

# Licorice

## Glycyrrhiza Glabra Root Extract

Loved and hated for its intense and divisive flavor, licorice, scientifically known as *Glycyrrhiza glabra*, is a plant with literally ancient roots. Evidence of its use dates back more than 5,000 years in China, where it was mentioned in the first known Chinese herbal compendium.

In Asia, licorice was long regarded as a precious gift of nature, used in traditional medicine to treat coughs, liver disorders, and even food poisoning. However, its value is not confined to Eastern pharmacology: ancient civilizations of the Near East, such as the Assyrians, also recognized its beneficial properties.

Egypt, Greece, and ancient Rome made extensive use of it, so much so that fragments of its root are said to have been found in Tutankhamun's tomb, as evidence of its cultural and therapeutic significance.

For centuries, licorice was primarily considered a medicinal plant. Only in modern times, thanks to its natural sweetness and unique flavor, has it gained a prominent role in the culinary world, becoming a popular ingredient in candies, beverages, and baked goods.



### COSMETIC EFFICACY\*




- ☒ SKIN-CONDITIONING
- ☒ ANTIOXIDANT
- ☒ EMOLLIENT
- ☒ BRIGHTENING

\*claim derivati e sintetizzati, vedi bibliografia

### NUTRACEUTICAL EFFICACY

- ☒ Digestive system functionality
- ☒ Fluidity of bronchial secretions
- ☒ Wellness of nose and throat
- ☒ Joint functionality

### ARDA NATURA PROPOSAL

-  009855 E.G. LIQUIRIZIA PF - Propylene Glycol, Aqua, Glycyrrhiza glabra Root Extract
-  003137 E.G. LIQUIRIZIA 1:2 PE - Propylene Glycol, Aqua, Glycyrrhiza glabra Root Extract
-  CL001 E.P. LIQUIRIZIA - Propanediol, Aqua, Glycyrrhiza Glabra Root Extract



## Licorice Extract

There are those who love it and those who hate it, there is no middle ground for anyone.

Licorice divides public opinion like few other things.

But what makes this root so special?

Which are its health benefits?

From its scientific name *Glycyrrhiza glabra*, licorice is a plant with deep roots and an equally ancient history. The first traces of its use date back over 5,000 years ago, in China, where it is mentioned in the first existing Chinese herbal. In Asia, this plant has long been considered a true natural treasure, used in traditional medicine to relieve coughs, liver disorders and food poisoning.

Licorice is not just a symbol of oriental pharmacopoeia. Even the ancient civilizations of the Near East, such as the Assyrians, appreciated its beneficial properties. Egypt, Greece and ancient Rome made extensive use of it, so much so that it is said that fragments of its root were found in Tutankhamun's tomb.

For centuries, licorice has been considered primarily a medicinal plant. Only in modern times, due to its natural sweetness, it has begun to gain a prominent place in the diet, becoming part of candies, beverages and baked goods.

Licorice has been used to treat liver diseases, gastrointestinal disorders, oral diseases and various skin disorders as well as being used in gums, sweets, herbs, alcoholic beverages and dietary supplements.

Licorice and its extracts, especially glycyrrhizin, can be taken orally and through the skin (in the form of gels and oils)

### Pharmacology and toxicology of glycyrrhizin

The active metabolites in licorice extract are glycyrrhizic acid and glycyrrhetic acid.

Glycyrrhetic acid is the more potent metabolite, with corticosteroid-like properties.

There are two stereoisomers of glycyrrhetic acid, 18a-glycyrrhetic acid and 18b-glycyrrhetic acid. These two stereoisomers have different bioactivities:

- 18a-glycyrrhetic acid selectively inhibits the 11b-HSD1 enzyme, but not 11b-HSD2
- 18b-glycyrrhetic acid inhibits both the 11b-HSD1 and the 11b-HSD2 enzymes.

The two 11b-HSD isozymes catalyze the interconversion between cortisol and cortisone. The enzyme 11b-HSD1 converts inactive cortisone into active cortisol in glucocorticoid target tissues such as adipose tissue, skeletal muscle, and liver.

11b-HSD1 regulates the tissue-specific effects of circulating glucocorticoid. Thus, 11b-HSD1 inhibition by glycyrrhetic acid could ameliorate insulin resistance and type 2 diabetes.

The major pharmacological mechanisms of glucocorticoid are broadly classified into immunological and metabolic effects. Glycyrrhetic acid is more likely to affect immunological responses. Glycyrrhizin acts as an immunoregulator by inhibiting the activation of T cells and cytokines.

For unresponsive patients or those with intolerance or absolute contraindication to standard therapy, licorice could be considered as an alternative therapeutic strategy. Many studies have been

conducted to determine the effects of glycyrrhizin on the underlying inflammation or autoimmune mechanisms of various skin diseases.

Licorice has an antiviral effect by enhancing T cell-mediated immunity through the regulation of T cell cytotoxicity, interferon- $\gamma$  (IFN- $\gamma$ ), and interleukin (IL)-12.

Licorice also exhibits antibacterial effects against *Helicobacter pylori* and *Streptococci mutans*, which may increase the eradication rate of *H. pylori* and decrease dental decay.

From a metabolic perspective, the active form of glycyrrhizin, glycyrrhetic acid, regulates energy metabolism and fat distribution by inhibiting the 11 $\beta$ -HSD1 enzyme at the adipocyte level.

Table 1. Clinical Implications of Licorice and Its Derivatives and Putative Biological Mechanisms from Clinical Trials

	Pharmacological activities	Mechanism of action
Oral health disorders		
Dental caries	Prevented and reduced dental caries	Antibacterial activity against cariogenic bacteria <i>Streptococci mutans</i> and <i>S. sobrinus</i> and periodontal pathogens <i>Porphyromonas gingivalis</i> and <i>Prevotella intermedia</i>
Xerostomia	Relieved mouth dryness	Increases salivary flow rate
Skin disorders		
Erythema	Relieved erythema and stinging	Reduces the secretion of proinflammatory cytokines
Atopic dermatitis	Decreased edema and itching sense	Enhances cortisol's inhibition of stress reaction and antibody formation
Alopecia areata	Effective and safe treatment of alopecia areata	Inhibits the activation of T cells and cytokines generated by CD4 <sup>+</sup> and CD8 <sup>+</sup> T cells

### Effects on oral health disorders

**Xerostomia.** Dry mouth (xerostomia) is a common symptom in hemodialysis patients. It not only affects oral health, but also the quality of life for patients undergoing hemodialysis. Yu et al. compared the mouthwash intervention effect of pure water and licorice in hemodialysis patients. The licorice mouthwash was effective in increasing salivary flow rate and relieving mouth dryness. Although both intervention groups showed improvement in salivary flow, the subjective feeling of mouth dryness was significantly improved only for the licorice mouthwash group ( $P < .001$ ). Perception of sweetness of licorice may improve the secretion of saliva and symptoms of dry mouth by stimulating the taste receptors.

### Effects on skin disorders

**Erythema.** As glycyrrhizin has been shown to have various pharmacological effects such as anti-inflammatory, anti-immune-mediated cytotoxicity, and anti-allergenic activities, many studies have been conducted to determine the effect of glycyrrhizin on the underlying inflammation of various skin



diseases. Kolbe et al. reported that applying a topical gel with licochalcone A, another natural phenol derivative of glycyrrhizin, significantly reduced erythema induced by shaving and ultraviolet (UV) light. In another study conducted by Weber et al., licochalcone A showed significantly improved average erythema scores and quality-of-life scores as assessed by questionnaires. The anti-inflammatory mechanism of licochalcone A was also demonstrated by an in vitro study conducted by Sulzberger et al. Licochalcone A stimulation significantly reduced prostaglandin E<sub>2</sub>, a proinflammatory mediator, and reduced tumor necrosis factor- $\alpha$ -induced nuclear factor  $\kappa$ B activation.

**Atopic dermatitis.** Glycyrrhizin has been reported to relieve immunoglobulin E-induced type 1 allergic diseases such as allergic dermatitis. Saeedi et al. reported that licorice gel dose-dependently reduced erythema score, edema, and itching sense among 90 atopic dermatitis patients (placebo vs. treatment group and 1% vs. 2% licorice gel, all  $P < .01$ ). The standard treatment for atopic dermatitis is a topical steroid, but some patients are resistant. Glycyrrhizin enhances cortisol's stress reaction inhibition, antibody formation, and inflammation. Thus, glycyrrhizin has the potential to be used more widely as a treatment for atopic dermatitis because it has similar actions to steroids, but with relatively few side effects.

**Alopecia areata.** The cause of alopecia areata is not clear yet, but recent studies have suggested that is a T cell-mediated autoimmune disease. In histological examinations, infiltration of a large number of T lymphocytes around affected follicles has been found. Glycyrrhizin acts as an immunoregulator by inhibiting the activation of T cells and cytokines generated by CD4<sup>+</sup> and CD8<sup>+</sup> T cells. A Chinese study including children (2–14 years of age) found that both glycyrrhizin tablets plus total glucosides of paeony capsule and glycyrrhizin tablets only were effective for treatment of alopecia areata. Another Chinese study also found that glycyrrhizin compound with topical 2% minoxidil was effective for treatment of alopecia areata. [1]

Licorice extracts have several active compounds that may stimulate or suppress melanogenesis. Glabridin, the main ingredient in the hydrophobic fraction of licorice extract, inhibits tyrosinase activity in cultured B16 murine melanoma cells, at concentrations from 0.1 to 1.0 mg/ml, without affecting DNA synthesis. Other active compounds, such as glabrene, isoliquiritigenin, licuraside, isoliquiritin, and licochalcone A, isolated from licorice extracts, were also shown to inhibit tyrosinase activity (Fu et al., 2005; Nerya et al., 2003). Liquiritin has no effect on tyrosinase; however, it causes depigmentation by other mechanisms, and studies demonstrate that a 20% liquiritin cream applied at 1 g/day for 4 weeks is therapeutically effective in melasma (Amer and Metwalli, 2000). [2]

It must be considered that according to the 2008 CIR reports on Glycyrrhiza Glabra (Licorice) Root Extract and Glycyrrhiza Glabra (Licorice) Root Water cosmetic formulators should only use licorice extracts in products in a manner that does not cause depigmentation.

There are several studies in literature in which the extract performed excellent brightening efficacy. [3] [4]

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