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Traditional Chinese medicine — *Glycyrrhiza uralensis* and *Glycyrrhiza glabra* seeds and seedlings

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Foreword

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Introduction

Liquorice is one of the most frequently used medicinal plants and has been used as a traditional Chinese medicine (TCM) for more than 4 000 years. It is widely used in medicine, food and cosmetics industry worldwide. It is rich in triterpenoids and flavonoids, such as ammonium glycyrrhizinate, glycyrrhizin, liquiritin, liquiritigenin, isoliquiritigenin, isoliquiritin, glabridin, and has antitumor, antimicrobial, antiviral, antiinflammatory, immunoregulatory, antioxidant and other effects. It is included in the Pharmacopoeia of the People's Republic of China, European Pharmacopoeia, Japanese Pharmacopoeia, Korean Pharmacopoeia and United States Pharmacopoeia. It is also used as a sweetener, an antioxidant, an antibacterial agent, a foaming agent and a flavour enhancer. Meanwhile, it is a food additive approved by the European Union, the United States, China and other countries (or regions). Glabridin is recognized as a safe whitening agent because it has a significant inhibitory effect on tyrosinase activity and has low toxicity to melanocytes. Between 2019 and 2021, a total of 119 countries (or regions) engaged in international trade of liquorice products. 3 countries (or regions) only exported and 60 countries (or regions) only imported liquorice products. 56 countries (or regions) both exported and imported liquorice products. It is ranked no. 1 in the priority list of single herbal medicines for developing standards in ISO/TR 23975.

Three original plants, *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza glabra* L. and *Glycyrrhiza inflata* Bat. are defined as liquorice in the Pharmacopoeia of the People's Republic of China, European Pharmacopoeia and Korean Pharmacopoeia. Due to high-intensity anthropogenic activities that cause habitat destruction and uncontrolled exploitation, liquorice resources have become increasingly limited. With the development of artificial cultivation technology geared towards meeting the growing market demands, cultivated varieties of liquorice have become the primary source of liquorice products. At present, only *G. uralensis* and *G. glabra* have realized the large-scale cultivation. High quality seeds and seedlings are the assurance of the efficacy and safety of clinical drug use. In the production of *G. uralensis* and *G. glabra*, the problems of confusion, heterozygosity and uneven quality of seeds and seedlings often occur. At present, an international standard for *G. uralensis* and *G. glabra* seeds and seedlings is absent. Therefore, it is urgent to formulate an international standard for *G. uralensis* and *G. glabra* seeds and seedlings. It is the requirement of the global trade and production. It can ensure the higher productivity and better product quality from origin and benefit seed or seedling trading, plantation and the related pharmaceutical industry.

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