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Traditional Chinese medicine — *Glycyrrhiza uralensis*, *Glycyrrhiza inflata*, and *Glycyrrhiza glabra* root and rhizome

Médecine traditionnelle chinoise — Rhizome et racine de Glycyrrhiza uralensis, Glycyrrhiza inflata *et* Glycyrrhiza glabra

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 249, *Traditional Chinese medicine*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Glycyrrhizae root and rhizoma, also known as Guolao, Lingtong, Sweet grass and Lolium, is the dried root and rhizome of *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza inflata* Bat or *Glycyrrhiza glabra* L. It is included in the Pharmacopoeia of the People's Republic of China, the Japanese Pharmacopoeia, the United States Pharmacopoeia, Korea Pharmacopoeia and European Pharmacopoeia. It has been widely used as an important medicinal herb around the world, such as in China, Japan, Turkey, Greece and Egypt. It's one of the oldest Chinese medicinal herbs which has high levels of bioactive phytochemicals. In ancient times, it was commonly used to treat oral ulcers, indigestion, and hemorrhoids. Besides, this plant has multiple pharmacological properties, including anti-inflammatory, antiviral, antimicrobial, antioxidative, anticancer, and antidiabetic effects.

Licorice products are mainly derived from cultivated *Glycyrrhizae* root and rhizoma plants from China or other Asian countries. For licorice, different extracts have different effects and, in some cases, do not have any effects. Therefore, consistent quality of *Glycyrrhizae* root and rhizoma cultivated is a prerequisite to ensure safety and efficacy in its preparations and production. However, wide variations in bioactive components contents of *Glycyrrhizae* root and rhizoma cultivated were observed, which are influenced by various factors, such as genetic differences, environmental factors, and agronomic practices. In addition, different countries, such as China, Japan and the United States, have different quality standards for the quality markers or other components about *Glycyrrhizae* root and rhizoma.

The establishment of an international standard for *Glycyrrhizae* root and rhizoma is therefore necessary to support its quality consistency, clinical effectiveness, and safety in international trade.

As national implementation may differ, national standards bodies are invited to modify the values given in 5.4, 5.5, and 5.6 in their national standards. Examples of national and regional values are given in Annex C.

Traditional Chinese medicine — *Glycyrrhiza uralensis*, *Glycyrrhiza inflata*, and *Glycyrrhiza glabra* root and rhizome

1 Scope

This document specifies the quality and safety requirements for *Glycyrrhiza* root and rhizome that is derived from the root and rhizome of *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza inflata* Bat *or Glycyrrhiza glabra* L. (Fam. Fabaceae).

This document applies to *Glycyrrhiza* root and rhizome that is sold and used as natural medicines in international trade, including Chinese materia medica (whole medicinal materials) and decoction pieces derived from this plant.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 18664, *Traditional Chinese Medicine — Determination of heavy metals in herbal medicines used in Traditional Chinese Medicine*

ISO 21371, *Traditional Chinese medicine — Labelling requirements of products intended for oral or topical use*

ISO 22217:2020, *Traditional Chinese medicine —Storage requirements for raw materials and decoction pieces*

ISO 22258, *Traditional Chinese medicine — Determination of pesticide residues in natural products by gas chromatography*

ISO 23723:2021, *Traditional Chinese medicine — General requirements for herbal raw material and materia medica*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

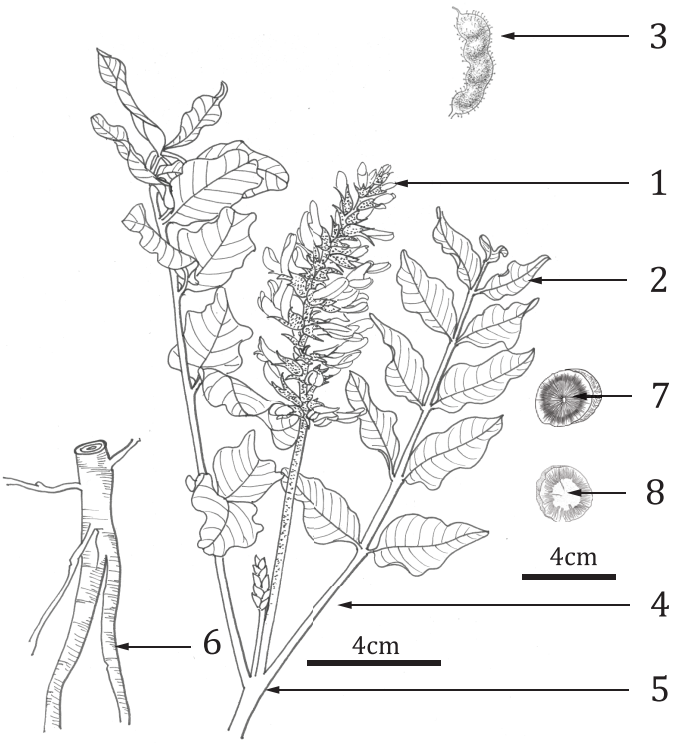
— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

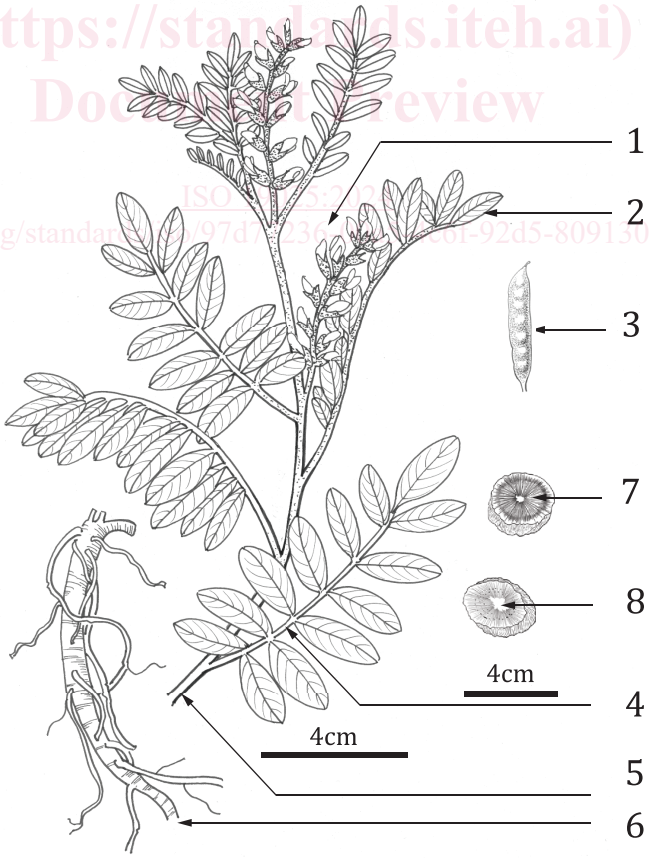
3.1
***Glycyrrhiza* root and rhizome**
dried root and rhizome of *Glycyrrhiza uralensis* Fisch., *Glycyrrhiza inflata* Bat or *Glycyrrhiza glabra* L. (Fam. Fabaceae) and their hybrids

4 Descriptions

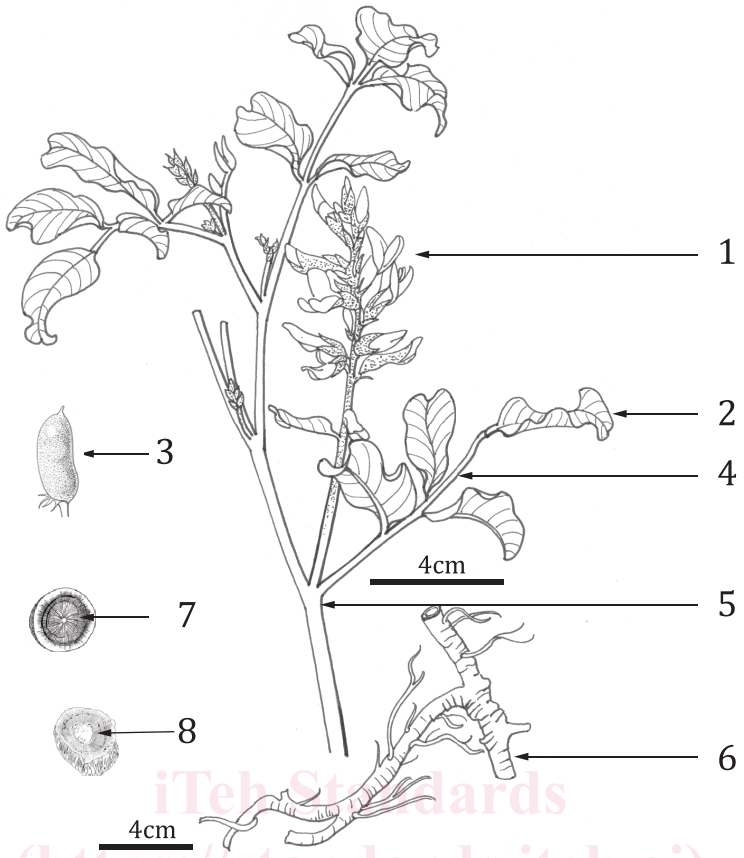
Glycyrrhiza root and rhizome is the dried root or rhizome of *Glycyrrhiza uralensis Fisch.*, *Glycyrrhiza inflata Bat.*, *Glycyrrhiza glabra L.* (Fam. Fabaceae) in the family of Leguminosae shown in Figure 1.



a) Plant of *Glycyrrhiza uralensis* Fisch.



b) Plant of *Glycyrrhiza glabra* L.



c) Plant of *Glycyrrhiza inflata* Bat

Key

1 inflorescence
2 leaf
3 pod
4 petiolate
5 stem
6 root and rhizome
7 xylem, cambium and phloem
8 pith

Figure 1 — Structure of *Glycyrrhiza* root and rhizome

5 Requirements and recommendations

5.1 General characteristics

The following requirements shall be met before sampling.

— *Glycyrrhiza* root and rhizome shall be clean and free from foreign matter.

— The presence of living insects, mouldy root and rhizome and external contaminants which are visible to the naked eye shall not be permitted.

5.2 Morphological characteristics

The morphological characteristics of *Glycyrrhiza* root and rhizome are given in Table 1.

Table 1 — Morphological characteristics of *Glycyrrhiza* root and rhizome

Licorice species	Morphological character
Glycyrrhiza uralensis	The root is cylindrical, 25 cm to 100 cm long, 0,6 cm to 3,5 cm in diameter. The outer bark can be loose or tight. The surface is reddish-brown or greyish-brown, obviously longitudinally wrinkled, furrowed, lenticel-like protruded, and with sparse rootlet scars. The texture is compact, fracture slightly fibrous, yellowish-white, starchy, cambium ring distinct, rays radiate, some with clefts. Rhizomes are cylindrical, externally with bud scars, pith present in the centre of fracture. The odour is slight; the taste is sweet.
Glycyrrhiza. glabra	The texture of root and rhizomes is relatively compact, some branched; the outer bark is not rough, mostly greyish-brown; lenticels are small and indistinct.
Glycyrrhiza inflata	Root and rhizomes are woody and stout, some branched; the outer bark is rough, mostly greyish-brown. The texture is compact, with abundant lignified fibres, and less starchy than *Glycyrrhiza uralensis.* Rhizomes have more and large adventitious buds comparative to *Glycyrrhiza uralensis.*

5.3 Microscopic characteristics

The transverse section is as shown in Figure 2.

— The transverse section reveals several yellow-brown cork layers, and a layer of phelloderm that is 1 to 3 cells thick.

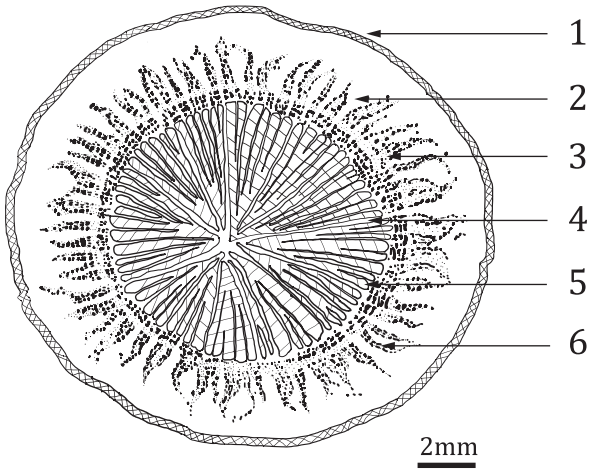
— The cortex exhibits medullary rays, and obliterated sieve portions radiate alternately.

— The phloem exhibits groups of phloem fibres, which are surrounded by crystal cells, with thick but incompletely lignified walls.

— The vessels are accompanied by xylem fibres, which are surrounded by crystal cells, and by xylem parenchyma cells.

— The parenchyma cells contain starch grains and often contain single crystals of calcium oxalate.

— The root doesn't have a pith at the centre, but the rhizome does.



a) *Glycyrrhiza uralensis* root