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info@avenalab.com
+381 (0) 69 / 55 65 029
www.avenalab.com

# TECHNICAL DATA SHEET

**Product Name:** Vitamin C (L-Ascorbic Acid)

**INCI Name:** Ascorbic Acid

**CAS Number:** 50-81-7

**Chemical Classification:** Polyol, Heterocyclic Compound

**Functional Category:** Skin and Hair Conditioner, Antioxidant, pH Adjuster

**IUPAC Name:** (5R)-[(1S)-1,2-dihydroxyethyl]-3,4-dihydroxyfuran-2(5H)-one

**Description:** Vitamin C, known as L-ascorbic acid, is one of the most valued active ingredients in cosmetics due to its numerous beneficial properties. As a powerful anti-oxidant, it helps neutralize free radicals—unstable molecules formed as a result of UV exposure, pollution, and other environmental stressors. This protection is crucial, as free radicals can cause cellular damage, leading to premature skin aging, including wrinkles, reduced elasticity, and loss of radiance. In addition to its antioxidant action, L-ascorbic acid is essential for collagen synthesis, a protein that maintains skin structure and firmness. By stimulating collagen production, vitamin C improves skin elasticity and firmness while reducing the appearance of fine lines and wrinkles. Beyond collagen stimulation, L-ascorbic acid plays a vital role in regulating melanin production, the pigment responsible for skin color. It helps brighten the skin and even out skin tone, resulting in a more radiant and healthier complexion. Regular use of vitamin C can significantly reduce the visibility of sunspots, post-inflammatory hyperpigmentation, and even scars. However, L-ascorbic acid has certain limitations in cosmetic formulations due to its low stability. Specifically, it is highly sensitive to environmental factors such as light, heat, and air. When exposed to these factors, L-ascorbic acid begins to degrade, leading to a loss of efficacy. Formulations with L-ascorbic acid also require a specific pH to preserve stability and effectiveness, typically a low pH around 3.5. Such an acidic environment allows L-ascorbic acid to remain stable and active but can pose challenges for individuals with sensitive skin. A low pH may cause irritation, redness, or discomfort, particularly in those with reactive skin. For such users, derivatives of vitamin C or other milder forms are recommended, as they are more stable and less irritating. Despite its challenges, the benefits of vitamin C in cosmetic formulations are numerous, and its effects on the skin are highly positive. Proper formulation and use of vitamin C ensure

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maximum results. It is often recommended to use L-ascorbic acid products in the morning, as it provides antioxidant protection throughout the day and can be paired with SPF creams for added protection against harmful UV rays. Vitamin C is compatible with many ingredients, but it is particularly effective when combined with vitamin E and ferulic acid, as this combination significantly enhances antioxidant properties and extends the stability of vitamin C. It appears as a white crystalline powder, odorless, and easily soluble in water and alcohol. pH 3 (0.5% solution). The melting point of vitamin C is around 190–192°C (374–378°F). Vitamin C has two naturally occurring isomers: L-ascorbic acid and D-ascorbic acid; however, only L-ascorbic acid is biologically active.

**Benefits:**

- ***Potent antioxidant:*** Neutralizes free radicals and protects the skin from damage.
- ***Collagen synthesis booster:*** Improves skin elasticity and firmness while reducing the visibility of wrinkles.
- ***Brightening effect:*** Helps reduce hyperpigmentation and evens out skin tone for a brighter complexion.
- ***Photoprotection:*** Shields the skin from photoaging caused by UV radiation.
- ***Overall improvement:*** Enhances the skin's appearance, making it more radiant and healthy-looking.

**Usage Instructions:** L-ascorbic acid is used in cosmetics as a powerful antioxidant and skin brightening agent. Its application is most effective in the morning, as it helps protect the skin from oxidative damage caused by UV exposure and pollution, especially when combined with SPF creams. Recommended concentrations vary depending on the type of product and skin condition. Most facial serums contain concentrations between 10% and 20%, providing optimal antioxidant and brightening effects. Lower concentrations, around 5%, are used in products for skin brightening or for individuals with sensitive skin prone to irritation. Higher concentrations, above 15%, are typically found in treatment serums aimed at reducing dark spots, improving elasticity, and diminishing wrinkles. Due to its sensitivity, products with L-ascorbic acid require packaging that protects against light and air to preserve stability and effectiveness.

**Warnings:** Avoid application around the eye area. The main challenge in creating cosmetic products with vitamin C is its extreme chemical instability. Factors that influence its stability and accelerate degradation include high pH, elevated tempera-

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ture, the presence of oxygen, and metal ions. Degradation, often marked by a yellowish color of the product, can accelerate depending on the type of formulation, packaging, and storage
conditions.

**Source Material:** Glucose (derived from corn or wheat starch)

**Production Process:** L-ascorbic acid is synthetically produced in a multi-step process in which D-glucose is hydrogenated to D-sorbitol, then oxidized to L-sorbose. Sorbose is further processed into 2-keto-L-gluconic acid and subsequently into 1-ascorbic acid through fermentation.

**Animal Testing:** Not tested on animals

**GMO:** Non-GMO

**Vegan:** Contains no animal-derived components