

SCSS Tea Talk

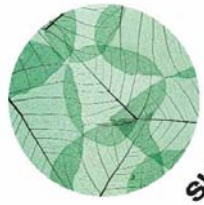
***Solutions for Preservation of Cosmetic Products
On 5 October, 2007
@ Sheraton Tower, Singapore***

*Presented by Albert Lee
Rohm and Haas Singapore (Pte) Ltd*





Hair Care



Skin Care



Sun Care



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Preventing Microbial Contamination in a Manufacturing Environment.

Part II

Use of Effective and Approved Preservatives for Your Personal Care Products.

Part III

Introduction of a New Series of Broad Spectrum Preservatives (NEOLONE™ and its Combos) suitable for Personal Care Products.

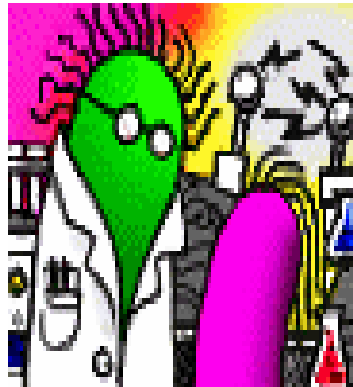


Part I

Preventing Microbial Contamination in a Manufacturing Environment.

Preventing Microbial Contamination in a Manufacturing Environment

- Microbiological Contamination - Effects and Consequences
- Why / How Contamination Occurs
- How to Prevent Microbial Contamination



Should we be concerned about Microbial Contamination?



Uncontaminated Plant

**Most of the time,
we cannot see
microorganisms**

And,

**What appears
to be clean from
the outside may
in fact be heavily
contaminated
on the inside!**



Contaminated Plant

Consequences of Microbial Contamination

Odors

Color change

Gas production

Visible growth (mats / slime)

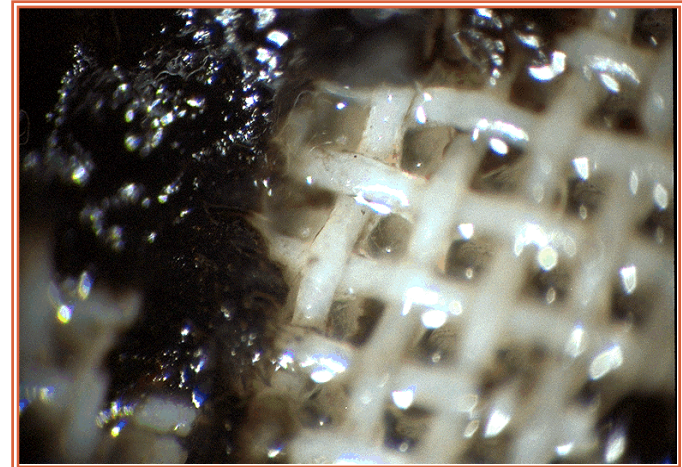
Modification of physical
properties of product

Change in viscosity

Emulsion separation

Change in 'feel' of the
product

Corrosion



Consequences of Microbial Contamination

Loss of preservatives

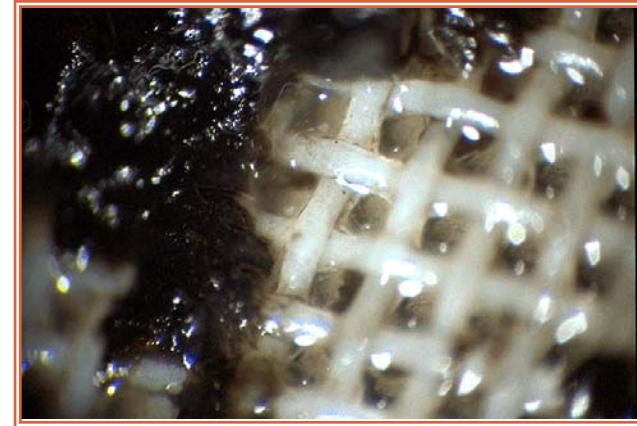
Financial Loss

Consumer complaints

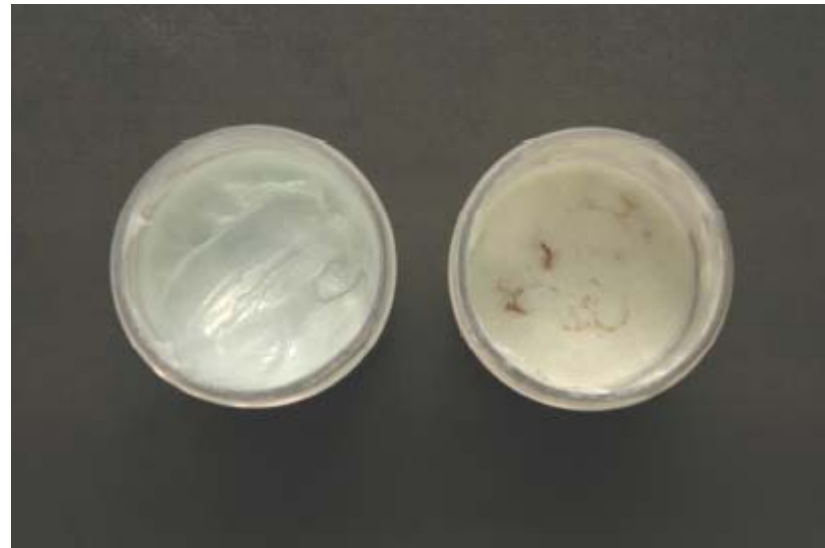
Production stoppage and
downtime

Potential health risks

Especially for eyes &
damaged skin



Prevention is always better than a cure



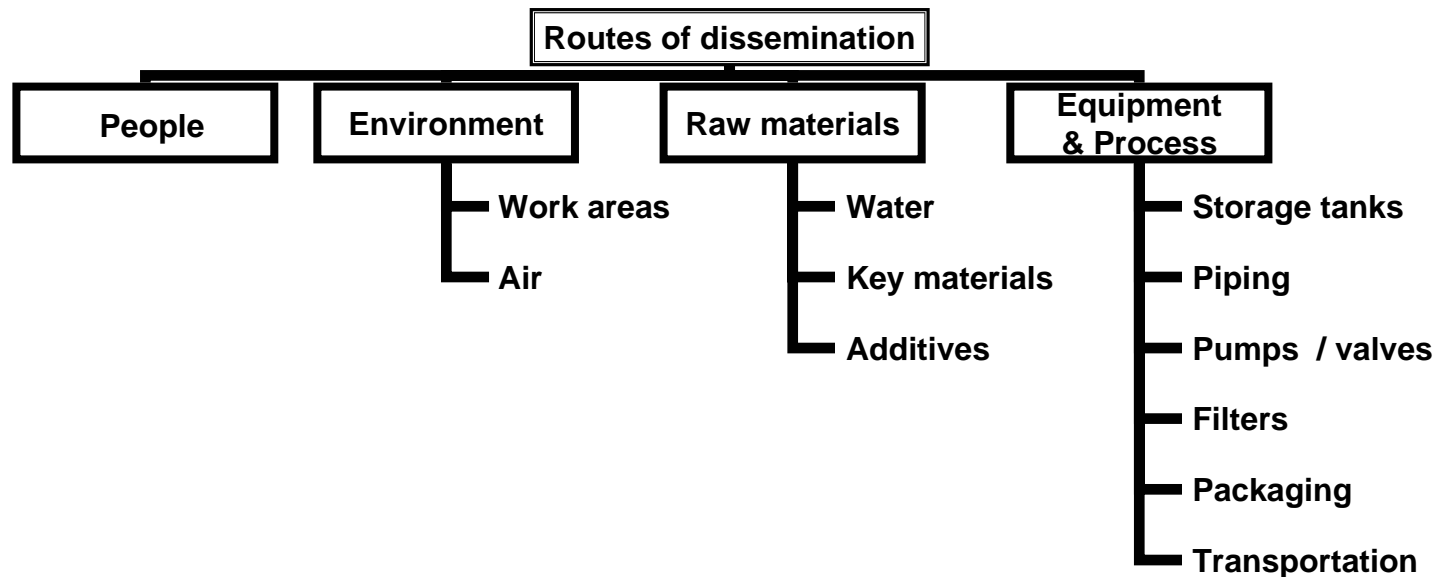
Contaminated Cream

Why Does Contamination Occur in Personal Care Products?

- Multiple Sources of Contamination
- Growth Conditions / Adaptability
- Lack of Plant Hygiene

Multiple Sources of Contamination

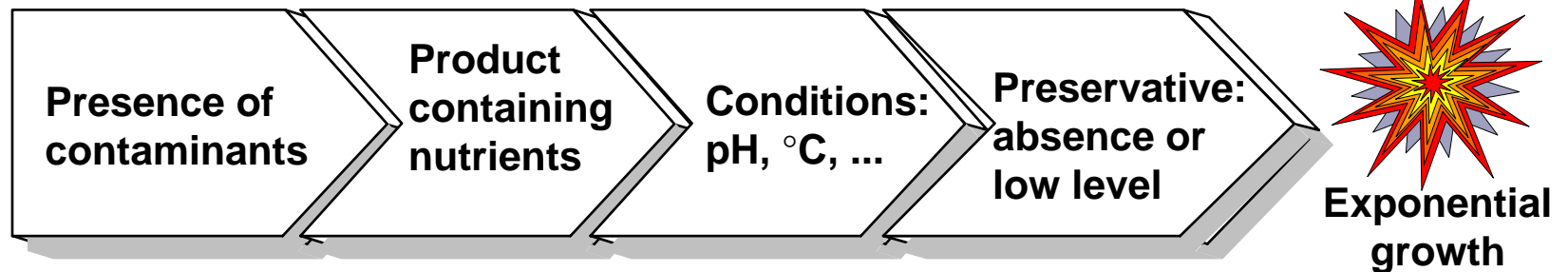
Huge potential for contamination by microorganisms



Good Manufacturing Practices (Good Plant Hygiene) are key to avoiding contamination!

Rapid Microbial Growth / Adaptability

Microorganisms are everywhere and multiply rapidly depending on the environment



Degree and rate of growth depends on

- pH
- temperature
- Water
- Nutrients (C, N, S, P, O)

Rapid Microbial Growth / Adaptability

- Biofilm Formation
 - Growth can lead to build-up and adhesion to surfaces
 - Continuous source of contamination
 - Increased tolerance / resistance to sanitizers and preservatives

Common **Bacterial** Contaminants

Consumer Product Manufacture / Products

Gram Negative Bacteria

Aerobic / Facultative

Pseudomonas

Burkholderia

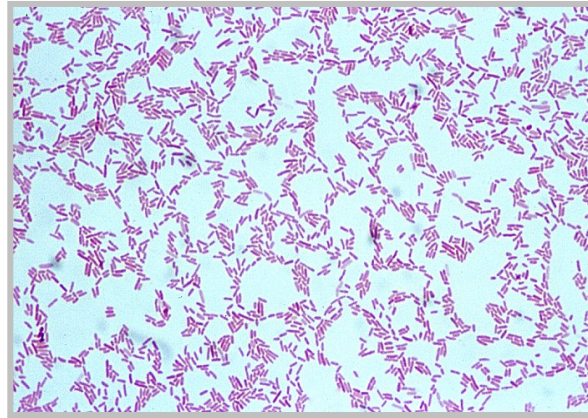
Klebsiella

Enterobacter

Alcaligenes

Proteus

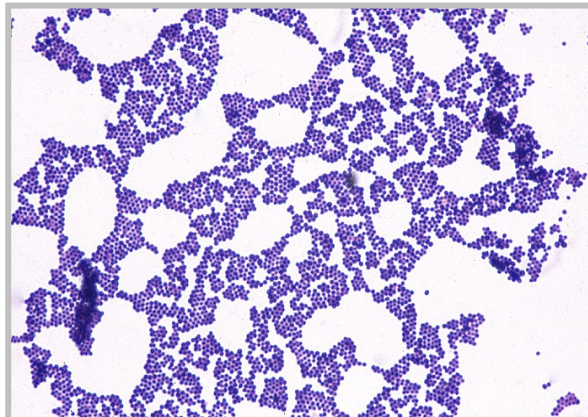
Acetobacter



Anaerobic

Desulfovibrio

Desulfobacter



Gram Positive Bacteria

Aerobic

Bacillus

Streptomyces

Anaerobic

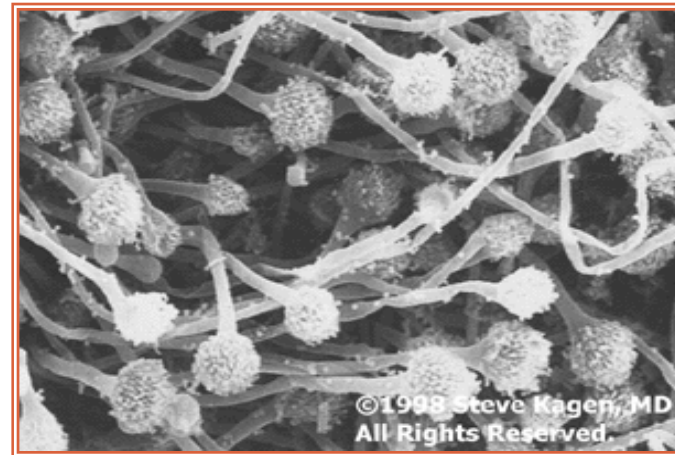
Clostridium

Common Fungal Contaminants

Consumer Product Manufacture / Products

Mold

Penicillium
Aspergillus
Cephalosporium
Fusarium
Cladosporium
Geotrichum
Trichosporin



Yeast

Candida
Pichia
Saccharomyces
Brettanomyces



Preventing Microbial Contamination in Personal Care Products

- Preservatives
 - Appropriate spectrum of activity / Stable / Compatible
 - Recommend thorough efficacy evaluations
 - Preservatives are NOT disinfectants –
 - Preservatives are designed to protect **clean products** from the occasional introduction of microbial contaminants.
 - Cannot and should not replace **good plant hygiene**
- **Good Manufacturing Practices**
 - Minimize the introduction/ proliferation of microorganisms in the plant / final product

How to Prevent Microbial Contamination in Manufacturing?

How Do We Prevent Microbial Contamination?

Good Manufacturing Practices (Part I)

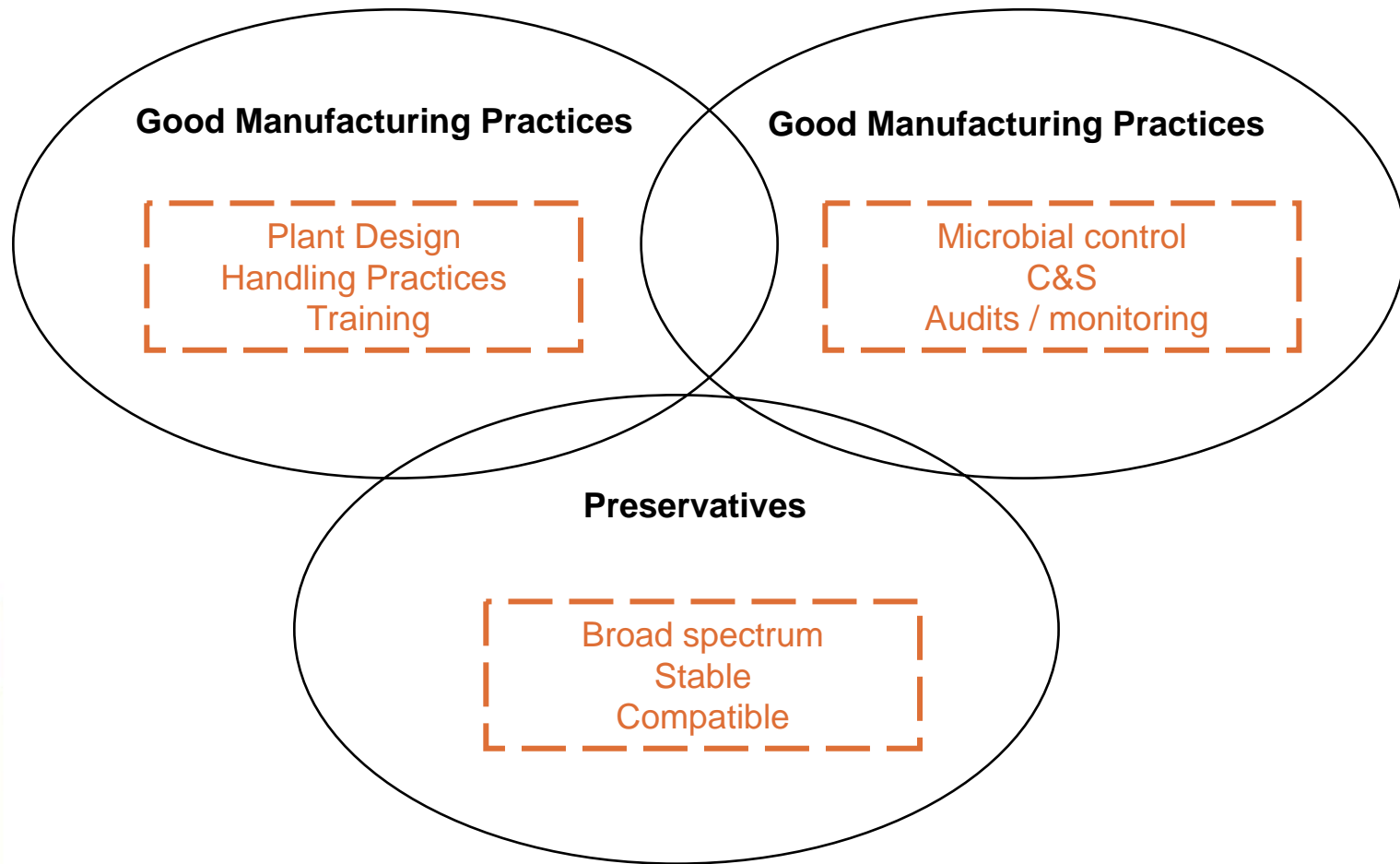
- Facility Design / Equipment
- Raw Material Quality / Susceptibility
- Process Water
- Storage and Handling Practices
- Training and Awareness

How Do We Prevent Microbial Contamination?

Good Manufacturing Practices – Microbial control (Part II)

- Microbiological (Hygiene) Audits
- Microbiological Monitoring Programs
- Cleaning and Sanitization Programs
- Quality Assurance

Working Together to Prevent Microbial Contamination



Prevention Instead of Cure



Part II

Use of Effective and Approved Preservatives for Your Personal Care Products.

Important Features of a Good Preservative System

- Broad Spectrum Activity
- Good Efficacy at low dosage
- Compatible with most commonly used ingredients
- Good stability for reasonable range of pH and temperature
- Solubility profile in water and oil
- Safe at use concentration to people and environment
- Broadly approved by most countries
- Affordable use cost
- Easy to detect a.i. in finished product

FDA Statistics of Commonly Used Preservatives in Cosmetic Formulations

<u>CHEMICAL NAME</u>	<u>2003</u>	<u>2001</u>
Methylparaben	7161	6893
Propylparaben	5809	5621
Butylparaben	2326	2174
Imidazolidinyl Urea	2038	2025
Ethylparaben	1725	1451
Phenoxyethanol	1670	1480
DMDM Hydantoin	993	943
Diazolidinyl Urea	725	701
MCI/MI	669	595
Quaternium-15	516	505
Sodium Benzoate/Benzoic Acid	500	372
Sorbic Acid/Potassium Sorbate	479	432
Sodium Dehydroacetate/Dehydroacetic Acid	445	396
Benzyl Alcohol	380	321
Isobutylparaben	227	187
Iodopropynyl Butylcarbamate	227	187
2-Bromo-2-Nitropropane-1.3-Diol	168	164
Formaldehyde	139	139
Methyldibromo Glutaronitrile	95	88
Chloroxlenol	43	42
Hexamidine Isethionate	43	37
Isopropylparaben	41	33
Chlorhexidine Digluconate	27	57
Sodium Hydroxymethylglycinate	24	23

ASEAN Cosmetic Document

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
1	Benzoic acid (CAS No. 65-85-0), and its sodium salt (CAS No 532-32-1)	Rinse off products, except oral care products; 2.5 % (acid) Oral care products; 1.7 % (acid) Leave on products; 0.5 % (acid)		
1a	Salts of benzoic acid other than those listed under reference number 1 and esters of benzoic acid	0.5 % (acid)		
2	Propionic acid and its salts	2% (acid)		
3	Salicylic acid and its salts (+)	0.5% (acid)	Not to be used in preparations for children under 3 years of age, except for shampoos	-Not to be used for children under 3 years of age (1)
4	Sorbic acid (hexa-2,4-dienoic acid) and its salts	0.6% (acid)		
5	Formaldehyde and paraformaldehyde (+)	0.2% (except for products for oral hygiene) 0.1% (products for oral hygiene) expressed as free formaldehyde	Prohibited in aerosol dispensers (sprays)	
7	Biphenyl-2-ol (o-phenylphenol) and its salts	0.2% expressed as phenol		

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LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
8	Zinc pyrithione (+) (CAS No 13463-41-7)	Hair products; 1.0 % Other products; 0.5%	Rinse off products only. No use in products for oral care	
9	Inorganic sulphites and hydrogensulphites (+)	0.2% expressed as free SO ₂		
10	Sodium iodate	0.1%	Rinse-off products only	
11	Chlorobutanol (INN)	0.5%	Prohibited in aerosol dispensers (sprays)	-Contains chlorobutanol
12	4-Hydroxybenzoic acid its salts and esters	0.4% (acid) for 1 ester; 0.8% (acid) for mixtures of esters		
13	3-Acetyl-6-methylpyran-2,4 (3H)-dione (Dehydroacetic acid) and its salts	0.6% (acid)	Prohibited in aerosol dispensers (sprays)	
14	Formic acid and its sodium salt	0.5% (expressed as acid)		
15	3,3'-Dibromo-4,4'-hexamethylenedioxydibenzamidine (Dibromohexamidine) and its salts (including isethionate)	0.1%		
16	Thiomersal (INN)	0.007% (of Hg) If mixed with other mercurial compounds authorized by this Directive, the maximum concentration of Hg remains fixed at 0.007%	For eye make-up and eye make-up remover only	-Contains thiomersal

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LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
17	Phenylmercuric salts (including borate)	Ditto	Ditto	-Contains phenylmercuric compounds
18	Undec-10-enoic acid and salts	0.2% (acid)		
19	Hexetidine (INN)	0.1%		
20	5-Bromo-5-nitro-1,3 dioxane	0.1%	Rinse-off products only Avoid formation of nitrosamines	
21	Bronopol (INN)	0.1%	Avoid formation of nitrosamines	
22	2,4-Dichlorobenzyl alcohol	0.15%		
23	Triclocarban (INN) (+)	0.2%	Purity criteria: 3,3',4,4'-Tetrachloroazobenzene less than 1 ppm; 3,3',4,4'-Tetrachloroazoxybenzene less than 1 ppm	
24	4-Chloro-m-cresol	0.2%	Prohibited in products intended to come into contact with mucous membranes	
25	Triclosan (INN)	0.3%		

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
26	4-Chloro-3,5-xyleneol	0.5%		
27	3,3'-Bis(1-hydroxymethyl-2,5-dioximidazolidin-4-yl)-1,1'-methylenediurea ("Imidazolidinyl urea")	0.6%		
28	Poly(1-hexamethylenebiguanide hydrochloride	0.3%		
29	2-Phenoxyethanol	1.0%		
30	Hexamethylenetetramine (methenamine) (INN)	0.15%		
31	Methenamine 3-chloroallylochloride (INNM)	0.2%		
32	1-(4-Chlorophenoxy)-1-(imidazol-1-yl) 3,3-dimethylbutan-2-one	0.5%		
33	1,3-Bis(hydroxymethyl)-5,5-dimethylimidazolidine-2,4-dione	0.6%		
34	Benzyl alcohol (+)	1%		
35	1-Hydroxy-4-methyl-6(2,4,4-trimethylpentyl)2-pyridon and its monoethanolamine salt	1% 0.5%	Products rinsed-off For other products	

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
36	1,2-Dibromo-2,4-dicyanobutane	0.1%	Not to be used in cosmetic sunscreen products at a concentration exceeding 0.025%	
37	6,6-Dibromo-4,4-dichloro-2,2'-methylene-diphenol:Bromochlorophen)	0.1%		
38	4-Isopropyl-m-cresol	0.1%		
39	Mixture of 5-Chloro-2-methylisothiazol-3(2H)-one and 2-methylisothiazol-3(2H)-one with magnesium chloride and magnesium nitrate	0.0015% (of a mixture in the ratio 3:1 of 5-Chloro-2-methylisothiazol-3(2H)-one and 2-methylisothiazol-3(2H)-one)		
40	2-Benzyl-4-chlorophenol (Chlorophene)	0.2%		
41	2-Chloroacetamide	0.3%		-Contains chloroacetamide
42	Chlorhexidine (INN) and its digluconate, diacetate and dihydrochloride	0.3% expressed as chlorhexidine		
43	1-Phenoxypropan-2-ol (+)	1.0%	Only for rinse-off products	
44	Alkyl (C12-C22) trimethyl ammonium, bromide and chloride (+)	0.1%		

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
45	4,4-Dimethyl-1,3-oxazolidine	0.1%	The pH of the finished product must not be lower than 6	
46	N-(Hydroxymethyl)-N-(dihydroxymethyl-1,3-dioxo-2,5-imidazolinidyl-4)-N'-(hydroxymethyl) urea	0.5%		
47	1,6-Di(4-amidinophenoxy)-n-hexane (Hexamidine) and its salts (including isethionate and p-hydroxy- benzoate	0.1%		
48	Glutaraldehyde (Pentane-1,5-dial)	0.1%	Prohibited in aerosols (sprays)	-Contains glutaraldehyde (where glutaraldehyde concentration in the finished product exceeds 0.05%)
49	5-Ethyl-3,7-dioxa-1-azabicyclo [3.3.0] octane	0.3%	Prohibited in oral hygiene products and in products intended to come into contact with mucous membranes	
50	3-(p-Chlorophenoxy)-propane-1,2-diol (chlorphenesin)	0.3%		
51	Sodium hydroxymethylamino acetate (Sodium hydroxymethylglycinate)	0.5%		

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
52	Silver chloride deposited on Titanium dioxide	0.004% calculated as AgCl	20% AgCl (w/w) on TiO ₂ Prohibited in products for children under three years of age, in oral hygiene products and in products intended for application around the eyes and on the lips	
53	Benzethonium chloride (INCI)	0.1%	(a) Rinse-off products only (b) Leave on products other than for oral care use.	
54	Benzalkonium chloride, bromide and saccharinate	0.1% calculated as Benzalkonium chloride		-Avoid contact with the eyes
55	Benzylhemiformal	0.15%	Only for products to be removed by rinsing	

ANNEX VI – PART 1

LIST OF PRESERVATIVES ALLOWED FOR USE IN COSMETIC PRODUCTS

Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
56	iodopropynyl butyl-carbamate (IPBC) 3-iodo-2-propynylbutylcarbamate CAS No: 55406-53-6	(a) rinse-off products: 0.02 % (b) leave-on products: 0.01 % except in deodorants & antiperspirants: 0.0075 %	Not to be used in oral hygiene and lip care products (a) Not to be used in preparations for children under three years of age, except in bath products/shower gels and shampoo. (b) Not to be used in body lotion and body cream (*) Not to be used in preparations for children under three years of age.	(a)Not to be used for children under three years of age (**) (b)Not to be used for children under three years of age (***)
A57	Aluminium pyrithione	Rinse off products; 0.5 %		
57	Methylisothiazolinone (INCI)	0.01 %		

Solely for products which might be used for children under three years of age and which remain in prolonged contact with the skin

(*) Concerns any products aimed to be applied on a large part of the body

(**) Solely for products, other than bath products/shower gels and shampoo, which might be used for children under three years of age.

(***) Solely for products which might be used for children under three years of age.

ANNEX VI – PART 2 LIST OF PRESERVATIVES PROVISIONALLY ALLOWED

Colipa No	Ref No	Substance	Maximum authorized concentration	Limitations and requirements	Conditions of use and warnings which must be printed on the label
	a	b	c	d	e

Note: no preservative is listed in this section for the present time.



Part III

Introduction of a New Series of Broad Spectrum Preservatives (NEOLONE™ & KATHON™) suitable for Personal Care Products.

Primary Application - Wet state preservative/microbicide

Chemistry/Product Name

KATHON™ CG

**5-chloro- 2-methyl-4-isothiazolin-3-one /
2-methyl-4-isothiazolin-3-one**

Characteristics

Water Soluble

Broad Spectrum

**Fast Acting-
(Rapid growth
inhibition)**

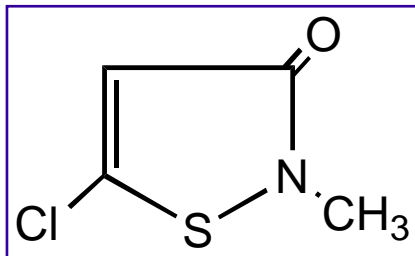
**NOT fast killing
Long residual**

Low use levels

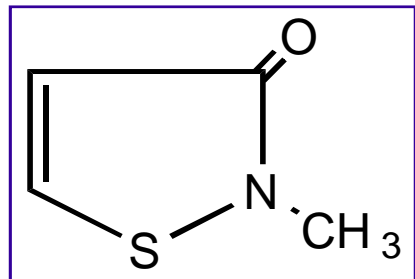
Applications

Household Products

Cosmetics & Toiletries



CMI / CMIT / MCI

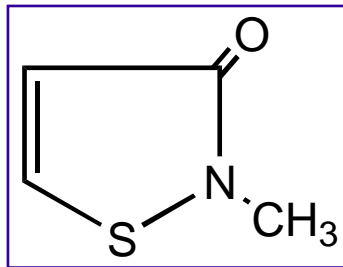


MI / MIT

Primary Application - Wet state bactericide

Chemistry/Products

NEOLONE™ 950
2-methyl-4-isothiazolin-3-one



MI / MIT

Characteristics

Water Soluble

**Broad spectrum
bactericide**

**Fast Acting-
(Rapid growth
inhibition)
NOT fast killing**

**Excellent chemical
stability**

Applications

**Household Products
Cosmetics and Toiletries**

KATHON™ CG

Broad spectrum microbicide

Methylchloroisothiazolinone/
Methylisothiazolinone

Formaldehyde free

Rinse off applications
(Stand alone)

Typical use level: 0.05%-0.10%
(7.5 - 15 ppm a.i.)

NEOLONE™ 950

Broad spectrum bactericide

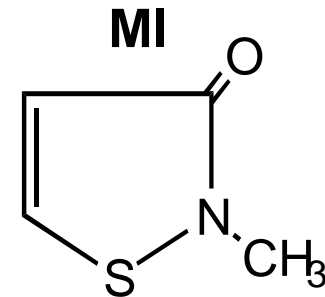
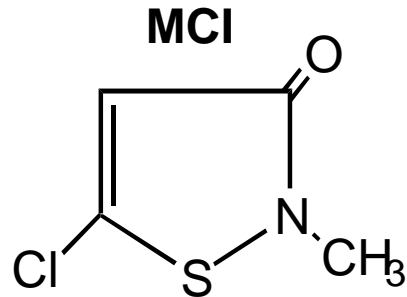
Methylisothiazolinone

Formaldehyde free

Leave on / Rinse off applications
(Recommended with other preservatives)

Typical use level: 0.053%-0.10%
(50 -100 ppm a.i.)

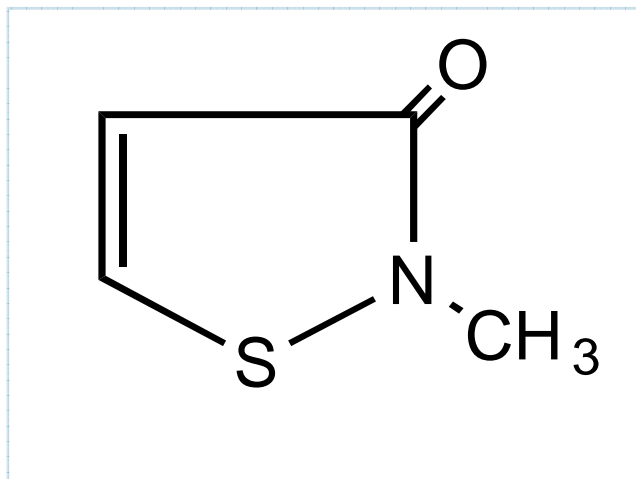
KATHON™ CG



**1.5 % Methychlorolisothiazolinone/ Methylisothiazolinone in water
Contains magnesium salts stabilizers**

Appearance	Clear, colorless – pale yellow liquid
pH	2
Solubility	Completely miscible in water, propylene glycol, and lower alcohols
Shelf Life	Four years

NEOLONE™ 950



MI

9.5% Methylisothiazolinone in water

Appearance	Clear, colorless liquid
pH	3 to 6
Solubility	Completely miscible in water, propylene glycol, and lower alcohols
Shelf Life	Three years



NEOLONE™ 950

Methylisothiazolinone
BACTERICIDE

NEOLONE™ PE

**Methylisothiazolinone /
Phenoxyethanol**
BROAD SPECTRUM

NEOLONE™ MxP

**Methylisothiazolinone,
Methylparaben / Propylparaben/
Phenoxyethanol**
BROAD SPECTRUM

NEOLONE™ DsP

**Methylisothiazolinone,
Methylparaben / Propylparaben**
BROAD SPECTRUM

NEOLONE™ CapG

**Methylisothiazolinone /
Caprylyl glycol**
BROAD SPECTRUM

Recommended Use Levels of NEOLONE™ Combinations

Preservative (Recommended Use Level)	% Product	ppm Methyl-isothiazolinone
NEOLONE™ 950 (0.05 – 0.11%)	0.05	50
	0.08	75
	0.11	100
NEOLONE™ PE (0.30 – 0.60%)	0.30	50
	0.45	75
	0.60	100
NEOLONE™ MxP (0.33 – 0.67%)	0.33	50
	0.50	75
	0.67	100
NEOLONE™ DsP (0.50-1.0%)	0.50	50
	0.75	75
	1.0	100
NEOLONE™ CapG (0.51-1.1%)	0.51	50
	0.83	75
	1.1	100

Spectrum of Antimicrobial Activity

	Bacteria	Fungi
KATHON™ CG	++	++
NEOLONE™ 950	++	+/-
NEOLONE™ PE NEOLONE™ MxP NEOLONE™ DsP NEOLONE™ CapG	++	+ to ++

Personal Care Applications



HAIR CARE

Shampoos
Conditioners
Raw Materials

Hair Gels
Styling Aids
Leave-on Conditioners
Raw Materials
Zpt shampoo

KATHON™ CG

NEOLONE™ 950
NEOLONE™ PE
NEOLONE™ MxP
NEOLONE™ DsP
NEOLONE™ CapG



SKIN CARE

Body Washes
Hand Soaps

Creams
Lotions
Wipes
Color Cosmetics
Soap Base Bodywash

KATHON™ CG

NEOLONE™ 950
NEOLONE™ PE
NEOLONE™ MxP
NEOLONE™ DsP
NEOLONE™ CapG



SUN CARE

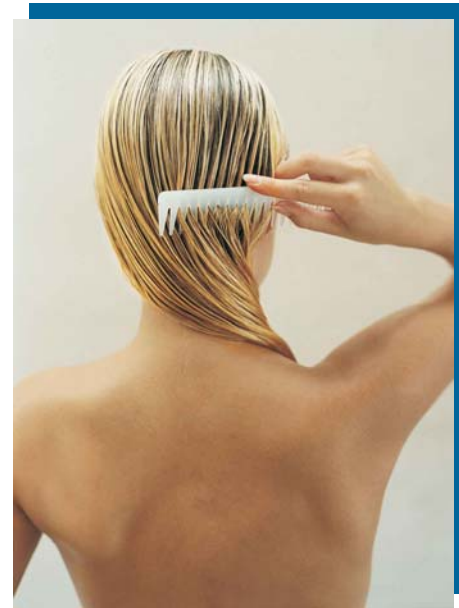
Sunscreens
Sun Blocks
Sunless Tanners
After Sun Care

NEOLONE™ 950
NEOLONE™ PE
NEOLONE™ MxP
NEOLONE™ DsP
NEOLONE™ CapG



NEOLONE™ Combos Preservatives

Performance in Rinse-off Products
and Cosmetic Raw Materials



NEOLONE™ Combos Preservative Performance Shampoo, pH 6.1

Preservative % Product	Concentration % Product	CFU/g sample after day:			
		7	14	21	28
Bacteria					
Unpreserved	-	10 ⁶	10 ⁷	10 ⁶	10 ⁷
NEOLONE™ PE	0.30	< 10	< 10	< 10	< 10
NEOLONE™ MxP	0.33	< 10	< 10	< 10	< 10
PHENONIP	0.70	10 ²	10 ⁴	10 ⁶	10 ⁶
Fungi					
Unpreserved	-	10 ⁷	10 ⁴	10 ⁵	10 ⁵
NEOLONE™ PE	0.60	10	< 10	< 10	< 10
NEOLONE™ MxP	0.67	< 10	< 10	< 10	< 10
PHENONIP	0.70	10 ⁵	10 ³	10 ⁵	10 ⁵

Challenged at 0 and 14 days

NEOLONE™ 950 Combos Preservative Performance Shower Gel, pH 5.4

Preservative % Product	CFU/g sample after day:		
	7	14	28
Bacteria			
Unpreserved Control	10 ⁶	10 ⁷	10 ⁷
0.05% NEOLONE™ 950/ 0.2% Methylparaben	< 10	< 10	< 10
Fungi			
Unpreserved Control	10 ³	10 ²	10 ²
0.05% NEOLONE™ 950 / 0.2% Methylparaben	< 10	< 10	< 10

NEOLONE™ 950 Preservative Performance Sodium Laureth Surfactant, pH 8.9

Preservative % Product	CFU/g sample after day:		
	7	14	28
Bacteria			
Unpreserved Control	10^7	10^7	10^7
0.05% NEOLONE™ 950	< 10	< 10	< 10
Fungi			
Unpreserved Control	10^7	10^7	10^7
0.05% NEOLONE™ 950	< 10	< 10	< 10

NEOLONE™ 950 and Combos Preservatives



Performance in Leave-on Products

NEOLONE™ 950 and Combos Preservatives Performance Daily Use Lotion, SPF 15

Active Ingredients: 7.5% Ethylhexyl methoxycinnamate,
3.0% Butyl methoxydibenzoylmethane

Preservative	CFU/g sample after day:		
	7	21 ¹	28
Fungi ²			
Unpreserved Control	10⁵	10⁴	10⁴
0.60% NEOLONE™ PE	< 10	< 10	< 10
0.67% NEOLONE™ MxP	< 10	< 10	< 10
0.08% NEOLONE™ 950 / 0.5% caprylyl glycol	< 10	< 10	< 10

¹ Samples were reinoculated after the 21 day plating

² Bacteria did not survive in the unpreserved sample

NEOLONE™ 950 and Combos Preservatives Performance

Hair Gel Type Preservative Treatment (% product)		cfu/g after day:			
		7	14 ¹	21	28
Durable Hold Gel with ACUDYNE™ DHR NEOLONE™ 950 / MP ² / PP ³ (0.05% / 0.2% / 0.1%)	Unpreserved	>10 ⁵	>10 ⁵	>10 ⁵	>10 ⁵
	Bacteria	<10	<10	<10	<10
	Fungi	<10	<10	<10	<10
Stiff Hold Gel with PVP NEOLONE™ 950 / Caprylyl Glycol (0.05% / 0.50%)	Unpreserved	>10 ⁵	>10 ⁵	>10 ⁵	>10 ⁵
	Bacteria	<10	<10	<10	<10
	Fungi	<10	<10	<10	<10
Medium Hold Gel NEOLONE™ MxP (0.50%)	Unpreserved	>10 ⁵	>10 ⁵	>10 ⁵	>10 ⁵
	Bacteria	<10	<10	<10	<10
	Fungi	<10	<10	10	<10

¹ Samples were reinoculated after the 14 day plating

² MP – Methyl paraben

³ PP – Propyl paraben

NEOLONE™ 950 and NEOLONE™ Combos Preservatives Efficacy Summary

- MIT Combos (NEOLONE™ PE, NEOLONE™ MxP, NEOLONE™ DsP and NEOLONE™ CapG) offer broad spectrum antimicrobial control for hair care, skin care and sun care products.
- The methylisothiazolinone (MIT) active in NEOLONE™ 950 is effective with other preservatives such as **phenoxyethanol, parabens, and benzyl alcohol** in protecting readily-contaminated products from microbial contamination
 - Hair gels, conditioners, creams, lotions, sun care products

NEOLONE™ 950 Preservative Stability Summary

NEOLONE™ 950 demonstrates excellent stability in:

- A wide range of temperature and pH conditions
- A variety of cosmetic ingredients:
 surfactants, proteins, other raw materials
- ZPT-based antidandruff shampoos
- A variety of hair gels and styling aids, creams, lotions,
 and sun care products
- Avobenzene-based products (unlike formaldehyde
 releasers)

NEOLONE™ 950 and Combos Preservatives Formulating Guidelines

Add Liquid Preservatives:

- After pH adjustment
- At typical cold or hot processing temperatures (up to 60°C)
- With good mixing

Safety of KATHON™ CG, NEOLONE™ 950 and Combos Preservatives

- ◆ Safe for Use at Recommended Use Levels
 - Toxicology testing has shown no carcinogenic, mutagenic or teratogenic effects.
- ◆ Environmentally Acceptable
 - Rapidly degrade, no bioaccumulation and non-persistent in environment.

Features and Benefits

NEOLONE™ 950 and NEOLONE™ Combos Preservatives

- Broad spectrum activity
- Effective at low concentrations
- Salt-free or low-salt options
- Easy to use liquids
- Exceptional stability-high pH /temperatures (NEOLONE™ Combos)
- Suitable alternatives to formaldehyde donors
- Safe to use at recommended levels
- Environmentally acceptable
- Global approvals - US, EU, Japan, ASEAN , China, Russia, SA
 - Approved for rinse off and leave on
 - Maximum use level: 0.11% NEOLONE™ 950

Activities of KATHON™ CG and NEOLONE™ Combos

Preservative	Bacteria		Fungi	
	G+	G-	Yeast	Mold
CMI/MI	++	++	++	++

*weak vs Pseudomonads

**MICs for Candida albicans and Aspergillus niger are > than EU permitted conc 0.2

Common Preservatives for Personal Care

Preservative	Bacteria		Fungi	
	G+	G-	Yeast	Mold
NEOLONE™ 950	++	++	+/-	+/-
NEOLONE™ PE	++	++	+	+
NEOLONE™ MxP	++	++	+	+
NEOLONE™ DsP	++	++	++	++
NEOLONE™ CapG	++	++	++	++

