

SPF Boostering Effects Of Olive Derived Emulsifiers

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Introduction

Cetearyl Olivatate/Sorbitan Olivatate* is a natural PEG free emulsifying system derived from olives via a mild esterification process of the fatty acid groups from the stabilized oil with sorbitol and cetearyl alcohol.

This ingredient can create oil in water creams and lotions through the formation of liquid crystal structures. In such systems the emulsifier stays at the interface of a two phases system in a preferential direction, placing the polar head into the aqueous phase and the non-polar tail into the lipid phase¹.

This organization gives the emulsions a very high hydrating property, due to the water that is kept inside the lamellar network. Many studies show that liquid crystal reticule increases the hydration capacity on the skin, both in the short then in the long term², improves the active delivery system and stabilizes the oil phase as well.

Cetyl Palmitate/Sorbitan Palmitate/Sorbitan Olivatate** is a vegetal base multi-ester complex designed as an additive to stabilize O/W systems for skin-care, make-up and sun-care applications. Its natural derivation from olive oil and its capability to re-organize the emulsion structure by forming smaller and more homogeneous distribution size oil droplets makes Cetyl Palmitate/Sorbitan Palmitate/Sorbitan Olivatate perform improved efficiency of the final product in terms of sensorial profile and sun-protection.

In-vitro tests made on simple sun-care formulations containing our ingredients (Cetyl Palmitate / Sorbitan Palmitate / Sorbitan Olivatate and Cetearyl Olivatate / Sorbitan Olivatate), in comparison with a control sample not containing any of the olive derivatives, have demonstrated that these two new ingredients work together improving the SPF value (SPF 11.53 ± 0.73 for the formulations made with Cetyl Palmitate/Sorbitan Palmitate/Sorbitan Olivatate and Cetearyl Olivatate/Sorbitan Olivatate vs SPF 7.81 ± 0.13 for the control).

Finally, Sorbitan Olivatate*** is another natural PEG-free emulsifier derived from olive oil indicated for W/O and W/S

formulations³, with very high coating properties for powders and pigments. Thanks to its particular molecular structure, Sorbitan Olivatate is also used as a functional lipid in sun-screen applications making the powder dispersion easier: in sun products it can improve the homogeneity of the sunscreen giving better efficacy and stability performance⁴. Sorbitan Olivatate can work as co-emulsifier in O/W sun-care emulsions improving the final viscosity and helping the powder dispersion too.

Testing

The synergic activity in sun-care products respectively of Cetyl Palmitate/Sorbitan Palmitate/Sorbitan Olivatate and Sorbitan Olivatate versus Cetearyl Olivatate/Sorbitan Olivatate has been studied into an *in vivo* system, in order to evaluate the improvement of the sun protection factor on a range of human volunteers.

The solar protection degree has traditionally been reckoned through the test of the solar protection factor (SPF), which evaluates the erythematous reaction of the skin to the ultraviolet radiation. The solar protection factor (SPF) is the ratio between the necessary energies to produce the slightest erythematous reaction - with or without the application of a solar product on the volunteers' skin - using an ultraviolet radiation coming from an artificial source (xenon arc lamp solar simulator).

To determine the Sun Protection Factor, incremental series of delayed erythematous responses are induced on a number of small sub-sites on the skin of selected human subjects. The test is restricted to the area of the back between waist and shoulder-line. An area of each subject's skin is exposed to ultraviolet light without any protection and another (different) area is exposed after application of a test sun protection product. Furthermore at least one further area is exposed after application of a SPF standard sunscreen.

By incrementally increasing the UV dose, varying degrees of skin erythema (redness due to superficial vasodilatation) are generated. These delayed erythematous responses are visually