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TECHNICAL DATA SHEET

Product Name: Sorbic Acid

INCI Name: Sorbic Acid

CAS Number: 110-44-1

Chemical Class: Carboxylic acids and derivatives

Functional Category: Preservative

IUPAC Name: (2E,4E)-hexa-2,4-dienoic acid

Description: Sorbic acid is an organic compound from the class of carboxylic acids, used exclusively as a preservative in the cosmetics industry. It appears as a white to slightly yellowish crystalline substance, poorly soluble in water but well soluble in alcohol and propylene glycol, making it suitable for a wide range of formulations including emulsions, gels, lotions, and hydroalcoholic solutions. Its primary role is as an antifungal agent, inhibiting the growth of molds and yeasts, with limited antibacterial activity. It is most effective under mildly acidic conditions (pH below 6), which aligns with the natural pH of the skin, thus commonly used in such formulations. Thanks to its low toxicity and good skin tolerance, sorbic acid is considered one of the safer preservatives for use in cosmetics and personal care products. At recommended concentrations, it does not cause irritation or sensitization in most users. It is often used in combination with other preservatives such as benzoic acid and its salts, achieving a synergistic effect and extended microbiological protection. Its use is regulated by the EU and FDA, typically at concentrations up to 0.6% in finished products to ensure effective preservation without risk to consumer safety.

Mechanism of Action: The antimicrobial effect of sorbic acid relies on its ability to inhibit the growth of microorganisms, mainly molds and yeasts, and to a lesser extent certain bacteria. Its active form is the undissociated molecule, which is effectively absorbed through microbial cell membranes under acidic conditions, typically below pH 6. Once inside the cell, sorbic acid disrupts the activity of metabolic enzymes, especially those involved in oxidative phosphorylation and ion transport. This leads to an energy imbalance, protein synthesis inhibition, and disruption of cellular homeostasis. The result is not immediate cell death (not bactericidal), but inhibition of growth and repro-

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duction (fungistatic and bacteriostatic effect). This specific mode of action makes sorbic acid particularly suitable for use in formulations requiring long-term microbiological stability, without compromising user tolerance or formulation integrity.

Benefits:

- Prevents mold and yeast growth in cosmetic products
- Extends shelf life without the need for strong synthetic preservatives
- Effective at low concentrations in slightly acidic environments
- Does not irritate the skin when used within regulatory limits
- Works synergistically with other preservatives
- Does not affect fragrance, color, or texture of formulations
- Stable in solid form and easily incorporated into formulas

Usage: Sorbic acid is used as a preservative in concentrations up to 0.6% in finished products, or between 0.05-0.15% when combined with other preservatives. Optimal efficacy is achieved in formulations with a pH below 6. Due to its low water solubility, it should first be dissolved in a small amount of warm propylene glycol or ethanol, and then added to the cooling phase of the formulation (typically below 40°C) to preserve the integrity and effectiveness of the active compound. It is suitable for use in emulsions, gels, lotions, serums, toners, and other microbiologically sensitive formulations, particularly those with a pH aligned to skin physiology. Under certain conditions, sorbic acid may oxidize and cause slight color changes in the product, which can be prevented by adding 0.1–0.3% citric acid. For external use only.

Natural or Synthetic Ingredient: Sorbic acid is a synthetic ingredient, although chemically identical to its natural analog, which occurs in trace amounts in fruits like the rowan berry (Sorbus aucuparia), from which its name derives. However, for industrial use in cosmetics and food, sorbic acid is exclusively produced via chemical synthesis, most commonly through the condensation of crotonic acid and malonic aldehyde. This method ensures high purity, stability, and standardization - essential for its role as a preservative.

Animal Testing: Not tested on animals
GMO: Non-GMO
Vegan: Does not contain animal-derived ingredients