

## Formulate Seminars

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John Woodruff

November is the month when almost the entire technical and much of the marketing personal employed in the British cosmetic industry make their way to the Ricoh Arena, Coventry for the annual SCS Formulate exhibition and conference. Many of them also enjoy the gala dinner on the first evening and hangovers the next morning but that is a separate matter. Concurrent with the exhibition and often with each other are a series of lectures and presentations grouped under the titles of Formulation Masterclass, the Source and the Knowledge.

Each Formulation Masterclass presentation focused on a specific topic, detailing the common issues formulators face and exploring the different techniques and processes used to help overcome these issues and create the desired formulations. They covered such diverse subjects as formulating sulphate-free structured liquid surfactant cleansing systems [Peter Clark, **Innospec**]; a guide to SPF [Ev Suess, **Symrise**]; cold process emulsion technology [**BASF**] and solving rheological problems [Jane Doyle, **BYK Additives**].

The Knowledge featured renowned experts and authorities who discussed a stimulating range of technical and commercial issues affecting formulators today. Subjects included enhancing formulation techniques, current and future trends and advice on the regulatory and scientific issues in the market place. In presenting brand values; the success of principles, Jennifer Hirsch [**The Beauty Botanist**] said the world is increasingly dominated by digital and social media. Distances across the globe have been shrunk to seconds by the internet and word of mouth is global and values have become key to differentiating brands in crowded markets. Living with the constraints of those values presents challenges to any business. Hirsch looked at how founding principles can translate into brand value and customer loyalty.

The journey from marketing brief to finished product was described by Andy Juj, [**Jason Cosmetic Laboratories**]. On a similar theme Andy Postles [**Hampshire Cosmetics**], highlighted and discussed the various issues, obstacles and misunderstandings that regularly arise during the product development process between client and manufacturer.

Many of the products made by cosmetic manufacturers target care of the skin and overcoming the skin barrier was the subject of the talk by Majella Lane, [**UCL School of Pharmacy**]. The vital function of skin is protection from excessive water loss in a terrestrial environment. Despite this barrier role, the skin is also the target for a diverse array of active ingredients and Lane reviewed some of the recent methods that have been used to characterise the skin barrier and she also outlined the various formulation strategies that have been used to target molecules to the skin.

Roger Barr, [**RB Consulting**], asked is product innovation science or art and suggested that creative, innovative product and brand ideas invariably come from the artistic end of the spectrum. However, in an increasingly regulated industry, cost effective, regulatory compliant, quality products and brands are executed at the technical end. Part of the product development process is to ensure that products and product users are safeguarded against microbial spoilage and John Reed, [**Donnington Laboratories**] described the methodology and strengths and limitations of the various challenge tests available.

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An important paragraph in Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products included the wording that as cosmetic products play such a big part in end users' lives, it is important to ensure that the information conveyed to them through such claims is useful, understandable and reliable, and that it enables them to take informed decisions and to choose the products that best suit their needs and expectations. To ensure compliance with that requirement Regulation (EU) No 655/2013 of 10th July 2013 lays down common criteria for the justification of claims used in relation to cosmetic products and this was the topic covered by Laura Marshall, [**Reading Clinical Research**].

In her presentation Marshall discussed claims and the common criteria for the justification of claims used in relation to cosmetic products that are included in the EU Regulation 655/2013. These are:-

1. Legal compliance
2. Truthfulness
3. Evidential support
4. Honesty
5. Fairness
6. Informed decision making

There are additional aspects for each of these criteria including the acceptability of a claim shall be based on the perception of the average end user of a cosmetic product, who is reasonably well-informed and reasonably observant and circumspect, taking into account social, cultural and linguistic factors in the market in question. If it is claimed on the product that it contains a specific ingredient, the ingredient shall be deliberately present and ingredient claims referring to the properties of a specific ingredient shall not imply that the finished product has the same properties when it does not. Perhaps ending "Free from" claims, claims for cosmetic products shall be objective and shall not denigrate competitors, nor shall they denigrate ingredients legally used.

The Source programme is a series of supplier led presentations featuring the latest products and services within the UK personal care and cosmetics industry. Attracting around 450 attendees over the two days it offered visitors the opportunity to hear about the latest product developments, formulating techniques and innovations directly from the people making them.

It has been very frustrating for formulators of sunscreens that the use of zinc oxide in nano form has not met with approval within the EU but with the publication of the SCCS Opinion earlier in 2012 it appeared that the position would be rectified in October 2013. Unfortunately approval is being withheld until the wording can be agreed by all member countries and this disappointment formed part of the presentation by Jeroen Van Den Bosch, [**Umicore**]. The hold-up is because of the wording over materials used for surface coating and it is hoped that approval may still be given before the end of 2013. Van Den Bosch explained the mechanism of zinc oxide UV protection; it is a mixture of absorbance and reflection and for optimum UVB and UVA protection two different sizes of zinc oxide crystal are required.

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Using the title protect, preserve, retain; a winning hair colour retention solution, Catherine Centro, [**Tri-K**] described a new technology that effectively retains hair colour through a natural and sustainable platform. According to Centro frequent shampooing coupled with UV exposure causes colour to fade and hair to lose its vibrancy and shine much sooner than desired. Centro showed that a hydrolyzed protein [INCI: Hydrolyzed quinoa] penetrated the hair shaft to prevent damage, while adding control and manageability. In a series of experiments using hair dyes, shampoos and conditioners Centro showed how this material gave consistent improvement in hair colour retention.

Improving hair colour retention was just one of the many claims made for Silicone HALS by Clara Gil Navarro [**Bluestar Silicones**]. Silicone HALS “Hindered Amine Light Stabilizer” are polydimethylsiloxane polymers that belong to the family of amine grafted silicones, recognised as excellent hair conditioning agents. Navarro showed how a Silicone HALS with the INCI name, propoxytetramethyl piperidinyl dimethicone had free radical scavenging properties and provided improved wet combing, softness and shine to the hair. By combining this with C15-19 alkane it provided colour protection, photo-protection and thermal protection and had a straightening effect on the hair.

Innovative polyglyceryl esters as eco-friendly, high performance emulsifiers for modern skin care products with sun protection was the title of the presentation by Achim Friedrich [**Evonik**]. TEGO Care PBS 6 [INCI: Polyglyceryl-6 stearate, polyglyceryl-6 behenate] is a polyglyceryl-based emulsifier that is 100% derived from renewable resources. It was suggested as an o/w emulsifier for challenging fluid emulsions such as sun care formulations containing a high load of water soluble UV filters. Beside its excellent stabilising properties in low-viscous systems, this new and unique emulsifier provides moisturising properties as proven in an in-vivo study, claimed Friedrich. The chemistry and properties of other polyglyceryl esters was also discussed.

Skin care is always a major topic at Formulate and solutions to the problems of sensitive skin were the subject of the presentation by Ruth Borner [**Lehvoss**]. More than 50% of women claim to have sensitive skin, which can be a short-term reaction to environmental or chemical aggression or long-term chronic atopic skin such as eczema or psoriasis. Cosmetic products for sensitive skin are designed to improve skin barrier function and moisture levels and to reduce inflammation and erythema. Borner showed how *Lactobacillus* ferment lysate normalised the skin barrier function, reduced trans-epidermal water loss and supported the skins microflora. It also had an anti-inflammatory effect and reduced erythema. Borner also presented other materials suggested for sensitive skin such as an extract of *Ximenia americana* that had antioxidant and astringent properties and a beta-glucan that helped skin repair mechanisms.

Antioxidant claims are one of those most frequently made so it is not surprising that Sheila Dan [**Kemin**] drew a good sized audience for her talk on the science behind natural antioxidants. Heat, solar radiation and oxygen lead to free radical formation, which is quenched by suitable antioxidants. Although tocopherol is a commonly used antioxidant it exists as four different isomers of which the alpha and beta isomers the

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most effective but these can also initiate free radical formation. An alternative is a rosemary extract trade named Rosamox by **Kemin**, which is comparable to vitamin E and BHT in olive oil and outperforms them in avocado and argan oils. Rosamox also appears to have skin hydrating and soothing properties.

The majority of skin care products are emulsions and emulsions are inherently unstable systems. Ways of improving emulsion stability was the subject of the presentation by Roman Ott, [**Rahn**]. An emulsion may be regarded as a five-part jigsaw comprising lipids and fatty alcohols; water and hydrocolloids; additives and an emulsifier and a co-emulsifier. However additives like preservatives, perfumes, UV filters and active ingredients may have negative influences on the stability of an emulsion by affecting the emulsifier or the hydrocolloid network.

The two main ways of stabilising an emulsion are by using hydrocolloids and fatty alcohols to form a stable matrix and by using an optimum emulsifier and co-emulsifier to stabilise droplet surfaces. Ott showed that by selecting sodium stearyl glutamate as the co-emulsifier and glyceryl stearate citrate as the prime emulsifier o/w emulsions were stabilised and had the added benefits of better electrolyte tolerance and improved sensorial properties. For w/o emulsions with polyglyceryl-3 polyricinoleate as the prime emulsifier sucrose polystearate had a good stabilising effect.

The presentation by **Azelis** is always fully attended; this year it had the title “A cosmetic formulator’s calendar” and was given by Helen Hill and Claire Summers. Based around the theme that the marketing team arrived in the laboratory each month throughout the year with requirements related to the season Hill & Summers presented ingredient ideas that would meet those demands. January required cold, fresh science and a hair growth stimulant based on three plants to increase cellular energy and activate follicle stem cells was suggested. February saw the team in the mood for love so a polysaccharide from tamarind seeds was used to form viscous gels at a level of just 1% with a silky soft sensory feeling.

The presentation continued throughout the year; March suggested new technologies to welcome spring; April showers suggested the need for moisturising ingredients; in May the emphasis was on green technology. Hill suggested hydrogenated olive oil stearyl ester to answer the demand for more natural ingredients. It is extremely hydrophobic, giving improved emulsion stability and supporting water-resistant claims. This novel presentation introduced sun protection and self-tanning products for the summer; detoxifying for the early autumn and anti-wrinkle ideas for later and for party-time in December it was time for adventurous make-up.

There are valid reasons for formulating personal care products at acidic pH: the skin’s natural pH is 4.0 –5.5; low pH gives maximum efficacy to organic acid preservatives; it gives better conditioning to the hair and self tanning and skin brightening ingredients are acidic. However there are problems inherent in formulating at low pH and this was the subject of the talk by Pat McDermott [**Surfachem**]. These difficulties include creating viscous emulsions and gel formulations; it is difficult to suspend insoluble ingredients in surfactant systems; and there can be poor end product clarity. McDermott introduced Carbopol Ultrez 30 Polymer from **Lubrizol** as a rheology modifier and suspending agent effective at pH 4 – 5.5 that is electrolyte tolerant and

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has good clarity. Carbopol Aqua SF-2 is effective as a thickening and suspending agent between pH 4 – 5.5. Carbopol Aqua CC remains effective at pH 2 to 6 and shows a synergistic thickening effect with fatty alcohols. McDermott also introduced a range of alternative preservatives from **Salicylates & Chemicals** that are effective at acidic pH and an aminopropyl dimethicone from Evonik for shampoos and leave-in hair conditioners. There were also a number of surfactants from **Stepan** and active ingredients from **Aldivia** that were compatible with low pH systems.

It is never easy giving the last presentation at the end of two intensive days; this dubious honour fell to Dave Popplewell [**Ashland**] who discussed formulating sulphate-free shampoos. According to Popplewell there is strong consumer demand due to perception that sulphate-free formulations are milder, cause less colour fading and are less drying than traditional sulphated surfactants. Formulating sulphate-free presents certain difficulties as they have a higher material cost, are difficult to thicken and performance and foaming can be disappointing.

A number of anionic, amphoteric and non-ionic surfactants were selected at **Ashland** and tested with various nature-derived rheology modifiers and conditioning polymers. The mixtures were screened for coacervate formation; wet and dry combability effects; foam properties and sensorial evaluation. It was concluded that N-Hance 4572 cationic guar conditioning polymer system delivered very effective conditioning across a wide range of sulphate-free systems. It was also found that hydroxypropyl cellulose and cetyl hydroxyethyl cellulose are effective at maintaining viscosity across these systems.

There were many other presentations including one by Jocelyn Paris [**Lonza**] on natural solutions for modern formulations that introduced Laracare A200, an extract of larch that grow in the swamps bordering Lake Superior that can only be harvested when the swamps are frozen. Tim Brown [Seppic] discussed functional ingredients based on sugar chemistry and there was a presentation given on behalf of **DSM** that tackled the problem of exposure to sub-erythema radiation that ages skin without the owner being aware of sunburn and many others that have not been mentioned. By necessity this review has only been able to deliver abstracts of those presentations that the author was able to attend. For further information readers are advised to contact the companies shown.

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