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DETERMINATION OF THE CONTENT OF BIOLOGICALLY ACTIVE SUBSTANCES COMPOUNDS OF POLYPHENOLIC NATURE IN THE DRY EXTRACT "LEOFLOMIS"

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The article presents the data on the study of the polyphenolic composition of the dry extract "Leoflomis" obtained from the herb Regel's zopnik (Phlomis regelii M. Pop.) and Turkestan motherwort (Leonurus turkestanicus L.), which has a sedative effect. For the first time, a polyphenolic analysis was performed by HPLC in a dry extract of Leoflomis. As a result of the work carried out, it was found that the dry extract of Leoflomis contains rutin, hyperoside campferol, isoramnetin and hypolaetin. The largest number is routine (28.2946). Thus, the presence of the above-mentioned polyphenolic compounds in the dry extract indicates the prospects for the development of drugs with antioxidant and sedative activity and will be taken into account in subsequent studies to standardize the Leoflomis dry extract.
Key words: dry extract, herb of Regel's zopnik and Turkestan motherwort, polyphenolic compounds, HPLC method.

Introduction

It is known that polyphenols are secondary metabolites of plants or organic compounds synthesized by them. In other words, these are molecules that are found in plants. Due to the wide variety of polyphenols and the plants in which they are contained, these compounds are subdivided depending on the source of origin, the function of polyphenols and their chemical structure; where flavonoids are the main ones. All the beneficial properties of polyphenols have not yet been studied, since this group of substances is very extensive and diverse. However, it is known that most polyphenols are powerful antioxidants and have anti-inflammatory effects. Polyphenols help fight cell damage caused by free radicals and components of the immune system [1,2]. Numerous studies also indicate that polyphenolic compounds play an important role in maintaining health, they have antiviral, anti-allergenic, antifungal, antitumor, anti-inflammatory, antioxidant, sedative and other effects. The main sources of polyphenols are plants [3,4, 5]. Previously, we developed a technology for obtaining a dry extract "Leoflomis" from a collection containing medicinal plants Zopnik regel and motherwort Turkestan by maceration [6,7,8]. One of the promising plants on the basis of which the possibility of creating potential preparations of plant origin containing a complex of biologically active substances (BAS) can be the herb Regel's zopnik (Phlomis regelii M. Pop.) and Turkestan motherwort (Leonurus turkestanicus L.) growing on the territory of the Republic of Uzbekistan, in particular in Tashkent, Zhizzakh, Samarkand, and Surkhandarya regions [9]. Previously conducted technological and pharmacological studies have shown the expediency of developing a technology for obtaining a dry extract from the above medicinal herbs, focused on the active groups of BAS- flavanoids, which cause its sedative effect, since when studying the specific activity of collecting Regel's Zopnik and Turkestan motherwort, its sedative effect

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has been proven, which can be explained by the compounds of phenolic nature [10, 11]. At the same time, there is no scientific data on the research of the polyphenolic composition in the dry extract of Leoflomis. Based on the above, the aim of the study is to study polyphenolic compounds in Leoflomis dry extract by high-performance liquid chromatography (HPLC).

MATERIALS AND METHODS:

The determination of polyphenolic compounds was carried out using HPLC using the isocratic elution mode and a diode-matrix detector (DAD). Acetonitrile and a buffer solution were used as the mobile phase. Spectral data were studied in the spectral range from 200 to 400 nm. Extraction was carried out on 70% ethanol twice at 70-750C for 3 hours with intensive stirring in solvent: plant ratios of 90:20. The solutions are filtered and combined. Take an aliquot of 1 ml and dilute 9 ml with an acetonitrile solvent system: buffer (acetate) 70:30. Centrifuged and filtered through a membrane filter. Chromatography conditions: Chromatograph - Agilent Technologies 1260. The mobile phase is acetonitrile buffer solution (30:70) (isocratic mode). pH=2.92 15-20 min. Injection volume is 5 µl. The velocity of the mobile phase is 0.75 ml/min. The column is Eclipse XDB – C18. 5.0 microns, 4.6x250mm. The detector is a diode-matrix detector, with wavelengths of 254, 320, 381nm. Results and discussions. The results of the conducted studies of the polyphenolic composition of the dry extract "Leoflomis" are shown in Table 1. HPLC results confirm the presence of flavanoids such as rutin, hyperoside, campferol, isoramnetin and hypolaetin. As a result of the HPLC analysis, with the maximum possible reliability for this method, it was concluded that five main polyphenolic compounds were present in the extract.

Table 1

The results of the study of polyphenolic compounds of the dry extract "Leoflomis" by HPLC

Holding time, min	Height, min.	Square, mAU*s	Concentration, %	Name of polyphenolic compounds
2.494	0.1463	760.90814	28.2946	Routine
3.167	0.1086	12.80046	0.2209	Kaempferol
3.286	0.1242	17.67831	0.3051	Isoramnetin
2.830	0.0944	249.81332	3.8940	Hyperoside
4.897	0.2087	19.00555	0.2962	Hypolaetine

As can be seen from Table 1, rutin is the most common of the flavonoids. From various sources such as PubMed / Medline, Science Direct, Scopus, Google Scholar, SpringerLink and Web of Science, the data obtained indicate that rutin found in Leoflomis dry extract has a sedative, analgesic, hypotensive, estrogen-like effect. Rutin is part of a complex of therapy aimed at restoring hormonal balance. It is prescribed to stimulate the production of glucocorticoids, normalize the synthesis of norepinephrine, adrenaline. Rutin is prescribed for neurodegenerative processes [13]. In addition, kaempferol has been identified in the dry extract of Leoflomis. It is known from the literature that kemferol has a wide range of pharmacological effects on inflammation, oxidation and regulation of tumors and viruses. Kaempferol has multiple therapeutic effects on liver diseases. A large number of preclinical studies have confirmed the positive role of kaempferol in the prevention and treatment of breast cancer [14,15]. Flavone isoramnetin is known for its anticoncerogenic activity, and hypolaetin has a hypoglycemic effect with alloxan diabetes. Hyperazide has a sedative effect and is used to treat

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insomnia, general anxiety and increased excitability. The active components are able to calm the central nervous system and improve overall health [16,17]. Based on the conducted scientific research, it can be concluded that the polyphenolic compounds included in the dry extract "Leoflomis" have a pronounced sedative effect, and in the future it will be possible to standardize to obtain a solid dosage form of sedative action.

Conclusion

As a result of the work carried out, it was found that the dry extract of Leoflomis contains rutin, hyperoside campferol, isoramnetin, hypolaetin and the largest amount is rutin (28.2946). Thus, the presence of the above-mentioned polyphenolic compounds in the dry extract indicates the prospects for the development of drugs with antioxidant and sedative activity and will be taken into account in subsequent studies to standardize the Leoflomis dry extract.

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