Proceedings of International Scientific-Practical Conference «Sustainable Development Goals: Youth Policy and Innovative Technologies», February 15-16, 2023, Oguz Han Engineering and Technology University of Turkmenistan, Ashgabat, Turkmenistan

INVESTIGATIONS ON PHYTOCHEMICAL ANALYSIS OF LICORICE EXTRACT

Serdar Gedayev Rejepbayevich[1*], Rozyyeva Ogulnur Charyyevna[2]

[1,2]*Oguz Han Engineering and Technology University of Turkmenistan, Ashgabat, Turkmenistan.*

[*]Corresponding author

DoI: https://doi.org/10.5281/zenodo.7782987

Licorice belongs to the genus Glycyrrhiza, and it is one of the most widely used medicinal plants in turkmen folk medicine. The underground stems (stolons) and roots of this plant have been used by mankind for 4 thousand years and are considered the "father of medicinal herbs" [1, 2].

The purpose of the scientific study was to analyze the phytochemical composition of the root. For this purpose, the split roots were placed in a drying oven at 40oC for 3 days to dry. It was then crushed in a mechanical grinder and ground into a powder. 30 grams of the obtained powder was placed in a solution of 320 ml of methanol (50%) for 72 hours. 150 ml of the methanol extract was taken and placed in a rotary evaporator at a temperature of 55-60°C. After evaporation of methanol, the final volume of the solution was 50 ml and the extract was used for phytochemical studies.

Phytochemical analysis revealed the presence of flavonoids, terpenes, tannins and glycosides in the extract. The obtained results are shown in figure 1 and table 1.

Table 1. Preliminary phytochemical analysis of water-methanol extract of Glycyrrhiza glabra roots ((+) substance presence; (-) lack of substance; * in small quantities)

No	Phytochemical compounds	Investigations	Results
1	Carbohydrates	Benedict test	(-)*
2	Proteins	Ninhydrin test	(-)
3	Flavonoids	NaOH solution test	(+)
4	Terpenoids	Salkowski test	(+)
5	Saponins	Buble test	(+)
6	Tannins	Ferric Chloride	(+)
7	Glycosids	Keller-Killany test	(+)
8	Phenolic compounds	Ferrous sulfate test	(-)

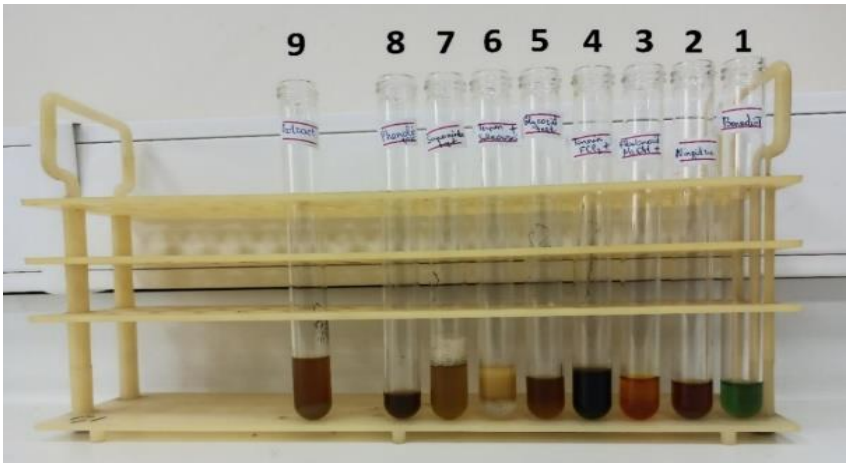


Figure 1. Phytochemical analysis results

Glycyrrhizic acid prepared from Glycyrrhiza glabra extract based on literature data was obtained for UV spectral analysis. A solution of glycyrrhizic acid with a concentration of 100 µg/ml was prepared and the wavelength of the UV spectrophotometer was scanned between 200 and 800 nm. A 70% alcohol solution was taken as standard.

Spectral analysis (figure 2) was performed using an SP-UV 500 DM spectrophotometer (Spectrum Instruments). The highest peak was at a wavelength of 234 nm. In literature sources, the standard wavelength of glycyrrhizic acid is 254 nm, which means that the obtained glycyrrhizic acid is closer to the standard [3].

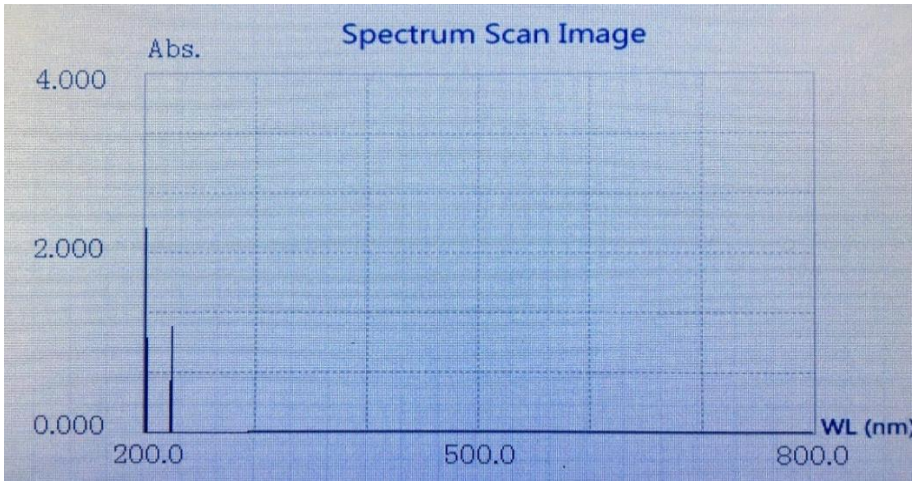
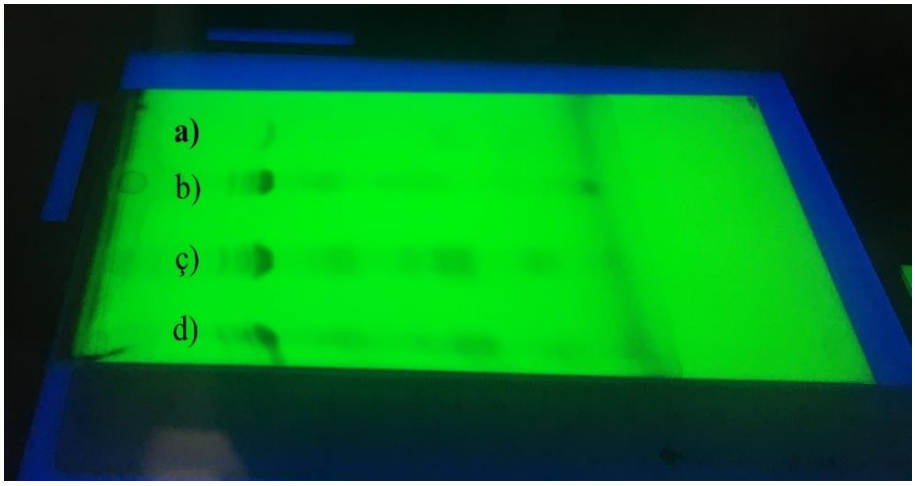


Figure 2. UV spectrum of the root extract. Glycyrrhizic acid gives a peak at 234 nm

A check solution, a standard solution and a reference solution were prepared for TLC analysis. To prepare the test solution, the extract was mixed with alcohol and water (7:3). The stirred solution was heated for 5 min and cooled. After cooling, it was filtered.

To prepare the standard solution, 50 mg of glycyrrhizic acid was mixed with a 7:3 solution of 1 mL of alcohol and water.

The lead solution was prepared by mixing butyl alcohol, water and acetic acid in a ratio of 7:2:1. TLC plates were prepared using a silica gel solution. Plates were stored in a running solution system (Camag TLC chamber) and visualized under UV light (UV lamb Camag) at 254 nm. Figure 3 shows the path of glycyrrhizin and the extracts prepared in different solutions.



International Journal of Multidisciplinary Research Transactions
ISSN (Print):2663-2381, ISSN(Online):2663-4007
www.ijmrt.in

Figure 3. Thin layer chromatograms of the extract obtained in different solutions compared with standard glycyrrhizin: a) Standard glycyrrhizin; (b) Aqueous extract of rhizome; c) Extract of the root in methanol; (d) Ethanol extract of burdock root

As we can see in the figure 3, glycyrrhizin forms a band, which indicates its purity. The presence of several bands in the extracts prepared in different solutions means that they contain many phytochemical compounds [3, 4].

The RF value (retention factor) is calculated by dividing the passage of the test solvent in the TLC analysis by the passage of the solution. The RF value was also calculated for glycyrrhizin and was equal to 0.42 cm.

RF= solvent flux/solvent
RF= 5cm/12cm = 0.42cm

As a result, a phytochemical analysis of the plant (*Glycyrrhiza glabra*) growing in the country was carried out and the groups of biologically active substances found in its composition were determined.

REFERENCES

[1]. Gurbanguly Berdimuhamedov. Medicinal plants of Turkmenistan. vol. XII. Ashgabat 2020.
[2]. M. Öztürk et al., Liquorice, Springer Briefs in Plant Science, 2017.
[3]. S. Chauhan, N. Gulati, U. Nagaich – Glycyrrhizic acid: extraction, screening and evaluation of anti-inflammatory properties – Ars Pharm. 2018; 59(2): 61-67.
[4]. D. Thakur, Abhilash, A. Jain and G. Ghosal – Evaluation of Phytochemical, Antioxidant and Antimicrobial Properties of Glycyrrhizin Extracted from Roots of Glycyrrhiza Glabra – Journal of Scientific & Industrial Research Vol 75, August 2016, pp. 487-494