APOENA
MORE THAN NATURAL, SUSTAINABLE

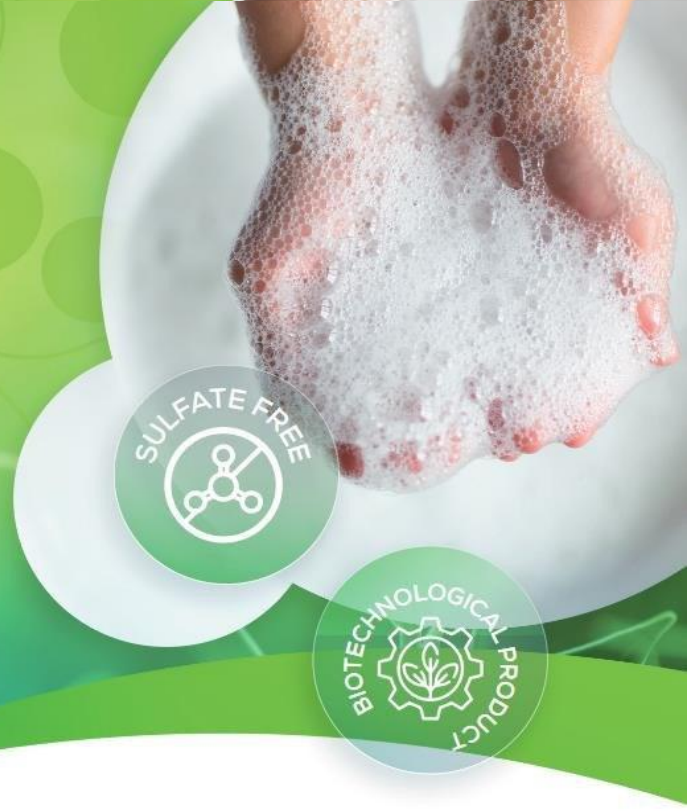
Ramnocare

INCI: AQUA, RHAMNOLIPIDS, BENZYL ALCOHOL, ETHYLHEXYLGLYCERIN

High-performance **multifunctional** biosurfactant with **anti-oxidant** and skin protection properties.

It cleans the skin gently skin irritation.

It can be used to replace traditional surfactants or as a co-surfactant.



Ideal for soap, shampoo, and make-up remover formulations sulfate-free.

Recommended usage levels: 2 to 6%

You no longer need to choose between a **high-performance** product or a **sustainable** product - you can have both.

Ramnocare is produced using microorganisms, and, in addition to its tensile properties, it offers **improved antioxidant** and **skin protection** benefits.

Antioxidant properties *(in vitro)*

Evaluation of Ramnocare's antioxidant properties in human epidermal fibroblasts:

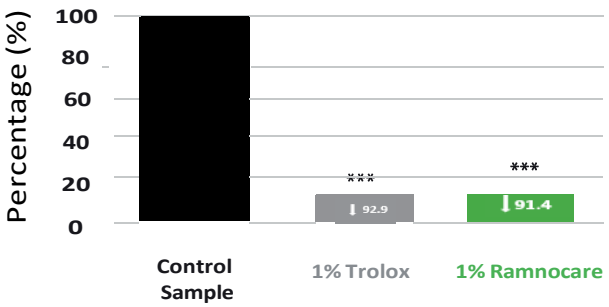
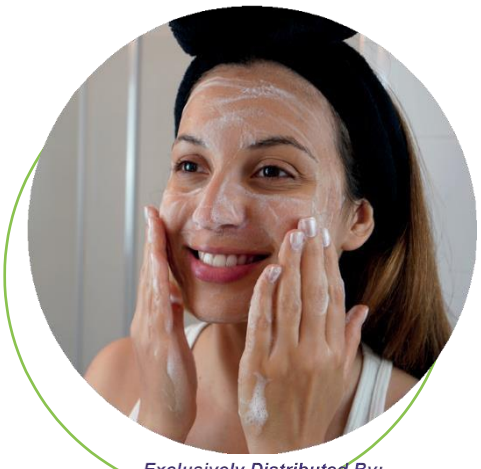


Chart 1: Free-radical production (%). The results show similar effectiveness for both the Ramnocare biosurfactant and the antioxidant vitamin E analog (Trolox). ***p<0.001



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Ex vivo evaluation of inflammatory activity

Evaluation of inflammatory cytokine production in supernatants from human skin culture treated with the products:

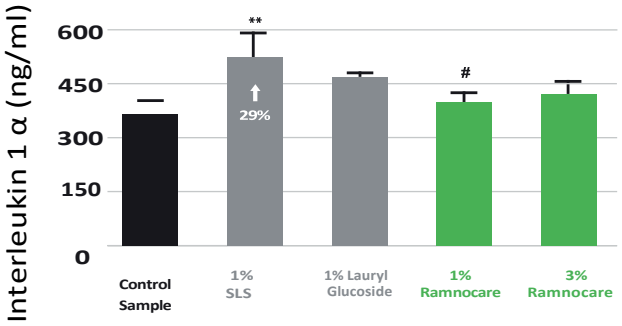

Chart 2: Quantification of IL-1α synthesis. No difference was found between the control sample and the samples treated with Ramnocare solutions. The results showed no skin irritation induced by Ramnocare. Whereas the 1% sodium lauryl sulfate solution induced synthesis of IL-1α at significantly higher levels when compared to Ramnocare. ** p<0.01 in relation to the control sample; # p<0,05 in relation to the 1% SLS solution.

Stability

Ramnocare has the ability to reduce water surface tension even after exposure to extreme temperature, pH, and salinity conditions. When we evaluated Ramnocare's ability to reduce water surface tension against the reduction promoted by sodium lauryl sulfate at the same concentrations, Ramnocare showed improved tensile effect.

Sample	Surface tension (mN/m-1)
Water	72.75
Ramnocare at normal conditions	25.9
Ramnocare pH5	26.5
RamnoCare pH7	26
RamnoCare pH9	26.2
6% RamnoCare NaCl	26.45
12% Ramnocare NaCl	26.5
Ramnocare at 100ºC for 15min	26.2
Ramnocare at 100ºC for 30min	26.2
Ramnocare at 100ºC for 60min	26,3
1% Sodium lauryl sulfate	31.8
1% Ramnocare	27.8

Table 1: Evaluation of Ramnocare's ability to reduce water surface tension at different conditions.

Foam Formation

Figure 1: Comparing foam formation properties exhibited by a 2% solution of Ramnocare (RC), a 2% solution of lauryl glucoside (LG) and a 2% solution of sodium lauryl sulfate (SLS). Ramnocare exhibited the same foam formation effect as the lauryl glucoside solution. The SLS solution produced higher foam volume, but the foam was less dense.

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Skin protection *(in vitro)*

Evaluation of gene expression of skin barrier and skin hydration markers in human epidermal keratinocytes:

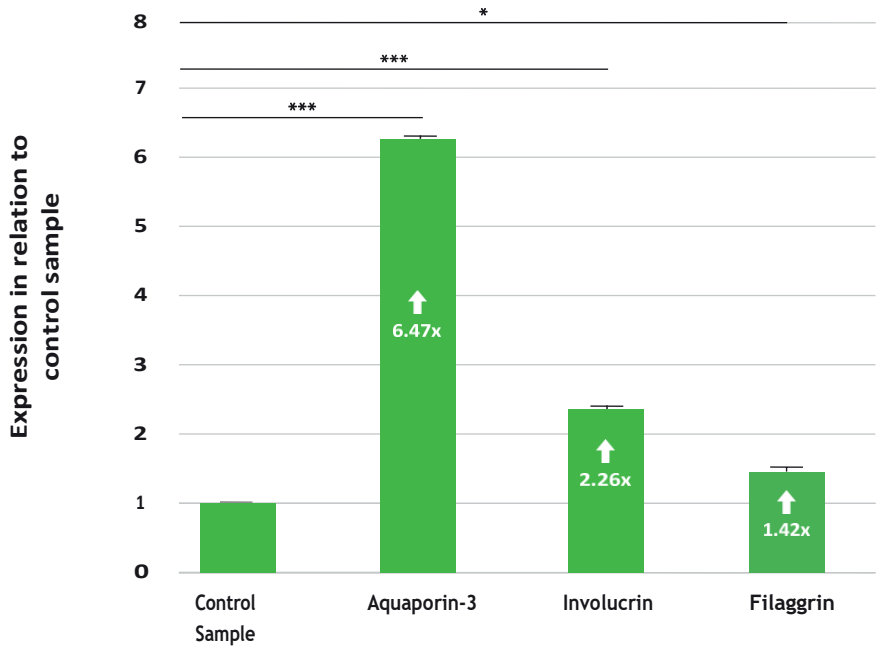

Chart 3: Relative expression of **aquaporin-3**, **involucrin**, and **filaggrin** genes in relation to the control group in samples treated with Ramnocare. Expression was determined using quantitative RT-PCR.
*p<0.05 ***p<0.001.
These results show that Ramnocare can potentially maintain skin cell cohesion, resulting in improved hydration, filling, firmness, and epidermal barrier formation.

Evaluation of Ramnocare as an active for make-up remover lotion asset

The efficacy of makeup remover formulations was determined by their ability to remove makeup. Formulations using different tensoactives, placebo formulations, and commercial makeup remover were evaluated.

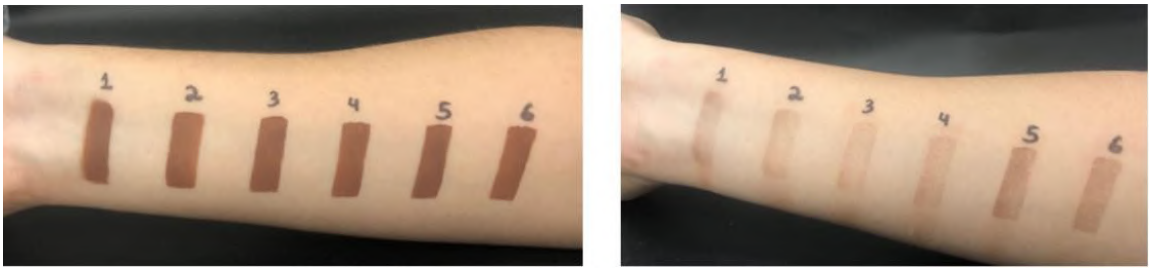

Figure 2: 1-RamnoCare (2%), 2-RamnoCare (4%), 3-Sodium Lauryl Sulfate (12.5%), 4-Lauryl Polyglucoside (7.5%), 5- Placebo, 6- Commercial makeup remover.

By visually comparing the removal of the base with different tensoactives, it can be observed that the formulation containing RC (4%) not only had a similar performance to the formulation with LG (7.5%), but was also able to better remove makeup when compared to commercial makeup remover.