

TECHNICAL DATA SHEET

Product Name: Linden Flower Infused Oil

INCI Name: Tilia Cordata Flower Extract, Helianthus Annuus Seed Oil, Prunus Amygdalus Dulcis Oil, Tocopherol

CAS Numbers: 84929-52-2, 8001-21-6, 8007-69-0, 59-02-9

Botanical Name: Tilia cordata Mill.

Synonyms: Linden Oil, Linden Flower Macerate, Linden Flower Macerated Oil, Lime Blossom Oil, Lindenblütenöl, Huile de macération de tilleul, Olio di tiglio, Hársfavirág olajos kivonat

Chemical Classification: Mixture

Functional Category: Skin conditioning agent ~ Occlusive; Skin conditioning agent ~ Emollient; Antioxidant

Maceration Type: Ultrasonic maceration, cold process

Extraction Method: Linden flower infused oil is obtained by ultrasonic extraction using ultrasound at frequencies of 20–25 kHz. These ultrasonic waves generate microscopic bubbles within the oil containing the plant material, resulting in a phenomenon known as cavitation. Cavitation creates localized zones of high pressure and temperature around the imploding bubbles. These extreme conditions mechanically break down plant cell walls, releasing active constituents such as essential oils, flavonoids, carotenoids, and sterols. Extraction is performed at 25°C to preserve heat-sensitive components. The carrier oils used are cold-pressed linoleic-type sunflower oil rich in essential linoleic acid with low oleic acid content and sweet almond oil. Tocopherol (vitamin E) is added as a natural preservative to maintain freshness and quality while ensuring the product remains entirely natural. During the process, the extraction vessel is cooled in an ice-water bath to prevent temperature rise, and ultrasonic treatment is applied in short intervals. After processing, the macerate is filtered to obtain a clear, usable oil. This method is more efficient than traditional maceration, offering better yield and shorter extraction time.

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Description: Linden flower is rich in flavonoids, antioxidants, and polysaccharides that soothe irritated skin, reduce redness, and help maintain hydration. Its calming properties are particularly valuable for dry, sensitive, or inflamed skin. The presence of tocopherol (vitamin E) enhances oil stability by preventing oxidation while acting as a potent antioxidant that protects the skin from oxidative stress and premature aging. This botanical macerate is widely used in natural and high-end cosmetic formulations for its regenerative and softening properties. It is especially suitable for dry, sensitive, and mature skin care, as well as after-sun or irritation-relief products. Its mild and nourishing profile makes it appropriate for all skin types, including redness-prone and reactive skin.

Bioactive Compounds: Linden flower infused oil contains a variety of bioactive compounds with synergistic effects. Flavonoids such as quercetin, apigenin, and kaempferol contribute to antioxidant protection by neutralizing free radicals. Tannins provide a mild astringent effect that reduces redness and irritation. Polysaccharides act as natural humectants, improving the skin's moisture retention capacity. The extract also contains essential oils with trace amounts of geraniol, farnesol, and linalool, which impart a gentle, relaxing scent and mild antiseptic activity. Phytosterols, including beta-sitosterol, aid in restoring the skin's lipid barrier, enhancing resilience and reducing transepidermal water loss. The presence of phenolic acids such as chlorogenic and ferulic acid further boosts the oil's antioxidant potential, shielding skin from UV damage and premature aging. Sesquiterpene lactones, naturally occurring in linden flowers, offer anti-inflammatory and calming benefits, particularly useful for sensitive skin. Tocopherol supports oil stability and protects cell membranes from oxidative damage. The carrier base sunflower and sweet almond oil is rich in essential fatty acids like oleic, linoleic, and palmitic acid, which nourish, soften, and help regenerate the skin while preventing dryness.

Benefits:

- Provides strong antioxidant protection and reduces oxidative stress.
- Offers anti-inflammatory action and strengthens the skin's natural defenses.
- Reduces redness and irritation with a mild astringent effect.
- Enhances moisture retention and prevents skin dehydration.
- Delivers a mild antiseptic effect and a calming natural scent.
- Soothes irritated skin and exhibits antibacterial properties.

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- Strengthens the lipid barrier and minimizes transepidermal water loss.
- Supports skin regeneration and improves elasticity.
- Protects from UV-induced damage and slows down skin aging.
- Calms inflammatory reactions and alleviates skin sensitivity.
- Nourishes, softens, and revitalizes the skin while protecting it from dryness.

Usage Instructions: In emulsified systems, it is used as part of the oil phase, typically in concentrations ranging from 5% to 15%, depending on skin type and the overall lipid content of the formulation. For dry and reactive skin, the dosage may be increased to 20%, whereas for oily skin formulations, lower concentrations are preferred to maintain a light texture. In anhydrous formulations such as balms or oil serums, linden macerate can serve as a base carrier oil, especially when combined with other oils with anti-inflammatory properties. It also contributes a subtle relaxing scent and supports dermal tolerance. In biphasic toners or cleansing milks, it is used in smaller doses (up to 5%) to calm the epidermis and mitigate potential irritation from active substances in the aqueous phase. Although stable, it is recommended to store linden oil in a cool, dark place. In preservative-free formulations, it should be used within a shorter shelf-life.

Animal Testing: Not tested on animals

GMO Status: Non-GMO

Vegan: Contains no animal-derived ingredients

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