

INVESTIGATION OF QUALITY PARAMETERS OF BIOLOGICALLY ACTIVE SUPPLEMENTS WITH BILBERRIES PRODUCED BY UKRAINE, RUSSIA AND BELARUS

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Introduction. Monitoring of the pharmaceutical market of Ukraine, Belarus and Russia showed the presence of such biologically active supplements containing bilberries as «Okovit» (Ukraine), «Ophthalmix» (Ukraine), «Chernika Forte» (Russia), «Chernika» (Belarus), «Chernika with lutein» (Belarus). These products are polycomponent – they contain vitamins A, C, E, microelements, in some cases, lutein. At the same time, they are monocomponent as regard to the content of phytocomponents – they contain only bilberry extract (12.5 mg, 20 mg or recalculated 2 mg of anthocyanins). The products are presented in two dosage forms such as capsules and tablets.

Aim. To determine the technological parameter «Uniformity of mass of single-dose preparations» and investigate the chemical composition of the specified biologically active supplements.

Materials and methods. The biologically active supplements containing bilberries mentioned above in 5 batches of each brand were purchased to carry out the work; number of units of single-dose preparations were not less than 50.

Uniformity of mass of single-dose preparations has been determined according to the requirements of SPhU. The quantitative content of the sum of flavonoids has been determined by the method of differential absorption spectrophotometry in the visible range of spectrum followed by the formation of the complex compound with AlCl_3 at the wavelength of 417 nm. The quantitative content of the sum of phenolic compounds has been carried out by the method of absorption spectrophotometry in the UV-range of spectrum at the wavelength of 270 nm.

Results and discussion. All investigated biologically active supplements satisfy the requirements of SPhU for tablets and capsules by the parameter «Uniformity of mass of single-dose preparations».

Optimal sample masses for tablets powder and capsules content have been grounded for quantitative determination of flavonoids and phenolic compounds.

The sum content of phenolic compounds in the investigated dietary supplements is within the range from 1 to 3 mg per tablet/capsule. The sum content of flavonoids is within the range from 0.5 to 2 mg per unit of single-dose preparation.

Conclusions. The study of technological and chemical quality parameters of biologically active supplements with bilberries produced by Ukraine, Russia and Belarus has been carried out.

DEVELOPMENT OF THE ISOLATION METHOD OF MELIPRAMINE FROM THE BIOLOGICAL MATERIAL USING CHLOROFORM

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Introduction. Melipramine (10,11-Dihydro-*N,N*-dimethyl-5H-dibenz[b,f]azepine-5-propanamine hydrochloride) is a tricyclic antidepressant. Cases of acute and lethal poisoning by melipramine has been registered. Its lipophilic property ($\text{Log } P(\text{octanol/pH } 7.4) = 2.5$, volume of distribution is from 10 to 20 l/kg) complicates the drug extraction from the biological material with hydrophilic solvents such as acidified water or acidified ethanol.

Aim. To develop of the isolation method of melipramine from the biological material using chloroform as a lipophilic extractant.

Materials and methods. The isolation method of melipramine from the biological material included the drug elution with chloroform from the liver tissue homogenized and dehydrogenated by

grinding with anhydrous sodium sulphate followed by the extraction clean-up procedure with the *n*-hexane-acetonitrile solvent system. Melipramine was detected and determined in the extracts with help of colour reactions, TLC and UV spectrophotometry.

Results and discussion. The following coloured products of melipramine interaction with the range of chromogenic reagents were observed: UV light (λ_{254}) (brown-red fluorescence, sensitivity was of 0.2 μg in the sample), Dragendorff reagent with Munier modification (orange, sensitivity was of 1.0 μg), ninhydrin solution (light pink, 4.0 μg), Mandelin's reagent (blue, 10.0 μg), Lieberman's and Froehde reagents (blue, 2.0 μg). The following values of chromatographic mobility of the antidepressant in thin sorbent layers were obtained in a range of mobile phases for Merk chromatographic plates: ethyl acetate – methanol – 25 % ammonia (85:10:5), $R_f = 0.72 \pm 0.05$; acetone, $R_f = 0.50 \pm 0.03$; toluene – acetone – ethanol – 25 % ammonia (45:45:7.5:2.5), $R_f = 0.68 \pm 0.03$; chloroform – dioxane – acetone – 25 % ammonia (47.5:45:5:2.5), $R_f = 0.49 \pm 0.02$. Absorption maximum for the melipramine solution in 0.1 mol/l hydrochloric acid was observed at the wavelengths of $251 \pm 2 \text{ nm}$ (A_{1284}). Quantitative determination of melipramine in the biological extracts was determined by UV spectrophotometric method after TLC clean-up procedure. The calibration curve was described by the equation of $y = 0.0421 \cdot x - 0.043$. Recovery of the developed isolation method was 54.3 % (RSD=5.5 %).

Conclusions. The effective method of the sample preparation of the biological material considering the melipramine lipophilicity has been proposed.

METHODS OF ANALYSIS IN BIOMEDICAL AND PHARMACUTICAL RESEARCHES

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Introduction. The use of radioactive isotopes for the study of the drugs metabolism and biogenic elements in the human body.

Aim. The use of radioactive nuclides in medicine and pharmacy is explained by the high sensitivity of its methods (10^{-19} g), economic and environmental safety, rapid excretion from the organism, selectivity, accuracy of registration, simplicity and cheapness of use. Radionuclides are used in diagnostics, biomedical researches and medical therapy.

Materials and methods. Synthetic radioactive isotopes are obtained by bombarding the substance with protons, neutrons, alpha particles or high energy gamma rays in the nearest nuclear reactors and charged particle accelerators. Nowadays, artificial radionuclides of all chemical elements that occur in nature have been received.

There are three main methods of using radioactive isotopes.

1. The method of radioactive tracers: radioactive isotopes are used as a "tag". Radioactive tracers - are radioactive nuclides that are injected into simple or complex substances to study their chemical, biological, physiological and other processes using special methods such as radiometry, mass spectrometry and others. Synthetically obtained radioactive nuclides don't differ in chemical and some physical properties from stable isotopes of the same element. The injection of the element's radioactive isotopes into the living organism signals about the movement of the entire mass of atoms of the exact element. In the investigated objects radionuclides are detected by their identification characteristics: by type of radiation energy and half-life. The application of this method allows studying complex metabolic processes, the path and topography of the element in the body. As a rule short-lived isotopes are usually used as radioactive "tags", for example: ^3H , ^{14}C , ^{32}P , ^{35}Ca , ^{59}Fe , ^{131}I , ^{60}Co , ^{24}Na , ^{95}Nb etc.

2. Methods that use high penetrating radiation: are used to determine the structure of molecules.

3. Methods using the effect of radiation itself: are used to study the distribution of substances in the body, their migration routes, mechanisms of reactions and quantitative analysis.

Results and discussion. Radioisotope diagnostics (RD) makes it possible to recognize diseases and study the functions of organs and body systems in normal and pathological conditions. For this purpose, a number of methods are used in the RD: the method of dilution, the method of studying the rate of excretion