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TECHNICAL DATA SHEET

Product Name: Benzyl Alcohol DHA

INCI Name: Benzyl Alcohol, Dehydroacetic Acid, Aqua

CAS: 520-45-6, 100-51-6, 7732-18-5

Chemical Class: Mixture

Functional Category: Preservative, Antimicrobial Agent, Antifungal Agent

IUPAC Name: Benzyl Alcohol + Dehydroacetic Acid

Chemical-Physical Properties: Benzyl alcohol is a simple chemical compound consisting of a benzyl group (-$C_6H_5CH_2$-) attached to a hydroxyl group (-OH). The hydroxyl group (-OH) is a functional group that imparts the characteristic properties of alcohol to this compound. The presence of the hydroxyl group enables benzyl alcohol to form hydrogen bonds with other molecules, affecting its reactivity and interactions with the environment. Additionally, the hydroxyl group can act as a polar part of the molecule, influencing its solubility properties and interactions with other compounds. Dehydroacetic acid, known as 3-acetyl-6-methylene-dicarbonycyclohexene, has a more complex structure that includes a carboxyl group (-COOH) and a double bond in the ring, along with an acetyl group (-$COCH_3$). Dehydroacetic acid has two functional groups that play a key role in its chemical properties. The carboxyl group (-COOH) gives the acid its acidity. It can donate a proton and form ionic interactions with other molecules, affecting its reactivity and ability to act as an acid. Additionally, the acetyl group has properties that can influence the reactivity and interactions of dehydroacetic acid. Functional groups are key parts of molecules that determine many chemical properties and reactivity, playing an important role in determining their biological activity and application. The Benzyl Alcohol-DHA product is soluble in water, alcohol, and glycols. It is eco-certified and classified as an environmentally friendly material according to EU regulations, also accepted by Whole Foods.

Mechanism of Action: Benzyl alcohol is a commonly used preservative with antimicrobial properties that can prevent the growth of bacteria, fungi, and other microorganisms in cosmetic products. Dehydroacetic acid also has preservative properties and is used to prevent the development of microorganisms in cosmetic products. The mechanism of

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action of these preservatives may vary depending on their specific interactions with microorganisms but generally involves disrupting vital processes necessary for microbial growth and reproduction. Benzyl alcohol works by altering the cell membrane of microorganisms and disrupting their metabolism. It penetrates the cell membrane and damages it, leading to a loss of cellular integrity and leakage of essential materials from the cell. Additionally, benzyl alcohol can inhibit enzymes necessary for the metabolism of microorganisms, further disrupting their growth and reproduction. Dehydroacetic acid works similarly, disrupting vital metabolic processes in microorganisms. It can damage the cell membrane, inhibit enzymes, or change the pH of the environment, preventing microbial growth and reproduction. When combined, these preservatives can act synergistically, having a stronger effect together than individually. Additionally, using multiple preservatives with different mechanisms of action can provide broad-spectrum protection against various types of microorganisms and reduce the risk of resistance development.

Benefits:

• ***Protection of Cosmetic Products:*** Benzyl alcohol and dehydroacetic acid are effective preservatives that prevent the growth of microorganisms such as bacteria, fungi, and other pathogens. This is crucial for extending the shelf life of cosmetic products and maintaining their freshness. The combination of these preservatives provides broad-spectrum protection against various microorganisms.

• ***Safety:*** Both ingredients are generally well-tolerated by the skin and have minimal irritation potential. This means that products containing them are less likely to cause irritation or allergic reactions on the skin.

• ***Product Stability:*** The combination of benzyl alcohol and dehydroacetic acid helps maintain the stability of cosmetic product formulations. These preservatives prevent product degradation and maintain its homogeneity over time, ensuring that the cosmetic product remains effective and efficient for a longer period. Dehydroacetic acid, besides helping to maintain product stability, may also have anti-inflammatory and antibacterial properties. It can help soothe inflamed areas of the skin and prevent acne or other skin issues.

Usage: Recommended concentrations range between 0.2-0.8%. In Brazil and Europe, the maximum concentrations are 1.0% (not allowed in aerosols). It is compatible with virtually all raw materials. It can be directly added to the formulation at temperatures below 40°C. pH sensitive, most effective at pH 3-6. It can be inactivated in the presence

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of non-ionic substances. For external use only.

Applications: Benzyl Alcohol DHA is used to protect all types of skin and hair care products (including emulsions, aqueous, and anhydrous systems), sun protection products, decorative cosmetics (makeup), etc.

Safety Information (EU): Benzyl alcohol can be used as a preservative in cosmetics and personal care products sold in the European Union at a maximum concentration of 1%. Benzoic acid, its salts, and esters are also allowed for use as preservatives in cosmetics and personal care products at a maximum concentration (expressed as acid) of 2.5% in rinse-off products (except oral care products), 1.7% in oral care products, and 0.5% in leave-on products (see Annex VI). Benzyl alcohol and benzyl benzoate are also listed in Annex III of the European Union Cosmetics Directive. When benzyl alcohol or benzyl benzoate is used as fragrance ingredients, Annex III requires their presence to be indicated on the product label when used at concentrations higher than 0.001% in leave-on products and higher than 0.01% in rinse-off products. Dehydroacetic acid (3-acetyl-6-methyl-2,4(3H)-dione) and its salts, including sodium dehydroacetate, are listed in Annex VI, Part 1 (preservatives that cosmetic products may contain) of the European Union Cosmetics Directive. The maximum allowed concentrations are 0.6%, expressed as acid; the use of dehydroacetic acid is prohibited only in aerosol sprays.

Source of Raw Material: Italy

Original Raw Materials: Benzyl chloride and diketene

Manufacturing Process: Benzyl alcohol is obtained by hydrolysis of benzyl chloride using sodium hydroxide. Dehydroacetic acid is synthetically obtained by dimerization of diketene via base-catalysis.

Animal Testing: The substance has not been tested on animals.

GMO: Not GMO

Vegan: Contains no animal-derived components