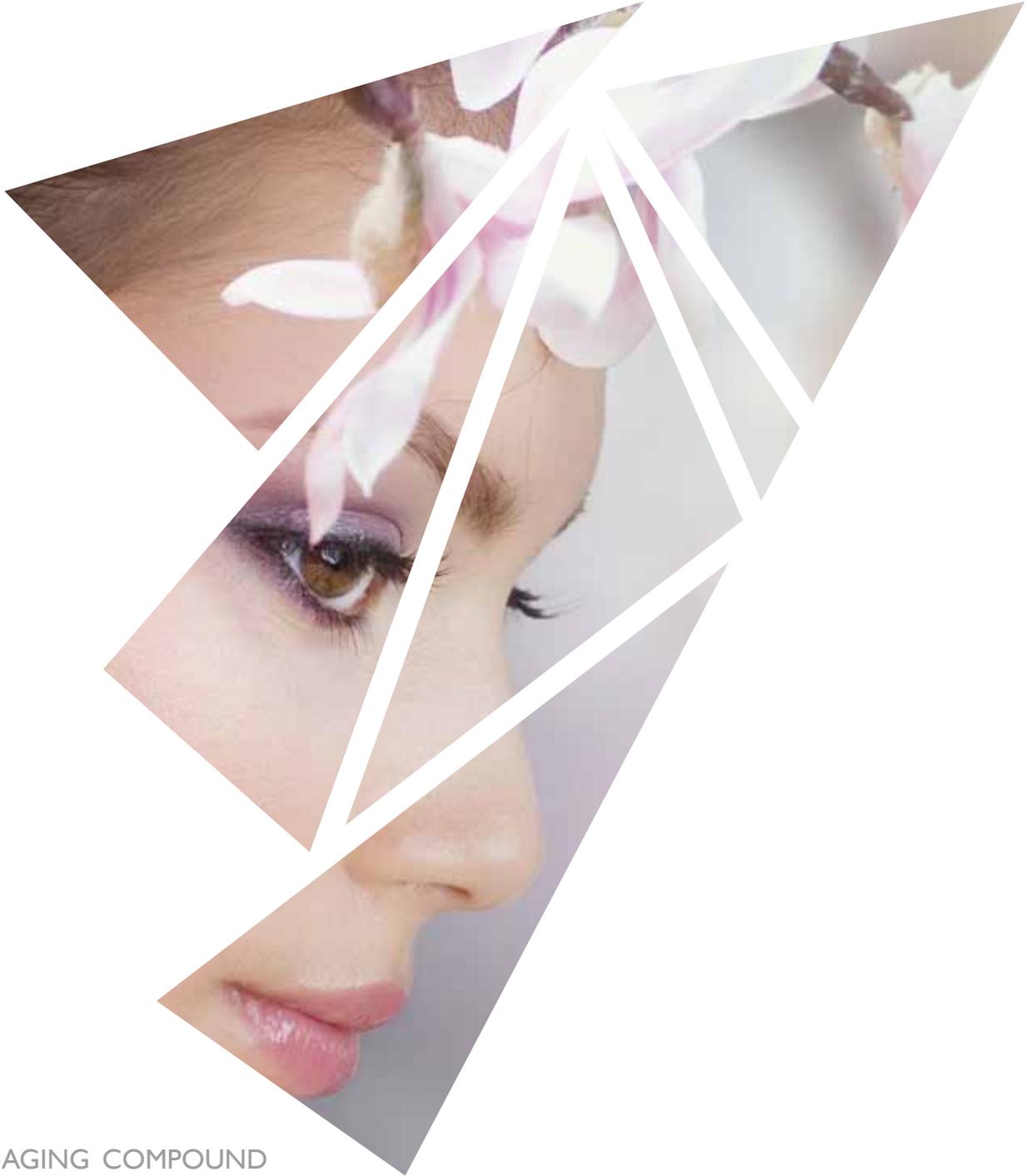


# ALISTIN<sup>®</sup>



ANTI-AGING COMPOUND  
ANTI-GLYCATION  
ANTI-OXIDATION  
REVITALIZATION

COSMETIC AGENT  
ANTI-WRINKLE  
SUN CARE  
SENSITIVE SKIN  
BODY FIRMING

**EXSYMOL**  
MONACO

# ALISTIN

## SKIN CLINICAL DAMAGES INDUCED BY OXIDATIVE STRESS

Besides intrinsic aging, the skin is under the constant aggression of oxidative entities (solar radiations, pollution, physical stress, etc.). The resulting oxidative stress can affect the structure of the cutaneous tissue and the metabolic activity of its composing cells such as fibroblasts and keratinocytes. Since these factors are essential for the quality of the skin, Exsymol developed **ALISTIN**, a peptidic compound which is able to protect the skin components such as the collagen from these aggressions and to maintain the metabolic activities of the exposed cells.

Treatment with **ALISTIN** will both prevent and repair the daily aggressions-induced damages, allowing the skin to remain healthy, firm and beautiful. **ALISTIN** acts in three different, non-exclusive, ways for a maximal efficiency:

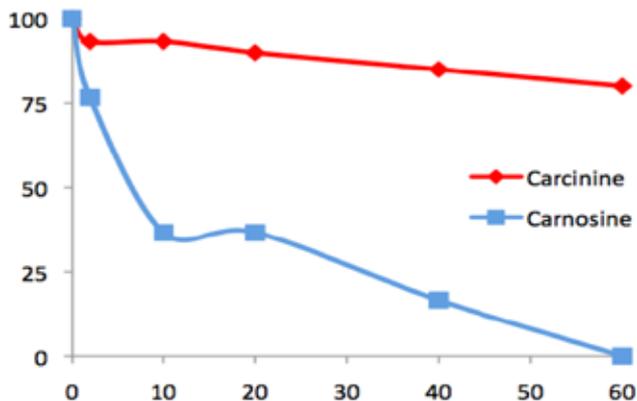
- 1) Anti-oxidation / anti-stress
- 2) Anti-glycation
- 3) Metabolism stimulation

Hence, **ALISTIN** protects and/or reduces the noxious effects of an exposure to oxidative stress that can eventually lead to severe damage as shown below:

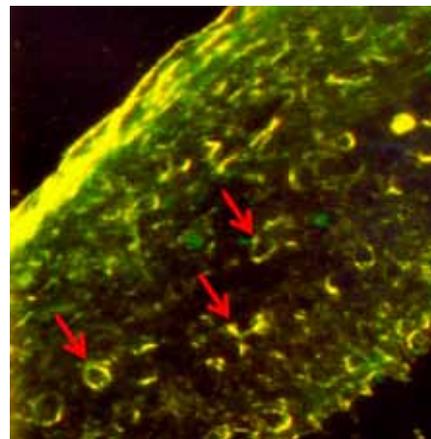
Cellular level	Skin level
1) Accumulation of oxidative forms Protein alterations (including structural proteins) DNA mutation	Structural collapse, loss of elasticity, fine lines
	Tissue inflammation
	Less efficient dermis tightening activity
2) Protein glycation (including collagen)	Homeostasis loss
3) Slackening of cell metabolism	Dehydration

## EXSYMOL'S SOLUTION : THE DECARBOXY-CARNOSINE

**Carcinine** (or Decarboxy Carnosine HCL), commercially available as **ALISTIN**, is a natural peptoid that has been identified as a potent anti-glycant and anti-oxidant. Furthermore, it has the advantage of being relatively stable when in contact with air. Derived from carnosine, another natural anti-oxidative compound, **Carcinine** displays similar anti-oxidative properties while being substantially more stable than its parent compound as shown below. This increased resistance to enzymatic degradation, makes **ALISTIN** a better candidate than carnosine for *in vivo* and therefore cosmetic applications.



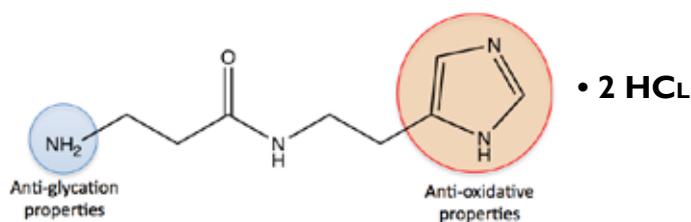
Furthermore, **ALISTIN** displays good bioavailability and localizes on the cell membrane (e.g. keratinocytes) as shown on human reconstructed epidermis (HRE).



**ALISTIN** (→) localizes on keratinocytes membrane as assessed by immuno-histochemistry.



INCI name: DECARBOXY CARNOSINE HCL



### Skin benefits

- Cell detoxification  
DNA protection
- Skin structural proteins (collagen) protection  
Increase of collagen production;  
Contraction of the extra-cellular matrix
- Metabolic protection and stimulation  
Sirtuin production  
Free radicals protection;  
Control of inflammation

*Detailed scientific files are available on demand for each of these benefits.*



### Cosmetic applications

- Anti-oxidation
- Anti-wrinkle
- Sun care
- Photo-aging
- Body firming
- Revitalization
- Sensitive skin

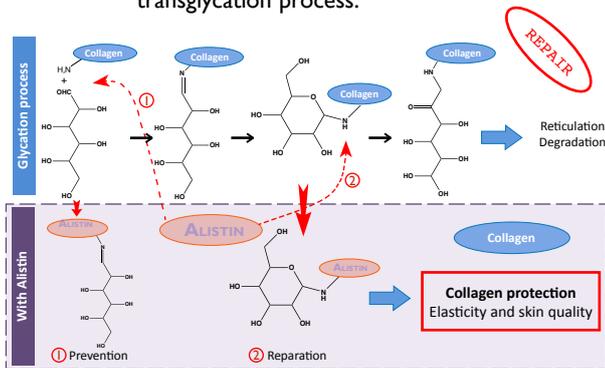
# ALISTIN

## Alistin prevents and repairs cutaneous tissue damage.

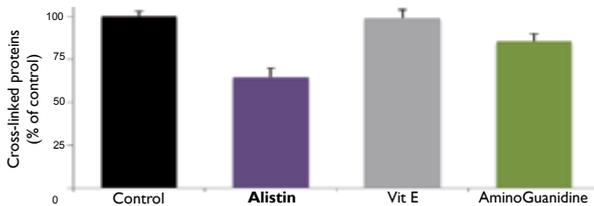
### ALISTIN, for anti-glycation

ALISTIN protects the collagen and other proteins from the glycation processes at two different levels:

- ① Prevention: by glucose scavenging.
- ② Reparation: by substituting itself to the collagen in a transglycation process.



Hence, ALISTIN prevents the protein from cross-linking, while other anti-oxidants such as vitamin E fail at it. ALISTIN is even more potent than aminoguanidine, a reference in anti-glycation. Furthermore, the final products of the reaction are neither toxic nor mutagenic.



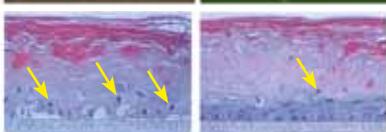
The skin preserves its structure and elasticity

### ALISTIN protects from UV-induced DNA damage

UV RADIATIONS CAUSE DNA MUTATIONS IN EPITHELIAL CELLS.



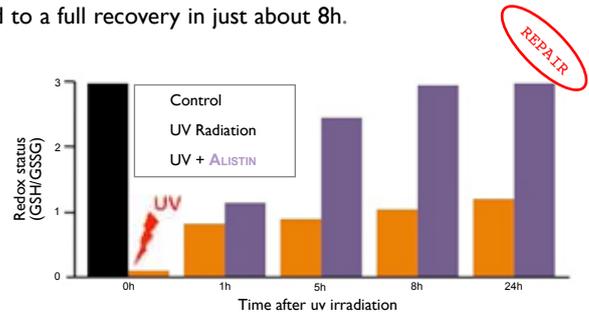
ALISTIN reduces UV-induced mutations such as TT dimers (→) that might ultimately lead to the formation of apoptotic cells such as sunburn cells (→) as assessed on HRE.



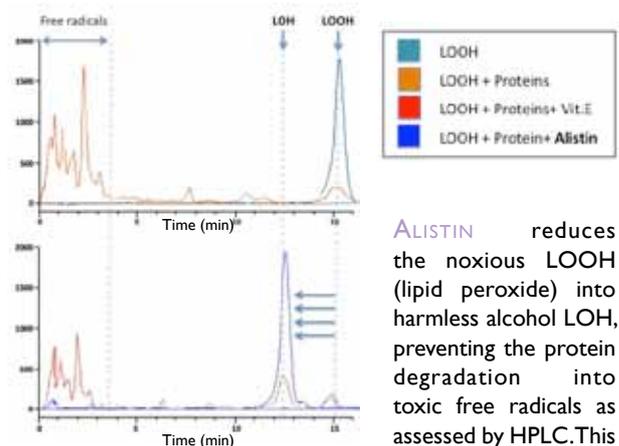
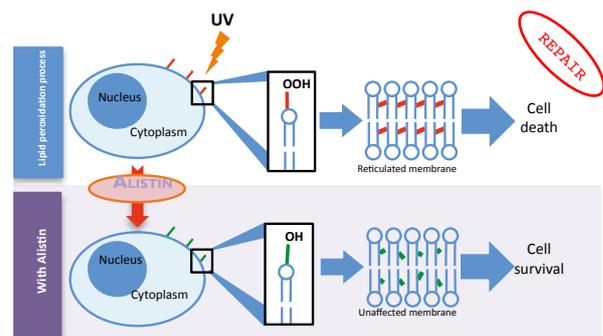
ALISTIN protects the DNA from UV-induced damage and mutation. ALISTIN stimulates the production of DNA-protecting proteins, hence decreasing the number of apoptotic cells.

### ALISTIN, a unique anti-oxidant

UV radiation can induce damage that can be monitored by measuring the cells redox status. The skin can slowly recover by itself from UV irradiation. However, even after 24h, the self healing process still was not complete. Treatment with ALISTIN led to a full recovery in just about 8h.

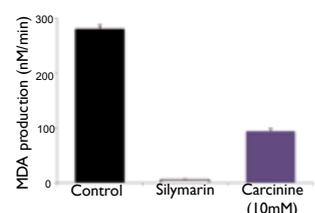


ALISTIN provides a fast and reliable protection against oxidative stress-induced damage as measured above.



ALISTIN reduces the noxious LOOH (lipid peroxide) into harmless alcohol LOH, preventing the protein degradation into toxic free radicals as assessed by HPLC. This anti-oxidative effect is unique and is not shared by other anti-oxidants such as Vitamin E.

ALISTIN's anti-oxidative properties are also due to its scavenging power as shown by its ability to reduce MDA (a toxic byproduct of oxidative stress) production.



The skin is protected, healthier.

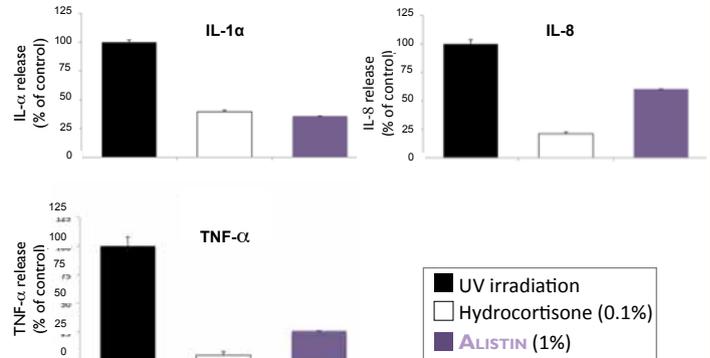
## Alistin has positive effects on skin cells' metabolism and function.

### ALISTIN reduces skin inflammation

Aggressions can lead to skin inflammation. **ALISTIN**, when applied on human reconstituted epidermis, reduces the secretion of pro-inflammatory cytokines such as TNF- $\alpha$ , IL-1 $\alpha$  and IL-8.

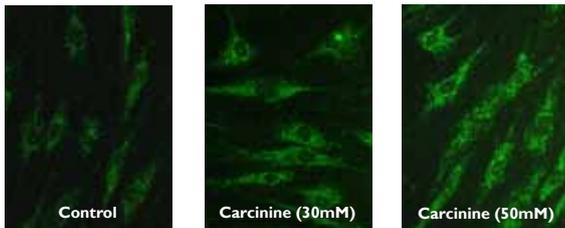
Hence, Alistin has anti-inflammatory and soothing properties comparable to corticoids without the severe side effects.

**The skin is soothed.**



### ALISTIN energizes the skin

Sirtuins are proteins involved in aging, stress resistance and cell metabolism through their ability to maintain ATP levels.

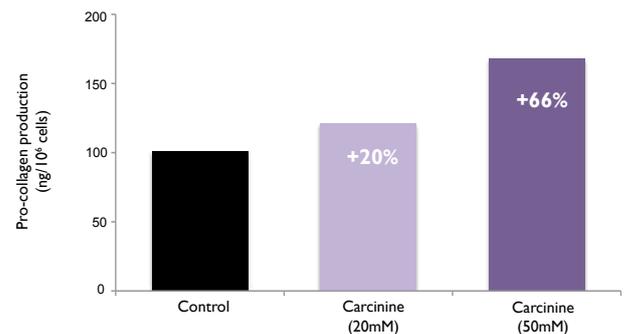


**ALISTIN** stimulates the production of sirtuins in a dose dependant manner, hence enhancing skin cells metabolic abilities.

**The skin is energized.**

### ALISTIN stimulates collagen production

With age, the collagen production is reduced, the firmness of the skin is reduced, wrinkles appear.



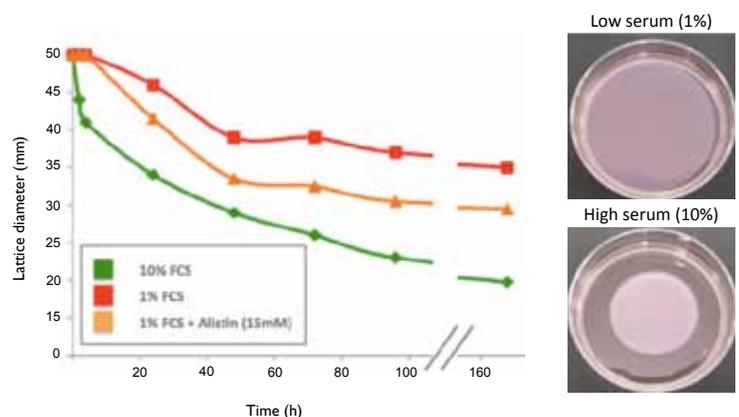
**ALISTIN** stimulates fibroblastic collagen production in a dose dependant manner. The skin is denser and younger.

**The skin is denser.**

### ALISTIN increases skin firmness

With age, fibroblasts' firming abilities decrease. Using collagen lattice, an *in vitro* model of dermis, we measured the ability of primary fibroblasts to contract the collagen fibers. Hence, for fibroblasts in low serum media (1%), representative of an aged dermis, the lattice contraction is much slower than in a high serum media (10%) which is representative of a young dermis.

Treatment of serum deprived fibroblasts with **ALISTIN** accelerated the lattice contraction, showing that **ALISTIN** has firming abilities.



**The skin is firmer, younger.**

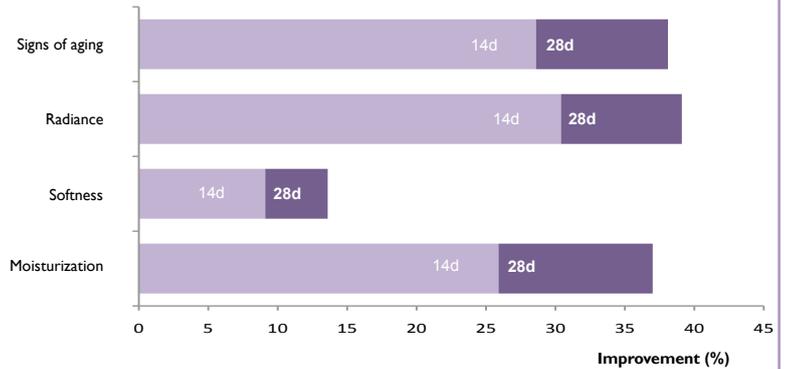
# ALISTIN

## Clinical research: *in vivo* testing

Realized under dermatological control, a clinical trial was performed on 35 women aged 30 to 59. The volunteers received a treatment with ALISTIN (0.75%) or placebo applied twice a day on the face for 28 days.

### Global benefits

Because of its energizing effect, ALISTIN is capable of globally improving skin aspect as assessed by a dermatologist after two and four weeks of treatment.

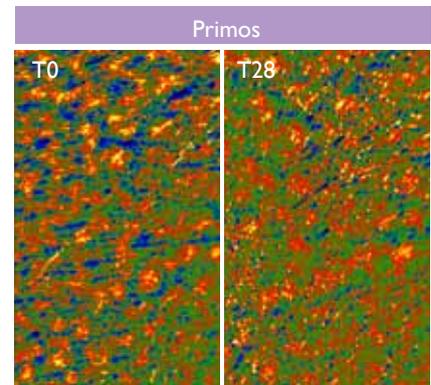
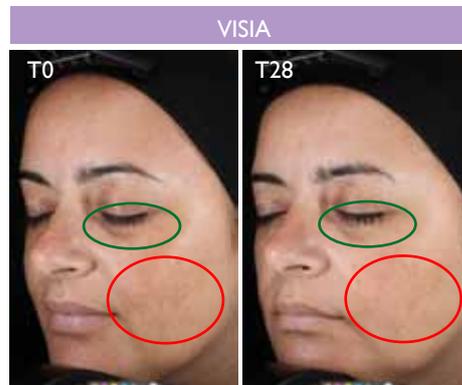


### Younger skin (20-40)

Younger skins have few wrinkle and treatments generally focus on skin tone (red circles) and eye contour, especially eye bags and dark circles (green circles). Skin smoothness is also assessed using Primos that measures skin reliefs

ALISTIN improves eye contour by decreasing eye bags and dark circles (left).

ALISTIN is capable of improving skin tone (right).

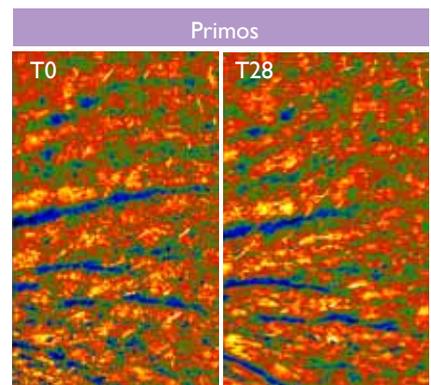


### Older skin (40+)

For older skins, the most important symptoms to address are wrinkles (red circles) and skin sagging (yellow arrows). The wrinkle number and volume were reduced as shown using Primos.

ALISTIN is capable of reducing both of these symptoms (left).

ALISTIN is capable of reducing wrinkle number and volume (right).



# ALISTIN

## Technical characteristics



### ANALYTICAL COMPOSITION

Decarboxy Carnosine HCL .....	10% (w/w)
Butylene glycol .....	8.18%
Preservatives*	
Water .....	(sq) 100%

### PHYSICO-CHEMICAL CHARACTERISTICS

Limpid colorless liquid.  
pH  $\approx$  5  
Density at 20°C  $\approx$  1.0  
Miscible with water, alcohol and glycols.  
Non miscible with hexane, mineral and vegetal oils.

### \*PRESERVATIVES

Different preservative systems are available in order to fit with your requirements. Please contact us for additional details about the available versions.

### TOLERANCE AND TOXICITY STUDIES

ALISTIN is perfectly tolerated.  
Tolerance and toxicity studies were performed using both in vitro (cell culture and reconstructed epidermis) and in vivo (human volunteers) methods.

### FORMULATION

Advised doses : 0.5 to 1.5%.  
No particular formulation restriction.

### AVAILABILITIES

ALISTIN is available in 1, 5 and 30 kg drums.  
ALISTIN is also available in powder (anhydrous)  
as Carnosine 2HCL.



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