

A-Leen 5

A-Leen 5 is the new name for the **pioneering, sustainable, COSMOS- and NATRUE-approved** version of the **multifunctional ingredient Pentylene Glycol**.

A-Leen 5 is made from sugarcane bagasse, a renewable off-product from food production. The whole manufacturing process of **A-Leen 5** is **in accordance with the principles of "green-chemistry"**.

A-Leen 5 combines the performance of Pentylene Glycol with an enhanced emphasis on social responsibility and environmental protection. Hence, **A-Leen 5** represents a unique option to **replace a formerly petroleum-based ingredient by a nature-derived version**.

A-Leen 5 is **especially suitable for natural cosmetic products**, which is highlighted by a range of **"green" formulations: Wellbeing Body Cream, Wellbeing Body Scrub, and Wellbeing Body Oil**. (Samples and recipes are available upon request).

Functions

- Emollient
- Skin humectant
- Solubilizer
- Antimicrobial protection agent

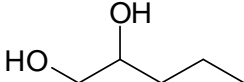
Applications

- Skin care
- Hair care
- Make-up
- Perfumes & Toiletries

Performances:

- **A-Leen 5** provides a **pleasant, non-tacky and non-oily skin feel**.
- **A-Leen 5** is a **skin moisturizer** with a long lasting effect comparable to that of Glycerin.
- **A-Leen 5** can help to solubilize and stabilize lipophilic ingredients in aqueous solutions.
- **A-Leen 5** shows a **broad-spectrum antimicrobial activity** against yeasts, moulds, and bacteria. It disturbs the integrity of microbial cell membranes, a mechanism of action that is unlikely to be affected by resistance. Being a non-ionic ingredient, the anti-microbial effect of **A-Leen 5** is largely **pH-independent**.
- **A-Leen 5** can act as a **standalone antimicrobial protection agent**. In addition, it can be easily combined with other classical or non-classical antimicrobial agents, to **boost** their **preservation effects**.

Specifications and characteristics

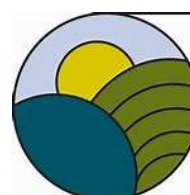
INCI name	Pentylene Glycol	Chemical structure 
CAS reg. N°	[5343-92-0]	
Recommended pH of use	2.0 – 12.0 (unlimited)	
Recommended use level	0.5 to 5.0 %	
Appearance	Clear colourless liquid	Regulatory status Globally approved. Safety and regulatory data sheets are available upon request.
Odour	Odourless or faint	
Purity (GC)	Min. 99.0 area-%	
Water content	Max. 1.0 mass-%	
Melting point	< - 30 °C	
Boiling point	206 °C	
Origin, ISO 16128	- Derived natural - Natural origin index: 1 - 100 % renewable carbon	



**NATRUE
APPROVED**



**COSMOS
APPROVED**



**USDA
CERTIFIED
BIOBASED
PRODUCT**
PRODUCT 100%

A-Leen 5

Antimicrobial performance: Microbial challenge tests according to ISO 11930

1) Formulations

a) O/W-emulsion, pH 5.5 (A-Leen 5 as a booster for Caprocin)

Phase	Ingredient	INCI name	%
A	Water	<i>Aqua</i>	ad 100
	Xanthan Gum ⁽¹⁾	<i>Xanthan Gum</i>	0.50
	Caprocin ⁽²⁾	Capryloyl Glycine	2.00
	A-Leen 5 ⁽²⁾	Pentylene Glycol	2.00
B	Emulgade PL 68/50 ⁽³⁾	<i>Cetearyl Glucoside (and) Cetearyl Alcohol</i>	5.00
	Shea Butter ⁽⁴⁾	<i>Butyrospermum Parkii (Shea) Butter</i>	3.00
	Joboba Oil ⁽⁴⁾	<i>Simmondsia Chinensis (Jojoba) Oil</i>	3.00
	Hazelnut Oil ⁽⁵⁾	<i>Corylus Avellana (Hazel) Seed Oil</i>	3.00
C	Bioxan T70 ⁽⁶⁾	<i>Tocopherol</i>	0.10
D	Citric Acid (50%)	<i>Citric Acid (and) Aqua</i>	ad pH 5.5

b) Wellbeing body cream, pH 5.3 (A-Leen 5 as a standalone preservative)

Phase	Raw material	INCI name	%
A	Water	<i>Aqua</i>	Ad 100
B Premix	A-Leen 5 ⁽²⁾	Pentylene Glycol	3.0
	Xanthan Gum ⁽¹⁾	<i>Xanthan Gum</i>	0.3
C	Emulium Kappa 2 ⁽⁷⁾	<i>Candellila/Jojoba/Rice Bran Polyglyceryl-3 Esters (and) Glyceryl Stearate (and) Cetearyl Alcohol (and) Sodium Stearoyl Lactylate</i>	1.5
	Glyceryl Monostearate	<i>Glyceryl Monostearate</i>	2.3
	TEGO Care PS ⁽⁸⁾	<i>Methyl Glucose Sesquistearate</i>	1.2
	Jojoba Oil ⁽⁴⁾	<i>Simmondsia Chinensis (Jojoba) Seed Oil</i>	5.0
	Almond Oil ⁽⁴⁾	<i>Prunus Amygdalus Dulcis (Sweet Almond) Oil</i>	4.0
	Cocoa Butter ⁽⁴⁾	<i>Theobroma Cacao Butter</i>	3.0
	BergaCare FG 5 ⁽⁹⁾	<i>Ethylhexyl Palmitate (and) Ethylhexyl Stearate (and) Hydrogenated Olive Oil (and) Caprylic/Capric Triglycerides</i>	2.0
	Grape Seed Oil ⁽⁴⁾	<i>Vitis Vinifera (Grape) Seed Oil</i>	4.0
	Beeswax	<i>Cera Alba</i>	1.5
D	Celebration Fitness ⁽¹⁰⁾	<i>Parfum</i>	0.1
	DL- α -Tocopherol (>97%)	<i>Tocopherol</i>	0.1

Raw materials suppliers:

⁽¹⁾ Jungbunzlauer
⁽²⁾ **Minasolve**
⁽³⁾ BASF

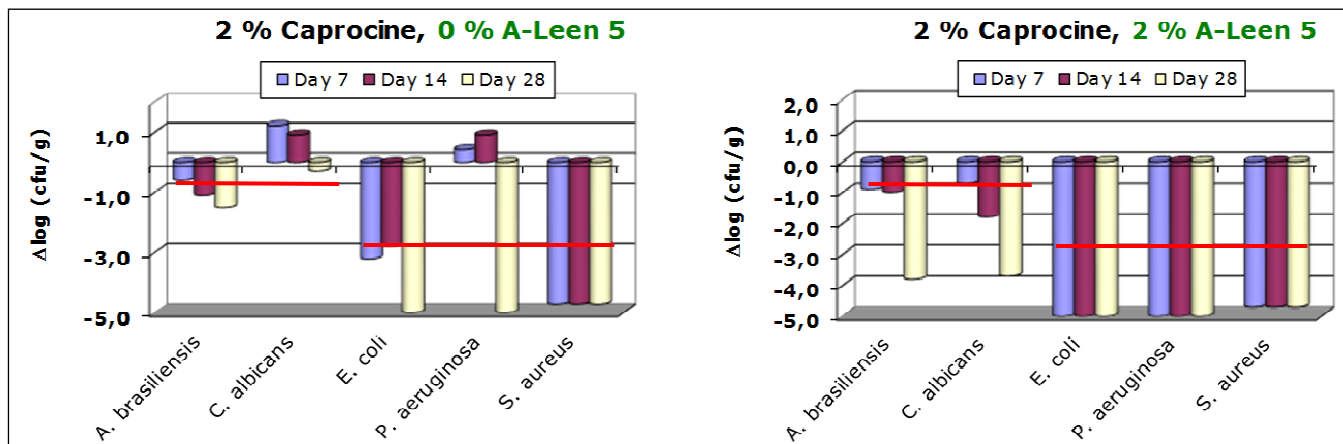
⁽⁴⁾ Caesar & Loretz
⁽⁵⁾ SanaBio
⁽⁶⁾ BTSA
⁽⁷⁾ Gattefossé

⁽⁸⁾ Evonik
⁽⁹⁾ Berg + Schmidt
⁽¹⁰⁾ Luzi

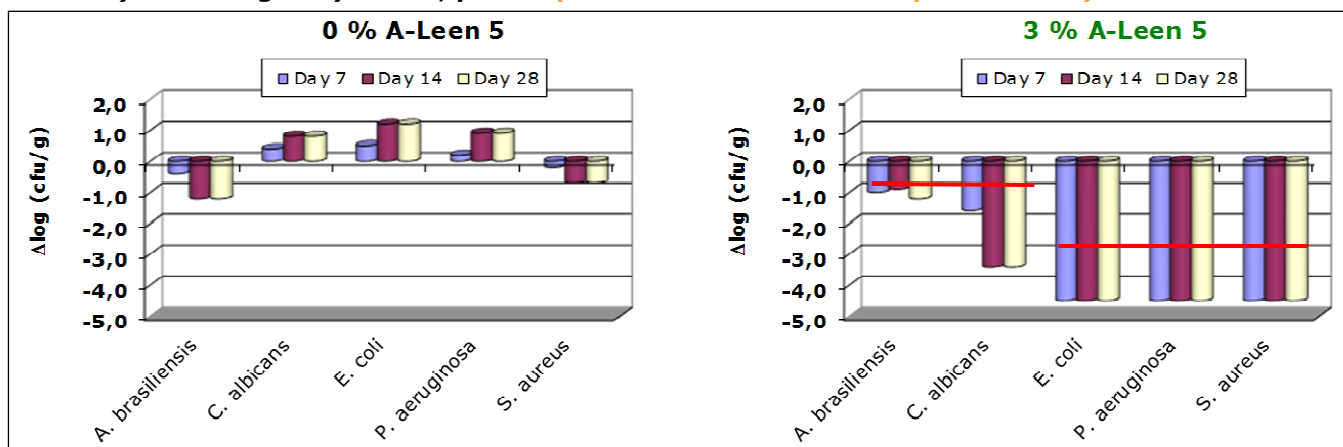
A-Leen 5

2) Results

a) O/W-emulsion, pH 5.5 (A-Leen 5 as a booster for Caprocin®)



b) Wellbeing body cream, pH 5.3 (A-Leen 5 as a standalone preservative)



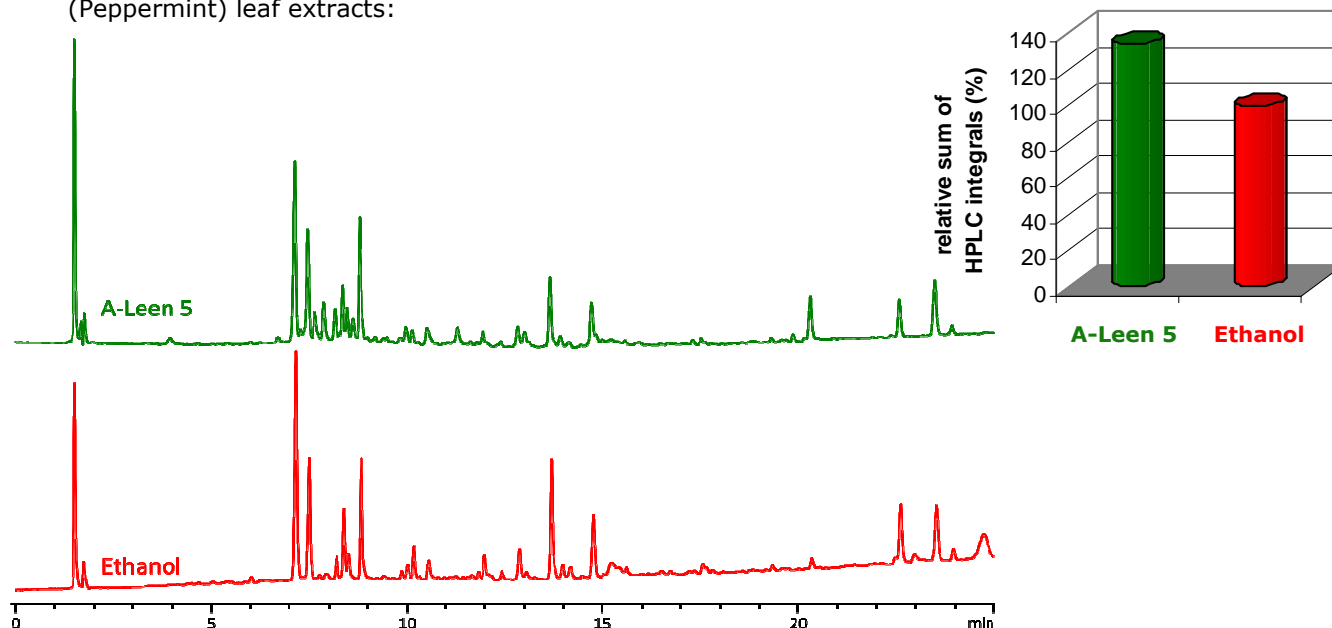
— ISO 11930 requirements for log (cfu/g) reduction after 28 days (criteria A)

→ **A-Leen 5** can act as an effective preservative **booster** (example a), and also as a **standalone preservative** (examples b).

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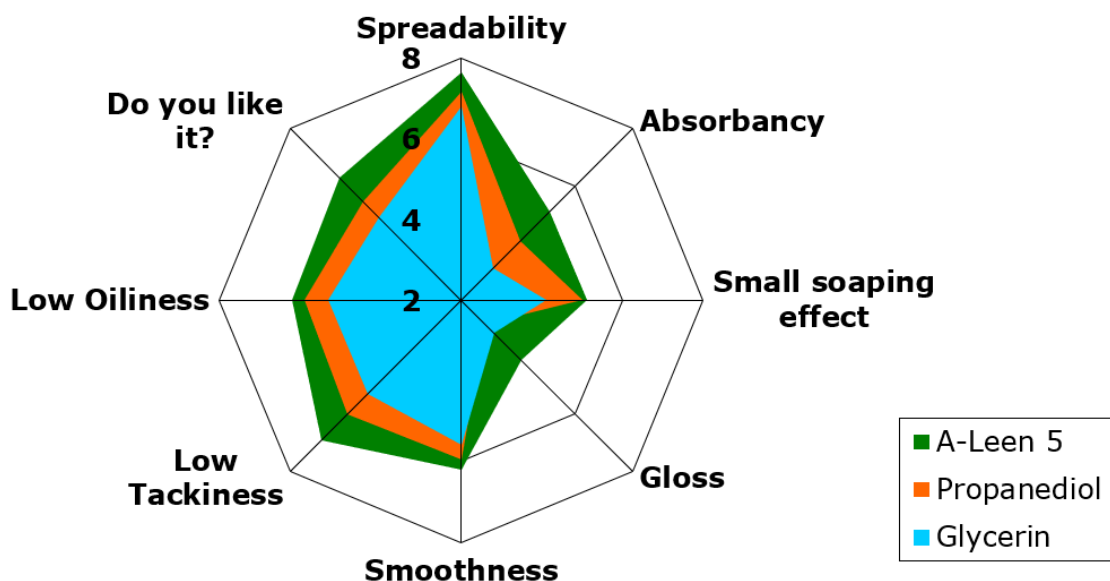
Solubilizing and extraction properties

A-Leen 5 was evaluated as an extraction solvent in comparison with ethanol. In batch extraction tests at 70-80 °C, both green solvents showed similar **extraction efficacies and selectivities**. These properties have been demonstrated by HPLC analysis, as shown below for *Mentha × piperita* (Peppermint) leaf extracts:



Sensory profile – consumer study

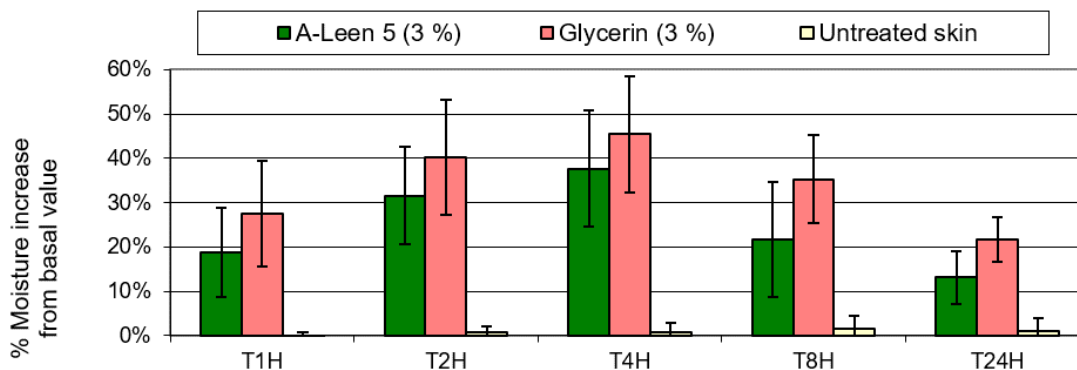
As an emollient, **A-Leen 5** provides an overall **pleasant skin feel** to cosmetic formulations. Its favorable impact on various sensorial properties was shown in a consumer study, where three different moisturizers were tested at 3 % in an O/W-emulsion, by 23 volunteers. As a conclusion, the sensorial impact of **A-Leen 5** was preferred by the panellists, demonstrating its **superior skin conditioning and in-use properties**:



A-Leen 5

Corneometry study – consumer study (PhD Trials, Lisbon)

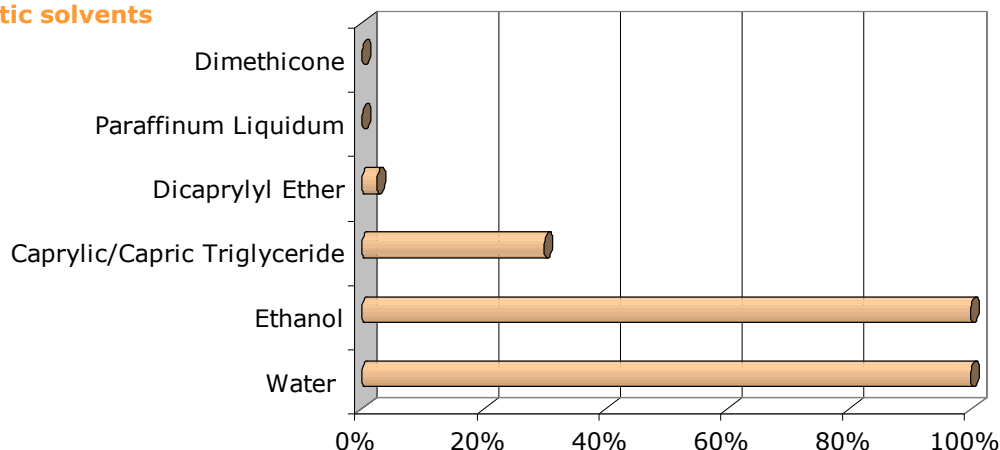
A-Leen 5 shows a **long lasting moisturizing effect** similar to that of Glycerin, in a comparative study where both substances were applied as an aqueous solution to the forearm area.



Applications in cosmetic formulations

- **A-Leen 5** is an **easy to handle liquid**. It can be added directly to the water phase, but it can also be mixed with vegetal oils. For optimum antimicrobial efficacy in emulsions, it should be added either to the aqueous phase or at the post-emulsification stage.
- **A-Leen 5** is an effective **skin humectant** with **emollient** properties, making it a versatile **skin-conditioning** agent in cosmetic products.
- **A-Leen 5** can act as a **solubilizer** and as a **solvent for extraction**; it can be used to disperse **gelling agents**, such as Xanthan Gum, in order to **shorten hydration times**.

Solubility in cosmetic solvents



Further readings

- Konaté N. et al., "Sustainably Sourced Pentylene Glycol – a Green Allrounder", *SOFW Journal*, 142, 44-48, October **2016**.
- Bergfeld W.F. et al., "Final Report of the Cosmetic Ingredient Review on the Safety Assessment of 1,2-Glycols as Used in Cosmetics", *Cosmetic Ingredient Review*, **2011**.
- Pillai R. et al., "1,2-Alkanediols for Cosmetic Preservation", *Cosmetics & Toiletries Magazine* **2008**, 123 (10), 53-61.
- 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**.