PERSONAL CARE

Crodafos CES

Conditioning and emulsifying system

Crodafos CES is a new phosphate-based emulsifying and conditioning wax conferring excellent functionality to personal care systems. As a finely-balanced complex blend of fatty alcohol and phosphate esters, Crodafos CES constitutes a synergistic emulsifying and conditioning system, offering formulating advantages over more conventional phosphate-based emulsifiers. Through a combination of its distinct chemical nature, surface activity and the rheological properties of the finished emulsion, Crodafos CES is highly recommended for both skin and hair care products.

Applications

- sun protection products
- skin creams/lotions
- phospholipid/liposome moisturising creams
- baby care
- ethnic hair care systems
- depilatories
- permanent waves
- hair colorants

The impressive functionality of Crodafos CES has been proven in both a skin care study, evaluating Crodafos CES as an enhanced delivery system for sunscreens, as well as a specialist hair care study conducted with ethnic hair relaxer systems. Supplied in easy-to-handle pastille form, Crodafos CES can be neutralised *in situ* with any amine or metal hydroxide base to produce highly stable and effective emulsions.

Skin care

Benefits

- phospholipid-like structure
- naturally substantive to skin
- conditioned afterfeel
- versatile oil-in-water emulsifier
- self-bodying
- exhibits shear thinning (thixotropic)
- combined release of oil and water
- greater oil phase deposition
- promotes higher waterproof SPFs in sunscreens
- phase inversion contributes to greater stability

It is believed that phosphate esters are naturally substantive and mild to skin due to the similarity of their chemical configuration to phospholipids which are important constituents of cell membranes. Crodafos CES has been carefully blended to optimise the performance benefits of its natural substantivity as a phosphate ester, and may constitute an ideal delivery system for liposomes or phospholipids which are frequently used in speciality moisturising creams targeted at the mature skin care market. The use of a phosphate ester based emulsion as a vehicle for this type of moisturising active has already been documented[i].

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In oil-in-water systems, Crodafos CES forms extremely stable emulsions. During manufacture these emulsions undergo a phase inversion which contributes to the final stability of the product.

In addition, emulsions based on Crodafos CES exhibit thixotropy (shear thinning), which promotes the combined release of oil and water from the system to leave a substantive, waterproofing layer of oil on the skin surface. As a result Crodafos CES is ideal both as an emulsifying base to produce conditioning skin creams/lotions and protective baby creams as well as a delivery vehicle for oil soluble actives eg sunscreens.

Sun protection factor study

Emulsion rheology is an important factor influencing the effectiveness of sun protection products based on physical sunscreens[2]. An independent study was conducted to evaluate the waterproof sun protection factor (SPF) of a Crodafos CES emulsion compared to a nonionic emulsion. Results show that Crodafos CES provides greater oil deposition and improved resistance to wash-off, producing sunscreen preparations with higher static SPFs and more persistent waterproof SPFs.

The two-part study used a standard sunscreen formulation, containing either Crodafos CES or the equivalent concentration of a nonionic emulsifier. Varying levels of sunscreen agent were used to determine the static and waterproof SPFs registered by human skin. FDA protocols were followed, using an adaptation of the method outlined in the Federal Register, volume 43, number 166. Throughout testing radiation was monitored continuously using a sunburn UV meter.

The Crodafos CES emulsion containing 7.5% active sunscreen increased the static SPF by approximately 15% and the waterproof SPF by approximately 20% compared to the nonionic control emulsions. The enhanced sunscreen performance of Crodafos CES is depicted in Figure 1. It is believed that the consistently higher waterproof SPFs are due to a combination of the greater initial oil deposition of the Crodafos CES system and its increased resistance to wash-off as a substantive phosphate-based emulsifying wax.

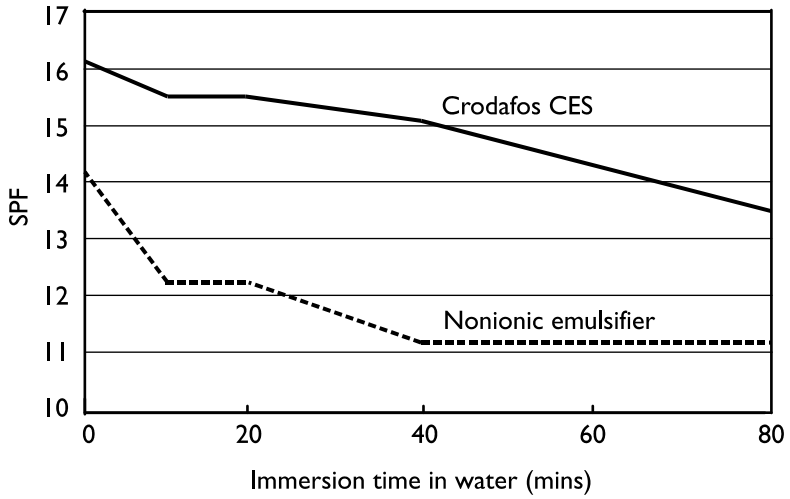

Figure 1: Evaluation of waterproof sun protection factor

A copy of the sun protection factor study is available on request.

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Ethnic hair care

Benefits

- wide pH compatibility
- shear thinning (thixotropy) aids application
- promotes rapid penetration of the hydroxide ion
- prevents over processing and consequent cuticle damage
- conditions and reduces dryness
- improves hair sheen
- low scalp irritation potential

The highly efficient emulsifying and self-bodying properties of Crodafos CES make it suitable as a base for a number of hair care products. However, because of its unusual performance characteristics it is especially recommended as an emulsifying and conditioning system for ethnic hair relaxers.

Ethnic hair relaxer study

Extensive in-house studies and independent salon trials have shown that relaxers based on Crodafos CES cause less cuticle damage than traditional relaxers and so improve the look and feel of relaxed hair. Crodafos CES can form relaxer creams which display a balance of hydroxide ion penetration and oil deposition, an action that enables rapid relaxation of the hair, reducing contact time and significantly lowering potential cuticle damage and scalp irritation.

A summary of the performance results from the in-house studies and salon trials is available on request.

An additional information sheet describing the recommended procedures for hair relaxer manufacture using Crodafos CES is also available.

INCI name

Cetearyl Alcohol and Dicetyl Phosphate and Ceteth-10 Phosphate

Health and safety

Crodafos CES is expected to possess a relatively low degree of acute oral toxicity and is essentially non-irritating at in-use dilutions. Results of a 50 person Repeat Insult Patch Test evaluating Crodafos CES neutralised to pH 7 with sodium hydroxide showed zero irritation.

References

[i]. Oil-in-water emulsion containing aliphatic phosphate, natural phospholipids, and moisturizer, Kao Corp., Japan (JP 62204842)

2. Rheology – its effect on physical SPFs, J Hewitt and G H Dahms, SPC March 1996

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