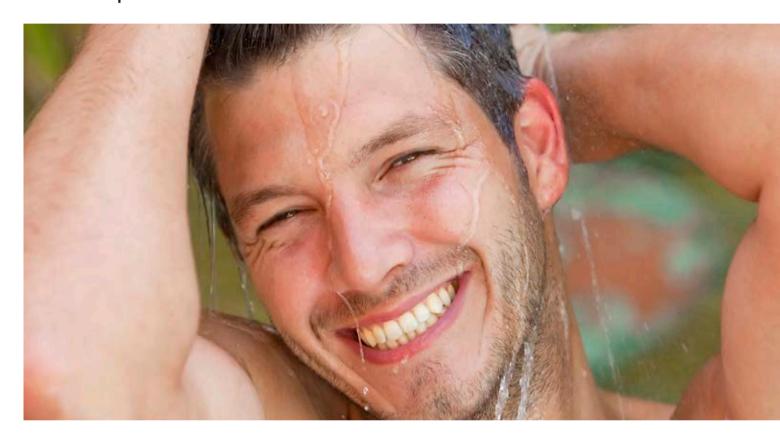




Glydant Plus®

Traditional Preservation for Broad Spectrum Product Protection



INCI Name: DMDM Hydantoin & Iodopropynyl Butylcarbamate (IPBC)

Key Product Attributes:

- Has a wide range of global regulatory approvals
- Unique and cost effective preservative
- Combination with a dual mode of action
- High level of antimicrobial activity in a wide variety of cosmetic and personal care formulations ("wash-off" or "leave-on" products)
- Highly effective in inhibiting the growth of gram positive and gram negative bacteria, yeasts and molds without the need of additional auxiliary preservatives
- Remains stable for extended periods of time over wide pH and temperature ranges
- Low odor
- White granular product
- Effective blend of DMDMH and IPBC
- Lower amount of preservative required
- Several modes of action
- Lower risk of microbial resistance

Recommended Use Level

0.075 - 0.18%

Description

Glydant Plus® is a synergistic preservation system that combines two well-known and traditional chemistries for personal care. The combination of DMDM Hydantoin and lodopropynyl Butylcarbamate (IPBC) allow for a dual mode of action, offering broad spectrum efficacy. These chemistries been used in personal care for years and have excellent safety and toxicological data. This product contains twice the amount of active ingredient as Lonza's Glydant Plus® Liquid but is offered as a powder form.

Compositional Breakdown

Chemical Compound Breakdown	Cas No.	EINECS No.
DMDM Hydantoin	6440-58-0	229-222-8
3-lodo-2-propynylbutylcarbamate	55406-53-6	259-627-5

Chemical Compound Breakdown	Percentage
DMDMH range	94-96%
3-lodo-2-propynylbutylcarbamate	4.5-5.5%

Applications

_	Anhydrous	_	Hair gel
_	Baby care (rinse-off only)	_	Hand soap
_	Conditioner	_	Lotion
_	Cream	_	Make up remover
_	Deo / Anti-perspirant	_	Mascara
_	Eye creams/gels	_	Oil in Water
_	Eye shadow	_	Powder
_	Face lotion	_	Shampoo
_	Face wipes	_	Suncare
_	Facial cream	_	Toner
_	Foundation	_	Water in Oil

Efficacy

Microbiological Challenge Studies

Studies were run using different concentrations of Glydant Plus® in various formulations to see efficacy against various bacteria, yeast and fungi. All samples were inoculated at the beginning of the study, sampled at 24 hours, 3, 7, 14, 21 and 28 days.

Glydant Plus® was incorporated into a glyceryl monostearate cream (GMS), a standard medium used for efficacy studies.

GMS Cream

Ingredients(all unpreserved)	% wt/wt
Aldosperse™ MS-20	4.0
Aldosperse™ MS (Glyceryl Monostearate)	6.0
TA 1618-F (Cetearyl Alcohol)	1.5
Lonzest™ 143-S (Myristyl propionate)	8.0
Glycerin	
Water, DI	
Total	

Heat Stability

Glydant Plus® at 0.1% in a GMS Cream at an accelerated aging temperature of 45% for 42 days.

Test Organism	CFU/days				
	Day O	Day 7	Day 14	Day 21	Day 28
Candida albicans	20000	<10	<10	<10	<10
Pseudomonas aeruginosa	<10	<10	<10	<10	<10
Control	>106	>106	>106	>106	>106

Antimicrobial Efficacy

Glydant Plus® at 0.05 % in a GMS cream.

Efficacy-GMS Cream	CFU/day	S				
Test Organism	Day 0	Day 1	Day 2	Day 3	Day 7	Day 28
Pseudomonas aerugiosa	<10	<10	<10	<10	<10	<10
Escherichia coli	2 × 10 ⁵	3 × 10 ⁵	<10	<10	<10	<10
Aspergillus niger	8 × 10 ⁶	2 × 10 ⁶	2 × 10 ⁴	6 × 10 ³	1 × 10 ³	<10
Candida albicans	3 × 10 ⁷	7 × 10 ⁶	5 × 10 ⁶	2 × 10 ²	<10	<10
Control	10 ⁶	10 ⁶				

Glydant Plus® at 0.1 % in a GMS cream.

Efficacy-GMS Cream	CFU/days	3				
Test Organism	Day 0	Day 1	Day 2	Day 3	Day 7	Day 28
Pseudomonas aerugiosa	<10	<10	<10	<10	< 10	<10
Escherichia coli	2 × 10 ⁵	<10	<10	<10	<10	<10
Aspergillus niger	8 × 10 ⁵	8 × 10 ³	<10	<10	<10	<10
Candida albicans	6 × 10 ⁶	2 × 10 ⁶	2 × 10 ⁶	2 × 10 ⁶	<10	<10
Control	10 ⁶	10 ⁶	10 ⁶	10 ⁶	10 ⁶	10 ⁶

Glydant Plus® was incorporated into a shampoo formula, a standard medium used for efficacy studies.

Shampoo Formulation

Ingredients	% wt/wt	
Sodium Lauryl Ethersulfate	35.0	
Triethanolamine Laurylsulfate	25.0	
Coco-Diethanolamide	3.0	
Water	36.0	
Polypro 5000		
Preservative	q.s.	
Total	100.0	

Glydant ${\sf Plus}^{@}$ at various concentrations against a Mixed inoculum-fungi.

Log CFU/Contact time, days							
Preservative, %	0	1	2	3	7	14	28
Glydant Plus® 0.050	5	3	0	0	0	0	0
Glydant Plus® 0.075	5	3	0	0	0	0	0
Glydant Plus® 0.100	5	0	0	0	0	0	0
Control	4	5	6	5	6	5	6

Glydant Plus® at various concentrations against a mixed inoculum-Bacteria.

Log CFU/Contact time, days							
Preservative, %	0	1	2	3	7	14	28
Glydant Plus® 0.05	5	3	0	0	0	0	0
Glydant Plus® 0.075	6	3	0	0	0	0	0
Control	5	5	6	5	4	5	6

Formulation Recommendations

- Low odor
- Wide pH range: 3-9
- Soluble in anionic surfactants, nonionic surfactants, cationic surfactants, alcohols, glycols, and glycol ethers
- Readily soluble in a 10 % or less active surfactant solution at recommended levels of preservative for shampoos; not soluble in water
- Soluble in the oil phase or emulsified portion of a cream, conditioner or lotion from room to elevated temperatures
- Best added at 45 °C during the cool down stage of processing
- Can be added to a surfactant by surfactant manufacturers where temperature is usually in the 50–60 °C and the pH is 7.5 to 8.5

Global Regulatory

Europe

- Both active ingredients approved, Annex V to Regulation EC/1223/2009.
- Finished products containing DMDMH must be labeled with the warning "contains formaldehyde" if the (free) formaldehyde concentration exceeds 0.05%
- Max use level: 0.6% DMDMH and 0.01% IPBC (leave-on except in creams and lotions aimed to be applied on a large part of the body), 0.6% DMDMH and 0.02% IPBC (rinse-off). Allowed in rinseoff products up to 0.02% IPBC and up to 0.01% IPBC
- Not allowed for oral hygiene and lip products
- Cannot be used in products for children under three years (except for rinse-off)

Japan

- Listed in the positive list. The following warning must be labeled: "should not be used by infants or by people who are hypersensitive to formaldehyde."
- Cannot be used in leave-on due to DMDMH
- Max use level: 0.3% DMDMH and 0.02% IPBC for rinse-off

USA

- Approved by CTFA for both rinse-off and leave-on applications
- Max use level of 0.6% DMDMH and 0.01% IPBC

Typical Properties

Appearance	Granular
Color	White
Odor	Characteristic

USA

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Switzerland

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