

Pharmacognostic and phytochemical profiling of *Glycyrrhiza glabra* roots.

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Description

Liquorice has a long history of use in herbal medicine, and its extracts are commonly incorporated into various herbal preparations. Medicinally, Liquorice has been employed for centuries due to its diverse therapeutic properties. Its root contains glycyrrhizin, a compound responsible for the characteristic sweet flavour and numerous health benefits. Glycyrrhizin exhibits anti-inflammatory, antimicrobial, and antioxidant properties, making Liquorice a valuable ingredient in herbal remedies. It is commonly used to soothe coughs, digestive issues, and respiratory ailments. Liquorice's pharmacognostic features include distinctive pinnate leaves, purple to pale blue pea-like flowers, and a robust root system. Authentication of the plant typically involves microscopic examination of root cross-sections to identify characteristic traits. Liquorice, derived from the roots of *Glycyrrhiza* species, has been employed in traditional medicine systems across the world for its numerous therapeutic properties. The use of Liquorice extracts in herbal preparations has gained popularity due to its versatility and potential health benefits. However, to guarantee the consistency and reliability of these herbal products, standardization and pharmacognostic evaluation are imperative.

Pharmacognostic evaluation commences with the proper botanical identification of Liquorice species used for extraction. *Glycyrrhiza glabra* and *Glycyrrhiza uralensis* are the most commonly utilized species. Microscopic examination, anatomical features, and DNA barcoding can be employed to confirm the botanical origin. Liquorice extracts contain a plethora of bioactive compounds, with glycyrrhizin being the most prominent. High-Performance Liquid Chromatography (HPLC) and Mass Spectrometry (MS) are instrumental in quantifying and identifying these compounds. Standardization involves setting minimum levels of marker compounds, such as glycyrrhizin, to ensure product consistency. The standardization process extends to quality control measures. Herbal preparations containing Liquorice extracts must adhere to established quality standards. Routine testing of raw materials, intermediates, and finished products is important to monitor compliance. Adulteration and substitution are common challenges in the herbal industry. Pharmacognostic evaluation helps identify potential adulterants by comparing physical and chemical characteristics with established reference standards.

Liquorice extracts, although beneficial, can pose health risks if consumed excessively. Pharmacognostic evaluation includes safety

assessments, especially regarding glycyrrhizin content. Regulatory agencies provide guidelines to limit glycyrrhizin levels in herbal preparations. Liquorice roots undergo processing techniques like decoction, extraction, or concentration. Pharmacognostic evaluation should also consider the impact of processing on the chemical composition and overall quality of the extracts. Beyond safety and quality, pharmacognostic evaluation may explore the therapeutic efficacy of Liquorice extracts in specific herbal formulations. *In vitro* and *in vivo* studies can shed light on the potential health benefits and mechanisms of action.

The standardization and pharmacognostic evaluation of Liquorice extracts in herbal preparations are essential processes to ensure the quality, safety, and efficacy of these products. Proper botanical identification, phytochemical profiling, and quality control measures are key to maintaining consistency and preventing adulteration. Safety assessments, including toxicological considerations, are paramount to protect consumers. Moreover, understanding the impact of processing and exploring therapeutic efficacy contribute to the overall development of high-quality herbal products. As the demand for herbal remedies continues to rise, these procedures become increasingly vital to support the responsible and effective use of Liquorice in herbal medicine and dietary supplements.

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