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Product Name: Paraben Blend

INCI Name: Propylparaben, Methylparaben, Diazolidinyl Urea, Propylene Glycol

CAS: 94-13-3, 99-76-3, 78491-02-8, 57-55-6

Functional Category: Preservative, antimicrobial agent, fungicide

Description: Paraben Blend is a stable and technologically balanced combination of parabens and diazolidinyl urea, designed to provide reliable and long-lasting protection against microbiological contamination in a wide range of cosmetic products. The synergy between propylparaben and methylparaben ensures a strong antimicrobial effect against bacteria and fungi, while both ester preservatives demonstrate high compatibility with emulsions, gels, and solutions, without affecting the sensory characteristics of the formulation. Diazolidinyl Urea is included to provide continuous antimicrobial activity through the gradual release of a minimal, regulatory-permitted amount of formaldehyde, which enhances overall protection and prolongs product stability during storage and use. Propylene Glycol acts as a carrier that enables homogeneity and even distribution of the active components across different product phases, preventing localized concentrations of preservatives and ensuring consistent activity throughout the formulation. Due to this technological compatibility, Paraben Blend remains stable across a broad pH range and under variable temperatures, making it suitable for creams, lotions, toners, cleansing products, and formulations intended for sensitive skin where effective yet unobtrusive preservation is required. This preservative does not alter the texture, color, or scent of the final product, and proper dosage ensures microbiological safety throughout the entire shelf life. The blend contains three broad-spectrum preservatives: 3% propylparaben, 11% methylparaben, and 30% diazolidinyl urea. Activity: 44% active substances, 56% solvent (propylene glycol), pH 6–8 (10% aqueous solution). White liquid, faint odor, water-soluble.

Mechanism of Action: The mechanism of action of Paraben Blend is based on the combined antimicrobial activity of parabens and diazolidinyl urea, with each component contributing to a specific inhibitory effect. Parabens penetrate microbial lipid membranes and disrupt their structural integrity. Once inside the cell, they interfere with enzymatic processes crucial for metabolism and ATP synthesis, ultimately slowing cell growth and leading to microbial death. Their effectiveness is particularly strong against

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fungi and gram-positive bacteria, and the synergy between two parabens broadens the antimicrobial spectrum while ensuring greater formulation stability. Diazolidinyl Urea acts through a complementary mechanism. In the aqueous phase of a formulation, it slowly releases extremely small, regulatory-approved quantities of formaldehyde. Formaldehyde is highly reactive and rapidly binds to amino and sulfhydryl groups of microbial proteins, causing protein denaturation and inhibiting replication. This mechanism provides sustained antimicrobial protection because microorganisms cannot easily develop resistance. Propylene Glycol does not function as a preservative in the strict sense, but it enhances the system's overall effectiveness by improving the solubility and bioavailability of the active components in the aqueous phase, ensuring faster and more uniform antimicrobial activity throughout the product. The combination of these three mechanisms ensures a broad antimicrobial spectrum, formulation stability, and strong resistance to contamination throughout the product's lifecycle.

Benefits:

- Expanded antimicrobial spectrum providing stable protection against bacteria and fungi.
- Long-lasting preservation achieved through gradual release of active agents.
- Formulation stability maintained without altering odor, color, or texture.
- Compatibility with a wide pH range enables use across many cosmetic categories.
- Even distribution within the formulation ensures consistent antimicrobial performance.

Method of Use: Paraben Blend should be incorporated into the water phase or emulsion phase at temperatures not exceeding approximately 40–45°C to preserve preservative stability. It disperses easily into creams, lotions, gels, and toners and performs best when added during the final stage of formulation, after cooling, to ensure optimal antimicrobial efficacy. Typical use levels range from 0.2% to 1%. Lower concentrations are suitable for simple emulsions and gels, while higher levels are recommended for formulations with a high water content or increased risk of contamination during use. These concentrations provide reliable, long-lasting, and regulatory-compliant preservation. For external use only.

Animal Testing: In compliance with European Regulation (EC) No. 1223/2009 on

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cosmetic products, this substance has not been tested on animals. Safety assessment relies on available toxicological data, scientific literature, and validated alternative test methods (in vitro and in silico). In silico refers to computational modeling and simulation methods used instead of in vivo or in vitro testing. This statement confirms compliance with the animal-testing ban and is provided solely as information for the ingredient's use in cosmetic formulations.

GMO: Not GMO

Vegan: Contains no animal-derived components

Final Product Assessment: Paraben Blend remains one of the most reliable and technologically stable preservation systems in modern cosmetics, despite market trends and growing demand for alternatives. The parabens in this blend deliver a predictable, broad-spectrum antimicrobial effect that clearly distinguishes them from preservative systems based on organic acids, benzyl alcohol, or newer "mild" alternatives whose efficacy can be highly sensitive to pH, temperature, or overall formulation composition. The strengths of Paraben Blend include low required concentrations, stability across a wide pH range, excellent compatibility with emulsions and gels, and no negative influence on texture or sensory properties of the finished product. Its primary disadvantage lies not in its scientific or technological properties, but in consumer perception, as parabens have long been subject to misunderstanding, misinterpretation, and media exaggeration. As a result, "paraben-free" labels are increasingly used as a marketing advantage, even though alternative systems often require higher concentrations and multiple components, potentially increasing irritation risk or destabilizing the formulation. In the European Union, parabens have a clearly defined regulatory status. Methylparaben and Propylparaben are approved for cosmetic use with maximum permitted levels of 0.4% individually and 0.8% combined, confirming that the EU regulates rather than bans these ingredients. Scientific bodies in the EU have repeatedly reaffirmed their safety at industry-standard concentrations, while restrictions apply primarily to long-chain parabens that are no longer allowed. In the United States, the situation differs: parabens remain fully permitted without defined maximum concentrations, as available toxicological assessments have demonstrated safety at cosmetic use levels. The FDA does not recommend their removal, emphasizing the absence of evidence for harm under realistic exposure conditions.