

## TECHNICAL DATA SHEET

**Product Name:** Caffeic Acid

**INCI name:** Caffeic Acid

**CAS:** 331-39-5

**Functional category:** Antioxidant, anti-inflammatory agent, skin brightening/whitening agent, skin conditioning agent, antimicrobial agent

**Chemical classification:** Carboxylic acid/derivative, phenol

**IUPAC name:** (2E)-3-(3,4-Dihydroxyphenyl)prop-2-enoic acid

**Description:** Caffeic acid, also known as 3,4-dihydroxycinnamic acid, is a naturally occurring polyphenolic compound found in many plants, fruits, vegetables, and spices. In the cosmetics industry, caffeic acid is valued for its potent antioxidant, anti-inflammatory, and antimicrobial properties. As an antioxidant, it effectively neutralizes free radicals, helping to prevent skin cell damage and slow the aging process. Additionally, it preserves cell membrane integrity by preventing the formation of lipid peroxides. Due to these properties, caffeic acid is often used in products designed to combat signs of aging, such as wrinkles and uneven skin tone. It inhibits elastase activity, an enzyme that breaks down elastin, thereby contributing to the maintenance of skin firmness and elasticity. Furthermore, its antibacterial and antiviral properties make it suitable for protecting the skin from microbial damage. Caffeic acid has the ability to absorb ultraviolet rays, providing additional protection from the harmful effects of sun exposure. Even in small concentrations, it can reduce melanin production, which is why it is used in skin-brightening products. In terms of physical characteristics, caffeic acid appears as yellowish to brownish crystals or fine powder. It is slightly soluble in water but dissolves well in organic solvents such as ethanol and methanol, allowing its use in various cosmetic formulations. Its melting point, between 212 and 219°C, indicates good thermal stability. A low residue on ignition and minimal loss on drying confirm its high quality, while a low concentration of heavy metals, below 10 ppm, ensures its safety for use in cosmetic products. The purity of caffeic acid is 99.0% (HPLC).

**Mechanism of action:** The mechanism of action of caffeic acid is based on its antioxidant, anti-inflammatory, photoprotective, and depigmenting properties. As a powerful

**Disclaimer:** The details provided here are specific to the identified material and may not remain accurate if that material is combined with other substances or used in different processes. The information presented is, to the best of the company's knowledge, considered precise and trustworthy as of the date mentioned. However, the company does not make any explicit or implied assurance, guarantee, or claim regarding the information's precision, trustworthiness, or comprehensiveness, and will not be held accountable for any losses, damages, or costs, whether direct or indirect, that arise from its use. Users are encouraged to independently verify the appropriateness and thoroughness of this information for their specific purposes.

## TECHNICAL DATA SHEET

antioxidant, it protects the skin from oxidative stress caused by an imbalance between the production of free radicals and the body's ability to neutralize them. Free radicals are unstable molecules that can damage cellular components, including DNA, proteins, and lipids. Caffeic acid stabilizes these radicals by donating electrons, preventing skin cell damage and slowing the appearance of signs of aging, such as wrinkles and loss of elasticity. Additionally, caffeic acid inhibits the enzyme tyrosinase, which is key in melanin biosynthesis, the pigment responsible for skin color. By reducing tyrosinase activity, caffeic acid helps decrease excessive melanin production, which is beneficial for treating hyperpigmentation and dark spots, making it a frequent ingredient in skin-brightening products. Its anti-inflammatory effect is reflected in the reduction of pro-inflammatory cytokine production, molecules responsible for inflammatory reactions. This helps soothe inflammation, redness, and irritation, which is particularly useful for sensitive and inflamed skin, as well as for treating conditions like acne and rosacea. Caffeic acid also has photoprotective properties, helping protect the skin from the harmful effects of UV radiation. It reduces the formation of UV-induced free radicals and protects DNA from damage, preventing photoaging and premature skin aging. Lastly, caffeic acid helps maintain the skin's barrier function. By acting on the lipid components of cell membranes, it helps maintain their stability and prevents transepidermal water loss, keeping the skin hydrated and elastic.

### Benefits:

- Protects the skin from free radicals and environmental damage.
- Effectively reduces inflammatory processes on the skin.
- Reduces dark spots and hyperpigmentation, contributing to a more even complexion.
- Hydrates and softens the skin, helping maintain its moisture.
- Helps reduce puffiness, especially around the eyes.
- Improves microcirculation, giving the skin a healthier appearance and glow.
- Acts as an effective antimicrobial agent against various microorganisms.

**Usage:** Caffeic acid is used in cosmetic products due to its antioxidant, anti-inflammatory, and brightening properties. The recommended concentration ranges from 0.5% to 2%, depending on the product type and desired effect. In creams, serums, and lotions for skin care, a concentration of around 1% is commonly used, which provides antioxidant and moisturizing effects with minimal risk of irritation. For skin brightening and

**Disclaimer:** The details provided here are specific to the identified material and may not remain accurate if that material is combined with other substances or used in different processes. The information presented is, to the best of the company's knowledge, considered precise and trustworthy as of the date mentioned. However, the company does not make any explicit or implied assurance, guarantee, or claim regarding the information's precision, trustworthiness, or comprehensiveness, and will not be held accountable for any losses, damages, or costs, whether direct or indirect, that arise from its use. Users are encouraged to independently verify the appropriateness and thoroughness of this information for their specific purposes.

## TECHNICAL DATA SHEET

evening out skin tone, caffeic acid is used in concentrations of up to 2%, as it effectively inhibits melanin production and reduces hyperpigmentation. In products designed to reduce puffiness, such as eye creams, a concentration of around 1% is used, helping reduce fluid retention and improve circulation. The stability of caffeic acid in formulations is crucial, as it is prone to oxidation, so it is often combined with stabilizers and other antioxidants to preserve its effectiveness.

**Source of raw materials:** Various plant species, including fruits, vegetables, herbs, and certain types of coffee.

**Production method:** Extracted from appropriate natural sources.

**Animal testing:** The substance has not been tested on animals.

**GMO:** Non-GMO

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

---

**Disclaimer:** The details provided here are specific to the identified material and may not remain accurate if that material is combined with other substances or used in different processes. The information presented is, to the best of the company's knowledge, considered precise and trustworthy as of the date mentioned. However, the company does not make any explicit or implied assurance, guarantee, or claim regarding the information's precision, trustworthiness, or comprehensiveness, and will not be held accountable for any losses, damages, or costs, whether direct or indirect, that arise from its use. Users are encouraged to independently verify the appropriateness and thoroughness of this information for their specific purposes.