E leen

GREEN OR

MULTIFUNCTIONAL INGREDIENT: UNIQUE COMBINATION OF CITRUS EXTRACT WITH A-Leen 5

- *Natural antimicrobial solution*
- *Alternative to conventional preservatives*
- *Skin humectant & anti-oxidant bio-flavonoids*
- *100% sustainable, made from agro-waste*
- *100% water soluble*

Approved by ECOCERT RAW MATERIAL

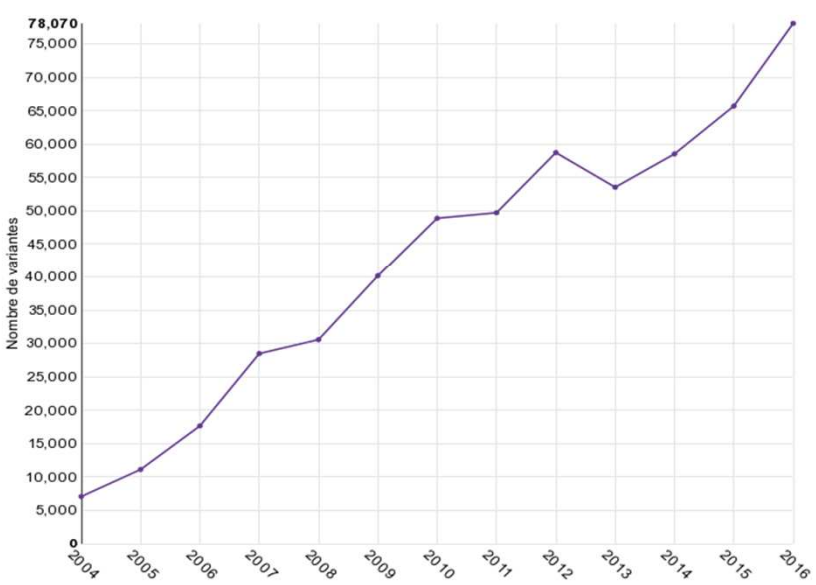
COSMOS APPROVED

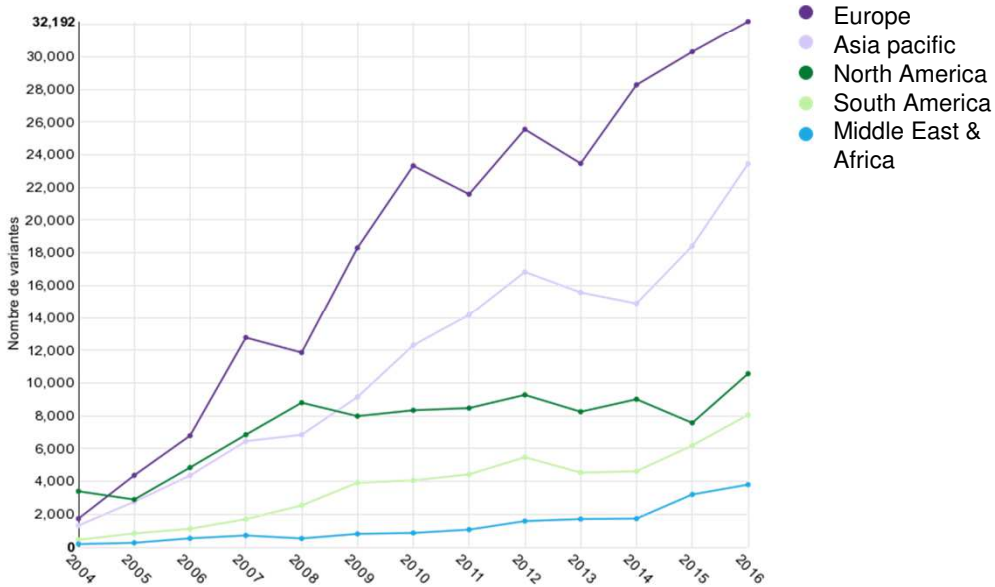
MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

green solving attitude.

The cosmetic trend follows sustainability

Cosmetic Ethical-Environmentally friendly product…





Environmental impact starts to become more and more a key driver for cosmetic formulations

➲ The need for new sustainable ingredients and solutions are highly demanded by cosmetic players and consumers

L'Oréal is using A-Leen 5

LesEchos.fr

ANNE FEITZ | LE 24/04/17 À 15H52

Cosmétiques : L'Oréal se tourne de plus en plus vers les ingrédients bio

Le géant des cosmétiques veut passer de 54 % à 65 % d'ingrédients bio dans ses produits.

Pour L'Oréal, utiliser des ingrédients bio est devenu une priorité depuis une dizaine d'années. *« C'est un processus continu »*, explique Laurent Gilbert, directeur de l'innovation durable du groupe. *« Nous sommes déjà passés de 35 % à 40 % de matières premières d'origine renouvelable en 2005 à 54 % aujourd'hui. Et nous espérons monter à 65 % d'ici dix ans »*. Pour le géant des cosmétiques, il s'agit de répondre à une demande croissante de ses clients, alors que les associations de consommateurs alertent sur la **dangerosité de certaines substances.** *« Il y a une attente des consommateurs sur l'origine des ingrédients, mais aussi des filières : ils sont de plus en plus attachés au caractère durable des produits comme des processus de production »*.

« De nouvelles filières industrielles "

Le groupe attend donc des efforts en ce sens de la part de ses fournisseurs. *« Il peut être complexe de mettre en place des filières répondant à ces critères de durabilité, en maintenant la performance des ingrédients mais sans en renchérir le coût - un critère indispensable »*, poursuit-il. *« Les chimistes ont pris conscience de ces enjeux, et on voit naître des filières industrielles inimaginables il y a quelques années "*.

Le groupe a par exemple adopté récemment le pentylène glycol du fabricant français Minasolve, qui a réussi à le produire à partir de bagasse (le résidu de la canne à sucre) ; or il s'agit d'un solvant extrêmement courant, utilisé comme humectant et comme conservateur dans les cosmétiques. L'Oréal a aussi conclu un partenariat avec la start-up française Global Bioenergies, qui produit à partir de sucre de l'isobutène, une molécule jusque-là issue du pétrole, et dont les dérivés sont largement utilisés dans la cosmétique.

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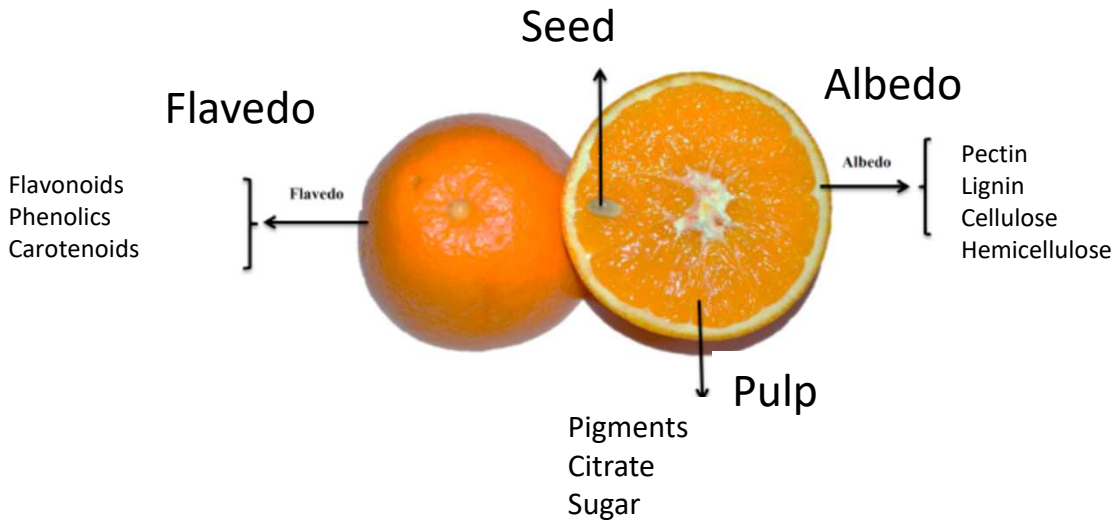
E-Leen Green OR
Sustainable skin detoxifier

Citrus plants are one of the world's major fruit crops
Citrus fruits : 56% = peel + pulp as off-products

Extraction of **Bio-flavonoids** with
water & natural glycerin from **Organic CITRUS waste**
(Flavedo & Albedo layers)



Anatomy of a citrus fruit

MINASOLVE
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR
Flow chart

Citrus aurantium amara
(Bitter Orange)

Citrus aurantium sinensis
(Orange)

Citrus reticulata
(Tangerine)

↓

Selection of CERTIFIED ORGANIC citrus fruits

↓

Fruit cleaning

↓

Grinding / trituration with glycerin / water

↓

Centrifugation of extract

↓

Addition of stabilizing ingredients

↓

Quality control

↓

Blending with nature-derived A-Leen 5

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

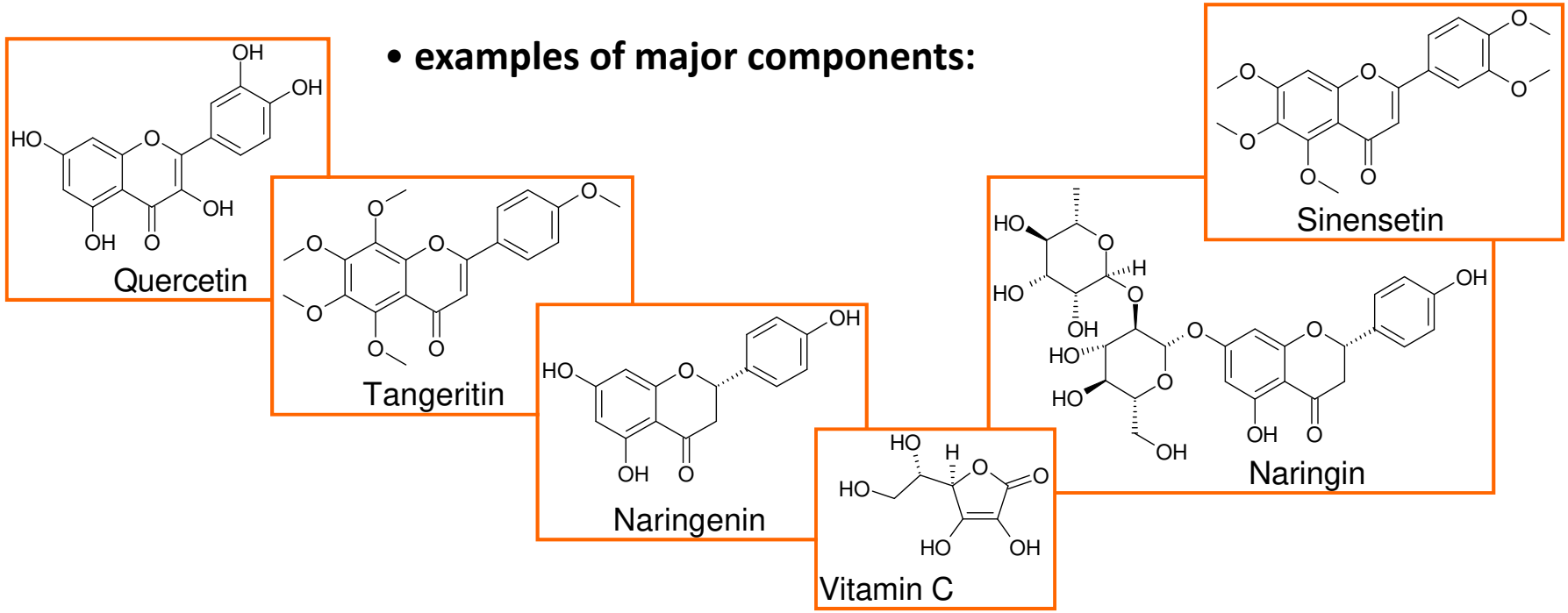
E-Leen Green OR
Characteristics

Approved by ECOCERT RAW MATERIAL
COSMOS APPROVED

Ingredient	E-Leen Green OR (Pentylene Glycol + Glycerin + Citrus-Extracts)
Appearance	Clear yellow liquid
Odor	Faint characteristic
INCI	Pentylene Glycol, Glycerin, Citrus Aurantium Amara (Bitter Orange) Fruit Extract, Citrus Reticulata (Tangerine) Fruit Extract, Citrus Aurantium Sinensis (Orange) Peel Extract (and) Citric Acid (and) Lactic Acid (and) Ascorbic Acid
Solubility	Soluble in water
Use level	1 - 3 %
Formulation	✓ max. 40° C ✓ pH 3 - 6.5 (for “colorless” formulations) ✓ incorporation at the end - e.g. after emulsification

E-Leen Green OR
Sustainable skin detoxifier

- **actives components = bio-flavonoids**
- **examples of major components:**



➲ Vitamin C is present in E-Leen Green OR at 0,1-0,5%*

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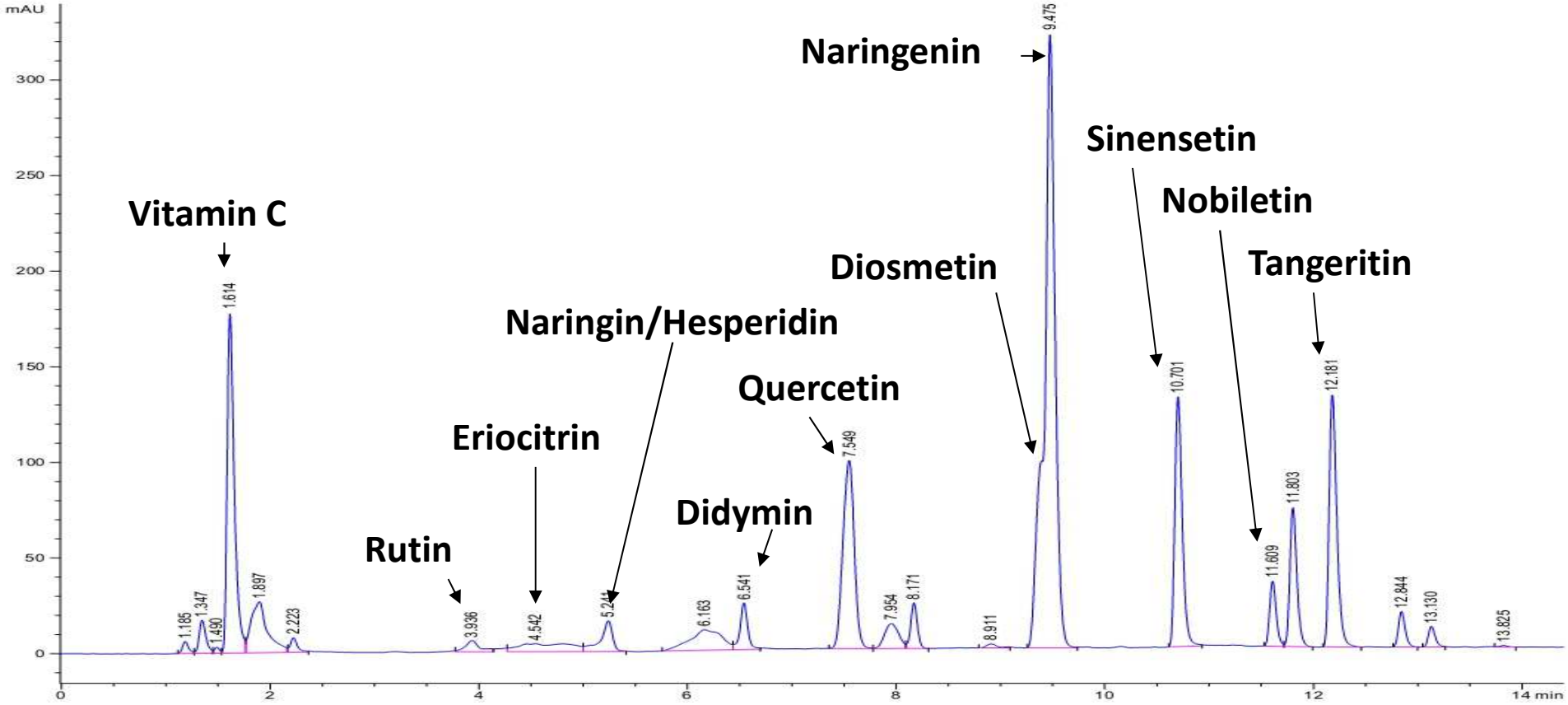
*indicative data

E-Leen Green OR
Sustainable skin detoxifier



E-Leen Green OR, HPLC with DAD-detector (UV, 210 nm)

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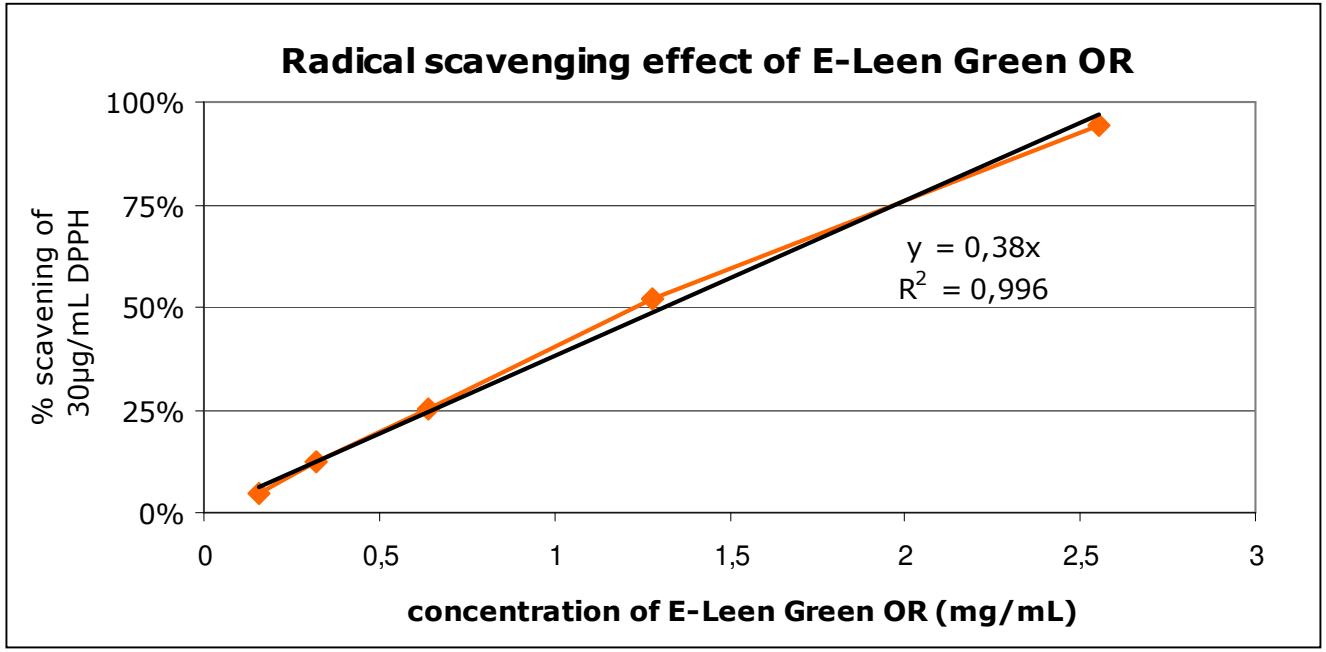
E-Leen Green OR
Free radical scavenger

Photometric assay



➲ **E-Leen Green OR @ 2% destroys 75% of the free radicals in a 30 µg/mL solution of DPPH**

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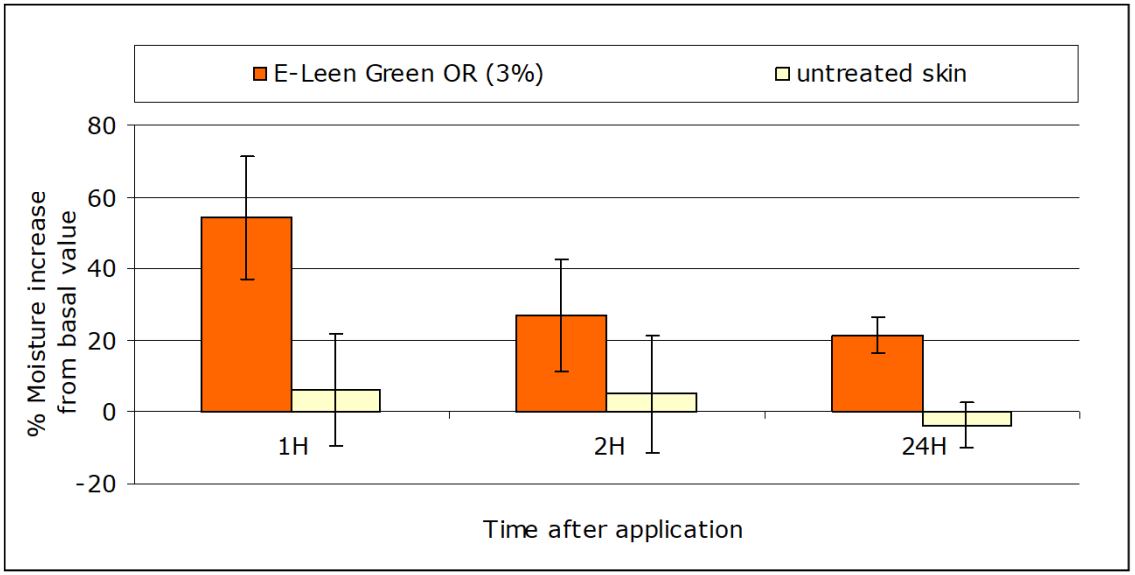
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR
Skin humectant

Corneometry study
tested at 3 % as aqueous solution
on 15 volunteers (male & female, 24-50 years old)



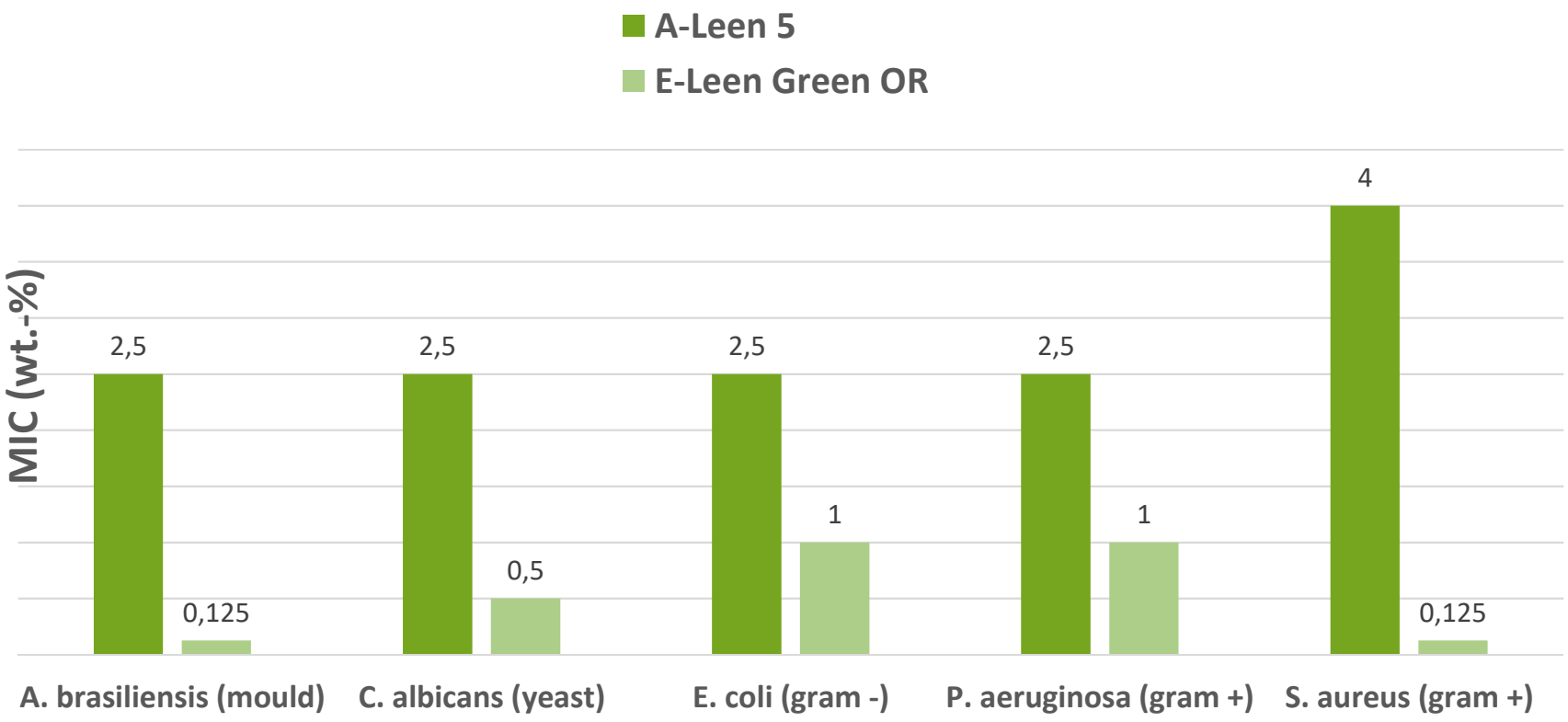
➲ E-Leen Green OR (3%) has a significant long-lasting moisturizing effect on skin

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR

The 100% nature-derived alternative to conventional preservatives

Minimum Inhibitory Concentration



MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR

The 100% nature-derived alternative to conventional preservatives

Challenge tests

Phase	Ingredient	INCI name	%
A	Water	Aqua	ad 100.0
	Xanthan Gum PC [1)]	Xanthan Gum	0.5
B	Emulgade PL 68/50 [2)]	Cetearyl Glucoside (and) Cetearyl Alcohol	5.0
	Lipex Sheasoft [3)]	Butyrospermum Parkii (Shea) Butter	3.0
	Jojoba Oil	Simmondsia Chinensis (Jojoba) Oil	3.0
	Hazelnut Oil	Corylus Americana (Hazel) Seed Oil	3.0
C	Bioxan T70 [4)]	Tocopherol	0.1
D	E-Leen Green OR [5)]	Pentylene Glycol, Glycerin, Citrus Aurantium Amara (Bitter Orange) Fruit Extract, Citrus Reticulata (Tangerine) Fruit Extract, Citrus Aurantium Sinensis (Orange) Peel Extract, Ascorbic Acid, Citric Acid, Lactic Acid	2.0 (pH 5.5) or 3.0 (pH 6.5)
E	Citric Acid (25 % aq.) or Sodium Hydroxide (10 % aq.)	Aqua (and) Citric Acid or Aqua (and) Sodium Hydroxide	ad pH 5.5 or pH 6.5

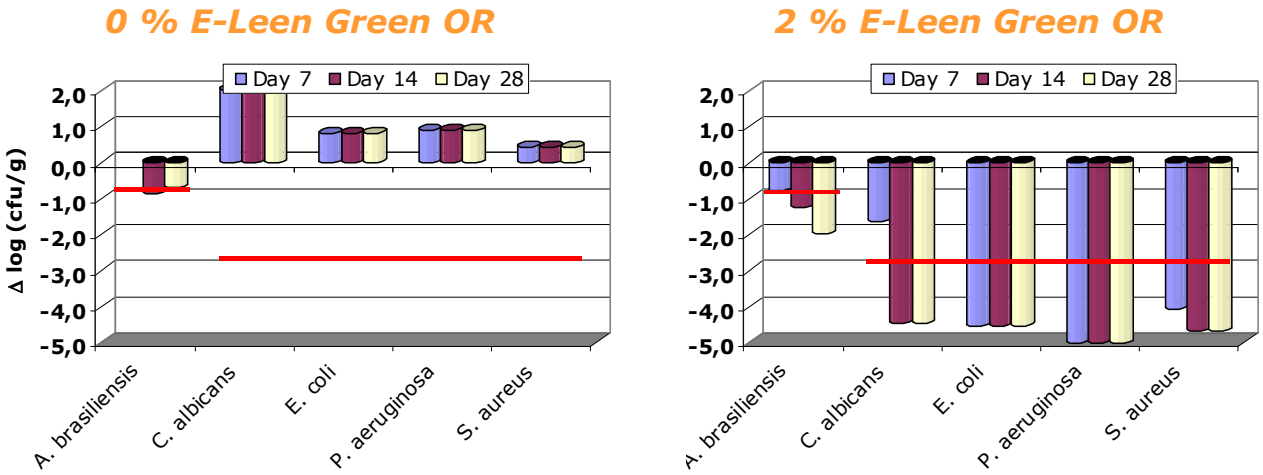
1) Jungbunzlauer; 2) BASF; 3) AarhusKarlshamn AAK, 4) AAKO B.V. **5) MINASOLVE**

MINASOLVE® BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR

The 100% nature-derived alternative to conventional preservatives

O/W emulsion, protected by 2 % of E-Leen Green OR, pH 5.5



subjected to challenge test, according to ISO 11930

ISO 11930 : reduction of germ count after 28 days (criteria A)

E-Leen Green OR (2%) has anti-microbial properties

➲ **E-Leen Green OR fulfils criteria A (ISO 11930) at pH 5.5**

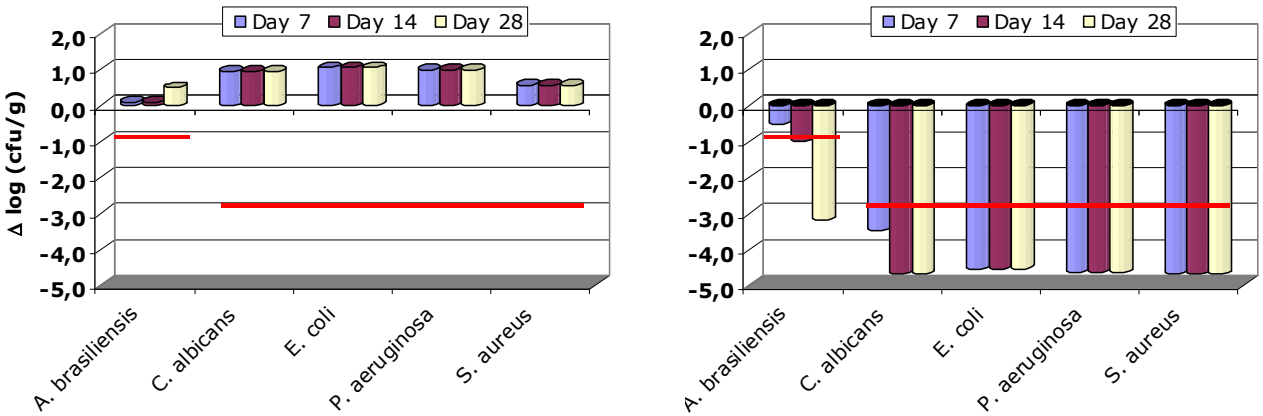
MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR

The 100% nature-derived alternative to conventional preservatives

O/W emulsion, protected by 3 % of E-Leen Green OR, pH 6.5

0 % E-Leen Green OR *3 % E-Leen Green OR*



subjected to challenge test, according to ISO 11930

ISO 11930 : reduction of germ count after 28 days (criteria A)

E-Leen Green OR (3%) has anti-microbial properties

➲ E-Leen Green OR fulfils criteria A (ISO 11930) at pH 6.5

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR

HRIPT (Human Repeated Insult Patch Test)

HRIPT protocol :

Skin compatibility study and absence of allergenic potential,
after repeated applications of the ingredients under occlusive conditions.
Patch material : Occlusive patch Finn Chamber Large, 40 µL

HRIPT	E-Leen Green OR
Focus group	103
Age	18-70
Skin Phototype (Fitzpatrick)	I to IV
Type of skin	50% normal / 50% sensitive
Results	- **No irritative reaction** - **Very good skin compatibility** - **No allergic reaction**

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

Guidance Formulations

Daily Protection Serum SPF20

Detox Mist

Make-up remover Milk

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

Daily Protection Serum SPF 20

Phase	Raw material	INCI name	%
A	**Water**	*Aqua*	65,1
B	**Xanthan Gum**	*Xanthan Gum*	0,2
	Pemulen TR1 (6)	*Acrylates/C10-C30 Alkyl Acrylate Crosspolymer*	0,25
C	**Amphisol K (3)**	*Potassium Cetyl Phosphase*	1,5
	Lanette 16 (2)	*Cetyl Acohol*	0,5
	Eumulgin SG (2)	*Sodium Stearoyl Glutamate*	0,25
	Eusolex OS (4)	*Ethyl Hexyl Salicylate*	5
	Eusolex HMS (4)	*Homomenthyl salicylate*	8
	Uvinul A Plus (2)	*Diethylamino Hydroxybenzoyl HexylBenzoate*	4
	Tinosorb S (2)	*Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine*	3
	DUB DIS (5)	*DiisopropylSebacate*	7
D	**E-Leen Green OR (1)**	*Pentylene Glycol (and) Glycerin (and) Citrus Aurantium Amara Fruit Extract (and) Citrus Reticulata Fruit Extract (and) Citrus Aurantium Sinensis Peel Extract (and) Citric Acid (and) Lactic Acid (and) Ascorbic Acid*	**3**
E	**A-Leen 5 (1)**	*Pentylene Glycol*	**2**
F	**Perfume Fireweed (7)**	*Parfum*	0,2
G	**Sodium Hydroxyde**	*Sodium Hydroxyde*	Qsp pH 6
	pH 4,5 avant la soude		100

Raw material suppliers:

(1) **Minasolve**
(2) Basf
(3) D.S.M
(4) Merck
(5) Stéarinerie Dubois
(6) Lubrizol
(7) Luzi

Manufacturing process:

1- Disperse B into A with strong stirring an heat to 75°C.
2- Mix phase C separately and heat to 85°C under 400 rpm .
3- Emulsifier introducing C into A/B with strong stirring with rotor/stator 3000 rpm.
4- Start to cool down under stirring 1500 rpm.
5- At 50°C add phase D and E.
6- At 30°C add phase F
7- Add phase G, sodium hydroxide (sol at 10%) to reach pH6

Properties, stability and microbiology:

Aspect Slight yellow emulsion.
pH 6 +/- 0,25

Stable during 3 months at 40 °C and room temperature.
Criteria A / ISO 11930.

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

Make up Remover Milk

Phase	Raw material	INCI name	%
A	**Water**	*Aqua*	77,275
	Sodium Citrate (2)	*Sodium Citrate*	0,5
B	**Glycerin** (3)	*Glycerin*	2
	keltrol CGSFT	*Xanthan Gum*	0,6
C	**E-Leen Green OR** (1)	*Pentylene Glycol (and) Glycerin (and) Citrus Aurantium Amara Fruit Extract (and) Citrus Reticulata Fruit Extract (and) Citrus Aurantium Sinensis Peel Extract (and) Citric Acid (and) Lactic Acid (and) Ascorbic Acid*	**3**
D	**Axol C 162** (5)	*Glycerine Stearate Citrate*	3
	Lanette 16 (3)	*Cetyl Acohol*	1
	Tego SMS SMS (5)	*Sorbitan Stearate*	0,5
	Emogreen L19 (4)	*C15-19 Alcane*	12
E	**Perfume Purple Lilies** (6)	*Parfum*	0,125
F	**Acide Citrique**	*Citric Acid*	qsp= 5,2

Raw material suppliers:

(1) Minasolve

(2) Univar

(3) Basf

(4) Seppic

(5) Evonic

(6) Luzi

Manufacturing process:

1- Mix ingredients of Phase A and heat at 75°C.

2- Mix separately ingredients of Phase B

3- Add Phase B to Phase A under stirring at 400 rpm and maintain at 75°C.

4- Mix separately Phase D and heat under stirring to 80°C.

5- Heat phase D at 75°C and Introduce into phase A emulsify with rotor/stator 1500 rpm and decrease T°C under mixing.

6- At 50°C add phase C.

7- At 30°C add phase E

8- Add phase F to reach pH 5,2 +/-0,2

Properties, stability and microbiology:

Aspect : White fluid emulsion

pH : 5,2 +/-0,2

Stable 2 months room T°C and 40°C.

Criteria B / ISO 11930

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BIO-INGREDIENTS FOR YOUR APPLICATIONS

Detox Mist

Phase	Raw material	INCI name	%
A	**Water**	*Aqua*	92,60
	Organic Water minth 100% (2)	*Menta Piperita extract*	5,00
	Sodium Citrate (3)	*Sodium Citrate*	0,25
B	**E-Leen Green OR (1)**	*Pentylene Glycol (and) Glycerin (and) Citrus Aurantium Amara Fruit Extract (and) Citrus Reticulata Fruit Extract (and) Citrus Aurantium Sinensis Peel Extract (and) Citric Acid (and) Lactic Acid (and) Ascorbic Acid*	**2,00**
D	**Citric Acid**	*Citric Acid*	0,15

Manufacturing process: cold processing

1- Prepare A at room Temp. Stir at 400 rpm.
2- Add B to A under stiring at 400 rpm.
3- Add C to reach pH 4,8 +/-0,2
4- Filter at 5 microns

Properties, stability and microbiology:

Aspect Clear transparent lotion
pH Qsp pH 4,8 +/- 0,2

Stable 1 month room T°C, 40°C, 50°C.
Criteria A / ISO 11930

Raw material suppliers:

(1) Minasolve

(2) Golgemma

(3) Univar

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

E-Leen Green OR
The power of orange bio-flavonoids

Approved by ECOCERT RAW MATERIAL

COSMOS APPROVED

- **Antioxidant** bio-flavonoids with free-radical scavenging effect
- **Antimicrobial** protection at pH 3 - 6.5 (bacteria and fungi)
- **Free of fragrance allergens and listed preservatives**

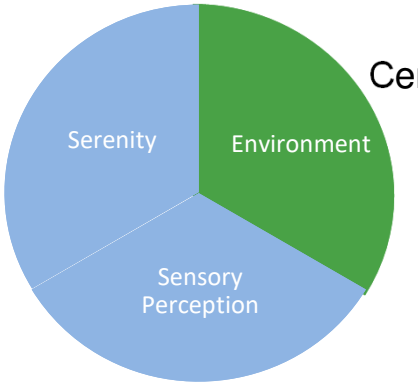
- **100% sustainably sourced :** manufactured from agro-wastes
- Skin **humectant**

MINASOLVE® BIO-INGREDIENTS FOR YOUR APPLICATIONS

A-Leen 5
Multifunctional ingredient

1. Preservative Booster
2. Skin Care Agent: moisturizer and emollient

+ Green Formula Protection
+ Green Extraction Solvent
+ Green Solubilizer
+ Green Bioavailability enhancer*



Ethical

Certified ingredients

Eco friendly

Bio-based

Multifunctional

+ Sustainable Cosmetics:

- Made from agricultural waste materials
- Sustainable & eco-responsible product
- "Green chemistry" manufacturing process
- Ecocert & Cosmos approved, Natrue compliant
- Nature derived alternative to the synthetic version

USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 100%

Approved by ECOCERT RAW MATERIAL

COSMOS APPROVED

Wellbeing

Wellbeing Ingredient

* **Heuschkel Sandra, Wohlrab Johannes, Schmaus Gerhard, Neubert Reinhard H.H.** (2008) Modulation of Dihydroavenanthramide D Release and Skin Penetration by 1,2-alkanediols. *Eur J Pharm Biopharm* 70(1): 239-247.

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

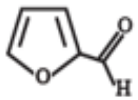
A-Leen 5
Pionner of bio-based Pentylene Glycol

Back Integrated Raw Materials – Full Traceability

« Pennakem, our US sister company is active in renewable chemistry since the 1940's »

FURFURAL APPLICATIONS

SUGAR CANE BAGASSE
RESPONSIBLE SOURCING

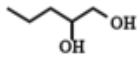


FURFURAL

- Food
- Pharma
- **Cosmetics**
- Rubber
- Agro

Furfuryl Alcohol Purified

A-Leen 5



COSMETIC GRADE ODOURLESS

Green Chemistry

- Natural index (ISO 16128-2) > 0.9
- 100 % Renewable carbon
- Halal compliant
- Vegan compliant
- Natrue compliant

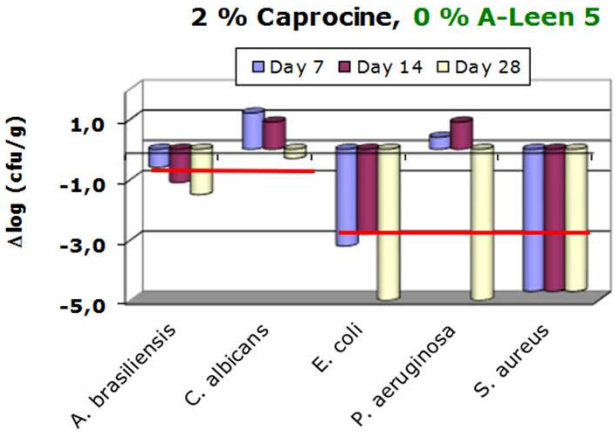
MINASOLVE
BIO-INGREDIENTS FOR YOUR APPLICATIONS

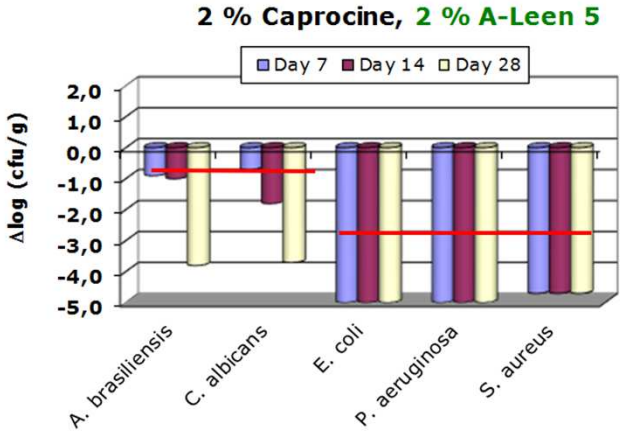
A-Leen 5
Preservative booster

O/W emulsion, protected by 2 % A-Leen 5 and 2 % Caprocine, pH 5.5

Phase	Raw material	INCI Name	%
A	**Water**	Aqua	ad 100
	Xanthan Gum OC	Xanthan Gum	0.5
	Caprocine	Capryloyl Glycine	2
	A-Leen 5	Pentylene Glycol	2
B	**Emulgrade PL 68/50**	Ceterayl Glucoside (and) Cetearyl Alcohol	5.00
	Lipex Sheasoft	Butyrospermum Parkil (Shea) Butter	3.00
	Jojoba oil	Simmondsia Chinensis (Jojoba) Oil	3.00
	Hazelnut Oil	Corylus Avellana (Hazel) Seed Oil	3.00
C	**Boixan T70**	Tocopherol	0.10
D	**Citric Acid (50%)**	Citric Acid (and) Aqua	ad pH 5.5

Subjected to challenge test, according to ISO 11930





A.brasiliensis (Mould)
C.albicans (Yeast)
E.coli (Gram -)
P. aeruginosa (Gram -)
S.aureus (Gram +)

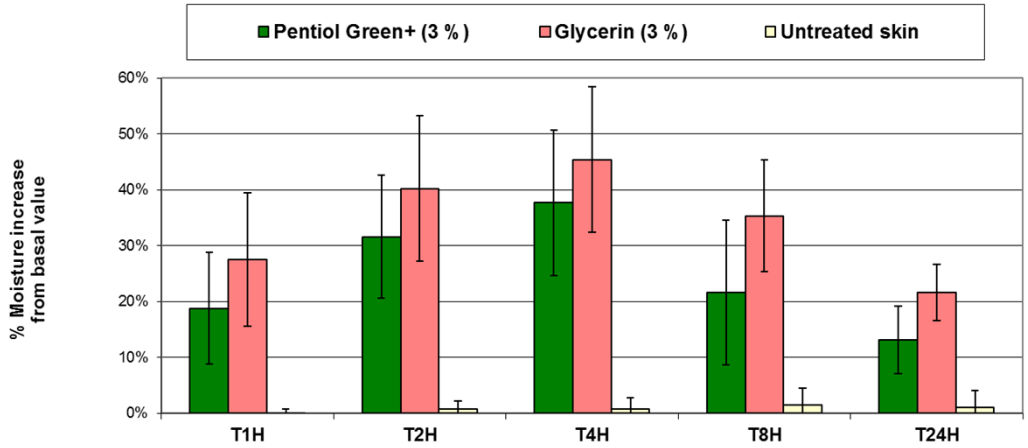
ISO 11930 : reduction of germ count after 28 days (criteria A)

→ **A-Leen 5 can act as an effective preservative booster**

MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

A-Leen 5
Safe moisturizer

Corneometry study, tested at 3 % as aqueous solution, by 12 volunteers



Long lasting moisturizing effect, comparable to glycerin in aqueous solution

HRIPT (Human Repeated Insult Patch Test)

HRIPT protocol :
Skin compatibility study and absence of allergenic potential, after repeated applications of the ingredients under occlusive conditions*, over 36 days.

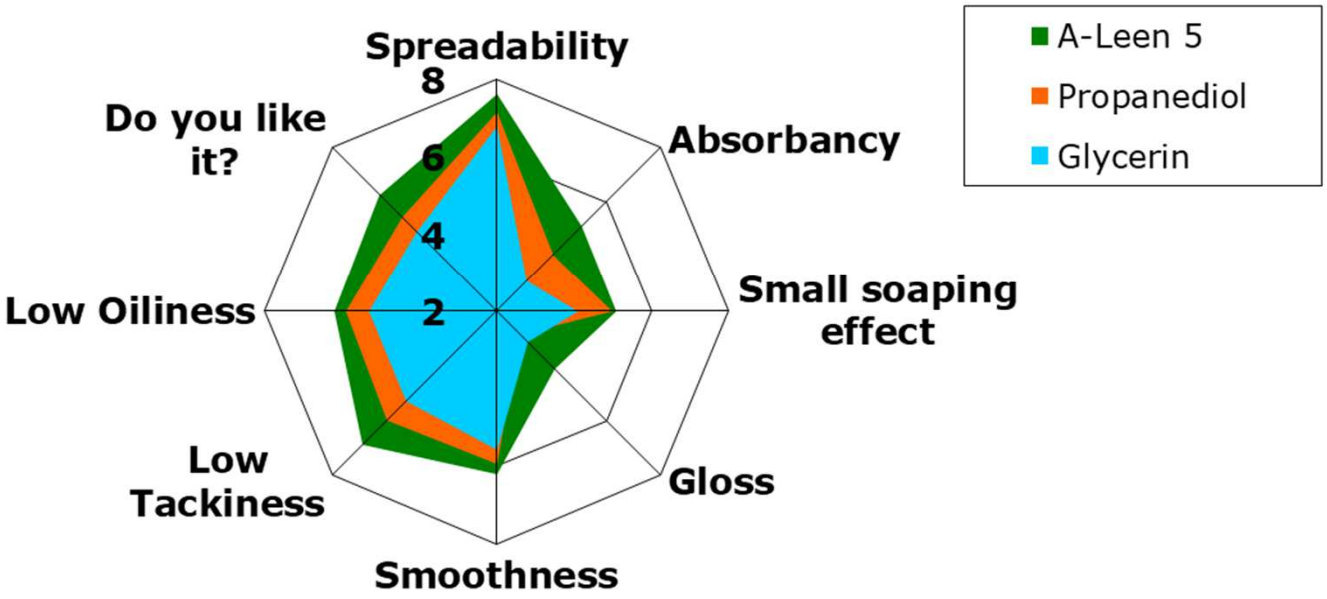
**Patch material :* Occlusive patch Finn Chamber standard

*Within the focus group, about 30 % of the panel has a sensitive skin. After the test, nobody showed skin reaction

HRIPT	A-Leen 5
Number of subjects	101
Age	18-65
Type of skin	All types
Skin Phototype (Fitzpatrick)	I to IV
RESULT	- No irritative reaction - Very good skin compatibility - No allergic reaction

A-Leen 5
Skin conditioning agent

Consumer study,
tested at 3 % in an O/W emulsion, by 23 volunteers



Superior skin conditioning and in-use properties for A-Leen 5

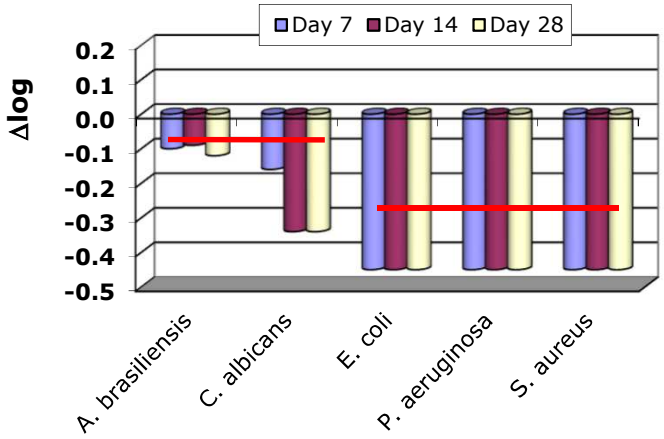
MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

A-Leen 5
Green Formula protection : comparison with propanediol

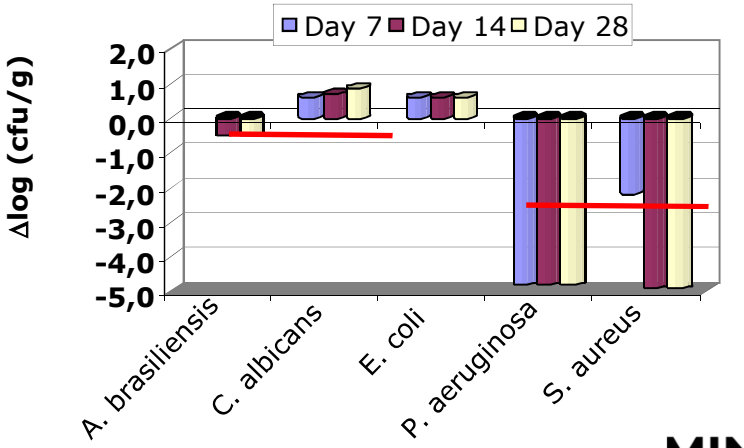
O/W emulsion, protected by 3 % A-Leen 5, pH 5.6 or 6 % Propanediol, pH 5.3

Phase	Raw material	INCI Name	%
A	**Water**	Aqua	72.0
B	**A-Leen 5**	**Pentylene Glycol**	**3.0**
Premix	**Xanthan Gum PC**	Xanthan Gum	0.3
C	**Emulium Kappa 2**	Candellila/Jojoba/Rice Bran Polyglyceryl-3 Esters (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Sodium Stearoyl Lactylate	1.5
	Glyceryl Monostearate	Glyceryl Monostearate	2.3
	TEGO Care PS	Methyl Glucose Sesquistearate	1.2
	Jojoba Oil	Simmondsia Chinensis (Jojoba) Seed Oil	5.0
	Almond Oil	Prunus Amygdalus Dulcis (Sweet Almond) Oil	4.0
	Lipex Cocoasoft	Theobroma Cacao Butter	3.0
	BergaCare FG5	Ethylhexyl Palmitate (and) Ethylhexyl Stearate (and) Hydrogenated Olive Oil (and) Caprylic/Capric Triglycerides	2.0
	Grape Seed Oil	Vitis Vinifera (Grape) Seed Oil	4.0
	Beeswax	Cera Alba	1.5
D	**Perfume Celebration Fitness**	Parfum	0.1
	DL-a-Tocopherol (>97%)	Tocopherol	0.1

3% A-Leen 5



For comparison: 6 % Propanediol



A.brasiliensis (Mould)
C.albicans (Yeast)
E.coli (Gram -)
P. aeruginosa (Gram -)
S.aureus (Gram +)

ISO 11930 : reduction of germ count after 28 days (criteria A)

→ A-Leen 5 is much efficient than Propanediol

MINASOLVE
BIO-INGREDIENTS FOR YOUR APPLICATIONS

A-Leen 5
Bio-sourced & odourless Pentylene glycol

Approved by ECOCERT RAW MATERIAL

COSMOS APPROVED

- **Preservative booster**
- **Green formula protection**
- **Easy to use**
- **Emollient & moisturizer**
- **Extraction solvent**
- **Solubilizer**

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- Minakem
- Minagro
- Pennakem
- Pressure Chemical
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Serving market leaders as well as emerging players, we support our customers' efforts to improve the quality of life in the global community by :

- Improving our chemistry and operational excellence today
- Creating and innovating for tomorrow
- Driving our enterprises together to go beyond expectations

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THANK YOU FOR YOUR ATTENTION

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