

TECHNICAL DATA SHEET

Product Name: Vitamin B5 (D-panthenol) 99.5%

INCI Name: D-panthenol, water

CAS: 81-13-0, 7732-18-5

Synonyms: D-Panthenol; Pantothenol; Ilopan; D-Pantothenyl alcohol; Bepanthen; Provitamin B; (R)-2,4-Dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutanamide

Chemical Classification: Amide, Alcohol

Functional Category: Skin and Hair Conditioning Agent

IUPAC Name: (2R)-2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutanamide

Description: Provitamin B5 (99.5%), known as D-panthenol, is a highly valued cosmetic ingredient due to its moisturizing and protective properties. It deeply hydrates the skin, retains moisture, and maintains natural elasticity, making the skin softer, smoother, and healthier-looking. D-panthenol enhances the skin's barrier function, making it more resistant to environmental stressors such as pollution, wind, and UV radiation. It has a soothing effect, making it suitable for sensitive and irritated skin formulations and after-sun care products. For hair care, D-panthenol improves hair structure, increases elasticity and shine, and reduces breakage and damage. Regular use of D-panthenol products makes hair healthier, softer, and easier to manage. D-panthenol is used in creams, lotions, serums, and hair care products such as shampoos, conditioners, masks, and sprays. It is stabilized and preserved with 1% D-pantolactone, with a pH value of 5.5 - 7. At room temperature, it is a viscous, transparent liquid, soluble in water, alcohol, and propylene glycol, partially soluble in glycerin, but insoluble in oils.

Mechanism of Action: Provitamin B5 has a chemical structure that includes a central carbon skeleton with several key functional groups. The presence of hydroxyl groups allows panthenol to attract and retain water. Panthenol's moisturizing ability is crucial for maintaining optimal moisture levels, which is essential to prevent dryness and cracking of the skin and hair. The presence of an amide group (CONH) in panthenol's structure contributes to its chemical stability and enables easy skin absorption. The amide group not only enhances the molecule's stability but also helps reduce irritation and

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inflammation. This functional group makes panthenol ideal for products intended for sensitive skin, acting as a soothing agent to reduce redness and irritation. Panthenol also has a long aliphatic chain, contributing to its emollient properties. This chain enables smooth application to skin and hair, giving products a smooth feel during use. Panthenol's emollient properties help create a protective layer on the surface of the skin or hair that locks in moisture and prevents drying. Additionally, panthenol is often used for its ability to improve skin elasticity, speed wound healing, and enhance hair texture. Its capacity to penetrate into the deeper layers of the skin makes it highly beneficial in various cosmetic and pharmaceutical products. It has two enantiomers, D and L. Only D-panthenol (dexpanthenol) is biologically active; however, both forms have moisturizing capabilities. For cosmetic use, panthenol can be in the D form or as a racemic mixture of D and L (DL-panthenol). Panthenol can be converted to pantothenic acid (vitamin B5) in the skin, further contributing to skin and hair health.

Benefits:

- D-panthenol attracts and retains moisture, improving skin hydration, softness, and elasticity.
- Forms a protective barrier on the skin, reducing transepidermal water loss.
- Soothes the skin, relieving irritation, redness, and inflammation, making it suitable for sensitive skin.
- Promotes cell regeneration and accelerates the healing of minor wounds and burns.
- Helps reduce the appearance of scars by stimulating fibroblast proliferation.
- Enhances hair elasticity, reduces split ends, and adds shine.
- Strengthens nails, increasing flexibility and reducing brittleness.

Usage Instructions: It is water-soluble and easily incorporated into the aqueous phase of cosmetic products. It combines well with various ingredients, facilitating its use in moisturizing creams, serums, toners, etc. It is stable in the pH range of 4.0 to 7.5 (optimal pH is 6.0). In facial and body creams and lotions, it is used in concentrations between 1% and 5%. At lower concentrations, it provides foundational hydration and soothes the skin, while higher concentrations significantly promote regeneration and accelerate healing of damaged skin. When used in shampoos and conditioners, D-panthenol is added in concentrations of 0.5% to 2%, improving hair hydration, shine, and elasticity and reducing damage and split ends. In facial gels and serums, concentrations

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of 1% to 2% provide intensive hydration and soothing, especially after sun exposure or treatments that may cause irritation. Lip balms often contain D-panthenol in concentrations of 1% to 2%, which aids in hydration and regeneration of chapped lips. In spray and toner formulations, D-panthenol is used in concentrations of 1% to 3%, providing refreshing hydration and a soothing effect on the skin.

Source Raw Materials: Propanolamine, Beta-dimethylbutyl-prolactone

Manufacturing Process: Produced synthetically by combining propanolamine and beta-dimethylbutyl-prolactone.

Animal Testing: Not tested on animals

GMO: Non-GMO

Vegan: Contains no animal-derived components

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