URALENSIS LICORICE ROOTS EXTRACT
GLABRIDIN FOR NOVEL SKIN-WHITENING

novel functional ingredients for multi-purpose formulations
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Description

The generic name derives from the Greek *glykys* and *rhiza*, a sweet root. It is a perennial, herbaceous plant with a thick rhizome of a dark, reddish-brown outside, and yellowish inside, from which its stolons and very long rootlets spring. The leaves are imparipinnatisect, that is, formed by a series of almost opposite leaflets, in pairs, and a central, apical leaflet; they are all oval-elliptic, the base being slightly more rounded than the tip. They contain numerous oil glands, which make them sticky. The almost sessile flowers are arranged in raceme, emerging corolla is 5-petalled, of a delicate blue tending towards violet. The fruit is a pod, which contains a dew dark-colored, slightly oval seeds.

There are two main varieties of this plant: the Typica which is known commercially as Spanish licorice and the Glandulifera which is generally called Russian licorice. The former comes from Spain and Italy, the latter from Turkey, U.S.S.R. and the countries around Asia Minor towards India.

Parts used:

Rhizomes & roots

Chemical compounds:

Glycyrrhizin, saponin, glucose, gum, sucrose, flavanoids, phytosterol, glabridin (the active component of licorice extract, which is responsible for its whitening effect.)

Ethnobotany

The root boiled in water with some Maidenhead and figs makes a good drink for those who have a dry cough or hoarseness, wheezing or shortness of breath, and for pains in the chest and lungs. It is also good for paints of the reins, strangury and heat of the urine. The juice is also effectual in all diseases of the lungs and chest. A strong decoction of the root given to children loosens the vowels and takes off feverish heats, which attend costiveness.

The juice or extract is made by boiling the fresh roots in water, straining the decoction and, when the impurities have settled, evaporating it over a gentle heat till it no longer sticks to the fingers. It is better to cut the roots into small pieces before boiling to obtain maximum extraction. A pound (454g) of Liquorice in 3 parts of water boiled down to 2 parts is best for all purposes. The juice can be obtained by squeezing the roots between two rollers. When made carefully, it is sweeter than the root itself.
**Modern uses:** A widely used remedy for coughs and lung complaints. It is soothing, expectorant, and anti-spasmodic. For coughs with sore throat it is often combined with Linseed and made into an infusion. One ounce (28g) of powdered Liquorice and one teaspoonful of powdered Linseed are simmered in 3 pt of water for 20 minutes. The same can be taken for stomach ulcers.

People with high blood pressure should not use Liquorice, as it may exacerbate this condition.

**Whitening properties of Licorice Roots**

Consumer demand for plant derived ingredients is gaining popularity. This keen interest from natural active materials has affected scientists in the cosmetic industry to come up with whitening agents from these natural sources. Toward these developments, cosmetic companies combine a whitening main active and other plant extracts to enhance the efficacy of their products. One remarkable observation that has been proven effective and has a perceivable result is the inclusion of the licorice extract.

The main active component of licorice roots extract is glabridin. This substance inhibits tyrosinase activity, DOPA chrome tautomerase and spontaneous conversion, while also preventing melanin formation.

Tyrosinase is an enzyme relating to the formation of melanin. In Melanocytes, tyrosinase is synthesized in the lysosome on the surface of the rough-surfaced endoplasmic reticulum. Then, it is modified by saccharide and activated in Golgi-associated endoplasmic reticulum of lysosome (GERL). Activated tyrosinase is secreted as a coated vesicle from GERL and is fused with premelanosome. Promelanosome is considered to be formed in Golgi body or smooth-surfaced endoplasmic reticulum. Melanin formation progresses in this way and melanosome is filled with polymerized melanin polymer.

It has been said that tyrosinase is the only enzyme, which is related to the melanin formation. Synthesis after Dopaquinone is considered to be spontaneously occurred. However, recent research indicates that there are three kind of enzyme including tyrosinase, which is related to the melanin formation.

It is reported that in melanin formation pathway by way of 5,6-dihydroxyindole-2-carboxylic acid (DHICA), DOPAchrome to DHICA. Likewise the existence of DHICA oxidase or TRP1 is reported. It catalyzes the conversion of DHICA into Indole-5, 6-quinone-2-carboxylic acid. In addition, these two enzymes have the function to stabilize tyrosinase.

In addition to the inhibition of tyrosinase activity, the inhibition of the activity of these two enzymes would be another important key issue for the development of whitening products.
## Major Whitening Cosmetics in Japan and Asia with Uralensis Licorice Roots Extract

<table>
<thead>
<tr>
<th>Company</th>
<th>Product Name</th>
<th>Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shiseido</td>
<td>Whitess Essence EX</td>
<td>Licorice Roots Extract</td>
</tr>
<tr>
<td>Kose</td>
<td>Whitening Serum FX</td>
<td>Licorice Roots, Alpha-ceramidein (as AHA)</td>
</tr>
<tr>
<td>Christian Dior</td>
<td>Clair de Dior Expert</td>
<td>Licorice Roots, Enzymes Coupled Vitamin C (Vitamin C Derivative)</td>
</tr>
<tr>
<td>Chanel</td>
<td>Blanc Pur-Whitening Serum</td>
<td>Vitamin C (Enzymes Coupled Vit. C ) Licorice Roots</td>
</tr>
</tbody>
</table>
**Inhibitory effect of Licorice Roots Extract on:**

**A. Tyrosinase**

<table>
<thead>
<tr>
<th>Conc. Ext. (mg/ml)</th>
<th>Melanin Formation*</th>
<th>% Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>26 ± 3</td>
<td></td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>-3 ± 1</td>
<td>110 ± 4</td>
</tr>
<tr>
<td>$10^{-4}$</td>
<td>10 ± 1</td>
<td>59 ± 4</td>
</tr>
<tr>
<td>$10^{-5}$</td>
<td>24 ± 2</td>
<td>5 ± 8</td>
</tr>
<tr>
<td>$10^{-6}$</td>
<td>26 ± 2</td>
<td>0 ± 8</td>
</tr>
<tr>
<td>$10^{-7}$</td>
<td>25 ± 2</td>
<td>3 ± 8</td>
</tr>
<tr>
<td>$10^{-9}$</td>
<td>30 ± 2</td>
<td>-15 ± 8</td>
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</tbody>
</table>

* pmol/24h/1.5x10^6 cells

Licorice Roots Extract was added to B16F10 derived Tyrosinase, and melanin formation was measured using $^{14}$C-tyrosine.

**B. Culture Cell**

<table>
<thead>
<tr>
<th>Conc. Ext. (mg/ml)</th>
<th>Melanin Formation*</th>
<th>% Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>398 ± 20</td>
<td></td>
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<tr>
<td>$10^{-2}$</td>
<td>165 ± 10</td>
<td>60 ± 3</td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>237 ± 18</td>
<td>41 ± 5</td>
</tr>
<tr>
<td>$10^{-4}$</td>
<td>319 ± 24</td>
<td>20 ± 6</td>
</tr>
<tr>
<td>$10^{-5}$</td>
<td>364 ± 30</td>
<td>8 ± 8</td>
</tr>
<tr>
<td>$10^{-6}$</td>
<td>389 ± 17</td>
<td>2 ± 4</td>
</tr>
<tr>
<td>$10^{-7}$</td>
<td>394 ± 12</td>
<td>1 ± 3</td>
</tr>
<tr>
<td>$10^{-8}$</td>
<td>410 ± 24</td>
<td>-3 ± 6</td>
</tr>
</tbody>
</table>

* pmol/24h/1.5x10^6 cells

HM-3-KO human melanoma cells were cultured with DMEM, which contains Licorice Roots Extract. After 3 days the cells were harvested, solubilized and the melanogenic activities were measured using $^{14}$C-tyrosine.
C. DOPAchrome Tautomerase

<table>
<thead>
<tr>
<th>Conc. Ext. (mg/ml)</th>
<th>DOPAchrome Tautomerase Activity*</th>
<th>% Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>323 ± 24</td>
<td></td>
</tr>
<tr>
<td>$10^{-2}$</td>
<td>95 ± 10</td>
<td>71 ± 3</td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>82 ± 8</td>
<td>75 ± 2</td>
</tr>
<tr>
<td>$10^{-10}$</td>
<td>82 ± 6</td>
<td>75 ± 2</td>
</tr>
</tbody>
</table>

* nmol/24h/1.5x10⁶ cells

HM-3-KO human melanoma cells were cultured with or without Licorice Roots Extract for 3 days. Then the cells were harvested, solubilized and DOPAchrome tautomerase activity was measured by the concentration of DHICA using HPLC.

D. DHI Production

<table>
<thead>
<tr>
<th>Conc. Ext. (mg/ml)</th>
<th>Spontaneous DHI Production*</th>
<th>% Inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>14.0 ± 2.6</td>
<td></td>
</tr>
<tr>
<td>$10^{-2}$</td>
<td>4.2 ± 0.8</td>
<td>70 ± 6</td>
</tr>
<tr>
<td>$10^{-3}$</td>
<td>3.3 ± 0.7</td>
<td>76 ± 5</td>
</tr>
<tr>
<td>$10^{-10}$</td>
<td>3.1 ± 0.8</td>
<td>78 ± 6</td>
</tr>
</tbody>
</table>

* µg/h/1.5x10⁶ cells

HM-3-KO human melanoma cells were cultured with or without Licorice Roots Extract for 3 days. Then the cells were harvested, solubilized and spontaneous DHI production was measured by the concentration of DHI using HPLC.

Campo Licorice extract was also safety tested using a variety of in vivo and vitro protocols. The CAMVA was used to determine irritancy. This in vitro assay determines the irritancy of a test compound based on its ability to induce hemorrhage on the chorioallantoic membrane of a chicken egg. Two other in vitro tests were run on Campo Licorice Roots Extract-EpiDerm and Epi-Ocular. EpiDerm is a three-dimensional system composed of human epithelial cells to which the test compound is applied. After incubation, the number of viable cells is measured using the MTT conversion assay.
An ET$_{50}$ is determined, which gives an idea of potential skin toxicity. EpiOcular is a three-dimensional system composed of stratified human keratinocytes to which the test material is applied. After incubation, the number of viable cells is measured using the MTTconversion assay. An ET$_{50}$ is determined, which gives idea of possible ocular irritation. Results are shown in Figure I.

![Figure 1. in vitro Toxicology](image)

A fifty-person RIPT was run on Campo Licorice Roots Extract to assess its ability to induce skin irritation and sensitization. The method is modified from the 200 person methodology cited in the reference *Appraisal of the Safety of Chemicals in Food, Drugs, and Cosmetics*. The material was tested at 100% concentration and underwent nine inductive patchings.
Clinical study

Skin care of liver spots

- Excerpt from dermal disease clinic, 15(8) ; 677 ~ 680, 1993 -

Fig. 1 Brown spots on one cheek before treatment

Fig. 2 Four months after treatment with licorice roots extract cream
Clinical study

Treatment of chloasma and senile pigment freckle by Licorice Extract

Fig. 1 Brown spots on the cheek before treatment

Fig. 2 Four months after treatment with Licorice Roots Extract cream
## CAMPO RESEARCH
### TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PRODUCT Name (Campo Research)</th>
<th>CAMPO LICORICE ROOTS EXTRACT (liquid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Trade Names (Campo Research)</td>
<td>LICORICE ROOT EXTRACT (liquid)</td>
</tr>
<tr>
<td>INCI Name</td>
<td>Licorice (Glycyrrhiza glabra) Extract</td>
</tr>
<tr>
<td>PRODUCT #</td>
<td>97.5847</td>
</tr>
<tr>
<td>SPECIES</td>
<td>Glycyrrhiza uralensis</td>
</tr>
<tr>
<td>PARTS USED</td>
<td>Roots</td>
</tr>
<tr>
<td>Glabadarin Content &gt; 40-45%</td>
<td>See COA</td>
</tr>
<tr>
<td>APPEARANCE</td>
<td>Clear, light brown yellow liquid</td>
</tr>
<tr>
<td>ODOUR</td>
<td>Characteristic (minimal)</td>
</tr>
</tbody>
</table>

### Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIFIC GRAVITY (20°C)</td>
<td>1.030 – 1.080</td>
</tr>
<tr>
<td>REFRACTIVE INDEX (20°C)</td>
<td>1.300 - 1.390</td>
</tr>
<tr>
<td>pH (100%)</td>
<td>1.00 - 3.00</td>
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<td>SOLVENT (S)</td>
<td>Water and ethanol</td>
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<tr>
<td>UV VIS SPECTROMETER @279 &amp; 290 nm</td>
<td>2.50 – 3.50</td>
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<tr>
<td>PRESERVATION</td>
<td>None</td>
</tr>
<tr>
<td>TOTAL GERMS</td>
<td>&lt; 100 cfu/ml - non-pathogenic</td>
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<tr>
<td>TOTAL YEAST/MOLD</td>
<td>Nil</td>
</tr>
<tr>
<td>HEAVY METALS (Total) As, Pb, Hg</td>
<td>&lt; Less than 0.5 ppm</td>
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<tr>
<td>COMMENTS</td>
<td></td>
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</tbody>
</table>

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CAMPO RESEARCH SINGAPORE
MATERIAL SAFETY & CONSUMER SAFETY TESTING LABS.
DIV. OF JTC KAMPOYAKI SINGAPORE

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Emergency Fax No: +(65)-63833631(24hours), 63824680, 63228558
EMAIL: mds911@campo-research.com.
References:


Vaya J, Belinky PA, Aviram M, Antioxidant constituents from licorice roots: isolation, structure elucidation and antioxidative capacity toward LDL oxidation, *Free Radic Med 1997;23(2):302-313*


Raggi MA, Bugamelli F, Nobile L, Schiavone P, Cantelli-Forti G, HPLC determination of glycyrrhetic acid in biological fluids, after licorice extract administration to humans and rats, Boll Chimm Farm 1994 Dec;133(11):704-708


Raggi MA, Maffei F, Bugamelli F, Cantelli Forti G, bioavailability of glycyrrhizin and licorice extract in rat and human plasma as detected by a HPLC method, Pharmazie 1994 Apr;49(4):269-272

Saito K, Molecular genetics and biotechnology in medicinal plants: studies by biotechnological plants, Yakugaku Zasshi 1994 Jan;114(1):1-20

Chen XG, Han R, Effect of glycyrrhetic acid on DNA damage and unscheduled DNA synthesis induced by benzo (a) pyrene, Yao Hsuueh Pao 1994;29(10):725-729

Sane T, Licorice, aldosterone and blood pressure, Duodecim 1994;110(10):974-980.
CAMPO GLABRIDIN PURE with hydroxyl group at 4’ position is the pure isolated compound of isoflavan, a sub-class of the polyphenolic flavonoids fraction of licorice roots extract of *Glycyrrhiza uralensis*. It is known for its beneficial effects on the skin due to its anti-inflammatory and antioxidant properties. In addition, *Campo Glabridin Pure* inhibits melanogenesis.

 Campo Glabridin Pure is being the main isoflavan compound of the polyphenolic flavonoid fraction of Uralensis licorice roots extract; of which pure isolate is hydro-alcoholic solubilized and freeze-dried into crystalline powder.

It is known for its beneficial effects on the skin due to its anti-inflammatory and antioxidant properties. In addition, Glabridin inhibits melanogenesis. Some researchers have established that this effect may be due to the inhibition of tyrosinase activity (1,3).

**COSMETIC USAGE**

CAMPO GLABRIDIN PURE with hydroxyl group at 4’ position has several unique properties that are useful for cosmetic applications.

These properties are among others:

* Skin whitening property or the ability to inhibit melanogenesis

* Anti-inflammatory property

* Antioxidant property
**CAMPO GLABRIDIN PURE**, with its unique structure is the main compound as a pure isolate of Isoflavan of the polyphenolic flavonoids fraction of licorice extract is known for its beneficial effects on the skin due to its anti-inflammatory and skin whitening properties (1).

Other Licorice flavonoids such as Glycyrrhizin and glychrrhetinic acid are also known to have anti-inflammatory properties (4).

The pure isolated fraction containing the Isoflavan Glabridin Pure is known to have an inhibitory effect on melanogenesis (3).

Some researchers have established that this effect may be due to the Isoflavan Glabridin’s constituent structure with a hydroxyl group at the 4’ is well-related to the unique functional ability to inhibit tyrosinase activity (1, 2, 3).

Both in-vitro and in-vivo studies were carried out to study the inhibitory effects of Glabridin on melanogenesis and inflammation (2).

**SKIN WHITENING EFFECT / INHIBITION OF MELANOGENESIS**

In a comprehensive study carried out by Yokota, T. et al. (2),

The inhibitory effects of Glabridin on melanogenesis as well as inflammation were examined. The structure-function relationship of Glabridin was also studied.

Topical skin-depigmentation activities of the active component, Glabridin, were examined using UVB-induced pigmented skins of brownish guinea pigs. A 0.5% Glabridin alcoholic solution was applied topically to the skin. Topical application of Glabridin significantly reduced pigmentation induced by UVB radiation on the backs of the brownish guinea pigs.

Skin samples were also taken from each of the Glabridin treated areas for histological studies.

The treated tissue was stained with 0.1% DOPA and the inhibition of melanogenesis was evaluated by counting the number of DOPA-positive melanocytes/mm² under an optical microscope.

Epidermal histological studies performed showed that DOPA-positive melanocytes reduced in number on the skin treated with Glabridin.

Treatment with Glabridin also lightened the skin color due to inhibition of melanogenesis.

The authors concluded that the Glabridin present in Licorice roots inhibits both melanin synthesis and inflammation. They also observed that these properties of Glabridin were related to its structure with hydroxyl group at the 4’.
MECHANISM OF ACTION

Glabridin may inhibit melanogenesis by one of two mechanisms:

1. Inhibition of the production of active oxygen species: \( \text{O}_2^\cdot - \)

2. Inhibition of tyrosine: Human tyrosinase is an essential enzyme, which regulates the production of melanin, a group of brown to black pigments in the skin of humans.

It is a known fact that a number of reactions (e.g. inflammatory, etc.) are induced when human skin is exposed to UV radiation\(^5\).

The membrane phospholipids of the skin tissue are damaged by UV-induced active oxygen. Histological changes occur in the skin that manifest as erythemas and skin pigmentation \(^6,7\).

Active oxygen is one of the species that induces skin pigmentation. Thus, prevention of its production is linked to inhibition of melanogenesis. To test this, an assay was performed to study the inhibitory effect of glabridin on superoxide anion production. As shown in Figure 2, Glabridin inhibited superoxide (active oxygen) formation at concentrations from 0.33 µg/ml to 33.3 µg/ml.

Thus, Glabridin may be useful for treating conditions like melasma or pigmentation of skin due to sun-exposure.
ANTI-INFLAMMATORY EFFECTS

An assay was performed to test the anti-inflammatory activity of **Glabridin** when used for topical application (2).

UVB-induced pigmented skins of guinea pigs were treated with 0.5% **Glabridin** solution. It was observed that **Glabridin** decreased the inflammation induced by UVB irradiation on the skin. The erythema manifested as redness in skin color is indicated by a* values. The extent by which the inflammation decreased was calculated by recording the a* values (of a L*a*b* colorimeter) before irradiation, after irradiation and after the topical application of **Glabridin**. The a* value increases with the appearance of erythema. As shown in Figure 3, the a* values of the skin treated with **Glabridin** were lower than those of the control, indicating a decrease in the inflammation.

![Figure 3. Anti-Inflammatory effect of Glabridin](image)

An assay was performed to determine the inhibitory effect of **Glabridin** on cyclooxygenase activity (2).

Cyclooxygenase is an enzyme that metabolizes arachidonic acid into prostaglandins, which are mediators that initiate the inflammatory cascade reaction. It was observed that addition of 6.25 µg/ml **Glabridin** inhibited the cyclooxygenase activity with respect to the control. The positive control in this experiment was indomethacin, a known cyclooxygenase inhibitor.

![Figure 4. Inhibition of Cyclooxygenase Synthesis by Licorice Extract (Proposed Scheme)](image)
It is believed that **Glabridin** has the anti-inflammatory effect through the arachidonic acid cascade by inhibition to cyclooxygenase \((5, 6, 8)\)

**ANTI-OXIDANT EFFECT**

As discussed in the assay performed to test the inhibition of superoxide production by **Glabridin**, it can be said that **Glabridin** has an antioxidant effect in addition to its skin-whitening (anti-melanogenetic) and anti-inflammatory properties.

**CAMPO GLABRIDIN** PURE is used topically is documented to reduce the amount of corticosteroids in dermatological infections. This is probably by inhibiting 11 - beta hydroxysteroid dehydrogenase which is responsible for the conversion of cortisol to corticosterone and thus, potentiating the effects of steroids \((9, 10)\).

**COSMETIC APPLICATIONS**

**CAMPO GLABRIDIN** PURE possesses potent and effective anti-inflammatory, antioxidant as well as melanogenesis-inhibiting properties. Thus, it would be a good ingredient for various cosmetic and/or medicinal skin care products (e.g. creams, lotions, body wash products, etc.).

**CAMPO GLABRIDIN** PURE is used in skin-whitening creams, and there are a number of patented formulations for this purpose. One patented formula for a skin whitening cream contains 0.05% **GLABRIDIN PURE**, galacturonic acid, lactic acid, kojic acid, ascorbyl palmitate and tocopheryl linoleate. \((11)\)

It is said to lighten the skin color by inhibiting melanin formation, mainly by the inhibition of tyrosinase activity.
# CAMPO RESEARCH
## TECHNICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>PRODUCT Name (Campo Research)</th>
<th>CAMPO LICORICE GLABRIDIN PURE-POWDER</th>
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<tbody>
<tr>
<td>Other Trade Names(Campo Research)</td>
<td>LICORICE ROOT GLABRIDIN EXTRACT-POWDER</td>
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<td>PRODUCT #</td>
<td>97.5847-6</td>
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<tr>
<td>INCI Name</td>
<td>Glycyrrhiza Glabra (Licorice) Rhizome/Root Extract</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Glycyrrhiza Uralensis (Licorice) Root Extract</td>
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<td>EU INCI Name</td>
<td>Glycyrrhiza Glabra Extract</td>
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<tr>
<td>CAS#</td>
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<td>84775-66-6 - Glycyrrhiza Glabra (Licorice) Root Extract</td>
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<td>N/A - Glycyrrhiza Uralensis (Licorice) Root Extract</td>
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<tr>
<td>SPECIES</td>
<td>Glycyrrhiza glabra</td>
</tr>
<tr>
<td></td>
<td>(syn G. glabra Gandilufers)</td>
</tr>
<tr>
<td></td>
<td>Ural Mountains Licorice Roots</td>
</tr>
<tr>
<td>PARTS USED</td>
<td>Autumn harvested Roots</td>
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<tr>
<td>APPEARANCE</td>
<td>Buff Creamy to Creamy White powder, with occasional clumps of fragile granules</td>
</tr>
<tr>
<td>ODOUR</td>
<td>Almost Odourless</td>
</tr>
</tbody>
</table>

- **Specifications**
  - **BULK DENSITY**: 0.30 – 0.50 g/cm³
  - **MELTING POINT**: 185 – 195°C
  - **SOLUBILITY**: Water (>0.50%), Propylene glycol (>9%), Glycerine (>14%) Ethanol- (>20%) |
  - **UV VIS SPECTROMETER @279 & 290 nm**: 2.50 – 3.50 |
  - **PH (1% in AQUEOUS SOLUTION.)**: 2.5 – 4.5. |
  - **PRESERVATION**: None |
  - **TOTAL GERMS**: < 100 cfu/ml - non-pathogenic |
  - **TOTAL YEAST/MOLD**: Nil |
  - **HEAVY METALS (Total) As,Pb,Hg**: < less than 0.5 ppm |

- **Results**
  - See batch lot COA |
  - See batch lot COA |

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**CAMPO RESEARCH SINGAPORE**
**MATERIAL SAFETY & CONSUMER SAFETY TESTING LABS.**
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REFERENCES:


BIBLIOGRAPHY SUMMARIES


The inhibitory effect of glabridin from licorice extracts on melanogenesis and inflammation.

Yokota T, Nishio H, Kubota Y, Mizoguchi M.

Basic Research Laboratory, Kanebo, LTD, Odawara, Kanagawa, Japan.

Glabridin is the main ingredient in polyphenolic flavanoids fraction of licorice extract affecting on skins. In this study, we investigated inhibitory effects of glabridin on melanogenesis and inflammation using cultured B16 murine melanoma cells and guinea pig skins. The results indicated that glabridin inhibits tyrosinase activity of these cells at concentrations of 0.1 to 1.0 microg/ml and had no detectable effect on their DNA synthesis. Combined analysis of SDS-polyacrylamide gel electrophoresis and DOPA staining on the large granule fraction of these cells disclosed that glabridin decreased specifically the activities of T1 and T3 tyrosinase isozymes. It was also shown that UVB-induced pigmentation and erythema in the skins of guinea pigs were inhibited by topical applications of 0.5% glabridin. Anti-inflammatory effects of glabridin in vitro were also shown by its inhibition of superoxide anion productions and cyclooxygenase activities. These data indicated that glabridin is a unique compound possessing more than one function; not only the inhibition of melanogenesis but also the inhibition of inflammation in the skins. By replacing each of hydroxyl groups of glabridin with others, it was revealed that the inhibitory effect of 2'-O-ethyl glabridin was significantly stronger than that of 4'-O-ethyl-glabridin on melanin synthesis in cultured B16 cells at the concentration of 1.0 mg/ml. With replacement of both of two hydroxyl groups, the inhibitory effect was totally lost. Based on these data, we concluded that two hydroxyl groups of glabridin are important for the inhibition of melanin synthesis and that the hydroxyl group at the 4' position of this compound is more closely related to melanin synthesis.

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