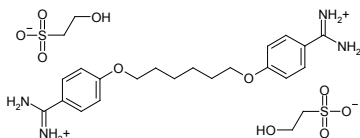


Specifications and Characteristics

MINASOLVE® HEXAM

INCI	Hexamidine Diisethionate
CAS REG. N°	659-40-5
APPEARANCE	White or slightly yellow powder
PURITY	Min. 98.0 %
SOLUBILITY	Water (4%)
RECOMMENDED PH OF USE	3.0 ▶ 6.5
RECOMMENDED USE LEVEL	0.01 ▶ 0.1 %
REGULATORY STATUS	Globally approved
ORIGIN	Non-natural (petrochemical)

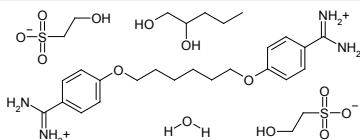
CHEMICAL STRUCTURE



EASYSAFE HEXAM+

INCI	Pentylene Glycol (and) Water (and) Hexamidine Diisethionate
CAS REG. N°	5343-92-0, 7732-18-5, 659-40-5
APPEARANCE	Clear colourless liquid
ODOUR	Odourless or faint
SOLUBILITY	Water and ethanol in all proportions
RECOMMENDED PH OF USE	3.0 ▶ 6.5
RECOMMENDED USE LEVEL	0.2 ▶ Max. 2.0 %
REGULATORY STATUS	Globally approved
ORIGIN	Derived-natural
NATURALITY INDEX	0.83, Contains 95 % renewable carbon

CHEMICAL STRUCTURE



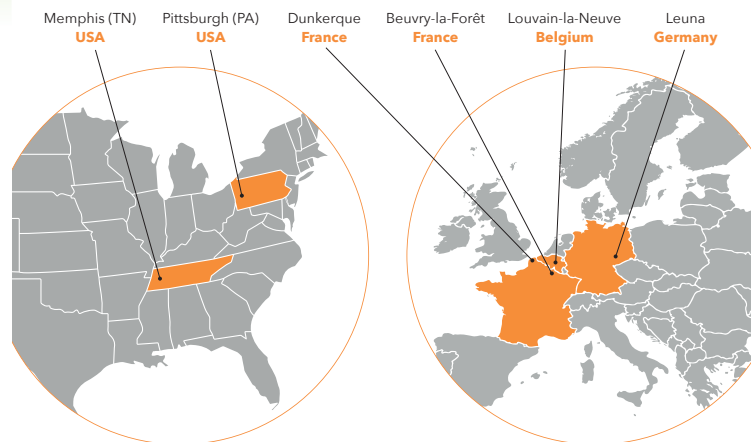
The given information is accurate to the best of our knowledge. Customers are advised to perform their own studies on the usefulness of any ingredient for a particular application. Any recommended usage information is only provided as indication, and should not be considered as recommendation to violate of any laws, patents, or official regulations dealing with manufacture, composition, local procedures, product design, or end usage.

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

MINAFIN®
GROUP

Preservative solutions for Skin Care, Baby Care, Sensitive Areas

MINASOLVE™ HEXAM

✓ *Mild and Efficient Preservative*

✓ *Eco-improved production process*

EASYSAFE HEXAM+

✓ *Easy to use liquid*

✓ *Boosted antimicrobial effect*

✓ *Skin moisturizer*



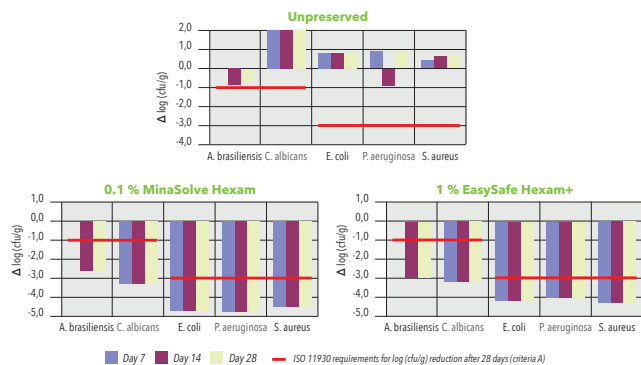
MINASOLVE®
BIO-INGREDIENTS FOR YOUR APPLICATIONS

green
solving
attitude.

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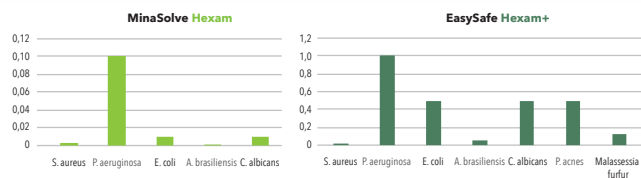
MinaSolve™ Hexam and **EasySafe Hexam+** act as broad-spectrum standalone preservatives, as demonstrated by microbial challenge tests on cosmetic products according to ISO 11930:

O/W-emulsion, subjected to challenge tests, pH 5.5



Phase	Ingredient	INCI name	%
A	Water	Aqua	ad 100
	Minasolve Products		
	Xanthan Gum OC	Xanthan Gum	0.5
B	Emulgade PL 68/50	Cetearyl Glucoside (and) Cetearyl Alcohol	5.0
	Lipex Sheasoft	Butyrospermum Parkii (Shea) Butter	3.0
	Jjoba Oil	Simmondsia Chinensis (Jojoba) Seed Oil	3.0
	Lipovol HNO	Corylus Americana (Hazel) Seed Oil	3.0
C	Bioxan T70	Tocopherol	0.1
D	Sodium Hydroxide (10% aq.)	Aqua (and) Sodium Hydroxide	ad pH 5.5

Minimum inhibitory concentration (MIC)



MinaSolve™ Hexam and **EasySafe Hexam+** are powerful broad-spectrum antimicrobial agents that inhibit the growth of bacteria, yeasts and fungi. Their powerful microbiostatic activity is demonstrated by low MIC values. In addition to its preservation effect, **EasySafe Hexam+** also shows activity against *Propionibacterium acnes* and *Malassezia furfur*. As a result it can be used as an additive in anti-acne and anti-dandruff products.

MinaSolve™ Hexam is a unique quality of Hexamidine Diisethionate. It is produced through a proprietary and sustainable process without the use of toxic solvents such as chloroform, which may still be used in today's standard manufacturing processes.

MinaSolve™ Hexam is an efficient preservative and sanitizer with good cutaneous and mucous tolerance. It belongs to the class of membrane-active microbicides. Related to its structure, **MinaSolve™ Hexam** is a stable ingredient that does not contain, nor release formaldehyde or any other substance of concern.

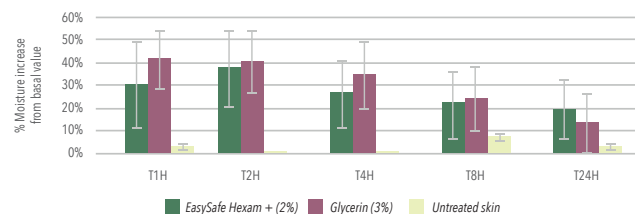
MinaSolve™ Hexam is suitable for sensitive skin, scalp and mucous areas (oral, eye and intimate care).

EasySafe Hexam+ is a synergistic blend of bio-sourced Pentylene Glycol and **MinaSolve™ Hexam** with a long-lasting skin moisturizing effect in addition to its preservative action.

EasySafe Hexam+ can be conveniently used in skin care, hair care, make-up and toiletry formulations with a special focus on sensitive skin.

Corneometry study of aqueous solutions - PhD Trials, Lisbon

EasySafe Hexam+ is an effective skin humectant, as confirmed by a corneometry study.



EasySafe Hexam+ shows a long-lasting moisturizing effect similar to that of Glycerin. Both test substances were applied as aqueous solutions to the forearm areas.



Application in cosmetic formulations

MinaSolve™ Hexam is stable within the pH-range of 3.0 - 6.5. Before adding **MinaSolve™ Hexam** to any formulation, the pH of the product should be adjusted to this range.

MinaSolve™ Hexam is a cationic substance that can interact with anionic ingredients. The compatibility should be therefore checked individually. Nonetheless, **MinaSolve™ Hexam** is generally compatible with the most common types of anionic surfactants.

In products where a thickening agent is required, **MinaSolve™ Hexam** is best formulated with non-ionic thickeners, e.g. non-surface treated cellulose and cellulose derivatives, non-ionic natural gums or polyethylene glycol based thickeners.

The liquid mixture **EasySafe Hexam+** optimizes the formulation with Hexamidine by eliminating the solubilization step. Furthermore, the presence of Pentylene Glycol **boosts the activity** of Hexamidine, leading to a **higher anti-microbial activity at lower use-levels**.

EasySafe Hexam+ also simplifies the formulation in combination with anionic polymers (e.g. Xanthan Gum, poly-acrylates). For instance, **EasySafe Hexam+** can be blended with surfactants at pH 3.0-6.5 prior to the addition to the anionic polymer in its gelled form. Alternatively, the addition of surfactants to a Carrageenan or Xanthan Gum gel allows for the addition of **EasySafe Hexam+** without leading to gel collapse.