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DEVELOPMENT OF COMPOSITION AND STUDY OF SUGAR-REDUCING ACTIVITY OF HYPOGLICEMIC HERBAL TEA MIXTURE

In the article the features of formation of skills of development of composition and technology of dosage forms at scientific research work on an example of development of composition and studying of sugar-reducing activity of a hypoglycemic herbal tea mixture are considered. Selection of medicinal plants was carried out by the method of ranking. The essence of the ranking method is that the expert is invited to assign numerical grades to each of the factors listed in the questionnaire. As a result of the research a scientifically well founded composition of a hypoglycemic herbal tea mixture consisting of leaves of white mulberry, licorice root, white bean flaps, medicinal sage and roots of chicory common was developed. Sugar-reducing activity of the herbal tea mixture in acute hypoglycemia was studied which made 34.5 ± 1.7%.

Key words: *medicinal plants, hypoglycemic herbal tea mixture, hypoglycemic index, hypoglycemic (sugar-reducing) activity.*

The development of herbal tea mixtures is a very interesting, but rather labor-consuming occupation. And it's not just that you need to know the medicinal properties of individual plants well. At compilation (development) of herbal tea mixtures the rule of combining the properties of individual components may not work. Moreover, a plant that has certain properties will show absolutely different properties in herbal tea mixtures. Formation of skills to develop the herbal tea mixtures of medicinal plant raw materials in students will allow later to use the plant raw materials wholly.

Review of references and analysis of plant raw materials used for the prevention and treatment of diabetes mellitus show that there are currently several schools to compile the herbal tea mixtures [1; 2].

Many researchers paid an attention to a group of so-called antidiabetic plants and herbal tea mixtures used in folk medicine. They are distinguished by the softness of action, the absence of contraindications and pronounced side effects.

In the treatment of diabetes mellitus, complex treatment is carried out and the main goal of the phytotherapy is to increase the effectiveness of complex treatment of patients with diabetes mellitus, lengthen the remission and reduce the side effects of chemical preparation and related complications and improve the quality of patients' life.

The main groups of medicinal plants used in the therapy of patients with diabetes mellitus include:

- Plants – adaptogens of restorative action are plants that activate regulatory neurohumoral systems and increase the body's resistance to the action of many unfavorable factors (ginseng, rhodiola rosea, eleutherococcus, aralia Manchurian etc.);
- Plants that have a diuretic action and contribute to the removal of excessive glucose from the body (horsetail, birch and cowberry etc.);
- Plants stimulating the restoration of β-cells of the islets of Langerhans, which produce insulin (blueberry, white and black mulberry, walnut, licorice, sowing flax, burdock etc.);
- Chromium-containing plants which strengthen the action of insulin and help to reduce the concentration of glucose in the blood serum and also reduce cravings for sweet foods (mountain arnica, medicinal ginger, siberian fir, gray alder, marsh saber, sage, etc.);
- Zinc-containing plants that normalize the action of insulin, as well as increase the body's resistance to many infections and improve the barrier properties of the skin, contributing to the rapid healing of wounds (bird mountaineer, corn stigmas, sage, Canadian goldenrod, etc.);
- Biguanide-containing plants that promote the preservation of insulin from destruction and normalize the assimilation of glucose (goatskin medicinal, plant peas, beans, blueberries etc.);
- Inulin containing plants used as a sweetener and contributing to lowering blood glucose levels and normalizing metabolic processes, as well as removing toxic and ballast substances from the body (dandelion, elecampane, Jerusalem artichoke, chicory, etc.) [3].

Usually, not individual plants are used, but their mixtures. The latter is recommended to alternate every two or three months. But before you start taking any polyherbal tea mixture, you need to find out that the patient has no contraindications to its plant components.

Of course, such a classification is very conventional, but it helps to understand which plants possess useful properties. This will allow more efficient selection of food for diabetics taking into account the properties of all plants.

Monitoring of local medicinal plants possessing the above-mentioned therapeutic properties was carried out. Selection of medicinal plants was carried out by the method of expert assessments for a comparative assessment of the qualitative composition of BAS and

pharmacotherapeutic activity (according to the method of A. Ya. Kobzar and O. M. Gritsenko) from 1 to 5 points.

Selection of medicinal plants was carried out by the method of ranking.

Ranking is a procedure for ordering objects performed by a decision maker or an expert.

Based on the knowledge and experience of the expert (technologist), objects are arranged in order of preference, guided by one or more selected comparison indicators. Depending on the type of relationships between objects, different options for ordering objects are possible.

The essence of the ranking method. The method of ranking is that the expert is invited to assign numerical grades to each of the factors listed in the questionnaire. The rank (grade), equal to one, is attributed to the most important factor, according to the expert, and the rank equal to two is assigned to the next most important factor etc.

The ranking is convenient in the following situations:

1) when it is necessary to arrange any objects in time or space;

2) when you need to order objects in accordance with any quality, but it does not require its accurate measurement.

The ordinal scale obtained as a result of the ranking must satisfy the condition of equality of the number of ranks N to the number of ranked objects. Sometimes there is a situation when the expert is at a loss to make a clear distinction between some factors. In this case, the so-called standardized or associated Ranks are introduced.

For example, the expert is asked to rank the attributes (factors) for importance in solving the problem of selecting medicinal plants according to the content of BAS and the pharmacological effect, taking into account the attributes of the main indicators and sorting by rank.

- The result is a ranking, the sum of grades SN obtained as a result of the ranking of n factors is equal to the sum of the numbers of the natural series, which are calculated by the formula 1:

$$S_N = \sum_{j=1}^{n} r_j = \frac{n(n+1)}{2} \quad (1)$$

For example: when choosing a hypoglycemic herbal tea mixture, the main symptomatic parameters of diabetes mellitus (type 2) were taken into account.

As a result of comparing all objects with respect to strict order, an ordered sequence is formed, where the object with the first number is the most preferable. The object with the second number is less preferable to the first object, but is preferable to all other objects etc. For example, indices for the ranking of preferences was calculated by a method of processing the results of literature and statistical indicators – the therapeutic activity

(hypoglycemic action according to the results of the research by prof. Kh. U. Aliyev and prof. A. A. Abidov, 2008) and the content of BAS:

Index: – Plants stimulating the recovery of β-cells of the islets of Langerhans, which produce insulin – 1.0;
- Biguanide-containing plants – 1.0;
- Chromium and zinc containing plants – 1.0;
- Plants-adaptogens of restorative action – 0.2;
- Inulin-containing plants – 1.5;
- Plants with a diuretic action – 0.3;

Then the analysis of the herbal tea mixture was carried out according to the following parameters: possible contraindications; technological incompatibility; chemical incompatibility; pharmacological incompatibility; number of ingredients.

Choice of the basis for the herbal tea mixture. It can be 1 or 2 kinds of raw materials, less often 3 or 4. The base should:
- simultaneously provide as many pharmacological effects as possible;
- have no contraindications (sometimes possible allergic reaction is allowed);
- be technological compatible.

Usually 3-8 types of raw materials are able to provide the entire necessary spectrum of pharmacological action. This fact was taken into account during the development of hypoglycemic herbal tea mixture. As a result of the research, a scientifically well founded composition of a hypoglycemic herbal tea mixture consisting of leaves of white mulberry and licorice root (stimulate the regeneration of β-cells of the islets of Langerhans, producing insulin), white bean flaps (prevent insulin destruction and normalize the glucose metabolism), zinc and chromium-containing plant – medicinal sage (normalizes the interaction of insulin with receptors and contributing to a decrease in the concentration of glucose in the blood, increases the body's resistance to many infections and improves the barrier properties of the skin), roots of chicory common (contains inulin, contributes to lowering blood glucose levels, normalizes metabolic processes and promoting the removal of toxins from the body due to diuretic action) was developed.

Hypoglycemic activity of the herbal tea mixture was studied in 30 laboratory rats weighing 153-185 g under conditions of experimental acute hypoglycemia caused by a single intraperitoneal injection of a hypertonic glucose solution at a dose of 4.5 g/kg. The decoction of the herbal tea mixture was administered orally in advance 30 minutes prior to the start of the experiment at a dose of 50 mg/kg, relative to the control group, which took purified water. The maximum hypoglycemic activity was observed at 90 minutes after the introduction of hypertonic glucose solution and made 34.5 ± 1.7% [4].

Conclusions. As a result of the research, the composition and technology of hypoglycemic herbal tea mixture, which has a complex hypoglycemic effect, were developed.

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Жалилов Уткирбек Мамарахимович, Файзуллаева Нодира Султановна, Бекчанов Хамдам Кузиевич. Разработка состава и изучение сахароснижающей активности гипогликемического сбора.

В статье рассматриваются особенности формирования навыков разработки состава и технологии лекарственных составов при научно-исследовательской работе на примере разработки состава и изучении сахароснижающей активности гипогликемического сбора. Отбор лекарственных растений проводили методом ранжирования. Сущность метода ранжирования состоит в том, что эксперту предлагается присвоить числовые ранги каждому из приведенных в анкете факторов. В результате исследований был разработан научно-обоснованный состав гипогликемического сбора, состоящего из листьев шелковицы белой, корней солодки голой, створок фасоли белой, шалфея лекарственного и корней цикория обыкновенного. Изучена сахароснижающая активность сбора при острой гипергликемии, которая составила – 34,5±1,7%.

Ключевые слова: *лекарственные травы, гипогликемический сбор, гипогликемический индек, сахароснижающая активность.*

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