the science of beauty

Vol 7 No 1

August 2017

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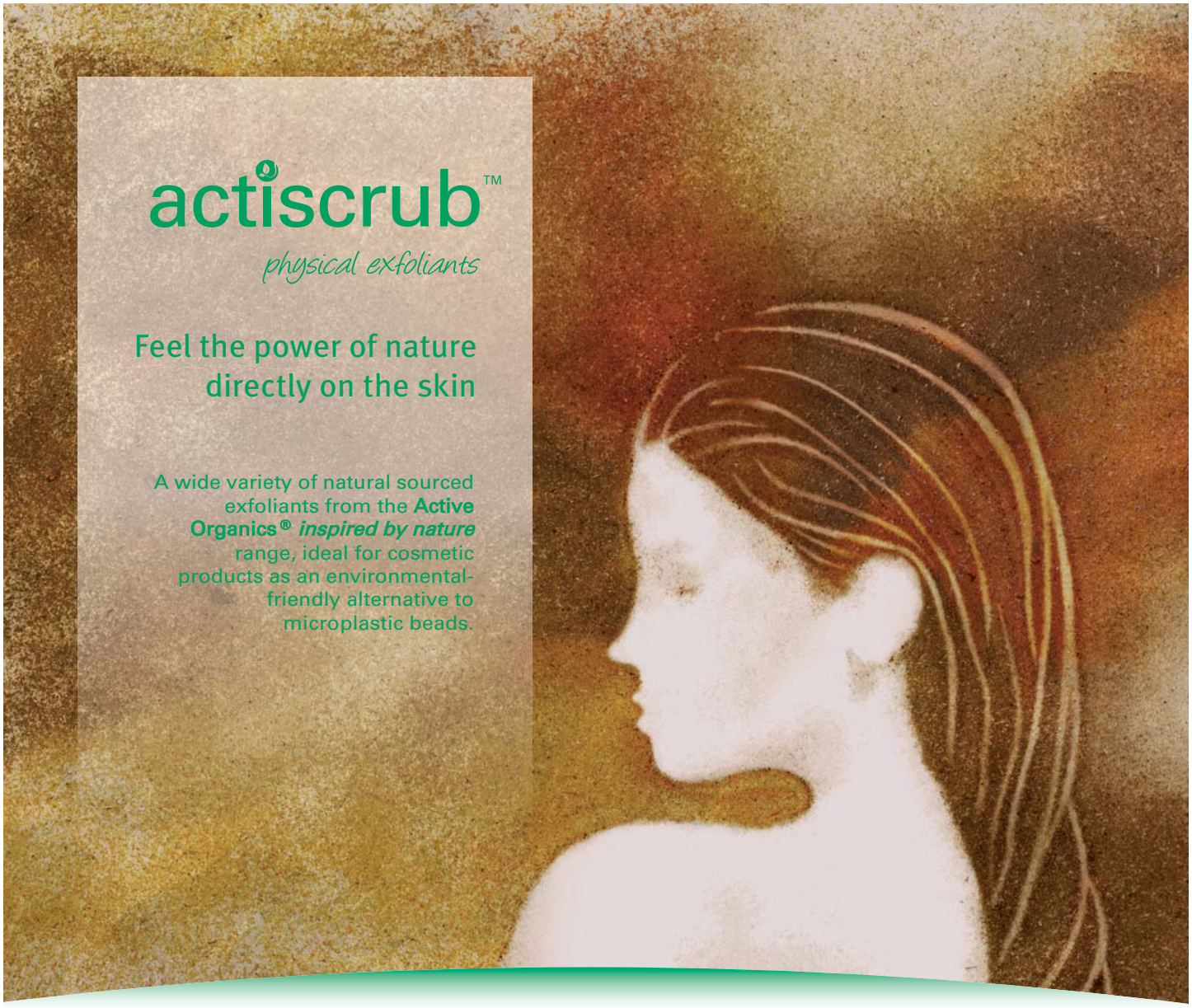

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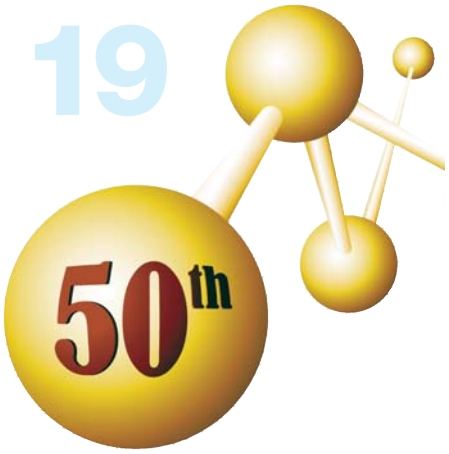

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Southern Chapter Supplier Day
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Queensland Industry Day
12 September
Colmslie Hotel Morningside

In Cosmetics Latin America
20-21 September 2017
Sao Paulo

In Cosmetics North America
11-12 October 2017
New York City

IFSCC Conference
23-26 October 2017
Seoul Korea

In Cosmetics Formulation Summit
25-26 October 2017
London UK

In Cosmetics Asia
31 Oct – 2 November 2017
Bangkok

Cosmoprof Asia
14 – 17 November 2017
Hong Kong

EVENTS 2018

In Cosmetics – Global
17-19 April 2018
Amsterdam

ASCC 50TH Annual Conference
16-18 May
Realm Hotel, Canberra

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meet the team...

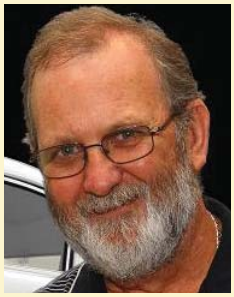
REBECCA AKHYANI is a creative perfumer with 15 years experience in the industry. Rebecca has a degree in Industrial Chemistry from UNSW and began her career as a fragrance evaluator before completing perfume school in Grasse, France. Rebecca has worked for a number of fragrance houses in Australia and abroad and is a full member of the British Society of Perfumers. Rebecca also runs perfume classes.

AUDREY PARATORE is a professional skin practitioner experienced in many aspects of professional, complimentary and paramedical skin care. She has more than 10 years experience as a Senior Lecturer in Vocational Education and consults for a number of leading skin care companies. Audrey describes herself as a life student of skin science and derives fulfilment in sharing information with other Skin Therapists empowering them to further their careers and bring awareness to the privilege of working hands-on with clients.

WENDY FREE has degrees in Science (B.Sc) and Technology Management (M.Tech Mngt) and is a member of a number of industry associations including Australian Society of Microbiologists, Royal Australian Chemical Institute, Association of Therapeutic Goods Consultants and is a Fellow of the Australian Organisation for Quality. With more than 25 years industry experience, Wendy's current roles include APVMA GMP auditioning, contributing to the Cochrane Collaboration and on a day to day basis, Scientific Director Quality Matters Safety Matters Pty Ltd (QMSM) that has over the last decade Wendy has provided expertise to over 400 Australian and International businesses. She specialises in regulatory compliance, commercialisation, troubleshooting and GMP systems, and considers cosmetics amongst the most challenging and enjoyable part of her work.

PAM STELLEMA is a business coach (www.salonsavy.com.au) and specialised copywriter (www.salonspacopywriter.com) for salons, spas, clinics and industry suppliers.
Her goal is to help her clients generate greater profits, which she does through her coaching, copywriting, courses, articles and books.
If you'd like to contact Pam, you can phone her on 0431 975 515 or send her an email via either website.

JOHN STATON has a background of over 40 years experience in the pharmaceutical and healthcare industries. John is a life member of the ASCC and serves in a number of industry representative roles with ASMI, ACCORD, TGA and Standards. He is the Australian representative to the ISO Committee on Sunscreen Testing-TC 217. (The committee for development of sunscreen standards). John is also in demand as a speaker on the International Conference Circuit.



RIC WILLIAMS was educated in Sydney obtaining his Bachelor of Science in Pure and Applied Chemistry from the University of New South Wales (1980) and a Diploma of Environmental Studies from Macquarie University in 1983.
Ric has had 40 years experience in the industry working for many companies and operating his own consultancy business for many years.
He has presented many lectures and workshops at national conferences for the Australian Society of Cosmetic Chemists (ASCC), the Association of Professional Aestheticians of Australia (APAA), Cosmetic and Pharmaceutical Special Interest Group (CAPSIG) and also beauty colleges nation wide.

TINA ASPRES has worked as a Pharmacist for almost 20 years in retail, industry and academia as well as being a Cosmetic Chemist. Currently she works in industry and has vast experience in both the pharmaceutical and healthcare arenas. In addition to this she is a casual academic at UTS, School of Health, (Faculty of Pharmacy in Pharmaceutics). Tina has a great interest in clinical research in dermatology and the treatment of skin disease and conditions and is Clinical Trial Coordinator at South West Sydney Dermatology. She is a keen researcher in transdermal drug delivery systems. Tina is a Member of the Pharmaceutical Society of Australia and a Member of the Australian Society of Cosmetic Chemists. She regularly consults pharmaceutical companies in the area of acne, eczema and skincare especially in the area of cosmeceuticals and has devised and written numerous support, training and education material for companies aimed at both professionals and consumers. Tina consults for the Eczema Association Australasia and is on their Integrity Assessment Panel and has worked with Choice Magazine on numerous reports. Tina has presented at the Annual Scientific Meeting of the Australasian College of Dermatologists and has published within the pharmacy and medical literature in the area of sun protection, Vitamin D, skin cancer prevention and eczema as well as co-authoring the book 'All About Kids' Skin – The Essential Guide' published by ABC Books

EMMA SUTHERLAND is a successful naturopath and TV presenter, her mission in life is to inspire women to get their "Mojo" back. She is the expert nutritionist on the Logie nominated "Eat Yourself Sexy" on LifeStyle You. She is also a key contributor and expert panellist for the recently launched Woolworths Baby & Toddler Club. With over 10 years experience working with women, Emma is the woman to turn to if you want your Mojo back!

STEVE WELSH is a cosmetic packaging specialist with over 20 years experience across all mediums of packaging. As the director of Weltrade Packaging, Steve leads a team of designers, technicians, printers and supply chain professionals. To ensure the best exposure of your beauty, skincare or cosmetics brand. Steve's philosophy is to design your packaging correctly, right from the start, so you can elevate your brand and move more product. Steve works closely with leaders in the cosmetic industry to ensure that your packaging consistently stands out on the shelves within this highly competitive market.

MARG SMITH is the owner of Syndet Works – an Australian company established in 1984 to formulate and produce soap free skincare bars. Syndet has developed an enviable reputation for custom formulated and manufactured skincare that now extend well beyond the origins of the business.

EMANUELA ELIA is the Director of Ozderm, which specialises in *in vivo* testing and clinical trials for cosmetic and personal care products. Emanuela Elia has a law degree from Rome and a Master of International Business from the University of Sydney. She had collaborated with Australia's longest serving Contract Research Organisation Datapharm for a few years before setting up a cosmetic and personal care products testing facility in 2009. Emanuela is enthusiastic about improving the quality of cosmetic and personal care products' research in Australia through science.

CATHERINE CERVASIO is a business woman with experience in natural personal care, baby skincare, international trade, marketing and branding, spanning two decades. Catherine is most well known for developing Aromababy- the world's first skincare brand to combine the use of natural and organic ingredients with neonatal research, creating a new category in retail in 1994. As the only Australian natural baby skincare brand with registered products in China, she is also sought after as a speaker on accomplishing business in this region. Catherine was a recent winner in CIBE China (Most Popular Natural Brand) and TBPA China (Best Brand Experience) Awards along with winning the HKABA, Export category, for Excellence in Bilateral Trade – China/Hong Kong 2016.

BELINDA CARLI is the Director of the Institute of Personal Care Science (www.personalcarescience.com.au), an International Training Organisation providing Certificate and Diplomas via distance education in the formulation, development, brand management and regulatory affairs for personal care and cosmetics.
She is a regular presenter at major International events and her work can be found in many national and International publications and Special Chem formulators site. She is the Official Technical Advisor to the in-cosmetics Group internationally and has written five books on Beginners and Advanced Cosmetic Formulation, Organic and Colour Cosmetic Formulation and Brand Management.

JAMES GILLARD is the Principal of Insurance Made Easy whose services include – business insurance, travel insurance and financial services. Insurance Made Easy has a client list of over 2000 businesses from all industries. The relevant major insurance schemes are – Hair and Beauty, Pharmaceutical Companies and Natural Therapists.

the best low-cost strategies to gain more clients and keep them returning

by Pam Stellema

One of the key elements of any successful beauty business is gaining, and then keeping, new clients. Clients are the lifeblood of every salon or spa because if you don't have enough clients to make sufficient sales, it doesn't matter how outstanding your products, services, décor or employees may be.

In this article, I'm going to explore with you some low-cost but proven strategies that will help you to gain valuable new clients as well as keep them returning.

Effective ways to attract new clients

Every salon or spa needs a steady flow of new clients to replace those who disappear. But, gaining new clients can be a very expensive activity, so it's vital to ensure that your client attraction strategies are returning great value on your investment of time and money. Here are some of the best.

Initiate cross-referrals with other local businesses

A quick way to gain new clients is to undertake cross referrals with other businesses in your trading area. Look for businesses that cater to your ideal client and then approach them to work with you to promote each other's business.

As an example, you may have a local gym that has loads of clients who would be interested in the services your business provides. If the gym promotes your business to their clients, you can gain many new clients in a short amount of time. This is best done by creating a special offer for their clients to use on their first visit – such as a $10-$20 gift voucher (depending on the price point of your services). This strategy encourages interested people to try out your services by creating a lower price-point for a service that they're interested in having, as opposed to giving them a voucher for a set service like a lash tint or a brow shape which might be of no interest to them at all.

Naturally, you also need to promote your cross-promotion partner to your own clients so that it becomes a win-win situation for both businesses.

This type of cross-promotion can be done with multiple non-competing businesses in your trading area and can be for either a short or long duration depending your needs.

Optimise your salon or spa website for search engines

Let's take a closer look at how to make your website work much harder for you than it probably is at present.

A great website is much more than pretty pictures on the landing page accompanied by a list of services and an About page. As well as being attractive to your website visitors, it must also be attractive to search engines such as Google, Bing and Yahoo. This is because most prospective clients will turn to the internet *first* when searching for a new local salon or spa. When they do, it's absolutely essential that your business

comes up on the first page of the search results as this will give you an important edge over your competitors.

To achieve this, you need to be aware of the search terms prospective clients might use to locate a spa, and then work these search terms into the copy on your website. For instance, if you're located in Southport, you might want to be found for search terms such as 'facials Southport', 'hair removal Southport', or 'massage Southport'. Once you're clear about what people are searching for, these search terms can be included in the copy on your website to help the search engines identify you as the right business to showcase to the person who is searching.

Search engines also look for websites that add fresh content regularly (at least monthly), as this indicates to them that up-to-date information is available on the website. Now, while you're most likely not a website copy expert, there is one thing that you can do without it costing a great deal and that is to add a blog.

Blogs are simply a series of informative articles that you can add to your website that focuses on the kind of information your prospective clients are looking for. A blog not only allows you to showcase your expertise, but it helps you to build some rapport with the reader, and this, in turn, makes them much more likely to do business with you.

Your blog articles don't have to be very long – about 500 words will usually be enough – but they can be rich in the keywords/search terms that prospective clients are likely to use when they do a search.

***TIP** – your business name is not a good search term as chances are prospective clients don't yet know what this is and won't use it to find a new spa.

Doing these few things will help to improve your Search Engine Optimisation (getting found by search engines) however, there are many more specialised activities that come under this banner and may need the input from an SEO expert to implement.

> *it's absolutely essential that your business comes up on the first page of the search results, this gives you an important edge over your competitors*

Focus on your client retention

Many salon and spa owners focus most of their attention on marketing for new clients however, this could be a costly and dangerous mistake. In fact, many salon and spa owners are blissfully unaware of how many clients are slipping away from their business because they simply don't monitor these figures regularly.

Retaining existing clients is not only *much less expensive* than gaining new ones (around 80% less expensive), but existing clients will generally spend more money at each visit. Therefore, developing strategies to keep existing clients happy and returning is extremely worthwhile for your business growth.

Now it's well and good to say, 'Retain more of your existing clients', but what strategies do you need to implement to achieve this? Here are a few I believe will help to keep your clients returning.

Develop a unique point of difference

What makes your facials, pedis, leg waxes or any of your many services stand apart from what your competitors offer? It's not enough to simply provide great customer service. Many businesses do that very well and so there is no great point of difference there.

Instead, you need to make every service you provide unique in your marketplace. Ask yourself (and your employees) how you can transform every service into something so memorable that the client simply can't get the same amazing experience elsewhere. Needless to say, these unique and memorable experiences must also be delivered alongside professional, high-quality treatments.

It's not enough to deliver the same level of treatment experience as your competitors. You must provide something better, unique and memorable to keep your clients loyal and returning to your salon or spa.

Create a worthwhile loyalty/reward program

Loyalty programs are not all equal. As a matter of fact, I see many poorly designed loyalty programs within the beauty industry. So poor in fact, that I think they're probably doing more harm than good.

A well-designed loyalty program will help to keep your clients returning, and to get this right you must focus on delivering the right reward at the right time. It's essential that any rewards provided must be client-centric and not spa-centric. In other words, it shouldn't be about what *you want to give* as a reward but instead, it should be about what *your clients want to receive*.

The most successful rewards are those that are *valued by the client*. If they aren't, there's very little incentive to remain loyal to your business and your loyalty program will fail.

Too little delivered too seldom will most likely lead to failure and too much generosity on your part will negatively impact on your profits, so you must put some thought into these aspects of your loyalty program before you get started.

Always be consistent

Have you ever been to a restaurant where the food was divine and the customer service was first class, only to return a month later and have exactly the opposite experience? Did you ever go back?

In most instances, people don't return when this happens. This inconsistency makes them feel uncertain about their

next experience and this is why they often avoid returning.

The same thing happens in salons and spas. No matter how fantastic their first, second or even third experience, if the quality doesn't remain consistent and the client is disappointed for some reason, then they may not return in the future.

To avoid this happening in your business, ensure that everyone is delivering the same treatment by having written treatment protocols in place and providing training on a regular basis based on these protocols. Even simple things like not offering a drink to a client when she is accustomed to receiving one can really disappoint her.

Aim for consistency for *all clients* at *every visit*. Ensure your employees are fully aware of what they are expected to deliver to their clients and don't let the standards slip. Your salon or spa may not be as amazing as that new one around the corner, but if you deliver your treatments and service in a quality and consistent manner, you'll never have a disappointed client looking elsewhere for their treatments.

Quality and effective client attraction and retention strategies are essential to the success and growth of your spa. Monitor these areas regularly to stay on top of any small issues that may be affecting your business growth before they become a major problem.

"Every contact we have with a customer influences whether or not they'll come back. We have to be great every time or we'll lose them." – Kevin Stirtz

PAM STELLEMA is a business coach (www.salonsavy.com.au) and specialised copywriter (www.salonspacopywriter.com) for salons, spas, clinics and industry suppliers.
Her goal is to help her clients generate greater profits, which she does through her coaching, copywriting, courses, articles and books.
If you'd like to contact Pam, you can phone her on 0431 975 515 or send her an email via either website.

Eco-logical

Ritamulse SCG is an Ecocert all-natural emulsifier blend that incorporates a pre-balanced blend of plant-based esters, fatty alcohols, and lactylates. This primary emulsifier can efficiently combine natural oils, esters, and silicones into the water phase.

Ritamulse SCG is formulated with Sodium Stearoyl Lactylate, which helps to increase emulsification ability of the sodium salt of the acyl lactylates, creating emulsions that can easily hold >10% oils and esters.

Lactylates hold in moisture well, slowing the rate of evaporation from the skin's surface. Ritamulse SCG's lactic acid and fatty acid components boost your skin's already naturally found moisturizing complex.

Ritamulse SCG is extremely mild and non-irritating, making it the perfect multi-functional emulsifer. It can be used in a variety of cosmetic products including: creams, lotions, conditioners and sticks.

Ritamulse is an expanding portfolio of naturally sourced, sulphate-free and efficient emulsifying blends that remove complexity and reduce costs in the manufacturing process. Putting the logic back into ecological.

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Concept Chemical Corporation is ready to support you, along with industry expertise and partnership with RITA Corporation to help meet your supply and new product research needs.

Contact us on (02) 9498 7600 or sales@conceptchemical.com.au to find out more.

why you need insurance protection

by James Gillard

Whether you are a Beauty Therapist, Hairdresser, Nail Technician or Make-up Artist you should make sure you have the right insurance cover package in place to suit your needs.

Your career in the beauty industry exposes you to potential liabilities because of failed treatments or client reactions to treatments resulting in a claim being made against you. It is important that your Public Liability insurance extends to cover these circumstances. A policy with Insurance Made Easy will provide the full policy limit on treatment risk.

Insurance coverage available includes most forms of therapy and services including IPL-, Peels and Cosmetic Tattooing. It is highly recommended that you review your current policy particularly your coverage in connection with all of the treatments that you perform to ensure that you are adequately covered.

Insurance Made Easy can offer national discounted rates with one of Australia's largest insurers for Business Insurance specifically aimed at the Hair and Beauty Industry. Specialised cover can also be offered with another large Insurer for mobile equipment for loss, theft and accidental damage.

A business package through Insurance Made Easy can accommodate all practitioners ranging from home salon operators, mobile technicians through to multi-location salon owners and operators. A full range of business coverage is available including essential Treatment Risk.

If you are unsure about your current coverage and need a professional advisor to review your policy or risk, and to discuss your own individual circumstances, please contact the friendly team at IME Insurance Brokers.

Talk to us today! Contact our office of insurance specialists on 1800 641260

Concept and the RITA Corporation team outside RITA headquarters in Crystal Lake, IL.
Left to Right: Ryan Kellett (RITA), Sandi Murray (Concept), Marten Hauville (Concept), Aaron Lorch (Concept), Tom Goode (RITA).

Concept Team's USA Supplier Visit

Concept has a new sales team, comprising of two superstars both from within and without. Recently joined the Concept team, but no stranger to the industry and with a solid repertoire of ASCC technical presentations is Aaron Lorch, working with Sandi as Technical Territory Manager, both Sandi and Aaron work as a team across Personal Care, Cosmetic & Household segments.

Sandi Murray –

Account Manager

With Concept for six years, Sandi Murray has stepped up to a customer facing Account Management role. Sandi has been working with the personal care, cosmetic, pharmaceutical and medical sectors of the business. With her Bachelor of Business and accounting/ finance background, Sandi has developed solid networks within the industry, both with Concept customers and overseas principals. Along with her strong customer service ethic, Sandi enjoys working with customers to custom fit their requirements with Concept product capabilities. Concept customers will benefit greatly from this focused Cosmetic, Personal Care and Household market segment investment.

Aaron Lorch –

Technical Territory Manager

With a Bachelor of Science (Chemistry), Aaron as joined Concept from a Personal Care sales role at Croda. As well as being a qualified chemist with over 10 years' experience in customer R&D labs with organisations such as Ecolab and BASF, Aaron brings a wealth of both technical and sales experience in the Personal Care, Household, Cosmetic and Auto Care market segments; with specific technical expertise in surfactants. Aaron also has experience working both in the lab and in his recent consultative sales role with a number of current customers. Both Concept and their customers will benefit greatly from this technical and territory development investment.

Recently in June, the newly formed Concept team went over to meet with key suppliers in the USA. It was a great opportunity for customers to brief

Rod Booth from Delta Laboratories effortlessly emulsifies water into a CareSil silicone suspended gel, during Aaron Lorch's presentation session at the recent ASCC NSW Supplier Day in Sydney.

the Concept team on any upcoming projects that Concept could work with suppliers on, particularly around Cold Process technology, Natural and "Free From" raw materials.

From Aaron:

The supplier visits were awesome! We went from Chicago, to New York, to New Jersey and finished in California on a whirlwind educational tour. It was highly informative and it was great to meet the dedicated teams supporting us. I'm excited to bring some new technology to our region! We learnt a lot of great stuff, and what stood out was NuSil. In the beauty industry, we get to make people more feel more beautiful. NuSil actually change lives, with medical silicones for the Cochlear ear implant, for prosthetics, or even just the right coating for a drug-eluting stent near a heart. There's no other way to put it: being there was heart-warming.

From Sandi:

We have not long returned from two weeks with key suppliers in the States, and in particular had a productive visit to Sandream Impact, as well as RITA Corporation, NuSil Technology for high tech Cosmetic silicones and Troy Corporation for preservative systems. It was great to further strengthen relationships with these key Principals.

Key focus across all supplier visits were detailed Technical Product briefing, update on latest Innovations, US/Global Market Trends, Regulatory, Free-From/ Cold Process Formulations. As well as the compulsory factory tours, meet & greet; the Concept team spent quite some time in the labs with the R&D and lab chemists.

The global manufacturers in cosmetic and personal care whom Concept have exclusive distribution agreements with that were visited in the USA are:

Rita Corporation

Surfactants (Sulphate free, DEA/MEA free), Carbomers, Lactylate emulsifiers, Emollients, PEG Esters, Emulsifiers, Fatty Alcohols, Flavonoids, Amino acids, Lanolin & Derivatives, Naturals (Aloe, Chitosan), Panthenol, PVPs, Sodium Hyaluronate, Natural Oils, and other actives including ECOCERT material.

Sandream Impact

Pigments, Colour Effects, Visual & Active Solutions

Nusil Technology

CareSil range of Cosmetic and Personal Care specialist silicones such as Elastomer Gels, Encapsulation Technology, Blends and Speciality Fluids

Troy Corporation

Environmentally friendly antimicrobials and performance for the Personal Care segment – broad spectrum, IPBC, Isothiazolinone, optimised/ customised solutions and organic acids

In addition to these USA suppliers above, Concept also have long-standing representation of one of Europe's largest suppliers of Essential Oils, Organic Oils, Natural Extracts and Butters who can offer COSMOS Certified and ECOCERT material. Concept also supply direct from Australian growers; Certified Organic Tea Tree Oil and other local Australian produced oils and natural extracts.

Concept are proud to be ASCC Benefactors, supporting the fantastic team and great work produced by the ASCC and the members. At the recent ASCC NSW Supplier Day in Sydney, Aaron Lorch presented on some of the key innovations and information from Concept's USA supplier trip. Those lucky enough to be able to make the upcoming ASCC suppliers day in Melbourne will be able to catch his insights.

The ASCC Southern Chapter Annual Supplier Day is on in Melbourne on 23rd August 2017, see here for booking and more details: http://bit.ly/2v9kE8N

Concept look forward to working with you, in particular leveraging recently enhanced capability and industry knowledge across trends, leading-edge materials and formulations that deliver on your customer's demands. The Concept team can be contacted directly on sales@conceptchemical.com.au or (02) 9498 7600.

Eco-Friendly

Ecological and Economically friendly.

For over 60 years, RITA Corporation has specialised in supplying personal care, cosmetic and household markets with a wide range of high quality raw materials and blends.

Consumer demand is increasing for environmentally friendly and natural based materials, as well as ecological and green manufacturing processes. Similarly, there is an increasing emphasis on creating formulations that are energy efficient, whilst reducing manufacturing costs.

RITA Corporation has met these demands by creating products such as Ritafactant SFE, Ritamulse SCG and Ritathix DOE.

Ritafactant SFE is a mild surfactant that can easily be added to the water-phase of cold process production for cosmetic, personal care and household market segments.

Ritafactant SFE is an all-in-one blend and can be used in a wide range of formulas. It is cost competitive, sulphate free, sulphonate free and DEA/MEA free.

Ritamulse SCG incorporates a pre-balanced blend of plant based esters, fatty alcohols, and lactylates into an all-natural emulsifier blend. Ritamulse SCG is sourced responsively (RSPO), completely GMO free and 100% vegan.

Ritathix DOE is a unique surfactant thickener blend, that can be added during any step of the manufacturing process. This eliminates the need for heat and other associative thickeners, all while reducing energy consumption and production costs.

All of these new materials deliver lower costs, streamlined production and more versatile materials that can be used across multiple market segments.

Cold process and natural blends, that offer more "Free From". Free from complexity, free from heating costs and free from formulating headaches.

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Concept Chemical Corporation is ready to support you, along with industry expertise and partnership with RITA Corporation to help meet your supply and new product research needs.

Contact us on (02) 9498 7600 or sales@conceptchemical.com.au to find out more.

packaging

In product development, **time** is always ticking

by Steve Welsh

We meet with different brands each week, they can vary from a startup to existing companies looking to release new products, but a common message is "we have this great product and we want to launch the product on this date!"

To make sure all parts of the product development are in place and that your product ends up a success, means you must allow time to make sure the packaging is also right. Sure, enlisting a skincare packaging specialist like Weltrade Packaging can help cut down the process somewhat. This is because we go through the options with you and look at what packaging will work to make the project as stress free as possible.

At the end of the day, when you select your packaging, whether it is from us or elsewhere, you will still need to undertake stability testing in conjunction with your chemist or formulator to make sure concentration of the active works well with the type of packaging chosen.

The last thing any of us want, is for you to release a product because you rushed it and six weeks down the track the packaging starts to discolour, suck in or generally does not dispense how you thought it would. The relationship between you and your packaging supplier should be a long term one, and that can only happen if all the risks are addressed in the early stages.

Sometimes filling companies can suggest one style but because packaging is not their specialty they can forget about what orifice would work better or a different type of sealing process that they are not used to may work better. Or they forget to consider the dosage of the pump and suddenly you have a "cleanser" running out, resulting in upset consumers that you will struggle to win back to your brand.

We work with many formulators and fillers all over the country, they do what they do best. We assist them with packaging advice and then carry out checks throughout the supply process to make sure the result looks like how it should, works how it is planned, and arrives on time.

A great five step plan to follow is:

1 Enlist a packaging expert (like Weltrade Packaging) when you are thinking about the product you are looking to launch. Sometimes this can be one year or more out from when you are looking launch.

2 Get samples of the packaging materials for stability testing with your fillers so they can carry out testing, check specifications and make changes where required. It won't necessarily need to be the exact size but should be the same base material / dispenser.

STEVE WELSH is a cosmetic packaging specialist with over 20 years experience across all mediums of packaging. As the director of Weltrade Packaging, Steve leads a team of designers, technicians, printers and supply chain professionals. To ensure the best exposure of your beauty, skincare or cosmetics brand. Steve's philosophy is to design your packaging correctly, right from the start, so you can elevate your brand and move more product. Steve works closely with leaders in the cosmetic industry to ensure that your packaging consistently stands out on the shelves within this highly competitive market.

3 When you have your final samples from your formulator that you are happy with i.e. the fragrance and consistency, confirm your packaging with your supplier and ask for up to date quotations based on the fill quantities, lead times and volume breaks. A minimum 12 weeks out from filling date is a good rule of thumb to complete this stage.

4 Finalise artwork on your supplier's supplied dieline, place your packaging purchase order and ask for preproduction samples, so you can see and feel the final product before the mass is manufactured. This can take 2 to 4 weeks, but you are still 8 – 10 weeks from when you need the packaging.

5 Confirm the samples, get the goods, fill and get the product to market.

In a recent IBIS world report the industry is still expecting consistent growth year on year to $AUD 1.5 billion by 2021-22.

With a growing market, to maximize your opportunity with your product, we advise our clients to really make the most of their time with the preproduction samples while they are waiting for the mass production. This is a great time to complete product photography, set up the website and be ready to take orders as soon as your product is filled.

As always, our global team at Weltrade Packaging is ready to assist your needs with support, advice or your more specific requirements. It's never too early to start a conversation.

2018 ASCC Conference: 50th Anniversary

Canberra, 16th - 18th May, 2018

As you may already know, for this very special 50th edition the conference will take place in Canberra, at the Realm Hotel from the 16th to the 18th of May 2018.

The organising committee of the 2018 conference is happy to announce that the call for abstracts is finally out! For the golden anniversary of our conference, we are asking for your help to make this conference exceptional! Whether it is to present a technical or marketing paper or a hands on workshop, we are calling for the expertise of a wide variety of players in the industry:

Brand owners

The Australian cosmetic world is more dynamic than ever! Why not display your innovations and show the industry what makes your brand so great? The attendees would love to hear from you!

Contract Manufacturers

In 2018, the conference will put a strong emphasis on Australian contract manufacturing. This is your conference! So be sure to be the first to present your capabilities during a technical paper or a hands on workshop!

Distributors

The COC 2018 knows we can count on your great support to contact your suppliers to present papers. We'll organise very hands on workshops so why not use your wide variety of ingredients to present your own this year?!

Ingredients Suppliers

This year again we are calling on your ever-wonderful support to present the latest coming from all over the world in the field of ingredients, whether technical, or trends presentations or workshops!

Packaging companies

Packaging companies have a lot to bring to our industry and they are too often absent at the ASCC conference. Please be in touch to show how the latest innovations in your field will help build tomorrow's cosmetics

Consultants

Your knowledge in formulation, regulations and standards is in high demand to make the Australian industry better every day. You are invited to present technical papers to keep us up to date with the latest news!

Lawyers & Regulatory

The industry is often struggling with ever changing regulations, trademarks and patent issues, so please come and share your expertise in a presentation to show the sector how to stay ahead!

Marketers

Your expertise in marketing is crucial to the ever evolving cosmetic industry and our attendees want to hear about the latest trends or how to market their products better, so please come and present part of your knowledge!

Interested? Read on for full details of how to submit an abstract…

Please note, the registration for the conference is free for the speaker if your paper is selected!

50th Golden Touch of Beauty

50th ASCC Conference 16th - 18th May 2018, Canberra

CALL FOR ABSTRACTS

To help celebrate 50 years of the ASCC, the organising committee invites expressions of interest for technical and non-technical content at the 2018 conference to be held in Canberra. The theme is: *Golden Touch of Beauty*. We encourage brands, chemists, contract manufacturers, regulatory specialists, suppliers, and distributors to submit abstracts as per the guidelines outlined below.

Technical?	Non-technical?
Technical presentation: where the purpose is to present scientific information (obtained by the scientific method) relevant to the industry and the theme.	Non-technical presentation: where the purpose is to present non-scientific information OR a formulation, sensory or back to basics workshop.
Examples include: academic research, clinical results, active ingredients, new technology	Examples include: marketing, social media, regulatory, legal, packaging, lab workshop
Only oral platform presentations are available for technical presentations (30 mins).	Oral presentations (30 mins) and lab workshops (60 mins) are available for non-technical presentations.
Preference will be given to abstracts that are original and are in line with the conference theme.	Preference will be given to abstracts for lab workshops that encourage high level of interaction.

ABSTRACT GUIDELINES

Abstracts are required for oral (technical, non-technical) presentations and workshops. They are to be submitted in English and be 100 to 250 words in length. Submissions should be in Microsoft Word format, double-spaced using Arial font in 12pt. Kindly ensure your abstract and presentation do not contain trade names (INCI names only).

Please include the following information:

1 Preference for (a) Oral presentation (technical or non-technical), (b) Lab Workshop,

2 Presentation Title, Name of Author(s)

3 Author's name to be underlined, Company/Organisation, Address, Phone, Fax and Email Address. It must be clearly stated if the presenter is not one of the authors.

Full papers must be submitted to be eligible for technical awards. Terms and conditions for awards are available at www.ascc.com.au

WORKSHOP GUIDELINES

For workshops, please enquire with the technical committee for available equipment. While there will be 1 set of basic equipment available, we encourage presenters to structure workshops to maximise audience participation (rather than a lecture). Please ensure slides are kept to a minimum (recommended 10 slides). We encourage formulation, sensory, and back to basics workshops by educators, formulation chemists, and contract manufacturers.

The Peter Strasser award for the best educational workshop will be awarded at the conference (full written paper not required).

KEY DATES

- Abstracts due 31st Oct 2017
- Successful abstracts notified 15th Dec 2017
- Full papers due 31st March 2018
- Conference: 16-18th May 2018

Isabel Sleiman Isabel@trulux.com.au

Valentine Guillet valentineg@ultraceuticals.com.au

Joshua Gosling joshua@rationale.com

President's Report

by Robert McPherson

With winter well and truly upon us, it time to wrap up, sit by the fire, drink a mulled wine and reflect on the highs and lows of the last few month.

In late June it was with great sadness that I shared the news of the passing of Gavin Greenoak. Gavin was an inspirational, highly active member of the ASCC having served on Council as President as well as a number of ASCC committees in a variety of positions. Gavin was President of the IFSCC when he was elected in 2010, an achievement that only enhanced his already incredible resume. One of Gavin's more recent successful contributions to the ASCC was to guide the society to secure the hosting rights for the ASCS conference in 2015. Gavin's dedication to the ASCC and the industry as a whole saw him loved and respected by everyone. Gavin was described by many as a man generous with his time, a great mentor and an outstanding leader whilst at the same time having a great and unique sense of humor. Around 40 members of the ASCC took the opportunity to share their memories, stories and condolences with Gavin's family. The impact that Gavin has made on our industry will continue to be felt for many years to come.

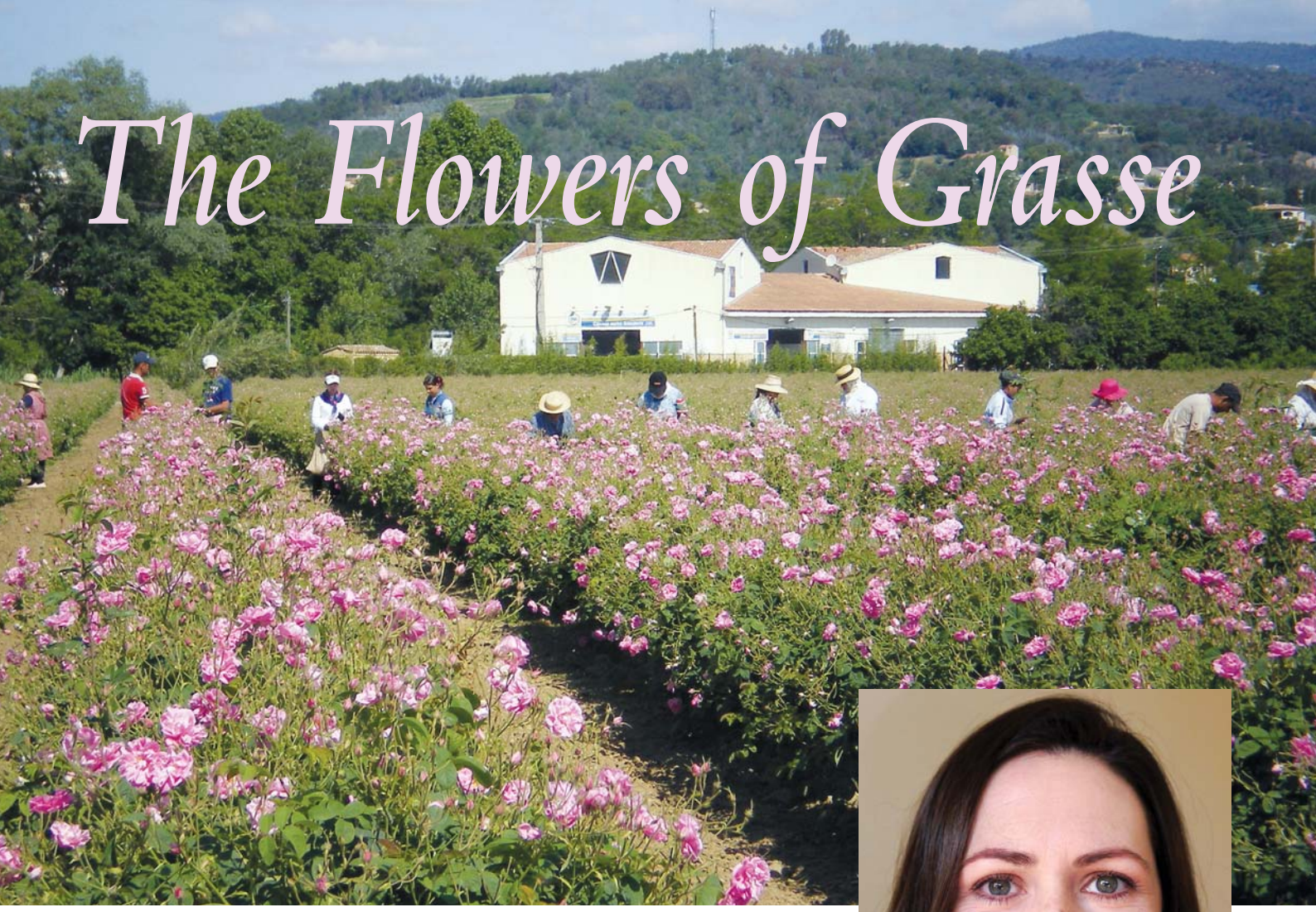
In early July the ASCC held its first Western Australia Industry day at the Northern Metropolitan TAFE in Perth. The event was very well attended with over 100 participants, most of whom were local to Perth. The day kicked off with an inspirational keynote address by Suzi Urbaniak who discussed the importance of hands on and real life learning, this was followed by 11 supplier presentations and 15 table top displays were showcased during the breaks. The event was a huge success and has set the foundations for more ASCC events to be held in Western Australia. This event would not have been possible without the help of Michelle Kane and her team at Pharmascope, so I'd like to extend my thanks to Michelle and her team.

In NSW, the chapter committee hosted the annual industry day again and the event was very well attended. Participates were treated to 12 engaging presentations with topics ranging from hair care trends, to natural actives to rheology modifiers and 15 table top displays. Congratulations to Avenir ingredients and IMCD for respectively winning the best presentation and table top display. I'd like to extend my congratulations to the ASCC NSW chapter committee for again organizing and running a very successful event. With the southern chapter suppliers day and Queensland Industry day to be held in the coming weeks there is plenty of activities for our members to participate in.

In ending this report I'd like to thank everyone involved in the organizing, presenting, and attending the events listed above and I'm looking forward to catching up with everyone at the upcoming events.

Robert McPherson
ASCC President

The Flowers of Grasse



by Rebecca Akhyani

When you arrive in Grasse, having driven up the winding streets, past the ochre coloured building of various hues, the road suddenly opens out at the Place du Cours Honoré Cresp, affording you views all the way down the valley and out towards Cannes and the sparkling Mediterranean. There, in front of the Palais de Congrès is a sculpture dedicated to the heritage of the city. The sculpture consists of a bottle of perfume entwined by four flowers synonymous with Grasse; rose, jasmine, tuberose and carnation. These plus three others, orange flower, violet and mimosa make up the flowers of Grasse. Yet of these, only carnation and violet are native to the region. A fragrant history, microclimate and fine soil have facilitated the cultivation of these plants in the region. Grasse has adopted these flowers which have become so embedded in its heritage that the two biggest events in the local calendar are the Expo Rose and Fête du Jasmine.

Rose

Queen of all the flowers, rose is a major note in three quarters of prestige perfumes. Of the hundreds of species of rose, only two are used in perfumery. The light pink, cabbage like species Rose Centifolia is the celebrated rose of Grasse. The odour is a light, sweet scented floral with honey tones. It is a hybrid species believed to have been developed by Dutch breeders from the Rose Damascena, which itself is said to have been brought to Europe from the Middle East by returning crusaders. Each bottle of À La Rose by Maison Francis Kurkdjian contains 250 Centifolia roses from Grasse.

Jasmine

Of such importance to Grasse, it is simply known as 'La Fleur'. Native to South Asia, Jasmine Grandiflorum was introduced to Europe by the Moors in the 16th Century. While conditions such as climate and soil are considered more favourable to growing this plant in other locations around the world, the quality of Jasmine Absolute from Grasse is considered supreme. Its odour is a warm, heady floral with fruity top notes. The Jasmine in J'Adore is grown at the Domain de Manon exclusively for Dior.

Orange Blossom

It is said that orange was brought from India to the Middle East by Alexander the Great, and by way of the Moors to Southern Europe, though it is originally native to South East Asia. While the blossoms of the sweet orange are left on the tree in order to bear fruit, it is the bitter orange tree with its highly fragrant flowers that are so highly prized

longer carried out. The leaves of the Viola Odorata are still processed in the region. Violet leaf absolute has a green, cucumber like character. Today the violet note is on trend for a whole new generation and paired with fruity notes imparts a youthful quality to fragrances.

Mimosa

The most recently adopted of all the flowers of Grasse, it is not a true mimosa at all. In fact, Acacia Dealbata is a species of wattle native to Australia. This plant was introduced to the South of France in the early 19th Century. The Mimosa festival is an integral part of the winter festivals of the French Riviera, celebrated along the 130km Route du Mimosa, which indeed ends in Grasse.

Carnation

Known as Oiellet absolute, today this material is produced in Egypt. It is a warm waxy floral with spicy and herbaceous facets. Currently the carnation note is perceived as old fashioned. Perhaps its resurrection is just around the corner.

in perfumery. The process of steam distillation yields fresh, citrus-like neroli oil, while solvent extraction produces the richer floral notes of orange blossom absolute. The hand-picked blossoms in L'Occitane's Neroli & Orchidée are extracted by ultrasound.

Tuberose

Often mistaken as being related to the rose, tuberose is a night blooming plant native to Mexico. The name is derived from the Latin tuberosa, meaning swollen. The odour is an intensely heady-sweet floral. The traditional method of Enfleurage synonymous with the Grasse savoir faire declined over the years, with tuberose being the last flower to continue to be processed in this way until the 1950s.

Violet

Few species of Violet are actually fragrant. The heyday for Parma Violet production in Grasse was around the turn of the previous century. But today extraction of the flower is no

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Repair the Hair:

actives for after the damage is done

by Belinda Carli

Many of today's modern styles require heat styling apparatus, where hair is heated to 230°C on multiple passes when creating the 1 style. These styles may be created more than 3 times a week – in some cases daily – meaning the potential for hair damage is much greater than in previous decades. While using a styling aid containing a heat protecting agent is imperative during the styling process, what happens when hair is already damaged, not to mention the ongoing accumulative damage from sometimes daily styling use? This article will look at the options available for shampoo, conditioner and after care products specifically suited to repair the impact of heat styling apparatus and restore healthy, shiny looking hair once the damage has been done, and in the face of ongoing heat styling use.

When the damage is done

The use of high temperature heat styling devices lifts the hair cuticle, making it more hydrophilic. As a result of the damaged cuticle layers, the hair becomes porous and more easily damaged, leading to splits and breaks. It also appears duller as it is not able to reflect light evenly, tangles easily and is more prone to future damage. Where the outer cuticle of hair is damaged, water will readily spread over the hair shaft and moisture is lost from inside the hair shaft. Below are images of Asian and Caucasian hair before heat styling and immediately after – the damage caused without the use of a heat protecting agent is evident. (See Figure 1 on next page.)

Hair is predominantly composed of protein molecules, with varying amino acid profiles in the cuticle, cortex and medulla. Other substances present in hair include water, lipids and minerals. When heated, the protein profiles are impacted and hair's normal barrier protection is lost. In addition to this, its hydrophobic properties are diminished which exacerbates frizz and further damage. How can we address these issues?

Repairing the cuticle

Since the hair is predominantly a protein, it would make sense to repair the external surface with hydrolysed proteins and peptides that have a natural affinity to the hair shaft. There are literally hundreds of hydrolysed amino acids, peptides and proteins to choose from, some key concepts you will want to consider:

- Proteins are composed of building blocks of amino acids and peptides; so the use of any of these substances in either a soluble powder form or hydrolysed derivative will provide supportive benefits to the hair shaft. For the purposes of this article I will use the term 'protein substance' to cover all three of these categories.
- The molecular weight (MW) of the protein substance will impact its performance on the hair. Lower molecular weight proteins (MW up to around 1000) are able to penetrate the hair fibre to moisturise from within, reduce brittleness and formation

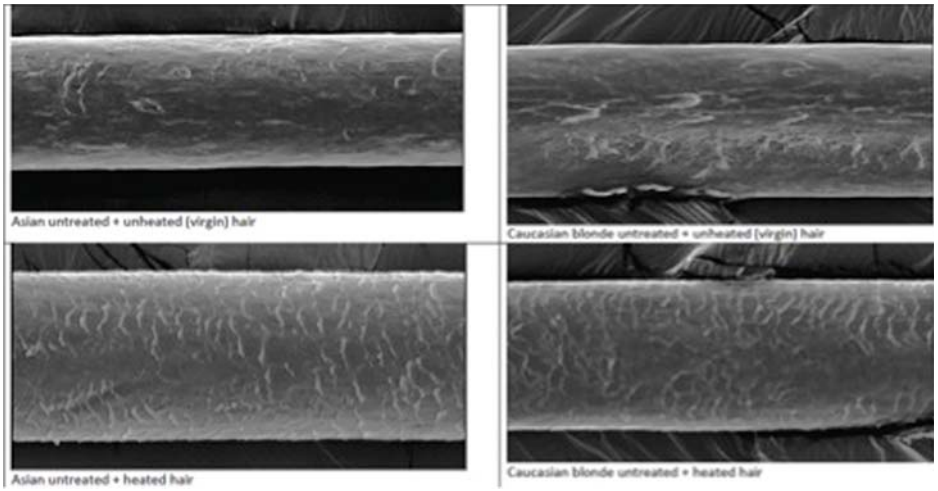


Figure 1: Asian and Caucasian hair before and after heating: damaged, lifted cuticles are evident.

of split ends and act as moisture regulators. Larger molecular weight proteins (MW upwards of 25,000) can act as 'protein shields' to form coherent films on the hair and physically smooth the cuticle.

- Quaternised protein substances will adsorb strongly to the most damaged areas of the hair because of their attraction for the hydrophilic (charged) portions. They are also particularly effective for damaged hair and to reduce the static/frizz of hair by neutralising the charge at the hair's surface.
- The 'story' associated with the protein substance of choice can be a benefit to marketing; especially where this protein is particularly appealing to consumers. Popular examples include silk, soy and keratin.

Lipids without the lank

One of the most effective ways to restore the hydrophobic, moisture protective barrier of hair is to coat it with lipids. The hair has a natural affinity for oily substances and healthy hair is naturally hydrophobic. However, excessive use of straight lipids in hair products can leave the hair feeling heavy, lank and without lustre. When using lipids, the 'least use to achieve the best' principle should apply: look for efficacy results from raw material suppliers for usage guides to input just the right amount to obtain benefits without significant residue to weigh the hair down.

- EFAs – Essential Fatty Acids (linolenic and linoleic acid) in small inputs are biocompatible with the hair, being a natural component of sebum secreted from the scalp to provide a protective coating for the hair.
- Other fatty acids such as eicosanoic acid and behenic acid provide significant conditioning benefits to the hair – look for plant or exotic oils particularly rich in these fatty acids.
- Volatile silicones spread extremely well through the hair and evaporate with no residue. They act as especially effective solvents to deposit very small amounts of lipid substance throughout the hair in an even manner for near-weightless application. They may be used as single solvents or blended materials with additional performance functionalities built into the solution.
- Ethoxylated lipids are another effective way of delivering conditioning benefits without excess residue; especially when they are used in wash off products. The ethoxylated portion is highly water soluble, meaning they can be used to deliver a conditioning portion to the hair while excess can be effectively washed away.

Materials of choice

Some of the most exciting launches in recent times to provide heat-styling repair include:

Fision Aquashield (by Tri-K): this is a multi-component material that enables you to select just 1 active with multiple benefits and potentially all the active materials your marketing department could be looking for! Containing hydrolysed keratin, humectants, essential fatty acids, vitamins B5 and E, jojoba oil and a wetting agent to help the material spread through the hair, it is also water based and weightless with no residue. It acts as an osmotic regulator to shield and protect hair in arid and humid environments and has efficacy data to prove its suitability for both Brasilian curly and Caucasian straight hair.

AlphaImprove 4D Hair (by Citroleo): a blend of babassu oil, pracaxi oil and alpha-bisabolol, it is naturally rich in behenic and lauric acid to provide deep repair and re-densify the cuticle and cortex for improved strength and frizz control. It is particularly suited to restore hair health after heat styling by rehydrating the hair and filling gaps in the cuticle for smoother, shinier hair.

BaobTein NPNF (Tri-K): based on the hydrolysed protein from baob trees, this material has particular efficacy data to prove its effectiveness in repairing and protecting hair from heat and UV damage. It works to support the protein matrix to strengthen the hair, making it softer and more manageable. The sourcing of this material also has a community benefits and sustainability message. Its efficacy has been proven with African, curly and straight Caucasian hair types.

Keratrix (Provital Group): oligopeptides from the carbon tree are provided in a matrix form for sustained, lasting strengthening benefits to nourish and repair the hair; especially that which is heat styled. Efficacy data is available for use on bleached Caucasian hair.

Dow Corning silicone derivatives: materials with various additional benefits, in addition to heat repair, include *CE-8411 Smooth Plus Emulsion* (boosts colour protection and shine), *8500 Conditioning Agent* (for clear products) and *5-7113 Silicone Quat Microemulsion* (particularly suited to colour protection and volume).

Which repair agent for your product?

Hair needs can vary significantly depending on the ethnicity of the user, previous or other damage, lifestyle and styling needs. For example, a Caucasian woman with chemically treated blonde hair that swims regularly is likely to have already incurred some damage to her hair, and be exposed to ongoing damaging conditions even without the use of heat styling apparatus. Being a finer hair type to begin with, it is also going to respond differently to residue, humidity and combing strength than very curly, hardier African hair not exposed to the same sort of chemical treatment – these hair types would require extremely different products to address their specific needs. When selecting actives for your next heat repair developments, look for the following:

- Efficacy data using hair tresses or human models with the specific hair type you are formulating for;
- Efficacy data of product after at least two or more passes of heat styling apparatus – this more accurately reflects consumer usage;
- Compatibilities with the formulation – even the best material used in an incompatible environment will render it as ineffective as if not used at all. Look for the required pH of end formulations and/or any impact of charge when assessing suitability.
- When used in leave on products, make sure residue or ingredients won't cause excessive weight as to prevent further styling. If a consumer is using a product to repair heat styling damage, they will be inclined to want to heat style their hair with product present. If the product weighs down their hair such that they can't style it effectively, they will look for another repair product that won't impact their ability to style their hair.

Finally, never forget the importance – or competitiveness – of marketing the finished product. The source of materials for marketing claims or INCI names may be enough to help you decide between two otherwise very similar materials. If evaluating materials with similar data and results, consider what is going to appeal to your target market to help the product stand out in an increasingly competitive sector of the market.

Happy formulating for healthier looking, heat-styled hair!

Scalp conditions: Dandruff

by Emanuela Elia

Dandruff is a common scalp disorder characterised by the formation of flaky white or yellowish scales and sometimes pruritus which affects a large number of the population post-puberty.

Dandruff can be due to an altered dead skin proliferation; a disrupted barrier function; a decrease in the level of hydration and of natural moisturising factors (NMF) in the scalp or a persistent inflammatory condition[1].

Dandruff is neither contagious nor serious. It can however cause embarrassment and may sometimes be difficult to treat. Dandruff symptoms are easily identified with profuse flakes on hair and shoulders.

Causes

Skin problems can readily occur on the scalp, but the awareness about the importance of skin care in this region is low when compared with the face.

Dandruff can have several causes[2], including:

- *Shampooing infrequently.* When hair is not washed regularly, oils and skin cells from the scalp can build up causing dandruff.
- *Sensitivity to hair care products (contact dermatitis).* Sometimes sensitivity to certain ingredients in hair care products or hair dyes can cause a red, itchy, scaly scalp. If these types of symptoms are experienced, discontinuing product use is advised. If an allergic reaction such as a rash, hives or difficulty breathing is developed, medical attention must be sought immediately.
- *Seborrheic dermatitis.* This condition is one of the most frequent causes of dandruff and is characterised by red, greasy skin covered with flaky white or yellow scales. Seborrheic dermatitis may affect the scalp and other areas where oil glands are present (e.g. eyebrows, the sides of your nose etc.). If over-the-counter dandruff shampoos don't seem to reduce dandruff, or if the scalp becomes red or swollen, specific treatment for seborrheic dermatitis may be needed.
- *A yeast like fungus called Malassezia.* Malassezia lives on the scalps of most adults. In some cases, it this fungus can irritates the scalp and cause more skin cells to grow. Tea tree oil, which comes from the leaves of Australian tea tree Melaleuca alternifolia, has been used for centuries as an antiseptic, antibiotic and antifungal agent. Small studies have suggested that tea tree oil may be effective in reducing dandruff.

Tea tree oil is therefore included in a number of shampoos found in natural foods stores. However, the oil may cause allergic reactions in some people.

- *Dry scalp.* Flakes from dry skin usually present smaller and less oily than those from other causes of dandruff. Other symptoms such as inflammation and redness are uncommon. People with dry scalp often have dry skin on other parts of the body as well (e.g. legs and arms). The condition may worsen during autumn and winter, when indoor heating can contribute to dry skin, and may improve during the summer.

Stratum corneum on the scalp

Research carried out to identify the factors causing flaky scalp has revealed some dysfunction of the stratum corneum (SC) in subjects affected by dandruff. The dandruff SC has lower hydration, elevated levels of urea and lower levels of lactic acid than the non-dandruff SC. Severe or chronic barrier damage can lead to atypical epidermal proliferation, keratinocyte differentiation and SC maturation. The depleted and disorganised structural lipids of the dandruff SC are consistent with the weakened barrier indicated by elevated transepidermal water loss[3]. Further evidence of a weakened barrier in dandruff includes subclinical inflammation and higher susceptibility to topical irritants. These observations suggest that directly addressing the quality of the SC could have a scalp benefit. A healthy stratum corneum (SC) forms a protective barrier to prevent water loss and maintain hydration of the scalp. It also protects against external insults such as microorganisms, including Malassezia, and toxic materials. Treatment of dandruff with cosmetic products to directly improve SC integrity while providing effective antifungal activity may thus be beneficial.

Efficacy studies

Clinical studies have been conducted to investigate the efficacy of anti-dandruff shampoo aiming at anti-fungal and/or moisturising effect to restore skin barrier. A study published in 2014 in the *International Journal of Cosmetic Science*[4] revealed that treatment with an anti-dandruff shampoo containing 1% zinc pyrithione (ZnPTO) substantially restored the levels of hydration, urea and lactic acid close to the non-dandruff levels. The levels of sebum localised within the SC were also brought closer to those of the non-dandruff condition after ZnPTO treatment.

In the same year another study[5] was conducted to investigate the efficacy of a moisturising 'leave on lotion' (LOL) containing a high concentration of glycerol (10%) and other known skin benefit agents (saturated fatty acid and sunflower seed oil) to reduce dandruff over an eight week treatment period with three applications per week. Results of expert visual grading and biophysical measurements of SC parameters (transepidermal water loss and hydration) revealed a significant reduction in the dandruff condition over this period, with significant improvement in both SC water barrier function and hydration. These scalp skin benefits were maintained for up to a week following the end of the treatment. This study indicates that use of a glycerol-rich substantive LOL, designed to directly improve the quality of the SC barrier can have a significant impact on the dandruff condition.

Scalp care

Dandruff can be associated with various dermatological conditions such as seborrheic dermatitis as well as inflammation due to Malassezia, not shampooing often enough, or use of inappropriate skin care. Scalp dryness due to low humidity during winter or cooling and heating in highly sealed living environments is also a common cause of dandruff. Once the main cause has been identified, dandruff can usually be controlled with appropriate scalp treatment. Mild cases of dandruff may need nothing more than daily shampooing with a gentle cleanser in the case of sensitive scalp; antifungal

shampoo in the case of seborrheic dermatitis or a moisturising shampoo, conditioner or 'leave on lotion' in the case of scalp dryness.

References

1 Wang L, Clavaud C, Bar-Hen A, Cui M, Gao J, Liu Y, Liu C, Shibagaki N, Guéniche A, Jourdain R, Lan K, Zhang C, Altmeyer R, Breton L; 'Characterisation of the major bacterial-fungal populations colonising dandruff scalps in Shanghai, China, shows microbial disequilibrium'; Exp Dermatol. 2015 May;24(5):398-400.

2 http://www.mayoclinic.org/diseases-conditions/dandruff

3 Turner GA, Hoptroff M, Harding CR; 'Stratum corneum dysfunction in dandruff'; Int J Cosmet Sci. 2012 Aug;34(4):298-306.

4 Bonnist EY, Pudney PD, Weddell LA, Campbell J, Baines FL, Paterson SE, Matheson JR.; 'Understanding the dandruff scalp before and after treatment: an in vivo Raman spectroscopic study'; Int J Cosmet Sci. 2014 Aug;36(4):347-54.

5 Harding CR, Matheson JR, Hoptroff M, Jones DA, Luo Y, Baines FL, Luo S; 'A high glycerol-containing leave-on scalp care treatment to improve dandruff'; Skinmed. 2014 May-Jun;12(3):155-61.

EMANUELA ELIA is the Director of Ozderm, which specialises in *in vivo* testing and clinical trials for cosmetic and personal care products. Emanuela Elia has a law degree from Rome and a Master of International Business from the University of Sydney. She had collaborated with Australia's longest serving Contract Research Organisation Datapharm for a few years before setting up a cosmetic and personal care products testing facility in 2009. Emanuela is enthusiastic about improving the quality of cosmetic and personal care products' research in Australia through science.

Feel the power of nature directly on the skin from the hand of Lipotec

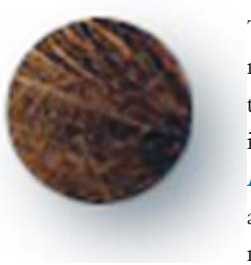
Exfoliation has played a very important role in the eternal pursuit of having a perfect skin. It offers uncountable skin benefits in one action, providing radiance, smoothness and even skin tone as well as enhancing actives penetration, to name a few.

The cell renewal cycle slows down with age, resulting in less radiance and a more wrinkled appearance of the skin. When this happens, a complementary exfoliation is needed to help stimulate the production of new cells. At present, the plastic microbeads, historically used in physical exfoliants, have been questioned in many countries for their contaminating effects giving way to the natural exfoliants as an excellent environment-friendly alternative.

Following its commitment to nature, Lipotec has developed ACTISCRUB™ physical exfoliants – a wide variety of natural-sourced scrubs that help remove dead cells and impurities from the surface of the skin to let the inner beauty arise. The range is launched with the following first six references:

Important component of many sparkling wines, Chardonnay is one of the oldest cultivars of grape in the world. The semi-rounded structure of **ACTISCRUB™ chardonnay seed** is not aggressive for the skin and provides a tender exfoliation for face and body.
Glamorous seeds for an extremely gentle exfoliation with a pleasant massage feel.

Its many natural attributes led cranberry to be known as the "wonderberry".
ACTISCRUB™ cranberry seed offers a soft touch with comfortable massage to remove the dead cells at the surface of both the face and the body. Visually eye catching red seeds allow for creating innovative formulations and playing with textures.
A wonderberry to care for sensitive skin through a mild peeling.



The Sanskrit name of coconut means "the tree which provides all the necessities of life". Possessing interesting abrasive properties, **ACTISCRUB™ coconut shell** offers a low to medium friction leading to a moderate exfoliation for face and body.
The jewel of the tropics to clean and unblock pores.

Coming from the ancient Persia, where they were reserved for the royalty, walnuts are the oldest tree food known to man. **ACTISCRUB™ walnut shell** has good abrasive properties and striking visual effect, providing a mild exfoliation for face and body.
Smooth aristocratic skin thanks to the royal nut.

One of the oldest cultivated fruits, apples are referred to as symbols of love and beauty by the Greek and Roman mythology. The size and shape of **ACTISCRUB™ apple fiber** particles offers a moderate exfoliation for face and body.
Beyond its countless health benefits, leads to flawless and fresh skin.

Used as an important material since the ancient times, cork is one of the most extraordinary products from nature. Recyclable and reusable, it is also able to absorb considerable amounts of CO^2, contributing to reducing greenhouse gas emissions known as the main cause of climate change. **ACTISCRUB™ cork** has a moderate to high friction and provides a strong exfoliation for body, hands and feet.

The only bark that regenerates to help promote skin renewal.

Natural scrub ingredients from renewable and biodegradable sources, ACTISCRUB™ physical exfoliants are the environment-friendly alternative to synthetic scrubs with a great potential to inspire cosmetic brands to create their own, unique identity.

For more information, please contact Robert McPherson, Account Manager for Australia and
New Zealand, at RMcPherson@Lipotec.com or
Tel: +61 (02) 9741 5237.

sunscreen highlights

by John Staton

TGA Launches SME Assist

For small to medium enterprises, coming to grips with even the basics of therapeutic regulation has always been a nightmare. TGA are not consultants to industry and have, up until now, deflected entry-level enquiries to professional consultants who may or may not have the skills to explain requirements such as sunscreen classifications, regulations and AUST L Listing requirements to marketers who want to enter this complex area of regulation of what might seem on the surface to be simple personal care products.

Now TGA has launched SME Assist – designed to help to inform SMEs and others in this exact area. SME Assist might represent a quantum change in the regulators approach to dealing with the "public". However, the project seems to be only at early stages of what might be considered really user friendly, but it is worth a try.

If you have ever tried to determine if your product is a therapeutic on not, then assistance given on the site has been designed to step SME's through the initial process of locating information. Click through connections to other general TGA information is also easier than previously.

See: https://www.tga.gov.au/book/export/html/757374

ISO Water Resistant Ring Studies Now Underway

The long awaited ring study for finalization of the two ISO water resistant standards got underway in July, with at least 10 sunscreen test laboratories offering to participate from all over the planet. The original and main objective of this collaborative project was to calibrate the current P2 reference sunscreen for wash-off percentage, so that limits for this could be set within the ISO standards. However, additional objectives were agreed in a meeting in Paris in May, so that the study will provide feedback on proposed changes to "static" SPF test requirement for ISO 24444 test method which is under review. It also incorporates testing of one of the proposed new higher SPF standard sunscreen.

The time line for this ring study is for reporting of results by end August, with review and reporting to the next ISO Plenary scheduled for late October 2017.

Separately, a second ring study is in early stages of planning. This is to test several alternative formulations for potential use as high SPF sunscreens.

skin pH and the acid mantle

why is it important?

by Tina Aspres

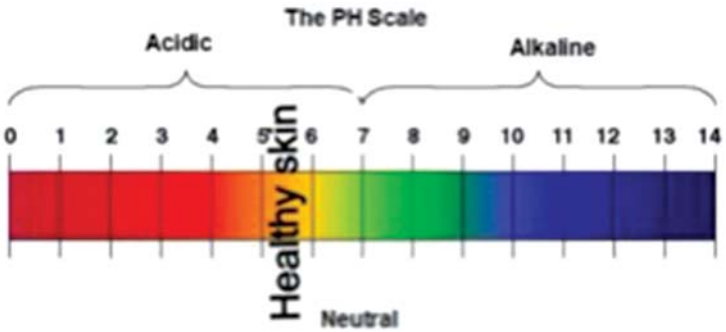
Skin is the largest organ of the body. Its main function is to provide a protective barrier to the external environment (physical, chemical and biological), maintain homeostasis, prevent water loss, provide thermoregulation, and to protect from oxidative stress.

It is believed that approximately 90% of barrier function is provided by the epidermis, and in particular the stratum corneum. The stratum corneum is the outermost layer of the epidermis and the skin's pH is considered to be one of the most important protective mechanisms in maintaining the skin's barrier. Often referred to as the 'acid mantle' – it plays a key role in maintaining skin integrity. The ideal pH of skin is somewhere between 4.5 and 6.5, making it slightly acidic – hence the term 'acid mantle'. The skin's pH may be affected by a number of endogenous as well as exogenous factors. An increase or decrease in pH may considerably impact the skin. Skin with a higher pH is often dry and sensitive (as we age, the pH tends to increase slightly). On the other hand a skin too acidic may be inflamed, tender and more easily irritated. It is important to try and maintain the integrity of the acid mantle to ensure skin maintains its optimum pH to maintain its barrier protection properties.

What is pH?

pH is an abbreviation for 'potential hydrogen' – which relates to the hydrogen ion potential – and so anything that contains water can have a pH value. pH is the measure of how acidic or alkaline a solution is. The neutral point is 7 and the range of the pH scales ranges from 0 to 14, with anything above 7 being alkaline and anything below 7 being acidic. The pH scale is logarithmic – not linear, so a pH change of say 1, whilst it may not appear to be a huge difference, the difference of 1 is a power of 10.

To try and understand this – it means that a pH of 4 is 10 times more acidic than a pH of 5 and a pH of 3 is 100 times more acidic than a pH of 5 – so a change of pH 1 can be quite significant.



Skin's protective mantle is slightly acidic at approx. 5.5

What is the skin's pH?

The optimal pH of skin on most of our face and body is between 4.5 and 6.5. A pH of 7 (that of pure water) is considered neutral. Anything below that is acidic and above it alkaline, so skin's natural pH is mildly acidic. This mildly acidic pH is created by the skin's acid mantle. Skin's pH may vary slightly according to both gender and where it is on the body. As already stated, the skin's pH will also be affected by both endogenous and exogenous factors and it may also change at different stages in life.

At birth, the skin pH of full term as well as premature babies is higher – approximately pH 7 – so is neutral. The pH then starts to decrease quickly within the first few days of life and then more gradually in the remaining neonatal period. The pH in later infancy is similar to that of adults. It is interesting to note that it has been shown that at three months, the pH on the cheeks and buttocks of babies seems to be higher than say on the forehead and their forearms. This apparent difference may be explained by exogenous factors such as that caused by nappy occlusion in the buttock area and climatic factors in the exposed cheek areas. Interestingly atopic eczema usually favours the cheeks in infants compared to older children where the distribution of the condition is more in the flexural areas. Eczema on the cheeks and contact dermatitis are commonly occurring conditions in infants – and this could be contributed to areas with a higher skin pH.

Why does the skin's pH matter?

The acid mantle protects the skin. The stratum corneum provides a protective barrier to the external environment. It is made up of a combination of sebum secreted from the sebaceous glands and sweat from the eccrine glands to form a hydrophilic film on the top of the stratum corneum (acid mantle) providing the skin's first line of defense. The acid mantle is made up of water, lactic acid, fatty acids, pyrrolidine carboxylic acid, urocanic acid, amino acids. Any changes in the pH or disruption e.g. if the skin becomes more alkaline, results in loss of normal balance and changes such as reduction in essential epidermal lipids synthesis and increased TEWL, causing an impaired barrier function. A compromised skin barrier function then makes skin more prone to environmental triggers. The skin may become dry and sensitive and this may play a role in the pathogenesis of skin disease, making the skin more susceptible to dermatitis, external irritants and infection.

What can affect skin's pH?

There are many endogenous and exogenous factors that may have an impact on the skin's pH. Endogenous factors include age, skin moisture, hormones, sweat & sebum, anatomical site, ethnicity and genetics. Exogenous factors include changes in temperature and humidity, detergents and soaps, cosmetic products/skincare, frequent hand and body washing, dirt and pollution. Chemicals with an alkaline pH are particularly detrimental to skin pH – e.g. soap bars usually have a pH greater than 7.

pH of skin at different sites

There appears to be a 'physiological gap' in the pH of some areas of skin depending on the anatomical site. Intertriginous areas such as the axillae, groin, inframammary area and interdigital spaces appear to have a higher pH than other parts of the skin. The higher pH in the axillae seems to favour the colonisation of certain types of odour producing bacteria. Deodorants generally appear to contribute to a significant reduction in the axillary pH. Candidal intertrigo also seems to preferentially develop in the alkaline environment of an intertriginous area.

Pigmented skin and pH

It has also been shown that people with a darker skin – Fitzpatrick IV – V- have a higher skin pH than lighter skinned individuals – Fitzpatrick I – II. In addition, superior stratum corneum integrity and barrier function have been observed in darker skinned individuals also.

Skin pH and microflora

The skin has transient, temporary and permanent microflora that live on the skin. Normal microflora growth is optimal at an acidic pH. Skin microflora are often referred to as the skin microbiome or skin microbiota. Permanent microflora are usually found in the upper part of the epidermis and predominantly around the hair follicle. Resident skin bacteria include staphylococcus, micrococcus, Corynebacterium and malasezzia. The skin microbiome can protect against pathogenic bacteria such as S. aureus that thrive at a neutral pH.

Skin pH in disease

An intact skin barrier allows skin to withstand external insults and maintain

skin hydration. Skin with a disrupted or impaired barrier function – e.g. in atopic dermatitis – will also have an altered pH. Research indicates that sufferers of atopic dermatitis seem to have a slightly higher skin pH. In addition to impaired barrier and slightly higher skin pH, S. aureus colonisation is also a feature of patient's suffering with atopic dermatitis. It appears that S. aureus growth proliferates at a neutral pH but is markedly inhibited at a pH of 5.

Many skin diseases have a disrupted skin barrier resulting also in a change in skin pH. Research has shown that sufferers of ichthyosis to have a skin pH up to 7. Candida albicans – a fungal infection – tends to favour moist conditions and a higher skin pH and these types of fungal infections are usually found in intertriginous areas such as the groin. Sufferers of irritant contact dermatitis have also shown to have a higher skin pH compared to a healthy skin individual. In a comparison of subjects with tinea pedis, one study showed sufferers to have a higher pH compared to the control group. In one study involving acne patients comparing skin washes, one group used a conventional alkaline soap and the other group used an acidic syndet bar. The number of inflammatory lesions in subjects was then compared over a four week test period. It was found that the group using the alkaline soap had an increased number of inflammatory lesions when compared to the group using the acidic syndet bar.

In summary, it appears that a change in the acidic pH of the acid mantle contributes to an impairment of the skin barrier, which may cause inflammation, irritation and skin dryness. Continual exposure to exogenous agents such as cleansers, moisturisers, deodorants and other skin care products that are not pH-balanced may exacerbate and contribute to chronic skin problems. Using pH balanced products is beneficial in maintaining skin integrity and maximising skin health and appearance.

Vitamin E

(Warning – science content)

by Wendy Free

'Vitamin E' is the term used for "chemical substances" (naturally occurring or not) that exhibit the biological activity of α-tocopherol (alpha-tocopherol)

There are eight naturally occurring Vitamin E that can be isolated from plants; there are four tocopherols and four tocotrienols. In each case the molecule can have alpha, beta, gamma and delta configurations.

For the uninitiated;

Vitamin E is a molecule that has a head and a tail; the way in which the bonds are arranged within the head and the adjoined tail adds variation to within the structure, but not the function. Think of this in terms of cats, there are both male and female (ie molecules with different internal structures), and then they both come in various coat patterns, tabby, solid colour, tortoiseshell and ginger (Yes – I was always told they all ginger cats are boys; but apparently not). But back to natural vitamin E variants; they all function as cats (or vitamin E); they just look different.

Now it gets a bit complicated;

Have you ever noticed have your left and right hands are not identical to each other, they are mirror images of each other? (Stay with me here)…they are both hands; but opposites.

Left handed molecules are usually terms levo- (l) and right handed ones typically called dextro-(d). Chemically they are identical, biochemically they may be different, (Sometimes biochemical reactions can only connect with the left-handed or the right-handed option – It depends on the system). Helpfully, scientists have named this type of phenomena 'Chirality' (Ki-ral-ity) and the various different 'cats' are called "enantiomers" – but that's enough of that….

Imagine if Vitamin E came in left and right handed as well? Guess what? It does!! When a plant makes alpha-tocopherol, it only makes the right-handed versions (d-alpha-tocopherol) but when man makes vitamin E it (via chemical synthesis) we get a mixture of both right and left handed versions (dl-alpha-tocopherol). Helpfully again scientists have named these RRR-α-tocopherol and all-rac α-tocopherol (respectively)….so that makes it very clear (not)!

So which one is best?

Most of the literature refers only to the alpha-tocopherol so I'm going to do the same….we are talking about 'tabby cats', the 'natural' tabby cats are all right handed, and the 'chemical' one are both left and right handed, but they are all cats

…if we can now think about which is the tabby best cat is best; without a collar, bell-collar or a flea-collar?… Here I'm talking where we attach things to the alpha-tocopherol like acetate or succinate. Have you ever noticed that the spelling changes? (Alpha Tocopherol become alpha-tocopheryl acetate or succinate)

Attaching acetate or succinate (or other bits) to tocopherol can improve

its stability etc, but it also changes how much 'bio-available' vitamin E is there….(Amazing you just can't make this stuff up…..). Somewhere, some scientist decided that the 'international units of vitamin E' (IU) were going to be based on dl-tocopheryl acetate; yes that's right, not the natural cat, but the synthetic one with the flea collar (got to love them)….

So going from most 'potent' to least potent we have:

D-alpha-tocopherol 1490 IU/g (Naked natural)

D-alpha-tocopheryl acetate 1360 IU/g

D-alpha-tocopheryl succinate 1210 IU/g

DL-alpha-tocopherol 1100 IU/g

DL-alpha-tocopheryl acetate 1000 IU/g

D-alpha-tocopheryl succinate 890 IU/g

So natural is the most potent in all cases (as a dietary supplement); so is D-alpha-tocopherol the best one to use in formulating?

Reportedly, the vitamin E naturally present in the human epidermis is present as 87% α-tocopherol, 9% α-tocopherol, 1% α-tocotrienol, and 3% α-tocotrienol. (Its here I loose the cat analogy for reasons about to be obvious)…. One study (on mice) reports that the epidermal content of α-tocopherol (didn't tell us if it was d or dl) markedly increased following application of a cream containing 0.5% α-tocopheryl acetate indicating that the α-tocopheryl acetate is metabolised to α-tocopherol in the (mouse) skin. (This has also been demonstrated in human skin). Another mouse study indicated that topically applied tocopherol sorbate, α-tocopherol, and α-tocopherol acetate found that the sorbate variant was superior when it came to protection of photo-aged skin and also for wrinkle reduction. So collared cats loose their collars on human skin.

Tocopherols can be oxidized by atmospheric oxygen, and the oxidation is accelerated by heat, light, alkali, and metal ions. Unlike free tocopherols, tocopheryl esters (collared cats) – like tocopheryl acetate, tocopheryl succinate are much more stable to oxidation, and do not function as antioxidants in vitro. They only work as antioxidants once they loose their collar.

So if you want to protect the formulation from oxidisation use the unbound tocopherol (the cat with no collar stays inside) and if you want to protect the skin use the bound ones like D-alpha-tocopheryl acetate or succinate (or sorbate).

And finally….the INCI 'TOCOPHEROL' is applied to all of the tocopherols, regardless of alpha, beta, gamma, delta or left or right handed. TOCOPHERYL ACETATE is applied regardless of orientation or source etc… so in the end its up to you what you use and how its added, it doesn't make much difference on the label, but it can have a difference in how and where its effective.

Yours in right-handed, un-collared, tabby-cat goodness,

Wendy Free

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Questions, concerns, comments / corrections are always welcome

Additional Reading/References….

Cosmeceutical Science in Clinical Practice ISBN-13: 978 0 415 47114 5

Cosmeceuticals and Active Cosmetics Drugs Versus Cosmetics Second Edition ISBN 13: 978-0-8247-5943-8

Cosmetic Formulation of Skin Care Products ISBN 13: 978-0-8493-3968-4

Dietary Supplements THIRD EDITION ISBN 978 0 85369 653 7

DRY SKIN and MOISTURIZERS Chemistry and Function SECOND EDITION ISBN 13: 978-0-8493-2134-4

https://www.nal.usda.gov/sites/default/files/fnic_uploads//186-283_150.pdf

Keeping Baby Safe

by Catherine Cervasio

With the growing appeal of 'natural' and 'organic', many parents are choosing to avoid brands containing mineral oil, parabens, propylene glycol, artificial fragrance and sulphates, for example – wanting what they consider to be the "best" for their baby.

Parents generally understand that residues from everything applied to the skin or used to cleanse the skin, can be absorbed into the bloodstream in the same way as nicotine or hormone patches are used. As such, baby skincare product ingredients are amongst those most closely scrutinised. A wide variety of brands all toute their own marketing message to promote one ingredient over another that may be used in a competitor product. Both natural and synthetic ingredients are regularly being investigated for their safety, efficacy and risk, by parents, before they make the all-important decision to purchase.

The skin's primary function is to act as barrier against infection, water loss and potentially harmful substances. This function is especial vital for an infant. Our skin is a living, breathing organ and due to the greater surface area to body weight ratio for an infant and the absence of a thick, protective keratin layer present in adult skin, products used to care for babies should be extremely carefully formulated.

A newborn baby's skin is 20-30% thinner than an adult. For a premature infant, the epidermis is even thinner and the substances applied to the skin have an even greater risk of permeating.

In general, creams, oils or emollients which are applied to an infant's skin are more readily absorbed and therefore, inappropriate formulations can present a greater risk to the baby. Care needs to be taken not only with moisturisers, but with baby wash products also. Over washing babies can actually lead to a breakdown of the skin's barrier and promote excess water loss.

With easy access to information and a move away from commercial-type skincare by consumers, nowadays product ingredients are being put under the spotlight more than ever – both by parents as well as wholesale buyers.

The application of synthetic-laden ointments, topical creams and body washes

may indeed play a role in the increasing incidence of rashes and irritations in babies. Research does exist, linking certain ingredients to a range of adverse outcomes – from eczema to hormone disruption, however natural ingredients are not without their own risks.

To market a baby care product as 'safe from birth', 'suitable for premature babies' or 'perfect for eczema' may be an unwise path for those who have not undertaken the appropriate research required to formulate for this specific, important end user.

Certain essential oils are thought to trigger allergies or have a propensity towards toxicity – in particular citrus and strong, herbaceous oils including lemongrass, lemon-scented tea tree, tea tree, basil, thyme and eucalyptus for example. Whilst lavender is one of the most commonly used essential oils in baby care, this ingredient too can cause problems – being a common allergy trigger to babies with sensitive skin. In fact Dr Justin Loden from the Tennessee Poison Centre believes "all essential oils are potentially harmful". And he's not alone. Below are some considerations for baby care products.

- The popularity of baby 'soaps' seen over the past 12 months has seen a new entrant to the list of products parents are researching. Alkaline soaps can increase skin surface pH beyond what is considered an ideal range[1] and are therefore best avoided for babies.
- Sodium lauryl sulphate (SLS) is a commonly used foaming agent still found in some baby shampoo and body wash. Products (non rinse-off) with concentrations over 1% (accounting for the majority of commercially available products) may induce skin or eye irritations.[2] Surfactants may also strip natural fatty acids, moisture and amino acids from the skin leading to dryness and roughness, and a disturbance to the healthy growth process of new hair and skin cells (men concerned about thinning hair, take note).
- Propyl paraben, commonly used as a preservative, has been found to impact on sperm production in rats, according to a report by The European Food Safety Authority (EFSA). There are numerous other preservative choices available however be sure the ingredient has been tested and approved for use in an infant product – often this is not the case with new raw materials.[3]
- Some reports indicate that 'bubble baths' in general, are best avoided to help prevent urinary tract infections. It is vital to research your surfactant and its potential hazards prior to releasing a product to market.[4]
- The combination of some surfactants together with the warm water used to wash, may render the skin of a baby more permeable, facilitating the easier absorption of any residues present.
- Some paediatric dermatologists suggest avoiding 'food' ingredients in personal care which can lead to sensitisation and allergies later in life. Check available data before formulating with goats milk, diary, nut oils, coconut oil, olive oil.[5]
- Not all vegetable oils are appropriate for use on skin. Vegetable oils can vary in composition, for example, in the ratio of linoleic to oleic acid. Some vegetable oils, including certain olive, soybean, and mustard oils, can be detrimental to the integrity of the skin barrier.[1]

With the variety of potential hazards posing risk to babies, it may be time to get back to basics. The promotion of less frequent bathing, less use of commercial product and a more thorough approach to formulating for baby and child specific products may be just what the paediatric dermatologist ordered.

References

1 Lorena S. Telofski, A. Peter Morello III, M. Catherine Mack Correa, and Georgios N. Stamatas, "The Infant Skin Barrier: Can We Preserve, Protect, and Enhance the Barrier?," Dermatology Research and Practice, vol. 2012, Article ID 198789, 18 pages, 2012. doi:10.1155/2012/198789

2 Cosmetic Ingredient Review, Published in The American Journal of Toxicology

3 EFSA

4 Well-connected UTI, Nidus Information Service

5 Journal of AAAA & I, 2014

VALE – GAVIN GREENOAK

Gavin was genuinely charming *and charismatic. His slightly raffish attire added to his presence. On meeting you his face would light up with a warm, slightly nicotine-stained smile. But there was much more to Gavin than that.*

He had a strong social conscience. If he believed that someone had been wronged he sought to help him/her, not by attempting to right the wrong, but by offering an alternative pathway. He told me about Jules Martin who had left her previous employment in the sunscreen testing business. Now I had been sending our sunscreen formulations to the late Gordon Groves to be tested, but Gordon took a year off to work in the USA. We needed to test in Australia to assure our R&D tax benefit. We could not wait for Gordon to return to Australia. When I reported this to my boss he said "Bring me solutions, not problems". So following meetings with Jules I donated Jules and Gavin a solar simulator, and APTF came into being in the Ross St Building at Sydney University. (Gavin also had an eye for business opportunities)

Another example of Gavin's sense of justice and generosity arose when a PhD student became persona non grata with her supervisor. She had been studying the course of the development of immunosuppression by UVR. As I recall it, the accepted truth at that time was that animals with skin cancer have suppressed immune systems. Ergo immunosuppression is an important precursor of skin cancer. However this PhD student had followed the course of immunosuppression and development of skin cancer in mice and she had found that UV-irradiation of the skin of hairless mice initially caused immunosuppression, but the immune status of the skin then recovered. Some weeks later skin cancers appeared and immunosuppression recurred. This led to the inconvenient conclusion that immunosuppression did not lead to skin cancer, but that skin cancer caused immunosuppression! Her paper won a prestigious award at a conference on UVR and skin cancer. (Later Halliday and co-workers reported a similar, but even more complex series of events, involved in immunosuppression in humans). Gavin found her a laboratory and supervisor in the Animal Science Department at Sydney University.

When I left Colgate Palmolive Gavin provided me with laboratory space in the Animal Science Department. This allowed me the chance to establish my own consultancy business until I had built my own laboratory. In another act of generosity he loaned Carole and I his camphor laurel house at Byron Bay. I know there have been many other beneficiaries of Gavin's kindness and generosity.

In most issues Gavin kept an open mind and listened to cogent arguments from all quarters including academe and industry. This was not always the case with other scientists. When I first came to Australia some of the biologists were smitten with what I called "The McBride Syndrome". (You remember William McBride. He made his name as the man who revealed the teratogenicity of thalidomide, but later damaged his reputation in the pursuit of Debendox). Scientists, both local and international, were publishing the results of Ames tests, and variations thereof, on many chemicals. Ames and others announced that various hair dyes were mutagenic which announcements were a rich source of journalistic headlines and research funding. Gavin was involved in some of this work, using his hairless mice. Against this background of mutual suspicion and excitement I found that Gavin listened and was questioned not only his listener but himself. Subsequently we collaborated in various scientific studies of the protectiveness of sunscreens against skin cancer.

Gavin loved to work collegiately with fellow scientists. He had a wide network, particularly in Sydney University. He was always eager to listen to, discuss and debate with those whose opinions he valued. At the same time he was suspicious of self-styled gurus and, as he put it, their ex cathedra pronouncements. In this vein he was prepared to question the shibboleths of certain branches of science, particularly the role of UVR-induced immunosuppression in skin cancer. In this way he played a leadership role in some important advances in the understanding of photobiology and skin cancer. Gavin published over 30 scientific papers on a wide range of topics. He won the Jack Jacobs Memorial Trophy on 2 occasions and was co-author of another winning paper.

One of the delights of working at Sydney University was the opportunity to listen to the some of the world's best scientists when they visited Australia. Gavin and I attended one of the most significant papers on cancer testing delivered by Professor Bruce Ames himself. Ames pointed out that cancer tests based on maximum tolerated dose grossly over-estimate cancer risk. He pointed out that 50% of vegetables contain supposed mutagens and carcinogens, but that a diet rich in vegetables

VALE – GAVIN GREENOAK

is protective against cancer (Biotherapy. 1998;11(2-3):205-20, "The causes and prevention of cancer: the role of environment" Ames BN1, Gold LS). Similarly the Ames test for mutagenicity could just be measuring increased rates of cell division. Like Ames Gavin was quite prepared to listen to arguments contrary to his previously held position.

Gavin had been an important member of the Australia/ New Zealand Sunscreen committee CS 042. Before the development of an ISO standard for sunscreens the local Australian/ New Zealand Standards sunscreen committee was acquainted with the relevant information and reached consensus (notwithstanding that committee members often disagreed profoundly on particular issues!). There was an understanding that the acronym CS stood for Consumer Safety. Of course it has long been understood that Australian Standards must not be a barrier to trade and it follows that an International Standard is desirable if it removes unnecessary trade barriers. However, as the decision-making on the ISO sunscreen standard became restricted to mainly overseas-based members of working parties, Gavin became increasingly frustrated and disillusioned. A high level of secrecy is imposed during the development and testing of a new standard procedure – for good reasons. If a consortium of manufacturers is designing a new aircraft and early tests in the wind-tunnel reveal problems you do not publicise this to the world. You set about redesigning and retesting the aircraft until this and all other problems have been eliminated. So it may be with a new sunscreen testing standard. Often multiple laboratories are involved and they would be less inclined to be involved if it seemed that their results were inadequate, but would be happy to continue in order to eliminate the problem. However the tradition of academe is "Publish and be damned". Also a full validation of the new sunscreen testing protocol should be published before members of national standards committees are required to vote on whether to accept the new Standard.

Gavin became increasingly involved with explaining the complex relationships between the different wavelengths of light, the intensity and completeness or otherwise of the spectrum to which the skin was exposed became his increasing concern. For example with Scott Menzies and others he made the important finding that the development of melanocytic naevi in guinea-pigs was primarily due to exposure to UVB, not UVA nor visible. However full spectrum simulated sunlight produced significantly less naevi than UVB alone, leading to the possibility that UVA and or visible light had some inhibitory effect on naevi development. Gavin was erudite with an elegant turn of phrase. As he said ''You can plot sunscreen effectiveness for each wavelength, but light doesn't work like that - just as you don't play a Mozart symphony note by note''.

Others have written of Gavin's love of poetry, something we share, but, sadly, rarely shared. We also shared a love of the Australian bush and the sense of awe we felt when living close to it.

Gavin it has been a privilege and a delight. Thank you.

Malcolm Nearn

***It was such a shock** for me to hear of the passing of Gavin Greenoak. Gavin was always a great supporter of the magazine over many years not only with advertising but he often wrote articles for us, mainly philosophical pieces which had a great deal of depth to them. Gavin was also instrumental in getting the magazine accepted into Asia through his many contacts.*

The last time I spoke to Gavin was just after he retired and he was sitting on his beloved Byron Bay beach, sunbaking and writing his poetry. This was something he longed to do so I am so glad that he was able to do it for a while at least.

When you think of characters who have been in the ASCC Gavin would always come to the forefront with his crocodile skin boots, cravates and bowties. He will be missed. – R.I.P. Gavin

Joy Harrison

Dear Joy, Dear Australian Friends in ASCC

***I am so sad** to receive the last news of Gavin. So many memories come back in my mind . His large smile, his availability to help the Thai society in 2011 during the flood, … his pushy temperament during the discussions and a strong will to build a Federation for the XXI century …*

I'm loosing a friend …

Please send my personal condolences to his girlfriend and family.

Kind regards,

Claudie Willemen

Past President, IFSCC

VALE – GAVIN GREENOAK

Our dear Gavin

Your passing leaves *a big shadow in my life, especially because it came so much too soon. The last three years we were mostly communicating via email, sometimes on the phone. You had this magical gift of expressing your thoughts and feelings in writing in a way that showed true genius. Just these past few days after I heard the sad news I went through some of the brilliant emails and the last message text you had sent me just two weeks before, in reply to my birthday wishes to you. I did feel that it was serious, but in our busy lives we don't take time to stop sometimes, when we should, or I certainly didn't. Now I wish I had taken a flight and just come to see you, but we cannot go back.*

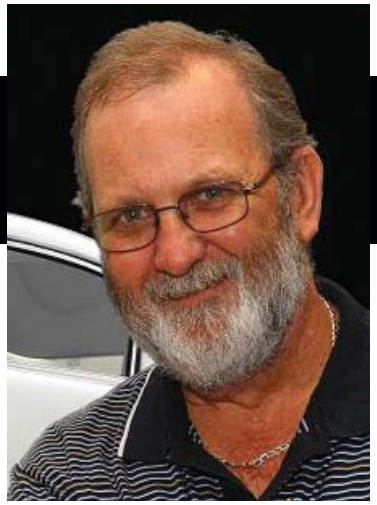
On the other hand, behind the shadow of my sadness and regret for not having seen you a last time, there is a bright light: the gift of having had the privilege and the honour of not only knowing you, but of having been one of your close friends. Our late night philosophical discussions, mixed in with science, where you were the master and I was the apprentice, sometimes under the big starry skies in Australia, in my garden in Singapore or at a street food stall in Bangkok, these moments remain vivid in my memory. Your participation at our ASCS Conference in Singapore in 2007 with a debate with our late friend Prof. Johan Wiechers about 'Perception vs Reality' is another unforgettable moment, where I could again witness you as an expert in your field on the crossroads between Science and Philosophy, as I had experienced you since the day I met you at the University of Sydney on some special day in 1998.

Our various road trips to the ASCC Conference in Woolongong, Sydney to Melbourne in your red Porsche and taking my boys Zimmy and Kemal for a spin in the purple one when we were visiting. Staying at your house in Byron Bay, going for strolls in the nature reserve, Christmas Dinner at Suzie's house, all those memories come up at this time and they will not be forgotten.

What connected us was the insatiable appetite for exploration and adventure, which we both lived in a completely different way, but which brought us together and connected our hearts and minds in a special way. Gavin, I am sad that I cannot repeat any of these great times with you anymore, but I am happy to have had them, they were one of a kind as were you. Wish you a great journey, wherever it may take you and I will see you on the other side. With much love, your friend Adrian with Yuniar, Kemal and Zimraan, you always used to call the "wild" boys.

Adrian Jaklowsky
(Formerly DSM, Singapore)

formulator's forum



Part 37 –

by Ric Williams

Shelf life

Shelf Life

Shelf Life is derived from many factors apart from preservative type (or level). The other ingredients in the formulation, incompatibilities, antioxidants, pH, packaging, storage conditions, etc. also play equally important roles in determining shelf life. By adding the recommended level of any preservative it should cover microbial contamination for two to three years (provided the product is not opened frequently and is stored at room temperature or less).

Factors in determining shelf-life are;

A) Incompatibilities between ingredients, in any formulation, will reduce the effectiveness of a given active ingredient or affect physical uniformity of the product causing variability in dosage;

B) Antioxidants would be needed to stop oils, vitamins, proteins and other organic materials from going rancid;

C) Preservative type (and level).
Preservatives are substances used in cosmetics to prevent contamination of products by bacteria, mould and yeast. They are not designed to render the product sterile or to cover for poor unhygienic manufacturing methods or inadequate packaging, but to help the product overcome the introduction of incidental microbial contamination during use.

D) pH may affect the stability of active ingredients, consistency or even the effectiveness of many components. As examples; Alpha Hydroxy Acids are effective skin peels at low pH – as the pH is raised the effectiveness decreases until, at pH 7, there is no exfoliant activity at all; A shampoo using Sodium Laureth Sulfate will hydrolyse at a pH of less than 5 causing the product to discolour, smell foul, lose viscosity and release acid. As the surfactant hydrolyses the pH drops even further thereby increasing the rate of the degradation reaction.

E) poor quality packaging that does not provide sufficient barrier to solvents leaching out of the product or air from outside the pack being absorbed causing oxidation, packaging that will affect the product (by leaching additives into the formula), packaging that is affected by the product such as a solvent being absorbed by a plastic bottle (sometimes causing deformities in the pack) or packaging with poor quality seals allowing contamination into the pack will all have an effect on the quality of the product.
Note; stability trials in glass jars with Bakelite caps are irrelevant as they will not give compatibility results or a true effect of environmental conditions on the product,

F) storage conditions will have an effect as too high a storage temperature may cause the product to separate or any other factor to increase its speed of degradation, while too low a temperature may cause separation by precipitation;

all of the above thereby reducing shelf-life.

Ric Williams B.Sc. Dip.Env St.
Cosmepeutics International
This column is intended not only as an education tool for non-technical people or beginners in our industry, but as a forum for those wishing to enlighten all about recent technology advances and new ideas. I hope experienced scientists will also contribute to this ideal and if you wish to do so please email me at: ric@cosmepeutics.net.au and I will publish your comments.

As a final word, you **MUST** test the product in its final packaging otherwise the tests to determine shelf-life may be deemed irrelevant!;

Poor product stability can result in:

- changes in the appearance of the product making it aesthetically unacceptable;
- the physical characteristics of the product being significantly changed, rendering it unpleasant, inconvenient or impossible to use;
- the product becoming ineffective in use;
- the product being unsafe to use;
- a potential market recall, and the loss of significant revenue to the manufacturing organization;
- loss of brand loyalty and usage of the product by the consumer.

Process Description :

Two types of trials should be considered

a) Short Term Stability Trials

These are conducted on laboratory batches to determine if they are stable enough to be submitted for Long Term Stability Trials.

They generally involve physical testing only.

b)Long Term Stability Trials

These are conducted on factory batches to determine the stability of the product in general use. This involves the testing of samples (in full finished product pack) at extremes of temperature in order to extrapolate to the maximum shelf life of the product.

This extrapolation may be up to three years.

While extrapolation is used to predict the shelf life it does not replace the need to test samples for up to five years at its recommended storage temperature as this would be the only true test. The extrapolation is only to expedite the sale of products which may appear satisfactory. They generally involve physical and chemical testing.

Tests

Short Term Stability Trials

a) Heat Cool Cycle Test

This involves the cyclic heating and cooling of a product between 21oC and 45oC.

5 cycles are generally used to test the product. ie 21oC to 45oC to 21oC to 45oC to 21oC to 45oC to 21oC to 45oC to 21oC to 45oC to 21oC .

The physical state and possibly key chemical parameters are checked after each cycle.

This places stress on the heat sensitive components to determine their robustness.

b) Freeze Thaw Cycle Test

This involves the cyclic freezing and thawing of a product between +ve 21oC and -ve 20oC.

5 cycles are generally used to test the product. ie +ve 21oC to -ve 20oC to +ve 21oC to -ve 20oC to +ve

21oC to -ve 20oC to +ve 21oC to -ve 20oC to +ve 21oC to -ve 20oC to +ve 21oC.
The physical state and possibly key chemical parameters are checked after each cycle.
This places stress on the cold sensitive components to determine their robustness.
ie indicates the probability of crystallisation or cloudiness.

c) Heat Freeze Cycle Test

This involves the cyclic heating and freezing of a product between +ve 45oC and -ve 20oC.
5 cycles are generally used to test the product. ie +ve 21oC to -ve 20oC to +ve 45oC to -ve 20oC to +ve 45oC to -ve 20oC to +ve 45oC to -ve 20oC to +ve 45oC to -ve 20oC to +ve 45oC to +ve 21oC .
The physical state and possibly key chemical parameters are checked after each cycle.
This places extreme stress on all components to determine their robustness.

d) Centrifuge Test

The product is subjected to 2 hours at a minimum Relative Centrifugal Force of 1000g.
The formula for Relative Centrifugal Force (RCF) is
RCF = 0.00001118 x r x N^2
where r = rotating radius in cm
N = rotating speed in rpm
The physical state is checked after 2 hours.
This places extreme stress on the physical state to determine its robustness (separation potential), as centrifuging will give an indication of agglomeration of particles or inconsistent particle size (both which will cause physical separation).

Long Term Stability Trials

The choice of temperatures is dependant on the end use of the product and the expected stability of the sample. In reference to the "expected stability" an example would be that it would be no use subjecting a sample to 50oC when you know it would not stand (nor will it ever stand) such temperatures in real life.

5°C a standard temperature that can be used in all trials, for two reasons.

1. It is postulated that at 4 – 5oC no reaction will take place hence samples kept at this temperature can be used to indicated zero time.

2. It is used if the product is susceptible to degradation from low temperatures eg crystallisation.

25°C a standard temperature that is commonly used, as this is generally the laboratory temperature, hence no special conditions need to be provided and the samples can be left in a cupboard or on a shelf in an air conditioned laboratory. It is just as common to use 20°C. These samples are indicative of real time storage.

30°C or 35°C are standard temperatures that are commonly used, as this is generally the maximum storage temperature recommended. Storage here is usually achieved via a temperature controlled incubator.

These samples are indicative of the maximum "degradation" achieved during real time storage.

37°C; 40°C or 45°C these are also standard temperatures that are commonly used to create accelerated stability data.

The issue of accelerated stability data is discussed in the

section under the heading Interpretation of Results, but suffice to say at this point that, a rule of thumb is that, in first order reactions (the vast majority of cases), for each ten degree Celsius rise in temperature, the reaction rate doubles or to put it another way for each ten degree rise in temperature the real time to reach that point of reaction can be doubled.

The choice of elevated temperature conditions is also useful in indicating storage conditions on the finished pack. For example, if a product passes stability trials at 30°C but not at 40°C, then you should state, on the pack, store below 30°C. To be prudent though, if a product passes stability trials at 30°C and 35°C but not at 40°C, then you should state, on the pack, store below 30°C or in the extreme case store below 25°C.

50°C ; 55°C or 60°C

standard temperatures that are commonly used to create accelerated stability data for expected extreme temperature conditions.

eg Sunscreens on a beach, products left in a car in summer.

These conditions should be used only when necessary as most products will not stand such extremes of temperature for long periods, these conditions can be too severe and you will get other factors such as wax melting or degradation of emulsifier action which you would not find in normal stability.

Note Testing in front of a window (although used in the past) is somewhat useless as the damaging ultraviolet light does not penetrate glass. This is particularly relevant if you are testing in glass containers. The only effect should be heat and you are testing for this effect anyway.

Interpretation of Results

Shelf Life

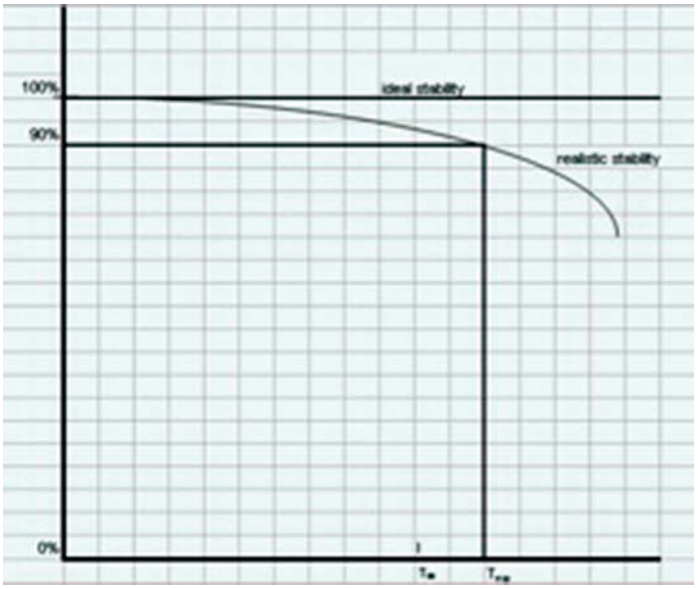
Is the length of time a product is guaranteed to last without going outside the acceptable limits of colour, texture, viscosity, pH, active ingredient levels or general quality.

Cosmetic preparations made from animal vegetable or even some synthetic substances are subject to decomposition. To extend the shelf life firstly the product must contain a suitable preservative (to prevent degradation from bacteria, fungi, molds and yeast particularly in water based products) and secondly it must be formulated within known stability parameters (ie. not using incompatible materials in the same product as well as beginning with a known stable base form). Products based on "saturated" fats and oils (such as Mineral Oil, Petrolatum, etc.) are much more stable than water based products as the base is much less prone to degradation (ie does not go rancid or decompose).

The shelf life is determined from its determined stability data curves. All parameters are checked for stability over time (these include appearance, odour, pH, Viscosity and % of active components). These are then plotted as a percentage of the original value vs time.

The ideal stability result is a straight line where the parameter does not decrease with time (ie a horizontal line at 100%).

However, the realistic stability is a curved line where the



parameter will decrease slowly at first increasing degradation as time goes on.

At some point (its "shelf life") the parameter will become what we consider to be unacceptable. Say this is at the point where a parameter reaches 90% of its original value. We measure this off the curve determining the time at which this occurs. This time is its real shelf life (Texp). To add in a measure of safety the manufacturers actually use a time which is 10% less than the real value (ie. T90) as we know that some consumers will still use it if it is only just out of date and also because we know that the test results also have some error in accuracy.

Note; the shelf life we select is when the first parameter to reach the unacceptability level (in the case above 90% of the original value) is determined.The simple rule is that ;

No sample tested must fall below the minimum required specification.

Once it has it is deemed to be outside the expiry limit. This limit once derived, by real time data (preferable) or extrapolation, is the limit to be used on the label.

The above graph indicates that using real time data, the degradation curve crosses the 90% limit (set as an arbitrary lower limit) at 36 months.

Therefore, the expiry limit would be 3 years.

When using extrapolation Arhhenius' equation is generally used. This is;

$k = Ao \cdot e\ Ea/RT$

Where k = rate of reaction
Ao = Initial value (constant)
Ea = Activation Energy
R = Gas Constant
T = temperature (°C)

Also expressed as

$\ln k = \ln A - Ea/R \cdot 1/T$

If one plots the value of ln k versus the corresponding 1/T

one should obtain a straight line, with a slope equal to the heat of activation per molecule (ie -Ea/R). The rate of degradation at any other temperature can be determined by extrapolation of the line.

It is also commonly accepted that the kinetics of an active ingredient in a preparation is either zero order, first order or pseudo first order. Zero order degradation is independent of the concentration of the active ingredient, such that if one plots the concentration versus time, the points should be linear, and the slope equal to the rate of degradation. In first order or pseudo first order reactions, if one plots the log of the concentration versus time, the points are linear , and the slope equal to the rate of degradation.

A rule of thumb is that, in first order reactions (the vast majority of cases), for each ten degree Celsius rise in temperature, the reaction rate doubles or to put it another way for each ten degree rise in temperature the real time to reach that point of reaction can be doubled. ie if the real time data is set at the 20°C temperature then 6 months at 40°C is considered equivalent to 24 months at 20°C.

If the real time data indicates an expiry limit of greater than five years then no expiry date is required on the label.

However, when such parameters as Description, Odour, Taste, pH or Viscosity are measured, the limits set are not generally +/- 10% and should be set based on the properties of the particular product and reflect any, undesired, observable change in the product.

Description, Odour, Taste are generally subjective and not objective assessment hence limits should be set as "too weak to too strong", "no off odours/taste developed", etc. Description is generally first observations, and while a specification of "as per standard" is set, comments/results such as "bottle deformed", "cream darker", etc., are common.

An example of the lower limit of the viscosity specification may be set at the point at which a cream becomes a flowable lotion while the upper limit is set at the point at which the cream is too thick to easily spread on the skin.

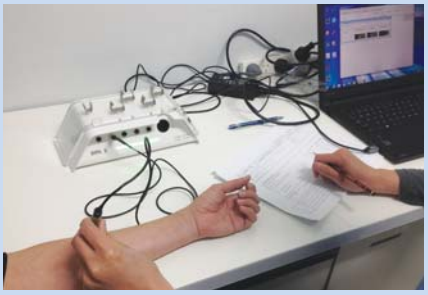
As examples of wider pH limits; Alpha Hydroxy Acids are effective skin peels at low pH – as the pH is raised the effectiveness decreases until, at pH 7, there is no exfoliant activity at all, hence the pH range should be set at a lower limit of 3.5 (arbitrary regulatory limit for cosmetics as lower pHs may be classed as therapeutic) up to a range where the action reaches its lowest desired action; A shampoo using Sodium Laureth Sulfate will hydrolyse at a pH of less than 5 causing the product to discolour, smell foul, lose viscosity and release acid, hence this should be the lower limit and the upper limit may be set due to other components or potential irritation increase.

Next Issue I will discuss *Product Recalls for Cosmetics in Australia* – Thank you

Dermatest

STEPS

1. Corneometer System



2. Measurement

3. Documentation of Results

No. 3 Skin Moisturising

The procedure for evaluating skin moisturising claims by measuring water conductivity.

Supportable Claims

- **Moisturises the skin**
- **Treats Dry Skin**
- **Protects from drying effect of sun and wind**
- **Replenishes lost moisture**
- **Increase your skins moisture by %**

Technique

Skin hydration is performed using a Corneometer and is usually compared to the baseline (untreated) skin. Test subjects are pre-screened and those identified as having below normal skin i.e. dry skin types, are used in the test. Skin moisture measurement is performed using instruments which are designed to measure the electrical conductivity of the skin.

How it Works

As the water content of the skin increases, the ability to conduct electrical current is also increased. The hand held probe of the instrument is held against the skin and a very low intensity electrical current passes between two electrodes in contact with the skin surface. The electrical resistance is digitally indicated - high resistance = low moisture and low resistance = high moisture.

In Lab vs In-Use

Most moisturisers will work even after only one product application, so it is possible to perform the test in controlled conditions in a clinical lab at say, 1, 2, 4, 7 hours. Alternatively, in-use performance can be measured after several days or weeks of repeat applications, depending on intended use and claims for the test product.

Regression

Some formulas will continue to have an effect for a period of time after the last use. The design of the test method allows for this measurement of ... “even works if you forget to use it! “

Analysis of Results - How Many Test Subjects?

When tested on test subjects with dry skin conditions, an effective moisturiser should provide at least 20 to 30% improvement. Provided there is not a high variability between individual test participants, A 10 person study should show significant results.

References

W. Courage, Hardware and Measuring Principle: Corneometer, Biogengineering of the Skin: Water and the Stratum Corneum”, edited by: Peter Elsner, Enzo Berardesca, Howard I. Maibach, 1994.
V. Zuang, C. Rona, F. Distante, E. Beradesca, The Use of a Capacitance Device to Evaluate the Hydration of Human Skin, J.Appl. Cosmetol. 15 July-Sept.1997

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John Staton is a founding Director of Dermatest Pty Ltd, Sydney and has been conducting SPF testing and skin efficacy and evaluation studies continuously since 1997.

A botanically derived skin surface lipid mimetic based on the composition of healthy 22-year-old females

by Jeff Addy, Tiffany Oliphant, and Robert Harper

Floratech, Chandler, AZ 85225 (J.A., T.O.), and Harper & Associates, La Jolla, CA 92037 (R.H.).

Synopsis

Introduction: Skin surface lipids (SSLs) greatly affect the skin physiology and are thought to be involved in skin processes such as thermoregulation, bacterial colonization, and barrier function and maintenance. SSLs are primarily composed of fatty acids, triglycerides, cholesterol, steryl esters, wax esters, and squalene. The objective of this research was to evaluate and better understand the SSL composition and variation in an age- and sex-controlled population, and create an appropriate botanically derived mimetic. Methods: SSL samples taken from the foreheads of 59 healthy, 22-year-old females were analyzed by gas chromatography mass spectrometry (GC-MS). Using botanically derived raw materials from *Macadamia integrifolia, Simmondsia chinensis,* and *Olea europaea,* a mimetic was engineered via a series of esterification reactions and lipid components quantitated with GC-MS. The glyceride and wax ester components were produced by the interesterification of *M. integrifolia* and *S. chinensis* under specified conditions. The steryl ester component was produced by the esterification of the fatty acids of *M. integrifolia* and phytosterols under similar conditions. Results: The following major classes of lipids were found and quantified by percent composition: glycerides, free fatty acids, squalene, wax esters, steryl esters, and cholesterol. The variability between subjects for each component was minimal; however, the greatest variation was seen for free fatty acids and cholesterol. Correlations among the components were calculated and found to be statistically or directionally significant with few exceptions. The esterification reactions of jojoba, macadamia, and tall oils, along with a precise addition of squalene derived from *O. europaea*, produced a suitable SSL mimetic. When applied to delipidized skin, the mimetic helped restore barrier function, increased skin hydration, and increased skin elasticity and firmness in aged skin. Discussion: The present research indicates that, overall, the SSL composition is quite consistent in a controlled population of 22-year-old females. Furthermore, there were strong correlations between the SSL components among subjects, with the exception of squalene and steryl esters. This was expected due to the fact that of the six major SSL components, steryl esters and squalene also showed higher variation over time for each individual. The variation in free fatty acids may be attributable to the potential differences in the microflora of the subjects. The variation in this study's results, as compared to previously published work, could indicate that the collection methods, geographic location, gender, and age specificity contribute to the distribution or collection of different lipid components on the skin surface. Since the excretion of sebum is known to decrease in females after 40 years of age, the proposed mimetic could be a beneficial supplement to human SSLs in aged skin, as well as in skin where the stratum corneum is defective, by aiding in the restoration of barrier function, while increasing skin hydration, elasticity, and firmness.

Introduction

Skin surface lipids (SSLs) are primarily composed of fatty acids (FAs),

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triglycerides, cholesterol, cholesteryl esters, wax esters, and squalene (1). The SSLs are either of sebaceous origin (i.e., sebum) (approximately 90%) or epidermal origin (approximately 10%), and the fraction of any one component varies based on body location (i.e., whether the location is rich in sebaceous glands) (2). Wax esters, squalene, glycerides, free fatty acids (FFAs), and cholesteryl esters are primarily derived from sebaceous glands (3). Cholesterol, FFA, and ceramides mainly originate in the epidermis along with small amounts of cholesteryl esters, and glycerides (3). SSLs greatly affect the skin physiology and are thought to be involved in skin processes such as thermoregulation (4), bacterial colonization (5), and barrier function and maintenance (6).

Although much research has been done to quantify the total content and various SSL components, there is still much debate as to the best method of noninvasive collection and analytical technique, as well as whether or not outside factors such as race, gender, and age affect the collective quantity or the percent composition of each SSL component. Previously explored methods of collection include (i) solvent extraction (2), (ii) Sebutape® (CuDerm Corporation, Dallas, TX) (7), and (iii) cigarette paper (8). Additionally, samples have been analyzed using various methods such as (i) thin layer chromatography (8), (ii) infrared spectroscopy (9), (iii) high-temperature gas chromatography and mass spectrom- etry (GC-MS) (10), (iv) nuclear magnetic resonance spectroscopy (11), (v) high-performance liquid chromatography (HPLC) and MS (12), or (vi) combinations of analytical techniques (13).

This current body of research used the cigarette paper collection method in conjunction with GC-MS analysis to determine the percent composition of each of the SSL compo- nents. On the basis of the research conducted by Shetage et al. (14), the cigarette paper method produces the most consistent data. Analysis by GC-MS allows optimal separation and identification of desired lipid components and constituents that cannot be achieved without a combination of chromatographic and mass spectral analysis. An all-female population was used to evaluate variance between highly similar individuals. The age 22 was chosen because sebum excretion rates are at a maximum within the 16- to 40-year age range (15), and remain steady through the 20s and 30s (16).

The composition of 22-year-old healthy female SSLs was then used to generate a botanically sourced SSL mimetic to determine the physiological effects when an SSL mimetic is applied to the skin topically. Moisturizers are often used for treatment of dry skin condi- tions, whether it is in conjunction with a drug for disease states like atopic dermatitis or psoriasis, daily use for self-perceived dry skin due to age or climate, or as a protectant in the workplace due to frequent contact with chemical agents (17). Moisturizers have both short- and long-term hydration and barrier function effects on the skin, and these effects are highly dependent upon the physicochemical properties of the moisturizer, e.g., pH, occlusivity, and type of ingredients used (17,18). The efficacy portion of this research primarily focused on the short- and long-term functions of skin hydration and skin barrier function and maintenance when an SSL mimetic is applied topically to the skin.

Materials and methods

Subjects and sample collection

The study, which was performed in Chandler, AZ, was approved by the Argus Indepen- dent Review Board (Tucson, AZ) prior to beginning any study procedures. Written in- formed consent was obtained from all subjects. Fifty-nine healthy, 22-year-old females were selected according to the following criteria: no active skin diseases on the face (e.g., acne, psoriasis, atopic dermatitis, eczema, rosacea, and skin cancer), no immunological disorders, and not pregnant or nursing. The subjects consisted of fifty Caucasian, three African American, two Asian, and four mixed race persons.

Solvent-washed cigarette rice papers (Rizla UK, Ltd, Pontypridd, United Kingdom) were used as lipid-free absorbent papers. Among the papers tested, it was found that adhesive- free rice paper contained the least amount of contaminants, particularly lipids. This is often an issue when using adhesive-containing collection methods such as Sebutape (CuDerm Corporation, Dallas, TX). Approximately 50 papers were washed at a time with 250 ml HPLC-grade diethyl ether in an ultrasonic water bath for 15 min at room temperature. After extraction, the cigarette rice papers were removed from the solvent and dried in a rotary evaporator. The papers were stored in polyethylene jars until further use on subjects.

Subjects were instructed to wash their faces approximately 12 h before sampling using Cetaphil® Gentle Skin Cleanser (Galderma, Fort Worth, TX), supplied by Floratech (Chandler, AZ), to remove dirt and oil from the facial skin. After this 12-h period, sub- jects reported to the testing facility where they acclimated in a controlled environment [20°–22°C, <50% relative humidity (RH)]. Noninvasive sampling of SSLs from the fore- head of each subject was then conducted over the course of 2 h in the following manner. Two sheets of lipid-free absorbent paper were placed on top of one another in the center of the forehead and held in position for 30 min. The paper was then removed, and placed in a sealed container for extraction. The lipid absorption step was then repeated, consecu- tively, three additional times.

Extraction and sample analysis

Each subject's collection papers were extracted twice with 25 ml HPLC-grade diethyl ether (Honeywell Burdick and Jackson, Muskegon, MI) in an ultrasonic water bath for 10 min. The collection papers were removed from the extraction flask, and the diethyl ether was evaporated under a gentle stream of nitrogen at 70°C on a hot plate until dry.

After drying, the samples were weighed and diluted with an appropriate amount of isooctane (EMD Millipore, Billerica, MA) to obtain a uniform concentration range for the series of samples, approximately 0.5–0.7 µg/µl.

The instrument consisted of an Agilent 6890 GC with a programmable cool on-column injector coupled to an Agilent 5973N with turbo pump (Santa Clara, CA). The instrumental analysis methods were developed using strategies referenced from Michael- Jubeli *et al.* (19). Software control and data analysis were accomplished with Agilent MSD Chemstation D.02.00.237, NIST 11 (Gaithersburg, MD), and AMDIS v2.70 (Gaithersburg, MD).

Skin surface lipid mimetic formulation

Refined jojoba oil, macadamia oil, ethyl macadamiate (Floratech), squalene (Ekiz, Izmir, Turkey), and phytosterols (ADM Nutrition, Decatur, IL) were used to formulate the mimetic. The jojoba and macadamia oil underwent a transesterification process under typical conditions in order to distribute the palmitoleic acid among both the wax-ester and triglyceride portions of the material. Ethyl macadamiate and phytosterols were transesterified in a similar process to create a phytosteryl ester of macadamia FAs thereby incorporating palmitoleic acid in the phytosteryl ester portion of the mimetic. The transesterified products of wax esters, triglycerides, and phytosteryl esters along with squalene and phytosterols were mixed in specific quantities resembling SSLs in the final formulation.

Efficacy analysis of topical application of ssl mimetic

Four efficacy studies were conducted in Chandler. Independent review board approval and a written informed consent from each subject were obtained before any protocol-related procedures were undertaken. All study participants were healthy females. Upon arriving at the testing facility, subjects acclimated for 30 min in a controlled environment (20°–22°C, <50% RH). All studies were carried out in a double-blind, vehicle-controlled, randomized manner according to the testing matrix (see Table I). The vehicle contained the following: water (q.s.), methylisothiazolinone and caprylyl glycol (0.9%), ammonium acryloyldimethyltaurate/VP copolymer (0.6%), sorbitan and sucrose cocoate (0.5%), hy- droxyethylcellulose (0.3%), and disodium ethylenediaminetetraacetic acid (0.1%). The SSL mimetic was compared to olive oil (OO) and caprylic/capric triglyceride oil (CCT) because these also contain skin-lipid-like components.

Results

Skin surface lipid composition and comparison

The initial portion of this study was to evaluate variation in the SSL composition within a population where age and sex were controlled. The sensitivity of GC-MS analysis allows for differentiation of not only primary SSLs but also differentiation and quantification of constituent FAs. The data in Table II demonstrate the mean percent composition of each SSL component, as well as the skin surface composition of the SSL mimetic. The most abundant component of SSLs was the glycerides. Relatively speaking, of the six SSL com- ponents evaluated, FFAs and cholesterol varied the most between subjects; however, when glycerides and FFAs were combined, the variation of the combination decreased greatly compared to the variation of either individual component.

For the purpose of correlation analysis, glycerides and FFA were combined due to the variation in the degree of hydrolysis of triglycerides by bacteria (20). Triglycerides are broken down into diglycerides, monoglycerides, and FFA; therefore, the variability be- tween these components is highly dependent on the microflora of the individual (16). Correlations between the five components were calculated yielding statistically ($p < 0.05$) or directionally ($p < 0.10$) significant correlations between all components with the exception of the following: squalene and wax esters, and cholesteryl esters with squalene or cholesterol, indicating

Table I
Efficacy Testing Matrix

Function	Washout (days)	Anatomical location	n	Sex	Instrument[a]	Insult/condition
Short-term barrier recovery	2	Volar forearms	14	M/F	Tewameter TM 300	Acetone exposure
Short-term hydration	2	Lower legs	12	F	Corneometer® CM 825	Dry skin
Long-term skin hydration and barrier function	3	Lower legs	18	F	Corneometer CM 825/Tewameter TM 300	Dry skin
Viscoelasticity and hydration	2	Forearms	13	M/F	MPA Cutometer/ Corneometer CM 825	Aged/sun-damaged skin (60–80 years of age)

a All instruments are products of Courage + Khazaka (Köln, Germany).

Table II
Mean Percent Composition for SSLs and SSL Mimetic

SSL component	Mean percent composition ± standard deviation	Mean percent composition of SSL mimetic
Squalene	15.6 ± 4.8	14.10
Wax esters	15.2 ± 3.2	18.40
Cholesterol (phytosterol)	0.6 ± 0.4	0.40
Cholesteryl esters (steryl esters)	2.1 ± 0.6	1.90
Glycerides	50.3 ± 12.5	
FFAs	16.2 ± 10.2	
Glycerides and FFAs	66.5 ± 6.2	65.20

that the cholesteryl ester and squalene compositions may vary independently of other components.

SSL mimetic efficacy (3%) when applied topically

In the first study, the SSL mimetic increased barrier recovery statistically significantly ($p < 0.001$) better than 3% OO, 3% CCT, and the vehicle 60 min posttest article appli- cation. These increases were amplified with the inclusion of ceramide 2 (C2), which provided the greatest amplification compared to the other skin-lipid-like emollients (Figure 1).

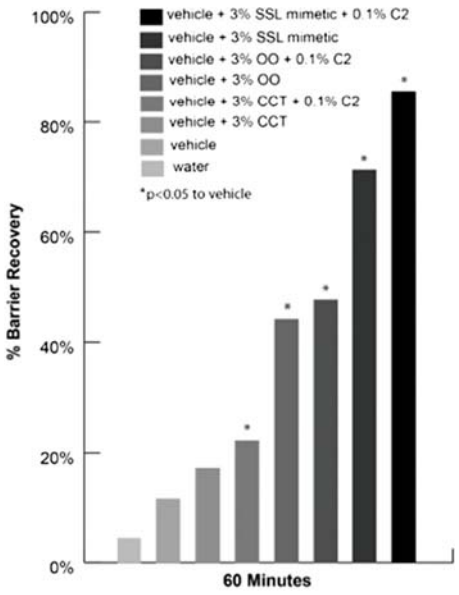


Figure 1. Evaluation of barrier recovery (i.e., reduction in TEWL as compared to the same test site after acetone treatment but prior to test article treatment) 60 min posttest article application.

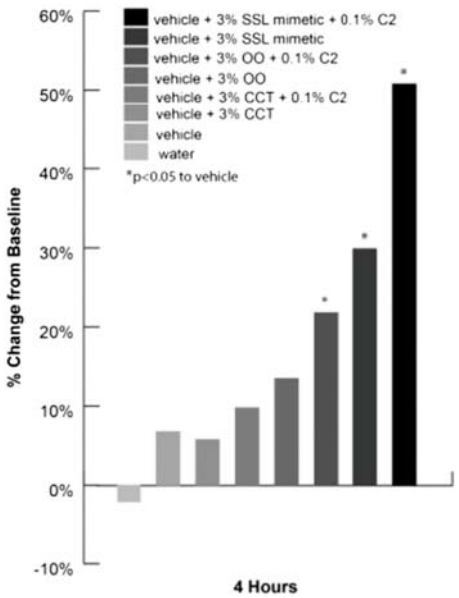


Figure 2. Evaluation of short-term skin hydration 4 h posttest article application.

In the second study, the test article containing the SSL mimetic produced statistically significantly ($p < 0.05$) higher percent changes in skin hydration than all other test ar- ticles. The addition of C2 seemed to act synergistically when combined with the SSL mimetic (Figure 2).

In the third study, the SSL mimetic produced statistically significantly ($p < 0.05$) higher percent changes in skin hydration than 3% petrolatum after 1 and 2 weeks of test article use, and following a 1-week regression. Additionally, the SSL mimetic produced statistically significantly ($p < 0.05$) larger decreases in transepidermal water loss (TEWL; an indica- tion of improvement in skin barrier function) after 1 and 2 weeks, and following a 1-week regression (Figure 3). Also, 1 h after application, both products statistically equivalently increased skin hydration (44.1% for the SSL mimetic and 48.8% for petrolatum) and decreased TEWL (-8.2% for the SSL mimetic and -7.1% for petrolatum). This demon- strates the difference between short- and long-term hydration and barrier function effects between the SSL mimetic and an occlusive ingredient such as petrolatum.

In the final study, the SSL mimetic

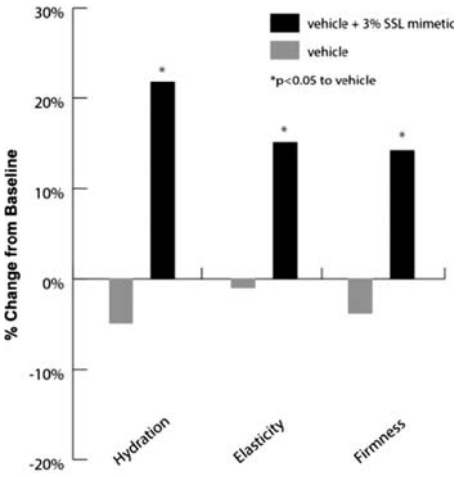


Figure 4. Evaluation of skin hydration, elasticity, and firmness after 1 week of test article use.

produced statistically significant ($p < 0.001$) higher percent changes in skin hydration, elasticity, and firmness than the vehicle (Figure 4).

Discussion

The present research indicated that, overall, the SSL composition is consistent in a con- trolled population of 22-year-old females. Furthermore, there were strong correlations between the various SSL components, with the exception of squalene and cholesteryl esters. The concentration of FFA demonstrated the greatest variance between subjects and

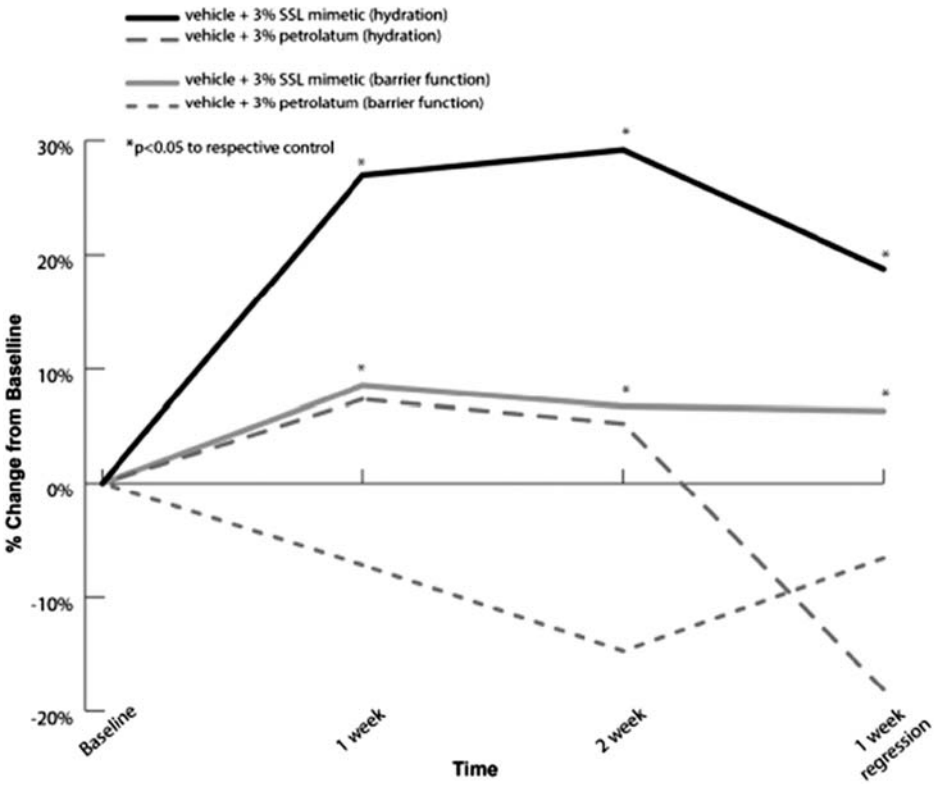


Figure 3. Evaluation of long-term skin hydration and skin barrier function after 2 weeks of test article use followed by 1 week of regression (no test article used).

within multiple samples taken from the same subject. The variation in FFA may be due to the differences in the microflora of the subjects (16). When FFAs were combined with glycerides, the coefficient of variation decreased greatly between subjects and between samples taken from the same subject. The variation of this study's results compared to previously published work could indicate that the collection methods, geographic location (10), gender, and age specificity contribute to the distribution or collection of different lipid components on the skin surface. Additionally, factors such as race, hormone- containing birth control, and oily skin did not appear to affect SSL composition (unpub- lished data collected by Floratech). However, these factors could affect whether or not individuals are prone to acne or the total amount of SSLs on the skin.

Pappas *et al.* (13) explored the possible variation of lipid production and composition based on ethnicities and concluded that composition, particularly wax esters, and lipid output may be affected by ethnicity; however, they did not limit the study to a particular age group. Focusing on a very specific age group, as was done in this research, allowed a less variable comparison since age also affects skin lipid composition (15). Additionally, wax esters play a role in barrier function and hydration (21), so understanding the com- plex relationship between each of the SSL components could also provide insight into the maintenance of healthy skin.

It is known that diet is a contributing factor in lipid metabolism in skin (22). The high variation of squalene among the subjects in this study, particularly with the unique lipid distribution from vegans and vegetarians, while not significant in number, could poten- tially be explained by the mechanism of squalene and triglyceride synthesis on a glandu- lar level. It has been shown that acetate directs lipogenesis toward the production of squalene at the expense of triglycerides (23). Similarly, triglyceride synthesis is heavily influenced by the amount of glycogen available to the sebaceous glands (24). A diet low in fat could contribute to this observation; however, more research is needed to prove these mechanisms are significant from a dietary standpoint.

When an SSL mimetic of young, healthy skin is applied topically to the skin, it can im- part many of the benefits attributed to the skin's natural SSLs. The mimetic provided better short-term barrier recovery than other botanicals with skin-lipid-like attributes and did not negatively impact long-term barrier maintenance, as was seen with an oc- clusive ingredient like petrolatum. Similarly, the SSL mimetic provided short- and long- term hydration and limited regression upon discontinuation of product use. It also increased viscoelasticity and hydration in aged skin, demonstrating the importance of replenishing SSLs on skin that has lower quantities due to age.

References

(1) N. Nicolaides, "Human skin surface lipids—origin, composition and possible function" in *Advances inBiology of Skin*, W. Montagna, R. A. Ellis, and A. F. Silver. Eds. (Pergamon Press, Oxford, England, 1963), pp. 167–186.

(2) R. S. Greene, D. T. Downing, P. E. Pochi, and J. S. Strauss, Anatomical variation in the amount and composition of human skin surface lipid, *J. Invest. Dermatol.*, 54, 240–247 (1969).

(3) P. M. Elias, Epidermal lipids, barrier function, and desquamation, *J. Invest. Dermatol.*, 80 (Suppl. 1), 44s–49s (1983).

(4) A. M. Porter, Why do we have sebaceous glands?, *J. R. Soc. Med.*, 94, 236 (2001).

(5) A. Kydonieus and J. J. Wille, Palmitoleic acid isomer (C16: 1Δ6) in human skin sebum is effective against gram-positive bacteria, *Skin Pharmacol. Appl. Skin Physiol.*, 16, 176–187 (2003).

(6) U. Jacobi, J. Gautier, W. Sterry, and J. Lademann, Gender-related differences in the physiology of the stratum corneum, *Dermatology*, 211, 312–317 (2005).

(7) A. M. Kligman and D. L. Miller, Sebutape: A device for visualizing and measuring human sebaceous secretion, *J. Soc. Cosmet. Chem.*, 37, 369–374 (1986).

(8) J. S. Strauss and P. E. Pochi, The quantitative gravimetric determination of sebum production, *J. Invest.Dermatol.*, 36, 293–298 (1961).

(9) A. Anderson and J. Fulton, Sebum: analysis by infrared spectroscopy, *J. Invest. Dermatol.*, 60, 115–120 (1973).

(10) R. Michael-Jubeli, A. Tfayli, J. Bleton, and A. Baillet-Guffroy, Chemometric approach for investigating the skin surface lipids (SSLs) composition: Influence of geographical localization, *Eur. J. Dermatol.*, 21 (Suppl. 2), 63–71 (2011).

(11) L. C. Robosky, K. Wad, D. Woolson, J. D. Baker, M. L. Manning, D. A. Gage, and M. D. Reily, Quantitative evaluation of sebum lipid components with nuclear magnetic resonance, *J. Lipid Res.*, 49, 686–692 (2008).

(12) E. Camera, M. Ludovici, M. Galante, J. L. Sinagra, and M. Picardo, Comprehensive analysis of the major lipid classes in sebum by rapid resolution high-performance liquid chromatography and electrospray mass spectrometry, *J. Lipid Res.*, 51 (11), 3377–3388 (2010).

(13) A. Pappas, J. Fantasia, and T. Chen, Age and ethnic variations in sebaceous lipids, *Dermato-Endocrinology*, 5, 319–324 (2013).

(14) S. S. Shetage, M. J. Traynor, M. B. Brown, M. Raji, D. Graham-Kalio, and R. P. Chilcott, Effect of ethnicity, gender and age on the amount and composition of residual skin surface components derived from sebum, sweat and epidermal lipids, *Skin Res. Technol.*, 20, 97–107 (2014).

(15) J. A. Cotterill, W. J. Cunliffe, and B. Williamson, Age and sex variation in skin surface lipid composition and sebum excretion rate, *Br. J. Dermatol.*, 87, 333–340 (1972).

(16) I. B. Ro and T. L. Dawson, The role of sebaceous gland activity and scalp microfloral metabolism in the etiology of seborrheic dermatitis and dandruff, *J. Invest. Dermatol. Symp. Proc.*, 10, 194–197 (2005).

(17) I. Buraczewska, B. Berne, M. Lindberg, H. Törmä, and M. Lodén, Changes in skin barrier function following long-term treatment with moisturizers, a randomized controlled trial, *Br. J. Dermatol.*, 156, 492–498 (2007).

(18) P. Todorova, P. Grant-Ross, S. Tamburic, and R. Kurimo, Biomimetic vs. traditional skin moisturization: An in vivo comparison, *Cosmetics Toiletries.*, 130, 30–40 (2015).

(19) R. Michael-Jubeli, J. Bleton, A. Baillet-Guffroy, High-temperature gas chromatography-mass spectrometry for skin surface lipids profiling, *J. Lipid Res.*, 52, 143–151 (2011).

(20) P. Ramasastry, D. T. Downing, P. E. Pochi, and J. S. Strauss, Chemical composition of human skin surface lipids from birth to puberty, *J. Invest. Dermatol.*, 54, 139–144 (1970).

(21) A. V. Rawlings, Ethnic skin types: Are there differences in skin structure and function, *Int. J. Cosmet. Sci.*, 28, 79–93 (2006).

(22) J. M. Ntambi, "Stearoyl-CoA desaturases are regulators of lipid metabolism in skin" in *Lipids and Skin Health*, A. Pappas Ed. (Springer Science: New York, NY, 2015), pp. 239–248.

(23) M. M. Downie and T. Kealey, Lipogenesis in the human sebaceous gland: Glycogen and glycerophosphate are substrates for the synthesis of sebum lipids, *J. Invest. Dermatol.*, 111 (2), 199–205 (1998).

(24) B. Middleton, I. Birdi, M. Heffron M, and J. R. Marsden, The substrate determines the rate and pattern of neutral lipid synthesized by isolated human sebaceous glands, *FEBS Lett.*, 231 (1), 59-61 (1988).

A novel approach to meet the challenges of sulfate-free formulating – Sodium Lauroyl Methyl Isethionate

by Dr Samantha Brown
Innospec Ltd

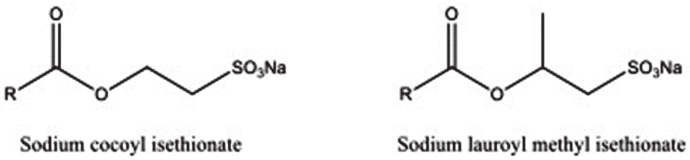
Sulfate-free origins

For many years Sodium Lauryl Sulfate (SLS) and Sodium Laureth Sulfate (SLES) have been the mainstay of the surfactant base in personal care cleansing formulations. Increasingly, however, there is a move to replace these, and other sulfate-containing surfactants, with sulfate-free alternatives. This trend appears to have begun around 8-10 years ago in North America following negative press about safety concerns when using sulfates. Whether or not there is any compelling evidence for this, consumers have picked up on the news and are seeking sulfate-free formulations perceiving the benefits to include mild, gentle, non-stripping, more natural products. The number of sulfate-free cleansing products (hair and body) launched has more than doubled globally since 2007.

Sulfate-free surfactant alternatives

Many sulfate-free surfactants exist but almost all suffer some drawbacks such as poor foaming, unwanted by-products, non-natural hydrophobe sources, ethylene oxide (EO) moieties present, pH instability and undesirable irritancy profiles.

Sodium cocoyl isethionate (SCI) is widely recognised as a versatile mild primary surfactant providing excellent lather in both liquid and solid formulations. Its limitation comes in terms of aesthetic appeal since it creates opaque products (unless used at very low levels, below that expected of a primary surfactant). Following extensive research, it was found that a minor modification of the structure of SCI (Figure 1) afforded a molecule with all the desired properties of a sulfate-free primary surfactant: SLMI. The added benefit of excellent water solubility sets SLMI apart from SCI and means that transparent formulations are easily created, helping meet today's trends for clear products.



Sodium cocoyl isethionate — Sodium lauroyl methyl isethionate

Figure 1 Structure of SCI and SLMI

The resulting molecule has demonstrated versatility as a primary and secondary surfactant thanks to improved hydrolytic stability and foaming performance. Key features, benefits and applications are detailed in Table 2

The technology and processes to create this new molecule, originally developed by Huntsman, have now been optimised by Innospec to deliver both solid and liquid forms of SLMI which can be easily handled and formulated into finished products.

Several parameters have been measured in order to substantiate claims about SLMI and to provide information to help formulators optimise product performance. Some of these are now discussed below.

Features	Benefits	Applications
• Mild	• Dense creamy lather	• Body wash
• Excellent water solubility	• Long-lasting	• Shower gels
• Can be used in clear systems	• Good slip	• Shampoos
• Natural/renewable feedstocks	• Elegant after-feel	• Facial Cleansers
• Sulfate free	• Reduced tack on drying	• Liquid hand soaps
• 1,4-Dioxane free	• Easy to formulate	• Shaving preparations
• Nitrosamine free	• Structured systems achievable	• Wipes and towelettes
• Broad pH stability		• Intimate cleansing
• Readily biodegradable		• Beauty bars
		• Baby bath and shampoo

Table 2 Features, benefits and applications of SLMI

Viscosity Building Properties

Product viscosity is important since it controls the way a products looks and has an impact on consumer perception of the efficacy and quality of an end product. It is also vital to achieve good viscosity if you wish to create novel visual effects such as suspended air bubbles or wax beads for exfoliation. The simplest and cheapest way to thicken a surfactant solution is using electrolytes like sodium chloride however many of the sulfate-free surfactants are not able to increase viscosity in this way. SLMI in combination with cocamidopropyl betaine (or other amphoterics) shows good thickening. Viscosity can be further increased by the addition of co-surfactants such as taurates and/or sulfosuccinates. Chart 1 shows a typical salt-thickening curve.

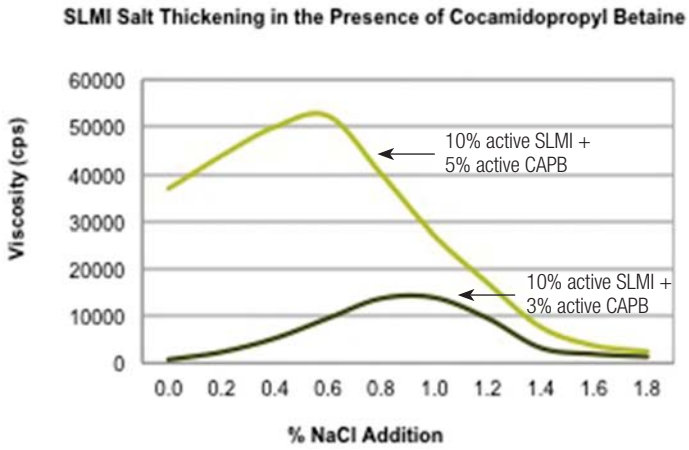
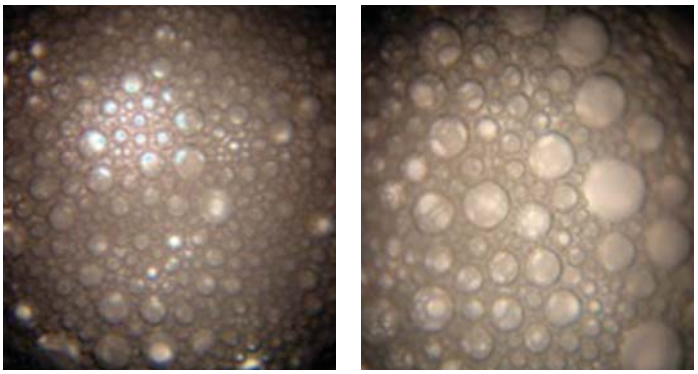


Chart 1 SLMI salt thickening in the presence of cocamidopropyl betaine (CAPB)

Foaming

The appearance, density and longevity of foam are perhaps the most important parameters in judging a good surfactant. A dense creamy foam which persists in the presence of hard water or high soil level is the ultimate goal. SLMI was benchmarked against SLES in tests on each of these parameters and performed very well. Close up inspection of the bubbles under a microscope revealed a much smaller bubble size than those of SLES which means a much denser, creamy-looking foam. Bubbles were measured and the size distribution compared. SLMI contains a greater number of small bubbles which supports the observations made just by looking at the foam with the naked eye.



Sodium Lauroyl Methyl Isethionate SLES

Figure 2 Blender foam photographs x10 magnification (0.3% w/w active surfactant, 20°C, Water Hardness: 50ppm Ca2+, 10ppm Mg2+); SLMI (l) and SLES (r)

Foam height tests using the Ross Miles methodology demonstrated that initial foam height using SLMI at 1% active in distilled water was in fact higher than SLES at the same concentration. The results after 10 minutes still showed SLMI to have the greater volume of foam with minimal loss in volume over that time. After 30 minutes SLES had retained the greater volume but SLMI compares favourably. The same trend in results was found when using hard water (100ppm Ca2+, 200ppm Mg2+).

Blends of SLES/CAPB and SLMI/CAPB were also tested for foam quality and again SLMI containing blends gave a smaller bubble size distribution that SLES blends.

Irritation, Biodegradation and Stability

Irritancy tests (skin) at 0.5% active solutions of SLMI showed that it is less irritating than SLS, SLES-2 and CAPB. It was also proven that SLMI can have a mollifying effect in combination with other surfactants, reducing the inherent irritancy of individual surfactants.

SLMI is deemed to be readily biodegradable according to OECD 301B test protocol.

SLMI also shows good hydrolytic stability over extended time periods with no loss in activity over 28 days. Activity was also maintained across a broad pH range (4.5-9.5) over 30 days.

Commercial launches

Since the introduction of SLMI more than 30 consumer products have been launched by some of the biggest names in personal care. The formulations include shampoo, body wash, shower gel, foaming sugar scrub and liquid handwash,

with many more products currently being trialled. SLMI is proving to be a simple cost effective and efficient way to go sulfate-free.

Conclusion

Sodium Lauroyl Methyl Isethionate has been developed as a sulfate-free primary surfactant for use in personal care cleansing applications. It performs well when benchmarked against the widely used SLES surfactants showing good foaming, stability and thickening. It is nitrosamine-free, EO-free, is derived from renewable resources and is readily biodegradable. SLMI can also be used to form structured systems.

SLMI is unique to Innospec and is manufactured and sold under the trade name Iselux®

For more information please contact Jeanette Padilla, Business Manager, A S Harrison & Co,

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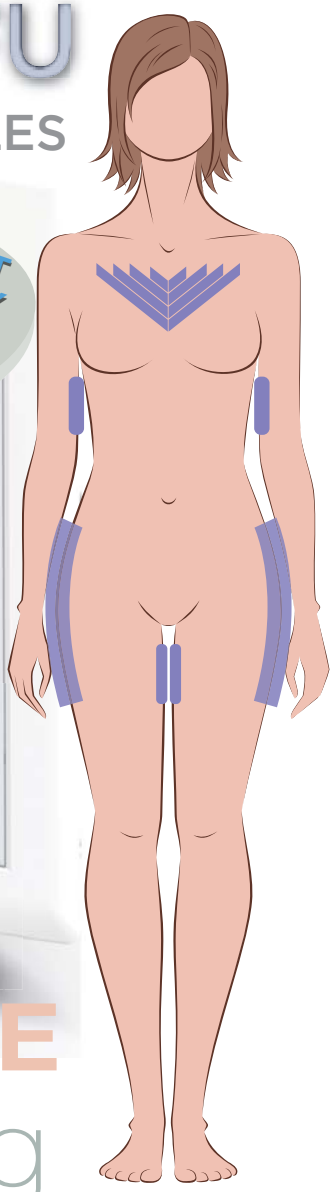

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