

Glycacil™ 2000 (patented)

Advanced Fungicidal Product Protection



INCI Name: Iodopropynyl Butylcarbamate

Key Product Benefits

- Highly effective fungicide; remarkably efficient in inhibiting growth of yeast and mold
- Has a wide range of global regulatory approval
- Patented innovative technology
- Water-soluble
- Strong safety profile
- Temperature stable
- Compatible with commonly used ingredients such as cationic, anionic, nonionic surfactants, emulsifiers and proteins
- Convenient form provides easier handling
- Low use levels for efficacy

Recommended Use Level

0.15 – 0.5%

Description

Glycacil™ 2000 is an advanced variant of the Iodopropynyl Butylcarbamate (IPBC) chemistry offered by Lonza under the Glycacil™ brand name. It is an effective preservative system that has been used in the personal care industry for years offering strong efficacy against yeasts and molds. This variant offers the additional benefit of being water soluble. In addition, the chemistry has excellent safety and toxicological profiles.

Compositional Breakdown

Chemical Compound Breakdown	Cas No.	EINECS No.
3-Iodo-2-propinylbutylcarbamate	55406-53-6	259-627-5
Cyclodextrin derivative	N/A	N/A
Water	7732-18-5	231-791-2

Chemical Compound Breakdown	%
3-Iodo-2-propinylbutylcarbamate	5.5-6.5%
Cyclodextrin derivative	46-48%
Water	46-48%

Applications

- Anhydrous
- Baby care
- Baby wipes
- Body wash
- Conditioner
- Cream
- Deo/ Anti-Perspirant
- Eye creams/gels
- Eye shadow
- Face Lotion
- Face wipes
- Facial Cream
- Foundation
- Hair gel
- Hand soap
- Lotion
- Make up remover
- Mascara
- Oil in Water
- Powder
- Shampoo
- Suncare
- Toner
- Water in Oil

Efficacy

Microbiological Challenge Studies

Studies were run using various concentrations of Glycacil™ - 2000 in various formulations to see efficacy on a mixed inoculum of fungi. All samples were inoculated at the beginning of the study, sampled at 24 hours, 3, 7, 14, 21 and 28 days.

Shampoo Formula

Ingredient	% wt/wt
Sodium lauryl ether sulfate	35.0%
Triethanolamine lauryl sulfate	25.0%
Cocamide DEA	3.0%
Anhydrous protein	3.0%
Sterile DI water	36.0%
Total	100.0%

Cream Formula

Ingredient	% wt/wt
Glyceryl monostearate	6.0%
POE 20 glyceryl monostearate	4.0%
Cetearyl alcohol	1.5%
Mristyl propionate	8.0%
Glycerine	5.0%
Sterile DI water	75.5%
Total	100.0%

Efficacy in the shampoo formulation			Organism count (cfu/ml) / Contact time (days)				
Test Organisms			0	7	14	21	28
Mix Fungi	Glycacil™ 2000	0.078%	1.4x10 ⁵	<10	<10	<10	<10
	Glycacil™ 2000	0.04%	1.2x10 ⁵	<10	<10	40	<10
	Glycacil™ 2000	0.016%	1.6x10 ⁵	2.5x10 ³	1.2x10 ³	4.5x10 ³	4.0x10 ²

Efficacy in the cream formulation			Organism count (cfu/ml) / Contact time (days)				
Test Organisms			0	7	14	21	28
Mix Fungi	Glycacil™ 2000	0.468%	1.8x10 ⁵	50	20	10	<10
	Glycacil™ 2000	0.312%	2.6x10 ⁵	6.0x10 ²	1.3x10 ²	40<	10
	Glycacil™ 2000	0.156%	3.0x10 ⁵	4.0x10 ³	2.0x10 ³	1.3x10 ³	1.4x10 ³

Glycacil™ 2000 is typically used at 0.03 – 0.8 % in both rinse-off and leave-on product formulations.

Comparative Fungicidal Activity of Glycacil™ 2000 to Parabens

The focused fungicidal activity of the IPBC in Glycacil™ 2000 leads to greater efficacy and lower usage levels versus competitive chemistries.

Mix fungi: A.niger ATCC# 16404 + C.albicans ATCC# 10231

% of preservative (as supplied) required to achieve < 10 cfu/g. of the mix fungi in anionic shampoo

	Day 7	Day 14	Day 21	Day 28
Glycacil™ 2000	< 0.04	< 0.04	< 0.04	< 0.04
Parabens 2:1 ratio Methyl: Propyl	> 0.6	> 0.6	> 0.6	> 0.6

Global Regulatory

Europe

- Listed in Annex VI
- Allowed in rinse-off products up to 0.02% IPBC and up to 0.01% IPBC in leave-on products except in creams and lotions aimed to be applied on a large part of the body
- Allowed for use in antiperspirants/deodorants up to 0.0075% IPBC

Japan

- Listed in the positive list. Can be used at a level up to 0.02% in leave-on and rinse-off products

United States

- Approved by CTFA for both rinse-off and leave-on applications. Maximum level: 0.1% IPBC

General

- Not allowed for oral hygiene and lip products or in preparations for children under the age of 3 except in rinse-off applications

Formulation Recommendations

- Soluble in water up to 95% allowing for wider formulation flexibility
- Fully compatible with a wide variety of formulations as well as all types of cationic, nonionic and anionic systems
- Can be added virtually anywhere in the manufacturing process
- Can be added at both room and elevated temperatures as high as 50°C for as long as 6 hours without loss of efficacy
- Wide pH range: 2-10
- Can be inactivated by strong reducing agents, acids and bases
- Typically needs to be used in combination with a bactericide
 - DMDMH (Glydant™ products), phenoxyethanol, CMI/MI (Isocil™ products) or other bactericide can be used
 - Formulator to confirm that there are no patent issues
- Glycacil™ 2000 is freeze/thaw/heat stable without phase separation or crystal formation through several cycles
- Glycacil™ 2000 shows significant improvement in both activity retention and resistance to color development versus solvent-based IPBC products (see below)

	%IPBC		APHA color	
	Glycacil™ 2000	Solvent based product	Glycacil™ 2000	Solvent based product
Initial	6.4	9.1	115	794
Room Temperature				
1 month	6.3	9	125	901
3 months	6.0	8.8	146	936
6 months	6.4	8.9	210	1024
50 °C				
1 month	6.3	7.8	1276	1386
Sunlight				
1 week	6.2	9.1	339	1093
2 weeks	6.4	9.1	339	1094
1 month	6.2	8.8	383	1094
3 months	5.9	8.5	833	1114
Typical Properties				
Appearance			Liquid	
Color (Gardner)			Clear white	
Odor			Characteristic	

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