

TECHNICAL DATA SHEET

Calendula Flower Infused Oil (Lutein Rich)

Product Name: Calendula Flower Infused Oil (Lutein Rich)

INCI Name: Calendula Officinalis Flower Extract, Helianthus Annuus Seed Oil, Prunus Amygdalus Dulcis Oil, Lutein, Tocopherol

CAS: 84776-23-8, 8001-21-6, 8007-69-0, 127-40-2, 59-02-9

Synonyms: Marigold Flower, Pot Marigold, Calendula aurantiaca Kotschy ex Boiss., Calendula eriocarpa DC., Calendula hydruntina (Fiori) Lanza, Calendula prolifera Hort. ex Steud., Calendula × santamariae Font Quer

Chemical Classification: Mixture

Functional Category: Skin Conditioning Agent ~ Occlusive, Skin Conditioning Agent ~ Emollient, Antioxidant

Maceration Type: Ultrasonic maceration, cold process

Method of Production:

Calendula Flower Infused Oil is produced using ultrasonic extraction technology with ultrasound frequencies ranging from 20–25 kHz. At these frequencies, ultrasonic waves generate microscopic bubbles within the oil containing the extract, resulting in a phenomenon known as cavitation. Cavitation creates extreme localized pressure and temperature conditions around the imploding bubbles. These conditions mechanically disrupt plant cell walls, releasing active compounds such as essential oils, flavonoids, carotenoids, and sterols. Extraction is performed at a controlled temperature of 25°C in order to preserve the stability of thermolabile compounds.

Cold-pressed high-linoleic sunflower oil and sweet almond oil are used as carrier oils. The sunflower oil contains a high proportion of essential linoleic acid and only a minor amount of oleic acid. Vitamin E is added as a natural antioxidant to preserve freshness and maintain oil quality while keeping the formulation completely natural. During extraction, the extraction vessel is cooled in an ice-water bath to prevent temperature increase. Ultrasonic treatment is applied in short intervals with pauses between cycles. After completion of the process, the infused oil is filtered to obtain a clear and usable oil.

This extraction method is more efficient than traditional maceration techniques because it provides improved raw material utilization and significantly shorter extraction times.

TECHNICAL DATA SHEET

Description:

Calendula Flower Infused Oil is a lipid extract obtained by macerating Calendula officinalis flowers in vegetable oil. During extraction, a broad spectrum of lipophilic botanical compounds migrates into the lipid phase, among which carotenoids are particularly significant. The most important of these is lutein, a xanthophyll pigment responsible for the oil's characteristic golden-yellow color and one of its most valuable functional bioactive components. Due to its pronounced lipophilic nature, lutein is efficiently extracted into the oil phase during maceration.

In cosmetic formulations, lutein plays an important functional role in protecting the skin from oxidative stress. As a powerful free radical scavenger, lutein contributes to the neutralization of reactive oxygen species generated by UV radiation and environmental pollution. Oils rich in lutein therefore help protect cellular membranes and maintain the integrity of the epidermal barrier.

In addition to its antioxidant role, lutein may also function as a protective factor that reduces oxidation of epidermal lipids. This effect is particularly valuable in formulations intended for sensitive or photo-damaged skin, where oxidative processes often contribute to premature skin aging, loss of elasticity, and uneven pigmentation.

The lipid fraction of the extract also contains other carotenoids, triterpene alcohols and esters, as well as small quantities of flavonoids transferred into the oil during extraction. These compounds contribute to the soothing and regenerative effects of the oil. The oil acts as an emollient that softens the skin and improves elasticity, while the carrier lipids form a protective film on the skin surface and reduce transepidermal water loss.

Estimated Lutein Content:

Visual assessment may provide a rough estimation when spectrophotometric analysis is unavailable. Oils with a very pale yellow color generally contain less than 30 ppm lutein. Clearly golden-yellow oils often contain approximately 50–150 ppm. Pronounced orange-golden coloration usually indicates concentrations of 150–300 ppm, while deep orange shades may suggest carotenoid levels above 300 ppm.

TECHNICAL DATA SHEET

Bioactive Compounds:

Calendula Infused Oil contains a broad spectrum of bioactive compounds that contribute to its soothing, regenerative, and antioxidant properties. Key components include flavonoids, triterpene saponins, carotenoids, sterols, and essential fatty acids.

Flavonoids such as quercetin and isorhamnetin act as powerful antioxidants and help reduce oxidative stress. They also possess anti-inflammatory properties that help soothe irritation and skin redness.

Triterpene saponins, including oleanolic acid and ursolic acid, exhibit pronounced regenerative and anti-inflammatory effects, helping restore damaged skin and reduce symptoms associated with inflammatory skin conditions such as eczema and dermatitis.

Carotenoids, predominantly beta-carotene and lutein, are responsible for the characteristic color of calendula oil and provide strong antioxidant protection. Their presence contributes to neutralizing free radicals and strengthening the skin barrier, thereby improving the skin's resistance to environmental stressors.

Plant sterols such as sitosterol and stigmasterol help stabilize the lipid structure of the skin and support maintenance of the hydrolipidic balance, which is particularly important for dry and sensitive skin.

Essential fatty acids, including linoleic and oleic acid, facilitate easy absorption of the oil and improve skin hydration. Their role in strengthening the skin barrier helps reduce transepidermal water loss and maintain tissue elasticity.

The combination of these bioactive compounds makes Calendula Flower Infused Oil an effective ingredient in formulations intended for skin regeneration, protection, and soothing care.

Benefits:

- Provides strong antioxidant protection due to flavonoid content.
- Exhibits pronounced anti-inflammatory activity and soothes irritated skin.
- Promotes epidermal regeneration and supports repair of damaged skin.
- Protects the skin from oxidative stress and helps slow premature aging.
- Strengthens the skin barrier and reduces moisture loss.

TECHNICAL DATA SHEET

- Improves skin elasticity and contributes to softer, hydrated skin.
- Provides natural protection against environmental aggressors and enhances skin resilience.

Directions for Use:

Calendula Flower Infused Oil may be used alone or incorporated into cosmetic formulations depending on the product type and desired effects. In lip balms and body balms, it is typically used at concentrations of 5–20%, where it contributes soothing and protective properties.

In creams and lotions for sensitive skin, it is commonly used at levels between 2–10%, providing regenerative benefits without leaving an excessively greasy feel. In oil blends for skin care, it may constitute up to 50% of the formulation, especially when intended for treatment of dry or irritated skin areas.

As an additive in soaps, it is generally incorporated at concentrations up to 5% in order to preserve its beneficial properties despite the saponification process. In serums and treatment oils requiring intensive soothing activity, it may be used at levels between 10–30%, depending on the combination with other active ingredients.

Safety in Use:

According to currently available information, there is no specific Cosmetic Ingredient Review (CIR) report dedicated exclusively to Calendula Flower Infused Oil. However, Calendula officinalis has a long history of traditional cosmetic use and is generally considered safe for topical application.

Recommended concentrations in cosmetic products vary depending on formulation type and intended use, but typically range between 2% and 20%. It is always important to follow applicable regulatory guidelines and conduct appropriate stability and safety testing when formulating products containing Calendula Flower Infused Oil.

TECHNICAL DATA SHEET

Animal Testing: In accordance with current European 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). The term “in silico” refers to testing and assessment methods performed using computer-based models and simulations rather than experiments on living organisms (in vivo) or cell cultures (in vitro). This statement confirms compliance with the ban on animal testing and is provided solely for informational purposes regarding the further use of the raw material in cosmetic formulations.

GMO: GMO-free

Vegan: Does not contain animal-derived components

Storage and Shelf Life:

The product remains stable when stored in a cool, dry place away from direct light and heat sources. Shelf life: 2 years.