

Sun care sprays

Formulating for the European market



Sprays and lotions combining effective sun protection with convenience and ease of use promise to be big sellers

It is not surprising, then, that Euromonitor International is forecasting global sun care value sales, which grew by 10% to reach 4.9 billion Euros in 2007, to grow by 29% from 2007 to 2012 – spurred in large part by sun protection products, which have grown steadily in market value since 2002. Given that Western

The challenge of formulating sun care products in Europe

UV-B radiation is the cause of sunburn, but UV-A radiation causes premature skin ageing and interference with the human immune system. Both types of radiation are significant contributors to the risk of skin cancer. Sun protection factor (SPF) refers only to the level of sunburn (UV-B radiation) protection, but not to the effects of UV-A radiation, which penetrates the skin more deeply than UV-B rays. Therefore, sunscreen products with only UV-B protection may provide a false sense of security by letting hazardous UV-A radiation reach the skin.

As a result, the EU Commission also recommended better labelling of UV-A protection in the form of a standardised UV-A seal on product labels, which indicates a protection factor of at least one-third of the SPF value. In addition, the Commission recommended methods to prove effective water resistance, quantified as greater than 50% of static SPF after lengthy water immersion.

Consumer demand for sunscreen sprays in the European Union is heating up along with the desire for greater protection, as consumers are becoming increasingly attracted to the ease of use and greater coverage that sprays provide.

Europe represents the largest sector of the global market for sun care products and is projected to remain so through 2012*, sprays and lotions that combine effective, long-term sun protection with convenience and ease of use promise to be big sellers in this region.

Film-forming technology is the key

The key to the sun care formulations developed by the Global Personal Care group of AkzoNobel based in Switzerland are the company's acrylic film-forming polymers. These serve as ideal technologies when formulating sunscreen products for delivering water resistance and rub-off resistance in both traditional and newer, non-traditional products, particularly in continuous sprays.

AkzoNobel and Symrise have developed a clear, non-aqueous sunscreen spray that is ethanol-based and with an expected SPF formulation of 30**. This non-aqueous sun spray with broad UVA protection has been in vitro tested by Symrise for high SPF and balanced UV-A and UV-B protection, in accordance with EU Commission recommendations. In this formulation, the key ingredient for enhanced water resistance is the acrylates/octylacrylamide copolymer Dermacryl 79 polymer. This polymer is a hydrophobic, high-molecular-weight, carboxylated



photos: AkzoNobel

The Commission recommended methods to prove effective water resistance

acrylic copolymer that has demonstrated effective water resistance, minimal impact on viscosity, and solubility in hydroalcoholic systems in both aerosol and non-aerosol sprays manufactured in the U.S.

Films of this polymer are inherently moisture-resistant, making it very effective for use in water-resistant products. It can also be used to hold active ingredients on the site of application by imparting resistance to abrasion or rub-off.

The enhanced water resistance and SPF possible with Dermacryl 79 polymer in hydroalcoholic, e.g., ethanol-

based, formulations, has been demonstrated by a third-party facility with in vitro testing that followed a "Very Water-Resistant" protocol requiring SPF to be measured before and after sample immersion in water with stirring for 80 minutes. This lengthy time frame is also used in the in vivo protocol for very water-resistant sunscreens published by the U.S. Food and Drug Administration² and recommended for "very water-resistant" claims by the EU Commission.

The SPF of the clear spray formulation was determined by means of a six-subject panel test based on the recommendation of the European Cosmetic, Toiletry and Perfumery Association (COLIPA) task force, and published in 2006. The result, an SPF of 30.9, can be labelled as 30 and may be described as a high SPF, according to the EU Commission recommendation for standard verbal descriptors. Moreover, the formulation's UV-A/UV-B balance was determined to be 65, using the in

vitro PPD 20 method specified in DIN 67502.

A variety of formulations for sunscreen sprays as well as for lotions have been designed by AkzoNobel with film-forming polymer technologies to satisfy EU Commission recommendations for SPF value, water resistance and uniform UV-A/UV-B radiation. The polymers used include, among others, not only Dermacryl 79 but also Dermacryl AQF, an acrylates copolymer that is formulated for use in aqueous sunscreen sprays and lotions. It provides effective water resistance with a light, non-waxy after-feel.



Global sun care value sales are set to grow by 29% from 2007 to 2012

*41% in 2007, 38.8% in 2012, according to Euromonitor International

**The formulation mentioned and further sun care formulations developed by the company, as well as the reference list, can be found on the Internet, see Internet button

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