

Polawax

Nonionic emulsifying waxes

Polawaxes are well-established nonionic emulsifying waxes which have been used successfully in the personal care and pharmaceutical industries for many years. As optimised combinations of vegetable-derived emulsifiers and stabilisers the Polawax proprietary blends offer formulators quick and reliable solutions to a wide variety of emulsification problems.

Due to their versatility Polawaxes can be used in both skin and hair care systems, producing emulsions with excellent texture and stability. In skin care products the formation of liquid crystals within the emulsion promotes 'time release' hydration, and also functions as a slow release delivery mechanism for actives.

Using Polawax as the emulsifying system reduces the development time for new product innovations and minimises raw material inventories, thereby lowering costs overall. Two grades are available*:

Product	Appearance	Function
Polawax GP200	White powder	General purpose emulsifying wax
Polawax NF	Yellow pastilles	General purpose emulsifying wax conforming to United States National Formulary monograph

* Polawax A31, an emulsifying wax developed for use in aerosol quick-breaking foams, is also available. Please refer to the personal care sales department for further details.

Functional benefits

- mild, oil-in-water self-bodying emulsifiers
- liquid crystal formation promotes 'time-release' hydration
- emulsions represent stable vehicles for the delivery of most actives over a wide pH range
- excellent ambient and high temperature stability.
- emulsions show good long-term storage stability
- electrolyte tolerant
- no neutralisation required

Applications

Skin care

- moisturising creams and lotions
- sun protection systems
- aftersun products
- sunless tanning creams and lotions
- AHA/BHA creams
- baby creams and lotions
- night creams
- anti-wrinkle creams
- pharmaceutical ointments and bases
- depilatories
- antiperspirants/deodorants

Polawax creams and lotions represent stable formulation bases for a wide range of moisturising skin products, sunscreens, baby care systems and speciality treatment products. As inert bases Polawax emulsions are ideal delivery systems for low and high pH actives, including alpha hydroxy/beta hydroxy acids in facial treatments, aluminium salts in antiperspirants/deodorants and thioglycollates in hair removal products. In the healthcare sector, Polawax NF in particular has a long history of safe use as an emulsion base for the topical delivery of pharmaceutical actives.

Hair care

- hair conditioners
- cream rinses
- hair bleaches
- chemical hair relaxers/straighteners
- hair colorants

Polawax emulsions are equally valuable in the formulation of hair care products. Their stability in low and high pH environments makes them suitable bases for conditioners using cationic conditioning agents, hair bleaches, ethnic hair relaxer systems and hair colorants.

Emulsion stability

Scientific research has shown that emulsion stability is linked to the formation of lamellar phases (liquid crystals) in which the emulsifier is arranged in bilayers incorporating large quantities of water¹. The swollen lamellar liquid crystalline phases form a rheological barrier to coalescence, reducing the van der Waals forces of attraction between the dispersed oil droplets. Figure 1 shows the liquid crystals and lamellar gel phase produced by a typical Polawax NF emulsion.

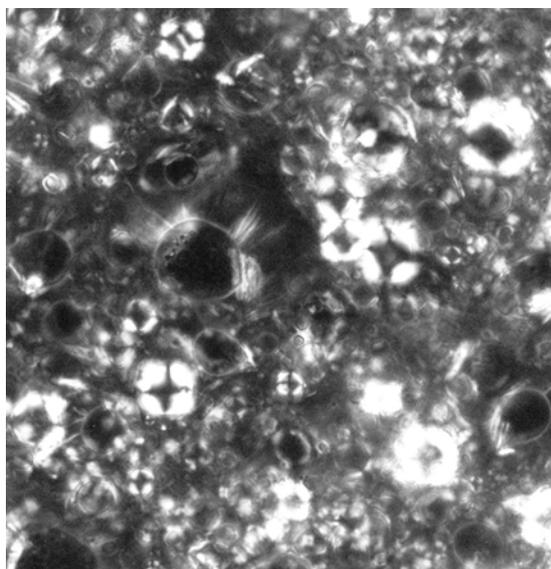


Figure 1 *Photomicrograph of Polawax NF emulsion showing liquid crystals. Lamellar gel phase appears as rigid matrices around oil droplets*

'Time release' moisturisation and delivery of actives

In addition to their enhanced stability, liquid crystal emulsions are of particular interest for the controlled delivery of moisture and active substances. The entrapped layers of water in the lamellar gel network act as a moisture reservoir, which is less prone to evaporation. This effect may prolong skin hydration for up to several hours. In addition, it is believed that water-soluble active substances eg vitamins, drugs, held within the water pockets, are progressively released to provide a controlled delivery system. The presence of lamellar liquid crystalline multilayers may similarly slow down the release of actives dissolved in the oil droplets by reducing interfacial transport².

Formulating

Polawaxes are self-bodying emulsifying waxes which can be used to produce high or low viscosity emulsions, depending upon the concentration employed. At lower concentrations (2-3%) fluid emulsions are easily produced, and may be supplemented with nonionic, anionic or cationic emulsifiers for enhanced stability. At higher concentrations (5-10%) Polawaxes can produce more viscous systems showing excellent long-term stability, without the inclusion of additional surfactants, fatty alcohols or waxes.

Polawaxes are suitable for the emulsification of most commonly used oils, fats and waxes including vegetable and mineral oils, esters and ethers; emulsions are stable in both acidic and alkaline media and tolerate high levels of electrolyte.

Polawaxes possess excellent heat stability and are recommended for the preparation of creams and lotions which require autoclaving. Polawaxes exhibit no loss in performance on heating to 150°C for two hours. There is only minor deterioration in colour with a 2-3% loss in weight and slight hardening of the product.

Health and safety

Polawax GP200 and Polawax NF are well established cosmetic and pharmaceutical raw materials; they are non-toxic on ingestion and essentially non-irritating to skin and eyes.

INCI names

Polawax GP200 and Polawax NF are proprietary products. Please refer to the personal care sales department for nomenclature for labelling purposes.

References

1. GM Eccleston, Multiple-phase oil-in-water emulsions, J. Soc. Cosmet. Chem., 41, 1-22 (January/February 1990)
2. P Loll, Liquid crystals in cosmetic emulsions, Cosmetics and Toiletries Manufacturing Worldwide, 108 – 116 (1994)

Non-warranty

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