Earth Supplied Products, LLC
Phone : 239-598-5088
Fax : 239-598-5015
E-mail : tech@espllc.us
1060 Collier Center Way
Naples, FL 34110 USA

Technical Data Sheet

Product: **ESP SafeGuard WS Clear**

Food Label: **Natural Flavor**

Product Pack Size	ESP Part Number
Pail (18 kg)	221-018-004

ESP SafeGuard WS Clear is a low cost, water-soluble, natural, EcoCert & NOP certified, proved natural ingredient with excellent skin soothing, fragrance, and Antimicrobial Hurdle Technology (AHT) properties.

Usage: ESP SafeGuard WS Clear is heat and pH stable. It can be added directly to the water in surfactant formulas or after the thickeners are dispersed in creams and lotions. It is functional over a wide pH range (<4 - 8) in any hydrous formulation including emulsions – oil-in-water or water-in-oil, and surfactant formulas. Recommended use level suggested: 5.00% to 10.00%.

Shelf Life: 1 ½ years if stored under cool (room temperature) conditions. If frozen, thaw for 24 hours and agitate to clarify.

Antimicrobial Hurdle Technology (AHT) was originally developed in the 1970s by Food companies' needing an all-natural alternative to synthetic preservatives. AHT employs clever combinations of synergetic formulation "hurdles" to create an inhospitable environment for microorganisms in a safe, reliable, natural, and ultimately unpreserved product. Commonly used hurdles are temperature, water activity, acidity, redox potential, ethanol, and ultra-high pressure. Crucial to the success of AHT is the impact it has on the homeostasis, metabolic exhaustion, and/or stress reactions of microorganisms. **ESP SafeGuard WS Clear** is not a preservative, yet it works synergistically with other hurdles to disrupt microbial homeostasis; thereby preventing the microorganisms from multiplying and causing them to remain inactive or die.

CTFA Antimicrobial Effectiveness Test*
The PCPC (formerly CTFA) has designed a series of tests to evaluate the effectiveness of the antimicrobial systems of many different types of Personal Care and Cosmetic (PC&C) products. PC&C products are ideal environments-containing water, starches, proteins, peptides, carbohydrates, etc.- for microorganisms to grow; and since these products are intended for use in contact with the body, it is imperative that they are free of microbial contamination. The CTFA Antimicrobial Effectiveness Tests are designed to verify that cosmetics avoid microbial growth despite various potential contaminates introduced either during manufacturing or nor- mal consumer use.

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Cosmetics manufacturers traditionally add chemical preservatives to cleansers, conditioners, makeups, and lotions, etc. to kill bacteria and extend the shelf life of these products. In fact, the FDA requires that PC&C products are "... (not) contaminated with microorganisms which may be pathogenic, and the density of non-pathogenic microorganisms is low…" Regardless, there is a growing concern about the safety of the preservatives themselves. Some claim traditional preservatives cause rashes and other allergic reactions. Other studies have linked some of these agents to cancer and other health problems.

We believe properly applied Antimicrobial Hurdle Technologies preclude the need for these traditional preservatives while enabling the formulator to create safe and naturally **"Preservative Free"** formulas.

ESP Organic Soothing Body Lotion Formula # 10009

	Ingredients	Function	NOP Status	%
1	Water	Moisturizer	n/a	61.15
2	ESP SafeGuard WS Clear	Moisturizer	n/a	5.00
3	ESP Organic Tapioca Starch	Feel Enhancer	Organic	2.00
4	ESP Organic Guar Gum	Thickener	Organic	0.35
5	Viscarin PC 209 (FMC BioPolymer)	Thickener / Humectant	205.605	0.50
6	ESP Organic Rice Extract	Humectant	Organic	3.00
7	ESP Organic Safflower Oil Hi-Oleic	Emollient	Organic	7.50
8	ESP Organic SafeBase 2	Emulsifier / Emollient	Organic	17.50
9	ESP Organic Sunflower Oil Hi-Oleic	Emollient	Organic	3.00

*All CTFA Antimicrobial Effectiveness Test studies are available.

Pure Inoculum Procedure Summary: The CTFA Antimicrobial Effectiveness Test consists of challenging test samples with pure inoculum of the test organisms indicated below. The changes in microbial population were determined at specified time intervals of 0, 3, 7, 14, 21, and 28 days for each microorganism to recover any surviving test organisms. At Day 28 the sample was re-inoculated with the organisms below and sampling continued for another 28 days at day 31, 35, 42, 49, and 56 days.

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M-3 CTFA Pure Inoculum Antimicrobial Effectiveness Test*			ESP Organic Soothing Body Lotion					
Inoculum	**cfu/g**	**Day 0**	**Day 3**	**Day 7**	**Day 14**	**Day 21**	**Day 28**	**% Reduction**
S. aureus	1.00×10^6	5.5×10^4	< 10	< 10	< 10	< 10	< 10	
% Reduction		94.5%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
E. coli	1.01×10^6	5.6×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		49.1%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
P. aeruginosa	1.00×10^6	4.8×10^4	< 10	< 10	< 10	< 10	< 10	
% Reduction		95.2%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
C. albicans	7.70×10^5	3.6×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		53.2%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
A. brasiliensis	7.00×10^5	3.6×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		48.6%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%

M-3 CTFA Pure Inoculum Antimicrobial Effectiveness Test* Day 28 Reinoculation			ESP Organic Soothing Body Lotion					
Inoculum	**cfu/g**	**Day 28**	**Day 31**	**Day 35**	**Day 42**	**Day 49**	**Day 56**	**% Reduction**
S. aureus	1.10×10^6	4.4×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		60%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
E. coli	1.00×10^6	4.0×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		60%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
P. aeruginosa	1.00×10^6	5.3×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		47%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
C. albicans	7.00×10^5	4.3×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		38.6%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
A. brasiliensis	6.70×10^5	3.5×10^5	< 10	< 10	< 10	< 10	< 10	
% Reduction		47.8%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%

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Mixed Inoculum Procedure Summary: The CTFA Antimicrobial Effectiveness Test consists of challenging test samples with mixed inoculum of the test organisms indicated below. The changes in microbial population were determined at specified time intervals of 0, 3, 7, 14, 21, and 28 days for each microorganism to recover any surviving test organisms. At Day 28 the sample was re-inoculated with the organisms below and sampling continued for another 28 days at day 31, 35, 42, 49, and 56 days.

Conclusion: This study demonstrated that the Antimicrobial Hurdle system for the test sample met the acceptance criteria per the CTFA Antimicrobial Preservative Effectiveness Method.*

M-13 CTFA Mixed Inoculum Antimicrobial Effectiveness Test*		**ESP Organic Soothing Body Lotion**				
Inoculum	**Day 0 cfu/g**	**Day 1**	**Day 7**	**Day 14**	**Day 21**	**Day 28**
Mixed Bacterium Inoculum	1.60×10^5	<10	< 10	< 10	< 10	<10
% Reduction	84.0%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
Mixed Mold/Yeast Inoculum	5.7×10^5	<10	< 10	< 10	< 10	< 10
% Reduction	14.9%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
Day 28 Reinoculation	**Day 28**	**Day 30**	**Day 35**	**Day 42**	**Day 49**	**Day 56**
Mixed Bacterium Inoculum	6.80×10^5	<10	< 10	< 10	< 10	< 10
% Reduction	38.2	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
Mixed Mold/Yeast Inoculum	4.0×10^5	<10	< 10	< 10	< 10	< 10
% Reduction	44.4%	>99.9%	>99.9%	>99.9%	>99.9%	>99.9%

Mixed Inoculum	**S. aureus**	**E. coli**	**P. aeruginosa**	**C. albicans**	**A. brasiliensis**	**Mixed Bacterial**	**Mixed Mold/Yeast**
Initial	1.1×10^6	1.0×10^6	1.0×10^6	7.4×10^5	6.7×10^5	1.0×10^6	6.7×10^5
Reinoculation	1.1×10^6	1.0×10^6	1.0×10^6	7.6×10^5	7.1×10^5	1.1×10^6	7.2×10^5

Safety Tests - all studies are available.

ESP SafeGuard WS Clear was tested at the highest recommended use percentage for Skin Irritation, Eye Irritation, and Mutagenicity potential. In each case, the material was found to be non-irritating and safe.

Safety Test	**Dosage**	**Result**	**Date**
Ames Mutagenicity	10% in Water	Non-Mutagenic	April 11, 2012
HET-CAM	10% in Water	Non-Irritating	April 11, 2012
RIPT	10% in Water	Non-Irritating & Non-Sensitizing	March 21, 2012
Formaldehyde	5% in Water	Naturally occurring 44 ppm – 00.0044%	March 24, 2014

ESP SafeGuard WS Clear is a 100% natural product that does not contain parabens, Phenoxyethanol, alcohol, sulfates, or quaternary compounds.

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