

APPLICATION OF HIGH PERFORMANCE LIQUID CHROMATOGRAPHY METHOD FOR QUANTITATIVE ANALYSIS OF GLYCYRRHIZIC ACID IN THE COMPOSITION OF DRY EXTRACT “FLEGMEN”

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The results of determining the amount of glycyrrhizin acid in the dry extract “Flegmen” using high-performance liquid chromatography are presented. The composition of the dry extract “Flegmen” includes local plants - Regel's Zopnik (*Phlomisregelii* M.Pop .), Turkestan motherwort (*Leonurusturkestanicus*L.), peppermint (*Menhtapiperita* L.), naked licorice (*Glycyrrhizaglabra* L.). According to pharmacopoeial article No. 42 uz-0979-2022, the biologically active substance - glycerrisin in the dry extract “Flegmen” was analyzed by high-performance liquid chromatography. It has been established that its content in 1 g of dry extract is 1.39% and corresponds to the indicator specified in the regulatory document - not less than 1%.

Key words: dry extract, glycyrrhizin acid, “Flegmen”, high-performance liquid chromatography, sedatives, Regel's Zopnik, Turkestan motherwort, peppermint, licorice.

Relevance. These days in our lives there is an increasing number of health problems associated with stress, long working hours, chronic fatigue, lack of sleep, tension and unpleasant memories. Often, when it comes to choosing a drug that will effectively help the patient in such cases, the first prescriptions from doctors begin with sedatives. Sedatives contain groups of drugs of different chemical composition, which are of plant and synthetic origin, reduce emotional stress and irritability, have a moderate sedative effect, and also help improve sleep. The main use of sedatives is for the treatment of mild forms of neuroses, neurasthenia and sleep disorders. These effects are carried out through a regulatory effect on the central nervous system, enhancing inhibition processes in it or suppressing excitation processes.

According to the World Federation of Neuroscience

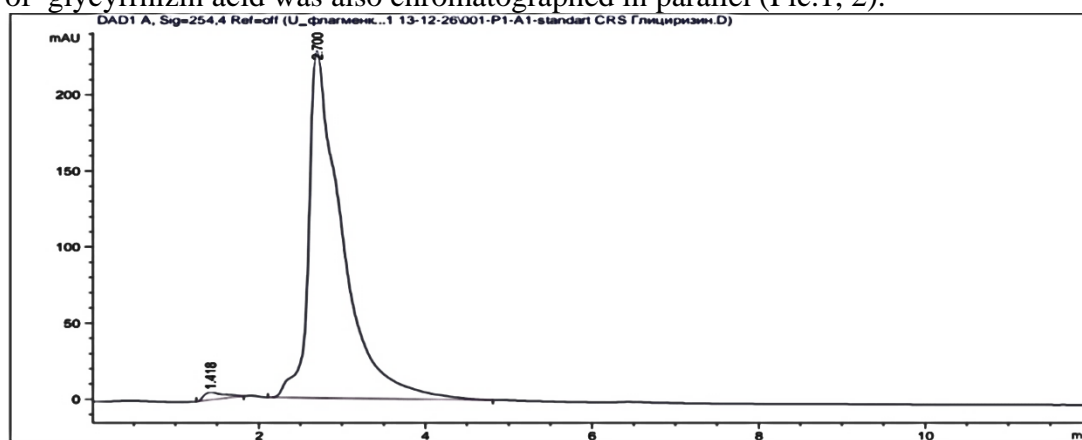
(The World Federation of Neurology World Brain Day 2023) dated June 29, 2023, there are more than a billion people worldwide suffering from neurological diseases. Currently, every ninth patient in central nervous system hospitals dies from this disease [1, 2]. The new pandemic can be cited as one of the main reasons for this. Diseases of the central nervous system lead to an increased number of deaths, especially among people with disabilities and the elderly. Considering this, it is important to conduct scientific research to expand the range of high-quality drugs against diseases of the central nervous system produced in our country, ensuring their quality using reliable and modern analytical methods. In addition, the choice of drug form is of paramount importance [1].

Purpose of the study. The purpose of the study is to determine the amount of glycyrrhizin acid in the dry extract “Flegmen”, which has a calming effect, using the high-performance liquid chromatography method. The composition of the dry extract “Flegmen” includes the

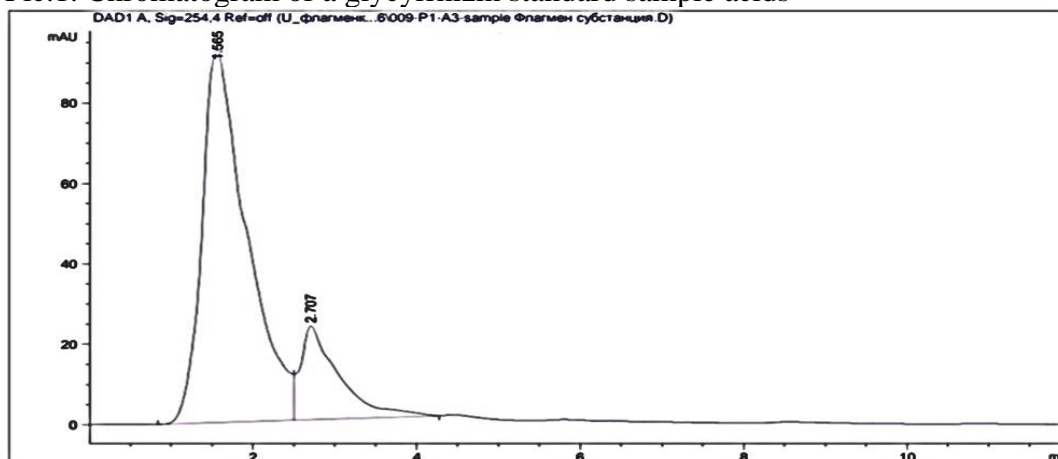
main active ingredient - glycyrrhizin , obtained from a collection consisting of plants: Zopnik Regel , motherwort of Turkestan, peppermint, licorice in the ratio (3: 3: 2: 2), respectively. Dry extract, according to regulatory technical documents (F C 42-Uz-0979-2022), 1 g of dry extract must contain at least 1% glycyrrhizin acid. To determine the amount of glycyrrhizin acid in the dry extract " Flegmen ", the method of high-performance liquid chromatography was used - a modern physicochemical method, widely used today in chemical laboratories, which has a very wide range of capabilities and provides reliable results when analyzing the composition of complex mixtures of biologically active substances [2].

Materials and methods . 1 g of precisely weighed drug was placed in a 100 ml volumetric flask, dissolved in a 50 ml mobile phase using a powerful stirrer, the volume of the solution was adjusted to the mark with solvent, mixed and filtered through a Millipore membrane filter with a pore volume of 0.45 μm . 20 μl of the resulting solution was analyzed on a high-performance liquid chromatograph in a column measuring 150x3.0 mm filled with Zorbax particle size 3.5 microns, ultraviolet radiation detector. The process was repeated 5 times. The analysis was carried out under the following conditions, which are indicated in the literature [3, 4]: the composition of the mobile phase consists of acetic acid, acetonitrile , methanol and water, respectively, in a ratio of 1: 35: 20:44.

Wavelength -254 nm , flow rate -1.0 ml/min, thermostat temperature - at room temperature. A chromatogram of the studied dry extract “ Flegmen ” was obtained, and a standard sample of glycyrrhizin acid was also chromatographed in parallel (Pic.1, 2).



Pic.1. Chromatogram of a glycyrrhizin standard sample acids



Pic.2. Chromatogram of dry extract " Flegmen "

Results and its discussion . The resulting chromatogram shows a peak with a retention time of 2.70 min. corresponds to glycyrrhizin acid (see chromatogram of a standard sample of glycyrrhizin acid - Pic. 1.). The content of glycyrrhizin acid (x) in the dry extract " Flegmen " in percent was determined by the formula:

$$x = \frac{S_{ГРК}}{\sum S_{и}} * 100$$

where: S_{ГК} is the peak area of the standard sample of glycyrrhizin acid,

$\sum S_{и}$ - peak area of the components of the dry extract " Flegmen " under study.

obtained as a result of quantitative analysis of the dry extract "Flegmen " are presented in the table.

Table.

Results of quantitative analysis of the dry extract " Flegmen " using high-performance liquid chromatography

Index	Regulatory document	Analysis results
Glycyrrhizic acid content	FS 42 Uz-0979-2022 not less than 1% in the composition of the drug	1.39 %

The quantitative content of glycyrrhizin acid in the dry extract " Flegmen ", according to the results of its study using high-performance liquid chromatography, is 1.39%.

Conclusions: As a result of analyzing the content of glycyrrhizin acid in the dry extract " Flegmen " using high-performance liquid chromatography, it was found that the content of glycyrrhizin acid in the dry extract " Flegmen " is 1.39% and corresponds to the amount established by regulatory documents.

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ПРИМЕНЕНИЕ МЕТОДА ВЫСОКОЭФФЕКТИВНОЙ ЖИДКОСТНОЙ ХРОМАТОГРАФИИ ДЛЯ КОЛИЧЕСТВЕННОГО АНАЛИЗА ГЛИЦИРРИЗИНОВОЙ КИСЛОТЫ В СОСТАВЕ СУХОГО ЭКСТРАКТА «ФЛЕГМЕН»

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Представлены результаты определения количества глицирризиновой кислоты в сухом экстракте "Флегмен" методом высокоэффективной жидкостной хроматографии. В состав сухого экстракта "Флегмен" входят местные растения - Зопник Регеля (*Phlomis regelii* M. Pop.), пустырник туркестанский (*Leonurus turkestanicus* L.), мята перечная (*Mentha piperita* L.), солодка голая (*Glycyrrhiza glabra* L.). Согласно фармакопейной статье № 42 uz-0979-2022, биологически активное вещество – глицерризин в сухом экстракте "Флегмен" проанализирован методом высокоэффективной жидкостной хроматографии. Установлено, что его содержание в 1 г сухого экстракта составляет 1,39 % и соответствует показателю, указанному в нормативном документе - не менее 1%.

Ключевые слова: сухой экстракт, глицирризиновая кислота, "Флегмен", высокоэффективная жидкостная хроматография, седативные средства, Зопник Регеля, пустырник туркестанский, мята перечная, солодка голая.