

Fucoreverse

*An anti-ageing glyconutrient
for sensitive skin*



ISO 16128
FOR NATURAL COSMETIC



LESSONIA
cosmetics + ingredients



PARFUSALE
enrich your senses

THE UNIQUE COMPOSITION

FUCOSE - AN ANTI-AGEING GLYCONUTRIENT

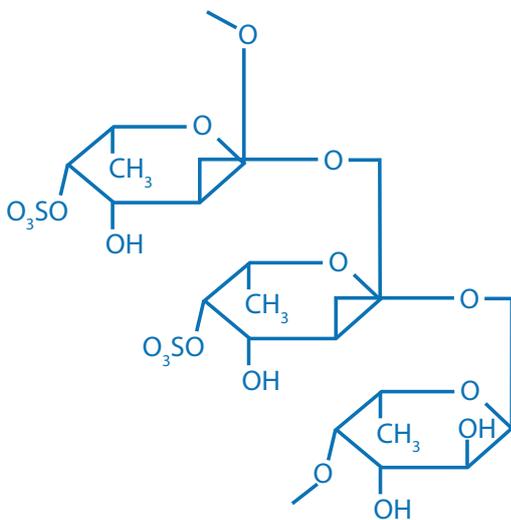
THE UNIQUE COMPOSITION OF **Fucoreverse**

Fucose is an essential sugar only present in nature, in some mushrooms and brown algae cell walls. LESSONIA has successfully developed an eco-friendly process to extract sulfated fucose by a hydrolysis of Fucoidans.

Fucoidans are high molecular weight polysaccharide (50 to 1000kDalton) of partially sulfated fucose, forming the skeleton of the algae.

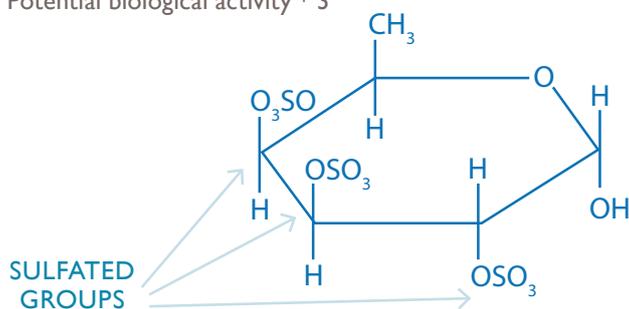
The unique technology developed by LESSONIA achieves the ultimate hydrolysis of fucoidans up to an extreme low molecular weight while saturating the fucose molecules with sulfated groups. A combination of mono, di- and trimers of sulfated fucose with a molecular weight under 2 kDa, is finally obtained. This is **Fucoreverse**.

NATIVE FUCOIDANS: ONE SULFATED GROUP PER FUCOSE



FUCOREVERSE: SATURATED FUCOSES IN SULFATED GROUPS

Fixing ability * 3
Potential biological activity * 3



CONSEQUENCES ON SKIN ABSORPTION AND BIOLOGICAL ACTIVITY

Both skin absorption and biological activity of the fucoidan derivatives are inversely proportional to the molecular weight of the molecules. Therefore, a fucoidan derivative is more active when the polysaccharide chain is short. **Fucoreverse** is able to easily penetrate when bigger polysaccharides would stay at the skin surface.

The biological activity is also directly related to the degree of sulfation of the molecule. Sulfated groups are the key to fix biological receptors and induce the activity. With its 3 sulfated groups, **Fucoreverse** has a high binding ability on the receptors and finally an advanced cosmetic activity.

For these reasons, **Fucoreverse** is the most biologically active form of fucoidan.

FUCOREVERSE: HIGH SKIN ABSORPTION



FUCOSE: AN ESSENTIAL GLYCONUTRIENT FOR THE SKIN

Fucoses are found both in the epidermis and in the dermis of the human skin where they are used by fibroblasts to synthesize glycoproteins.

Therefore, the rare sugar fucose is involved in vital functions of the human body by playing a key-role in cellular communications and cellular functions. Thus, it plays an important role as a membrane associated sugar (in glycoproteins). As a notable feature of the skin, the fucose is one of the 8 essential sugars.

The application of fucoses to the skin cells achieves a variety of stimulatory effects. It promotes the accelerated healing of wounds (regeneration) and reduces allergic reactions. Its properties qualify fucoses for its use in anti-ageing cosmetics designed for sensitive skin.

BIOLOGICAL ACTIVITY

THE PROTECTION AND THE REPAIR OF THE DERMIS



In vitro: Fibroblast proliferation: +51,1%
Collagen synthesis: +31,1%

The extracellular matrix in dermis is composed of a molecular network (collagen, elastin and glycosaminoglycans) between fibroblasts which ensures the skin's structure. When deterioration and repair of this system are imbalanced, wrinkles appear and skin loses its firmness.

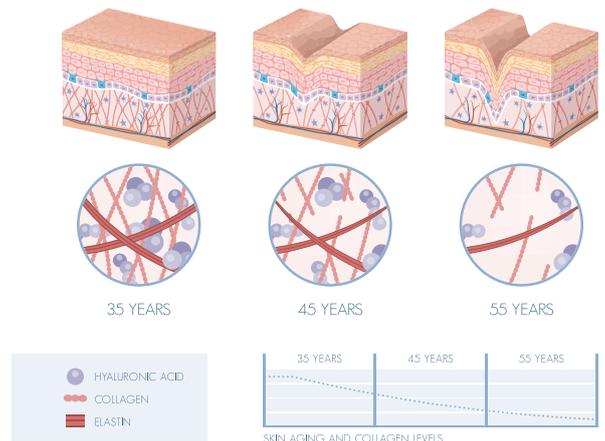
FUCOIDANS PROTECT THIS NETWORK BY:

- Inhibiting enzymes involved in extracellular matrix deterioration, such as matrix-metalloproteinases (MMP-2 and MMP-9).
- Protecting cells by lowering the oxidative stress ;
- Decreasing the pro-inflammatory cytokines which damage the collagen.
- Protecting against the advanced glycation endproducts formation which induce inhibition of the collagen synthesis.

FUCOIDANS ALSO ACT AS A REPAIRING AGENT BY:

- Stimulating metabolism of fibroblasts and collagen synthesis.
 - Stimulating elastin biosynthesis and glycosaminoglycans synthesis.
- With these 2 synergistic actions, Fucoreverse helps to reverse the signs of ageing by bringing back the skin's structure and firmness.

WRINKLES APPEAR WITH DETERIORATION OF THE EXTRACELLULAR MATRIX



IN VITRO TESTS: SKIN DENSIFYING EFFICACY OF FUCOREVERSE

PROTOCOL:

A culture of human dermal fibroblasts in contact with different doses of Fucoreverse : 0,15% and 1,5 % . ; Cell treatment were performed for 48 hours. Untreated cells were used as negative control.

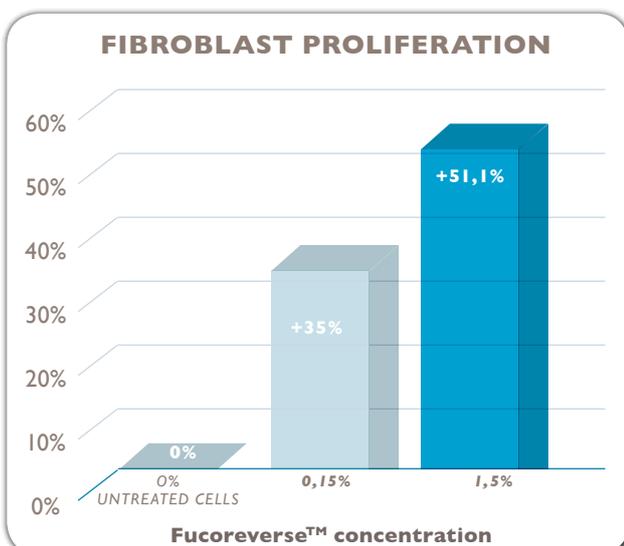
1- Measurement of cells viability and cells proliferation in comparison to non-treated fibroblasts.

2- Measurement of extracellular collagen synthesis using a culture of human dermal fibroblasts in contact with Fucoreverse.

1 RESULTS:

Fucoreverse stimulates the fibroblasts proliferation

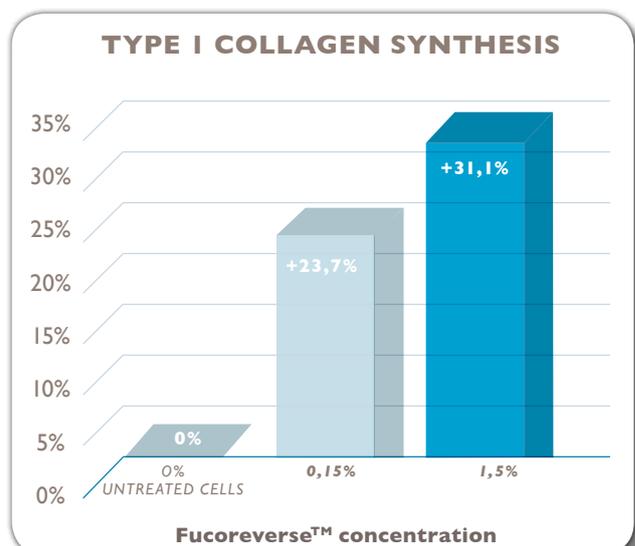
The fibroblast proliferation increases in cell culture treated with Fucoreverse compared to untreated cells.



2 RESULTS:

Fucoreverse stimulates type I of collagen synthesis

The treatment with Fucoreverse has significantly modulated the collagen synthesis in the considered experimental system.



EFFICACY

FUCOREVERSE DECREASES WRINKLES' DEPTH AND IRRITATIONS



Clinical: 70% of women observed a reduction of wrinkles up to 18,9%

CLINICAL TEST - PROTOCOL

The aim of the study is to evaluate the efficacy of **Fucoreverse** to decrease wrinkles' depth.

A clinical-instrumental study is carried out by skin profilometry which allows to evaluate wrinkles' depth.

THE FOLLOWING PROTOCOL IS USED:

- **42 volunteers** (women showing wrinkles on the crow's foot area).
- Divided in 2 groups : 21 women applied a cream with 1,5% **Fucoreverse** (**active group**), while the **placebo group** of 21 women applied the same cream without **Fucoreverse**.
- Age : 43 – 68 years of age.
- Application area : skin face and neck
- Twice a day for 28 days
- Measurements were made on Day 0 (D0), before the application, and again on Day 28 (D28).

CLINICAL TEST - RESULTS

WRINKLES' DEPTH:

Active group

Used at 1,5%, **Fucoreverse** determines a statistically significant decrease of wrinkles' depth at D28 compared to the baseline.

Average a decrease of 6,3% and **up to 18,9%**. T-test vs T0 = 0,018

70% of women observed a reduction of the main wrinkles.

Placebo group

Placebo determines a statistically non-significative increase of wrinkles' depth at D28 compared to the baseline. Average an increase of 2,8 %.

Comparaison active group and placebo group

Used at 1,5%, Fucoreverse decreases significantly the wrinkles' depth of 9,1% compared with placebo.

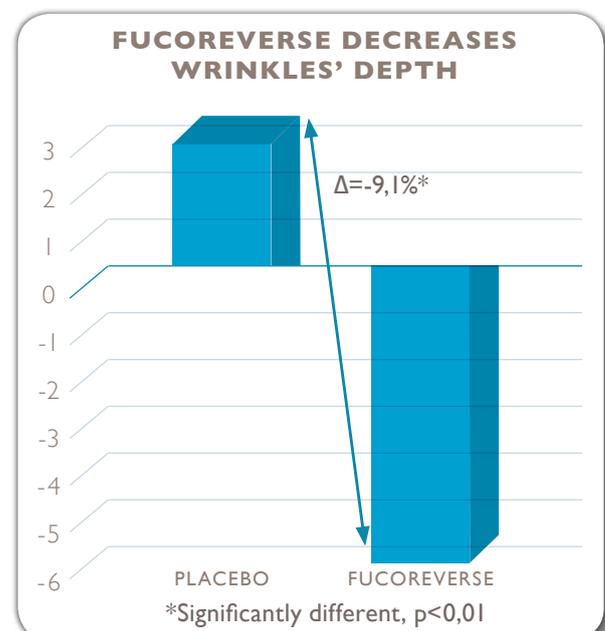
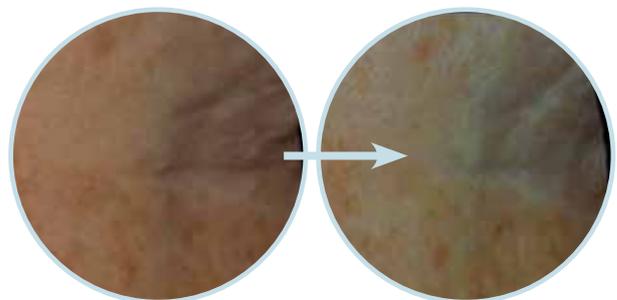
IRRITATIONS:

Active group: The result of tolerance is good

Placebo group: The result of tolerance is moderate

The study concludes that **Fucoreverse significantly decreases irritations versus placebo**. These results suggest the use of **Fucoreverse** to calm sensitive skins.

MACROPHOTOGRAPHY: EFFECT OF 1,5% FUCOREVERSE ON CROW'S FEET WRINKLES.



FOCUS ON THE PRODUCT

Designed for anti-ageing skin care products and particularly suitable for sensitive skins, Fucoreverse is composed of fucoses which play a major role in the skin physiology as they are a constituent of the cellular receptors. It allows regulation of the inflammation, the protection of the extracellular matrix and its regeneration.

A clinical trial on Fucoreverse, randomized double-blind against placebo, concerning 42 subjects, highlighted a significant reduction of wrinkles' depth. The difference between the active group and the placebo group was on average 9,1% and up to 18,9% with the active group (student test $P < 0,01$). Moreover, the clinical trial confirmed a better skin tolerance of the product in the active group compared with the placebo.



The Iroise Sea

Laminaria from the Iroise Sea

The specificity of the fucoidans present in the cellular membranes of Laminaria from the Iroise Sea (France) is their high sulfated fucose content. This laminaria has developed a defence system enabling it to resist to the extreme conditions of the Brittany coast (storms, ocean currents and very high tides).

The fucoidan structure in the cell walls of these algae plays a protective and restorative role in rebuilding the tissues after a storm. The capacity of these molecules to protect and repair cells was a source of inspiration for Lessonia.

Eco-friendly marine biotechnology process

Fucoreverse is made on the principle of an algae biorefinerie.

Fucoidans are extracted and hydrolyzed to manufacture Fucoreverse whereas other compounds are extracted and used for other applications (gelling agent, agricultural compounds...).

This optimized process allows to limit largely the marine resources used. Finally, there is almost no waste produced by this extraction process.

SUMMARY

Technical information

■ Regulation:

- Suggested INCI: Glycerin & Aqua & Hydrolyzed fucoidan
- Worldwide approval for cosmetic applications
- Origin: Marine polysaccharide hydrolysis
- Preservation: Preservative free
- Certification: Cosmos certification pending

■ Technical:

- Appearance: Limpid yellow liquid
- Solubility: Water soluble
- Recommended dosage: 1,5 %
- Processing: Can be added to the water phase. Formulated at any temperature and a pH between 3 and 8
- 100% Natural origin according to Iso 16128 for natural and organic cosmetic ingredients

Applications

- Anti-ageing
- Anti-wrinkles
- Sensitive skin
- Skin regeneration
- Eye contour
- Skin perfectors



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FOR NATURAL COSMETIC

COSMOS COMPLIANT

ABOUT LESSONIA

With many years of experience in the development of cosmetic ingredients and also in algae extracts, LESSONIA, with its headquarters in Brittany is one of the leaders in marine ingredients for cosmetic use. Taking its inspiration from the biodiversity of its environment, LESSONIA develops ranges of natural products from algae.

Marine glycotecnology involves hydrolyzing algae polysaccharides to obtain precise fractions of biologically active Oligosaccharides. It was in this context that LESSONIA researchers, experts in marine glycobiology, discovered the new cosmetic applications of marine oligosaccharides.

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