



MINASOLVE[®]
BIO-INGREDIENTS FOR YOUR APPLICATIONS

**green
solving
attitude.**

From Biomass to COSMETIC Sustainable Multifunctional Ingredients and Solutions.

Bio-based chemistry is penetrating all market segments and is promoted more and more to consumers of final products. Cosmetic and beauty care are industries where this trend is strongly growing and provides challenges to the key players to develop new formulations in line with consumer demands. New formulations mean new ingredients with a stronger sustainable approach for the production of the raw material and the final products. **Minasolve® is helping in such achievement by proposing bio-ingredients developed under green chemistry principles** to cope with market demands and customer focus. **One of the key ingredients** developed for this market segment is **A-Leen 5** (INCI name Pentylene Glycol) which has been developed and produced with a proprietary process established by Minasolve®'s sister company Pennakem, specialized in furfural chemistry. This bio-based ingredient has now proven its versatility in its use in cosmetic formulations and brings multiple properties to the final products. This bio-based ingredient, **odourless**, GMO free, first of its kind in the 1,2-alkanediol range, has been awarded the silver award for Green Ingredients at in-cosmetics 2014 in Hamburg.

A particular challenge of today is the cost-effective production of self-preserved cosmetic products for the mass-market. In order to meet this demand, Minasolve offers now three cost-optimized and easy to use solutions: **EasySafe P8**, **EasySafe GC 8** and **EasySafe OC 8**. Each of these ingredients is based on safe, mild and undisputed components, all three of them being effective at low dosage. Together these novel ingredients provide a versatile tool-box to the formulator, helping to meet the latest market expectations in terms of safety and "clean labelling".

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Production

Today's general environmental and human safety concerns, associated with the growing global trend for sustainable production, have led to more and more interest in the development of high value ingredients in accordance with the principles of green chemistry.

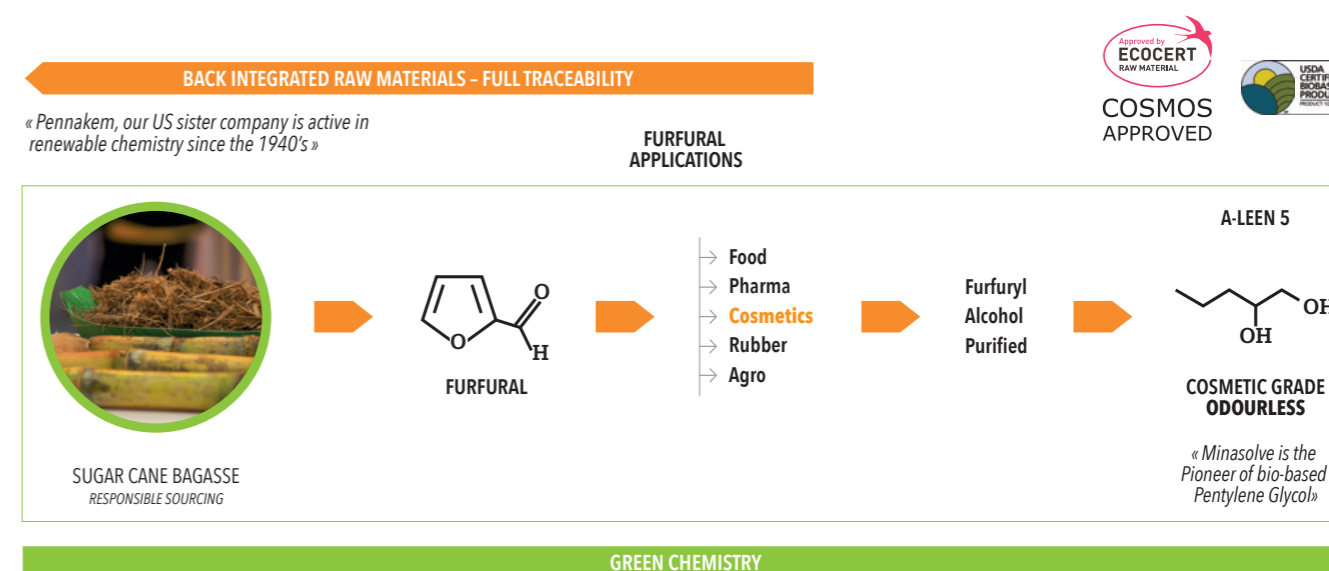
Pennakem, which has been active in renewable chemistry since the 1940s, and Minasolve®, a sister company in the Minafin group, have jointly developed a new, efficient and cost effective process to deliver high volumes of the multifunctional compound, bio-based 1,2-pentanediol (INCI name Pentylene Glycol). Minasolve® is marketing this ingredient under the brand name A-Leen 5 for personal care and other applications.

Pennakem has developed a proprietary green manufacturing process to produce **odourless bio-based 1,2-pentanediol** which is based on valorizing the natural waste material sugar cane bagasse and which

uses renewable chemistry to create a high quality cosmetic ingredient.

The growing interest of personal care formulators in using this ingredient is confirmed by the growth of new product launches during the past few years. According to Mintel, the number of new products containing pentylene glycol has grown from 1000 in 2010 to 1500-1600 in the last three years. Additionally, the number of new products claiming "no parabens" almost doubled from under 200 in 2010 to nearly 400 last year.

The anti-microbial activity profile of A-Leen 5 is equivalent to its petrochemical-based analogues. The suitability of A-Leen 5 as an anti-microbial protection agent for typical cosmetic products has been demonstrated in microbial challenge tests in accordance to ISO 11930 standards.



CONCLUSIONS

The development of an efficient, green, and cost effective process to produce large volumes of bio-based 1,2-pentanediol results from the trend towards sustainable growth in many different global markets. A key multifunctional ingredient for personal care and cosmetic products has been developed in the quest for safer preservation and sensory improvement systems and to support the growing market demand for

natural ingredients. A-Leen 5 answers customers' expectations for better environmental respect and social responsibility. It can easily be used to substitute petrochemical-based additives in current cosmetic products and consequently easily improves the natural index of the product. This innovative achievement won the silver Green Ingredients Award at In-Cosmetics 2014.

Green Extraction Solvent

Bio-based cosmetic formulations are becoming increasingly popular. The most commonly used natural ingredients are extracts from plant materials. A key decision in the production of truly sustainable extracts is the choice of the extraction solvent.

A-Leen 5 (INCI name Pentylene Glycol) is a non-volatile hydrophilic/amphiphilic solvent. It can be favorably used as a (co)extraction agent and solvent for herbal ingredients:

- ▶ **The amphiphilic nature** of A-Leen 5 ensures that both polar and non-polar constituents are extracted from plant materials and **stabilized inside the extract**. The extraction power of A-Leen 5 is comparable to that of ethanol (Figure A/B).
- ▶ A-Leen 5 **can be easily combined with water as extraction agent**, which lowers the viscosity and **enhances the cost effectiveness**. The solubilization properties of A-Leen 5 are largely maintained, even at higher levels of water.
- ▶ A-Leen 5 has a relatively **low volatility** with a boiling point of 206 °C. Extractions at high temperature can be carried out under atmospheric pressure.
- ▶ **The attractive skin conditioning effects** of A-Leen 5 make it possible to add the obtained extracts directly into cosmetic formulations. It is not necessary anymore to remove any extraction solvent that is possibly not skin friendly. **Energy-intensive solvent exchanges can be omitted**.
- ▶ Thanks to the antimicrobial activity of A-Leen 5, extracts containing at least 5% of A-Leen 5 **are self-preserved**. Microorganisms potentially present on vegetal materials are effectively killed, and the extracts are well protected against a re-infestation by microbes.

Figure A

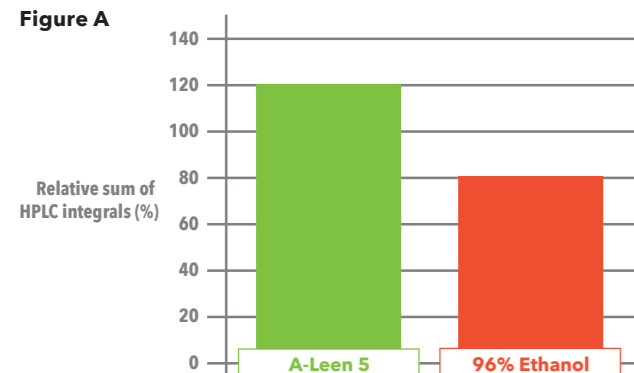


Figure B

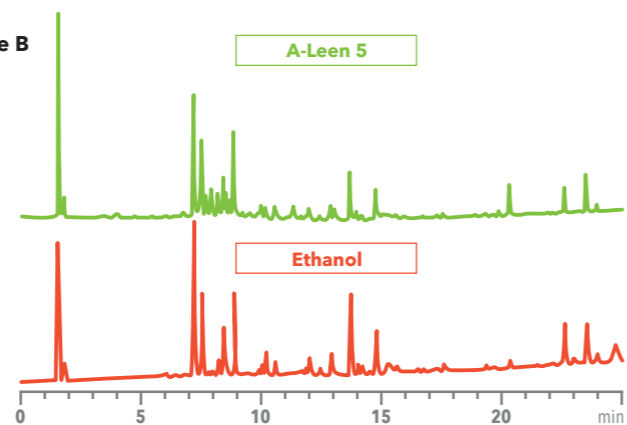


Figure A highlights the application of A-Leen 5 in comparison with Ethanol as solvent for the extraction of peppermint leaves. For each extraction, 10 g of plant materials were suspended in 50 g of extraction solvent. The mixtures were heated and stirred at 75-80°C for 15 minutes. After cooling, the solid constituents were filtered off and the filtrates were analyzed by HPLC. In conclusion, A-Leen 5 and Ethanol showed comparable performances as extraction solvents.

Figure B: Qualitative and semi-quantitative HPLC-analysis (UV detection at 254 nm) of Peppermint leave extracts obtained by using A-Leen 5 and Ethanol as extraction agents.

CONCLUSION : A-Leen 5 is an innovative green extraction solvent that enables to increase the Natural Origin Index of cosmetic formulations.

A-Leen Aroma-3 & E-Leen Green A

Two universal solutions for natural antimicrobial protection over a large pH range.

There is a general and steadily growing demand from consumers for safe, mild and nature-based cosmetics. These products should be self-preserved, as well as free of harsh preservatives and allergens. Minasolve offers two novel solutions to protect these kinds of modern formulations:

A leen® Aroma-3

INCI: Phenylpropanol

A-Leen Aroma-3 is a nature-derived version of Phenylpropanol, a fragrance component naturally occurring in flowers and fruits – such as Hyacinths, Narcissus and ripe strawberries.

A-Leen Aroma-3 is a mild perfuming agent. It brings a comfortable, balsamic and spicy oriental note to personal care products.

A-Leen Aroma-3 also shows a broad spectrum anti-microbial activity that helps to protect all kinds of cosmetic products against microbial degradation. This activity is largely pH-independent.

A-Leen Aroma-3 is produced starting from Cassia essential oil, which is traditionally obtained by steam distillation from the leaves and branches of the Chinese cinnamon tree *Cinnamomum cassia*. The full manufacturing process of A-Leen Aroma-3 is in accordance with the principles of “green-chemistry” and complies with the standards COSMOS and NATRUE.

A-Leen Aroma-3 is free of fragrance allergens and free of listed preservatives.

E leen® Green A

INCI: Pentylene Glycol, Phenylpropanol

E-Leen Green A is a novel, synergistic combination of nature-based Pentylene Glycol (A-Leen 5) and nature-based Phenylpropanol. The mixture represents a cost-effective solution to obtain completely self-preserving cosmetic products.

Both constituents of E-Leen Green A are produced by means of “green chemistry” and thus meet the requirements of the natural cosmetics standards COSMOS and NATRUE.

E-Leen Green A is skin-moisturizing, skin conditioning and mildly perfuming. Its antimicrobial effect is largely independent of the pH value.

E-Leen Green A is water-soluble up to 3% and therefore suitable for clear, water-based products. By combination with Pentylene Glycol, the lipophilic Phenylpropanol remains predominantly in the water phase of emulsions. This circumstance contributes significantly to the broad antimicrobial effect of E-Leen Green A.

EasySafe P8 / GC 8 / OC 8

Three optimized and cost-effective solutions for alternative formula protection

Safety is key in the design of consumer products, regardless of their sales price. Minasolve® therefore offers three new solutions for alternative formula protection. They are based on the cost-effective multifunctional ingredient Octiol (INCI name Caprylyl Glycol). All three solutions are temperature-stable and easy to use liquids.

EasySafe P8

The alternative for ultimate performance

INCI: Caprylyl Glycol, Phenylpropanol

EasySafe P8 provides broad-spectrum protection, also at high pH-values. It combines two multifunctional ingredients: Caprylyl Glycol, a wellknown skin humectant, and Phenylpropanol, an aroma compound naturally occurring in flowers and fruits. EasySafe P8 is also well suitable for clear, water-based products.

EasySafe GC 8

Mild, safe and versatile protection

INCI: Caprylyl Glycol, Glycerol Caprylate/Caprates, Glycerin

EasySafe GC 8 is designed to protect mild and low-odour formulations. It is based on Glycerol Caprylates and Caprates derived from vegetable oils. These mild skin care agents have refatting and co-emulsifying properties. EasySafe GC 8 has a broad-spectrum antimicrobial effect. It can also help to avoid thinning effects which may be caused by Caprylyl Glycol in some formulations.

EasySafe OC 8

The eco-friendly preservative solution

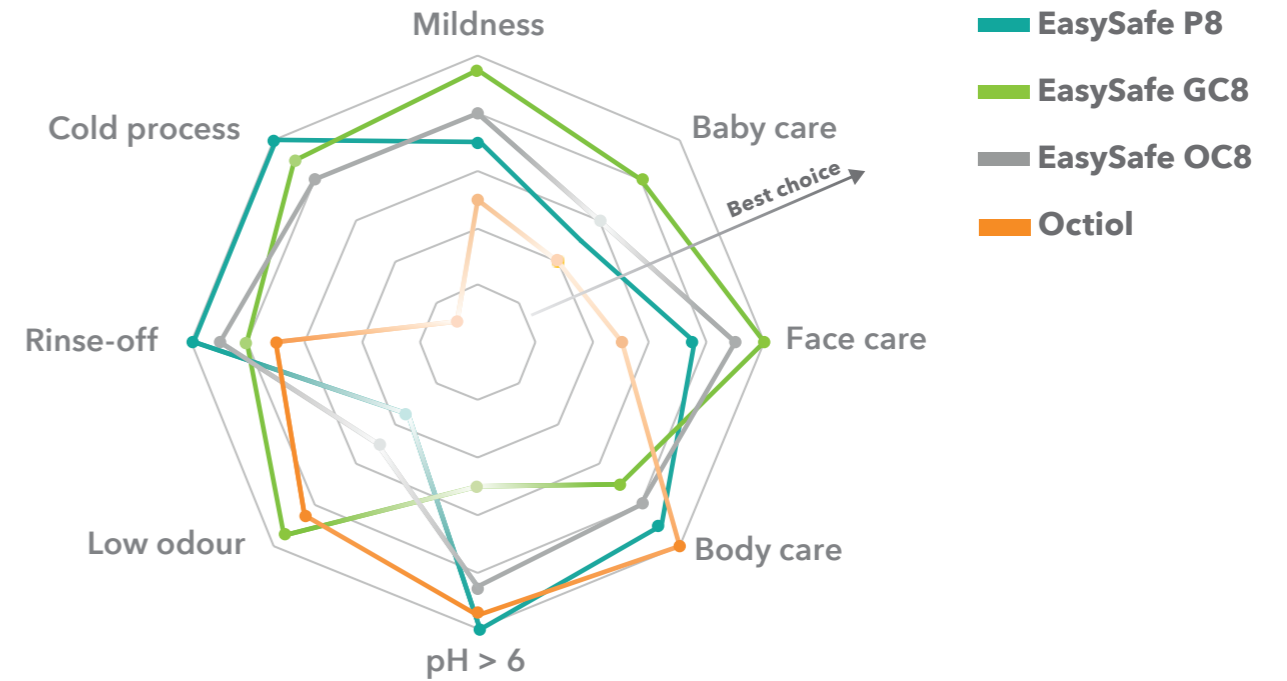
INCI: Caprylyl Glycol, Phenylpropanol, o-Cymen-5-ol

EasySafe OC 8 is an eco-friendly alternative to out-of-time preservatives, such as Triclosan or Triclocarban. EasySafe OC 8 combines three mild ingredients, resulting in a powerful antimicrobial and anti-oxidant activity. Among them is the skin-friendly preservative o-Cymen-5-ol, an isomer of thymol - the active molecule of thyme. EasySafe OC 8 is of low odour and free of halogen-containing compounds. The antimicrobial effect of EasySafe OC 8 is largely pH-independent.



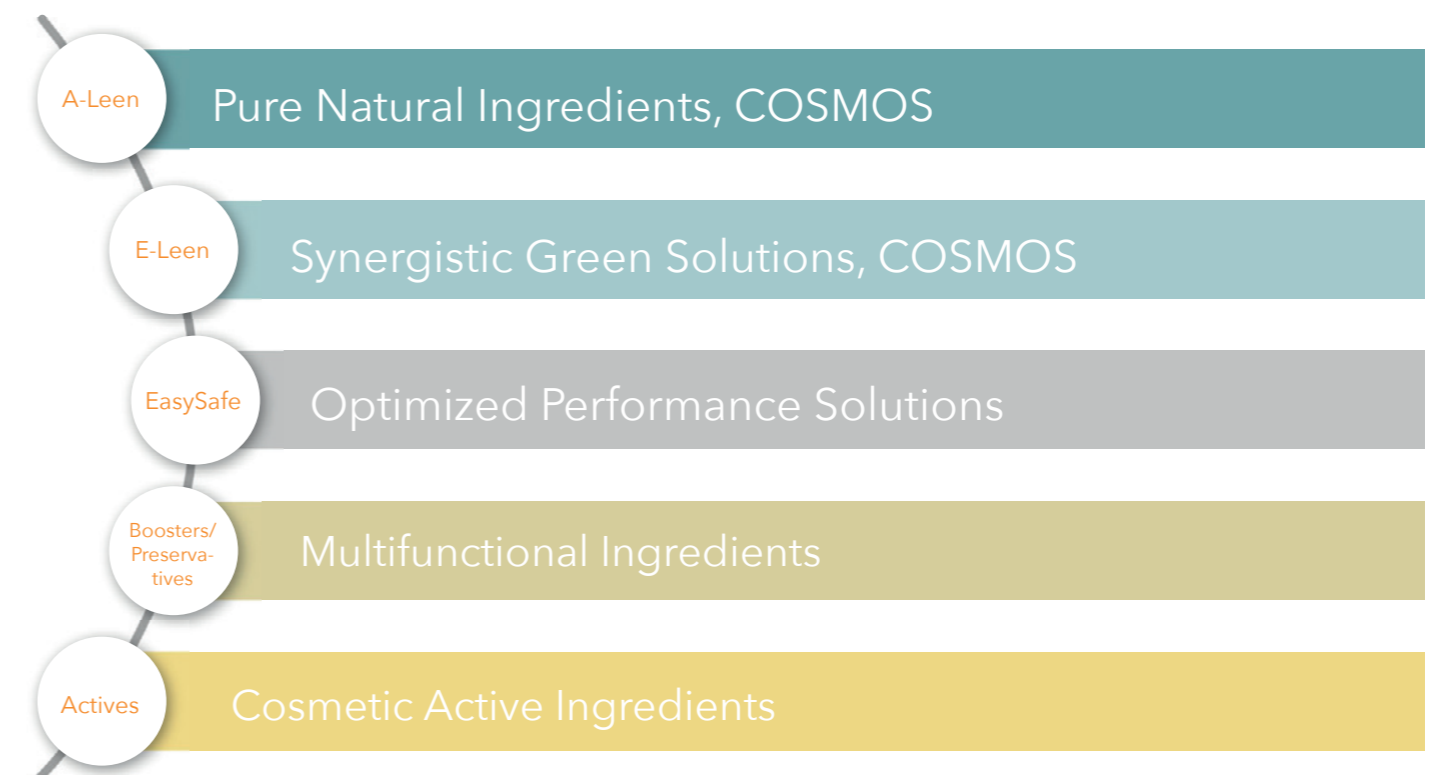
EasySafe Selector

In order to simplify the choice of the best ingredient for your project, we have created a simple selection tool. It provides a first recommendation for the most appropriate EasySafe candidate versus pure Octiol, based on specific applications and key criteria.



Our Product Portfolio

In 2019, Minasolve will pursue its goal: becoming your key partner for Green Solutions. In order to reach this objective, we are pleased to propose the following range of products



Our Product Range

A-Leen, E-Leen, EasySafe and Boosters/Preservatives

FORMULA PROTECTION

	INCI	ORIGIN	ECOCERT	COSMOS APPROVED	NATRUE COMPLIANT	REGULATORY STATUS	DESCRIPTION	FORM/ODOUR	ANTIMICROBIAL ACTIVITY	PH RANGE	RECOMMENDED USE LEVEL	FORMULATION GUIDELINES
A-Leen												
A-Leen 5	Pentylene Glycol	Derived-natural	✓	✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Derived-natural emollient & moisturizer. Preservative booster. Extraction solvent & solubilizer. Excipient for gelling agents.	Clear, colourless liquid Odourless	Bacteria, Yeast and Mold (Booster)	3.0 ▶ 10.0	0.5 ▶ 5.0%	For optimum efficacy of preservation, it should be added to emulsions at the post-emulsification stage.
A-Leen Aroma-3	Phenylpropanol	Derived-natural		✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Nature-derived perfuming agent with pH-independent antimicrobial effect. Free of listed preservatives and fragrance allergens. NEW 2018	Clear, colourless liquid Characteristic odour	Bacteria, Yeast and Mold (Booster)	3.0 ▶ 10.0	0.5 ▶ 1.0%	Soluble in water up to 0.5%, miscible with alcohols and polar oils; should be added to emulsions at the post-emulsification stage for optimum anti-microbial efficacy.
E-Leen												
E-Leen Green A	Pentylene Glycol, Phenylpropanol	Derived-natural		✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Non ionic, preservative-free and nature-derived antimicrobial blend. Contains A-Leen 5 and natural origin Phenylpropanol. NEW 2018	Clear, colourless liquid / Sweet, floral	Bacteria, Yeast and Mold	3.0 ▶ 10.0	1.0 ▶ 3.0%	Water soluble up to 3%. Suitable for cold and hot processes
E-Leen Green B	Pentylene Glycol, Water, Sodium Benzoate, Benzoic Acid	Derived-natural	✓	✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Anionic broad spectrum antimicrobial, ideal for low pH formulations. Contains A-Leen 5	Clear, colourless liquid / Odourless or faint	Bacteria, Yeast and Mold	3.0 ▶ 6.0	1.0 ▶ 3.0% (max. 5%)	Water soluble. Suitable for cold and hot processes. The lower the pH, the stronger the activity.
E-Leen Green C	Pentylene Glycol, Glyceryl Caprylate/Caprates	Derived-natural	✓	✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Non ionic, preservative-free antimicrobial blend. 100% nature-derived. Contains A-Leen 5.	Clear, colourless liquid / Odourless or faint	Bacteria, Yeast, Fungistatic against Mold	4.0 ▶ 7.0	1.0 ▶ 3.0%	Dispersible in water. Suitable for cold and hot processes.
E-Leen Green OR	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	Derived-natural		✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Non ionic, multifunctional ingredient with antimicrobial and antioxidant properties. Contains A-Leen 5 & Citrus extracts. Preservative-free, water-soluble and 100% nature-derived. NEW 2018	Clear, yellow liquid / Odourless or faint	Bacteria, Yeast and Mold	3.0 ▶ 6.5	1.0 ▶ 3.0%	Water soluble. Suitable for cold and hot processes. Keep product pH <= 6.5
EasySafe												
EasySafe Green A	Pentylene Glycol, Phenylpropanol	Derived-natural				Europe, USA, Canada, Australia, China, Japan, Korea	Non ionic, preservative-free antimicrobial blend. Contains A-Leen 5 and aromatic compound.	Clear, colourless liquid / Sweet, floral	Bacteria, Yeast and Mold	3.0 ▶ 10.0	1.0 ▶ 3.0%	Water soluble up to 3%. Suitable for cold and hot processes.
EasySafe Hexam+	Pentylene Glycol, Water, Hexamidine Diisethionate	Derived-Natural				Europe, USA, Canada, Australia, China, Korea	Boosted liquid form of MinaSolve® Hexam with A-Leen 5. Cationic antimicrobial blend with skin moisturising properties. For sensitive skin & baby applications.	Clear, colourless liquid / Odourless or faint	Bacteria, Yeast and Mold	3.0 ▶ 6.5	0.2 ▶ 2% / max. 1.0% eye & oral care	Water soluble. Suitable for cold and hot processes. Can be added at any stage of the formulation, as long as the product is kept at pH 3-6.5.
EasySafe GC 8 NEW 2019	Caprylyl Glycol, Glyceryl Caprylate/Caprates, Glycerin	Derived-natural				Europe, USA, Canada, Australia, China, Japan, Korea	Nature-derived antimicrobial blend - efficient, non-ionic and preservative-free, for mild and low odour formulations	Clear, colourless or slightly yellow liquid / Odourless or faint	Bacteria, Yeast and Mold	4.0 ▶ 7.0	0.5 ▶ 2.0%	Can be added to aqueous phases containing surfactants, or at the end, e.g. after emulsification
EasySafe OC 8 NEW 2019	Caprylyl Glycol, Phenylpropanol, o-Cymen-5-ol	Non-Natural				Europe, USA, Canada, Australia, China, Japan, Korea	Preservative blend, boosting the effect of o-Cymen-5-ol, easy to use liquid, bio-degradable alternative to Triclosan	Clear, colourless liquid/ faint aromatic odour	Bacteria, Yeast and Mold	3.0 ▶ 8.0	0.5 ▶ max. 1.5%	Can be added to aqueous phases containing surfactants, or at the end, e.g. after emulsification
EasySafe P8 NEW 2019	Caprylyl Glycol, Phenylpropanol	Non-Natural				Europe, USA, Canada, Australia, China, Japan, Korea	Cost-effective antimicrobial blend based on Octiol, non-ionic and preservative-free, suitable also for high pH, easy to use	Clear, colourless liquid/ faint aromatic odour	Bacteria, Yeast and Mold	3.0 ▶ 10.0	0.5 ▶ 1.5%	Can be added to aqueous phases containing surfactants, or at the end, e.g. after emulsification

BOOSTER/PRESERVATIVES

	INCI	ORIGIN	ECOCERT	COSMOS APPROVED	NATRUE COMPLIANT	REGULATORY STATUS	DESCRIPTION	FORM/ODOUR	ANTIMICROBIAL ACTIVITY	PH RANGE	RECOMMENDED USE LEVEL	FORMULATION GUIDELINES
BOOSTER / PRESERVATIVES												
Caprocine	Capryloyl Glycine	Derived-natural	✓			Europe, USA, Canada, Australia, China, Japan, Korea	Anionic multifunctional ingredient with antimicrobial properties.	White crystalline powder	Bacteria and Mold (weak on C. albicans)	4.0 ▶ 7.0	0.5 ▶ 2.0%	Dissolve in hot water or in cold alkaline water (pH > 7.0).
MinaSolve CapEasy	Water, Capryloyl Glycine, Sodium Bicarbonate	Derived-natural	✓			Europe, USA, Canada, Australia, China, Japan, Korea	Self preserved, aqueous solution of Caprocine (~30% a.i.). Multifunctional with antimicrobial properties.	Clear, colourless liquid / Odourless or faint	Bacteria and Mold (weak on C. albicans)	4.0 ▶ 7.0	1.5 ▶ 7.0%	Can be added at any stage of the formulation. No heating, premixing, or pH-adjustment is needed for dissolution.
MinaSolve Hexam	Hexamidine Diisethionate	Non-Natural				Europe, USA, Canada, Australia, China, Korea	Cationic, mild antimicrobial & antiseptic. Recommended for sensitive skin & suitable for baby applications. ECO-IMPROVED PROCESS	White or slightly yellow powder	Bacteria, Yeast and Mold	3.0 ▶ 6.5	0.01 ▶ 0.1% / max. 0.05% eye & oral care	Dissolve into the water phase, or make a premix in water or a diol. Keep the pH of the product at 3-6.5.
Hexiol	1,2-Hexanediol	Non-Natural				Europe, USA, Canada, Australia, China, Japan, Korea	Emollient & moisturizer. Preservative booster. Also a perfume co-solubilizer and pigment dispersing aid.	Clear, colourless liquid Faint characteristic odour / Odourless for Hexiol EP	Booster	3.0 ▶ 10.0	0.3 ▶ 3.0%	Can be added either upfront in the water phase, or once the emulsion has been made and cooled down to < 40°C.
Octiol	Caprylyl Glycol	Non-Natural				Europe, USA, Canada, Australia, China, Japan, Korea	Emollient & moisturizer. Preservative booster.	Clear colourless liquid or low melting waxy solid	Booster	3.0 ▶ 10.0	0.1 ▶ 1.5%	Should be molten at ≥40°C before use. Limited water solubility; can be dispersed in the aqueous phase.
Pentiol	Pentylene Glycol	Non-Natural				Europe, USA, Canada, Australia, China, Japan, Korea	Non-natural emollient & moisturizer. Preservative booster. Extraction solvent & solubilizer. Excipient for gelling agents.	Clear, colourless liquid Odourless	Booster	3.0 ▶ 10.0	0.5 ▶ 5.0%	For optimum efficacy of preservation, it should be added to emulsions at the post-emulsification stage.

Active Ingredients

For your skin care, hair care, make-up & toiletry products, to treat, purify, condition, soothe or refresh !

ACTIVES

INCI	ORIGIN	ECOCERT	COSMOS Approved	NATRUE COMPLIANT	REGULATORY STATUS	DESCRIPTION	FORM/ ODOUR	ANTIMICROBIAL ACTIVITY	PH RANGE	RECOMMENDED USE LEVEL	FORMULATION GUIDELINES	ANTIOXIDANT	ANTI-INFLAMMATORY	ANTI-SEBUM	DEO	LIGHTENING	ANTI-DANDRUFF	ANTI-AGE	COOLING
Caprocine	Capryloyl Glycine	Derived Natural	✓		Europe, USA, Canada, Australia, China, Japan, Korea	Anionic multifunctional ingredient with antimicrobial properties.	White crystalline powder	Bacteria and Mold (weak on C. albicans)	4.0 ▶ 7.0	0.5 ▶ 2.0%	Dissolve in hot water or in cold alkaline water (pH > 7.0).	✓	✓	✓			✓		
MinaSolve CapEasy	Water, Capryloyl Glycine, Sodium Bicarbonate	Derived Natural	✓		Europe, USA, Canada, Australia, China, Japan, Korea	Self preserved, aqueous solution of Caprocine (~30% a.i.). Multifunctional with antimicrobial properties.	Clear, colourless liquid / Odourless or faint	Bacteria and Mold (weak on C. albicans)	4.0 ▶ 7.0	1.5 ▶ 7.0%	Can be added at any stage of the formulation. No heating, premixing, or pH-adjustment is needed for dissolution.	✓	✓	✓			✓		
E-Leen Green OR	Pentylene Glycol, Glycerin, Citrus Aurantium Amara (Bitter Orange) Fruit Extract, Citrus Reticulata (Tangerine) Fruit Extract, Citrus Aurantium Sinensis (Orange) Peel Extract	Derived Natural		✓	Europe, USA, Canada, Australia, China, Japan, Korea	Non ionic, multifunctional ingredient with antimicrobial and antioxidant properties. Contains A-Leen 5 & Citrus extracts. Preservative-free, water-soluble and 100% nature-derived. NEW 2018	Clear, yellow liquid / Odourless or faint	Bacteria, Yeast and Mold	3.0 ▶ 6.5	1.0 ▶ 3.0%	Water soluble. Suitable for cold and hot processes. Keep product pH ≤ 6.5	✓							
Elage	Ellagic Acid	Derived Natural	✓		Europe, USA, Canada, Australia, China, Japan (QD (1)), Korea	Lightening agent	Beige to yellow powder	-	3.0 ▶ 5.5	0.1 ▶ 1.0%	Disperse in the water phase of an emulsion.					✓		✓	
Fresh'in	Methyl Diisopropyl Propionamide	Non-Natural			Europe, USA, Canada, Australia, China, Japan, Korea	Refreshing agent	White crystalline powder / Fresh odour	-	Unlimited	0.04 ▶ 1.5% (2)	Add to the oil phase of the emulsion or solubilise in a diol or alcohol.								✓
Fresh'in Green+	Pentylene Glycol, Methyl Diisopropyl Propionamide	Derived Natural			Europe, USA, Canada, Australia, China, Japan, Korea	Refreshing agent, easy to use liquid form	Colourless liquid / Fresh odour	-	Unlimited	0.1 ▶ 2.5% (3)	Add at any stage of the formulation, soluble/dispersible in water.								✓
MinaSolve Hexam	Hexamidine Diisethionate	Non-natural			Europe, USA, Canada, Australia, China, Korea	Cationic, mild antimicrobial & antiseptic. Recommended for sensitive skin & suitable for baby applications. ECO-IMPROVED PROCESS	White or slightly yellow powder	Bacteria, Yeast and Mold	3.0 ▶ 6.5	0.01 ▶ 0.1% / max. 0.05% eye & oral care	Dissolve into the water phase, or make a premix in water or a diol. Keep the pH of the product at 3-6.5.							✓	
Resve	Resveratrol	Natural (Japanese knotweed / min. 98%)	✓	✓	Europe, USA, Canada, Australia, China, Japan, Korea	Multifunctional ingredient	Off-white to beige powder / Characteristic odour	-	3.0 ▶ 7.0	0,1 ▶ 1.0%	Lipophilic; soluble in the presence of PEGs, alcohols.	✓	✓	✓		✓		✓	

(1) Quasi-drug registration required

(2) Max recommended use level for a leave-on body application: 0.04%

(3) Max recommended use level for a leave-on body application: 0.1%



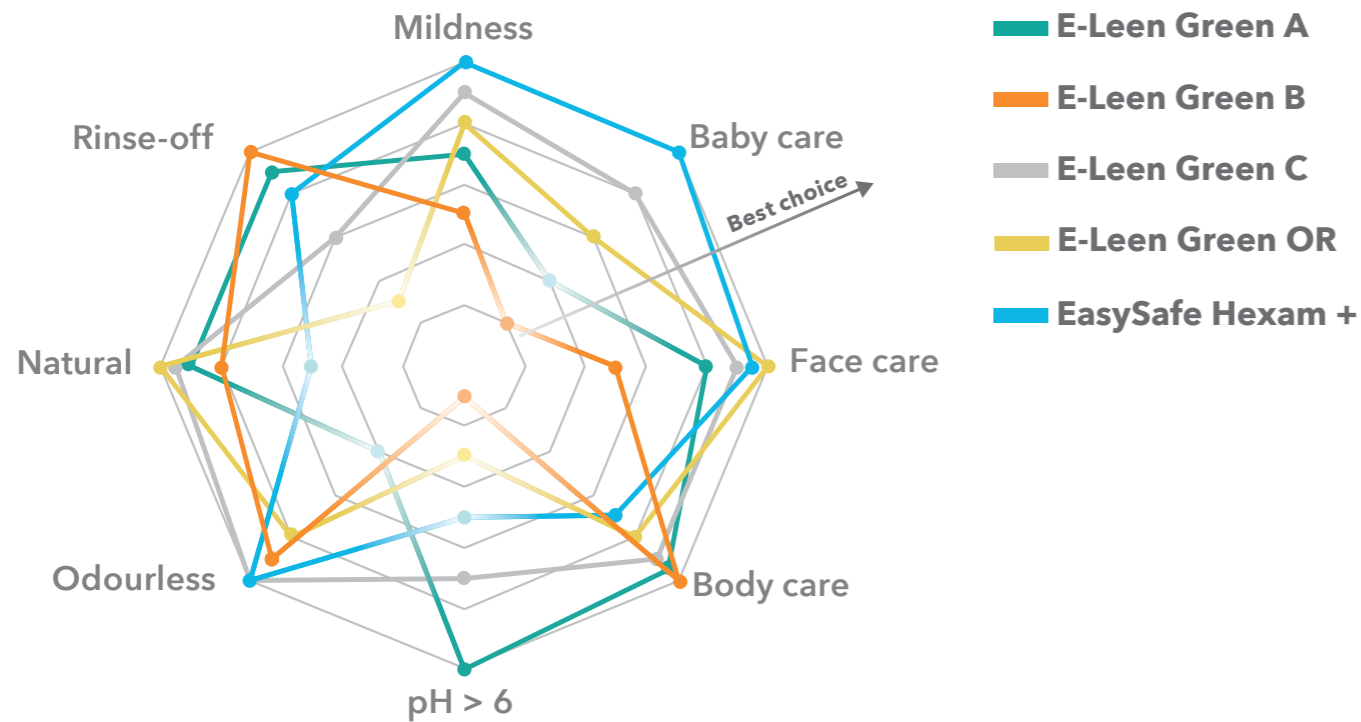
E-Leen Selector

Comparison of blends based on A-Leen 5 (Pentylene Glycol):

- E-Leen Green A** Pentylene Glycol, Phenylpropanol
- E-Leen Green B** Pentylene Glycol, Water, Sodium Benzoate, Benzoic Acid
- E-Leen Green C** Pentylene Glycol, Glyceryl Caprylate/Caprates
- E-Leen Green OR** Pentylene Glycol, Glycerin, Citrus Aurantium Amara (Bitter Orange) Fruit Extract, Citrus Reticulata (Tangerine) Fruit Extract, Citrus Aurantium Sinensis (Orange) Peel Extract
- EasySafe Hexam+** Pentylene Glycol, Water, Hexamidine Diisethionate

In order to select the appropriate blend, you can find below a tool, the E-Leen Selector.

Depending on your development project or key criteria you can choose the best candidate which fits your needs or constraints.



Quick decision guide:

Antimicrobials & boosters for Skin Care, Hair Care, Toiletries & Make-up

pH → 3.0 4.0 6.0 7.0 8.0 10.0

FORMULA PROTECTION

Pure Natural Ingredients, COSMOS

Synergistic Green Solutions, COSMOS

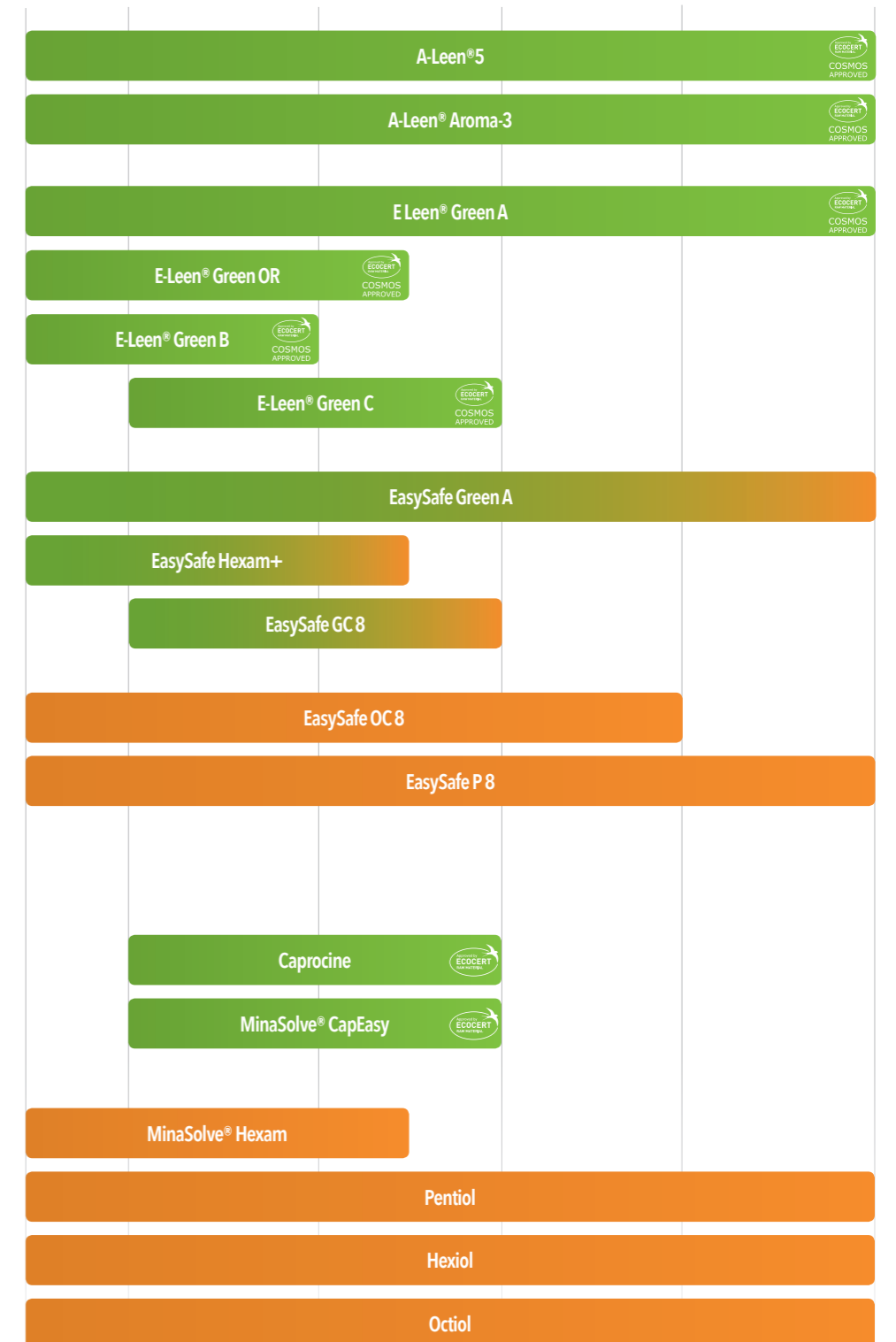
Optimized Performance Solutions, Derived Natural

Optimized Performance Solutions, Non Natural

BOOSTER / PRESERVATIVES

Derived-natural

Non Natural



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.



Minasolve® Solutions

Minasolve® is able to provide you a reliable partnership from its brand new offices located in Belgium:



- ▶ Different research and application Laboratories:
 - ▶ New product development Lab to prepare the future
 - ▶ Formulation Lab to assist our customers in their day-to-day activity
 - ▶ Microbiology Lab for challenge tests
- ▶ Formulation Academy for customer training
- ▶ International distribution network
- ▶ Local and overseas warehouses



Minasolve® social commitment through our partnership with a local & work adapted company

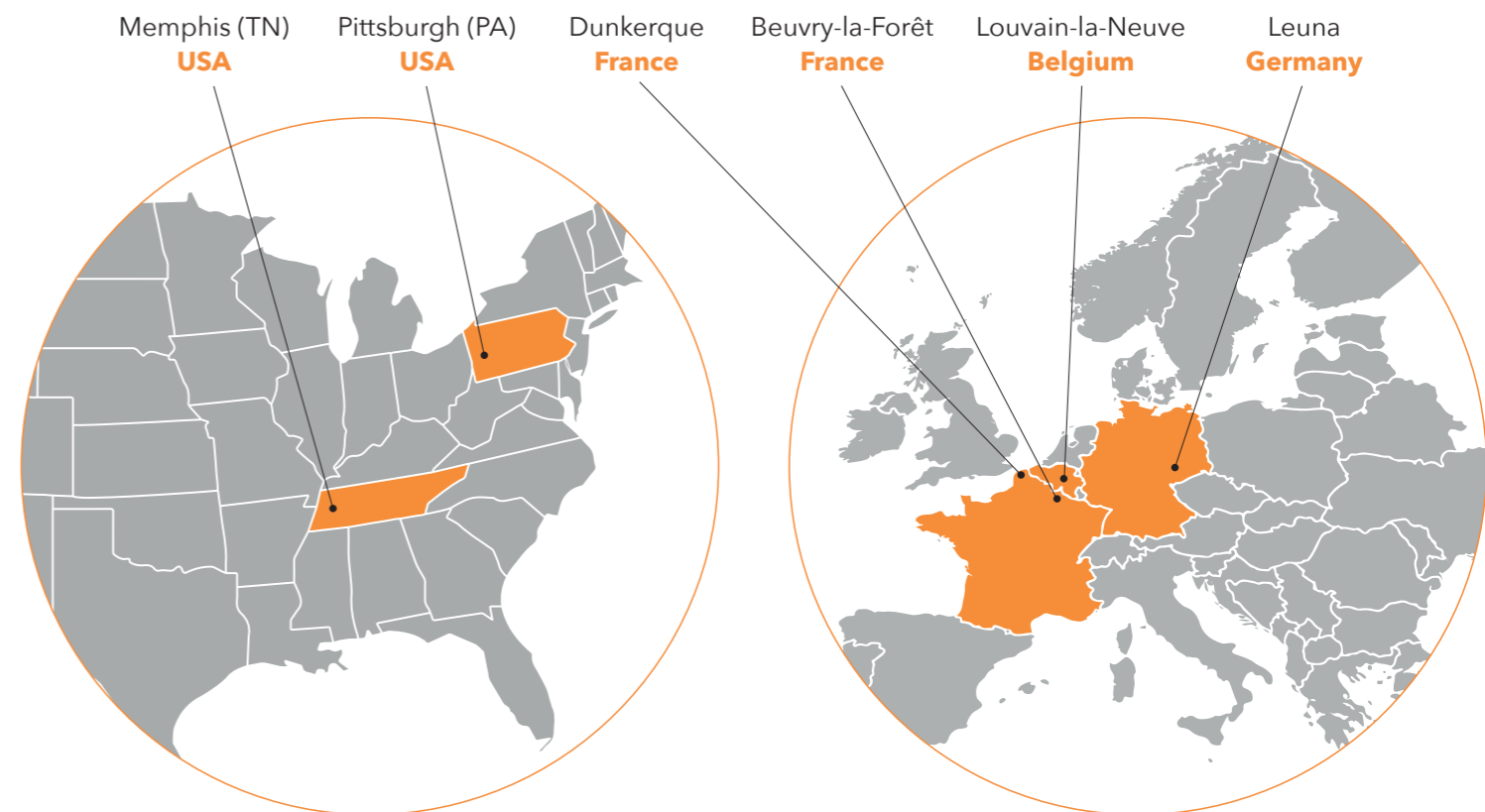
Minasolve® gives great importance to his social commitment. Since January 2018, Minasolve® is supporting a local, economic and social project. Indeed Minasolve® has decided to subcontract the sampling logistics (filling, labelling, packaging, dispatch) to Axedis. Axedis is a Work Adapted Company located in Belgium where 85% of their employees are disabled people. Our common goal is to offer disabled people a long-term job in a work environment adapted to their needs.

Minasolve® is an affiliate of Minafin® GROUP

Created in 2004, The **MINAFIN® Group**, specializes in fine chemistry for the life sciences and high tech industries. Activities include industrial subcontracting, development of chemical syntheses and industrial scale-up of custom-made processes as well as proprietary products with high added value for the pharmaceutical, cosmetics, agriculture and high-tech industries. Strong synergies exist between all business units: MINASOLVE, MINAKEM, MINAGRO, PENNAKEM, PRESSURE CHEMICALS, MINASCENT and EcoXtract.

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**



192
M€ SALES



860
EMPLOYEES



85
SCIENTISTS



6
PRODUCTION SITES





MINASOLVE[®]
BIO-INGREDIENTS FOR YOUR APPLICATIONS

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