How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?

A good formulation delivers the expected SPF in reality, not only in a laboratory setting. This means that the product should be aesthetically attractive, spread easily on the skin and feel comfortable also on a hot sunny day on the beach. AAK Personal Care has developed emollients, such as Lipex SheaLight™ (INCI: Shea butter ethyl esters) which enable the formulation of high SPF products without compromising on the aesthetics and efficacy. It is also completely natural and from 100% renewable raw materials, something that becomes more and more important as we search for sustainable solutions. It is a good solubiliser for solid UV blockers and acts as a very good dispersing medium for titanium dioxide and zinc oxide based inorganic sunscreens. Apart from enabling the formulation of high SPF products without compromising on the aesthetics and efficacy. It is also completely natural and from 100% renewable raw materials, something that becomes more and more important as we search for sustainable solutions. AAK has developed Lipex SheaLight™ an attractive ingredient for formulating the ever popular “alphabet creams”, which combine sun protection with pigments for the aesthetic effect.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

As specialists in shea butter we base many of our solutions on utilizing the unique composition of the shea butter.

Florian Weighardt, H&PC Today, TKS Publisher

Jari Alander
Business Development Director, Personal Care, AAK Sweden AB.

Sun care products represent a powerful preventive tool against UV induced skin ageing and skin cancer, don’t they?

Yes, in the long term. However, most people use sunscreens to protect the skin for the immediate effect, avoiding sunburn and redness, with the resulting itching and irritation, which follows from unprotected sun exposure. Sunscreens can tackle both the short term and long term problems, if they are used correctly, frequently enough and if the formulations deliver what they promise. A common problem is that suncare products which do not spread well and are feeling greasy and tacky, will not be used, whatever their SPF is. The challenge to the formulator is to create a product that delivers on all these requirements and to make the consumer eager to use the product, not only for the long-term benefits but also for the immediate effect.
Liquid shea butter, also known as shea oil, is easy to use and delivers good emolliency. A new version of this classic material, Lipex SheaClear™ (INCI: Butyrospermum parkii oil), makes it possible to also formulate clear, 100% oil products, with intense moisturizing and skin softening properties. For example, this can be used to formulate soothing and calming after-sun products, especially by combining Lipex SheaClear™ with the Lipex Shealight™ to adjust viscosity and skin feel. With this combination a sprayable and easily spreadable, fast absorbing after-sun oil can be created. The formula can be further improved by adding small amounts of the concentrated shea butter extract, Lipex SheaTrs™ (INCI: Buthyrospermum parkii butter extract) which contains 60-65% the soothing triterpene esters.

An easy way of applying a sunscreen is in the form of oil sprays that give a thin film of the sunscreen on the skin. Sprayable sun protection products can be easily formulated with the help of Lipex Shealight™. It solubilises organic sunscreens and the low viscosity and high spreadability makes it well suitable for sprayable systems. Lipex Shealight has also a good compatibility with other emollients, including di- and cyclomethicones, making it a versatile component in this type of formulations. It is also a good strategy to include a more moisturizing vegetable oil to the sunscreen formulation. Here we suggest our long-term favourite, Lipex PreAct™ (INCI: Canola oil), which is a vegetable oil rich in Vitamin E and phytosterols from canola. Apart from moisturisation and emolliency, the Vitamin E provides extra protection against free radicals and the phytosterols help to sooth irritated skin.

Are vegetable oil based solutions really suited for sunscreen applications in view of their poor oxidative stability?

This is a relevant question, especially for sunscreen applications. Most typical vegetable oils, such as sunflower seed oil, are indeed too unsaturated to be used in sunscreens where they will be exposed to high temperatures, UV radiation and free access to oxygen during several hours. But you can overcome the problem by carefully selecting the right oil to include in the formulation. Mono-unsaturated oils with high levels of natural Vitamin E are well suited and AAK Personal Care offers several alternatives. Lipex Bassol C (INCI: Canola oil), is a vegetable base oil derived from rapeseed oil, with good oxidative stability and also good stability against UV induced breakdown. It has numerous uses as an additive in sunscreen emulsions and oils for improved moisturisation and emolliency.

In after-sun, the oil stability issue is not as critical and here the choice is wider. A good balance between poly-unsaturated oils, that contain omega-6 and omega-3 fatty acids for skin repair, and other oils providing stability, is required. We have made life easier for the formulator by designing our Lipex Omega 3/6™ (INCI: Olus oil (and) Camelina Sativa Seed Oil) to deliver both the required essential fatty acids in a base which resists oxidation. This combination makes it possible to bring components that improve the skin condition without jeopardizing the product quality. So we can answer the question by stating that “Yes, vegetable oil based ingredients can be used in sun applications but you have to select the oil carefully”. This is where AAK Personal Care is there to help you make the choice!

Randy Bull
Vice President Dermatology and Medical Care, Consumer Specialties, Ashland Specialty Ingredients, Bridgewater, NJ, USA.

Sun care products represent a powerful preventive tool against UV induced skin ageing and skin cancer, don’t they?

Sun Care products help reduce the damage and ageing of skin that can result from UV exposure. In addition to sun protection, the segment includes pre-sun and after-sun regimens that work together to provide overall protection and maintain the beauty and youthful appearance of skin. Sunscreen products are formulations that can offer multiple functions that span from technical performance to consumer acceptance. In addition to UV filters, key performance requirements include booster ingredients to enhance sun protection characteristics, water resistance, and ingredients to insure adequate availability and efficacy of the delivered actives. Consumer acceptance requires pleasing appearance, texture and feel of the sunscreen formulation when applied to the skin, as well as characteristics that encourage ease of reapplication. Pre-sun care offers ingredients that moisturize the skin and prepare it for harsher conditions when outdoors. After-sun care requires products that mitigate the discomfort that sun exposure can cause, and may also help reduce the appearance of redness and inflammation.

How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?

A correctly formulated product maximizes the UV protection, provides broad-spectrum protection (UVB and UVA), remains stable when worn outside/on the beach, and resists wash off. A poorly formulated product can result in low SPF / UVA protection and create poor aesthetics and sensory effects. Consumers depend on their sunscreen to give protection from exposure to UV radiation and provide an overall pleasing experience from the bottle to the body. Ashland has a solid base of experience in formulation development and innovation, as well as a comprehensive understanding of the consumer via an extensive Consumer Science laboratory network. With one of the broadest portfolios of active and inactive ingredients for Sun Care, Ashland maintains an active innovation portfolio to develop new technologies for superior performance.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

Ashland is a pioneer in film former and water resistance innovation with Ganex™/Antaron™, Advantage™ Plus and Allianz™ OPT polymers. Ashland continues to expand its line of
Sun care products always contain UV-filters protecting from both UV-B and UV-A light. However, we still see a continuous rise of skin cancer rates in most countries, which requires us to extend our efforts even further.

**How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?**

From listening to consumers, we know that creating the right sunscreen formulation is key, not only focusing on the efficacy of a product. From a consumer perspective they can buy two SPF 50 products, meaning they have the same performance, but one is liked and the other not. Why? One key element is the sensorial attributes of a sunscreen as well as the product form supporting convenience and ease when used. At DSM we focus on 3 main pillars to ultimately deliver to consumers: First, to select the right UV-filters and combine them in the most efficient concentrations so delivering to the idea of ‘less is more’ for consumers. Secondly, improving the film forming properties of sunscreens to further boost the efficiency whilst supporting the touch and feel properties at the same time. Last but not least, we are strongly focusing on how to improve the sensorial features of sunscreens, as we know these stop, or decreases the frequency, at which consumers apply an appropriate amount of sunscreen. Based on our own proprietary consumer insight studies, we generated deep insights of regional and target group differences as well as preferences by brand positioning, which enables us to discuss respective solutions with our customers.

**Which are the most relevant novelties and solutions your company is offering to the sun care market?**

PARSOL® TX is one of the most widely used titanium dioxide in sun protection, providing a reliable protection plus a pleasant feel. It’s an aluminum-free, inorganic UV filter manufactured from a highly pure rutile form. Thanks to its unique, highly compact double coating, it is exceptionally compatible with formulations containing other UV filters, such as avobenzone, as well as acrylate thickeners and other active ingredients in cosmetics. These results were revealed by testing PARSOL® TX against competitive benchmark products under extreme conditions of formulation complexity and stability. PARSOL® TX is also notable for its substantial contribution to the sun protection factor (SPF), while consumers observe its exceptional contribution to sensory perception and the very pleasant skin feel it delivers.

In addition, AMPHISOL® K is a unique emulsifier for the ultimate stability in sunscreens and its ease of product development. With the continuous blurring of product lines between skin and sun care, consumers are becoming much more demanding in products delivering more functionality and improved sensory aspects from both categories. The challenge of executing these products remains with the formulator; they must combine the functionality of high amounts of oil for respective SPF’s and skin active benefits with the aesthetic components, such as pleasant skin feel, colored pigment, and various viscosities. New data with AMPHISOL® K reveal a way forward and how to overcome such challenges. Also, we recently launched our VALVANCE™ portfolio. It complements our focus on sensorial features in serving the great feel and look benefits of a finished market product.
Susann Wiechers  
Technical Manager Personal Care, Evonik Nutrition & Care GmbH, Essen, Germany.

How important are sun care products for protecting skin against UV-induced skin ageing and skin cancer?

Sun care products allow us to enjoy outdoor activities while reducing the risk of UV-induced skin damage. Since consumers can choose from a broad variety of Sun Protection Factors (SPF), ingredients and formulation types, these products can be used in every situation. Modern sun care products provide broad spectrum protection against UV-A and UV-B radiation, which can cause long-term and short-term effects such as skin ageing or sunburn. Both types of radiation are associated with skin cancer risks, making the regular use of sun care products a key protection factor.

How important is the right formulation of a sunscreen for the efficacy of a sun care product?

Consumers increasingly favor lighter formulations, while the awareness of the need for a high level of protection grows. This creates the challenge to deliver high SPFs in such formulations. The sensory properties of sun care products are equally important for consumer satisfaction. If consumers don’t like to apply a product on a regular basis, even the highest-performing product cannot provide adequate protection.

Which solutions does your company offer?

We offer a broad portfolio of multifunctional ingredients for sun care formulations to guarantee optimum formulation flexibility and to support the performance of UV filters. It ranges from emulsifiers and emollients to sensory additives and film formers. One example is a versatile emulsifier based on vegetable raw materials, supporting water resistance of O/W formulations. Furthermore, our sensory additives like cellulose or Nylon powders impart quick absorption and a pleasant dry after feel.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

To give an example, the versatile PEG-free O/W emulsifier TEGO® Care PBS 6 offers outstanding stabilization properties for low-viscosity formulations and is entirely based on renewable resources. Our broad portfolio also comprises high-performance emollients. TEGOSOFT® XC combines excellent solubility for UV filters with a light feel on the skin and is therefore especially suitable for sun care applications.

Customized service and integrating consumer’s feedback in your support. What can you offer from this point of view to your customers?

We offer innovative, high-quality product solutions along with excellent commercial and technical service worldwide. The cosmetics market is increasingly driven by innovation and new product launches, while the complexity of formulating new emulsions keeps rising, especially in sun care. That is a challenge for formulators, who have to be familiar with an enormous amount of available choices. Nowadays, next to performance, additional parameters increasingly gain importance for the customers. Especially sustainability or registration in various countries are among the aspects that have to be taken into consideration to find the right product. To facilitate the search for new ingredients that meet customer requirements, we recently launched a new emulsifier selection tool. This online tool helps navigate the complex world of emulsifiers to easily pick out the best product fit for specific needs.

Tony Gough  
Director of Technical Services, Performance Chemicals, Innospec, UK.

Sun care products represent a powerful preventive tool against UV induced skin ageing and skin cancer, don’t they?

Sun care products are imperative for people who cannot avoid sun exposure due to their occupation, for example, as well as those who like the benefits of sun exposure but wish to minimise its harmful effects such as sunburn, signs of premature ageing and, most importantly, potential causation of skin cancer. It is reported frequently in the general media and cosmetics and toiletries trade press that, unfortunately, skin cancer/melanoma is on the rise.
It is essential, therefore, that consumers are continually made aware from a young age of the importance of using sunscreen products. Initiatives by the government, charities, healthcare professionals and even end product manufacturers concerning the importance of protection from the sun’s harmful effects are key to this. That said, consumer awareness of the potential hazards of exposure to the sun, and hence the need for using sunscreen products, is greater than it has ever been before.

How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?

A sunscreen product needs to contain the correct types and amounts of UV filters, whether they are organic or physical UV filters or mixtures of these, which are appropriate to the sun protection factor levels and UVA/UVB star rating levels that are claimed on the pack. It is also beneficial if the products are pleasant and easy to use since this encourages the consumer to apply and maintain adequate sun protection. For this, the following factors are important:

i) The formulation should be carefully devised and tested to ensure that the crystalline organic filters are completely dissolved in a suitable solubiliser/emollient system emulsified into the formulation and they must remain soluble and stable throughout the shelf-life of the product.

ii) The product should have good spreadability so that a sufficient amount for the necessary skin coverage of the product can readily be applied by the user.

iii) Often associated with good spreadability is a pleasant texture and skin after feel which ensures that consumers are happy to make the necessary multiple re-applications of the product throughout the day of enjoying the sun and are not put off from re-applying due to it having an unpleasant feel.

iv) Any physical UV filters such as titanium dioxide that are used should remain stable and well dispersed, again, throughout the shelf life of the product.

Innospec offers a range of elegant emollients which are also excellent solubilisers for the numerous crystalline organic UV filters that are used by formulators for developing sun screen products. These Innospec emollients/solubilisers come under the trade names of Finsolv® and Activemol and are useful ingredients in the sun screen product formulator’s toolkit to be used in combination with one another or with other emollients to create high-performing sun screen formulations which meet all of the criteria in (i) to (iii) above.

To complement and enhance the contribution to the texture and feel of sun screen products both during use and after application, Innospec also offers a range of high-quality silicone products under the trade names of Cosmetic Fluid, Gelaid®, Emulsil®, Chemsil®, Volasil® and Dimethisil®.

For formulations containing physical UV filters (eg, titanium dioxide and zinc oxide), Innospec offers a range of dispersants under the trade name of Dispersuns. These bind strongly to the inorganic sunscreen particles and keep them separated by mutual steric repulsion. They allow for higher pigment loadings, greater UV absorption, viscosity control and improved transparency. There are three variants in the range; two are for non-aqueous dispersions (dispersion in the non-aqueous phase) and one is for water-based dispersions.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

All of the Innospec products mentioned above can be used to create novel, elegant and high-performing sun screen formulations. Their properties and functionalities enable formulators to create modern formulations in line with current sun screen product trends across all of the different formats such as creams, lotions, transparent oils, pump sprays, aerosol sprays and continuous sprays. They can also be used for makeup and skin care products with SPF claims such as foundations, eye shadows, BB creams, facial moisturising creams, firming creams and hand moisturising creams, and so on.

Customized service and integrating consumer’s feedback in your support. What can you offer from this point of view to your customers?

Our research and development laboratories offer extensive technical help and expertise to customers developing any type of personal care formulations that use Innospec ingredients. We welcome and respond to all kinds of feedback from our customers in order to identify their specific needs, provide them with solutions to their problems, and, most importantly, help them develop the effective, commercially successful formulations they strive for.

How do you see the future of suncare and how Innospec will meet future needs?

The sun care market is currently estimated to be worth $10bn annually is growing at a pace. Formulators are striving for ever superior formulations which deliver the required SPF across various formats, are pleasant and convenient to use and give good transparency and skin feel after application. Innospec is gearing up to become a key player in solubilisers/emollients and silicones for suncare products to meet formulators’ current and future needs in these areas.

Debbie McCarthy, Stacey House and Yun Shao
Kobo Products, Inc.,
South Plainfield, NJ, USA.
Sun care products represent a powerful preventive tool against UV induced skin ageing and skin cancer, don’t they?

Debbie McCarthy: Yes, it has been shown that harmful UV rays affect the skin in a negative manner by accelerating skin aging and causing skin cancer for example. Sun care products offer both long term and short term benefits by protecting the skin from experiencing this type of damage. Sun care products offer people of all ages the ability to enjoy outside activities while limiting the harmful effects of the sun’s UV rays.

How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?

Stacey House: Effective protection against UVA/UVB rays are dependent on an optimal balance and synergy of the ingredients and the actives used in the formulation. Kobo’s sunscreen technologies provide the sunscreen formulator with raw materials that enable high protection, efficacy and product stability, and may be easily incorporated into formulations. Kobo provides its customers with formulation and regulatory guidance to ensure their formulations meet global compliancy.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

Debbie McCarthy: Kobo offers support in a variety of areas including the following:

- Custom Development in Dispersions that cater to the formulator’s goals. This includes working together to recommend the most appropriate combination of a TiO2 and/or ZnO particle size to achieve the SPF, PFA and CW results desired in a particular formula. Other products including Composite Powder ACT & ACZ are offered. These products feature a micron sized acrylates copolymer matrix serving as the encapsulation medium of a TiO2 or ZnO particle. The resulting material is a 7-15 μm sized powder with an active content ranging from 45-55%. SunBoost ATB™ is a proprietary mixture of antioxidants, anti-irritant and anti-inflammatory agents. When used in sunscreens in combination with organic and/or inorganic UV Filters, SunBoost ATB™ shows an increase in SPF and PFA scores by more than 30%.

- Formulation Guidance
- Regulatory Guidance
- Global Compliancy Guidance

Customized service and integrating consumer’s feedback in your support. What can you offer from this point of view to your customers?

Yun Shao: Kobo recognizes that consumers of sunscreen products and their demands are based on global diversity and compliance. Kobo is highly engaged in custom formulations and customer assistance with formulation labs globally located in regions including USA, Asia, Europe and South America.

François Marchio
C.O.O and partner at Sytheon Ltd., Sytheon France, Boulogne Billancourt, France.

Sun care products represent a powerful preventive tool against UV induced skin ageing and skin cancer, don’t they?

Indeed. Meanwhile, beside simple optical protection, there will be more focused biological targets enabling Sun Care products to better prevent aging and skin cancer. The NOX enzymes (NADPH oxidase) are now evident causes of CPD formation on DNA, leading to cells’ mutation. It is now possible to inhibit these enzymes which are induced by UV radiations. Surprisingly, there are no known benefits from these enzymes found in Skin cells membranes. The use of classical antioxidants is a plus, but not sufficient for a good protection against biological damages induced by repeated exposures to UVA & UVB.

How important is the right formulation of a sunscreen for the efficacy of a sun care product? Which solutions does your company offer?

The excipient, the choice of the polymer, the quality of the film left on the skin, are crucial for the performance of the sunscreen. A good dispersion or perfect solubilization are absolute requirements, but photostability is as important. There are still numerous sunscreen presenting weak photostability, or combining incompatible UV Filters such as Avobenzone with Octinoxate.

Which are the most relevant novelties and solutions your company is offering to the sun care market?

Synoxy®HSS is our last innovation, and the result of 7 years of Research and Development at Sytheon. It is the most performant commercial photostabilizer on the market today, and in several sunscreen systems, it is able to boost the UV filters performance by 50% and more. More interestingly, it is proven to inhibit NADPH oxidase and the CPD formation, while chelating iron and copper which are also playing a detrimental role on skin when it is exposed to UV rays (Fenton reaction). It is the most achieved ingredient for Biological protection and a great additive for reducing the concentration of organic and inorganic UV filters; a real value added for increasing product safety and reducing bioaccumulation in the environment. On a more trivial question, it also helps to substantially reduce the cost per SPF unit.
What future challenges do you anticipate for the Suncare market?

The suncare market has always been challenged by multiple hurdles, whether we refer to regulatory, toxicological, economical or more simply formulation issues. To be a leader in that market, you need a “thick skin”, in every sense of the word!

Now, what can be perceived as the future roadblock will be related to environmental aspects. With the fast growing consumption of sunscreens all over the world (Asia and soon Africa), the questions of bioaccumulation, biodegradability, compatibility with marine organisms will be key issues exploited by NGOs, and activist groups. The technical grade UV absorbers used in plastics and paints start to present some problem. Environmental issues always start by large industrial applications first, and often end up on the cosmetic list of concerns.

Sytheon dedicates its resources to breakthrough new molecules. With the more stringent regulations and toxicological requirements, it is always a high investment. Therefore, it is often challenging to develop exclusive partnerships with brands, which have to dedicate of large part to their cost structures to merchandising and marketing resources. Though, we do have collaborations with multinational companies which can afford exclusive sponsorship for genuine innovation (not reshuffling old ingredient with new stories).

Regarding consumer’s feedback, let’s be honest! Although we do show volunteers assessment in our clinical studies, we are upstream of the market, in a pure BtoB model and nothing replaces the large scale consumer experience. Who else better than the BtoC brands can do that?