

ACTIMULSI GA 20

A NEW MULTIFUNCTIONAL BIOACTIVE FOR MORE EFFECTIVE AND NATURAL COSMETICS FORMULATION

INCI Name: Acacia Senegal Gum Extract

Plants have evolved sophisticated innate immune system during long period evolution against pathogens. Pathogen-associated molecular pattern (PAMP)-triggered immunity (PTI) serves as a primary plant defense response against microbial pathogens, while plant Resistance (R) proteins can recognize pathogen effectors to initiate a stronger defense mechanism, termed effector-triggered immunity (ETI). Part of the pathogen-associated molecular pattern (PAMP) immune system of the plant is based in the production of an exudate, which acts as a chemical barrier, preventing attacks by pathogens and allowing for the recovery of the plant tissue.

This exudate is mostly composed of heteropolysaccharides with a complex structure, with different sugars such as arabinose, galactose, glucose, rhamnose, xylose and uronic acids that form a sophisticated polymeric structure with unique properties.

The Acacia senegal is a species of leguminous genus Acacia native to semi-desert regions of Sub-Saharan Africa.

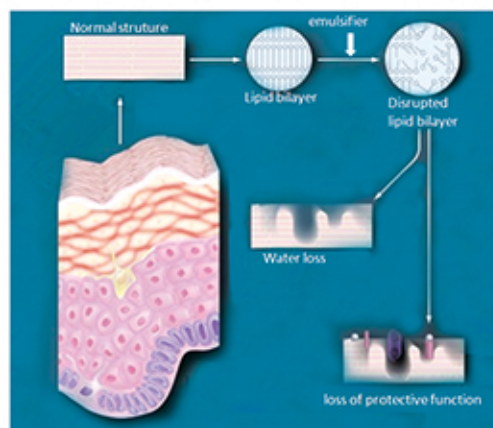
When subjected to attacks by microorganisms, environmental stress or suffer any physical damage, Acacia senegal exudes a gum that protects and helps the plant in its regeneration.



ACTIMULSI GA 20 is a new ingredient, extracted from the exsudate of Acacia Senegal. ACTIMULSI GA 20 is a branched heteropolysaccharide (acid arabinogalactan) containing approximately 70% of galactose and 12% of glucose, rhamnose, xylose and uronic acids. ACTIMULSI GA 20 also contains other defense-related molecules from the secondary metabolism of the plant. Due to its structural characteristics, ACTIMULSI GA 20 acts as a co-emulsifying natural agent.

EFFECT OF EMULSIFIERS ON THE SKIN

Emulsifiers can damage the skin barrier by emulsifying the intercellular lipids and disrupting the lipid bilayer, increasing TEWL and impairing the protective function of the skin.



EVALUATION OF THE STABILITY OF EMULSIONS THROUGH THE ANALYSIS OF MICELLES

Computational analysis of the distribution of micelles by size over time is a good method for evaluating the stability of an emulsion (See Figure 1).

Micelles in less stable emulsions show a tendency to coalesce, but in stable emulsions they remain unchanged.

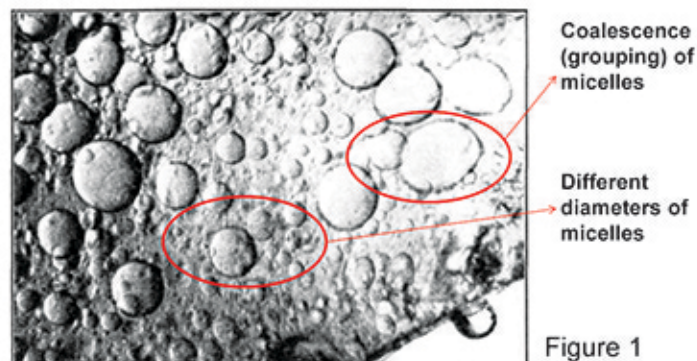


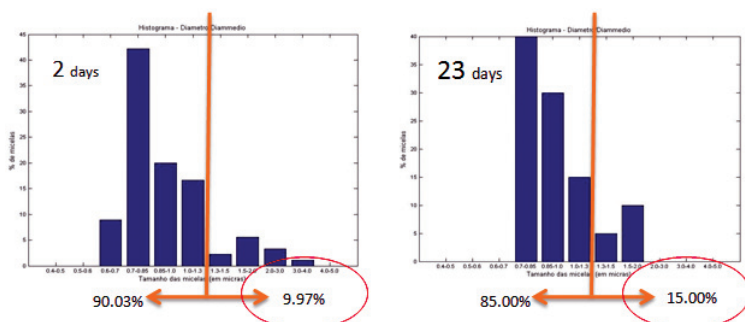
Figure 1

The effect of ACTIMULSI GA20 on the stability of an emulsion was tested. A formula (Control Formula - CF) containing 2.75% Laureth-23 as a co-emulsifier was compared with a test formula (Test Formula – TF) containing 1% of ACTIMULSI GA20, where the emulsifier concentration was reduced to 1%. The stability of both formulas was evaluated over 23 days using computational analysis (a proprietary program developed over a MATLAB™ platform).

Results are seen below

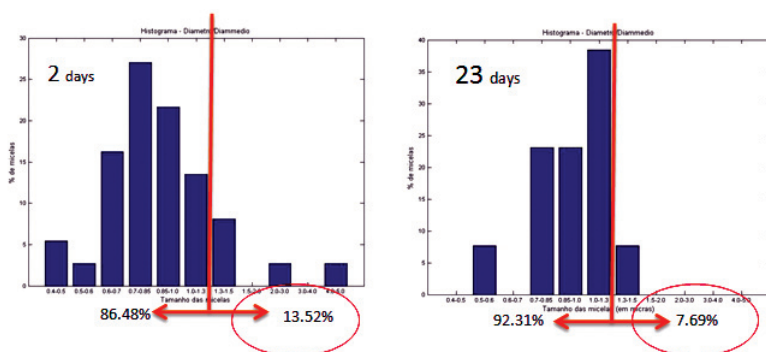
Graphs 1 and 2 below show the distribution of micelles in the emulsions of control formula (CF) and test formula (TF1), after 2 and 23 days.

CONTROL FORMULA



Analysis of the control formula with 2.75% Laureth-23 shows the increase of the number of large micelles, a clear indication that the micelles in this formula are coalescing.

TEST FORMULA



Test formula with ACTIMULSI GA20 + 1% Laureth-23 shows the decrease of the number of large micelles.

Analysis of the results show that the micelles in the test formula, containing only 1% emulsifier (Laureth-23) are more stable over time than the control formula (CF) containing 2,75% Laureth-23. The use of ACTIMULSI GA 20 into the test emulsion also allowed for the reduction of Laureth-23 by 63.6% without loss of stability.

ANALYSIS OF THE MORPHOLOGY OF MICELLES

Similarly to the analysis of the stability of emulsions, the computational analysis of the morphology of the micelles is a good indicator of the sensory attributes of an emulsion.

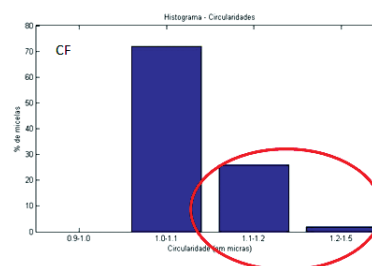
Emulsions formed by spherical-shaped micelles generally have better sensory attributes when compared to emulsions formed by odd-shaped micelles.

Thus, the effect of ACTIMULSI GA20 on the shape of the micelles in an emulsion was tested. A formula (Control Formula - CF) containing 2.75% Laureth-23 as a co-emulsifier was compared with a test formula

(Test Formula– TF) containing 1% of ACTIMULSI GA 20, where the emulsifier concentration was reduced to 1%. The analysis of the shape of both formulas was evaluated using computational analysis (a proprietary program developed over a MATLAB™ platform). Results are seen below.

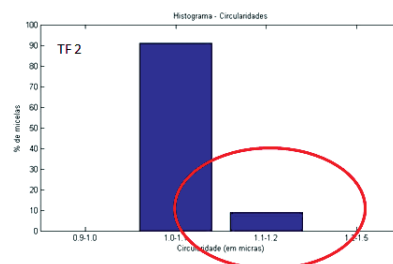
Graphs 3 and 4 below show the distribution of micelles accordingly to their shape (circularity /sphericity) in the control formula (CF) and test formula (TF2).

CONTROL FORMULA



Analysis of the control formula with 2.75% Laureth-23 shows a poor distribution of spherical micelles in the emulsion.

TEST FORMULA

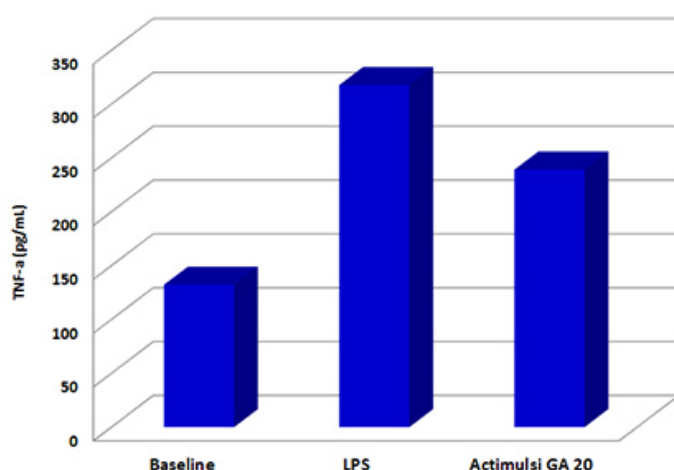


Test formula with ACTIMULSI GA20 + 1% Laureth-23 shows a better sphericity, with 90% of the micelles in the optimum range, while the control formula showed only 70% of the micelles in the ideal range of circularity/shpericity.

The increase in the average sphericity of the micelles in the test formula leads to a better skin feel of the emulsion. Comparative tests performed with both formulas showed a clear preference of the panelists for the test formula (TF2), reaching high scores of “smooth” and “silk touch” and “good preadability” attributes.

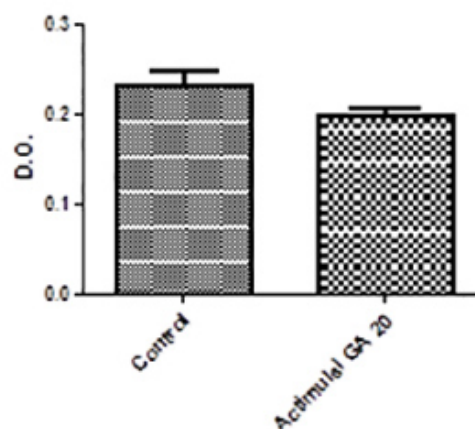
ANTI-INFLAMMATORY ACTIVITY

Evaluated by TNF- α release from macrophage culture stimulated with LPS. Macrophages were incubated for 1 hour in the presence of test compound. After this period, the cells were stimulated with LPS (100 ng / ml) for 24 h. Supernatant was collected and subjected to cytokine quantification by ELISA.



ACTIMULSI GA20 at 1 % reduced the production of TNF- α in stimulated macrophages by 24.7%

CELL VIABILITY BY MTT



ACTIMULSI GA20 is not toxic to macrophages at 1% concentration

ACTIMULSI GA20 is a natural plant-derived bioactive that combines the ability of stabilizing emulsions with an intense biological activity, promoting the regeneration of the skin and stimulating the synthesis of collagen I and III.

The use of ACTIMULSI GA20 in emulsion formulas also improves the product's sensory attributes, adding a pleasant dry / silky feeling to the skin.

ACTIMULSI GA20 is a perfect choice for a "greener formula", reducing the need of ethoxylated emulsifiers in cosmetic formulas, while keeping them stable and safe.

Recommendations for use

Product	(%)
Moisturizing creams	1.0 to 2.0
Moisturizing lotions	1.5 to 3.0
Anti-ageing emulsions	1.5 to 3.0
Night creams	1.5 to 3.0
Serums for the scalp	1.5 to 3.0