Avena Lab
Farmadria d.o.o. Since 1991.

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TECHNICAL DATA SHEET

Product Name: Lemon Peel Infused Oil

INCI Name: Citrus Limon (Lemon) Peel Extract (10:1), Helianthus Annuus Seed Oil, Prunus Amygdalus Dulcis Oil, Tocopherol

CAS: 84929-31-7, 8001-21-6, 8007-69-0, 59-02-9

Botanical Name: Citrus limon (L.) Osbeck

Synonyms: Citrus medica var. limonum, Lemon peel

Chemical Classification: Mixture (botanical extract in oil base with antioxidant)

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

Maceration Type: Ultrasonic maceration, cold process

Production Method: Lemon peel infused oil is obtained through ultrasonic extraction using ultrasound at frequencies between 20-25 kHz. These waves generate microscopic cavitation bubbles in the oil-extract medium. The implosion of these bubbles creates intense microenvironments of pressure and temperature that mechanically rupture plant cell walls, releasing active compounds such as essential oils, flavonoids, carotenoids, and sterols. Extraction is conducted at 25°C to preserve thermolabile components. The carrier oils used are cold-pressed linoleic-type sunflower oil (rich in essential linoleic acid) and sweet almond oil. Tocopherol is added as a natural antioxidant to maintain freshness and stability. The suspension vessel is cooled in an ice-water bath to prevent heat buildup, and ultrasound is applied in short intervals with pauses. After processing, the infused oil is filtered to yield a clear and usable product. This method is more efficient than traditional maceration, offering better yield and shorter processing time.

Description: The oil has a mild, refreshing citrus peel aroma and a moderate golden-yellow hue. Its pronounced emollient properties allow easy spreadability, enriching formulations with plant lipids, while leaving the skin soft, elastic, and protected from transepidermal water loss. Tocopherol further stabilizes the oil and protects cell membranes

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from oxidative damage. In cosmetic products, it serves as a natural antioxidant and emollient, particularly in creams, lotions, serums, lip balms, and massage oils. Its gentle nature and lack of synthetic additives make it suitable even for delicate areas, such as the region around the eyes. The presence of limonoids and polyphenols may help even out skin tone and provide a refreshing effect on tired skin. Since no heat or aggressive solvents are used, the bioactives remain intact, making this oil highly suitable for clean beauty formulations and products with natural certifications. It has a stable structure, pleasant texture, and is non-comedogenic, meaning it does not clog pores, making it ideal for skin prone to inflammation and acne.

Bioactive Compounds: The bioactive components of lemon peel infused oil primarily originate from secondary plant metabolites found in Citrus limon peel. Through lipid-based extraction, compounds like limonoids (especially limonin and nomilin) with antioxidant and soothing properties are transferred into the oil. Flavonoids such as hesperidin, eriocitrin, and diosmin support capillary stability, act against free radicals, and help even out skin tone, beneficial for skin prone to hyperpigmentation and visible capillaries. Trace amounts of ascorbic acid (vitamin C) may be present, possibly in derivative form such as ascorbyl palmitate. Minimal amounts of essential oil constituents like limonene, citral, linalool, and geraniol enter the oil, contributing antimicrobial and refreshing effects, while also enhancing the natural aroma of the product. Their concentrations remain within regulatory safety limits, particularly in diluted formulations. Plant waxes and phytosterols contribute to skin barrier reinforcement and offer mild anti-inflammatory effects. Carotenoids, notably beta-carotene, provide added protection against oxidative stress caused by UV radiation. The oil base, composed of sunflower and almond oils, enriches the formula with essential fatty acids-oleic, linoleic, and palmitic acids-crucial for epidermal lipid barrier repair and maintenance. This synergistic profile makes lemon peel infused oil a valuable ingredient for formulations targeting oxidative stress, uneven tone, mild inflammation, and loss of skin elasticity.

Benefits:

- Antioxidant skin protection
- Soothes and refreshes complexion
- Evens out skin tone
- Non-comedogenic (does not clog pores)

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- Moisturizes and restores the skin barrier
- Mild antimicrobial effect
- Natural citrus aroma
- Suitable for delicate areas
- Ideal for clean beauty formulations

Application: Lemon peel infused oil is used as a functional botanical component in the oil phase of formulations, most commonly in oil-in-water emulsions, body oils, and conditioning serums. In creams and lotions, usage levels typically range from 1% to 5%, contributing emollient and antioxidant effects. In oil serums and balms, concentrations can reach up to 10%, depending on the intended function and compatibility with other plant oils. Its gentle profile and absence of irritants make it suitable for sensitive areas such as around the eyes, where it is used in lower concentrations, typically 0.5% to 2%. It should be added only to the oil phase and is best incorporated in the final emulsification stage at reduced temperatures to preserve the integrity of sensitive bioactives.

Animal Testing: Not tested on animals

GMO: Non-GMO

Vegan: Contains no animal-derived components