bioflavonoids, vitamins, polysaccharides, amino acids, minor elements, etc. Modern technologies and equipment allow not only extract the whole complex as much as possible, but also preserve its natural combination. Often this leads to the fact that bioavailability and effectiveness of each of the biologically active substances is greatly enhanced. For example, phenolic compounds are more active in combination with polysaccharides, vitamin C is more effective in combination with flavonoids (rutin).

Concentration of biologically active substances in extracts from plants is such that it allows then to use the obtained food additives in relatively small amounts (doses), sufficient for both prevention and complex therapy of diseases.

Use of a large assortment of drug plants containing various natural substances allows create dietary supplements to food with wide possibilities for correcting various disorders in a human body [6-8].

An analysis of the development of the food industry shows that over the last 15-20 years, a reorientation of production is taking place all over the world - alternative technologies are developing that involve the use of new types of raw materials and fundamentally different technological solutions [9-13].

In Kazakhstan have been recently introduced a policy framework, which aims to address this emerging demand providing a legal context to avoid unfair competition among producers and to provide clear information to final consumer through certification systems. At present time framework covers products from organic farming and the "made in Kazakhstan" labelling system assuring the provenance of the produce [14].

The main active components of the plant genus Haplophyllum A. Juss are: coumarins, flavonoids, dimethoxyflavone, alkaloids (acetamide, folifin, evoxin, haplotin, candecin), terpenoids; steroids, carboxylic acids, lignans, tannins etc. [15].

As already noted above, it is inadmissible to use highly toxic natural products – poisonousand drastic drug plants in the composition of dietary supplements. Dietary supplements to food are not strictly dosed and controlled means,they are recommended to people of any age and therefore cannot contain substances with possible toxic properties.

To obtain a dietary supplement to food, official plants are used. They are relatively well studied in terms of chemical composition and pharmacological properties. At that, a more in-depth study of these parameters is often carried out. This allows obtain new information and expand the scope of many drug plants.

For example, milfoil extract *(Achilleamillefolium)* is known as a stomachic medication, used as a drug and dietary supplement to food –"Akhillan"–in gastritis and ulcer disease. However, it has been experimentally established that the milfoil extract also charms away enterospasmand at the same time has a mild, laxative effect, all along the intestine. Unlike traditional laxatives (senna, buckthorn), which, incensing the intestines, release only its lower parts, causing colicky pains in the small intestine.

Bottlebrush *(Equisetum arvense L)*, which is a part of "Urolizin" additive, is awell-known drug plant recommended for diseases of kidneys and urinary tracts as an anti-inflammatory and diuretic agent. Experimental studies have established that bottlebrush extract does have a pronounced diuretic effect, but this effect is not accompanied by excretion of potassium and sodium salts from a human body, which is a great advantage over synthetic diuretics – furosemide, hydrochlorothiazide, acetazolamide.

Chamomile (Matricária) has long been used as an anti-inflammatory, hemostatic agent, as well as in the treatment of various diseases. Medical properties of wild chamomile are the most pronounced. Effectiveness of other varieties is lower and therefore they are applied less often. The plant is found in meadows, along roads, as a drug it is specially grown in gardens. Prepared domiciliary chamomile formulations help to cope with viruses, colds, inflammation, charm away spasm, allergy, convulsions, anesthetize. Chamomile formulations help in case ofparasecretion of digestive glands, in gastritis, peptic ulcer, and remove edema of mucous coat of stomach.

Medical properties of thyme*(Thýmus)*have long been known to people. The plant is a good meliferous plant, and thyme honey is very much appreciated for its aroma and high healing properties. The most common in our area iswild thyme, with high straight stems, which is grown also on ether-oil plantations, and creeping thyme, having groveling runners, which usually grows in the steppe.Composition of thyme includes tannins, terpenes, minor elements, gum and other ingredients, but the most valuable in this plant is its ether oil. Thyme infusion is also used. For its preparation, a half-liter capacity is filled with fresh inflorescences, a bottle of vodka is poured. Then, this composition is infused during 10 days in a dark place.

Methods. We have obtained dietary supplements and found optimal conditions for the process and identified target products – biologically active additives by the methods of thin-layer and column chromatography, as well as IR, NMR, mass spectrometry methods [6-8]. The flavor syrup is a concentrated solution of all components that make up flavor and aromatic base of the drink. The flavor syrup is made

by mixing sugar syrup with all components of the drink, except for soda water, or by boiling fruit and berry half-finished productswith sugar. The flavor syrups are prepared by a cold, hot or semi-hot way.

Results and their discussion. The cold way of preparing the flavor syrup: all half-finished products are put into the blending tank with mixing in a certain sequence according to the principle: from less to more aromatic types of raw materials. All is thoroughly mixed and filtered until complete transparency. The cold method is used for drinks on citrus infusions, concentrates, compositions, aromatic infusions and essences.

The semi-hot and hot methods are used if the flavor syrup composition includes juices and wines, for their dealcoholization and evaporation.

Drinks are prepared only on drinking water (GOST 2874).

Choice of technology for water treatment depends on its properties. Muddy water, not amenable to filtration, is settled for a day or more. If the process ofwater settling and its clarification is slow and inefficient, water impurities are coagulated. In necessary cases, water suspensions of different molecular weight are removed by filtration.

Water is passed through coal-sand filters to free it from foreign odor, dechlorination or discoloration. Iron compounds are removed from water by aeration, coagulation, liming and cationing.

In case the water is hard, it must be softened in various ways. Ion exchange is the most commonly used. In practice, Na-cationization and H-cationization are used for this purpose. H-cationization of water, in which a significant decrease in pH value occurs, obtained a wide distribution in nonalcoholic industry.

Water purification and softening is usually carried out in the water treatment department of a plant, from where it is sent to saturation, i.e. it is artificially saturated with carbon dioxide, and then mixed with the flavor syrup.

Conclusions. Use of inverted sugar syrupallows reduce consumption of sugar in production of soft drinks and improve their quality. The inversion is based on hydrolyticsucrose splitting in the presence of weak acids orinvertase enzyme. In the industry at present, for this purpose, citric acid is mainly used,tartaric acid is used less often (when obtaining dry drinks).

Sucrose substitutes – artificial sweet substances: sorbitol, xylitol and saccharinare used for preparation of low-caloricsoft drinks and drinks for patients with diabetes.

Food lemon, tartaric, orthophosphoric, lactic, ascorbic and sorbic acids are usedin production of soft fruit drinks. From these acids, the latter two are used only to increase persistence of drinks. The most widespread is lemon acid. Alcoholic infusions and extracts, as well as essences from plant raw materials are used to aromatize drinks. Ether oils and some synthetic aromatic substances are widely spread.

The developed recipes for enriched cold drinks using dietary supplements derived from Turkestan region drug plants have high biological activity. The obtained cold drinks will be the first domestic products, obtained with the use of Turkestan region drug plants.

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ДӘРІЛІК ӨСІМДІКТЕРДІҢ ТҰЗДАРЫ НЕГІЗІНДЕ АЛКОГОЛЬСІЗ СУСЫНДАР ӘЗІРЛЕУ

Аннотация. Бізбен түрлі алкогольсіз сусындардың Қазақстанда және шетелде зерттелу үрдістері қарастырылды. Жоғары биологиялық белсенділігімен байытылған Оңтүстік Қазақстан облысының ләрілік өсімдіктерінен алынған БАЗ қосылған салқындатылған сусындардың рецепті өңделді. ОҚО дәрілік өсімдіктерінен алынған салқындатқыш сусындар бірінші отандық өнім болып табылады.

Түйін сөздер: биологиялық белсенді қосылыстар, дәрілік өсімдіктер, флавондар, флавоноидтар, флавонолдар, алкалоидтар, электрохимиялық синтез.

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РАЗРАБОТКА РЕЦЕПТУРЫ ПРОХЛАДИТЕЛЬНЫХ НАПИТКОВ НА ОСНОВЕ ОТВАРОВ ЛЕКАРСТВЕННЫХ РАСТЕНИЙ

Аннотация. В работе предлагается использовать натуральные добавки с применением лекарственных растений ЮКО. Подобный состав прохладительных напитков позволяет не только утолять жажду, но и восполнять в организме необходимые витамины и другие полезные вещества. В Казахстане произрастает более 20 тысяч видов растений, 6 тысяч из них содержат биологически активные вещества. Но в составе растений имеются и другие соединения, которые не желательны в составе напитков. Поэтому большое значение имеет возможность разделения и получения необходимых биологически активных соединений, которые положительно влияют на полезные и органолептические свойства напитков. Нами исследованы тенденции и перспективы рынка различных безалкогольных напитков в Казахстане и за рубежом. Разработанные рецептуры обогащенных прохладительных напитков с использованием БАД, полученных из лекарственных растений ЮКО обладают высокой биологической активностью. Полученные прохладительные напитки будут первой отечественной продукцией, полученные с применением лекарственных растений ЮКО.

Ключевые слова: биологически активные вещества, лекарственные растения, флавоны, флавоноиды, флавонолы, алкалоиды, электрохимический синтез.

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