

Geogard Ultra[®]



INCI Name: Gluconolactone & Sodium Benzoate

Recommended Use Level

0.75–2.0%

Key Product Benefits:

- Has a wide range of global regulatory acceptance
- Broad spectrum activity
- COSMOS, NATRUE & Soil Association approved
- Wide applicability
- Added moisturization benefit
- Vegan
- Non-GMO
- Cruelty-free [Not Tested On Animals]
- China compliant

Description

A synergistic blend of gluconolactone and sodium benzoate, providing broad spectrum protection and ease of formulation. Typically organic acids on their own provide only anti-fungal protection and are too weak, requiring a co-preservative or booster to perform optimally. The gluconolactone in this blend works together with sodium benzoate to act as an efficient booster that also delivers moisturization to the end application providing true multifunctional benefits. This preservative system is the ideal choice for the naturally-minded formulator.

Compositional Breakdown

Chemical Compound Breakdown	CAS No.	EINECS No.	Percentage
D-glucono-1,5-lactone	90-80-2	202-016-5	70–80%
Sodium benzoate	532-32-1	208-534-8	22–28%
Calcium gluconate	299-28-5	206-075-8	1%

Applications

Makeup



Skin Care



Hair Care



Body Care



Baby Products



Efficacy

Microbiological Challenge Studies

Studies were run using different concentrations of Geogard Ultra® in various formulations to see efficacy against various bacteria and fungi. All samples were inoculated at the beginning of the study, sampled at 7, 14 and 28 days.

In these challenge studies, the bacterial pool consisted of *S.aureus*, *P.aeruginosa* and *E.coli*, and the fungal pool of *C.albicans* and *A.brasiliensis*.

Moisturizing Cream (pH 5.28)

Ingredient	%W/W
Water, deionized	q.s
Caprylic Triglyceride	20.00%
Sorbitan Monostearate	2.00%
PEG Stearate	1.50%
Glyceryl Stearate	2.00%
Decaglyceryl Decaoleate	5.00%
UV absorber	optional
Thickener	optional
Preservative	1.5% Geogard Ultra®
Total:	100.00%

Moisturizing Test Results

Bacterial Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
1	Unpreserved Moisturizer	9.5x10 ⁶	4.2x10 ⁵	8.9x10 ⁴	<10
	Moisturizer with 1.5% Geogard Ultra®	6.5x10 ⁶	<10	<10	<10

Moisturizing Cream Test Results

Fungal Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
3	Unpreserved Moisturizer	8.8x10 ⁵	1.7x10 ⁵	1.9x10 ⁵	2.8x10 ⁵
	Moisturizer with 1.5% Geogard Ultra®	2.1x10 ⁵	<10	<10	<10

Anionic Protein Shampoo (pH 5.42)

Ingredient	%W/W
Water, deionized	q.s
Sodium Lauryl Ether Sulfate	15.0%
Triethanolamine Lauryl Sulfate	10.0%
Cocamide DEA	3.0%
Anhydrous Protein	1.0%
50% Aqueous Citric acid	pH adjuster
Preservative	1.5% Geogard Ultra®
Total	100.00%

Anionic Protein Shampoo Test Results

Bacterial Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
1	Unpreserved Shampoo	9.5x10 ⁶	4.76x10 ⁷	1.06x10 ⁸	2.0x10 ⁷
2	Shampoo with 1.5% Geogard Ultra®	5.2x10 ⁵	<10	<10	<10

Anionic Protein Shampoo Test Results

Fungal Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
3	Unpreserved Shampoo	6.6x10 ⁵	2.0x10 ⁵	3.0x10 ⁵	1.7x10 ⁷
4	Shampoo with 1.5% Geogard Ultra®	4.4x10 ⁵	<10	<10	<10

Hair Conditioner (pH = 4.89)

Ingredient	% W/W
Water, deionized	q.s
Polysorbate 80 (Glycosperse® 0-20)	0.5%
Lecithin	1.0%
Distearyldimonium Chloride (Varisoft TA100)	2.0%
Cetyl alcohol	2.1%
Cetearyl alcohol	1.5%
PDE 4 Lauryl Alcohol (Ethospense® LA-4)	3.1%
10% Aqueous Sodium Hydroxide	pH adjuster
Preservative	1.0% Geogard Ultra®
Total:	100.00%

Hair Conditioner Test Results

Bacterial Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
1	Unpreserved Conditioner	8.3 x 10 ⁶	4.8 x 10 ⁷	2.4 x 10 ⁶	9.0 x 10 ⁶
2	Conditioner w/ 1.0% Geogard Ultra®	3.5 x 10 ⁵	< 10	< 10	< 10

Hair Conditioner Test Results

Fungal Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 28
3	Unpreserved Conditioner	4.2 x 10 ⁶	1.8 x 10 ⁷	8.3 x 10 ⁵	3.7 x 10 ⁵
4	Conditioner w/ 1.0% Geogard Ultra®	4.1 x 10 ⁴	2.0 x 10 ²	<10	<10

Wet Wipe Liquor (pH = 5.54)

Ingredient	%W/W
Water	q.s to 100
Decyl glucoside (Plantaren® 2000)	0.25%
Polysorbate 20 (Glycosperse® L-20)	0.30%
Disodium EDTA	0.20%
Sodium citrate	3.00%
Geogard Ultra®	2.00%
Total	100.00%

(pH adjustments for in-situ buffer)

Wet Wipe Liquor Test Result

Bacterial Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 21	Day 28
1	SPC nonwoven (unpreserved)	1.6×10^6	3.1×10^5	$>3.9 \times 10^6$	$>3.9 \times 10^6$	$>3.9 \times 10^6$
2	SPC nonwoven with 2% Geogard Ultra®	2.1×10^6	<100	<100	<100	<100
3	Spunlace nonwoven (unpreserved)	2.6×10^6	3.0×10^6	$>3.9 \times 10^6$	$>3.9 \times 10^6$	$>3.9 \times 10^6$
4	Spunlace nonwoven with 2% Geogard Ultra®	1.9×10^6	<100	<100	<100	<100

Wet Wipe Liquor Test Result

Fungal Counts (CFU/gram)

Sample#	Test Samples	Day 0	Day 7	Day 14	Day 21	Day 28
5	SPC nonwoven (unpreserved)	7.7×10^4	2.4×10^6	6.4×10^6	4.1×10^5	1.2×10^6
6	SPC nonwoven with 2% Geogard Ultra®	7.8×10^4	1.0×10^2	<100	<100	<100
7	Spunlace nonwoven (unpreserved)	1.2×10^5	5.5×10^5	8.8×10^5	1.1×10^6	1.2×10^6
8	Spunlace nonwoven with 2% Geogard Ultra®	9.5×10^4	<100	<100	<100	<100

There is also a moisturization benefit on the skin with the Geogard Ultra®. In the same moisturizing cream formulation used to demonstrate preservative efficacy, Geogard Ultra® produced a quantitative moisturization benefit to the skin. Over a period of time, Geogard Ultra® produced a moisturizing effect that was superior to the use of 2 % glycerin.

Average Moisturizing Effect on 9 Subjects Over Five Days

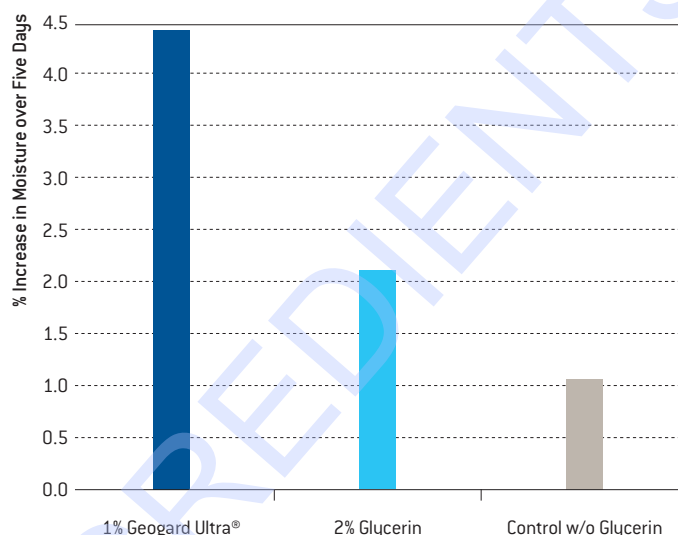


Fig. 1

Global Regulatory

Europe

- Max concentration of sodium benzoate is based on benzoic acid content
- Max concentration of benzoic acid is 2.5% for rinse-off (equivalent to 2.95% sodium benzoate)
- Max concentration of benzoic acid is 0.5% for leave-on (equivalent to 0.59% sodium benzoate)

Japan

- 1.0% total max level of sodium benzoate

US

- 5.0% total max level of sodium benzoate

Formulation Recommendations

- Water soluble
- Compatible with a wide variety of formulation ingredients as well as most types of cationic, nonionic and anionic systems
- Can be used effectively over a pH range of 3 to 6 and can be added at both room and elevated temperatures
- Soluble up to 4% in ambient water; it can be easily dispersed in glycols and alkyl sulfates

To maximize the pH stability of the final formulation, it may be necessary to pH adjust and buffer as described below.

This may be carried out by withholding approximately 10-15% of water from the product, dissolving the Ultra and carrying out the adjustment in a side vessel, and then adding the pH adjusted solution added to the batch. Alternatively Geogard Ultra may be dosed directly into the batch.

1. Dose the final product (or withheld water) with the required level of Geogard Ultra®.
2. Mix thoroughly to ensure all solids have completely dissolved.
3. Add sufficient base (for example sodium hydroxide or AMP), to adjust the pH of the formulation to approximately 7.5 or higher.
4. Mix thoroughly and ensure the pH remains above pH 7 after 30 minutes. If the pH drops below pH 7 more base is needed.
5. Once the pH holds above 7, adjust the pH to desired final product pH (pH 5.0–5.5 is ideal) with citric acid. The pH is now buffered. As a guide, for a 1% solution of Geogard Ultra®, using AMP (95%) to adjust pH, it will take approximately 0.4% AMP (95%) to adjust the pH over 7.5 and approximately 0.05% citric acid monohydrate to adjust to a final buffered pH of 5.

If carried out in a side tank, add the buffered solution back to the main vessel. Note that with the side tank procedure, if other ingredients which affect pH are present in a particular formulation, a final further addition of citric acid or sodium citrate may be necessary to get the final desired pH.

Solubility Data

Solvent	Soluble/Insoluble
Water	Soluble
Propylene Glycol	Dispersible
Glycerin	Soluble
Ethanol	Insoluble
Mineral Oil	Dispersible
Vegetable Oil	Insoluble
Silicone (Dimethicone)	Insoluble
Alkyl Sulfates	Dispersible

Typical Properties	
Gluconolactone,%	70% Minimum
Sodium Benzoate,%	22% Minimum
Appearance	Free flowing, white powder
Activity	99%



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