NIO-SENSYL

the perfectly balanced moisturizing system for sensitive and reactive skin

Approved by ECOCERT RAW MATERIAL

COSMOS APPROVED

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LIFE TECHNOLOGIES

ISO 9001
LL-C (Certification)

NIO-SENSYL

NIO-SENSYL, based on the synergistic association of Zinc-enriched yeast extract with, mangostin from Garcinia mangostana and Magnolol/Honokiol from Magnolia bark, all enclosed into niosomal vesicles. NIO-SENSYL is a power active ingredient specifically designed to mitigate problems of sensitive skin, acne, urticaria, eczema, and rosacea.

Cosmetic Use

- Formulations for preventing and protecting sensitive skin.
- Sun care products
- Hypoallergenic care products
- Cosmetic formulations for acne.

Main Components

Active components	Origin	Skin Benefits
Zinc-enriched yeast extract	Biotechnology	Skin renovation activity
Mangostin	Botanical *(Garcinia mangostana)*	Anti-inflammatory activity Anti-oxidant activity
Magnolol/ Honokiol	Botanical (Magnolia bark)	Anti-inflammatory activity

INCI/CTFA-Declaration

Hydrolyzed Garcinia Mangostana Fruit Extract, Saccharomyces/Zinc Ferment, Magnolol, Honokiol, Polyglyceryl-10 Oleate, Apricot Kernel Oil Polyglyceryl-6 Esters, Sorbitan Palmitate, Cetyl Phosphate, Aqua/Water.

Formulating with NIO-SENSYL

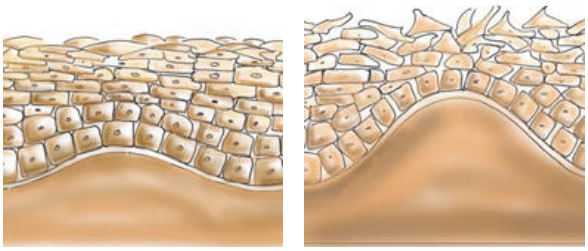
- DOSAGE: 1-3%.
- SOLUBILITY: soluble in water, insoluble in oils or fats.
- MODE OF INCORPORATION: dilute in a part of water before blending in the cosmetic product. Do not heat above 50° C.

SKIN SENSITIVE PROCESS

Sensitive skin is characterized by hyper-reactivity to external stimuli. This reactivity can manifest itself as one or several of the following: burning, recurrent irritation, redness, blotchiness, itchiness, rash, flaking. Some dermatologists believe sensitive skin is depending on a condition of lowered skin barrier function. Epidermis, and stratum corneum in particular, are responsible for normally functioning protective skin barrier. Special intracellular lipids (ceramides) of the stratum corneum, as well as sebum act to prevent the evaporation of water as well as penetration of bacteria, allergens and irritants. Dysfunctional skin barrier makes it possible for

irritants to penetrate into deeper skin layers and cause inflammation and irritation. If sensitive skin is not treated properly and the condition deteriorates, this can lead to more serious skin disorders. Several skin diseases can be linked to sensitive skin such as: acne, urticaria, eczema and rosacea; and they all have one characteristic in common: inflammation.

NIO-SENSYL, thanks to the innovative association of effective anti-inflammatory molecules is specifically designed to mitigate all problems of sensitive and reactive skin.



Normal skin Sensitive skin

Niosoma as a potent skin delivery system for effective cosmeceuticals

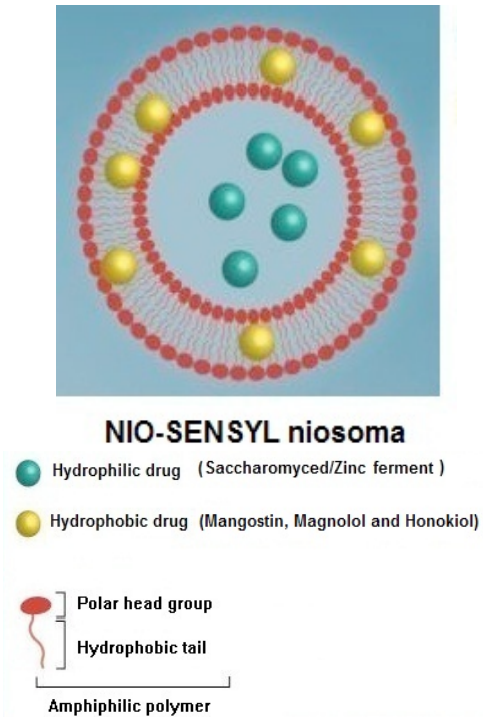
NIO-SENSYL is a powerful active for sensitive and reactive skin based on niosoma technology as carrier of biologically active molecules. Niosoma is an effective drug delivery system particularly suitable for pharmaceutical and cosmeceutical. It consists of vesicles formed by the self-assembly of non-ionic surfactants in aqueous media in which the active compounds are trapped inside. The niosome is made of a surfactant bilayer with its hydrophilic ends exposed on the outside and inside of the vesicle, while the hydrophobic chains face each other within the bilayer.

Like liposomes, niosomes are able to increase drug stability, to enhance the effectiveness, to prolong circulation time and to promote uptake of the entrapped drugs into the target site.

However, compared to liposomes, niosomes have several important advantages such as:

- ability to entrap both hydrophilic and hydrophobic drugs
- greater chemical stability
- no problems related to phospholipids purity
- low toxicity due to non ionic nature
- no requirement of special precautions and conditions for formulation
- production without the use of unacceptable solvents.

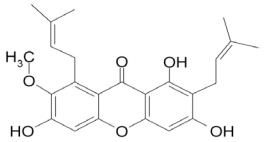
NIO-SENSYL increases the stability of entrapped active agents, improves bioavaiability of poorly absorbed ingredients and enhances skin penetration improving percutaneous passage of biologically active molecules through human stratum corneum which is known to be a highly impermeable protective barrier.



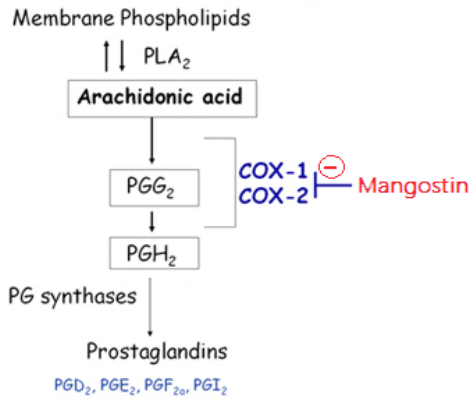
NIO-SENSYL a powerful active ingredient for sensitive and delicate skin

NIO-SENSYL consists of Zinc-enriched yeast extract, together with a potent mix of anti-inflammatory molecules such as mangostin, Magnolol and Honokiol contained into niosomal vesicles:

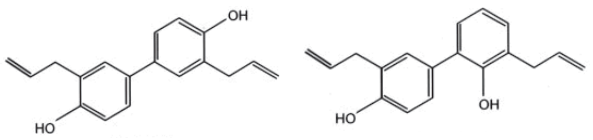
- **Zinc-enriched yeast extract** is manufactured by special yeast strain and fermentation process in which the zinc is added to the tank and transferred to organic form. Zinc is a trace element essential for cell growth, development and differentiation. It is also involved in maintaining the structure and function of over 300 different enzymes. Zinc plays also an important roles in the skin renovation. The lack of zinc will result in the skin dry, acne and skin chapping. Furthermore, this yeast extract contains plenty of peptides, amino acids, vitamins and polysaccharides, essential for skin and specially suitable for the cosmetic treatment of sensitive and reactive skin
- **Mangostin**, a tetraoxygenated diprenylated xanthone obtained from the fruit hull of mangosteen *(Garcinia mangostana)*, has been widely used as an anti-inflammatory medicine in Southeast Asia for many years. Several studies have demonstrated that mangostin is not only a potent inhibitor of the release of an inflammatory chemical mediator such as PGE2, but also a new inhibitor of COX-2 gene activation and acts as an anti-inflammatory agent.



Mangostin



- **Magnolol and Honokiol**, two highly purified hydroxylated biphenyl molecules extracted from magnolia bark, have strong anti-inflammatory and antioxidant properties. They are able to reduce inflammation by inhibiting NF-kB factor through the enzime inactivation of IkB kinase (IKK). Thanks the inhibition of the NF-kB factor, Magnolol and Honokiol down regulate also the production of important inflammation mediators as the interleukin-8 (IL-8) and the tumor necrosis factor alpha (TNF-alpha)

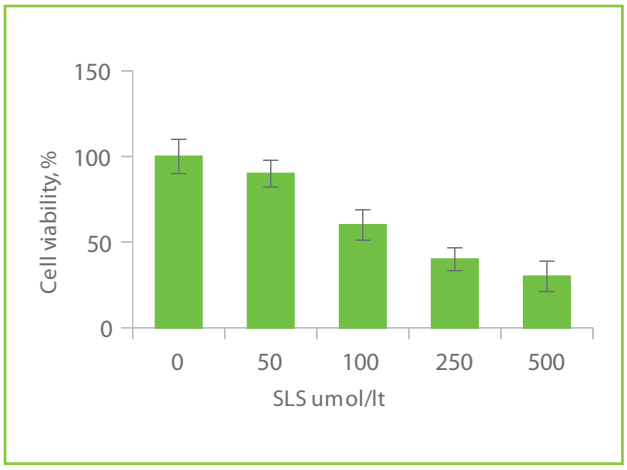


Magnolol Honokiol

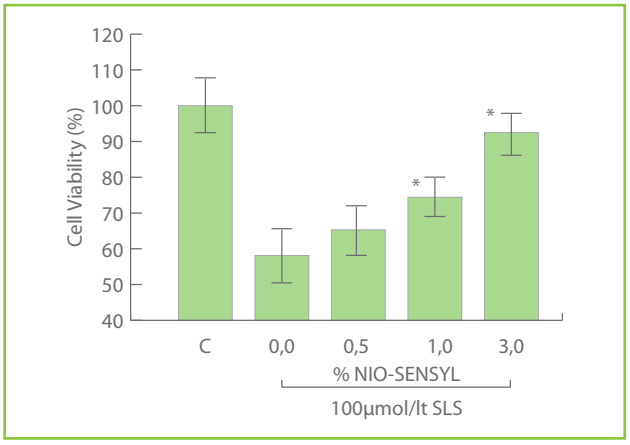
Thanks to balanced combination of mangostin, Zinc-enriched yeast extract and Magnolol/ Honokiol, NIO-SENSYL prevents cutaneous irritation by limiting inflammatory process and discomfort. It should be considered as a basic ingredient for sensitive and reactive skin products.

NIO-SENSYL: Efficacy tests:
IN VITRO TEST:
Effect of NIO-SENSYL cell viability

Sodium lauryl sulfate (SLS) is a primary irritant, which damages skin by direct cytotoxic action, without prior sensitization. For such reason SLS methods are often used in vitro and in vivo as irritant reactivity tests. To demonstrate protective effect of NIO-SENSYL, cultured keratinocytes cells (HaCaT cell line) were pretreated with different concentrations of NIO-SENSYL together with 100µM of SLS for 18 hours. Cell viability was assessed using MTT assay.



Cell viability of HaCaT cells treated with differents concentrations of SLS was significantly decreased in a concentration-dependent manner.



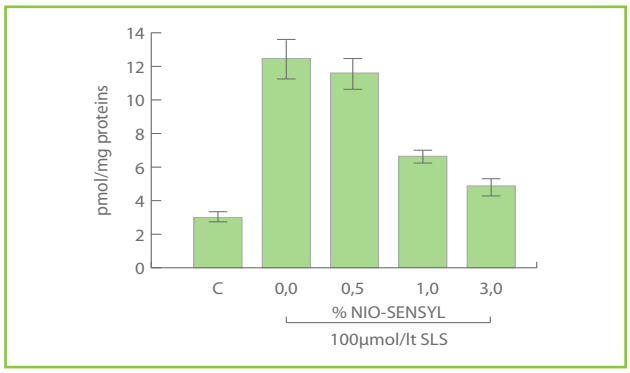
*Effect of NIO-SENSYL on cell viability of HaCaT cells pre-incubated with 100µmol/lt SLS. The cell viability increased significantly in the cultures treated with NIO-SENSYL in a concentration-dependent manner. (*P<0,01). ANOVA test*

Data demonstrate that NIO-SENSYL has, at low concentration, a remarkable cytoprotective effect against SLS damage.

Effect of NIO-SENSYL on PGE2 release

Prostaglandins PGs and arachidonic acid (AA) metabolites of the cyclooxygenase (COX) pathway, are major mediators in the regulation of inflammation and immune function.

To evaluate the protective effect of NIO-SENSYL we treated sub-confluent cultures of HaCaT cells with SLS (100µmol/lt) alone and in the presence of NIO-SENSYL (0,5-3%) for 18 h. PGE2 was determined in culture media using a commercial enzyme Immunoassay kit. (ELISA)

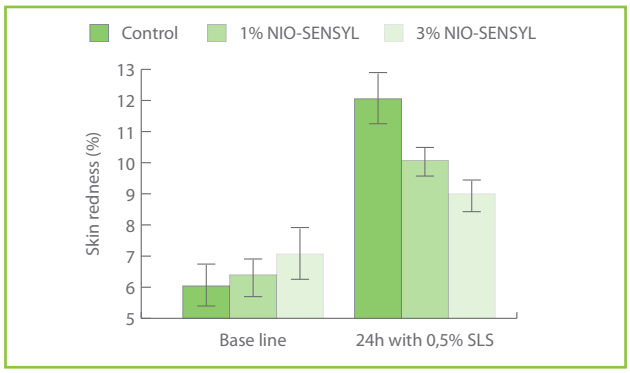


*The levels of PGE2 in HaCaT cells treated with 100µmol/lt SLS were significantly greater as compared with the untreated cultures (control). PGE2 release was potently reduced in the SLS cells treated with NIO-SENSYL. * P< 0.01. (ANOVA test)*

In conclusion NIO-SENSYL is a very effective active ingredient to reduce the inflammatory process on skin sensitive.

IN VIVO TESTS: NIO-SENSYL effect on skin redness induced by SLS

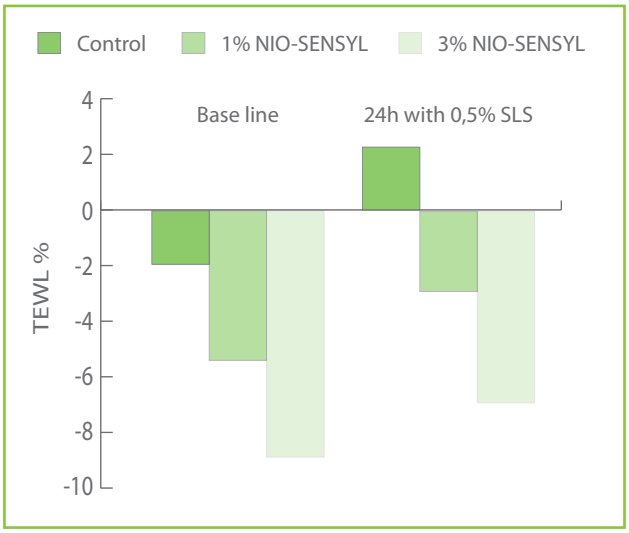
To evaluate the protective effect of NIO-SENSYL an irritant reactivity test in which 0,5% solution of SLS has been applied in occlusive patch test on inner side of the forearms of 20 volunteers aged from 20 to 60 (average: 41,6) for 24 hours. After this period the test area, was treated with an oil in water cream containing 1-3% of NIO-SENSYL versus placebo, applied twice daily for 4 days. At the end of treatments, redness, TEWL and hydration were evaluated on volunteers.



*The skin redness was evaluated with a chromameter. The results revealed that NIO-SENSYL decreased skin redness induced by SLS respect control. * p<0.05*

IN VIVO TEST: NIO-SENSYL effect on TEWL

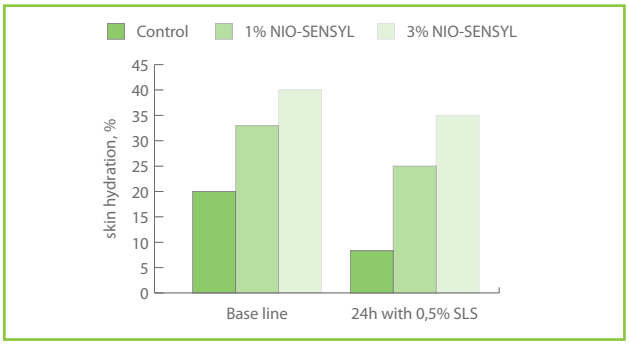
Trans epidermal water loss (TEWL) measures skin surface water loss, and represent a measurement of the integrity of barrier function and therefore quantify skin damage of an irritant as SLS.



The results demostrated that NIO-SENSYL not only improve the integrity of barrier fuction of the group treated only with the cream containing NIO-SENSYL but significantly reduced the Trans Epidermal Water Loss in the group pre-treated with SLS restoring the integrity of the skin barrier.

IN VIVO TEST: NIO-SENSYL effect on skin hydration

NIO-SENSYL significantly increased hydration both in the group treated only with the cream containing NIO-SENSYL and in the group pre-treated with SLS in occlusive patch test



NIO-SENSYL significantly increased hydration both in the group treated only with the cream containing NIO-SENSYL and in the group pre-treated with SLS in occlusive patch test

NIO-SENSYL thanks to the synergical combination of Zinc-enriched yeast extract, mangostin and Magnolol/Honokiol entrapped into niosomal vesicles, represents an effective and innovative active ingredient to mitigate all sensitive and reactive skin problems, restoring the integrity of the skin barrier.

In summary NIO-SENSYL:

- increase cell viability and protection by sensitive ingredients (+60%)
- decrease of PGE2 production (-50%)
- reduces effectively redness in vivo (-40%)
- decrease of TEWL (-65%)
- increases skin hydration (+42%)

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