

## TECHNICAL DATA SHEET

**Product Name:** Vitamin C (3-O-Ethyl Ascorbic Acid)

**INCI name:** 3-o-Ethyl Ascorbic Acid

**CAS:** 86404-04-8

**Synonyms:** 3-O-Ethylascorbic acid; L-Ascorbic acid 3-O-ethyl ether; COS-VCE; ENB-VCE; VC Ethyl; Ethyl Ascorbic Acid; VCE; Vitamin C ethyl ether

**Chemical classification:** Heterocyclic compound, Ether, Alcohol

**Functional category:** Skin conditioning agent, Antioxidant, Whitening agent, Anti-inflammatory agent

**IUPAC name:** (2R)-2-[(1S)-1,2-dihydroxyethyl]-3-ethoxy-4-hydroxy-2H-furan-5-one

**Description:** The chemical structure of 3-O-ethyl-L-ascorbic acid is similar to that of ascorbic acid (vitamin C). The structure of this acid contains a six-carbon atom ring, two of which are hydroxyl-substituted, with an ethyl group at the third carbon. The addition of an ethyl group to ascorbic acid affects some properties of this substance, such as stability and lipophilicity. In addition to its pronounced hydrophilicity (water solubility), 3-O-ethyl-L-ascorbic acid is also soluble in fats or lipids, which can enhance its ability to penetrate the lipid layer of the skin and reach deeper skin layers. This modification of the chemical structure also contributes to improved substance stability, meaning that this form of vitamin C will retain its activity for a longer period in cosmetic products, thereby increasing its effectiveness. 3-O-ethyl-L-ascorbic acid usually appears as a white crystalline powder. The minimum purity percentage for 3-O-ethyl-L-ascorbic acid, measured by high-performance liquid chromatography (HPLC), is  $\geq 98.5\%$ . The minimum required level of free vitamin C is 10 ppm (parts per million), suggesting that the substance is very pure and does not contain high levels of unwanted substances. For 3-O-ethyl-L-ascorbic acid, the pH value of a 3% aqueous solution should be in the range of 4.0 to 5.5. This pH value is slightly acidic to neutral, making it suitable for use in cosmetic products as it matches the pH value of the skin.

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### Skin Effects and Benefits:

- **Skin Lightening:** 3-O-ethyl ascorbic acid inhibits the activity of the enzyme tyrosinase, which is crucial in the melanin synthesis process. This process reduces melanin production in the skin, resulting in the lightening of dark spots, hyperpigmentation, and uneven skin tone.

- **Antioxidant Protection:** As a potent antioxidant, 3-O-ethyl ascorbic acid neutralizes free radicals that damage the skin and cause premature aging. This helps preserve the integrity of skin cells, reduce wrinkles and fine lines, and improve overall skin health and appearance.

- **Stimulation of Collagen Synthesis:** 3-O-ethyl ascorbic acid stimulates collagen synthesis, the main structural protein of the skin responsible for firmness and elasticity. This stimulation helps reduce skin laxity and improve its tone and texture.

- **Hydration and Skin Conditioning:** This ingredient acts as a moisturizer and softener on the skin, helping it retain moisture and prevent dryness. This results in soft, smooth, and radiant skin.

- **Penetration into the Dermis:** Unlike pure ascorbic acid, which has difficulty penetrating the skin barrier, 3-O-ethyl ascorbic acid can easily penetrate into the dermis, the skin layer beneath the epidermis surface. This allows active ingredients to reach where they are most needed to exert their effects on collagen synthesis, melanin inhibition, and reduction of oxidative stress.

- **Biological Effect:** When 3-O-ethyl ascorbic acid reaches the dermis, it is metabolized by the skin and body into ascorbic acid, allowing it to exert its biological effects. This includes stimulating collagen synthesis, reducing tyrosinase activity (an enzyme crucial in melanin synthesis), and neutralizing free radicals as a potent antioxidant.

- **Stability and Tolerance:** Due to its stable chemical structure, 3-O-ethyl ascorbic acid is less irritating than pure ascorbic acid, making it suitable for a wider range of skin types, including sensitive skin.

**Usage:** Easily incorporated into cosmetic emulsions and other formulations. Typical concentrations range from 0.15 to 15%. The recommended pH range is 5.0 - 6.0. For external use only.

**Application:** 3-O-ethyl ascorbic acid is used to formulate various types of cosmetic products. It is often used in facial serums, formulated to be easily absorbed and

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penetrate deep into the skin to provide benefits such as lightening, hydration, and antioxidant protection. It can also be found in face creams, which provide hydration and care while simultaneously helping to lighten the skin, reduce wrinkles, and improve skin texture. It is added to lotions and toners to provide additional hydration and antioxidant protection while also helping to improve skin tone and texture. It can also be found in face masks used for deep cleansing, hydration, and revitalization of the skin. Sometimes it is used in eye care products to reduce dark circles, under-eye bags, and fine lines. It can be added to body care products, such as body and hand lotions, to provide hydration and antioxidant protection to the skin throughout the body.

**Method of Production:** 3-O-ethyl ascorbic acid is obtained synthetically by modifying the molecular structure of ascorbic acid (vitamin C). The process involves adding an ethyl group to a specific position in the ascorbic acid molecule. After synthesis, 3-O-ethyl ascorbic acid can be further processed and refined to obtain a pure product, which is then used in cosmetic product formulations.

**Animal Testing:** Substance has not been tested on animals.

**GMO:** Not GMO.

**Vegan:** Does not contain animal-derived components.

**Storage:** Store in a cool, dry place, away from light. Room temperature for regular storage, and 2-8°C or lower temperature for long-term storage.