

Sorbitan Caprylate – the Preservative Boosting, Multifunctional Ingredient

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Abstract

Sorbitan Caprylate (Velsan® SC) is an Ecocert-approved multifunctional ingredient which is based 100 % on renewable resources. It helps to thicken surfactant systems and can help to stabilise emulsions, as it has a co-emulsifying property on top. Furthermore, Sorbitan Caprylate can boost the efficacy of preservative systems. It shows an excellent synergism with e.g. aromatic alcohols or organic acids. This property helps to reduce the amount of classical preservatives without reducing the high level of a safe preservation of cosmetic formulations. As Sorbitan Caprylate is not listed as a preservative, together with non-listed actives 'preservative-free' claims can be made.

Introduction

For a range of different reasons the trend to use less classical preservatives for the preservation of cosmetic products continues unbroken. The group of the above mentioned classical preservatives includes halogenated substances, formaldehyde-donors and Parabens. These preservatives, which have been used most widely for the preservation of cosmetic formulations⁽¹⁾, are easy to work with, as in most cases they are not limited to a special pH range, do not alternate the viscosity of a formulation or modify the smell. As alternatives to classical preservatives, aromatic alcohols like Phenoxyethanol and Benzyl Alcohol or organic acids are used, especially as the Benzyl Alcohol and many organic acids are seen as 'naturally based' preservatives. Additionally several products which are not listed on Annex V of the European Cosmetic Regulation or on the Japanese Standards for Cosmetics list are offered to the market in combination with listed preservatives or as stand alone solutions.

Switching from classical preservatives to alternatives often needs a readjustment of the entire formulation setup. Organic acids, for example, are only active in low pH formulations, so a pH < 5.5 is needed. Aromatic alcohols have a strong smell and often tend to decrease the viscosity of a formulation. This is the reason why normally not more than 0.5 % of an

aromatic alcohol is used, even though it would be possible to add 1.0 % to a cosmetic formulation from a product safety perspective.

Non-listed alternatives often have a strong smell, for example botanical extracts and often lack a longer use history, so that their real toxicological profile is as yet unknown. In summary, a universal alternative preservative which can be seen as a real replacement to classical preservative groups is not yet available.

Sorbitan Caprylate

To follow the trend of reducing or replacing classical preservatives and to claim a 'natural' preservation, organic acids are used. This group consists mainly of Benzoic Acid, Salicylic Acid and Sorbic Acid, which are listed as preservatives, and the non-listed Anisic Acid. While these organic acids show a really good performance against fungi, they are rather weak against both Gram-positive and Gram-negative bacteria. It is an advantage that the growth of Gram-negative bacteria is already weakened at a pH < 5.5, a pH limit which is needed for organic acids to be active. For closing the gap against bacteria it is advisable to combine organic acids with alcohols. Apart from the well-known aromatic alcohols Phenoxyethanol or Benzyl Alcohol, other actives like Ethylhexylglycerin or 1,2-Octanediol can be used. Apart from Benzyl Alcohol, none of these actives is seen as a 'natural' preservative, as they are based on synthetic raw materials. The common structure of these surface-active molecules is to have a hydrophilic head group and a mid-chain lipophilic tail. A molecule which has the same structural motive is Sorbitan Caprylate.

Sorbitan Caprylate is a multifunctional ingredient. It is not only known as a hydrotrope but also as a co-emulsifier helping to stabilise emulsions. In addition, it can help to build up viscosity. While this effect in leave-on formulations is dependent on the chosen system, the viscosity increasing ability of Sorbitan Caprylate in surfactant based systems is high. As especially mild surfactant based rinse-off formulations are often hard