

E-Leen Green OR

The 100% nature-based alternative to conventional preservatives
UNVEILING THE POWER OF ORANGE BIO-FLAVONOIDS
TO DETOXYFY YOUR SKIN



**COSMOS
APPROVED**

- ✓ **Antioxidant bio-flavonoids with free-radical scavenging effect**
- ✓ **Antimicrobial protection at pH 3 – 6.5 (bacteria and fungi)**
- ✓ **100% sustainably sourced – manufactured from agro-wastes**
- ✓ **Skin humectant**

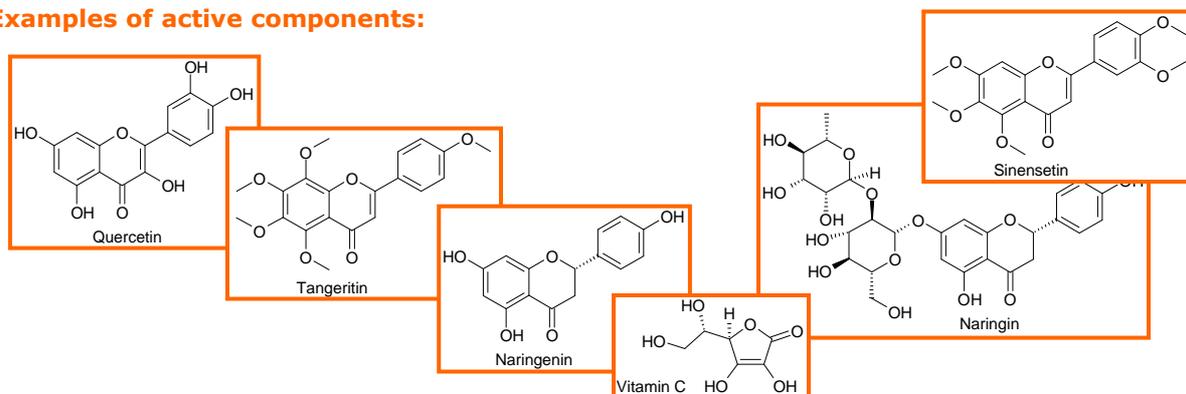
E-Leen Green OR is a **multifunctional ingredient** with a **broad spectrum anti-microbial activity**. It protects cosmetic formulations against microbial contamination.

E-Leen Green OR is a balanced composition of **humectants** and **bioflavonoids**. It is **free of listed preservatives** and especially suitable for **leave-on products** and **detox-concepts**.

Origin

- The **active ingredients** of **E-Leen Green OR** are **bioflavonoids** with **antioxidant and antimicrobial** properties. These are extracted with water and natural glycerin from the squeezed fruit remains of tangerines, bitter oranges and sweet oranges (grapefruits are not used). The Citrus fruits are cultivated according to **certified organic standards**.
- The **base-ingredient** of **E-Leen Green OR** is **bio-sourced** Pentylene Glycol, which has a **skin humectant** effect. It is manufactured starting from sugar cane bagasse. The production process follows the principles of green chemistry.

Examples of active components:



Specifications and characteristics

INCI names	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
CAS reg. N°	[5343-92-0]; [56-81-5]; [72968-50-4]; [8008-31-9]; [97766-30-8]; [50-81-7]; [77-92-9]; [79-33-4]
Appearance	Clear yellow liquid
Odour	Odourless or faint
Solubility	Hydrophilic, readily soluble in water and alcohol
Recommended pH of use	3.0 – 6.5
Recommended dose	1.0 – 3.0 % (max. 5.5 %)
Regulatory status	Globally approved; MSDS and RDS are available upon request
Origin, ISO 16128	- Derived-natural - Natural origin index: 1 - Contains 100 % renewable carbon

The above information is accurate to the best of our knowledge. Customers are advised to make their own studies on the usefulness of any ingredient for a particular application. Recommended usage information is only provided as indication and should not be considered as recommendations to use Minasolve's products in violation of any laws, patents, or official regulations dealing with manufacture, composition, local procedures, product design, or end usage.

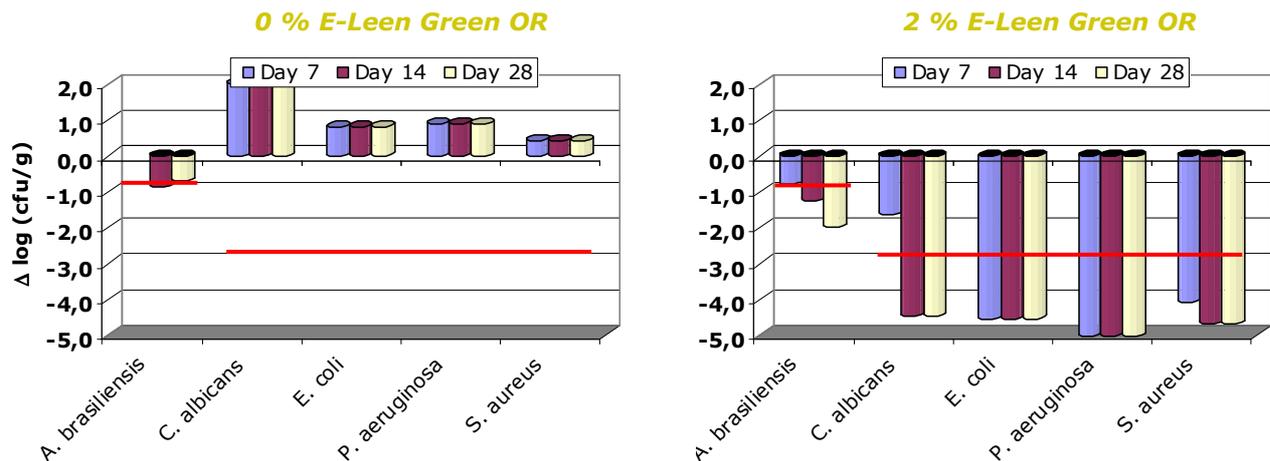
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Antimicrobial protection of an O/W-emulsion:

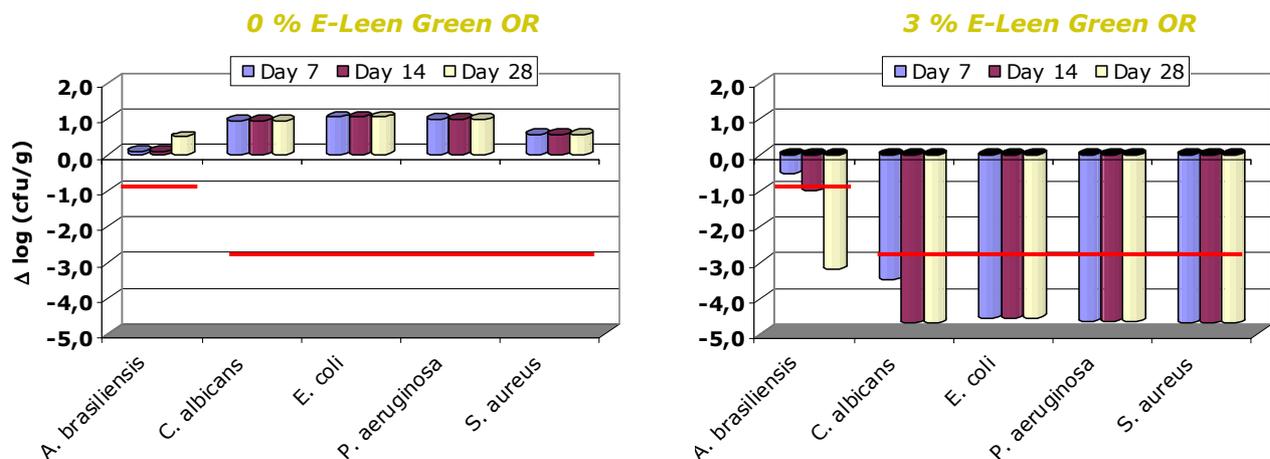
Phase	Ingredient	INCI name	%
A	Water	<i>Aqua</i>	ad 100.0
	Xanthan Gum ¹⁾	<i>Xanthan Gum</i>	0.5
B	Emulgade PL 68/50 ²⁾	<i>Cetearyl Glucoside (and) Cetearyl Alcohol</i>	5.0
	Shea Butter ³⁾	<i>Butyrospermum Parkii (Shea) Butter</i>	3.0
	Jojoba Oil ³⁾	<i>Simmondsia Chinensis (Jojoba) Oil</i>	3.0
	Hazelnut Oil ⁴⁾	<i>Corylus Americana (Hazel) Seed Oil</i>	3.0
C	Bioxan T70 ⁵⁾	<i>Tocopherol</i>	0.1
D	E-Leen Green OR ⁶⁾	<i>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</i>	2.0 (pH 5.5) or 3.0 (pH 6.5)
E	Citric Acid (25 % aq.) or Sodium Hydroxide (10 % aq.)	<i>Aqua (and) Citric Acid</i> or <i>Aqua (and) Sodium Hydroxide</i>	ad pH 5.5 or pH 6.5

1) Jungbunzlauer; 2) BASF; 3) Caesar & Loretz; 4) SanaBio; 5) BTSa, 6) MINASOLVE

Challenge Test results (ISO 11930) at pH 5.5 → fulfils criteria A of ISO 11930



Challenge Test results (ISO 11930) at pH 6.5 → fulfils criteria A of ISO 11930



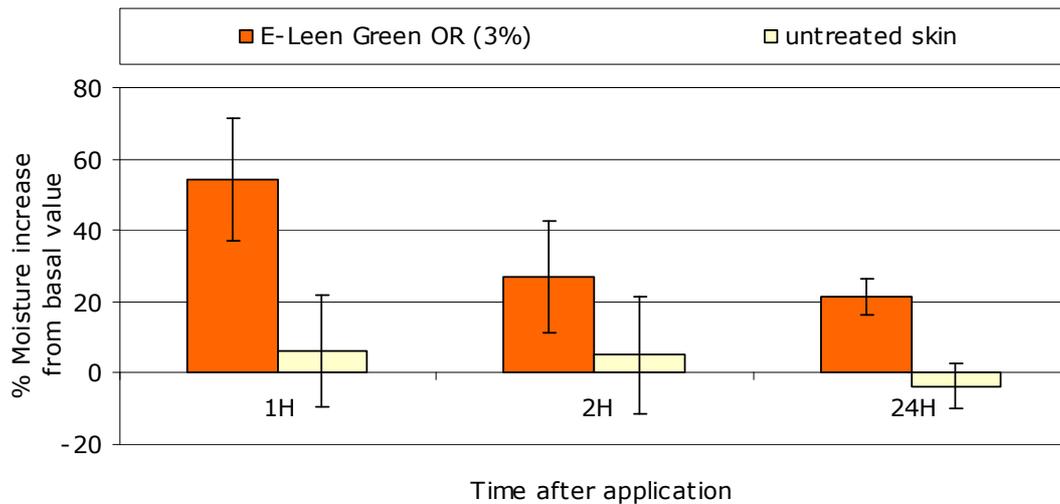
— = requirements of ISO 11930 for log (cfu/g) reduction within 28 days (criteria A)

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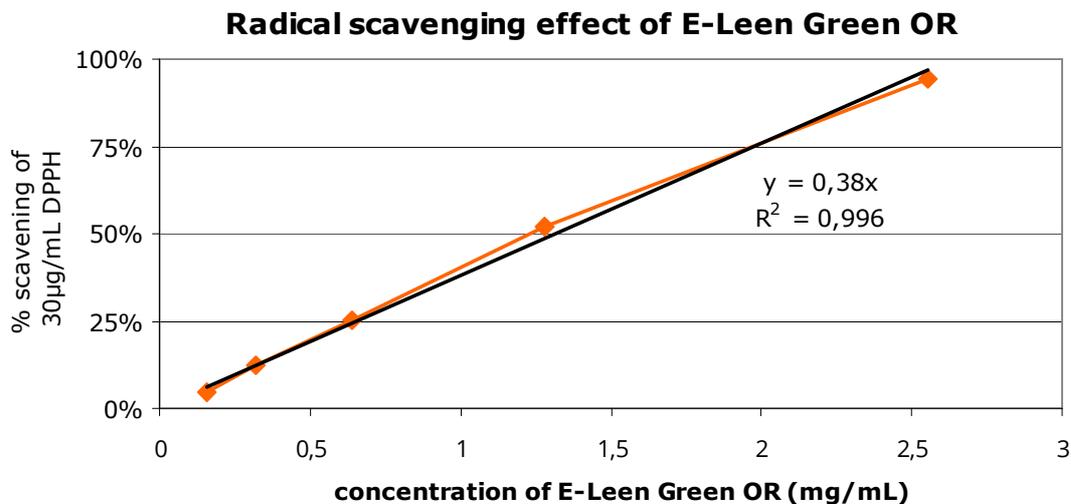
Skin Humectant

E-Leen Green OR has a **long-lasting moisturizing effect on skin**. Its humectant property was demonstrated in a clinical study over 24 hours. **E-Leen Green OR** was topically applied (2 mg/cm²) as a 3 % aqueous solution to the forearm areas of 15 panellists (male and female, aged 24-50 years). The skin hydration was measured before (0h) and after the treatment (1h, 2h and 24h), through corneometer technology. A significantly increased skin hydration was observed compared to untreated basal area:



Antioxidant

E-Leen Green OR contains Citrus-derived flavones and flavanones with well-known **anti-inflammatory** and **anti-oxidant properties**. The antioxidant effect of **E-Leen Green OR** is comparable e.g. to that of a 1 wt.-% solution of Resveratrol or Tocopherol. In a photometric assay **E-Leen Green OR** effectively scavenged a 30 µg/mL solution of the free radical DPPH with an EC₅₀-value of 1.3 mg/mL:



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Application

- ✓ **E-Leen Green OR** is soluble in water, alcohol and polar vegetable oils.
- ✓ **E-Leen Green OR** can be added at any stage of the production process. It is suitable for hot or cold processing, and it is compatible with most common cosmetic ingredients. For maximum efficacy it is preferably added after emulsification at ≤ 40 °C. Since the blend is slightly acidic, it may be advisable to add it to the formulation before the final pH-adjustment.
- ✓ **E-Leen Green OR** is recommended for formulations with a pH of ≤ 6.5 . Its activity will be maintained also at higher pH levels. However, a yellow discoloration can occur and the bio-flavonoids may get oxidized more easily by air oxygen.
- ✓ **E-Leen Green OR** is especially suitable for the protection of emulsions. It can also be used for single-phase products, but in such cases, it may be necessary to combine it with a second anti-fungal agent, such as e.g. an organic acid or an aromatic alcohol.
- ✓ **E-Leen Green OR** should not get in contact with strong oxidizing agents, such as hydrogen peroxide, as this will destroy the active components and/or lead to discoloration.

Further readings

- Barbulova A. et al., "New Trends in Cosmetics: By-Products of Plant Origin and Their Potential Use as Cosmetic Active Ingredients", *Cosmetics*, 2, 82-92, **2015**.
- Putnik P. et al., "Innovative "Green" and Novel Strategies for the Extraction of Bioactive Added Value Compounds from Citrus Wastes—A Review", *Molecules*, 22, 680, **2017**.
- Karsheva, M. e al., "Comparison of Citrus Peels as a Source of Valuable Components – Polyphenols and Antioxidants", *Journal of Chemical Technology and Metallurgy*, 48 (5), 475-478, **2013**.
- Konaté N. et al., "Sustainably Sourced Pentylene Glycol – a Green Allrounder", *SOFW Journal*, 142, 44-48, October **2016**.
- Pillai R. et al., "1,2-Alkanediols for Cosmetic Preservation", *Cosmetics & Toiletries Magazine*, 123 (10), 53-61, **2008**.
- Schnittger S. et al., "Use of alkanediols in personal care formulations – closer look at antimicrobial activity", *Proceedings of the SCC Annual Scientific Meeting & Technology Showcase*, New York, **2006**.

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