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Colloidal Fenugreek Seed Extract

Product Name: Colloidal hydro-glycerin fenugreek seed extract

INCI Name: Glycerin, Aqua, Trigonella foenum-graecum Seed Extract, Benzyl Alcohol, Dehydroacetic Acid

CAS: 56-81-5, 7732-18-5, 84625-40-1, 100-51-6, 520-45-6

Botanical Name: *Trigonella foenum-graecum*

Chemical Classification: Mixture

Functional Category: Skin and hair conditioning agent, humectant, emollient

Extraction Method: The extract is obtained using an ultrasonic extraction method operating at frequencies between 20 and 25 kHz. At these frequencies, ultrasonic waves generate microscopic bubbles within the liquid medium containing the plant material, leading to a phenomenon known as cavitation. Cavitation creates localized conditions of extreme pressure and temperature in the microenvironment surrounding the imploding bubbles. This phenomenon mechanically damages plant cell walls, releasing intracellular active components and significantly increasing extraction speed and efficiency. The process is conducted at a temperature of 25 °C to preserve the stability of heat-sensitive components, such as flavonoids, vitamins, and essential oils. Compared to conventional maceration methods, ultrasonic extraction allows for shorter processing times, higher yields, and better utilization of the botanical raw material. The resulting extract is preserved with a combination of benzyl alcohol (0.86%) and dehydroacetic acid (0.14%), a preservative system approved for use in natural cosmetics and certified by ECOCERT and COSMOS. The extract is water-soluble, allowing easy integration into various water-based cosmetic formulations. The pH value of the finished extract ranges from 4.0 to 6.5, making it suitable for most dermal applications without requiring additional pH adjustments to the formulation.

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Description: Colloidal fenugreek seed extract is a hydro-glycerin suspension rather than a true solution. It is characterized by a cloudy appearance and natural viscosity, as it contains finely dispersed plant material that remains suspended in the liquid rather than fully dissolving. The dispersed phase includes galactomannan-type polysaccharides, proteins, fibrous plant matter, as well as traces of saponins and flavonoids. High molecular weight polysaccharides in particular contribute to the extract's gel-like structure and density, but are not sufficient to maintain full system stability over time. Sedimentation (particle settling due to gravity) occurs over time, which may form a visible sediment at the bottom of the container. This physical instability is characteristic of natural colloidal systems and does not indicate microbiological spoilage or degradation. Therefore, it is necessary to gently shake the extract before each use to ensure uniform distribution of the active compounds. The extract has a slightly viscous consistency and a light yellow to dark amber color. It is suitable for formulations requiring moisturizing, soothing, or conditioning effects on the skin, particularly in serums, gels, lotions, and toners. It helps retain moisture in the surface layers of the skin and hair through the action of natural humectants, while plant mucilages form a protective film that softens and shields the epidermis. The emollient effect helps maintain skin elasticity, and saponins enhance microcirculation, thereby improving tone and promoting more efficient absorption of other active ingredients in the formulation. In hair care products, fenugreek extract acts as a natural conditioner—improving hair texture, reducing breakage, and helping to strengthen the roots. It is particularly suitable for serums and emulsions designed for dry, sensitive, and mature skin, as well as for lotions and masks intended to revitalize thin, weakened, or chemically treated hair.

Bioactive Compounds: Hydro-glycerin fenugreek seed (*Trigonella foenum-graecum*) extract contains a complex profile of bioactive phytochemicals. Prominent among the most significant compounds are steroidal saponins, most notably diosgenin, yamogenin, and tigogenin. These compounds possess pronounced anti-inflammatory and stimulating actions, promote microcirculation, and improve skin tone, while also being known for their role in lipid metabolism regulation and tissue regeneration stimulation. The extract also contains galactomannans, which belong to the polysaccharide group and are known for their strong hydrating properties. They form a thin, non-occlusive film on the skin surface that helps retain moisture, improving skin smoothness and elasticity, while in hair products, they act as natural conditioners, coating the hair strand and protecting it from dryness and environmental damage. The presence of flavonoids such as vitexin, isovitexin, and orientin provides cellular

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antioxidant protection against free radicals, contributing to the slowing of aging processes and the reduction of oxidative stress caused by UV radiation or environmental pollution. Additionally, coumarins, phenolic acids, and alkaloids are present in the composition, further contributing to the extract's protective, soothing, and antimicrobial effects. Plant mucilages naturally present in fenugreek seeds have the ability to form a gel-like film on the skin, providing a mild tightening effect alongside a feeling of a soothing and protected epidermal surface. Due to the synergistic action of all these components, the extract exhibits a broad spectrum of beneficial effects, ranging from hydration and irritation relief to anti-aging and revitalizing actions.

Benefits:

- Helps neutralize free radicals, thereby slowing skin aging
- Acts as a humectant, retaining moisture in the skin to keep it hydrated and elastic
- Reduces skin irritation and inflammation, alleviating conditions such as eczema and acne
- Helps accelerate regenerative processes, making the skin healthier and refreshed
- Stimulates hair growth, strengthens follicles, and reduces hair loss
- Reduces dandruff and balances sebum production, promoting a healthier scalp
- Rich in vitamins and essential fatty acids, providing skin and hair with essential nourishment for recovery

Method of Use: The extract is suitable for use in creams, serums, face and hair masks, as well as lotions. When added to formulations, its recommended concentration typically varies between 5% and 10%, depending on the product type and desired effect. For moisturizing face creams and serums, the usual concentration of hydro-glycerin extract ranges from 2% to 5%. This amount is sufficient to provide the skin with necessary moisture, soothe irritation, and protect against oxidative stress. In hair care preparations, such as shampoos or masks, concentrations can be slightly higher, between 3% and 10%, to leverage its ability to strengthen hair follicles and reduce

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dandruff. In face masks, due to a more intensive effect, the extract concentration can go up to 8%, whereas in body lotions or lightweight creams, the optimal concentration is usually around 3% to 5%. It is recommended to add the extract during the cooling phase of formulation to preserve its active properties, especially since high temperatures can damage delicate bioactive components such as flavonoids and saponins. The combination of water and glycerin carriers facilitates easier absorption into the skin and hair, enhancing overall product efficacy. For external use only.

Note: Fenugreek extract contains colloidal particles, polysaccharides, proteins, and other plant components that do not fully dissolve in a water-glycerin mixture. Phase separation occurs over time; therefore, it is recommended to shake the extract well before use.

Safety: The CIR (Cosmetic Ingredient Review) Expert Panel published a safety assessment in 2012 regarding polysaccharide compounds, including hydro-glycerin seed extract of *Trigonella foenum-graecum* (fenugreek), based on data collected through late 2011. The report concluded that this raw material is considered safe for use in cosmetic products, with no evidence of significant risks regarding irritation, photosensitivity, or systemic toxicity. It notes that fenugreek extracts in leave-on products are most commonly used in very low concentrations—in certain cases as low as 0.00001%. For rinse-off formulations, higher concentrations are permissible due to shorter skin contact time. Because fenugreek seed extract contains active components such as steroidal saponins, flavonoids, and polysaccharides, the Panel recommended caution when formulating products for sensitive skin. In leave-on preparations, concentrations up to 5% are considered safe within good formulation practice, while in rinse-off products, concentrations up to 10% are considered safe, aligning with industry standards.

Animal Testing: In compliance with applicable European legislation (Regulation (EC) No 1223/2009 on cosmetic products), this substance has not been tested on animals. The safety assessment of the raw material is based on available toxicological data, scientific literature, and validated alternative testing methods (*in vitro* and *in silico*). *In silico* refers to testing and assessment methods performed using computer models and simulations rather than laboratory experiments on living organisms (*in vivo*) or cell cultures (*in vitro*). This note confirms compliance with the ban on animal testing

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and serves exclusively for informational purposes regarding further use of the raw material in cosmetic formulations.

GMO: Non-GMO

Vegan: Contains no animal-derived ingredients

Storage and Shelf Life: The product is stable when stored in a cool, dry place. Shelf life: 2 years.

