With The Emulsifying Power Of the Sunflower – Hostacerin® SFO, A Co-Emulsifier Based On Natural Sunflower Seed Oil

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Abstract

Hostacerin® SFO is a novel co-emulsifier based on vegetable, renewable, and GMO-free resources. It follows the trend of ecological, natural based ingredients and is manufactured by a low energy consuming one-step process directly from high oleic sunflower oil, which provides the product with excellent oxidation stability.

Introduction

Emulsifiers are essential base ingredients for any cosmetic cream or lotion. They lower the surface tension between oil and water and allow the formation of stable emulsions by generating electrostatic and sterical repulsion between the emulsion droplets. Depending on their molecular structure, they also influence the viscosity of the cosmetic product. Traditional, widely used emulsifiers are ethoxylated fatty alcohols. In the more hydrophobic category, glyceryl stearate or sorbitan oleate are still widely used and cost effective components.

Over the last decade, however, due to discussions about the safety/tolerability of ethoxylated emulsifiers and the mineral oil origin of the hydrophilic part of ethoxylates, a trend towards EO-free emulsifiers can be detected. Additionally, public awareness of global warming has initiated a debate in the cosmetic industry to search for ways to reduce the greenhouse impact of cosmetic products. The majority of emulsifiers in the personal care industry are nowadays plant based and therefore already based on renewable resources. However, this is not the sole factor in regards to the greenhouse impact of cosmetic raw materials. In an overall assessment, the CO_2-balance of the raw material processing of natural based ingredients should also be taken into consideration.

In the past, the industry mainly worked with emulsifiers based on refined fatty acids or fatty alcohols. This is due to the fact that through the use of pure fatty acid cuts (mainly saturated cuts) the application properties of the final emulsifier can be modified very widely. An additional reason is the oxidative stability of the raw material, which is improved, if saturated cuts are used. These processing steps are, on the other hand, connected with a high energy consumption for refining and distillation of the intermediates, which makes the eco-balance less favourable.

Emulsifiers based on natural plant oils, however, were quite rare, as natural plant oils normally contain significant amounts of unsaturated and especially polyunsaturated fatty acids like linolic and linoleic acid, which cause an undesired, fast oxidation of the cosmetic raw material. In the meantime, however, non-GMO high oleic plant oils are available. They are ideal feedstocks for manufacturing emulsifiers with a low melting point, excellent handling and nevertheless high oxidative stability.

Based on high oleic sunflower oil, we have developed Hostacerin® SFO (Sunflower Seed Oil Sorbitol Esters), a material which is based on non-GMO, natural sunflower oil using a low energy consuming transesterification method, which minimises the overall greenhouse impact of processing. In the following article the composition and the manufacturing process of this new ingredient in comparison to Sorbitan Oleate will be discussed. In the second part, application studies in skincare formulations are provided and discussed.

Composition and Properties of Hostacerin® SFO

Hostacerin® SFO is obtained from natural sunflower oil and the polyol sorbitol via a transesterification reaction. As both starting materials come from natural sources, Hostacerin® SFO is 100% based on renewable resources. As an additional benefit, the atomic economy of the product is 100%, i.e. both raw materials are completely consumed and no side-products or waste streams are formed in processing. The composition is a complex mixture of sorbitol esters and partial glycerides, which both act as emulsifiers as well as low amounts of residual triglyceride and sorbitol, which enhance moisturisation. These components interact synergistically and therefore