Personal Care

Mikrokill® COS (patented)

Broad Spectrum Preservation System

INCI Name: Phenoxyethanol & Caprylyl Glycol & Chlorphenesin
SAP Code#: 137520

Key Product Benefits

- Safe and effective
- Highly effective antimicrobial
- Broad spectrum activity on bacteria, yeast and mold
- Has a wide range of global regulatory acceptance
- Can be used alone or in combination with other preservatives
- Stable in the usual operating range for Personal Care products (pH 3-8)
- Compatible in a wide range of skin care, hair care and sun care systems
- Low odor profile
- Not tested on animals
- Liquid for ease of use
- Well documented safety profile
- Patented formula (US Patent No. US7854940)

Recommended Use Level

0.75–1.5%

Description

Mikrokill® COS is a unique, patented combination of three components (Phenoxyethanol, Chlorphenesin and Caprylyl Glycol), which are well accepted in a wide range of personal care products. Phenoxyethanol is a widely used and versatile preservative. Chlorphenesin is a known broad spectrum preservative and the inclusion of Caprylyl Glycol contributes biological synergism with moisturizing and wetting capabilities.

Compositional Breakdown

Chemical Compound Breakdown	CAS No.	EINECS No.
Phenoxyethanol	122-99-6	204-589-7
Caprylyl Glycol	1117-86-8	214-254-7
Chlorphenesin	104-29-0	203-192-6

Chemical Compound Breakdown	%
Phenoxyethanol	62–66%
Caprylyl Glycol	18–22%
Chlorphenesin	13–19%

Applications

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

Efficacy

Microbiological Challenge Studies

Studies were run on four formulas using a 0.75% concentration of Mikrokill® COS. The protocol used was a modification of the Cosmetic, Toiletry and Fragrance Association (CTFA) Challenge test using a 3 week re-challenge time period instead of a 4 week period. All samples were inoculated at the beginning of the study, sampled at 24 hours, 7 days, 14 days and 21 days. The samples were diluted in neutralizer and plated quantitatively for viable organisms at all sampling times. After 21 days, all samples were re-inoculated and subjected to a second challenge.

Water in Oil Emulsion Cream (KKL9 – 137) Base Formulation

pH: n/a

% water: 75%; A_w: n/a

Ingredient	%
Phase A	
DI-Water	q.s. to 100
Glycerin	3.00
Sodiium Chloride	1.00
Phase B	
SF1328	10.00
SF 1202	8.50
Gel Base BSM-PT	2.50

Test Results

Colony Forming Units per Gram (CFU/g)

Test Organism	Unpreserved Control				Test-Mikrokill® COS (0.75%)			
	Initial Challenge			Rechallenge	Initial Challenge			Rechallenge
	24 hrs	7 days	21 days	21 days	24 hrs	7 days	21 days	21 days
S. aureus	$1.1x10^5$	$1.5x10^2$	<10	<10	<10	<10	<10	<10
P. aeruginosa + B. cepacia	$5.1x10^4$	$4.2x10^2$	<10	<10	<10	<10	<10	<10
K. pneumoniae	$5.2x10^4$	<10	<10	<10	<10	<10	<10	<10
C. albicans	$7.0x10^3$	$3.2x10^2$	$8.1x10^2$	$5.5x10^3$	<10	<10	<10	<10
A. niger + Penicillium sp.	$1.6x10^3$	$7.0x10^3$	$3.8x10^2$	$3.7x10^2$	6.0x10	<10	<10	<10

Oil in Water Emulsion (AR5-026) Base Formulation

pH: 5

% water: 69.5%; A_w: n/a

Ingredient	%
Phase A	
DI-Water	q.s. to 100
Glycerin	5.00
Phase B	
Cetearyl Alcohol & Ceteareth-20	4.50
GMS 165	4.00
Mineral Oil	17.00

Test Results

Colony Forming Units per Gram (CFU/g)

Test Organism	Unpreserved Control				Test-Mikrokill® COS (0.75%)			
	Initial Challenge			Rechallenge	Initial Challenge			Rechallenge
	24 hrs	7 days	21 days	21 days	24 hrs	7 days	21 days	21 days
S. aureus	$1.1x10^6$	$1.4x10^4$	4.0x10	<10	$2.5x10^2$	<10	<10	<10
P. aeruginosa + B. cepacia	$1.2x10^6$	$2.8x10^6$	$8.0x10^6$	$8.2x10^6$	<10	<10	<10	<10
K. pneumoniae	$1.6x10^6$	$1.1x10^5$	$1.5x10^2$	$3.2x10^5$	<10	<10	<10	<10
C. albicans	$1.7x10^5$	$2.0x10^5$	$2.7x10^5$	7.2x104	<10	<10	<10	<10
A. niger + Penicillium sp.	$3.3x10^4$	$3.3x10^4$	$3.4x10^4$	$7.2x10^4$	$4.3x10^4$	<10	<10	<10

Hair Conditioner (AR5-024) - Base Formulation

pH: 4.9

% water: 71.2%; A_w: n/a

Ingredient	%
Phase A	
DI-Water	q.s. to 100
Hydroxyethylcellulose	0.30
Phase B	
Cetrimonium Bromide & Cetearyl Alcohol	1.00
Cetyl Alcohol	2.50
Stearyl Alcohol	1.00
Steareth-21	2.50
Phase C	
Polysorbate 80	0.50
Lecithin	1.00
Water	20.00

Test Results

Colony Forming Units per Gram (CFU/g)

Test Organism	Unpreserved Control				Test-Mikrokill® COS (0.75%)			
	Initial Challenge			Rechallenge	Initial Challenge			Rechallenge
	24 hrs	7 days	21 days	21 days	24 hrs	7 days	21 days	21 days
S. aureus	$<10^3$	<10	<10	<10	<10	<10	<10	<10
P. aeruginosa + B. cepacia	$4.6x10^5$	$2.9x10^7$	$1.3x10^7$	$<10^7$	<10	<10	<10	<10
K. pneumoniae	$6.0x10^3$	<10	<10	<10	<10	<10	<10	<10
C. albicans	$9.8x10^4$	$6.9x10^4$	$4.4x10^4$	$1.4x10^5$	<10	<10	<10	<10
A. niger + Penicillium sp.	$1.4x10^4$	$1.5x10^4$	$1.3x10^4$	$5.9x10^4$	$2.2x10^3$	<10	<10	<10

Oil in Water Lotion (KKL-9-159) Base Formulation

pH: 6.2

% water: 72.2%; A_w: n/a

Ingredient	%
Phase A	
DI-Water	q.s. to 100
Sodium Borate	0.30
Glycerin	6.00
Xanthan Gum	0.50
Sucrose Stearate	0.50
Phase B	
Mineral Oil	15.00
Stearic Acid	3.00
Vitamin E Acetate	0.50
Beeswax	2.00

Test Results

Colony Forming Units per Gram (CFU/g)

Test Organism	Unpreserved Control				Test-Mikrokill® COS (0.75%)			
	Initial Challenge			Rechallenge	Initial Challenge			Rechallenge
	24 hrs	7 days	21 days	21 days	24 hrs	7 days	21 days	21 days
S. aureus	$1.5x10^6$	$2.3x10^6$	$4.5x10^3$	$7.9x10^3$	$2.3x10^4$	$9.3x10^3$	$6.8x10^2$	$3.0x10^2$
P. aeruginosa + B. cepacia	$3.5x10^6$	$4.0x10^6$	$2.8x10^7$	$<10^8$	<10	<10	<10	<10
K. pneumoniae	$3.0x10^6$	$2.9x10^7$	$7.2x10^7$	$7.4x10^7$	<10	<10	<10	<10
C. albicans	$6.4x10^4$	$8.9x10^4$	$4.8x10^4$	$3.8x10^7$	$9.0x10^3$	<10	<10	<10
A. niger + Penicillium sp.	$3.6x10^4$	$2.1x10^5$	$2.2x10^5$	$3.8x10^7$	$3.4x10^4$	$1.1x10^3$	<10	<10

Formulation Recommendations

- Can be easily added directly to the oil phase of the formulation during pre- or post-emulsification < 60°C
- For highly aqueous systems, co-solvents, coupling agents and/or surfactants may be needed to assist with solubilization. Mix 1:1 with Glycosperse® L-20 or Lonzest® SML-20 and add to finished product
- Compatible with most personal care ingredients
- pH: 2–8

Global Regulatory

Europe
- Approved under Annex V to Regulation EC/1223/2009
- Max concentration of 1% Phenoxyethanol and 0.3% Chlorphenesin

Japan
- All ingredients approved (JNCI)
- Max concentration of 1% Phenoxyethanol and 0.3% Chlorphenesin
- Not permitted for products coming into contact with mucous membranes

United States
- All ingredients allowed (CIR/CTFA)
- Max concentration of 1% Phenoxyethanol and 0.3% Chlorphenesin

General
- Phenoxyethanol & Chlorphenesin - classified as preservatives
- Caprylyl Glycol
  - Officially/legally classified as an emollient
  - Not recognized and classified as a preservative
  - Antimicrobial synergistic activity becoming recognized

Typical Properties	
Appearance	Liquid water - white to straw
Color (Gardner)	2 max.
Odor	Characteristic

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