

D-Panthenol 75 % aqueous solution

Definition

D-Panthenol 75% is an aqueous solution of pure Dexpanthenol Ph. Eur. The solution reduces its viscosity and improves its handling and distribution in cosmetics. D-Panthenol is the alcohol form of dextrorotatory isomer of pantothenic acid (vitamin B₅), belonging to the group of water-soluble vitamins, member of B-complex-vitamins

Synonymous names

Dexpanthenol,
D-Pantothenyl Alcohol,
Dextro-Pantothenyl Alcohol,
D-Pantothenylol,
D-Pantothenol,
Old (obsolete) names from literature
Pro-Vitamin B₅,
Vitamin B₅,
N-pantoyl-3-propanolamine

Chemical names

(R)-2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutyramide;
(R)-butanamide, 2,4-dihydroxy-N-(3-hydroxypropyl)-3,3dimethyl;
(R)-2,4dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutanamide;
D(+)-alpha, gamma-dihydroxy-N-(3-hydroxypropyl)-beta,
beta-dimethylbutyramid

Official adopted names and nomenclatures

CAS No.: 81-13-0
EINECS No.: 201-327-3
IUPAC/IUP: Pantothenic Acid
(CAS-No. 79-83-4)
INN name (WHO): Dexpanthenol
INCI name: Panthenol
CTFA name: Panthenol
CN Code: 2936 2400
D- or DL-Pantothenic Acid
Vitamin B₅ or Vitamin B₅
and its derivatives



Producer: DAIICHI FINE CHEMICAL CO., LTD., Japan

 DAIICHI FINE CHEMICAL CO. LTD



Kyowa Hakko Europe GmbH
Daiichi Fine Chemical Division

SPECIFICATION

| | | |
|---------------------|--|-------------------------|
| Chemical Name: | (R)-2,4-dihydroxy-N-(3-hydroxypropyl)-3,3-dimethylbutyramide | |
| Chemical Structure: | | |
| Empirical Formula: | C ₉ H ₁₉ NO ₄ | Molecular weight: 205.3 |
| Appearance: | Colorless, clear, slightly viscous liquid, odorless or with a faint characteristic odor, bitter taste and sweetish after-taste | |
| Identification: | Maximum absorption at the same wavelengths as that for D-Panthenol (IR Spectrum) | |
| Specific rotation | $[\alpha]_D^{20}$: +29.5° ~ + 32.0° | |
| Specific gravity | d _{20/20} : 1,05-1,20 | |
| Sulfated ash: | Not more than 0.1 % | |
| Aminopropanol: | Not more than 1.0 % (TLC) | |
| Heavy metals: | Not more than 10 ppm | |
| Assay: | 75.0% - 78,0% (w/w) Dexpanthenol Ph. Eur. (HPLC) | |

Other Physico-Chemical Properties

| | |
|---------------------|--|
| Stabilizers: | 0.5% L-pantolactone and 0.1% citric acid adjusting the pH-value. |
| Undesirable matter: | Within actual, relevant EC regulations for food and cosmetics incl. maximum residue levels |

Storage and Packaging

| | |
|--------------|--|
| Storage: | To be stored at room temperature (JP: 1°C to 30°C), preserve in tight, light-resistant containers |
| Packaging: | PE-drum with 200 kg net PE-canister with 20 kg net Multiway 1-ton-container |
| Expiry Date: | In unopened original packaging and under adequate storage conditions minimum 2 years after production date |

Formulating

Biological standards: Calculated on the different molecular weights the relations to common derivatives of pantothenic acid are as follows:
1.248 g D-Panthenol 75% = equivalent to 1.0 g Dex Pantothenic Acid
1.149 g D-Panthenol 75% = equivalent to 1.0 g Dex Calciumpantothenate
1.173 g D-Panthenol 75% = equivalent to 1.0 g Dex-Ethyl-Panthenol
1.333 g D-Panthenol 75% = equivalent to 1.0 g Dexpanthenol

Stability: In order to safeguard a shelf-life of minimum 2 years, D-Panthenol 75% has been stabilized with 0.5% L-pantolactone and 0.1% citric acid adjusting the pH-value.
D-Panthenol itself is relatively stable to oxygen and light typically sensitive to moisture by hygroscopicity and heat, stable in neutral or slightly acidic (pH 4-6), less stable in acidic and alkaline aqueous solutions by hydrolytic cleavage, exposure to heat exceeding 70° -75° C may cause racemization. D-Panthenol 75% is particularly designed for cosmetic preparations that are mostly moving between pH 5 and pH 7. Within this range D-Panthenol can be regarded as stable.

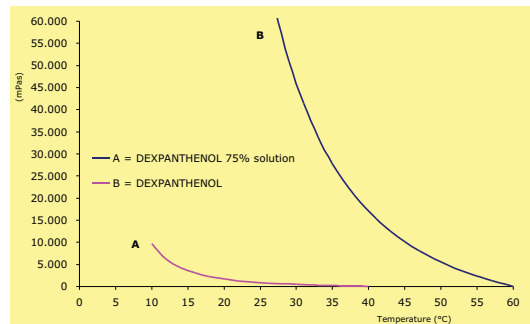
Solubility: Soluble in water and propyleneglycol

Microorganisms: Bacteria count not more than 100/g
Funghi not more than 10/g
Pathol. causative organisms like pseudomonas aeruginosa, staphylococcus aureus, candida albicans, escherichia coli are not traceable.

Handling

Properties: D-Panthenol 75% is easy to handle and smoothly to incorporate in water phase of normal hair care and skin care formulations thanks to its low viscosity at room temperature

Viscosity:



Applications

Widely used in cosmetic formulations like lotions, rinses, creams, ointments to promote cell regeneration of the skin, hair care and environmental skin/hair lesions, baby care formulations, sun care formulations

Physiological Functions in Skin, Scalp and Mucosae

D-Panthenol as a viscous liquid derivative of pantothenic acid has been specially developed for topical application. Many researchers report that this alcoholic form is easily penetrating into skin, hair and finger nails. It is converted into pantothenic acid working mainly as a constituent of the coenzyme A which is present in all living tissues ("pantons" meaning "found everywhere"). Obviously, the basal metabolism of the coenzyme A in the skin is relatively high. Environmental disturbances and lesions may cause a local deficiency of pantothenic acid.

Cosmetical efficacy: D-Panthenol is regarded as multi-active ingredient for cosmetics thanks to its physio-chemical properties in

- penetrating relatively deep into the skin
- water binding and/or water retention
- being transformed to pantothenic acid in skin and hair after topical administration creating pro-vitamin B5 activities

D-Panthenol may be regarded as ideal cosmetic ingredient which may improve skin and hair care as well as protect against environmental stress.

The cosmetological actions of D-Panthenol are based on following findings:

- improvement of the mitotic activity (cell regeneration)
- acceleration of epithelisation and granulation after burns, eczemas ulcerations, radiotherapy and plastic surgery
- improving symptoms of inflammations
- alleviating itching
- strengthening of hair-roots and hair-shafts
- pigment stimulation
- protection against ammonia produced napkin rash

Recommendations for cosmetic use:

According to international accepted formulators, the following D-Panthenol supplementations are recommended:

| Product | D-Panthenol in % | Product | D-Panthenol in % |
|-----------------|------------------|------------------------|------------------|
| Day/night cream | 0,5 - 5,0 | Baby care formulations | 1,0 - 5,0 |
| Sun care | 1,0 - 5,0 | Foam bath | 0,5 - 3,0 |
| After sun care | 1,0 - 5,0 | Hand cream | 0,5 - 2,0 |
| Hair lotion | 1,0 - 2,0 | After shave lotion | 0,5 - 2,0 |
| Shampoo | 1,0 - 2,0 | Face lotion | 0,5 - 2,0 |
| Conditioner | 1,0 - 2,0 | Body lotion | 0,5 - 2,0 |

Safety:

Pantothenic acid and its derivatives are reported to be atoxic. The LD50 are as follows: mice: 6.25 g/kg rabbits: 3.00/kg High dosages of 10 g/day to humans over long periods caused no serious symptoms

Literature: K.-H. Bässler, I. Golly, D. Loew, K. Pietrzik: Vitamin-Lexikon für Ärzte, Apotheker und Ernährungswissenschaftler (1997). P. Berry Ottaway: The Technology of Vitamins in Food (1993). Dr. H. Eggensperger: Multiaktive Wirkstoffe für Kosmetika (1994/1995). Bundesanzeiger Nr. 179 dd. 93/09/23: Monographie Pantothenic Acid, systemic use; Nr. 24 dd. 93/02/05: Monographie Pantothenic Acid, systemic use; Nr. 24 dd. 93/02/05: Monographie Pantothenic Acid, topical use.

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