

TECHNICAL DATA SHEET

Product Name: Lemon Balm Infused Oil

INCI Name: Melissa Officinalis Leaf Extract, Helianthus Annuus Seed Oil, Prunus Amygdalus Dulcis Oil, Tocopherol

CAS Numbers: 84082-61-1, 8001-21-6, 8007-69-0, 59-02-9

Synonyms: Lemon balm infused oil, Melissa oil infusion, Melissa macerate, Infused Melissa Officinalis oil, Lemon balm macerated oil

Chemical Classification: Mixture (botanical extract in plant oils with added antioxidant)

Functional Category: Skin conditioning agent ~ occlusive, skin conditioning agent ~ emollient, antioxidant, skin-soothing agent

Maceration Type: Ultrasonic maceration, cold process

Extraction Method: Lemon balm infused oil is obtained by ultrasonic extraction using ultrasound frequencies of 20–25 kHz. At these frequencies, ultrasonic waves generate microscopic cavitation bubbles in the oil containing the extract. This phenomenon, known as cavitation, creates localized high-pressure and high-temperature conditions as bubbles implode. These mechanical forces rupture plant cell walls, releasing active compounds such as essential oils, flavonoids, carotenoids, and sterols. The process is carried out at 25°C to preserve thermolabile compounds. The carrier oils used are cold-pressed linoleic-type sunflower oil, rich in essential linoleic acid and low in oleic acid, along with sweet almond oil. Vitamin E is added as a natural preservative to maintain freshness and quality while keeping the product completely natural. The mixture is cooled in an ice water bath during extraction to prevent temperature rise, and ultrasound is applied in short intervals. After processing, the oil is filtered to obtain a clear, ready-to-use product. This method is more efficient than traditional maceration techniques, offering better raw material utilization and reduced extraction time.

Description: Lemon balm oil is highly dermocompatible and exhibits gentle yet effective action on sensitive, reactive, or environmentally stressed skin. The presence of flavonoids, phenolic acids, and triterpenes provides strong soothing, anti-inflammatory, and antioxidant effects. Components of the base oils, especially unsaturated fatty acids and

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plant sterols, help restore the lipid barrier, improve elasticity and hydration, and protect the skin from dryness and irritation caused by UV radiation, pollution, or chemicals. This oil is particularly effective at relieving redness, tightness, stinging, and irritation, making it suitable for skin prone to allergies, atopy, or persistent inflammatory conditions. Its mild nature also makes it appropriate for use in products intended for sensitive areas, such as the eye contour, as well as in formulations for children and highly intolerant skin. Lemon balm infused oil integrates well into emulsions, serums, lotions, oil blends, and emulgel systems, especially in preparations targeting skin regeneration, protection, and intensive soothing under external stressors.

Bioactive Compounds:

Lemon balm infused oil contains lipophilic bioactive components extracted from plant cells during ultrasonic processing. The most significant phytochemicals originate from the secondary metabolism of *Melissa officinalis*, encompassing several compound classes with pronounced biological effects. Flavonoids such as apigenin, luteolin, and quercetin contribute to antioxidant defense by neutralizing free radicals and reducing oxidative stress, especially important for UV-exposed and polluted skin. Phenolic acids mainly rosmarinic, caffeic, and ferulic acids exhibit strong anti-inflammatory, antimicrobial, and photoprotective properties, while also stabilizing skin structures and inhibiting inflammatory mediators. Triterpenoid derivatives, especially oleanolic and ursolic acids, support epidermal repair, enhance cell regeneration, and reinforce the skin's natural protective functions. Plant sterols like beta-sitosterol have emollient and anti-inflammatory properties, improve structural cohesion of corneocytes, and reduce transepidermal water loss. Trace amounts of lipophilic derivatives of essential oils typical for lemon balm such as citral, citronellal, and linalool may also be present, contributing to the oil's soothing, refreshing, and mildly antimicrobial profile. These compounds are present at low concentrations, sufficient to exert a beneficial synergistic effect without causing irritation. This complex of phytochemicals makes lemon balm infused oil a high-value functional ingredient for cosmetic products designed to calm, repair, and protect sensitive, damaged, or inflamed skin.

Benefits:

- Soothes irritated and inflamed skin
- Reduces redness and tightness

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- Protects skin from oxidative stress
- Aids in epidermal regeneration
- Strengthens the skin's natural barrier
- Reduces sensitivity and reactivity
- Provides mild antiseptic and refreshing effects
- Enhances skin elasticity and softness
- Suitable for skin prone to allergic reactions
- Safe for use around the eye area

Usage: Lemon balm infused oil is used as a functional botanical extract in oil-based cosmetic formulations and is typically added to the oil phase of emulsions or as an active component in finished products, particularly in formulations processed without heat. Recommended concentrations in facial care, serums, and products for sensitive areas range from 1–5%, while in balms, lotions, and body formulations, it may be used at higher levels up to 10%, depending on the intended effect and skin type. It can be used alone or in combination with other infusions or plant oils for synergistic effects. Due to its mild profile and excellent tolerance, it is also suitable for products designed for children and individuals with highly reactive skin. It should be incorporated into stable formulations, protected from light and heat, to preserve the activity of its bioactive compounds.

Animal Testing: Not tested on animals

GMO: GMO-free

Vegan: Contains no animal-derived components

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