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DETERMINATION OF FRUCTANS CONTENT IN SOME PLANT ANTIDIABEIC MIXTURES

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Diabetes mellitus is one of WHO's priority issues. It requires immediate resolution as the epidemiological situation is gaining alarming proportions –

the number of diabetic patients is increasing every year along with the number of deaths and disabilities due to the development of angiopathies. According to the official information of International Diabetes Federation (2019), the number of patients is projected to increase to 642 million by 2040 [1].

Therefore, the optimization of pharmacotherapy, search and study of new drugs with hypoglycemic activity for the prevention and treatment of this disease and its dangerous complications is a top issue of modern pharmacy and medicine.

One of these areas is using the plant remedies, either as monotherapy for the prevention or in the mild stages of the disease or in the combination with traditional therapy in more severe forms of the disease. Phytotherapy is a justified method for the prevention and treatment because it has some advantages, such as relatively low toxicity, mild pharmacological effects and possibility to be used for long periods without significant side-effects, and it often well combines with synthetic drugs, has a complex activity through a number of biologically active compounds [2, 3, 4]. Particular attention deserve the combinations of different medicinal plants, because such plant mixtures will have more biologically active substances that will influence on the all links of the pathogenetic mechanism of development of diabetes mellitus and its complications [5, 6, 7, 8].

Thus, the aim of our research was to determine the quantitative content of fructans by spectrophotometric method in the plan antidiabetic mixtures.

The objects of study were the plant antidiabetic mixtures No. 3 (*Urtica dioica* leaf, *Cichorium intybus* roots, *Rosa majalis* fruits, *Elymus repens* rhizome, *Taraxacum officinale* roots) No. 4 (*Arctium lappa* roots, *Elymus repens* rhizome, *Zea mays* columns with stigmas, *Helichrysum arenarium* flowers, *Rosa majalis* fruits), No. 7 (*Inula helenium* rhizome with roots, *Helichrysum arenarium* flowers, *Zea mays* columns with stigmas, *Origanum vulgari* herb, *Rosa majalis* fruits, *Taraxacum officinale* roots), No. 13 (*Cichorium intybus* roots, *Elymus repens* rhizome, *Helichrysum arenarium* flowers, *Rosa majalis* fruits, *Zea mays* columns with stigmas), No. 19 (*Urtica dioica* leaf, *Taraxacum officinale* roots, *Vaccinium myrtillus* leaf, *Rosa majalis* fruits, *Mentha piperita* herb), which have proven hypoglycemic, hypolipidmic, antioxidant properties [9, 10, 11, 12, 13, 14]. It was used the herbal raw materials harvested in June – August 2019 in Ternopil region and Charpathians (*Vaccinium myrtillus* leaf) (Ukraine) during the study.

The quantitative content of the fructans was determined by spectrophotometric method using spectrophotometer Shimadzu (Japon). 3.00 g of each sample of crushed plant mixture was extracted by 100 mL of water at the water bath under reflux at 80 °C for 1 hour. To prepare an initial solution the extracts were cooled, filtered and the volumes were completed to 100 mL by

water. To prepare a tested solution 2 mL of an initial solution was placed into 100 mL volumetric flask and 50 mL of 5 % hydrochloric acid was added. The obtained solution was hydrolysed at the water bath under reflux for 2 hours. Than 2.0 mL of cooled hydrolysate was placed into 50 mL volumetric flask and added 5 % hydrochloric acid to the mark. To prepare a comparison solution 2 mL of the initial solution was placed into 50 mL volumetric flask and added 5 % hydrochloric acid to the mark. The absorbance of the tested solutions were measured at a wavelength of 285 nm relative to the compensatory solution. The total content of fructans in the studied plant mixtures was calculated as 5-Hydroxymethyl-2-furaldehyde and it represents the average of five determinations. Statistical processing and data analysis were performed using Statistica v 10.0 program package for Microsoft Office.

The results of spectrophotometric determination showed that the plant mixture No. 3 contains 6.39±0.01 % fructans, the plant mixture No. 4 – 2.79±0.01 %, the plant mixture No. 7 – 2.96±0.01 %, the plant mixture No. 13 – 3.79±0.01 % and the plant mixture No. 19 – 4.93±0.01 %. Fructans are very important biologically active substances for the treatment and prevention of diabetes because they have hypoglycemic, hypolipidemic and detoxifying properties.

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