



# Biopolysan<sup>®</sup>

## BIOPOLYSAN<sup>®</sup> 220B

### Multifunctional Preservative for Natural Cosmetic Products

#### OVERVIEW

Biopolysan<sup>®</sup> 220B is a novel cosmetic ingredient formulated to exploit certain active botanical constituents that are utilized by plants to provide protection from microbes in the environment. These ingredients, rearranged and concentrated, are useful for preserving and improving personal care formulations, especially when formulating natural cosmetic products.

Biopolysan<sup>®</sup> 220B delivers the features that formulators want in their natural products at a competitive price, with outstanding quality, and in an easy-to-use format that can be used with confidence.

<sup>1</sup> Methods and compositions for novel liquid crystal delivery systems.

U.S. Patent Number: 8,546,593

<sup>2</sup> NPA Standard and Certification for Personal Care Products. The Natural Standard (04/11/12). [https://www.npainfo.org/App\\_Themes/NPA/docs/naturalseal/The%20Natural%20Standard%20041112%20final.pdf](https://www.npainfo.org/App_Themes/NPA/docs/naturalseal/The%20Natural%20Standard%20041112%20final.pdf)

<sup>3</sup> Positive List of Authorized Synthetic Ingredients and Ingredients from Mineral Origin. ECOCERT Doc TS034(GC)v03.3en. v.26/03/2015. [http://www.ecocert.com/sites/default/files/u3/TS011\(GC-COS\)v03en-guide-for-raw-materials-validation.pdf](http://www.ecocert.com/sites/default/files/u3/TS011(GC-COS)v03en-guide-for-raw-materials-validation.pdf)

#### DETAILS

Biopolysan<sup>®</sup> 220B is a 50/50 mixture comprised of Biopolysan<sup>®</sup> 220 (plant based lauric esters) and nature-identical benzyl alcohol.

Biopolysan<sup>®</sup> 220 uses a patented liquid delivery system<sup>1</sup> to deliver otherwise insoluble ingredients from coconut or palm kernel oil based lauric esters and vegetable oil to add lauric esters that, in nature, protect everything from the coconut palm to healthy human skin. It is prepared by partial saponification and transesterification of glyceryl laurate derived from sustainable coconut or palm kernel oil, and polyglyceryl-2 derived from sustainable vegetable oil. Because these ingredients are of vegetable origin, Biopolysan<sup>®</sup> 220 can be used in formulations where the final product claims to be natural.

Benzyl alcohol, a proven preservative, is a substance produced naturally by many plants and is commonly found in fruits and teas. It is also found in a variety of essential oils including jasmine, hyacinth, and ylang-ylang. Nature-identical benzyl alcohol is a synthetic material that is chemically identical to the benzyl alcohol found in nature. Benzyl alcohol is approved for use in natural products if less than 5% of total concentration.<sup>2,3</sup>

Biopolysan<sup>®</sup> 220B may be used at concentrations up to 10% wt/wt% in natural products.

#### BENEFITS

- ◆ Formulated with plant based Biopolysan<sup>®</sup> 220 (lauric esters) verified by ECOCERT for use in natural and organic cosmetics.
- ◆ Water-soluble - cold process capable
- ◆ Broad spectrum antimicrobial properties - C12 lauric esters plus benzyl alcohol
- ◆ Skin conditioning - emollient and humectant
- ◆ Excellent solvent or carrier for fragrances or active ingredients - other botanicals, essential oils, other actives
- ◆ Non-ionic emulsifier and mild surfactant
- ◆ Dispersant properties
- ◆ Wetting agent
- ◆ Stabilizer and pH modifier



When Biopolysan<sup>®</sup> 220B is added to personal care and cosmetic products, it provides additional preservation, skin-conditioning, and overall product stability benefits.

## Green Processing and Biodegradability

The patented method of manufacture for Biopolysan<sup>®</sup> 220 uses sustainable, botanically derived raw materials, is a low energy process, and produces no waste stream.

All of the ingredients in Biopolysan<sup>®</sup> 220 are readily biodegradable within 48-96 hours in the environment and result in the ultimate break down of glycerol and fatty acids.

Benzyl alcohol has been shown to be readily biodegradable in water, soil and sewage. The results of testing showed a degradation of 95-97% after 21 days, which indicates that benzyl alcohol is readily biodegradable.<sup>4</sup>

## Multifunctional Biopolysan<sup>®</sup> 220B is...

- ✓ Gluten Free
- ✓ Paraben Free
- ✓ Phthalate Free
- ✓ Sulfate Free
- ✓ Aluminum Free
- ✓ Silicone Free
- ✓ Cruelty Free

## Cosmetic Ingredient Reviews

All of the ingredients in Biopolysan<sup>®</sup> 220B are commonly used in personal care and cosmetic products and have cosmetic ingredient reviews (CIRs)<sup>5,6,7</sup> by expert panels and safety assessments. The ingredients are suitable for use in the USA, Canada, EU, Japan, Australia, Brazil, New Zealand and other global markets.

## Composition

INCI Name: Benzyl Alcohol (and) Diglycerin (and) Polyglyceryl-2 Laurate

Ingredient (INCI)	CAS No.	EINECS	Description	Source
Benzyl Alcohol	100-51-6	202-859-9	Diluent, Cosmetic Preservative	Synthetic or Botanical
Diglycerin	59113-36-9	211-013-8	Diluent/Humectant	Vegetable Oil
Polyglyceryl-2 Laurate	96499-68-2	N/A	Active	Coconut or Palm Kernel Oil

<sup>4</sup> Trenel, J., Kühn, R. Umweltforschungsplan des Bundesministerium des Inneren, Wasserwirtschaft (1982) "DOC Die-Away Test" in accordance with the OECD Guideline 301A for benzyl alcohol".

<sup>5</sup> Safety Assessment of Polyglyceryl Fatty Acid Esters as Used in Cosmetics. January 28, 2016. <http://www.cir-safety.org/sites/default/files/PGlyFE122015SLR.pdf>

<sup>6</sup> Benzyl Alcohol, Benzoic Acid, and its Salts and Ester. September 27, 2011. [http://www.cir-safety.org/sites/default/files/120\\_final\\_ba.pdf](http://www.cir-safety.org/sites/default/files/120_final_ba.pdf)

<sup>7</sup> Amended Safety Assessment of Monoglyceryl Monoesters as Used in Cosmetics. August 28, 2015. <http://www.cir-safety.org/sites/default/files/monoglyceryl%20monoesters.pdf>

## Typical Physical Properties

Typical Physical Properties – Biopolysan <sup>®</sup> 220B	
Appearance	Clear slight amber liquid
Odor	Slight, characteristic of benzyl alcohol
Specific Gravity @ 25°C	1.1030
pH (5% solution in water)	9
Solubility	
Acetone	Soluble
Ethanol	Soluble
Water	Soluble
Propanediol	Soluble
Viscosity (Brookfield) @ 25°C	127 cps

## Recommendations For Use

Biopolysan<sup>®</sup> 220B is easy to incorporate into formulations. It readily forms emulsions in most aqueous and oil systems and may be added to either oil or water phase. Since Biopolysan<sup>®</sup> 220B will cross into both the aqueous and oil phases, addition of Biopolysan<sup>®</sup> 220B may be split and added to both depending upon the needs of the formulation.

Biopolysan<sup>®</sup> 220B may be used in products with a pH range of 5 to 10. It may be used in more acidic products, i.e., exfoliating products, provided that care is taken to form separate emulsions.

**For preservation**, concentrations between 0.5% and 2.0% are recommended. Note, to ensure adequate preservation, preservative challenge testing is required. Contact your representative to discuss a challenge test sponsorship by Copperhead Chemical Company<sup>®</sup>.

**As a self-preserving, skin-conditioning ingredient**, concentrations up to 10% are appropriate for most personal care products, and up to 20% for hair dye products.<sup>8</sup>

\* Each unique product formulation requires preservative challenge and stability testing to determine adequate preservation from microbial spoilage and to establish product shelf life. Please contact Copperhead Chemical Company<sup>®</sup> about study sponsorship opportunities when using Biopolysan<sup>®</sup> products.

## Storage

To preserve the product at maximum quality, it is recommended that Biopolysan<sup>®</sup> 220B be stored in a cool and dry place. Store in original container. Avoid light and excessive heat. The working area should be kept free of accumulated dust and ignition.

Biopolysan<sup>®</sup> 220B is available in 5 and 30 gallon phenolic lined steel containers.

<sup>8</sup>Nair B. Final report on the safety assessment of Benzyl Alcohol, Benzoic Acid, and Sodium Benzoate. *Int J Toxicol*. 2001; 20 Suppl 3:23-50. <https://www.ncbi.nlm.nih.gov/pubmed/11766131>

## Microbial Studies

Biopolysan<sup>®</sup> 220 alone has strong self-preserving activity due to the presence of C12 lauric esters and potassium laurate and has been shown to effectively inhibit the growth of Gram-positive bacteria. Chart 1 shows the minimum inhibitory concentrations (MICs) of Biopolysan<sup>®</sup> 220 against selected bacteria.

The addition of benzyl alcohol to Biopolysan<sup>®</sup> 220 enhances efficacy against Gram-negative bacteria while still maintaining the skin conditioning properties of Biopolysan<sup>®</sup> 220. The data show that the combination of Biopolysan<sup>®</sup> 220 with benzyl alcohol is synergistic. Biopolysan<sup>®</sup> 220B is soluble in water whereas benzyl alcohol has poor solubility in water, allowing Biopolysan<sup>®</sup> 220B to be used in either the oil or water phase in personal care and cosmetic products where it acts to preserve across the oil/water or water/oil interface.

Chart 2 shows MICs for Biopolysan<sup>®</sup> 220B as compared to benzyl alcohol alone against two bacteria - *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

Chart 1. MICs of BPS 220 Against Gram Positive Bacteria

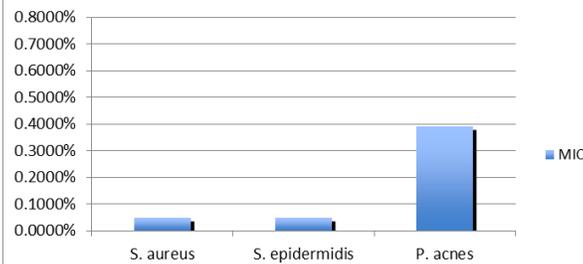
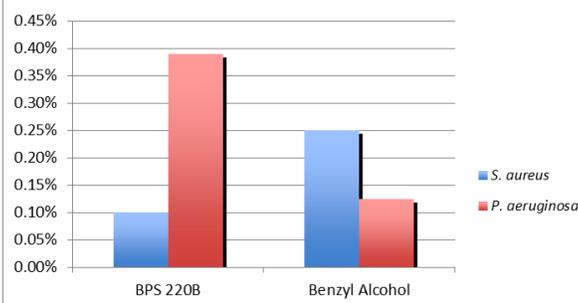


Chart 2. MICs: BPS 220B compared to Benzyl Alcohol



## About Copperhead Chemical Company<sup>®</sup>

Copperhead Chemical is a leading manufacturer of active pharmaceutical ingredients and specialty chemicals located in Tamaqua, PA USA. Copperhead is dedicated to quality and operates in accordance with Good Manufacturing Practice regulations enforced by the U.S. FDA. Contact information is as follows:

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