

schülke -+

euxyl® K 900

Preservative for cosmetics & toiletries



the plus of pure
performance

Product description

euxyl® K 900 is a liquid cosmetic preservative based on benzyl alcohol and ethylhexylglycerin. The addition of ethylhexylglycerin affects the interfacial tension at the cell membrane of microorganisms, improving the preservative activity of benzyl alcohol. Its use is permitted both in products that remain on the skin as well as in rinse-off products.

euxyl® K 900 has a broad, balanced spectrum of effect against bacteria, yeasts and mould fungi.

EU-INCI-declaration

Benzyl Alcohol
Ethylhexylglycerin
Tocopherol

US-INCI-declaration

Benzyl Alcohol (and)
Ethylhexylglycerin (and)
Tocopherol

Microbiological effectiveness

euxyl® K 900 is equally effective against bacteria, yeasts and mould fungi. It is a typically biostatic product with the biocidal properties necessary for practical use.

For euxyl® K 900 to perform effectively in destroying organisms in products already contaminated, a minimum contact time of 48 hours is necessary. Since the effect of euxyl® K 900 takes place through chemical reactions with the microorganisms, when it is used in heavily contaminated products loss of active ingredient must be taken into account.

Good production hygiene, as well as the use of raw materials with low microorganism levels as a result of correct raw material control are of course vital prerequisites for the production of microbiologically faultless finished products.

MIC values

Determination of the minimum inhibitory concentration in the serial dilution test produced the following values:

Species	ATCC-No.	MIC-Value [%] euxyl® PE 9010	MIC value [%] euxyl® K 900
Gram-negative:			
<i>Enterobacter gergoviae</i>	33028	0.5	0.5
<i>Escherichia coli</i>	11229	0.5	0.5
<i>Klebsiella pneumoniae</i>	4352	0.25	0.25
<i>Pseudomonas aeruginosa</i>	15442	0.5	0.5
<i>Pseudomonas fluorescens</i>	17397	0.25	0.5
<i>Pseudomonas putida</i>	12633	0.5	0.5
Gram-positive:			
<i>Staphylococcus aureus</i>	6538	0.5	0.5
<i>Staphylococcus epidermidis</i>	12228	0.5	0.25
Mould fungi:			
<i>Aspergillus brasiliensis</i>	16404	0.25	0.5
<i>Penicillium funiculosum</i>	36839	0.25	0.25
Yeasts:			
<i>Candida albicans</i>	10231	0.25	0.25

Germ count reduction test

Dilutions of euxyl® K 900 are prepared with sterile tap water 25 ml portions of the end solutions are each inoculated with 0.1 ml microorganism suspension (initial microorganism count approx. 10⁸ cfu/ml) and stirred.

Test organisms	ATCC-No.
<i>Pseudomonas aeruginosa</i>	15442
<i>Escherichia coli</i>	11229
<i>Candida albicans</i>	10231
<i>Aspergillus brasiliensis</i>	16404

The solutions are streaked out onto tryptone soya agar or Sabouraud-dextrose 4% agar after 3, 6, 24, 48, 72 and 168 hours, depending on the test organism. The cultures are incubated for 48 hours at 37°C, except for *Aspergillus brasiliensis*, which is incubated for 72 hours at 25 – 27°C. The evaluation is made on the basis of semi-quantitative assessment of the microbial growth of the streaks.

In the table below, the microorganism reduction achieved by euxyl® K 900 as a function of the contact time and use-concentration is presented for the various test organisms:

Test organism	Use concentration (%)	Contact time [h]			
		6	24	72	168
<i>Pseudomonas aeruginosa</i>	0.50	C	++++	++++	++++
	0.75	C	C	++	-
	1.00	++++	++	-	-
<i>Escherichia coli</i>	0.50	C	C	C	C
	0.75	C	++++	+++	-
	1.00	-	-	-	-
<i>Candida albicans</i>	0.50	C	C	C	C
	0.75	C	++++	-	-
	1.00	++++	++	-	-
<i>Aspergillus brasiliensis</i>	0.50	C	C	C	C
	0.75	C	C	C	++
	1.00	C	C	++++	-

Symbol	Finding	Germ count/ml
-	= no growth	< 100
+	= slight growth	approx. 10 ²
++	= moderate growth	approx. 10 ³
+++	= heavy growth	approx. 10 ⁴
++++	= massive growth	approx. 10 ⁵
C	= surface covered	approx. 10 ⁶

Repeated challenge test (schülke KoKo test)

This method is used to determine the preservative effect of chemical preservatives in cosmetic formulations, e.g. creams, lotions and shampoos. For this in various test series the preservative to be tested is added in different concentrations to unpreserved samples. A constant microorganism load is achieved by means of periodic inoculation (inoculation cycles) of the test preparations. Immediately before inoculation samples of the individual preparations are streaked out onto nutrient media.

The preservative effect is evaluated on the basis of the microorganism growth on the nutrient media. The longer the time before the occurrence of the first microbial growth, the more effective is the preservative. Experience has shown that a well preserved product should remain growth-free for six inoculation cycles in order to ensure the shelf-life in the original packaging required in practice (30 months).

Oil/water and water/oil systems as well as shampoos and bath additives preserved with use concentrations of between 0.5 and 1.0 % euxyl® K 900 proved to be well preserved even after three months storage at +40 °C.

Leave-on formulations (KoKo test results)

Alternative o/w creme	Inoculations						
	0	1	2	3	4	5	6
unpreserved	-	+++ B,Y,M	+++ B,Y,M	./.			
+ 0.75% Benzyl Alcohol	-	+++ B,Y	+ B,Y	++ B,Y	+ B,Y	++ B,Y	++ B,Y
+ 1.0% Benzyl Alcohol	-	+ B	+ B	+ B,Y	+ B	+ B,Y	++ B
+ 0.75% euxyl® K 900	-	-	+ Y	-	-	-	-
+ 1.0% euxyl® K 900	-	-	-	-	-	-	-
+ 0.75% euxyl® PE 9010	-	-	-	-	-	-	-
+ 1.0% euxyl® PE 9010	-	-	-	-	-	-	-

Carbopol Gel	Inoculations						
	0	1	2	3	4	5	6
unpreserved	-	+++ B,Y,M	+++ B,Y,M	./.			
+ 0.5% euxyl® K 900	-	+ M	+ M	+ M	++ M	++ M	+ M
+ 0.75% euxyl® K 900	-	-	-	-	-	-	-
+ 0.5% euxyl® PE 9010	-	+ M	+ M	+ M	++ M	++ M	++ M
+ 0.75% euxyl® PE 9010	-	-	-	-	-	-	-
+ 0.5% sensiva® PA 20	-	+ M	+ M	+ M	++ M	++ M	+ M
+ 0.75% sensiva® PA 20	-	-	-	-	-	-	-

Legend

0 = Sterility control - = free of microbial growth
 B = Bacteria + = slight growth
 Y = Yeast ++ = moderate growth
 M = Mould +++ = massive growth

euxyl® PE 9010 contains Phenoxyethanol and Ethylhexylglycerin.
 sensiva® PA 20 contains Phenethyl Alcohol and Ethylhexylglycerin.

International approvals

Use concentrations	acc. schülke-recommendation	acc. EU and ASEAN Cosmetics Legislation	acc. CIR (USA)
Leave-on (i.e. creams, lotions etc.)	0.5 – 1.0 %	max. 1.1 %	max. 11.1 %
Rinse-off (i.e. shampoos, bath preparations etc.)	0.5 – 1.0 %*	max. 1.1 %	max. 11.1 %

Recommended use concentrations are based on average active content. Please pay attention to the corresponding certificate.

* A high load of ethoxylated surfactants result in a loss of efficacy.

The schülke recommended percentages relate to the complete formulation in each case. The values given are recommended guides. The individual use concentration is dependent on the sensitivity of the product to microbial contamination, the choice of raw materials and production hygiene.

The efficacy and optimum use concentration should always be determined in the end product with the aid of a preservation load test (i.e. Schülke & Mayr GmbH Technical Service Department and Microbiology).

All responsibility for determining the most effective percentage for a given use remains with the final product manufacturer since the optimal use concentration level will vary due to product-specific variables such as choice of raw materials, production, hygiene etc.

	Benzyl Alcohol	Ethylhexylglycerin
Australia	AICS	NICNAS (File No: NA/966); AICS; TGA
Canada	listed on DSL	listed on DSL
Japan	is approved as a cosmetic preservative up to 5.0 % for all types of cosmetics and toiletries without restrictions	listed on ENCS (No.: - 414) listed in JSQI [Code: 540033 (51)] listed in Japanese INCI list

Indications for use

General

euxyl® K 900 is stable to hydrolysis, temperature and pH. As a result of the good solubility of euxyl® K 900 an easy dispersion in the various systems even at low temperature is possible. euxyl® K 900 is effective in pH-ranges up to 12.

Emulsions

In practice emulsions are preserved with 0.5 – 1.0 % euxyl® K 900.

Solutions

euxyl® K 900 is clearly soluble in use concentration of 0.5 – 1.0 %. It can tolerate high salt content. A high load of surfactants can result in a loss of efficacy.

Wet wipes

For wet tissues good preservation results are achieved with 0.5 – 1.0 % euxyl® K 900.

Natural products

Formulas containing natural raw materials have a higher risk for microbial contamination. Microorganisms introduced by this pathway are quickly eliminated by euxyl® K 900.

For other uses please contact us.

Chemical compatibility

In general, it is possible for interactions to occur between various active ingredients and auxiliary substances in cosmetic formulations. Thus certain incompatibilities of euxyl® K 900 with other ingredients have been established and are listed below.

General

euxyl® K 900 shows a good compatibility with salts. euxyl® K 900 can be used in pH-ranges up to 12.

Discolouration

In general euxyl® K 900 displays good compatibility with the ingredients of cosmetics. No discolourations have been detected.

Compatibility with sulphite ions

euxyl® K 900 shows no interaction with sulphite ions.

Compatibility with pigments

euxyl® K 900 shows no interaction with pigments such as TiO₂.

Product-specific properties

Material compatibility

Concentrate

In the material compatibility tests with the concentrate of euxyl® K 900 stainless steel, brass, copper, zinc and aluminium as well as polyethylene (PE), polyoxymethylene (POM), polyamide (PA) and hard polyvinyl chloride (hard PVC) proved to be suitable materials for handling the undiluted product. Other non-metallic materials should be checked for their suitability. Polycarbonate (PC), Polymethylmethacrylate (PMMA), polyethyleneterephthalate (PET) and acrylnitrilbutadienstyrolcopolymer (ABS) should not be used. As sealing material when handling undiluted euxyl® K 900 fluorine rubber or polytetrafluorethylene (PTFE) should be preferred. Other sealing materials can show swelling or lead to pronounced discolouration of euxyl® K 900.

Dilutions

The behaviour of euxyl® K 900 in 1.0 % aqueous solution with regard to material compatibility was not significantly different from that of the tap water used for the dilution. No incompatibilities with plastics have been observed with products preserved with euxyl® K 900.

Please check the compatibility in individual cases.

Effect on surface tension

The surface tension of water is significantly reduced by the addition of euxyl® K 900. A 1.0 % solution in water is 35.0 mN/m (water: 72.6 mN/m).

Foaming behaviour

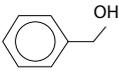
In the foaming test in accordance with DIN 53 902, a 1.0 % solution of euxyl® K 900 in demineralised water proved to be non-foaming.

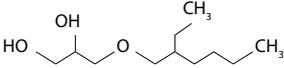
Solubility

In water euxyl® K 900 is only limitedly soluble. 100 g water at 20 °C dissolve approx. 1 g euxyl® K 900. In the polar solvents such as 1,2-propylene glycol, glycerol, triethylene glycol, 2-phenoxyethanol euxyl® K 900 is unlimitedly soluble. In non-polar solvents it is only limitedly soluble, in pure hydrocarbons it is practically insoluble.

General information

Descriptions of the individual substances

	C_7H_8O 108.13 g/mol
CAS no.:	100-51-6
INCI name:	Benzyl Alcohol
Name according 1223/2009/EU:	Benzyl Alcohol
Number according to 1223/2009/EU:	34
EINECS name:	Benzyl Alcohol
EINECS no.:	202-859-9

	$C_{11}H_{24}O_3$ 204.31 g/mol
CAS no.:	70445-33-9
CAS name:	3-[[2-Ethylhexyl]oxy]-1,2-propanediol
INCI name:	Ethylhexylglycerin
ELINCS name:	sensiva® SC 50
ELINCS no.:	408-080-2

Physical-chemical data

Appearance:	clear, colourless – yellowish liquid
Colour Index (Hazen):	max. 60
Odour:	characteristic
Refractive index n_D :	approx. 1.53
Density (20 °C):	approx. 1.035 g/ml
Flash point (ISO 2719):	> 100 °C
Flow time (DIN 53 211/20 °C):	< 15 seconds
Water solubility (20 °C):	approx. 10 g/l

Storage

We recommend storing in the original container at room temperature.

Environmental information

schülke has DIN EN ISO 9001 and DIN EN 14 001 certification and a validated environmental management system in accordance with the Eco Audit Regulation. The canisters and drums used by schülke are made of polyethylene (HDPE) and are labelled accordingly. The 1000 kg containers are affiliated to a recycling system that guarantees free pickup and sensible utilisation of used containers throughout Europe. The labels are made of PE. Our packaging materials contain no PVC and are recyclable.

Expert opinions

The Toxicology and Tolerance of the Preservative euxyl® K 900, Dr. Susanne Hendrich, Schülke & Mayr GmbH, January 2014



schülke subsidiaries in:

Belgium

S. A. Schülke & Mayr Belgium N.V.
1130 Brussels
Phone +32-2-479 73 35
Fax +32-2-479 99 66

China

Schülke & Mayr GmbH
Shanghai Representative Office
Shanghai 200041
Phone +86-21-62 17 29 95
Fax +86-21-62 17 29 97

France

Schülke France SARL
94250 Gentilly
Phone +33-1-49 69 83 78
Fax +33-1-49 69 83 85

Italy

Schülke & Mayr Italia S.r.l.
20148 Milano
Phone +39-02-40 26 590
Fax +39-02-40 26 609

Netherlands

Schülke & Mayr Benelux B.V.
2031 CC-Haarlem
Phone +31-23-535 26 34
Fax +31-23-536 79 70

Switzerland

Schülke & Mayr AG
8003 Zurich
Phone +41-44-466 55 44
Fax +41-44-466 55 33

United Kingdom

Schülke & Mayr UK Ltd.
Sheffield S9 1AT
Phone +44-114-254 35 00
Fax +44-114-254 35 01

USA

schülke inc.
Fairfield, NJ 07004
Phone +1-973-770-7300
Fax +1-973-770-7302

Other Distributors in:

Africa (north) · Albania · Argentina · Australia · Austria · Belarus · Bosnia-Herzegovina · Brazil · Bulgaria · Canada · Croatia · Cyprus · Czech Republic · Denmark · Egypt · Estonia · Finland · Ghana · Greece · Hong Kong · Hungary · India · Indonesia · Iran · Israel · Japan · Jordan · Kazakhstan · Korea · Kuwait · Latin America · Latvia · Lebanon · Lithuania · Malaysia · Malta · Macedonia · Mexico · Middle East · Montenegro · New Zealand · Nigeria · Norway · Pakistan · Philippines · Poland · Portugal · Puerto Rico · Romania · Russia · Serbia · Singapore · Slovakia · Slovenia · Spain · South Africa · Sweden · Syria · Taiwan · Thailand · Turkey · Ukraine · Vietnam



Our recommendations regarding our products are based on in-depth scientific testing in our Research Department; they are given in good faith, but no liability can be derived from them. It is the responsibility of the final product manufacturer to assure that claims made for the final product are in conformance with all applicable local laws. In other respect our Conditions of Sale and Supply apply.

Schülke & Mayr GmbH

22840 Norderstedt | Germany
Phone | Fax +49 40 521 00-0 | -244
www.schuelke.com | sai@schuelke.com

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Air Liquide Group

