

TECHNICAL DATA SHEET

Product Name: Trehalose

INCI Name: Trehalose

CAS: 99-20-7

Chemical Classification: Disaccharide; non-reducing sugar; carbohydrate composed of two D-glucose molecules linked by an α,α -1,1-glycosidic bond

Functional Category: Moisturizing agent; Humectant; Stabilizer; Protective osmolyte;

IUPAC Name: α -D-glucopyranosyl-(1 $\rightarrow$ 1)- α -D-glucopyranoside

Description: Trehalose is a natural disaccharide composed of two glucose molecules linked by an α,α -1,1-glycosidic bond, which provides exceptional chemical stability compared to most other sugars. It occurs naturally in plants, fungi, algae, and certain bacteria, where it plays a key role in protecting cells against dehydration, extreme temperatures, and oxidative stress. This bioprotective function makes it a highly valuable ingredient in modern cosmetic formulations. In cosmetics, trehalose is used as an effective moisturizing agent with the ability to bind and retain water within the stratum corneum. It acts as an osmoprotectant, stabilizing cellular membranes and proteins under conditions of reduced moisture. In addition to its moisturizing effect, trehalose exhibits antioxidant potential by indirectly protecting cellular structures from damage caused by free radicals. It stabilizes active ingredients sensitive to oxidation and temperature fluctuations, which is why it is commonly used in serums, creams, masks, and formulations containing sensitive bioactive components. Its ability to protect proteins and lipid structures is particularly important in products containing peptides, enzymes, and biotechnologically derived extracts. Trehalose is water-soluble, chemically stable over a wide pH range, and compatible with most cosmetic raw materials, including humectants such as glycerin and sodium hyaluronate. It does not clog pores and does not exhibit irritation potential at typical usage concentrations, making it suitable for formulations intended for sensitive skin. In anti-aging products, it is used to improve skin elasticity and reduce the appearance of fine lines caused by dehydration. In hair care products, it helps maintain moisture and reduce hair breakage, while in protective formulations it contributes to stabilizing structures exposed to UV radiation and environmental stressors.

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

Physicochemical Properties: Trehalose is a white to slightly creamy crystalline substance in the form of a fine powder, odorless and with a mildly sweet taste. In cosmetic applications, it is supplied as a highly purified disaccharide of pharmaceutical and cosmetic grade, with controlled low moisture content and a stable crystalline structure. The substance is hygroscopic but does not tend to become sticky or form lumps when stored in dry conditions and in well-sealed packaging. The melting point is approximately 200°C with thermal decomposition, confirming its stability under typical cosmetic manufacturing conditions. It is stable over a wide pH range typical for dermocosmetic formulations and does not exhibit significant chemical reactivity with standard ingredients used for hydration, stabilization, or texture enhancement. Trehalose is easily and completely soluble in water, forming clear and stable solutions without precipitation. Solubility in polar solvents is satisfactory, while it is practically insoluble in oils and non-polar media, which is why it is primarily used in the aqueous phase of formulations. Aqueous solutions remain chemically stable and do not change color or odor under appropriate storage conditions. In terms of compatibility, trehalose is stable in the presence of common humectants, polysaccharides, proteins, peptides, and most active substances intended for skin hydration and protection. It does not exhibit irritation potential at recommended usage levels and does not clog pores, making it suitable for a wide range of formulations, including those intended for sensitive and dehydrated skin.

Benefits:

- Provides intensive skin hydration by binding and retaining water in the stratum corneum
- Reduces transepidermal water loss by stabilizing surface lipid structures
- Protects cellular proteins and membranes from dehydration-induced damage
- Supports skin elasticity and reduces the appearance of fine lines caused by dryness
- Stabilizes sensitive active ingredients and prolongs their functionality
- Helps protect the skin from oxidative stress caused by external factors
- Improves product tolerance for sensitive and reactive skin
- Helps maintain moisture and reduce hair breakage in hair care formulations

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

Method of Use: Trehalose is used in formulations as a water-soluble ingredient and is incorporated into the aqueous phase. It is dissolved in demineralized water with gentle mixing at room temperature or at moderate temperatures until complete dissolution, after which it is integrated into emulsions, gels, or serum systems. Due to its good thermal stability, it can also be added during the heating phase, while in formulations without heating it dissolves directly in the cold aqueous phase. It is stable within the typical cosmetic pH range and does not require special dispersion conditions. In hydrating serums and light gel formulations, it is typically used at concentrations of approximately 1–5%, providing a pronounced humectant and osmoprotective effect without affecting product texture. In creams and emulsions for dry and dehydrated skin, concentrations range from 2–5%, depending on the desired hydration level and combination with other humectants. In formulations intended for sensitive skin, it is used at 1–3% to improve tolerance and support the skin barrier. In anti-aging products, concentrations typically range from 2–5%, especially in combination with peptides, hyaluronate, or antioxidants. In face masks, it can be used at higher concentrations, up to approximately 5–10%, for intensive short-term hydration. In hair care products, usage typically ranges from 0.5–3%, where it helps maintain moisture and reduce hair breakage. weight, dermal penetration is limited, further reducing the risk of systemic effects.

Animal Testing: In accordance with current European regulations (Regulation (EC) No. 1223/2009 on cosmetic products), the substance has not been tested on animals. Safety assessment is based on available toxicological data, scientific literature, and validated alternative testing methods (in vitro and in silico). “In silico” refers to methods of testing and evaluation performed using computer models and simulations, rather than on living organisms (in vivo) or cell cultures (in vitro). This statement confirms compliance with the ban on animal testing and is provided for informational purposes regarding further use of the ingredient in cosmetic formulations.

GMO: Non-GMO

Vegan: Does not contain ingredients of animal origin

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.