1. *INCI composition*

Benzyl Alcohol
Potassium Sorbate
Sodium Benzoate
Water

2. *General description*

TRIstat E is a broad spectrum preservative blend based on nature-identical ingredients. This combination represents a gentle on the skin and effective alternative in cosmetic preservation, designed to replace other preservatives currently under pressure.

Suitable for use in most type of cosmetic products, provides complete protection against bacteria, yeasts and molds in the acid pH range up to 5.5.

TRIstat E consists of globally accepted cosmetic ingredients, also used in food preservation and in pharmaceuticals. *TRIstat E* is also allowed for use in natural and organic cosmetics in accordance to major certification standards like Ecocert, Soil Association, BDIH, AIAB.

3. *Specification data*

Appearance:	Clear pale yellow liquid
Odor:	Light characteristic
Benzyl alcohol:	48.0-52.0%
Potassium sorbate:	14.0-16.0%
Sodium benzoate.	9.0-11.0%
Water:	29% max.
pH (as is)	7.5-9.0
Shelf life:	1 year in original packing

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4. Other properties

Density (20°C)**:**	Approx. 1.110 g/mL
Freezing point:	Less than 0°C
Solubility (in water at 20°C)**:**	Approx. 3.5%

5. Properties

TRIstat E is a preserving system containing Potassium sorbate and Sodium benzoate dissolved in Benzyl alcohol and water. This combination broadens the antimicrobial spectrum of activity of each agent, providing a unique system suitable for the protection of cosmetics against microbial contamination, with no need of additional preservatives.

Benzyl alcohol is an aromatic alcohol with a mild and sweet odor, it is a natural constituent of some essential oils (jasmine, hyacinth, ylang-ylang), many edible fruits and green/black tea.
It is largely used as preservative, component of fragrances and also as a local anaesthetic in cosmetics, foods and pharmaceuticals.
Benzyl alcohol is active primarily against bacteria and molds. The mechanism of action is the disruption of membrane permeability barrier by solubilization of lipids. Benzyl alcohol may increase the permeability of cells, allowing the entry of materials that are normally unable to penetrate the cell[i]. This disruption of cell membrane permeability provides conditions that allow permeabilization synergy with other antimicrobial compounds.
It is worldwide approved and preferably used in combination with other preservatives, may substitute highly effective but controversial preservatives.

Potassium Sorbate is the potassium salt of sorbic acid, a polyunsaturated organic acid naturally occurring in berries of the mountain ash tree *Sorbus aucuparia* (Fam. *Rosaceae*)[ii]. Sorbic acid and potassium sorbate have been extensively used for more than 40 years as fungistatic agents in foods, beverages, wines, packaging materials, pharmaceuticals and cosmetics[iii].
Similarly to sorbic acid, potassium sorbate is effective in the acidic pH range. The antimicrobial activity is dependent on the degree of dissociation: only the undissociated component is active. When dissolved in water at pH <7.0 potassium sorbate ionizes to form the sorbic acid; lowering the pH value the effectiveness increases as increase the amount of sorbic acid. Potassium sorbate is most effective at pH below 6, however it can be used at lower effectiveness at pH upto 6.5.
Potassium sorbate acts mainly on yeasts and molds, however growth of bacteria is also inhibited, especially at slightly acid conditions encountered in cosmetics.
The microbial growth is inhibited by different mechanisms. The main antimicrobial effect is attributed to the undissociated acid penetrating the microbial cell wall and then disassociating in the higher pH cytoplasm. The hydrogen ion released is believed to inhibit glycolysis and growth[iv]. There is some evidence that sorbic acid acts against the cell wall membrane[v,vi], inhibits the transport of carbohydrates into yeast cells; in a variety of bacteria inhibits oxidative/ fermentative assimilation and uncouples oxidative phosphorylation. Bacteria have to pump out protons permanently and take in sodium ions to maintain the physiological pH of the cell. This energy-consuming process decrease the rate of

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reproduction, lower further the pH outside the cell, enabling the penetration of protonated acid, and finally lead to the death of microorganisms[vii].

Sodium benzoate is the sodium salt of benzoic acid occurring in nature in benzoin (*Styrax benzoin*), in several fruits (cranberries, prunes, strawberries, plums, apples) and in secret of water beetles *Dytiscus ssp.*. Sodium benzoate is one of the oldest preservatives discovered, first described in 1875, and one of most common food preservatives, also largely used in cosmetics and pharmaceuticals.
As with potassium sorbate, sodium benzoate is effective in the undissociated form, but according to its dissociation constant pK_a more acidic conditions are required and a maximum pH of 5.5 recommended.
The action of sodium benzoate is directed mainly against yeasts and molds, bacteria are only partially inhibited. There is evidence that benzoate inhibits nutrient uptake trough acidification of the cytoplasm and it interferes with enzymatic activity[viii], sometimes with types of action very similar to those of sorbic acid.
The combination of sodium benzoate and potassium sorbate has resulted synergistic.

6. Solubility

TRIstat E is very soluble in glycerin and glycols, soluble in water, soluble to unsoluble in polar oils, slightly soluble in alcohol, not soluble in apolar oils.
The solubility of *TRIstat E* at 20°C in common cosmetic ingredients is showed below (read as $g_{TRIstat\ E}$ /100 $g_{solution}$):

Solvent	*%w/w*
Water	3.5
Ethanol	0.9
Glycerin	>50
Propylene glycol	>50
Decyl oleate	10
Caprylic/capric triglyceride	4
Octyl octanoate	<0.01
Mineral oil	<0.01

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7. Stability

TRIstat E may tolerate not prolonged process heating to 80°C, nevertheless its use at the lowest possible temperature is suggested.
Should be stored in the tightly closed original container in a cool place at temperature to 25°C, protected from direct sunlight light and frost.
After prolonged exposition to UV-light and temperature >80°C a light discolouration occur, inferior to the equivalent potassium sorbate aqueous solution.

The product is stable to temperature below 0°C.

8. Antimicrobial activity

The activity of *TRIstat E* against microbial contaminants was determined following the ***Minimum Inhibitory Concentration (MIC)*** and ***Minimum Biocidal Concentration (MBC)*** method[ix].
The test was conducted using the standard panel of microorganisms (bacteria and fungi) used for pharmacopeial tests. Microbial suspensions of microorganisms derived from ATCC were prepared in suitable nutrient broths buffered to pH 5.5. Serial dilutions of the preservative were carried out aseptically in microtiter plates. Each well was inoculated with a single culture to the concentration of 10^5-10^6 cells/mL. The plates were incubated at 35°C for 48 hours for bacteria and at 25°C for 5 days for fungi.

The *minimum inhibitory concentration (MIC)* provides the bacteriostatic/fungistatic activity, that is the ability to inhibit the reproduction of microorganisms. The *MIC value* is the lowest concentration which inhibits the visible growth of test organisms after 48 hours for bacteria, 72 hours for yeasts and 5 days for molds.

The *minimum biocidal concentration (MBC)* gives the bactericidal/fungicidal activity, which defines the ability to kill microorganisms after a contact time of 48 hours with the antimicrobial. This is obtained by plating an aliquot of each dilution without visible growth into a suitable solid nutrient media.
The *MBC value* is the lowest concentration of preservative that killed more than 99.9% of the initial concentrations of microorganisms.

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Tab 6.1: Inhibitory (MIC) and biocidal (MBC) activity of TRIstat E in ppm at pH 5.5

Test organisms *(≅ 10^6CFU/mL)*		***Minimum inhibitory concentration***	***Minimum biocidal concentration***
Gram-negative bacteria			
Escherichia coli	*ATCC 8739*	***2000***	***5000***
Pseudomonas aeruginosa	*ATCC 9027*	***2500***	***5000***
Gram-positive bacteria			
Staphylococcus aureus	*ATCC 6538*	***1750***	***4000***
Yeasts			
Candida albicans	*ATCC 10231*	***3000***	***3500***
Molds			
Aspergillus niger	*ATCC 16404*	***4000***	***6000***

TRIstat E has bacteriostatic and fungistatic effect at levels of 0.4%. It exhibits bactericidal and fungicidal activity at 0.6%.

The above MIC/MBC values estimate the antimicrobial activity of preservatives in culture media. The exact level of preservative to be used in cosmetic products should be determined by challenge testing.

On demand, our microbiological laboratory may provide the appropriate support.

9. Preservative efficacy tests

The antimicrobial activity of *TRIstat E* in different cosmetic formulations was evaluated by challenge testing, using a modified *European Pharmacopoeia* method (*5.1.3 Efficacy of antimicrobial preservation*).
The tests were performed using the following microorganisms:

- *E. coli ATCC 6538;*
- *P. aeruginosa ATCC 9027;*
- *S. aureus ATCC 8739;*
- *C. albicans 10231;*
- *A. niger ATCC 16404.*

Amounts of 30 g of test products (unpreserved and with different levels of preservative) were challenged with mixed inocula of bacteria and fungi separately, to reach microbial levels of not less than 10^6 cfu/g for bacteria and 10^5 cfu/g for fungi. These samples were tested for microbial count at 0, 2, 7, 14, 21, 28 days.
These microbial count were performed on 1 g of test sample serially diluted in Letheen broth and plated in suitable agarized media; plates are incubated at 35°C for bacteria and at 25°C for fungi. After incubation readings of the number of colonies per gram (cfu/g) were made.

The tested products are judged *adequately preserved* when bacteria are reduced of more than 99% (2 Log) after *2 days* and more than 99.9% (3 Log) after *7 days*; yeasts and molds should be reduced of more than 99% (2 Log) after *14 days*.

The composition of the formulations tested (PEG-free o/w emulsion and shower bath PEG & sulphate-free) as well as the results obtained are showed in following tables and graphs.

NOTE: value <10 is the limit of detection of plate count method and indicates the absence of microbial growth.

PEG-free O/W emulsion

INCI name	***Weight %***			
Arachidyl glucoside,				
Arachidyl alcohol				
Behenyl alcohol	*5.0*	*idem*	*idem*	*idem*
Caprylic/capric triglyceride	*4.0*	*idem*	*idem*	*idem*
Cetyl alcohol	*4.0*	*idem*	*idem*	*idem*
Glycerin	*4.0*	*idem*	*idem*	*idem*
Octyl palmitate	*3.0*	*idem*	*idem*	*idem*
Allantoin	*0.3*	*idem*	*idem*	*idem*
Phytic acid	*0.1*	*idem*	*idem*	*idem*
Sodium hydroxide 10%	*q. s.*	*idem*	*idem*	*idem*
Water	*to 100*	*idem*	*idem*	*idem*
TRIstat E	*0*	*0.8*	*1.0*	*1.2*

Final pH 5.5

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Results:

The ***unpreserved*** emulsion resulted susceptible to bacterial and fungal contamination and supported high levels of viable organisms for all the test period.

The formulation with ***0.8%*** *TRIstat E* lowered the bacterial inocula of 2 Log in 7 days and fully inactivated them in 21 days.
C. albicans was reduced >2 Log in 7 days and fully inactivated within 21 days.
A. niger was inactivated in 14 days.
The formulation with *0.8% TRIstat E* was judged, according to EP criteria of acceptance, poorly preserved against bacteria and adequately preserved against fungi.

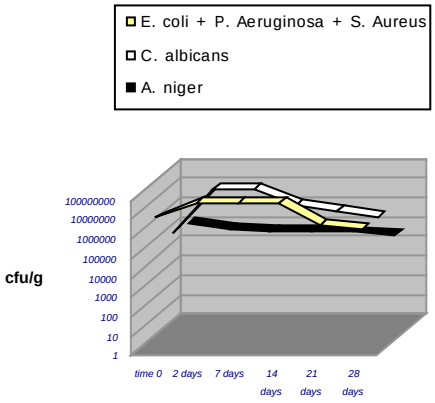
The formulation with ***1.0%*** *TRIstat E* reduced the bacterial inocula of more than 3 Log in 2 days and completely inactivated them in 14 days.
C. albicans was fully inactivated within 14 days.
A. niger was inactivated in 7 days.
The formulation with 1.*0% TRIstat E* was judged, according to EP criteria, adequately preserved against all test organisms.

The formulation with ***1.2%*** *TRIstat E* has given complete inactivation of bacterial and fungal inocula in 7 days .
The formulation with *1.2% TRIstat E* was judged, according to EP criteria of acceptance, adequately preserved against all tested organisms.

In view of the results obtained in this preservation test, the suggested level to be used in this formulation is ***1.0%*** *TRIstat E*, which represents the lowest concentration tested able to provide an effective antimicrobial protection, according to EP protocol.

Preservation efficacy on o/w emulsion unpreserved

Strains	***time 0***	***2 days***	***7 days***	***14 days***	***21 days***	***28 days***	***Results***
E. coli *P. aeruginosa* *S. aureus*	$7.7 \cdot 10^6$	$>10^7$	$>10^7$	$>10^7$	$3.6 \cdot 10^6$	$2.2 \cdot 10^6$	Failed
C. albicans	$2.5 \cdot 10^5$	$>10^7$	$>10^7$	$6.5 \cdot 10^6$	$3.4 \cdot 10^6$	$1.7 \cdot 10^6$	Failed
A. niger	$1.4 \cdot 10^5$	$7.5 \cdot 10^4$	$6.2 \cdot 10^4$	$5.8 \cdot 10^4$	$5.1 \cdot 10^4$	$3.5 \cdot 10^4$	Failed



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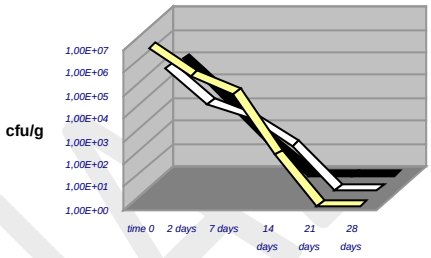
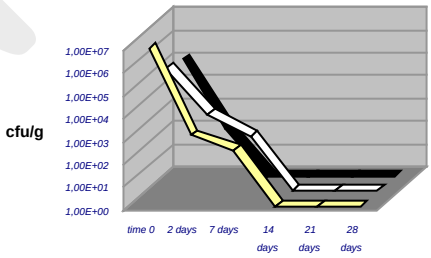
Preservation efficacy on o/w emulsion with 0.8% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$4.8 \cdot 10^5$	$7.6 \cdot 10^4$	$1.6 \cdot 10^2$	<10	<10	Failed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	$6.3 \cdot 10^3$	$1.4 \cdot 10^3$	90	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$2.4 \cdot 10^3$	30	<10	<10	<10	Passed



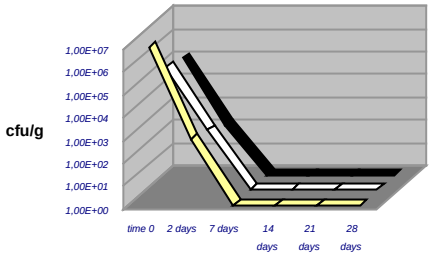
Preservation efficacy on o/w emulsion with 1.0% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$1.2 \cdot 10^3$	$2.6 \cdot 10^2$	<10	<10	<10	Passed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	$2.3 \cdot 10^3$	$2.7 \cdot 10^2$	<10	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$1.2 \cdot 10^2$	<10	<10	<10	<10	Passed



Preservation efficacy on o/w emulsion with 1.2% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$7.5 \cdot 10^2$	<10	<10	<10	<10	Passed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	$4.2 \cdot 10^2$	<10	<10	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$1.6 \cdot 10^2$	<10	<10	<10	<10	Passed



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Shower Bath PEG & sulphate-free

INCI name	***Weight %***			
Decyl glucoside 55%	*12.0*	*idem*	*idem*	*idem*
Sodium lauroyl sarcosinate 35%	*12.0*	*idem*	*idem*	*idem*
Cocamidopropyl betaine 30%	*8.0*	*idem*	*idem*	*idem*
Glycerin	*5.0*	*idem*	*idem*	*idem*
Sodium Chloride	*0.9*	*idem*	*idem*	*idem*
Allantoin	*0.2*	*idem*	*idem*	*idem*
Phytic acid	*0.1*	*idem*	*idem*	*idem*
Citric acid	*q. s.*	*idem*	*idem*	*idem*
Water	*to 100*	*idem*	*idem*	*idem*
TRIstat E	*0*	*0.5*	*0.6*	*0.7*

Final pH 5.0

Results:

The ***unpreserved*** shower bath was susceptible to bacterial as well as fungal contamination and supported high levels of viable organisms for all the test period.

The formulation with ***0.5%*** *TRIstat E* reduced the bacterial inocula of more than 2 Log in 2 days and fully inactivated them in 7 days.
C. albicans was fully inactivated within 2 days.
A. niger was reduced of 2 Log in 7 days and fully inactivated in 21 days.
The formulation with *0.5% TRIstat E* was judged, according to EP criteria of acceptance, adequately preserved against all test organisms.

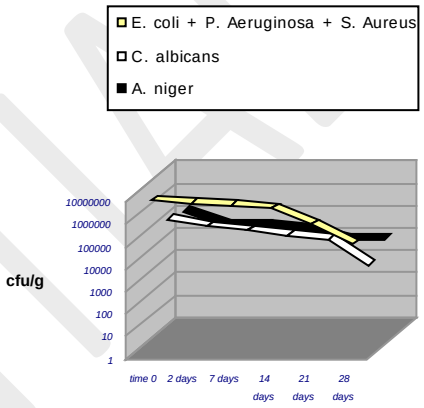
The formulation with ***0.6%*** *TRIstat E* reduced the bacterial inocula of more than 3 Log in 2 days and has fully inactivated them in 7 days.
C. albicans was fully inactivated within 2 days.
A. niger was reduced of more than 2 Log in 7 days and fully inactivated in 14 days.
The formulation with *0.6% TRIstat E* was judged, according to EP criteria of acceptance, adequately preserved against all tested organisms.

The formulation with ***0.7%*** *TRIstat E* reduced the bacterial inocula of more than 4 Log in 2 days; all bacteria were fully inactivated in 7 days.
C. albicans and *A. niger* were fully inactivated within 2 days and 7 days respectively.
The formulation with *0.7% TRIstat E* was judged, according to EP criteria of acceptance, adequately preserved against all

tested organisms.
In view of the results obtained in this preservation test, the suggested level to be used in this formulation is ***0.5%*** *TRIstat E*, which represents the lowest concentration tested able to provide an effective antimicrobial protection, according to EP protocol.

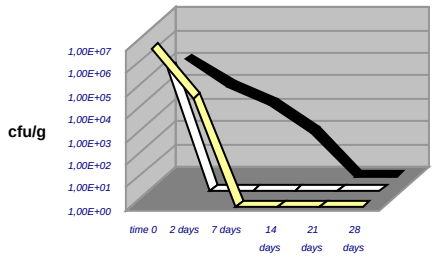
Preservation efficacy on shower bath unpreserved

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$5.8 \cdot 10^6$	$4.5 \cdot 10^6$	$3.3 \cdot 10^6$	$6.5 \cdot 10^5$	$8.2 \cdot 10^4$	Failed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	$1.3 \cdot 10^5$	$8.3 \cdot 10^4$	$4.7 \cdot 10^4$	$3.2 \cdot 10^4$	$2.2 \cdot 10^3$	Failed
A. niger	$1.4 \cdot 10^5$	$3.5 \cdot 10^4$	$3.3 \cdot 10^4$	$2.1 \cdot 10^4$	$8.5 \cdot 10^3$	$7.8 \cdot 10^3$	Failed



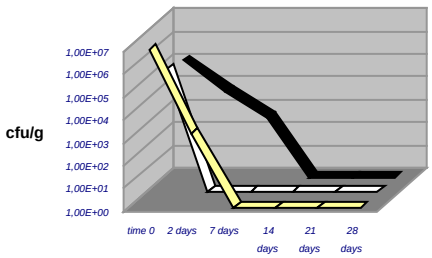
Preservation efficacy on shower bath with 0.5% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$5.4 \cdot 10^4$	<10	<10	<10	<10	Passed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	<10	<10	<10	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$1.0 \cdot 10^4$	$1.4 \cdot 10^3$	90	<10	<10	Passed



Preservation efficacy on shower bath with 0.6% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$1.5 \cdot 10^3$	<10	<10	<10	<10	Passed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	<10	<10	<10	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$5.9 \cdot 10^3$	$4.1 \cdot 10^2$	<10	<10	<10	Passed



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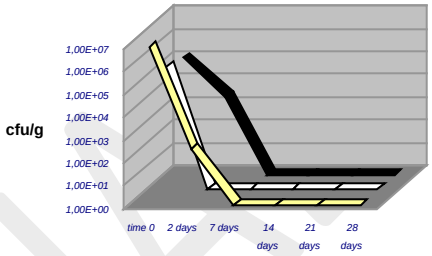
Preservation efficacy on shower bath with 0.7% TRIstat E

Strains	*time 0*	*2 days*	*7 days*	*14 days*	*21 days*	*28 days*	*Results*
E. coli							
P. aeruginosa	$7.7 \cdot 10^6$	$2.7 \cdot 10^2$	<10	<10	<10	<10	Passed
S. aureus							
C. albicans	$2.5 \cdot 10^5$	<10	<10	<10	<10	<10	Passed
A. niger	$1.4 \cdot 10^5$	$2.6 \cdot 10^3$	<10	<10	<10	<10	Passed



10. Applications

TRIstat E is a stable preservative blend with broad spectrum activity suitable for the protection of a wide range of personal care products with slight acidic pH.
The components of *TRIstat E* are worldwide accepted for every cosmetic application. All ingredients of *TRIstat E* are also permitted as synthetic preservatives in natural and organic cosmetics according to the main certification standards: Ecocert (France), Soil Association (UK), BDIH (Germany) and AIAB (Italy).

TRIstat E is effective in the pH range from 3.0 to 5.5 maximum. The final pH of the cosmetics should be adjusted to value up to 5.5, preferably 5.0 or lower, because potassium sorbate and sodium benzoate must be present in the acid undissociated form to exert their antimicrobial action. In general the antimicrobial activity of *TRIstat E*, and particularly its antifungal effect, increases as pH decreases; hence the lower the pH level, the greater the preservative efficacy.
As *TRIstat E* is slightly alkaline, the pH value of formulations could increase after its addition, therefore the final pH must be checked and adjusted to the abovementioned range.

TRIstat E is a clear liquid, light in color with mild pleasant odor, that can be added in most system without affect the properties of formulations. It is compatible with most cosmetic ingredients and fully effective in anionic, non-ionic, cationic systems.
As the presence of highly ethoxylated surfactants (e. g. polysorbate 80) may reduce the effectiveness of *TRIstat E*, their use should be minimized and the preservative level should be slightly increased.

TRIstat E may be used in a wide range of cosmetics for rinse-off, leave-on and wet wipes. As a liquid soluble in water, many solvents and surfactants, it is easily incorporated in aqueous products, surfactant-based products and emulsions.
Can be added to the aqueous phase at room temperature under stirring. Also if heating to 80°C is well tolerated, prolonged exposition to high temperature during manufacture should be avoided and the use at the lowest possible process temperature is recommended.

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In *water-based formulations* and *gels* can be solubilized upon stirring at room temperature or with gentle heating to 30°C to accelerate the dissolution.
In *surfactant-based systems* can be easily mixed at room temperature into the surfactant blends before the addition of the other components.
In *emulsions* should be added with stirring after the emulsification, preferably during the cooling stage at temperature below 40°C.
The solubility and compatibility with *oil-based formulations* depends on the oil blend composition and should be checked on a case by case basis.
TRIstat E is also recommended for the preservation *of wet wipes*.

The recommended use levels are normally within 0.5-1.2%, which can be increased to 1.5% in more complex and contaminable formulations.

Vehicle form	***Applications***	***% use levels***
Aqueous formulations	hair lotions and gels skin serums tonics shaving gels aftersun gels body and foot gels baby lotions	0.5-1.0
Surfactant-based formulations	shower gels bubble baths shampoos hair conditioners shave foams hand cleaners intimates	0.5-0.8
Emulsions	body lotions and creams face lotions and creams suncare lotions and creams shaving lotions and creams hand and foot creams foundations	0.8-1.2
Oil-based formulations	body oils massage oils	0.4-0.7
Powders	bath powders make-up powders	0.4-0.7

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Wet wipes	acqueous products cleansing lotions moisturizing lotions	0.8-1.2
Raw materials	surfactants blends vegetal extracts	0.4-0.8%

The above use levels are only general indications. The exact use concentration is related to many factors including raw materials quality, manufacturing hygiene, formula composition and packaging. The optimal amount of preservative should be determined by challenge testing in the specific product.

11.Toxicological information

The components of *TRIstat E* have been studied extensively over the years for toxicity, also as food additives. Benzyl alcohol[x], Potassium sorbate[xi] and Sodium benzoate[x] were all evaluated by the expert panel of the Cosmetic Ingredient Review (CIR). Based on these assessments *TRIstat E* is recognized as safe for cosmetics and considered not irritating and not sensitizing in the use concentration to 6.6%.

The actives Benzyl alcohol, Potassium sorbate and Sodium benzoate are listed in the Annex VI of EU Cosmetic Directive as preservatives permitted without restrictions up to the maximum use concentration of 2.0% *TRIstat E*.

12. Regulatory status

TRIstat E is approved as cosmetic preservatives in the EU to the maximum concentration of 2.0% without product type restrictions.
It is allowed in USA to 6.6% and in Japan to 4.4%.

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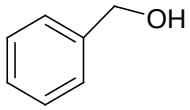
13. Storage

TRIstat E should be stored in the well closed original container at temperature below 25°C, protected from direct sunlight and frost. Containers once opened should be firmly re-closed.
At these conditions its minimum shelf-life is one year from the manufacturing date.

14. Description of single ingredients



INCI name: *Benzyl Alcohol*

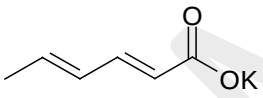
CAS number: 100-51-6

Empirical formula: C_7H_8O

EINECS name: Benzyl alcohol

Molecular weight: 108.1

EINECS number: ***202-859-9***



INCI name: *Potassium Sorbate*

CAS number: 24634-61-5

Empirical formula: $C_6H_7O_2K$

EINECS name: 2,4-Hexanedioic acid, potassium salt, *(E,E)-*

Molecular weight: 150.22

EINECS number: ***246-376-1***

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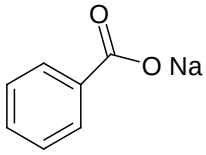

INCI name: *Sodium Benzoate*

CAS number: 532-32-1

Empirical formula: $C_7H_5O_2Na$

EINECS name: Sodium Benzoate

Molecular weight: 144.1

EINECS number: ***208-534-8***

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[ix] E. W. Koneman (1992). *Diagnostic Microbiology* 4 ed., J. B. Lippincott Company, Philadelphia, p. 559.

[x] Anonymous (2001) Final report on the safety assessment of benzyl alcohol, benzoic acid and sodium benzoate. International journal of toxicology; 20 (3), pp. 23-50.
[xi] Anonymous (1988) Final report on the safety assessment of sorbic acid and potassium sorbate. Journal of the American college of toxicology; 7 (6), pp. 837-880.

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