

## ANNOTATION

of thesis «**Development of technology and standardization of extracts from the raw material of plant species of the genus *Echinops L.***» for the degree of doctor of philosophy (PhD) specialty 6D074800 – "Technology of pharmaceutical production" **Kiyekbayeva Lashyn Nurtasovna**

### **The topicality of the research**

The Republic of Kazakhstan is rich in natural resources, the rational use of which will contribute to the solution of the tasks. One of the main tasks facing the pharmaceutical science of Kazakhstan is to search for potential sources of biologically active compounds, to identify and study their nature, to study physical and chemical properties, to determine qualitative and quantitative indicators, to develop the technology of pharmaceutical substance is a necessary stage in the process of developing new medicines, as well as standardization of the created medicinal substances and ensuring their quality of introduction in medical practice for new products of plant origin. The rich flora of Kazakhstan is a stimulus for research and revealing new types of plant raw materials, expanding the raw material base and creating safe and effective modern phytoproducts is one of the directions of the pharmaceutical science. By studying biologically active substances and developing medicines from raw materials of various plant species, it will be possible to expand the assortment of medicinal plants and meet the need for highly effective and low-toxic plant preparations. This systematically reduces the dependence of health care of the Republic of Kazakhstan on the import of medicines. To solve the task, it is necessary to use our own raw materials, production capacities and scientific and technical potential.

In this regard, recently research has been expanding on wild plants that grow widely in the saline and arid soils of the Republic of Kazakhstan and have adapted to extreme conditions. Promising plants are the genus *Echinops L.*, they are rich in various biological active substances and Kazakhstan plant species need more detailed phytochemical and technological studies.

In this regard it is important to search for potential sources of biologically active compounds, and the task of developing technology and standardizing extracts from the raw materials of plants of the genus *Echinops L.*

### **The purpose of the research**

Pharmacognostic and phytochemical study of the genus *Echinops L.* (globe-thistle), search of new sources of the bioactive agents.

### **The objectives of the research**

- To study the pharmacognostic features of the hibernator of white-stalked plants of the genus *Echinops L.* (*Echinops albiculis Kar. Et Kir*);
- To study the pharmacological features of the mammal of Zailiysky

plants of the genus *Echinops* L. (*Echinops transiliensis* Golosk.);

- Carry out pharmaco - technological and phytochemical research of plant raw materials of *Echinops* L species;
- Development of technology and standardization of extracts from the raw material of plant species of the genus *Echinops* L .;
- Fraction, isolate and identify the main compounds from the extract of the white-stalked echinopsis *albiculis*;
- Identification and determination of the quantitative analysis of the main active compounds by physicochemical methods;
- To study the acute and subacute toxicity and biological activity of the extract and the isolated compound;

**Objects of the research:** endemic species globe-thistle, Minni Daisy: *Echinops albicaulis* Kar.et Kir., *Echinops transiliensis* Golosk.

**Methods of the research:** physical and physicochemical, pharmacognostic, pharmaco-technological, biological, microbiological, statistical, pharmacopoeial and nonpharmacopoeial methods.

**Scientific novelty** It is for the first time, that

- Pharmacognostic features and standardization of the raw material of the herb of the white-stalked (*Echinops albicaulis* Kar. Et Kir) and the mammal of the Zailiysky (*Echinops transiliensis* Golosk) of plants of the genus *Echinops* L. were studied. Comparative macroscopic and microscopic features were established.

- Comparative pharmaco - technological and phytochemical studies of plant raw materials of *Echinops* L.

- An optimal technology for obtaining extracts and standardization of extracts from the raw material of the white-stalked mammal *Echinops albicaulis* has been developed. The novelty is confirmed by the patent for utility model No. 2582 "Method for obtaining the dry extract of white-stalked whitehead (*Echinops albicaulis* kar.et kir) with antioxidant activity" registered in the State Register of Utility Models of the Republic of Kazakhstan on 18.11.2016.

- The main 11 compounds from the extract of the white-stalked *Echinops albicaulis* were isolated and identified. Two alkaloids (echinorin, echinopsin) 4 flavonoids (apigenin, rutin, quercetin, 7-methoxyapigenin), two triterpenes (lupeol, 3-O-lupeol acetate), one steroidal glycoside (beta-sieve styrene glycoside) and two thiophenes (6, 10-trimethyldodec-2,6,10-triene, 5- (3-buten-1-lynyl) -2,20-thiophene). Determined by modern physicochemical methods of the structure of compounds, and a compound possessing antiprotozoal activity was selected and identified;

- The acute and subacute toxicity and biological activity of the extract and the isolated compound were studied and the pharmaceutical development and standardization of the extroverts of the white-stalked mordant was carried out.

**The main provisions of the dissertation research put on defense:**

Study the pharmacognostic features of the hibernator of white-stalked plants of the genus *Echinops* L (*Echinops albiculis* Kar. Et Kir) and (*Echinops*

*transiliensis Golosk.*);

Pharmaco - technological and phytochemical research of plant raw materials of *Echinops L* species;

Technology and standardization of extracts from the raw material of plant species of the genus *Echinops L* .;

Fraction, isolate and identify the main compounds from the extract of the white-stalked echinopsis albiculis;

Technology of obtaining and standardization of the dry extract of the white-stemmed white-throat minton possessing antioxidant activity and a substance possessing antiprotozoal activity. technology of obtaining and standardization of dry extract with antioxidant activity and pure substance possessing antiprotozoal activity.

### **Practical significance of the study**

- A collection and harvesting of grass species *Echinops L*. technology and standardized extract *Echinops belostebelno* and isolation technology of the basic compounds *Echinops albicaulis belostebelno* form in accordance with standard GACP;

- for introduction into the practical pharmaceutical industry, new medicines are proposed in the form of phytosubstance: an extract with antioxidant activity. Pharmaceutical development and standardization extract *Echinops belostebelno* technology and isolation of basic compounds from the extract *Echinops belostebelno* form *Echinops albicaulis*; determination of the chemical structure of compounds by modern methods, the determination of the safety and biological activity of the compounds of which will contribute to the solution of the proposed work to enhance the level of scientific and technical potential. The developed technology of collecting and storing raw materials and the technology of obtaining active substances will serve as a basis for the creation of new drugs in the future. Studies of all biological activities in Kazakhstan and the US NCNPR - (National Research Center for the Study of Natural Substances) are registered using special serial numbers.

### **Approbation of research results**

The main theses of the thesis are reported and published in the materials of the following scientific forums: Health Forum of The Silk Road-International Summit of the Forum on Research and Development on the Traditional Chinese Medicine and Ethnic Medicine, Meeting Guide (Urumqi, China, 2015), IX international scientific conference "Innovative Development and Demand for Science in Modern Kazakhstan" (Almaty, 2015), III International Scientific and Practical Conference "Protection and Sustainable Use of Medicinal Plants Resources" (Almaty, 2015), VI All-Russian Scientific Conference of Students and graduate students with International Participation "Young Pharmacy-Future Potential" (St. Petersburg, 2016), X I Scientific and Practical Conference of Young Scientists and Students of the Tambov State Medical University named after Abduali ibni Sino with international participation dedicated to the 25th anniversary of the state independence of the Republic of Tajikistan "Medical Science : achievements and

prospects "(Dushanbe, 2016), The 16 th annual International Conference on the Science of Botanicals (USA, Mississippi, Oxford, 2016).

### **Publication Information**

- Based on the results of the research, 20 scientific publications have been published, including:

- articles in international journals included in the Web of Science - 3 databases;

- articles in journals recommended by the Committee for Control in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan - 9;

- Abstracts at international scientific and practical conferences (China, Russia, Kazakhstan) - 7;

- application for the invention of a utility model - 1.

**The connection of the research tasks with the plan of scientific programs.** The dissertational work was carried out within the framework of the draft program of the Ministry of Education and Science of the Republic of Kazakhstan: 055 "Scientific and / or scientific and technical activities" of the sub-program: 101 "Grant financing of scientific research" priority: "Life Sciences" on "Biological features and phytochemical study of perspective species of plants of the genus *Echinops* L. in the conditions of the Dzungaro-Severotianshan mountain province, development of phytopreparations based on them "Scope and structure of the dissertation

### **The scope and structure of the thesis**

The thesis is presented on 152 pages of typewritten text in a computer suite, contains 49 tables and 95 figures, a list of references including 206 sources, as well as applications from the letter A to the letter P.