

Methodological approach
to the creation of multicomponent herbal medicines
for the treatment of diseases of the digestive system P.B.
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Methodological approach to development of multi-component
medicinal herbal remedies for diseases of the digestive organs
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SUMMARY

A methodological approach to the development of new herbal medicinal products is proposed, based on the theoretical substantiation of the contribution of each component of the herbal composition, followed by experimental confirmation of the optimal composition of the collections intended for the prevention and treatment of diseases of the digestive system.

Key words: multicomponent collections, methodological approach, organ diseases digestion.

RESUME

A methodological approach to the development of new medicinal herbal remedies based on the theoretical substantiation of the contribution of each component of the herbal composition, with subsequent experimental confirmation of the optimal composition of fees intended for the prevention and treatment of diseases of the digestive organs is proposed.

Keywords: multicomponent herb teas, methodological approach, diseases of the digestive organs.

Usage of herbal preparations is an promising direction in the treatment of diseases of the digestive system, accompanied by frequent relapses of pathologies and disability of patients. During therapy with synthetic drugs, the formation of resistance to such drugs is observed. Herbal medicinal products containing biologically active substances have a wide range of pharmacological properties, have a complex effect on regulatory proteins, limit the development of inflammatory and oxidative processes that underlie the pathogenesis of many diseases of the gastrointestinal tract. The task of expanding the range of drugs intended for the prevention and treatment of socially significant diseases of the digestive system can be solved by creating new effective compositions of medicinal plants.

The purpose of this work is to substantiate a methodological approach to the development of multicomponent preparations intended for the treatment and prevention of socially significant diseases of the digestive system.

According to statistical data [1], in the Siberian Federal District (SFD), the frequency of the spread of diseases of the digestive system exceeds the all-Russian indicators. So, for the period 2012–2016. the number of patients per 100 thousand of the adult population (with a diagnosis established for the first time) with gastric ulcer and duodenal ulcer in the Siberian Federal District by 43-59%, gastritis and duodenitis - by 64-72%, with liver disease - by 28-42%, with diseases of the biliary tract and gallbladder by 46-51%, with eating disorders and metabolic disorders and diseases of the endocrine system - 34-49% higher than the national indicators [1]. It should be noted that diseases of the digestive system are characterized by a severe course with the organic nature of the pathology. Herbal remedies are widely used for

treatment and prevention of diseases of the digestive system, and taking into account the statistical data on the morbidity of the population, the development of new means intended for the complex treatment and prevention of diseases of the digestive system is an urgent task. The creation of new herbal remedies is based on a methodological approach to development; at the modern scientific level of knowledge, including the results of their own research and scientific literature data; on medicobiological requirements for drugs; on the principles and rules of ensuring the quality and effectiveness of new products.

Previously, methodological approaches to the creation of natural medicines based on the experience of traditional medicine in Russia were proposed [2]. With their use, medicinal collections "Siratok", "Sedospazmil", "Trezlevton" were developed [3]. Based on the works of T.L. Kiseleva. et al (2000), we have compiled an algorithm for the creation of multicomponent herbal medicinal products for the treatment of diseases of the digestive system, taking into account the contribution of each component and pharmacological screening.

When substantiating a methodological approach to the development of new collections on the basis of studying the practical experience of folk and traditional medicine, modern herbal medicine, an algorithm for conducting research has been developed. Schematically, the scope of work on the development of new herbal medicines can be divided into two stages: information-analytical (justification of the need to develop a new herbal remedy, methodological approaches, formulation development) and experimental (pharmacognostic, preclinical and clinical studies, development and implementation of regulatory documents).

The considered methodological approach to the development of new phytopreparations has signs of system analysis:

- complexity (information, analytical, experimental database; chemical, biological, medical, social, economic, legal components of the system);
- integrity and hierarchy (information database → analysis → prognosis → experiment → result; drug → basic and related substances → object of influence (organism) → pharmacological action of basic substances and synergistic or antagonistic interaction with related substances → pharmacotherapeutic effect; multicomponent agent → medicinal product → BAS group → individual substance → molecular cell mechanism of action;
- isolation of the leading link (multicomponent agent → base or "core" of the formulation → main group of biologically active substances → main pharmacological action).

The algorithm for the development of new collections makes it possible to take into account most of the factors influencing the achievement of the goal, to perform theoretical and experimental studies with the aim of developing and introducing new herbal remedies. The goal is designated - the creation of a new effective herbal medicinal product, the criteria for achieving the goal at individual stages are determined.

To substantiate the relevance of creating new collections, statistical data on the structure of the morbidity of the population, literature data on the nomenclature of herbal medicines on the domestic pharmaceutical market were taken into account. The criteria for choosing a nosological form, for the treatment and prevention of which it is necessary to develop a new phytopreparation, are: a high frequency of the spread of a particular disease among the local population; the social nature of the disease, the chronization of the pathological process when the body's defenses are suppressed, the need for long-term maintenance therapy, the presence of side effects during the main therapy with synthetic drugs. The study of the pathogenesis of the disease and the differentiation of clinical symptoms observed in the selected pathology, allow us to determine the range of pharmacological properties, necessary to achieve the pharmacotherapeutic effect of the new agent, and to choose the types of medicinal products with such properties, according to the literature [4]. The objects of study at this stage are review works on herbal medicine (books and monographs about medicinal plants), recipes for traditional medicine. When choosing components of fees Patent Search and Data Synthesis

scientific literature on the designated topic allows you to evaluate the originality and novelty of the development.

At the stage of developing a methodological approach, it is necessary to identify the consumer properties of the new herbal medicinal product being developed, which substantiate its future competitiveness in the pharmaceutical market: functional (efficiency and safety when used in the treatment of the selected pathology), economic (cost and trade price of the final product, availability of raw materials, etc. final product), informational (advertising). The established set of consumer properties of the new herbal medicinal product being developed makes it possible to choose research methods: statistical, economic, chemical, biological (in vitro, in vivo, pharmacological, morphological, toxicological, etc.). The achievement of the goal is also influenced by the criteria for choosing the consumer (brand of the manufacturer of phytopreparations, terms of sale).

When developing new plant compositions, we have given preference to a universal method based on the teachings of A.N. Kudrin on the multi-vector effect of multicomponent herbal remedies aimed at eliminating, weakening the cause of the disease and strengthening the adaptive compensatory mechanisms of the whole organism [5]. Based on the analysis of data from traditional and folk medicine, practical experience of modern phytotherapy, information on the chemical composition and pharmacological properties of medicinal products, the criteria for choosing the components of the collection were established. So, the criteria for choosing the prospect of including a certain type of medicinal plant in the composition of a new herbal remedy are: high frequency of occurrence (or inclusion index) in phytopreparation formulations intended for the treatment of the selected pathology; officiality, including in foreign pharmacopoeias, belonging to food plants; the knowledge of the chemical composition of the main active substances and specific pharmacological activity, which makes it possible to predict the pharmacotherapeutic orientation of a new drug. Also, the achievement of the goal at the stage of developing the formulation of a new drug is influenced by the presence of restrictive lists of medicinal products, the availability and pricing policy on the herbal raw materials market, and the availability of raw materials for medicinal products.

At the experimental stage of the development of new phytopreparations, the criteria for achieving the goal are: the choice of diagnostically significant signs (in the case of collection), the amount of chemical research and an adequate choice of active substances, harmonization and unification of standardization methods, the choice of optimal technological parameters, the rationality of using raw materials. At the stage of chemical and technological characteristics of a new herbal medicinal product, the requirements of regulatory documents are relevant - GMP, GOST, GF, SanPin, etc.

The criteria for achieving the goal at the stage of confirming the effectiveness of a new herbal medicinal product are higher efficiency in comparison with analogues and the evidence-based safety of the new drug. The clinically significant pharmacological effect of a new herbal medicinal product depends on the chemical composition of the main and accompanying biologically active substances, their synergistic or antagonistic interactions, physicochemical properties, dose, bioavailability, method and rate of administration, and duration of use. The experimental block ends with an organizational stage, where the tasks of registration, registration of regulatory documents and clinical trials, organization of production and sales in accordance with legislative norms are solved.

Table 1

Content of groups of biologically active substances
in aqueous extractions of charges and their components

Water extraction * (1:10)	Content **, in% by weight of dry residue in 1 ml of water extract				
	FL	DV	AK	TTS	VRPS
Collection number 1	1.15	4.55	0.83	12.4	43.5
Collection number 2	1.71	6.75	0.13	1.25	18.8
Collection number 3	0.38	2.40	0.20	5.47	20.1
Collection number 4	1.48	3.35	0.53	0.22	20.9
Collection number 5	0.09	14.00	4.43	0.50	11.1
Collection number 6	1.087	4.45	0.78	11.8	3.7
Coriander fruit	0.04	7.01	9.17	0.67	26.8
Dandelion roots	-	1.11	0.18	0.51	37.2
Calamus rhizomes	-	1.40	0.18	0.90	28.0
Yarrow herb	4.98	8.33	0.66	3.99	8.8
Plantain leaves	1.27	2.05	0.93	0.74	20.7
Wormwood herb	2.26	10.20	3.90	1.44	11.6
Sea buckthorn fruit	0.10	8.44	7.04	0.55	36.9
Nettle leaves	-	5.90	0.36	0.57	42.8
Elecampane rhizomes	-	1.91	-	0.53	15.1
Hawthorn fruit	0.03	1.61	3.28	13.60	3.82
Highlander's grass	3.30	3.38	0.68	0.39	19.4
Creeper herb	3.21	2.78	1.35	0.78	13.5
Tansy flowers	4.53	10.6	0.68	1.62	20.8
Licorice roots	1.98	1.20	1.30	5.80	13.5
Dog-rose fruit	0.53	4.78	1.70	0.78	50.1
Marigold flowers	2.74	2.45	1.31	17.10	19.5
Lingonberry leaves	3.64	7.08	1.30	0.03	2.9
Mint leaves	8.39	5.73	0.91	0.21	2,3
Eleutherococcus rhizomes	-	1.13	2.24	4.52	5.4
Badan leaves	1.10	27.20	-	-	-
Chamomile flowers	2.30	5.38	0.35	2.76	14.1
Thyme herb	-	16.30	0.59	2.18	22.7
Centaury grass	Ks - 2.2	2.2	0.5	0.7	2.1

Note. DV - tannins, FL - flavonoids, AA - ascorbic acid, TTS - triterpene saponins, VRPS - polysaccharides, Ks - xanthones; * - infusions, in the case of essential oil species and fees, in other cases - decoctions; ** - content in percent by weight of dry residue in 1 ml of water extract (1:10), the average of three determinations; a dash means that the substances were not found.

The developed research algorithm for the creation of new herbal remedies was used in the development of the formulation of 6 collections recommended for treatment and prevention.

diseases of the digestive system. The 7-component collection No. 1 for the treatment and prevention of alcoholic hepatitis and withdrawal symptoms includes (%): rhizomes and roots of elecampane high - 25, hawthorn fruits - 20, rose hips - 20, peppermint leaves - 10, lingonberry leaf - 10, roots eleutherococcus prickly - 10, marsh creeper grass - 5 [6]. The 6-component collection No. 2 for the treatment and prevention of alcoholic hepatitis and pathological craving for alcohol includes (%): calamus rhizomes - 30, wormwood herb - 20, yarrow herb - 20, thyme herb - 10, stinging nettle leaves - 10, tansy flowers - 10 [7]. The 7-component collection No. 3 for the treatment and prevention of hypercholesterolemia includes (%): rose hips - 30, hawthorn fruits - 20, calamus rhizomes - 15, dandelion roots - 15,

- 5, black leaves of badan - 5 [8]. The 9-component collection No. 4 for the treatment and prevention of gastric ulcer and duodenal ulcer includes (%): calendula flowers - 25, rose hips - 20, hawthorn - 15, sea buckthorn - 5, coriander - 5, licorice roots - 10, rhizomes and roots of a tall elecampane - 5, plantain leaves - 10, marsh creeper grass - 5 [9]. The composition of the 4-component collection No. 5 for the treatment and prevention of chronic colitis includes (%): black berry leaves - 30, chamomile flowers - 28, yarrow herb - 24, mint leaves - 18 [10]. The composition of the 5-component collection No. 6 for the treatment and prevention of liver diseases includes (%): roots and rhizomes of elecampane high - 25, herb of centaury common - 15, roots of Ural licorice - 15, rose hips - 25, hawthorn fruits - 20.

The content of groups of biologically active substances was determined in water extracts of charges and their components (Table 1). Phenolic compounds - flavonoids and tannins (Table 1), which have a wide spectrum of biological activity necessary to achieve a therapeutic effect in various chronic pathologies of the digestive system, are extracted in sufficient quantities into the aqueous extracts of the collections (infusions and decoctions). The pharmacotherapeutic effect of the developed fees was confirmed by experimental studies, the result of which was patented and published earlier [6-10].

Thus, the application of a methodological approach to the development of new drugs based on the analysis of data from traditional and traditional medicine and modern herbal medicine allows the development of scientifically grounded options for the recipe of fees intended for the treatment and prevention of certain diseases of the digestive system.

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Lubsandorzhieva, P.B. Methodological approach to the creation of multicomponent herbal medicines for the treatment of diseases of the digestive system / P.B. Lubsandorzhieva, E.V. Ferubko, T. D. Dargaeva // Traditional medicine. 2018. No. 3 (54). P.3539.

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