

euxyl™ k 712 preservative

September 2022

euxyl™ k 712 preservative

basics

- product specific properties
- global approvals
- practical advice

efficacy

- influence of the pH value
- germ count reduction tests
- challenge tests
- comparison tests

overview

product specific
properties

product specific properties

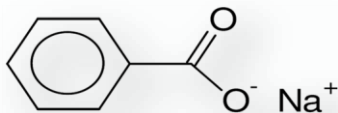
euxyl™ k 712 preservative

INCI declaration: Sodium Benzoate, Potassium Sorbate, Aqua

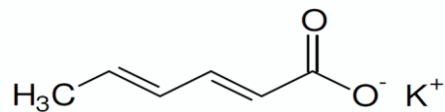
recommended use concentration: 0.50 – 1.50%

chemical structure

Sodium Benzoate



Potassium-(E,E)-hexa-2,4-dienoate



product specific properties

benefits

- strong broad spectrum efficacy
- suitable for certified natural cosmetics
- mild, liquid blend
- fully effective in anionic, cationic and non-ionic systems
- cost effective

global approvals

global approvals

for approvals in further countries please contact your local sales representative

		leave-on	rinse-off
Ashland recommendation		0.5 – 1.50%	0.5 – 1.50%
EU Cosmetics Regulation		max. 1.96%	max. 5.35%
CIR (USA)		max. 3.33%	max. 3.33%
ASEAN Cosmetic Directive		max. 1.96%	max. 5.35%
TSSC 2015 (China)		max. 1.96%	max. 1.96%
MERCOSUR		max. 1.96%	max. 5.35%

regional availability:

For country-specific availability please check ashland.com or contact your local sales representative.

accepted preservatives by certification bodies



preservative actives	NaTrue	Cosmos	EcoCert	BDIH	Soil Assoc.	NPA USA	IBD Brazil
Benzyl Alcohol	○	○	○	○	○	○	○
Sorbic Acid and its salts	○	○	○	○	○	○	○
Benzoic Acid and its salts and esters	○	○	○	○	○	○	○
Salicylic Acid and its salts	○	○	○	○		○	
Formic Acid and its salts	○						
Propionic Acid and its salts	○						
Dehydroacetic Acid and its salts	○	○	○		○	○	○
Phenoxyethanol					with special permission	○	
Chlorphenesin						○	
Ethyl Lauroyl Arginate HCl	○						

practical advice

practical advice

applications

- o euxyl™ k 712 preservative is a liquid cosmetic preservative and suitable for



leave-on



rinse-off



wet-wipes



sensitive
applications

- o fully effective in anionic, cationic and non-ionic systems

practical advice

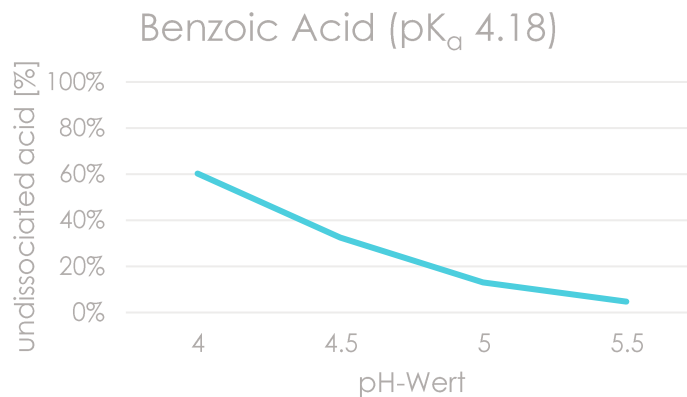
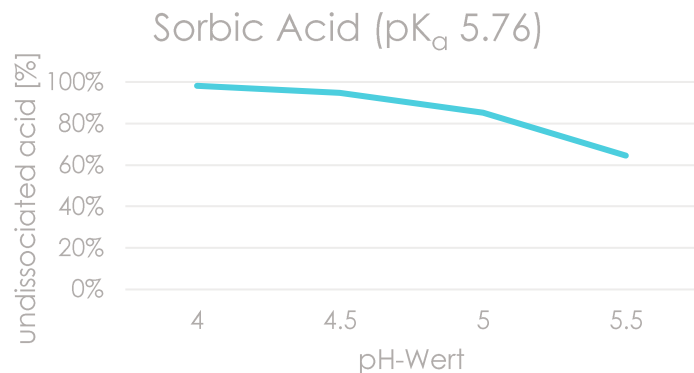
physical data

- clear, yellowish to brownish liquid
- characteristic odor
- pH range < 5.5
- maximum temperature 80°C (max. 4 hours)
- shelf life 24 months

influence of the pH value

influence of the pH value

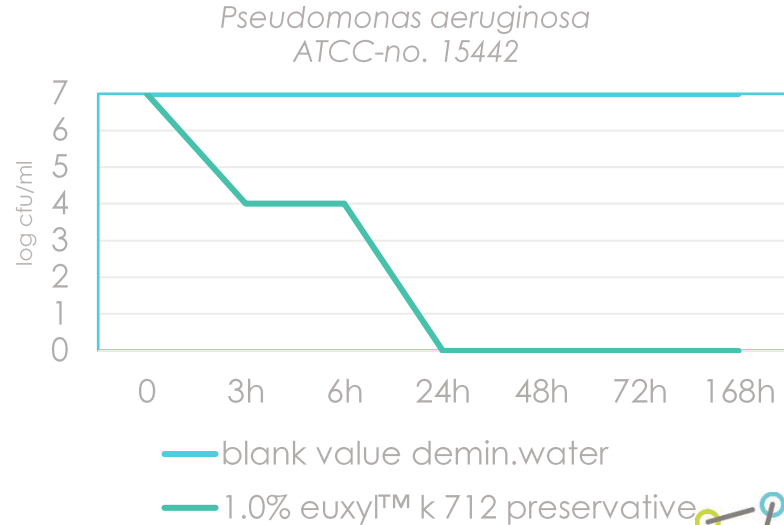
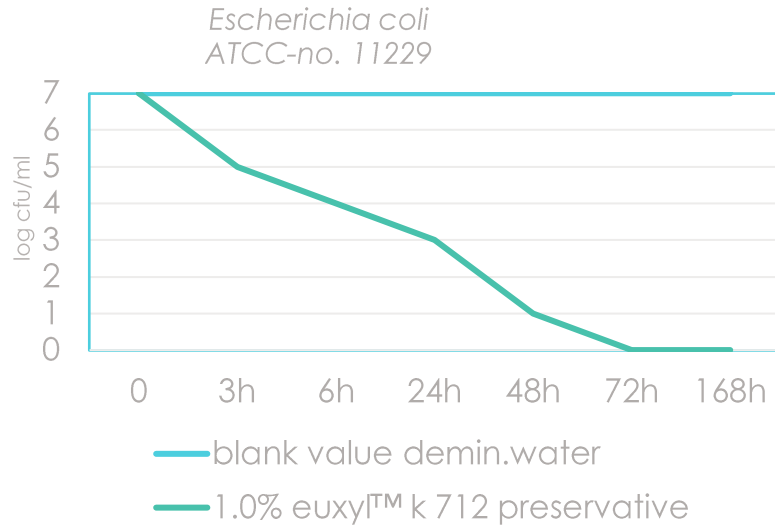
- euxyl™ k 712 preservative should not exceed a pH value of 5.5
- efficacy depends on pH-value and is increased by reducing the pH value
- only the free organic acids are biocidal active, as the dissociated organic acids are completely ineffective



germ count reduction test

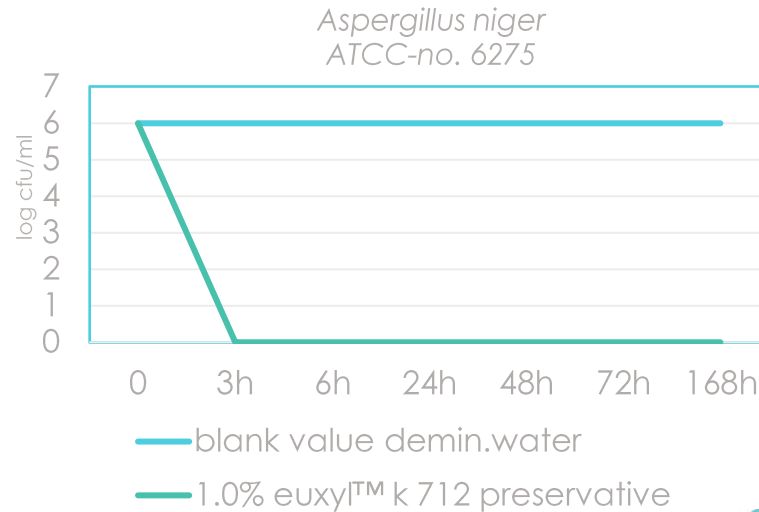
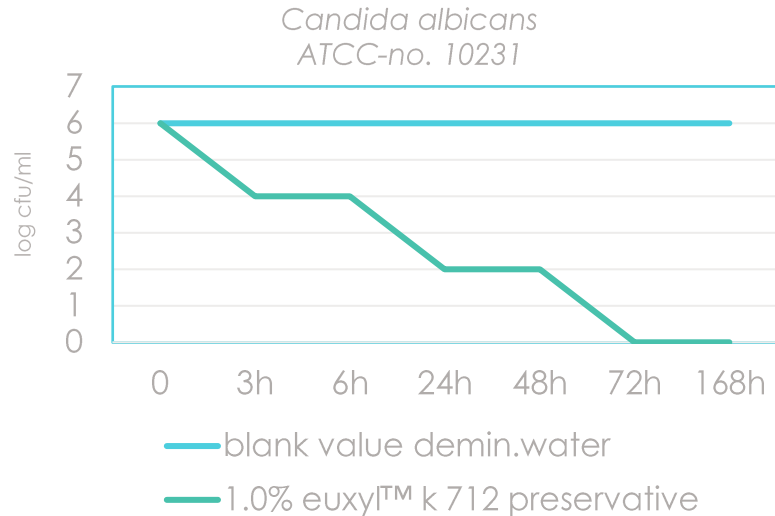
germ count reduction test

- 50 ml portions of the samples are inoculated with 0.5 ml microorganism suspension
- pH value 5.0



germ count reduction test

- 50 ml portions of the samples are inoculated with 0.5 ml microorganism suspension
- pH value 5.0



challenge tests

Koko test

test material / product	inoculation cycles							assessment
shampoo	0	1	2	3	4	5	6	
unpreserved, with betaine at pH 5	-	+++ B,Y,M	+++ B,Y,M	. / .				failed
+ 0.75% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A
unpreserved, with APG at pH 5	-	+++ B,Y,M	+++ B,Y,M	. / .				failed
+ 0.75% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A

0 = sterility control
B = bacteria
M = molds
Y = yeasts

- = free of microbial growth
+ = slight growth
++ = moderate growth
+++ = massive growth
./ = cancelled

APG = Alkylpolyglycoside

cosPET

test material / product	pH	sterility control	evaluation								assessment
			bacteria				fungi				
			2d	7d	14d	28d	assessment	14d	28d	assessment	
natural wipe emulsion WL-13-0121 unpreserved	5.0	-	C	C	C	C	f	C	C	f	f
+ 0.50% euxyl™ k 712 preservative	5.5 → 5.0	-	+++	+++	++++	-	F	+++	-	B	f
+ 1.00% euxyl™ k 712 preservative	5.5 → 5.0	-	-	-	-	-	A	-	-	A	A

assessment

f = failed

A = pass criteria A

B = pass criteria B

-

+

++

+++

++++

C

= free of microbial growth

= slight growth

= moderate growth

= heavy growth

= massive growth

= completely overgrown

cosPET

test material / product	pH	sterility control	evaluation								assessment
			bacteria					fungi			
			2d	7d	14d	28d	assessment	14d	28d	assessment	
pure and clean make-up remover unpreserved	5.8	-	++	-	-	-	A	+++	++++	f	f
+ 0.75% euxyl™ k 712 preservative	6.0 → 5.5	-	-	-	-	-	A	-	-	A	A
urban serum HA #AA2G-013 unpreserved	6.3	-	C	C	C	C	f	C	C	f	f
+ 0.5% euxyl™ k 712 preservative	6.4 → 5.0	-	-	-	-	-	A	+	-	A	A

assessment

f = failed

A = pass criteria A

B = pass criteria B

-

+

++

+++

++++

C

= free of microbial growth

= slight growth

= moderate growth

= heavy growth

= massive growth

= completely overgrown

comparison tests

comparison tests

test material / product	inoculation cycles							assessment
betaine shampoo at pH 5	0	1	2	3	4	5	6	
unpreserved betaine shampoo at pH 5	-	+++ B	+++ B, Y	. / .				failed
+ 0.3% Sodium Benzoate	-	+++ B	+++ B	. / .				failed
+ 0.4% Sodium Benzoate	-	+ B	-	+ B	+ B	++ B	++ B	failed
+ 0.25% euxyl™ k 712 preservative	-	++ B	+++ B	+++ B	. / .			failed
+ 0.5% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A

0 = sterility control

B = bacteria

M = molds

Y = yeasts

- = free of microbial growth

+ = slight growth

++ = moderate growth

+++ = massive growth

. / . = cancelled

comparison tests

test material / product	inoculation cycles							assessment
APG shampoo at pH 5	0	1	2	3	4	5	6	
unpreserved	-	+++ B	+++ B, Y	. / .				failed
+ 0.4% Sodium Benzoate	-	+++ B	+++ B	. / .				failed
+ 0.25% euxyl™ k 712 preservative	-	-	-	-	+ B	+++ B	+++ B	failed
+ 0.5% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A

0 = sterility control
 B = bacteria
 M = molds
 Y = yeasts

- = free of microbial growth
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 ++ = moderate growth
 +++ = massive growth
 . / . = cancelled

APG = Alkylpolyglycoside

comparison tests

test material / product	inoculation cycles							assessment
wheat shampoo at pH 5	0	1	2	3	4	5	6	
unpreserved	-	+++ B	+++ B, Y	. / .				failed
+ 0.3% Sodium Benzoate	-	+++ B	+++ B, Y	. / .				failed
+ 0.4% Sodium Benzoate	-	+ B	+++ B, Y	. / .				failed
+ 1.0% euxyl™ k 712 preservative	-	++ B, Y	+++ B, Y	. / .	-	-	-	failed
+ 1.5% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A

0 = sterility control
 B = bacteria
 M = molds
 Y = yeasts

- = free of microbial growth
 + = slight growth
 ++ = moderate growth
 +++ = massive growth
 . / . = cancelled

comparison tests

test material / product	inoculation cycles							assessment
	0	1	2	3	4	5	6	
betaine shampoo at pH 5								
unpreserved	-	+++ B	+++ B	. / .				failed
+ 0.25% euxyl™ k 712 preservative	-	+++ B	+++ B	. / .				failed
+ 0.5% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A
+ 0.25% 625/007*	-	+++ B	+++ B	. / .				failed
+ 0.5% 625/007*	-	-	-	-	-	-	-	A

0 = sterility control
B = bacteria
M = molds
Y = yeasts

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+++ = massive growth
. / . = cancelled

* 625/007: 30% Sodium Benzoate and Salicylic Acid (corresponding to the acid content of K 712)

comparison tests

test material / product	inoculation cycles							assessment
betaine shampoo at pH 5	0	1	2	3	4	5	6	
unpreserved	-	+++ B,Y,M	+++ B,Y,M	. / .				failed
+ 0.25% euxyl™ k 712 preservative	-	+++ B,Y,M	+++ B,Y,M	. / .				failed
+ 0.5% euxyl™ k 712 preservative	-	-	-	-	-	-	-	A
+ 0.25% euxyl™ k 712 preservative + 0.3% Dissolvine* GL 38	-	+++ B,Y,M	+++ B,Y,M	. / .				failed
+ 0.5% euxyl™ k 712 preservative + 0.3% Dissolvine* GL 38	-	-		++ B	++ B	++ B	++ B	failed
+ 0.75% euxyl™ k 712 preservative + 0.3% Dissolvine* GL 38	-	-	-	-	-	-	-	A

0 = sterility control
B = bacteria
M = molds
Y = yeasts

- = free of microbial growth
+ = slight growth
++ = moderate growth
+++ = massive growth
./ = cancelled

We could not detect boosting effect of complexing agents in combination with organic acids.

overview

euxyl™ k 712 preservative

INCI declaration: Sodium Benzoate, Potassium Sorbate, Aqua

product benefits

- strong broad spectrum efficacy
- suitable for certified natural cosmetics
- mild, liquid blend
- fully effective in anionic, cationic and non-ionic systems
- cost effective



leave-on



wet-wipes



rinse-off



sensitive applications

recommended use-concentration:	0.5 – 1.5%	limitation: The efficacy depends on the pH value
pH value:	< 5.5	
maximum temperature:	80°C (max. 4 hours)	

backup slides

challenge test - germ count reduction test

test lotion is inoculated with test organisms

test organisms:

- *Staphylococcus aureus*
- *Escherichia coli*
- *Pseudomonas aeruginosa*
- *Candida albicans*
- *Aspergillus brasiliensis*

initial germ count: 10^6 cfu/ml

lotion is streaked out onto nutrient media and incubated

semi-quantitative assessment of microbial growth

challenge test - germ count reduction test

test lotion is inoculated with test organisms

test organisms:

- *Staphylococcus aureus*
- *Escherichia coli*
- *Pseudomonas aeruginosa*
- *Candida albicans*
- *Aspergillus brasiliensis*

initial germ count: 10^6 cfu/ml

lotion is streaked out onto nutrient media and incubated

semi-quantitative or quantitative assessment of microbial growth

challenge test – Ashland Koko test

microorganisms used in pharmaceutical tests

germ spectrum

bacteria:

gram-positive

Kocuria rhizophila

Staphylococcus

aureus

gram-negative

Enterobacter gergoviae

Escherichia coli

Klebsiella pneumoniae

Pseudomonas aeruginosa

Pseudomonas fluorescens

Pseudomonas putida

molds:

Aspergillus brasiliensis

Penicillium pinophilum

yeasts:

Candida albicans

25 g of each material to be tested



without preservative



with x% preservative

challenge test – Ashland Koko test

2 days exposure time streak (see below) as sterility control
periodic microbiological preservation test - 6 weeks = 6 inoculation cycles
weekly inoculation with 0.1 ml mixed suspension
(titre 10^7 - 10^8 cfu/ml)

0.1 ml



storage at + 25 °C



streak weekly before each inoculation on tryptone-soya-agar / sabouraud-dextrose-agar

incubation of the
nutrient media:
3 days at + 25 °C



agar plates

assessments:

- free of growth
- + slight growth
- ++ moderate growth
- +++ heavy growth

selective identification of bacteria, yeast and molds

A = free of growth during the 6 inoculation cycles

B = slight (+) growth during the 6 inoculation cycles

challenge test – Ashland Koko test

1. streak (see below) as sterility control
2. periodic microbiological preservation test - 6 weeks = 6 inoculation cycles weekly inoculation with 0.1 ml mixed suspension (titre 10^7 - 10^8 cfu/ml)
3. streak weekly before each inoculation on tryptone-soya-agar / sabouraud-dextrose-agar



incubation of the
nutrient media:
3 days at + 25 °C



agar plates

assessments:

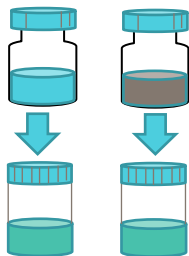
- free of growth
- + slight growth
- ++ moderate growth
- +++ heavy growth

selective identification of bacteria, yeast and molds
A = free of growth during the 6 inoculation cycles
B = slight (+) growth during the 6 inoculation cycles

challenge test - Ashland CosPET procedure

CosPET (semiquantitative)

S. aureus
S. epidermidis
P. aeruginosa
P. gergoviae
P. putida
B. cepacia
E. coli
K. pneumoniae



C. albicans
A. brasiliensis

10^5 - 10^6 CFU/g

evaluation time points:

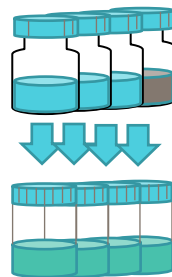
bacteria: 2, 7, 14, 28d

fungi: 14, 28d

	criteria	germ reduction			
		2d	7d	14d	28d
B	A	2	3	-	n.i.
	B	-	-	3	n.i.
Y & M	A	n.d.	n.d.	3	n.i.
	B	n.d.	n.d.	2	n.i.

European Pharmacopoeia (quantitative)

S. aureus
P. aeruginosa
C. albicans
A. brasiliensis



10^5 - 10^6 CFU/g

evaluation time points:

bacteria: 2, 7, 14, 28d

fungi: 14, 28d

	criteria	log ₁₀ -germ reduction			
		2d	7d	14d	28d
B	A	2	3	-	n.i.
	B	-	-	3	n.i.
Y & M	A	n.d.	n.d.	3	n.i.
	B	n.d.	n.d.	2	n.i.

n.i. – no increase
 n.d. – not determined

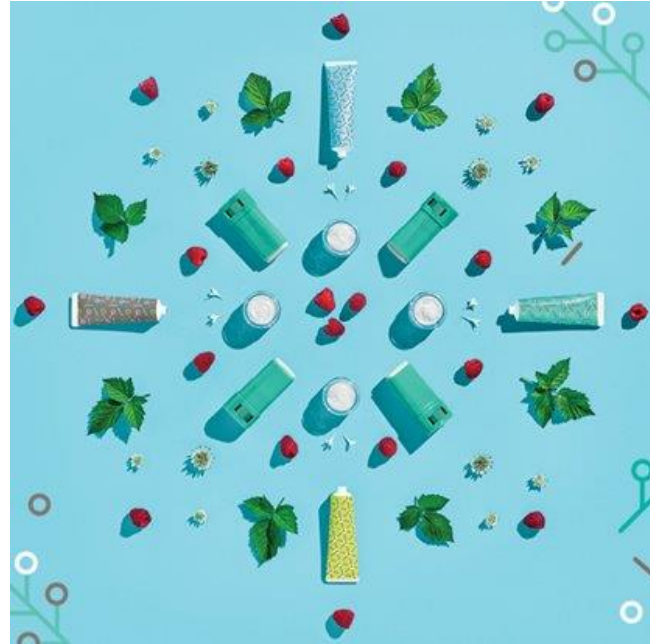
challenge test – Ashland CosPet

conclusion

benefits of the CosPET

- based on European Pharmacopoeia (EP)
- results are directly comparable to EP
- single inoculation
- good reproducibility
- gives insights on fast performance (bacteria)
- distinguishes between bacterial and fungal performances
- improved germ spectrum including *burkholderia cepacia*
- A-Criteria possible even if yeast and mold are not completely reduced
- fast

send us your
preservative
challenges!



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