Avena Lab
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TECHNICAL DATA SHEET

Calendula Extract

Product Name: Water-Glycerin Calendula Extract

INCI Name: Glycerin, Aqua, Calendula Officinalis Flower Extract, Benzyl Alcohol, Dehydroacetic Acid

CAS: 56-81-5, 7732-18-5, 84776-23-8, 100-51-6, 520-45-6

Botanical Name: *Calendula officinalis*

Synonyms: Pot Marigold, Garden Marigold

Chemical Classification: Mixture (botanical extract in a water-glycerin base with preservatives)

Functional Category: Skin and hair conditioning agent, humectant, emollient, with pronounced soothing, regenerating, and anti-inflammatory properties due to the presence of triterpenoid saponins, flavonoids, and carotenoids.

Extraction Method:
The extract is produced using an ultrasonic extraction process employing ultrasound frequencies between **20 and 25 kHz**. At these frequencies, ultrasonic waves generate microscopic bubbles within the liquid containing the plant material, resulting in a phenomenon known as **cavitation**. Cavitation creates localized zones of extremely high pressure and temperature around the collapsing bubbles, mechanically disrupting plant cell walls and releasing intracellular bioactive compounds, thereby significantly improving extraction efficiency and yield.

The extraction process is carried out at **25°C** to preserve thermolabile constituents such as flavonoids, vitamins, and volatile compounds. Compared with conventional maceration techniques, ultrasonic extraction provides shorter processing times, higher extraction yields, and more efficient utilization of botanical raw materials.

The finished extract is preserved with **0.86% benzyl alcohol** and **0.14% dehydroacetic acid**, a preservative system approved for use in natural cosmetics and compliant with **ECOCERT** and **COSMOS** standards. The extract is water-soluble,

allowing easy incorporation into a wide range of water-based cosmetic formulations. The finished extract has a pH ranging from **4.0 to 6.5**, making it suitable for most dermal applications without requiring significant pH adjustment.

Description:
Calendula Extract is a botanical ingredient renowned for its soothing, regenerating, and protective properties, making it particularly valuable in formulations intended for sensitive and reactive skin. It is obtained from the flowers of *Calendula officinalis*, which are naturally rich in bioactive compounds such as flavonoids, triterpenes, saponins, and carotenoids.

These constituents exhibit anti-inflammatory and antioxidant activities, promote epidermal renewal, and support the epithelialization of damaged skin.

Due to its excellent skin compatibility and gentle nature, Calendula Extract is frequently incorporated into cosmetic products designed for infants, individuals with atopic skin, and products intended for delicate areas such as the eye contour.

In daily skincare products—including lotions, facial toners, emulsions, and anti-aging serums—the extract helps reduce redness, soothe irritation, and support the skin's natural regenerative mechanisms. Its balanced activity profile and compatibility with various skin types make it one of the most versatile botanical extracts used in cosmetic formulations.

The extract is **light yellow in color, odorless, and water-soluble.**

Bioactive Compounds:
Calendula Extract contains a complex spectrum of naturally occurring phytochemicals.

Among the most abundant constituents are **flavonoids**, including **quercetin, isorhamnetin, and luteolin**, which function as powerful antioxidants and modulators of inflammatory responses. These compounds stabilize cell membranes and help reduce free radical-induced cellular damage, making them particularly beneficial for sensitive and inflamed skin.

Triterpene alcohols and their esters, including **faradiol, arnidiol, and helenalin derivatives**, represent one of the most biologically active fractions of calendula due

to their pronounced anti-inflammatory activity. These compounds inhibit pro-inflammatory enzymes such as **cyclooxygenase-2 (COX-2)**, helping to reduce localized irritation and supporting cosmetic formulations intended to soothe irritated skin and alleviate mild dermatological discomfort.

The presence of **carotenoids**, particularly **beta-carotene, lutein, and zeaxanthin**, further enhances the protective properties of the extract by helping neutralize oxidative stress induced by UV exposure and supporting the integrity of the skin's lipid barrier. These pigments are also responsible for the extract's characteristic yellow to orange coloration.

Additionally, the extract contains **saponins**, which improve the absorption of active ingredients while providing mild antiseptic activity.

Polysaccharides, especially **arabinogalactans**, exhibit moisturizing and immunomodulatory properties by forming a protective film on the skin surface, reducing transepidermal water loss (TEWL) and helping maintain optimal skin hydration.

Benefits:

- Flavonoids provide antioxidant protection and help reduce skin inflammation.
- Faradiol and its derivatives soothe irritation and reduce redness.
- Beta-carotene, lutein, and zeaxanthin help protect the skin against UV-induced oxidative damage.
- Carotenoids support the integrity of the skin's lipid barrier and improve elasticity.
- Saponins enhance the absorption of active ingredients while providing mild antiseptic properties.
- Polysaccharides form a protective moisture-retaining film on the skin.
- Supports faster regeneration of damaged skin.

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• Particularly beneficial for sensitive, irritated, inflamed, and atopic skin.

Recommended Use:
Water-Glycerin Calendula Extract is widely used as a functional ingredient in cosmetic formulations intended for sensitive, dry, or irritated skin.

Recommended use levels include:

• **Facial toners, micellar waters, and cleansing gels: 1–3%**

• **Moisturizing creams, emulsions, and serums: 3–5%**

• **Products for sensitive skin and the eye area: 1–2%**

• **Hair care products: 2–5%**

The extract is highly compatible with natural preservatives and humectants, making it particularly suitable for **clean beauty** formulations free from harsh synthetic irritants.

The naturally occurring glycerin further enhances the moisturizing performance of the extract.

To preserve the stability of its phytochemical constituents, the extract should be incorporated during the **cool-down phase**, preferably at temperatures **below 40°C**.

For external use only.

Safety:
The **Cosmetic Ingredient Review (CIR) Expert Panel** published its safety assessment of *Calendula officinalis* extracts in **2001**, evaluating various forms of calendula extracts, including aqueous, glycerin, and ethanol extracts.

The panel concluded that calendula extracts are **safe for use in cosmetic products** at concentrations commonly employed in the industry, generally up to **10%**.

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The assessment acknowledged that calendula may naturally contain potentially sensitizing constituents such as trace amounts of essential oils and pollen proteins. However, in properly manufactured cosmetic extracts, these substances are present at very low levels and are not considered to pose toxicological or significant irritation risks.

The CIR evaluation included data from **in vitro** and **in vivo** studies, which demonstrated no significant dermal irritation, photosensitization, or systemic toxicity, even following repeated application.

The panel particularly noted that **water-glycerin calendula extracts**, which contain neither alcohol nor high concentrations of essential oils, represent one of the mildest and most suitable forms for products intended for sensitive skin.

Recommended use levels are:

• **Leave-on products:** up to **5%**

• **Rinse-off products:** up to **10%**

when manufactured according to Good Manufacturing Practice (GMP).

Manufacturers are advised to maintain appropriate quality control and standardized levels of bioactive constituents to ensure consistent product safety.

Animal Testing:
In accordance with **Regulation (EC) No. 1223/2009 on Cosmetic Products**, this ingredient has **not been tested on animals**.

Its safety assessment is based on available toxicological data, scientific literature, and validated alternative testing methods, including **in vitro** and **in silico** approaches.

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The term **in silico** refers to safety assessment methods performed using computer-based models and simulations rather than studies conducted on living organisms (**in vivo**) or cell cultures (**in vitro**).

This statement confirms compliance with the European ban on animal testing and is provided solely for informational purposes regarding the cosmetic use of this raw material.

GMO: Non-GMO

Vegan: Contains no ingredients of animal origin.

Storage and Shelf Life:
Store in a cool, dry place in tightly closed containers. Shelf life is **2 years** under recommended storage conditions.

Country of Origin: China