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SIGNIFICANCE OF FLAVONOIDS AS QUALITY INDICATORS IN THE PHARMACEUTICAL STANDARDIZATION OF GLYCYRRHIZA GLABRA L. RAW MATERIAL

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Introduction. The quality of medicinal plant raw materials is one of the key factors determining their suitability for pharmaceutical applications. Although the identification of morphological and botanical characteristics enables the authentication of plant raw materials, the qualitative and quantitative parameters of biologically active constituents must also be monitored in order to comprehensively assess their pharmaceutical value.

Glycyrrhiza glabra L. belongs to the Fabaceae family and is a perennial medicinal plant whose roots and rhizomes are considered important natural raw materials in the pharmaceutical industry. The plant contains triterpenoid saponins, flavonoids, flavanones, chalcones, isoflavonoids, and other phenolic compounds [1].

Glycyrrhizin is considered one of the key components in the standardization of licorice. However, assessing the quality of a medicinal plant with a complex phytochemical composition on the basis of a single compound does not fully reflect its chemical characteristics. Therefore, the investigation of flavonoids as additional quality indicators expands the possibilities for the comprehensive assessment of the raw material [2].

Main part. *G. glabra* contains biologically active constituents such as liquiritin, liquiritigenin, isoliquiritin, isoliquiritigenin, and glabridin. Their combined analysis makes it possible to assess the raw material not only according to the content of a single compound but also on the basis of a broader phytochemical profile. In particular, glabridin is an important constituent for the chemical characterization of *G. glabra* raw material. Studies conducted on *G. glabra* samples collected in Uzbekistan have identified glabridin in the underground parts, whereas leaf samples differed in terms of the predominance of the major flavonol glycosides-rutin or isoquercitrin. These findings demonstrate the presence of phytochemical variability among local licorice samples [3].

The chemical composition of the raw material may vary depending on genotype, geographical origin, soil and climatic conditions, vegetation period, harvesting time, plant organ, as well as drying and storage conditions. Therefore, the comparative assessment of licorice raw materials obtained from different regions using uniform analytical criteria is of considerable importance for pharmaceutical standardization.

High-performance liquid chromatography (HPLC) is one of the effective methods for conducting such analyses. It enables the separation of individual flavonoids, their identification by comparison with reference standards, and their quantitative determination



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[4]. The simultaneous analysis of components such as liquiritin, liquiritigenin, isoliquiritin, isoliquiritigenin, and glabridin makes it possible to characterize the specific phytochemical profile of the raw material.

The assessment of the commodity-chemical quality of medicinal plant raw materials also requires a comprehensive approach. In addition to traditional parameters such as appearance, moisture content, ash content, and extractive substances, it is advisable to take into account the quantitative content of biologically active constituents [5]. From this perspective, the evaluation of flavonoids in *G. glabra* as additional quality indicators may be important for comparing different raw material samples, selecting promising samples for pharmaceutical processing, and assessing their potential for obtaining standardized extracts.

The regional investigation of the phytochemical composition of naturally growing and cultivated licorice resources in Uzbekistan is of particular importance [6]. Identification of raw materials rich in target biologically active constituents and determination of their quality parameters provide a scientific basis for the efficient utilization of local medicinal plant resources.

Such an approach makes it possible to evaluate licorice not only as a primary plant raw material but also as a promising source for obtaining standardized extracts and biologically active substances. Consequently, the chemical composition of the raw material may be regarded as one of the factors determining its commercial value for pharmaceutical applications.

Conclusion. The evaluation of flavonoid composition as an additional quality indicator in the pharmaceutical standardization of *Glycyrrhiza glabra* L. raw material is of both scientific and practical significance. The qualitative and quantitative determination of constituents such as liquiritin, liquiritigenin, isoliquiritin, isoliquiritigenin, and glabridin by HPLC enables a comprehensive characterization of the phytochemical properties of licorice raw material.

The combined application of flavonoid parameters and traditional commodity-chemical criteria expands the possibilities for comparing raw materials obtained from different sources, selecting high-quality samples, and identifying promising raw materials for pharmaceutical processing.

Investigation of *G. glabra* samples growing in Uzbekistan using this approach may provide a basis for further research aimed at standardizing local medicinal plant resources, scientifically assessing their commodity-chemical value, and developing high-value-added pharmaceutical products.

REFERENCES:

1. Hayashi H., Hattori S., Inoue K., Khodzhimatov O., Ashurmetov O., Ito M., Honda G. Field survey of *Glycyrrhiza* plants in Central Asia (3). Chemical characterization of *Glycyrrhiza glabra* collected in Uzbekistan // Chemical and Pharmaceutical Bulletin. - 2003. -Vol. 51, No. 11. -P. 1338–1340.



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2. Simmler C., Jones T., Anderson J.R., Nikolić D.C., van Breemen R.B., Soejarto D.D., Chen S.N., Pauli G.F. Species-specific standardisation of licorice by metabolomic profiling of flavanones and chalcones // *Phytochemical Analysis*. -2014. -Vol. 25. -P. 378–388. DOI: 10.1002/pca.2472.
3. Jiang Z., Wang Y., Zheng Y., et al. Ultra-high-performance liquid chromatography coupled with triple quadrupole mass spectrometry and chemometric analysis of licorice based on the simultaneous determination of saponins and flavonoids // *Journal of Separation Science*. -2016.
4. Simmler C., Anderson J.R., Gauthier L., et al. Identification and chemical standardization of licorice raw materials and dietary supplements using UHPLC-MS/MS // *Journal of Agricultural and Food Chemistry*. -2016. -Vol. 64, No. 42. -P. 8062–8070. DOI: 10.1021/acs.jafc.6b02954.
5. Pastorino G., Cornara L., Soares S., Rodrigues F., Oliveira M.B.P.P. Liquorice (*Glycyrrhiza glabra*): A phytochemical and pharmacological review // *Phytotherapy Research*. -2018. -Vol. 32, No. 12. -P. 2323–2339.
6. Wang C., Chen L., Xu C., Shi J., Chen S., Tan M., Chen J., Zou L., Chen C., Liu Z., Liu X. A comprehensive review for phytochemical, pharmacological, and biosynthesis studies on *Glycyrrhiza* spp. // *The American Journal of Chinese Medicine*. -2020. -Vol. 48, No. 1. -P. 17–45. DOI: 10.1142/S0192415X20500020.

