Methodological approaches to the creation of recipes for specialized food products for patients with diabetes mellitus based on experience domestic traditional medicine V.A. Tutelyan, T.L. Kiseleva, A.A. Kochetkova, M.A. Kiseleva

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Methodological approaches to the development of specialized food products for diabetic patients, based on the native traditional medicine experience

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RESUME

According to WHO reports, worldwide experience of Traditional medicine (TM) has been successfully applied to the development of modern standardized herbal medicines. Researchers are guided mainly by local sources of medicinal plants and traditional medical systems. TM experience is also used in search of plants considered as food ingredients and biologically active substances (BAS) sources for modern herbal drugs.

The steady increase in the incidence of type 2 diabetes, makes clear the need for research of domestic plant sources of BAS (with a proven carbohydrate metabolism effect) to create a modern specialized foods. This review proves the feasibility of using TM experience of Russia and neighboring European countries (Belarus, Ukraine) to develop optimized compositions for specialized food products.

For reliable selection of the most promising plants we offer to study at least 500 traditional antidiabetic herbal formulations of at least 50 traditional recipe directories of Russia, Belarus and Ukraine.

Keywords: food ingredients, type 2 diabetes mellitus, specialized food products, traditional medicine, traditional anti-diabetic recipes.

SUMMARY

According to the WHO, all over the world the experience of traditional medicine (TM) is successfully applied for the development of modern standardized herbal medicines. In doing so, developers focus primarily on local sources of medicinal plants and local traditional medical systems and schools. The TM experience is also used to search for plants as promising sources of food ingredients and biologically active substances (BAS) for modern herbal medicines.

In connection with the steady increase in the incidence of type 2 diabetes, the relevance of research on the search for promising domestic plant sources of biologically active substances (with a proven effect on carbohydrate metabolism) for the creation of modern specialized food products is obvious. This review substantiates the expediency of using the experience of TM of Russia and neighboring European states (Belarus, Ukraine) for the development of modern domestic specialized food products with an optimized composition. To reliably identify the most promising plants, we propose to study at least 500 traditional herbal antidiabetic

recipes from no less than 50 traditional recipe directories of Russia, Belarus and Ukraine.

Key words: food ingredients, diabetes mellitus 2 types; specialized food products; traditional medicine; traditional antidiabetic formulations.

Diabetes mellitus (DM) is the most important medical, social and economic problem caused by the steady increase in the prevalence of the disease, the development of severe disabling complications, the need for specialized medical care [26, 27]. Despite the high quality of drugs used in the treatment of diabetes, the development of new technologies for its treatment, the creation of an effective system of diabetological services, the level of disability and mortality of patients does not significantly decrease [26]. The Global Diabetes Plan 2011–2021, adopted by the International Diabetes Federation in Brussels, highlights the importance of nutrition in the prevention of food-borne diseases, including diabetes, and the prevention of diabetes can prevent the development of other noncommunicable diseases [18].

To date, the experience of domestic traditional medicine (TM) in the prevention and treatment of diabetes, as well as in the traditional features of eating behavior, is not systematized and is practically not used in the development of modern food products, including specialized food products (SPP) for patients with diabetes.

The purpose of this information and analytical study: to justify expediency and propose methodological approaches to using the experience of domestic TM in the development of formulations of SPP optimized composition for patients with type 2 diabetes.

Methodology. When performing the work, the following methods were used research: information and analytical, historical, content analysis, systematization.

The objects of the study were available bibliographic sources of a high degree of reliability: official WHO documents, laws and regulations of the Russian Federation, regulatory documents and methodological materials of the Ministry of Health of Russia and Roszdravnadzor, monographs, reference publications, reviews, domestic and foreign scientific periodicals, including those available on official websites RSCI and PubMed.

TM experience in the search for promising sources of biologically active substances for modern herbal preparations.

The official recognition of the growing role of medicinal plants (HR) in the health care of most developed countries of the world is facilitated by high requirements for the quality, safety and efficacy of medicinal plant raw materials and standardized preparations from it, as well as WHO assistance in preparing the legislative framework in this area [45, 95, 130 -133]. The European herbal market is growing rapidly, and European consumers,

for example, in France, Germany, Italy, Sweden, Switzerland and the UK, they are already routinely used as an adjunct to conventional medicine [133]. In Russia, the corresponding segment of the drug market is still behaving inconsistently [3, 4], however, global trends are beginning to manifest themselves in our country [30].

According to the WHO, the basis of the nomenclature of official herbal preparations in many cases are traditional remedies [16, 45, 95, 109, 111, 128], and the developers of modern standardized herbal preparations all over the world are turning to the experience of TM, including with the purpose of searching promising biologically active substances (BAS) of natural origin as part of traditional formulations [16, 45, 107, 115, 119, 121, 124, 128]. For example, the results of 10-year studies of the so-called “antidiabetic plants” from various ethnomedical sources have been published, which made it possible to identify the most promising botanical families and genera for diabetology [102]. More than 1200 plants from Ayurvedic and other ethnomedical treatises used in TM for treating DM have been subjected to modern screening [129].

In phytopharmacy of many countries of Europe and Asia, today one of the main principles of TM is still actively used - the “area principle”, or “to treat the area” - that is, to use local raw plant resources that have maximum affinity for the body of local residents [38, 45, 128]. The course towards import substitution is also being implemented in our country, especially since 2014 [36].

In 2000, for the first time in Russia, we formulated the main methodological provisions and compiled scientifically based algorithms for using the experience of domestic TM for the development of effective and safe medicines of natural origin [39], which have found their practical implementation in modern medicines and regulatory documents [19, 20, 40, 74-77, 81, 82, 95].

Prospects for the use of TM experience for the development of specialized food products with optimized composition Modern food products must not only satisfy the physiological needs of the body for nutrients and energy, but also perform preventive and therapeutic tasks to restore and normalize metabolic processes in the body. Therefore, the most important role of SPP with a given chemical composition for the prevention of the most common alimentary-dependent diseases and their use in the nutrition of patients is obvious [18, 89].

Almost all traditional medical schools and systems of the world proceed from the assumption that food carries not only nutritional, but also medicinal value, being sometimes the main or even the main medicine [42, 44, 56–58, 68, 83, 91]. To this day, these positions are used to build their theoretical foundations and therapeutic

tactics of traditional Chinese medicine (TCM) [58, 67, 83, 84, 91, 103, 104], Tibetan medicine [7, 54, 79, 94, 98], Ayurveda [6, 56, 57, 86, 116], Unani [122], Japanese TM Kampo [32, 50, 52, 53, 101] and even some traditional European schools based on national traditions [28] and the works of Hippocrates: the means must be food substances ... "," ... only the treatment that is based on diet can be effective "[21]. Food plants familiar to us are considered medicinal in a number of countries and are included in the national State Pharmacopoeias [45].

According to modern concepts, biologically active substances of food plants, like LR, have a pronounced physiological effect on the body [8, 10–13, 43, 61, 69, 87–89] not only in fresh and dried plants, but also in the products of their purposeful processing [8, 11-13, 18, 22, 73, 88, 97]. There are even known attempts to use nutraceuticals as a method of psychocorrection [65]. In HM for food plants, the “area principle” and national traditions of food compatibility are taken into account even more than in LR [11, 12, 17, 42, 57, 58, 79, 84]. Therefore, local food and drug products can, first of all, be considered as promising sources of micronutrients for SPP with optimized composition, and their biologically active substances - as promising ingredients for this class of products.

Feasibility of using TM experience for development specialized food products with modified carbohydrate profile for patients with type 2 diabetes

With the current worldwide threatening situation with a high prevalence of diabetes, a steady increase in the number of patients and the development of severe disabling complications of this disease [25–27], SPPs of an optimized composition for patients with type 2 diabetes mellitus are of particular relevance [18, 90].

Practically in all traditional medical schools an important place is given to food and medicinal herbal products used for diabetes or for its prevention [6, 7, 9, 11, 41, 46, 57, 58, 67, 92, 101, 103, 104, 110]. To date, the effectiveness and safety of food and drug drugs in the treatment and prevention of diabetes mellitus and impaired glucose tolerance of various origins is beyond doubt [33, 107, 108, 118, 124, 125]. For more than 200 plants, this has been confirmed experimentally and clinically [10, 11, 51, 78, 102, 107, 118, 124].

In the development of modern antidiabetic herbal medicines based on the experience of TM, the “area principle” is actively used [120, 121, 124, 126, 127, 108, 129]. At the same time, regardless of the country of origin, well-known spices, for example, cinnamon [105, 114, 117], as well as green tea [90, 100, 2008, 112, 113, 123] are often used all over the world as antidiabetic agents.

The expediency of searching for promising domestic sources of biologically active substances with a proven effect on carbohydrate metabolism for the development of modern herbal preparations and SPP is obvious. There are separate experimental and clinical studies confirming the effectiveness, safety and

traditions of using food and drug products in Russia and neighboring European countries (Belarus, Ukraine) in the treatment of diabetes mellitus [1, 2, 5, 31, 35, 37, 48, 61, 66, 99]. There have even been attempts to generalize disparate and heterogeneous materials in the form of monographs [78], textbooks [29, 62] and popular science publications [14, 33, 70-71].

However, the results of studying the experience of folk and TM of Russia, Belarus and Ukraine on the use of multicomponent herbal hypoglycemic agents (with the analysis of statistically significant amounts of traditional formulations) were not found in bibliographic sources. Neither information-analytical nor targeted medico-pharmaceutical research in terms of using the experience of domestic TM for the treatment of diabetes was carried out. There is scattered information about the use of certain medicinal plants and preparations for the treatment of diabetes in domestic folk medicine, in Belarus, in Ukraine [15, 23, 24, 34, 47, 49, 55, 59, 63, 64, 72, 85, 92, 93, 96], which in no way correlate with the publication of the results of experimental and clinical studies.

Since the world medico-pharmaceutical science and practice have a positive experience of using the traditional medical heritage of different countries for the development of modern medicines of natural origin and food products [9, 16, 106, 109, 111, 128, 132], we would consider it expedient to apply the developed and the model of scientifically substantiated use of the experience of domestic TM [39], introduced earlier for herbal medicinal products, to create an SPP with a modified carbohydrate profile for patients with type 2 diabetes.

To do this, it is necessary to conduct a targeted study of at least 500 traditional antidiabetic formulations of Russia and neighboring states (Belarus, Ukraine), which have common cultural and historical roots. As a result of an information and analytical study of at least 50 prescription bibliographic sources, the most popular medicinal and food plants traditionally used for the treatment of diabetes were identified and the active groups of biologically active substances were identified. At the final stage, phytochemically, technologically, experimentally and clinically, to assess the prospects of their use as ingredients for SPP with a modified carbohydrate profile for patients with type 2 diabetes.

According to modern concepts, the priorities in the development of such products, in particular, include: ensuring favorable metabolic effects of functional ingredients included in their composition, satisfying the patient's physiological need for food and biologically active substances, as well as solving a number of special technological issues [90].

An innovative approach to creating new generations specialized products for the diet therapy of type 2 diabetes could be the purposeful use of plant minor biologically active substances (phytonutrients) isolated from the most popular traditional food and medicinal plants with proven types of action: hypoglycemic, hypolipidemic and hypocholesterolemic, antioxidant and

antihypoxic. To date, there are adequate experimental models of type 2 diabetes, which reproduce biochemical and morphological disorders in the rat organism, characteristic of this disease [60], with the help of which it is possible to evaluate the results of studying the TM experience. A methodology for training experts (testers) to determine the sensory quality and acceptability of developed specialized products has also been proposed [80].

Thus, in connection with the continuing steady increase in the incidence of type 2 diabetes, the relevance of research on the search for promising domestic plant sources of biologically active substances (with a proven effect on carbohydrate metabolism) for the creation of modern SPP with an optimized composition is obvious. To develop formulations of food products with a modified carbohydrate profile for patients with type 2 diabetes, it is advisable to apply the previously developed methodological approaches to the scientifically substantiated use of the experience of TM of Russia for the development of standardized import-substituting herbal medicines ".

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conclusions

1. The expediency of studying and applying the experience of domestic TM for the development of recipes for specialized food products with an optimized composition.

2. A methodology for studying and further practical using the experience of TM of Russia and neighboring European countries with similar cultural and medical traditions (Belarus, Ukraine) for the development of recipes for specialized food products with a modified carbohydrate profile for patients with type 2 diabetes mellitus.

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