ANNOTATION

dissertation work of Tleubayeva Meruyert Ilyasovna on the topic: "Pharmaceutical development of medicines from plants of Portulaca *oleracea* L. *(Portulaca oleracea* L.*)", for the degree of Doctor of Philosophy (PhD) degree in the specialty 6D074800 - "Technology of pharmaceutical production"

Relevance of the research topic

Currently, one of the urgent tasks in the pharmaceutical industry is the creation and introduction into production of import-substituting drugs, including increasing the share of medicines of plant origin. The experience of domestic manufacturers of medicinal products shows the promising priority of work on the creation of production of pharmaceutical products competitive in the market based on medicinal plant raw materials.

One of the main objectives of the State program of industrial - innovative development of the Republic of Kazakhstan in 2015 - 2019, 2020 - 2025 is to reduce imports of medicines, increasing domestic production capacity, raw material and scientific - technical potential.

The flora of Kazakhstan is rich in medicinal plants. Efficient use and processing of raw materials allows increasing production of new competitive domestic drugs [L.M. Grudzinskaya, N.G. Gemezhieva, N.V. Nelina, Zh.Zh. Karzhaubekova (2014)].

One of the main objectives of the state in the development of the pharmaceutical industry is to increase up to 50% of domestic pharmaceutical products on the domestic market, development of the full cycle of domestic pharmaceutical production: from substance to finished dosage forms. The above data determine the relevance of scientific justification of a new pharmaceutical product for health care of the Republic of Kazakhstan.

At present, in many countries of the world the priority part of the total nomenclature of drugs is occupied by phthopreparations created by innovative methods, medicines of plant origin are being more and more widely introduced into use every day. The advantage of medicines based on herbal raw materials is relative safety, low toxicity in the prevention and treatment of chronic diseases [TleubayevaM.I., Abdullabekova R.M., Datkhayev U.M. (2018)].

In Kazakhstan, there are more than 1400 species of wild medicinal plants, of which onloy 230 species are used in official medicine [L.M. Grudzinskaya, N.G. Gemezhieva, N.V. Nelina, Zh.Zh. Karzhaubekova (2014)].

More than 1000 types of medicinal plants have been used in traditional medicine for centures. However, there is still a lot of work to be done on the development of herbal medicine, the pharmacological properties of many plants are not well understood, and the number of those used as medicines is not enough. This is due to the incomplete study of the types of medicinal plants. This is one of the main reasons for the high penetration of foreign herbal medicines into the pharmaceutical market of Kazakhstan [L.M. Grudzinskaya, N.G. Gemezhieva, N.V. Nelina, Zh.Zh. Karzhaubekova (2014)].

Thus, one of the most promising objects for introduction into official medicine is the garden purslane (*Portulaca oleracea* L.). Garden purslane (*Portulaca oleracea* L.) is widely used in folk and official medicine in many countries [TleubayevaM.I., Yerkasymova A.Ye., Ishmuratova M.Yu., Datkhayev U.M., Abdullabekova R.M. (2019)].

The Portulaca plant is of particular interest to growers and nutritionists. The vegetable portulaca is an annual plant and is a common weed among field crops. Variety types, timing of harvest, and environmental conditions can affect nutritional value and benefits [Spyridon A. Petropoulos et al. (2019)].

The plant grows in a variety of climatic conditions. It is widely used in Central Europe, Asia and the Mediterranean region. It is cultivated in Central Asia and Transcaucasia. Portulaca oleracea is the main component of green salad, its soft stems and leaves are used raw on their own and together with other vegetables. *Portulaca oleracea* L. is also used for cooking and sauces. Its medicinal value is clearly defined by its use for the treatment of burns, headaches, stomach, intestines, liver, for coughs, for diseases related to shortness of breath and for arthritis. Its laxative, cardiotonic, anti-inflammatory, diuretic actions and use as a muscle relaxant increase its phytotherapeutic value. *Portulaca oleracea* L. is also used to treat osteoporosis, psoriasis [Karomatov I.D., Abduhalilova M.H. (2017)].

At one time, Hippocrates and Pliny used the juice, decoction and water extracts of this plant in the treatment of varios diseases. *Portulaca oleracea* L. seeds were used as an antipyretic agent. Ibn Sina considered the herb *Portulaca oleracea* L. plant to be an effective analgesic, hemostatic, anti-inflammatory, diuretic and choleretic agent. Arab doctors used this plant to lower blood sugar levels in the treatment of diabetes [http://www.1000listnik.ru/lekarstvennie-travi/15/86-portulak-ogorodnyj.html; Evdokimov O.V. (2002); Lekarstvennye rastenia v medicine. Medicinal plants in medicine (1993)].

In Chinese folk medicine, the dried raw material (herb) is called Machixian (Herba *Portulacae oleraceae*), which removes toxins, fever, stops bleeding, has anti-inflammatory, diuretic, antidiabetic, antitoxic effects. The seeds have antipyretic, aphrodisiac effects. *Portulaca oleracea* L. juice has a choleretic, cooling effect [Shreter A.I.,Valentinov B.G., Naumov E.M. (2004)], as well as possesses a wide spectrum of pharmacological action, including antibacterial, antiulcer, anti-inflammatory, wound healing properties. In Chinese folklore, it is called «a vegetable for longevity» [Yan-Xi Zhou et al. (2015)].

Burns, skin rashes, boils and carbuncules can be treated by effectively combiningthe the leaves of *Portulaca oleracea* L. with the leaves of other plants. *Portulaca oleracea* L. extract protects the skin from pollution and premature aging, therefore it is included in a number of skin lotions [Cherukuri Vidyullatha Chowdhary et al. (2013)].

Studies have shown that the composition of vegetable portulaca contains much more beta-carotene, ascorbic acid and alpha-linolenic acid compared to cultivated vegetables [Md. Kamal Uddin et al. (2014)].

Growing *Portulaca oleracea* L. is a quick and inexpensive process. The plant has a rich chemical composition. Thus, preparations obtained from medicinal

plants based on the *Portulaca oleracea* L. plant are relevant and economical [Kadarbagamaev S.M. (2018)].

Thus, the creation and research of new medicines based on a substance that has the ability to form a permanent raw material base from the raw material of portulaca plantago for domestic production is an urgent problem.

The purpose of the dissertation research

Pharmaceutical development of obtaining medicines from raw materials *of* the plant *Portulaca oleracea* L.

Objects of research

Medicinal plant material of Portulaca *oleracea* (*Portulaca oleracea* L.) and carbonic acid extract *of Portulaca oleracea*.

Subjects of study

Search and analysis of the literature on the chemical composition and pharmacological properties of the object of research - the plant *Portulaca oleracea* L., its use in traditional medicine, evaluation of the area of distribution; definition of the purpose and objectives of the study, the study of the chemical composition and pharmacological properties, standardization of raw materials and carbonic extract *Portulaca oleracea*, development of regulatory documents, collecting materials in final form, determining the theoretical and practical value of the thesis.

Standard physical, physical-chemical (gas-liquid chromatography-mass spectrometry), chemical, pharmacological, statistical methods of analysis.

Objectives of the research paper:

1. Development of technology of gathering and procurement of raw materials *Portulaca oleracea* L. , study of anatomical and morphological structure.

Determination of quality parameters of raw materials, shelf life of *Portulaca oleracea* L.

Determination of parameters of preparation and component composition of carbonic acid extract from medicinal plant material *Portulaca oleracea* L.

4. Development of a rational technology of carbonic acid extract from medicinal plant raw materials *Portulaca oleracea* L. and feasibility study.

5. Determination of quality parameters, shelf life of *Portulaca oleracea* carbonic acid extract.

6. To study toxicity, antimicrobial activity and antioxidant properties of carbonic acid extract of *Portulaca oleracea*.

Scientific novelty of the study

For the first time, a carbonic acid extract was obtained from vegetable raw material of Portulaca *oleracea* L., 50 components were identified as a result of phytochemical study; the antimicrobial and fungicidal activity of *Portulaca oleracea*. carbonic acid extract with respect to test microorganisms *E. coli, S. aureus* and *B. subtillis, C. albicans* was determined, antioxidant properties were proved.

Scientific novelty of the research is confirmed by the patent for invention № 34777 "Method of obtaining carbon dioxide extract of *Portulaca oleracea* (*Portulaca oleracea* L.)." and registered in the State Register of Inventions of the Republic of Kazakhstan from 20.12.2020.

Provisions for Defense

1. The results of research on the development of harvesting technology, on the study of the anatomical and morphological structure, on the determination of quality indicators of medicinal plant raw materials *Portulaca oleracea* L..

2. Production parameters, rational technology, component composition, quality indicators, shelf life, results of studying toxicity, antimicrobial activity, antioxidant properties of the carbonic acid extract from *Portulaca oleracea* L. raw materials.

3. Feasibility study for the production of *Portulaca oleracea* extract.

The practical significance of the results obtained

The technology of harvesting of plant raw materials *Portulaca oleracea* L. was proposed. Samples of collected plants and samples of seeds were submitted to the herbarium fund and to the seed fund of RGP at the "Institute of Botany and Phytotroduction" of the Committee of Forestry and Wildlife (Almaty), which is confirmed by the act of delivery.

Technology of carbonic acid extract from plant raw materials *Portulaca oleracea* L. recommended for pharmaceutical production by "PLP ZHANAPHARM" LLP

On plant raw material *Portulaca oleracea* L. and on carbonic acid extract draft regulatory documents were developed and methods described in the projects were tested with samples of medicines and herbal raw materials and implemented:

- in the practical course of the internship «Fundamentals of microscopic and histochemical analysis» on the basis of the Research Park of Biotechnology and Environmental Monitoring of the Biological and Geographical Faculty of the NJSC «Karaganda University named after Academician E.A. Buketov» (Karaganda);

- DGP on PCV "Center for physical and chemical methods of research and analysis" RGP on PCV "Al-Farabi Kazakh National University" MES RK.

The results of scientific research of the medicinal plant and carbonic acid extract have been implemented in the educational process of the Kazakh National Medical University named after S.D. Asfendiyarov, the Karaganda University named after Academician E.A. Buketov, Bolashaq Academy (Karaganda), St. Petersburg State Chemical and Pharmaceutical University (Russia).

Personal contribution of the doctoral student

All the results of the dissertation research were obtained by the author independently, which indecates the personal contribution of the applicant to science in the field of pharmaceutical production technology and pharmacy. The reliability of the results, main provisions, conclusions and conclusions defended in the dissertation is based on a significant amount of experimental materials. This is confirmed by the results of individual studies obtained in laboratory and production conditions using modern equipment and literature.

Approbation of dissertation results

The main provisions of scientific research on the subject of the thesis were presented at the conferences: of the VI International Scientific Conference of Young Scientists and Students, initiated by the First President of Kazakhstan and

the South Kazakhstan Medical Academy, Perspectives of Biology, Medicine and Pharmacy (Shymkent, 2018), International Scientific and Practical Conference «Pharmacology and Pharmaceutics: Theoretical and practical aspects of development» (Moscow, 2018), at the International scientific-practical conference "Modern aspects of pharmaceutical education, science and practice" Bashkir State Medical University, (Ufa, 2019), at the International scientific-practical conference «Formation and development prospects of the scientific pharmaceutical school: the continuity of generations» Materials of the International scientific and practical conference in memory of the professor R. Dilbarkhanov (Almaty, 2019), at the XI International Scientific and Practical Conference "Global Science and Innovation 2020: Central Asia", (Nur-Sultan, 2020), at the Department of Pharmaceutical Technology NJSC «Kazakh National Medical University named after S.D.Asfendiyarov» (Almaty 2021), at the Scientific Commission "Pharmacy" and "Technology of pharmaceutical production" NJSC «Kazakh National Medical University named after S.D.Asfendiyarov» (Almaty 2021).

Publications

The main results have been published in 13 scientific papers, including 1 article in the journal included in the international database Scopus, 5 articles in the editions recommended by the Committee for Control of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan, 5 articles in the proceedings of international scientific conferences, 1 patent for invention, 1 article in the RSCI database.

Scope and Structure of the Dissertation

The thesis consists of an introduction, literature review, materials and methods of research, 5 sections of experimental research, conclusion, list of references and appendices. The work is written on 127 typewritten pages, contains 46 tables, 43 figures, annex from A to C. The list of references includes scientific works of 134 domestic and foreign authors.