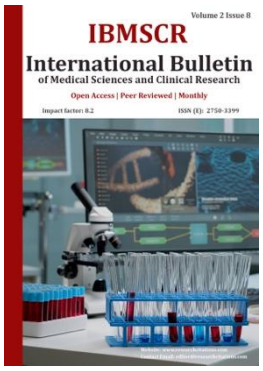

STUDY OF THE PROSPECTS FOR DEVELOPING ANTIDIABETIC PHYTOPREPARATIONS BASED ON LOCAL MEDICINAL PLANTS OF UZBEKISTAN

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Abstract

Diabetes mellitus remains one of the most significant medical and social problems worldwide. The increasing prevalence of type 2 diabetes in Uzbekistan creates the need for the development of effective, affordable, and safe antidiabetic medicines. In recent years, particular attention has been paid to herbal medicines due to their relatively low toxicity, availability, and complex pharmacological activity. Uzbekistan possesses rich reserves of medicinal plants with potential hypoglycemic properties, including licorice, milk thistle, rosehip, barberry, and chicory. This article investigates the prospects for developing antidiabetic phytopreparations based on local medicinal plants and evaluates their technological potential in pharmaceutical production. The study analyzes scientific literature, pharmacognostic characteristics, extraction technologies, and pharmaceutical forms suitable for antidiabetic herbal preparations. The results indicate that the use of local plant raw materials can contribute to the development of import-substituting medicines and improve pharmaceutical independence in Uzbekistan. Particular attention is paid to the technological processes involved in obtaining dry extracts and producing solid dosage forms.

Keywords

diabetes mellitus, phytopreparations, medicinal plants, pharmaceutical technology, Uzbekistan, dry extracts, antidiabetic activity, herbal medicines

Introduction

Diabetes mellitus is considered one of the fastest-growing chronic diseases globally. According to international medical reports, the number of patients diagnosed with diabetes continues to rise annually, especially in developing countries. In Uzbekistan, changes in lifestyle, dietary habits, and reduced physical activity have contributed to the increasing incidence of type 2 diabetes among different age groups.

Modern antidiabetic therapy includes synthetic hypoglycemic agents and insulin preparations. However, long-term use of synthetic drugs may cause adverse reactions, including gastrointestinal disturbances, hepatotoxicity, and metabolic complications. Therefore, scientific interest in herbal medicines with antidiabetic activity has increased considerably in recent years.

Uzbekistan has favorable climatic conditions for cultivating medicinal plants rich in biologically active compounds. Plants such as licorice (Glycyrrhiza glabra), milk thistle (Silybum marianum), rosehip (Rosa canina), chicory (Cichorium intybus), and barberry (Berberis vulgaris) are widely distributed throughout the country and possess medicinal properties confirmed by scientific studies.

Materials and Methods

The present study was based on the analysis of scientific literature, pharmacopeial sources, and pharmaceutical technological data related to antidiabetic medicinal plants used in Uzbekistan. Scientific articles published by Uzbek and foreign researchers between 2018 and 2025 were reviewed.

The following research methods were applied:

- Comparative analysis of medicinal plants with hypoglycemic activity;
- Evaluation of extraction technologies for obtaining biologically active compounds;
- Analysis of pharmaceutical dosage forms suitable for herbal antidiabetic preparations;
- Assessment of technological characteristics of dry extracts.

Special attention was paid to pharmaceutical technological processes including selection of plant raw materials, drying and grinding, extraction, concentration, drying of extracts, and production of tablets and capsules.

Results and Discussion

The conducted analysis demonstrated that medicinal plants cultivated in Uzbekistan possess considerable pharmaceutical potential for the development of antidiabetic phytopreparations. Among the studied plants, licorice and barberry showed the most promising hypoglycemic properties due to the presence of flavonoids and alkaloids affecting carbohydrate metabolism.

Dry extracts are considered one of the most promising pharmaceutical forms because they possess improved stability, convenience in transportation, and accurate dosage control. In addition, dry extracts can easily be incorporated into tablets and capsules.

Studies conducted by Uzbek pharmaceutical researchers have shown that combined herbal compositions may exhibit synergistic effects. For example, combinations of licorice and milk thistle extracts not only demonstrate hypoglycemic activity but also contribute to liver protection, which is particularly important for diabetic patients with metabolic disorders.

Despite the advantages of phytopreparations, several challenges remain. Standardization of herbal raw materials, variability of active compound concentration, and stability of extracts require additional technological and pharmacological studies.

Conclusion

The study demonstrated that local medicinal plants of Uzbekistan possess significant potential for the development of effective antidiabetic phytopreparations. Pharmaceutical technological approaches including optimized extraction methods, production of dry extracts, and formulation of solid dosage forms provide opportunities for creating modern herbal medicines with stable quality indicators.

The use of local plant raw materials may contribute to reducing dependence on imported pharmaceuticals and improving the availability of antidiabetic treatment for the population. Further scientific investigations should focus on pharmacological evaluation, clinical studies, and standardization of herbal preparations in accordance with international pharmaceutical requirements.

Table 1. Medicinal Plants with Potential Antidiabetic Activity in Uzbekistan

Medicinal plant	Main active compounds	Potential pharmacological effect
Glycyrrhiza glabra	Glycyrrhizin, flavonoids	Hypoglycemic, hepatoprotective

Silybum marianum	Silymarin	Antioxidant, liver protection
Rosa canina	Vitamin C, polyphenols	Metabolic regulation
Berberis vulgaris	Berberine	Blood glucose reduction
Cichorium intybus	Inulin	Improvement of carbohydrate metabolism

Diagram 1. Stages of Antidiabetic Phytopreparation Development

Selection of medicinal plants
↓ Drying and grinding
↓ Extraction process
↓ Concentration of extract
↓ Dry extract production
↓ Tablet/capsule formulation
↓ Quality control and standardization

Table 2. Advantages of Herbal Antidiabetic Preparations

Parameter	Herbal preparations	Synthetic drugs
Toxicity	Low	Moderate to high
Availability	High	Depends on import
Cost	Relatively affordable	Often expensive
Complex pharmacological effect	Present	Limited
Long-term safety	Higher	Requires monitoring

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