# the science of beauty

Vol 7 No 6

June 2018

# Hydresia™

## A DIFFERENCE YOU CAN FEEL

**100% Natural**
**Powerful Emulsifier**
**Proven Delivery System**

- ✓ Palm Free options, Vegan, Non-GMO
- ✓ PEG free
- ✓ Ecocert COSMOS approved
- ✓ Cold Processable

Hydresia® SF2 | Hydresia® G2 | Hydresia® Dulcé

## BOTANECO™

Refer to our article "Hydresia® Oleosomes – A Difference You Can Feel" or Contact us for more details, starting formulations and samples

GOLD SPONSOR

A S Harrison & Co would like to thank all our customers and visitors who spent time with us at the recent ASCC Conference in Canberra. We will continue to be proud supporters of the ASCC and are looking forward to ASCC 2019 in Fremantle.

HARRISON CELEBRATING 95 YEARS

Established 1923

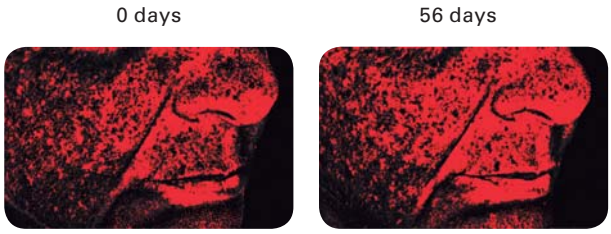
Lipotec™
Active Ingredients

# lumicease™

*blue ingredient*

## Get your skin ready for life in the light

Biotechnological ingredient that fights digital and photoaging through a skin adaptive response




Changes in UV spots (not yet visible)

- Prepares, protects and repairs the skin
- Reduced wrinkle volume up to **21.5%**
- Decreased number of both visible and not yet visible spots

**Lipotec International, Inc.**
28 River Street
Silverwater NSW 2128, Australia
Phone: +61 (02) 9741 5237 | Fax: +61 (02) 9748 4924
E-mail: CommercialANZ@lubrizol.com

Lubrizol

www.lipotec.com

# contents

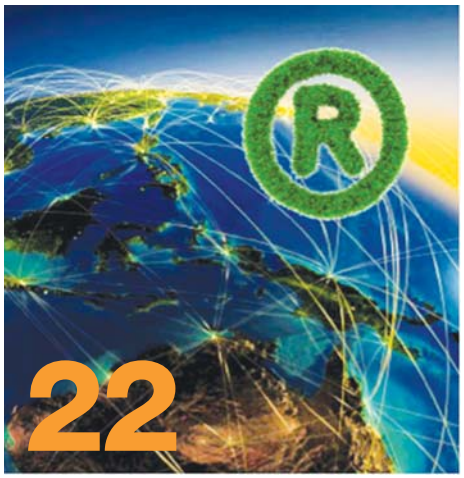
Vol 7 No 6
June 2018

## Business




## ASCC

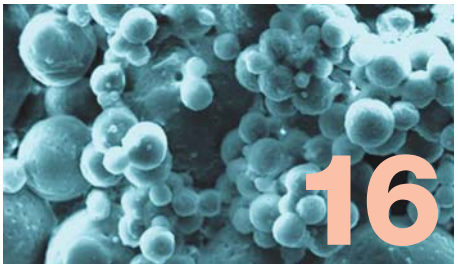






## Educational





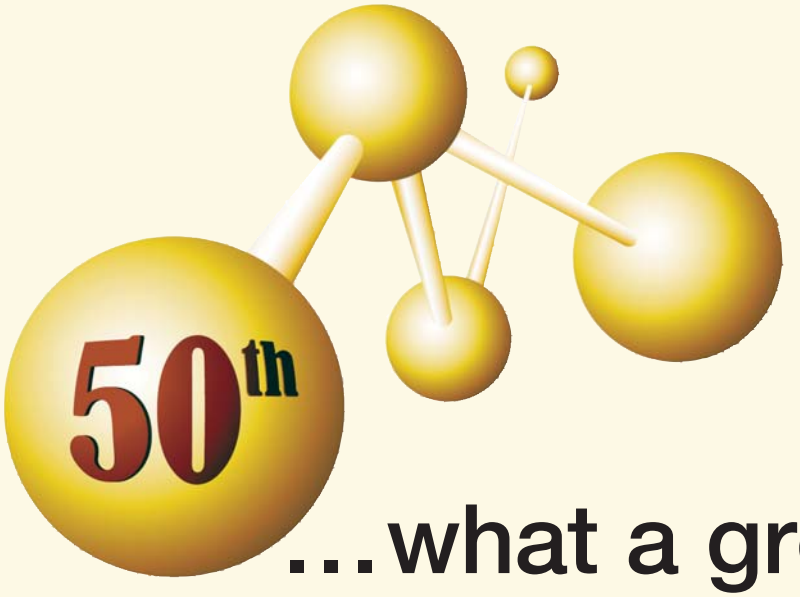



## Technical




## Advertisers






editor's note

# …what a great conference

The ASCC 50th Anniversary Conference has come and gone and what a great conference it was. 320 delegates in all making it one of the largest conferences ever. The social events are always a highlight and this year was no exception. The cocktail party at the Portrait Museum was enjoyed by all as was the Gala Dinner.

The winners of all the prizes were presented at the Gala Dinner. The Lester Conrad Award for the best paper was won by Emily Holt from Warwick University/Lubrizol, her paper is published in this issue. The Peter Strasser Award for the best workshop was won by Francesca Cradduck from Carst and Walker. Because Francesca's workshop was on PowerPoint we were unable to publish it in this issue but she is working hard to have it in Word for our next issue so look out for that. The Best Stand Award was won by Ingredients Plus.

At the Dinner the 2019 Conference was announced and it will be held for the first time in Freemantle Western Australia. The organizing committee are already hard at work and you will find the "Call for Papers" on page 9 of this issue.

On pages 40 – 42 of this issue you will find the Conference in Photos.

I really am looking forward to the conference next year to once again catch up with old friends and to make new ones.

Until next time, happy reading.

Joy

The "Old Farts Club"

**The Science Of Beauty**
ISSN: 1837-8536
Published Bi-monthly
(January March May July
September November)

www.thescienceofbeauty.com.au

**Publisher**
Manor Enterprises Pty Ltd
ABN 32 002 617 807

**Editor**
Joy Harrison
All correspondence should be sent to
The Editor
The Science of Beauty
PO Box 487
GULGONG NSW 2852
Mobile: 0418 541 998
Email: joyh@ozemail.com.au

**Advertising**
Tony Harrison
Advertising Manager
PO Box 487
GULGONG NSW 2852
Mobile: 0429 165 156
Email: tonyhar@ozemail.com.au

**Subscriptions**
The Subscription Manager
(PO Box 487 Gulgong NSW 2852)
$66.00 (per year) incl P/H (Aust.only)
$106.00 (2 year) 20% discount



# meet the team...

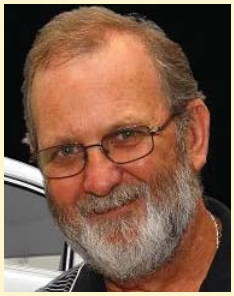
**REBECCA AKHYANI** is a creative perfumer with 15 years experience in the industry. Rebecca has a degree in Industrial Chemistry from UNSW and began her career as a fragrance evaluator before completing perfume school in Grasse, France. Rebecca has worked for a number of fragrance houses in Australia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

**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.

**TONI OVENELL** is a formulation chemist and consultant for Queensland Cosmetic Formulators. She has worked in the cosmetic industry for many years in a range of roles covering areas of technical sales, quality, supply chain, manufacturing and product development. Most recently Toni has worked for a small contract manufacturer as technical manager, prior to setting up her own business. Toni is passionate about sharing her knowledge, maintaining a viable cosmetic industry in Australia and helping people bring their product ideas to market. She also likes champagne and hockey.

**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.

**JULIAN JONES**, the founder and Managing Director of ikonsulting Pty/Ltd, is Passionate about the Personal Care Industry in Australia and Globally. Julian has been an active member of the ASCC for over thirty years. During this time he has served as President and Chairman of the Victorian Chapter of the ASCC. He is widely known and well respected both nationally and internationally for his knowledge and skills in developing and marketing the best Personal Care Products.



**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.

**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.

**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.

**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.

**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.

**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.

**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

**GINT SILINS** is a registered patent and trade marks attorney, and a principal of Cullens Patent & Trade Mark Attorneys. He holds a Bachelor of Science degree in chemistry with honours in biochemistry, and a Doctor of Philosophy degree in biochemistry. Gint specialises in protecting branding and innovations largely in the health care, personal care, animal health, food and beverage, biotechnology, industrial chemical, clean energy and agricultural sectors. His practice includes: conducting brand and innovation availability and registrability searches; IP audits; registering patents, trade marks and designs worldwide; enforcing intellectual property rights; resolving IP disputes; and, providing infringement and validity advice.

# the power of story

by Julian Jones

## People love stories!

Since ancient times stories have informed, educated and entertained us. Before the invention of the written word, verbal stories served to pass on experiences and knowledge from one generation to the next. Sometimes they were spoken and some times they were sung and some stories were related visually via paintings and drawings. All these methods have one thing in common: a willing audience!

Stories connect with our emotions – both positive and negative. A successful brand builds a positive connection with its audience (customers) through story.

Up until recently, brands developed value based on the customer's long-term experience of the product or service. Think Rolls Royce! A long established brand with excellence at its core and customer satisfaction to prove it.

Whilst a long successful history helps create a strong brand story, there are lots of "start ups" looking to establish themselves as reliable, trustworthy brands from the get go. Some are more successful than others and an indicator of success can be their ability to leverage a strong story.

Innovation may seem to be the opposite of long established products and services but in some industries it can work well. Take Apple, for example: a company with a relatively short history but one that has formulated innovation into its brand story from day one. It could be argued that they are not always first to Market but most people would agree that when they launch a new product it becomes the dominant player, based on a history of great user experience and very strong benefit marketing.

In the cosmetics industry we see a combination of both, some very well established brands leveraging their history and satisfied customer base along with new "disruptor" brands looking to capitalise on the latest breakthroughs in active ingredients.

Indeed, the recent panel discussion at the ASCC Annual Conference in Canberra addressed the issue of innovative product claims and the current legislative constraints the industry faces.

So how does a relatively young brand build a credible story?

One way is to engage a well-respected Formulator to help create the brand's products. The experience and skill of such a formulator can be associated with the new brand lending it credibility – someone who can help you to capitalise on the story of the actives. Another great way to build a brand's story is to have people on board in sales, marketing and management who have been successful in creating the story with other brands. Experience counts for a lot when it comes to getting it right with a new brand!

Of course it's not all about history! If your new brand is going to market itself as an innovator, explaining what is new and different about your brand is crucial. It's okay for you to know how special your products are, but you must make sure your customers get it too!

Translating scientifically proven actions into strong end consumer benefits Is a science in itself – not to mention staying on the right side of claims legislation.

At the end of the day, a brand needs to be credible and respected in order to sell well!

Building a strong brand story will go a long way to ensuring success!

See you next time! – *Cheers*

**Julian**

# Call for Papers

**2019 Annual Conference of the Australian Society of Cosmetic Chemists**

## *'East meets West - The Beauty of Opportunity'*

### ESPLANADE HOTEL, FREMANTLE, WESTERN AUSTRALIA 7-9th May, 2019

If you are a raw material supplier, finished product manufacturer, brand owner or in any other related discipline (such as packaging, marketing or IP protection), the ASCC Conference is an excellent opportunity to highlight new exciting technologies and research, showcase the latest market trends and provide a hands on experience that people will be talking about well after the event. In the last few years the ASCC Conference has continued to grow and attract a diverse range of delegates, all with a link to the Personal Care Industry, both in Australia and Internationally. The 51st Annual Conference looks to build on the close relationship Australia has with our Asian neighbours. By holding this event in Western Australia it represents a gateway for future Innovation and collaboration.

Persons interested in presenting papers or workshops at this Conference are invited to submit abstracts.

Conference programming requirements dictate the following timing:

- Papers should take 20 – 25 minutes to present.
- Workshops should be of 55 minutes duration. These should be of an interactive/ hands-on nature and encourage a high level of participation by attendees. There will be a set of basic lab equipment available to be used for sensory/ formulation workshops.

The abstract shall be submitted by email in the following format:

- The abstract must be typed double spaced, in English, preferably Arial font 12 point, and be between 100 and 200 words in length.
- The title must be in capital letters and include the name(s) of the author(s), with the presenting author's name underlined. If the presenter is not one of the authors, that must be clearly stated.

With your abstract, please ensure that you include the following information:

- Paper title, name of author(s), name of presenter, company or organisation
- Postal address, phone (with country and area code) and email address
- Please indicate clearly whether you are submitting a paper or workshop and for workshops indicate if there is a maximum number of attendees and any special resources required.
- Please include what category you wish to submit your abstract for (regulatory, natural products, fragrance, active materials, sunscreen, marketing etc). The organizing committee is looking at grouping conference sessions by theme in order to best separate papers and offer a more targeted experience for delegates who may be interested in particular subject areas.
- Please provide as much detail as possible within your abstract as this will form part of the selection process. For workshops an understanding of the concept and how you will engage the audience is highly recommended to be included with your submission.

Full guidelines and eligibility criteria for awards can be found on the ASCC Website (www.ascc.com.au)

Abstract submissions are to be sent to the Conference Technical Organising Committee; Matthew Martens (matthew.martens@croda.com), Ric Williams (ric@cosmepeutics.net.au) and Danny Hettiarachchi (danny@phytocognosy.com.au)

**Call for Papers/ Abstracts will close on 31 October 2018**
**All accepted submissions will be notified by 1 December 2018**
**Full papers and presentations to be submitted by 1 March 2019**

**We look forward to seeing you in the West in 2019**


# ethical consideration in cosmetic testing

by Emanuela Elia

Although differences exist between medical research and in vivo cosmetic testing, many similarities exist between the two. Clinical trials on therapeutic and cosmetic products both involve:

**a** humans taking part in a research study

**b** evaluating the efficacy and safety of products designed for the human health and wellbeing

**c** using science to broaden knowledge on certain aspects involving humans

Therefore, for both therapeutic and cosmetic trials, ethical considerations are necessary to ensure the safety of the humans involved in the study.

Today, the fundamental document in the field of human research ethics is the Declaration of Helsinki. The document sets out basic ethical guidelines regarding the protection of human beings involved in research studies. Since 1964 it has undergone six revisions, the first of which in 1975 introduced the concept of oversight by an "independent committee". In Australia, this is better known as "human research ethics committees" (HREC) or in the USA, the term "Institutional Review Board" (IRB) would be more familiar. Such committees are tasked with reviewing, approving and monitoring biomedical research with the aim of protecting the rights and welfare of the research subjects.

Depending on the project, the Investigator (i.e. doctor or other qualified person responsible for conducting the research project) should consider whether it is necessary to obtain an approval from the ethics committee. In the case of certain efficacy cosmetic studies on healthy volunteers, the risks to the study participant may be minimal. For example, when testing products

or ingredients that have been on the market for some time (i.e. their safety has long been documented or otherwise established) on healthy volunteers, using non-invasive skin bio-engineering methods (e.g. instruments for measurements of skin parameters such as hydration, elasticity etc.), the investigator may deem the risk of such project very low. However, should the research project involve novel ingredients, a non-topical product, treatment of a medical or dermatological condition, or invasive assessments, then the project should undergo an independent ethics committee review. Essentially, if there is any element in the research project that has a non-negligible risk to study participants, it should be assessed by an ethics committee.

In Australia the concept of risk assessment is also addressed by the National Statement on Ethical Conduct in Human Research (2007). The document, which officially sets our local guidelines for human research in Australia, states that *"research with more than a low level of risk (as defined in paragraph 2.1.6) must be reviewed by an HREC. Research involving no more than low risk may be reviewed under other processes described in paragraphs 5.1.18 to 5.1.21"*

The Declaration of Helsinki was the basis for developing the Guidelines for Good Clinical Practice (GCP), an internationally recognised standard governing the ethical and scientific quality for the design, conduct, recording and reporting of clinical trials involving human subjects. The main principles of GCP are outlined by the International Conference of Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH).

All the general principles of GCP listed in Section 2 of the ICH GCP Guidance apply to cosmetic trials. These are:

*"2.1: Clinical trials should be conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki, and that are consistent with GCP and the applicable regulatory requirement(s).*

*2.2: Before a trial is initiated, foreseeable risks and inconveniences should be weighed against the anticipated benefit for the individual trial subject and society. A trial should be initiated and continued only if the anticipated benefits justify the risks.*

*2.3: The rights, safety, and well-being of the trial subjects are the most important considerations and should prevail over interests of science and society.*

*2.4: The available nonclinical and clinical information on an investigational product should be adequate to support the proposed clinical trial.*

*2.5: Clinical trials should be scientifically sound, and described in a clear, detailed protocol.*

*2.6: A trial should be conducted in compliance with the protocol that has received prior institutional review board (IRB)/independent ethics committee (IEC) approval/favourable opinion.*

*2.7: The medical care given to, and medical decisions made on behalf of, subjects should always be the responsibility of a qualified physician or, when appropriate, of a qualified dentist.*

*2.8: Each individual involved in conducting a trial should be qualified by education, training, and experience to perform his or her respective task(s).*

*2.9: Freely given informed consent should be obtained from every subject prior to clinical trial participation.*

*2.10: All clinical trial information should be recorded, handled, and stored in a way that allows its accurate reporting, interpretation and verification.*

*2.11: The confidentiality of records that could identify subjects should be protected, respecting the privacy and confidentiality rules in accordance with the applicable regulatory requirement(s).*

*2.12: Investigational products should be manufactured, handled, and stored in accordance with applicable good manufacturing practice (GMP). They should be used in accordance with the approved protocol.*

*2.13: Systems with procedures that assure the quality of every aspect of the trial should be implemented."*

In summary, to ensure that the rights, safety, and well-being of study subjects are protected, and that results of clinical studies are credible and accurate, cosmetic testing must adhere to the standards set down by the Declaration of Helsinki. With regards to the principles of ICH GCP, the spirit of GCP and especially its ethical considerations, should also be complied with as much as it is considered relevant for the protection of human beings. In addition, human research in Australia must follow the principles established by the National Statement on Ethical Conduct in Human Research (2007) which is applicable to all types of research involving humans, including cosmetic testing.

**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.

## References

Joachim W. Fluhr, Practical Aspects of Cosmetic Testing, 1st Edition. 2010

National Statement on Ethical Conduct in Human Research (2007) – Updated May 2015

ICH Guideline for Good Clinical Practice

# inventory control or out of control?

by Toni Ovenell

Inventory and cash flow can make or break a business. When it comes time to do your annual stocktake, as a contract manufacturer, you may find that you have lots of small amounts of raw materials on your list. In the cosmetics industry, where you have many expensive actives, this can add up to a small fortune.

The role of a cosmetic contract manufacturer is to make and package products according to a formulation for a brand owner. This formulation may be owned by the contract manufacturer or by the brand owner. The formulations are usually a mix of standard raw materials and specialty raw materials designed to make the product stand out from the crowd. This is where things start to get complicated.

Let's say a client comes to you with a formulation for a moisturiser. This moisturiser may contain 10-20 different raw materials, or sometimes more, in the case of cosmeceuticals. But let's start with 15 for the sake of this exercise. Out of these raw materials, you may stock 10 of these ingredients as you use them in other products. That leaves five raw materials that may need to be added to your inventory.

This is the stage that decisions need to be made. Do you supply these ingredients, or does your client supply these materials?

## Pros

- You control the supply. If you are purchasing the ingredient you often have determination of where you source and how much you have on order. You are in control of delivery dates and times and can tie this into your production schedule.
- You control the cost. You often has access to good pricing structure and purchasing the raw material also allows for you to set the price of manufacture as a total. It also increases your total spend at suppliers and improves your buying power.

## Cons

- You carry the cost. You are outlaying money initially to purchase the raw materials and will carry the cost of these until final payment.
- You add to your current inventory. You will need to add a new product line to your inventory and are often left with some leftovers ie you may require 4.5kg but need to purchase in 5kg amounts. This leaves 0.5kg of stock that may not be used. If this is an expensive ingredient this can be hundreds of dollars.
- Cost to manufacture for client becomes complicated as you will not be including all raw materials in your quoting procedure.
- You can't control the supply or quality of the raw material. You must set boundaries for your client on quality if they supply the ingredient.

## Weighing the risk

It is really important at this stage to consider a standard procedure to mitigate your risk and cost. If you are purchasing

for a large, long term client, with regular orders it is not a difficult decision to purchase all of the raw materials on their behalf. Offering a full service to your client will keep them satisfied and your long term gain is a customer ordering on a regular basis.

If , on the other hand, you have a new, start-up client with many actives, you may want to reduce your risk by asking them to purchase their own specialty raw materials so you are not left with excess inventory if they do not reorder. There is always the option to renegotiate if the product takes off.

Once you have decided on a course of action for new, expensive or unique raw materials, you also need to decide on a system for your standard raw materials. Do you carry excess stock to ensure continuity of supply, do you have numerous approved suppliers or do you run a just in time scenario and hope that your supplier has the ingredient in stock?

The most difficult challenge as a contract manufacturer is maintaining control of your inventory. You need to rely on your customers giving notice on orders, giving repeat orders or realising that there may be long lead times on some manufacture if there is no forecast. Communication is the key. Communication with your customers and communication with your suppliers. Working together, forecasting where possible and being realistic about lead times on ingredients makes the process run smoothly and will help, long term, to keep your inventory under control.

TONI OVENELL is a formulation chemist and consultant for Queensland Cosmetic Formulators. She has worked in the cosmetic industry for many years in a range of roles covering areas of technical sales, quality, supply chain, manufacturing and product development. Most recently Toni has worked for a small contract manufacturer as technical manager, prior to setting up her own business. Toni is passionate about sharing her knowledge, maintaining a viable cosmetic industry in Australia and helping people bring their product ideas to market. She also likes champagne and hockey.

# Get your skin ready for life in the light

One of the main reasons for the damage and premature aging of the skin is UV radiation, and it is impossible to escape from it. Coming from the sun, it is believed to cause up to 90% of skin aging signs including wrinkles, roughness, sagginess, skin thickening and dark spots.

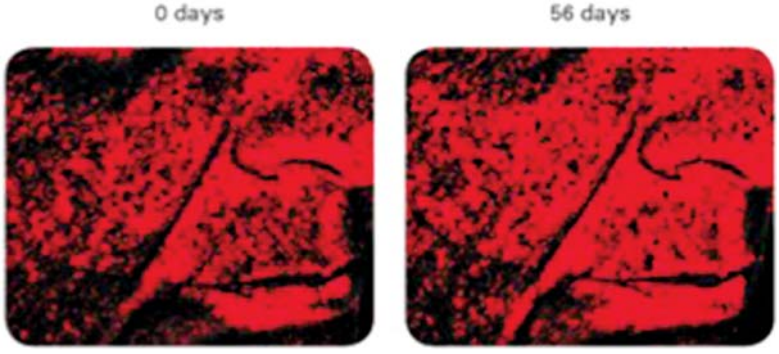
The sun also emits other types of harmful light, such as infrared and blue light, which penetrate deeper in the dermis and which regular sunscreens do not protect us from. Blue light can also be found indoors, since it is artificially produced by electronic devices such as computers, TVs, smartphones and tablets. The smartphone dependency, the selfie boom, and long workdays in front of computers can negatively impact our skin appearance.

To protect itself from light-induced damage, human skin adapts by developing biological mechanisms that increase its resistance to light, just like some animals can adapt to the environment through, for example, camouflage. Opsins, which are the main photoreceptors of the eye with a key role in light perception, have also been detected in human skin. They are believed to help the skin act as a sensory system for light, increasing its alertness and protection.

Obtained through biotechnology from one of the most radiation-resistant microorganisms, LUMICEASE™ blue ingredient activates opsins on the skin and promotes adaptive responses which help prepare the skin for future exposure to light. It also protects and repairs the skin from solar and artificial blue light-induced damage, minimizing the main signs of photoaging.

In vitro, in addition to activating opsins, considered as the eyes of the skin, the ingredient helped induce the skin adaptive responses against light damage. An increase of cell survival and improvement and protection of the extracellular matrix were also observed.

A clinical test was performed on women who applied a cream with 2% LUMICEASE™ blue ingredient on half face and a placebo cream on the other half, during the summer and while being daily exposed to artificial blue light. The number of brown spots decreased by 11.7% as well as the amount of UV spots (not yet visible), that were reduced by 14.1%, suggesting a repair effect.




A reduction of 21.5% and 13.2% in wrinkle volume and average roughness respectively was observed after 56 days of treatment.

In accordance with Lubrizol's sustainability policy, the isolation process of the microorganism was performed following sustainable practices, which did not involve harvesting high amounts of materials from nature. But at Lipotec we wanted to go a step further in our commitment with the environment by returning to nature what it had offered us, and that is why a percentage of sales of LUMICEASE™ blue ingredient will be donated to Paisatges Vius, an organization dedicated to the conservation of the aquatic ecosystem of the Pyrenean area in Northern Spain where the isolation of the microorganism took place.

Lipotec's LUMICEASE™ blue ingredient prepares, protects and repairs the skin from solar and artificial blue light helping minimize the main signs of digital and photoaging so you can enjoy your life in the light.

Discover the full sustainability story of LUMICEASE™ blue ingredient

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

Concept is the exclusive distributor for Rita Corporation across Australian Pacific region.

# Improved Materials for better results

## All-in-One Blend

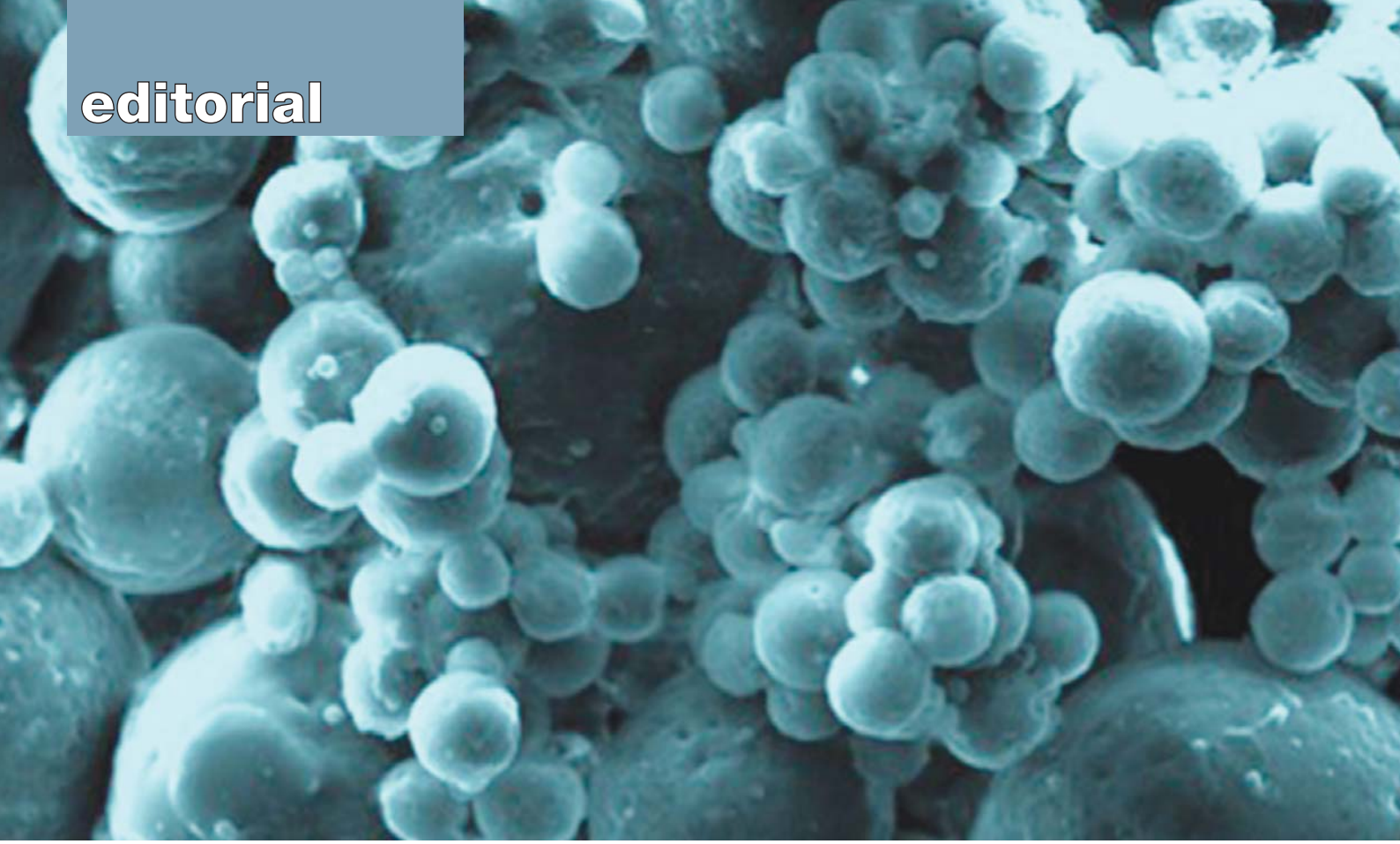
**Ritafactant SFE** is an all-in-one cold process blend that can be used in a wide range of formulas: shampoos, face and body washes as well as in baby care products and more.

This material is exceptional because of its ability as a Lactylate, providing residual moisturisation, extended fragrance release, and enhanced delivery of actives. Lactylate boosted prototypes are cost competitive to their sulphated counterparts. Ritafactant SFE can easily be added to the water-phase of cold process production for cosmetic, personal care and even household market segments.

**Ritafactant SFE + cold process = improved efficiency + reduced energy consumption**

The Concept and Rita partnership aims to meet your supply and new product research needs. Contact us on (02) 9498 7600 or email sales@conceptchemical.com.au to find out more.

conceptchemical.com.au ritacorp.com



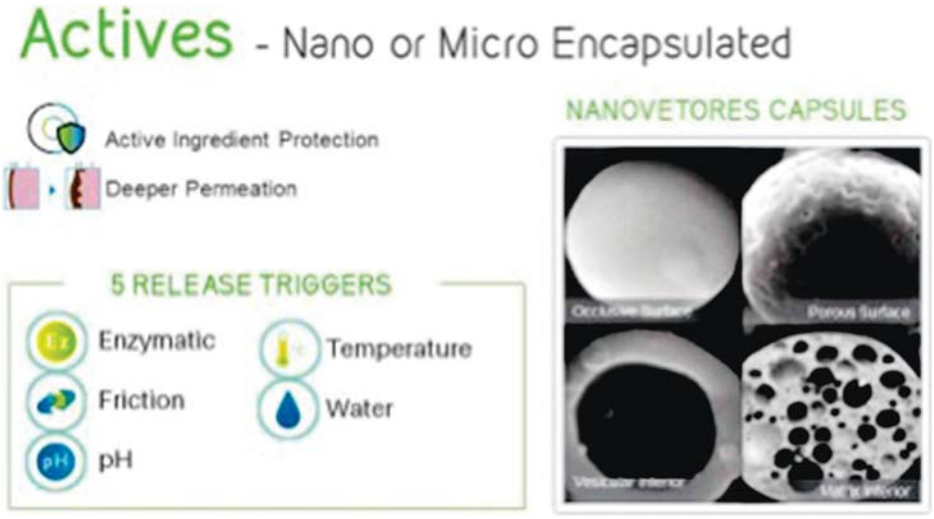
# High performance encapsulated ingredients with total release control

There is a great variety of cosmetic active ingredients on the market, either with higher, low or zero technology added. These ingredients are normally sensitive to specific environments or situations. Oxidation, hydrolysis and photosensitivity are among the most common chemical instabilities that formulators have to deal with. The instabilities may also be harmful for the final users, causing dermal irritations or greater problems.

Interaction between components, low solubility of the active ingredients and low skin permeation also means low efficacy for the products, meaning that customers generally do not see the benefits that they were promised when purchasing the product.

Encapsulation technologies are designed to solve this issue; encapsulating actives protects them from many of the afore-mentioned problems which decrease the efficacy of cosmetics. The challenge was to find a way to break the capsules and release the ingredients at the right moment. Nanovetores technology, created by PhD Betina Giehl Zanetti Ramos, met this challenge by creating five specific release triggers.

The triggers are specially designed to maximize the benefits of each application. Enzymes, temperature, pH, water, and friction; all five work



differently and aim for different kinds of application.

- The enzymatic trigger grants that the capsules will only release the protected active ingredients after the interaction of the enzymes from the body with the capsule material. The capsule will be degraded along the next 8 hours after application, enabling a sustained and controlled release of the active ingredients, granting that the final user will receive controlled dosages of the compounds over a longer duration.
- The temperature trigger releases the ingredients after the user applies heat to the product. As the capsule is sensitive to higher temperatures, it is a perfect application for haircare products. The hair dryer or the iron plate applies enough heat to break the capsules, the contents of which can then permeate the hair to the cortex, enabling the full delivery of the promised benefits.
- The pH trigger releases the actives after pH alteration. Human skin has a specific pH when it's dry; this pH naturally changes once we start sweating, and this alteration triggers the release of the capsule contents.
- The water release trigger enables the final user to control the moment of release of the active, by bringing the capsule into contact with water.
- Finally, the friction trigger is the one used in our fragrances, where the fragrance is released only after friction has been applied.

The control of how capsules break and release their contents is not the only benefit related to our technology. The small and safe size of the capsules (all above 200nm) grants deeper permeation, delivering the actives right where they are needed to deliver the maximum benefit. The capsules are biocompatible, biodegradable and multifunctional: after releasing their contents, they help to promote hydration and skin firmness.

The particles release their ingredients at the right moment, in the right place for deeper permeation. The release of actives can be sustained over a long duration, which means total control over the applications, with new efficacy standards for cosmetics. All this, created in a totally sustainable environment, free of organic solvents.

For Further information please contact Trulux on 02 9975 2655 or info@trulux.com.au

# Hydresia® Oleosomes – a difference you can feel

What do you get when you combine an oilseed and a gentle, extraction process that does not require crushing, heat or the use of chemicals? Hydresia® Oleosomes, micron sized spheres of emollient plant oils and vitamin E.

- Palm Free options, Vegan, Non-GMO
- PEG Free
- Ecocert COSMOS approved
- Cold Processable

Botaneco, a long-term partner of A S Harrison & Co, specialises in personal care ingredients with their flagship product Hydresia®. Hydresia® Oleosomes are a truly natural emulsifier on the market today possessing powerful skin hydration and multi-functional delivery system benefits. Hydresia® Oleosomes boast a unique, continuous moisture delivery system that is an all-natural alternative to chemical emulsifiers and irritating ingredients with its micro particles of skin softening oils and vitamins.

A naturally superior system, Hydresia® Oleosomes allow our customers to create better products that satisfy the emerging needs of consumers. The Hydresia® system offers a difference you can feel and is currently used in over 350 different personal care products globally.

## Beyond Oil

Hydresia® oleosomes are micron-sized spheres of emollient plant oils and vitamin E, surrounded by a phospholipid membrane and protein coat. Found naturally in all oil bearing plant seeds, oleosomes serve as the natural storehouse of energy used by the seed during germination.

Oleosomes are isolated as aqueous dispersions according to a patented, chemical-free, green manufacturing process. Hydresia® oleosomes consist of a 65% dispersion of oleosomes in water. This unique mixture has considerable benefits over and above regular plant oils in personal care formulations.

## Revolutionary Benefits

Hydresia® oleosomes enhance formulations with multifunctional benefits and provide a perfect balance between natural authenticity and real performance.

Due to their unique structure, Hydresia® oleosomes function in hot or cold-process emulsifying systems over a wide HLB range.

This allows for natural emulsions with potentially reduced manufacturing cost. Hydresia® SF2 can emulsify three times its weight in oil, Hydresia® G2 can emulsify two times its weight and

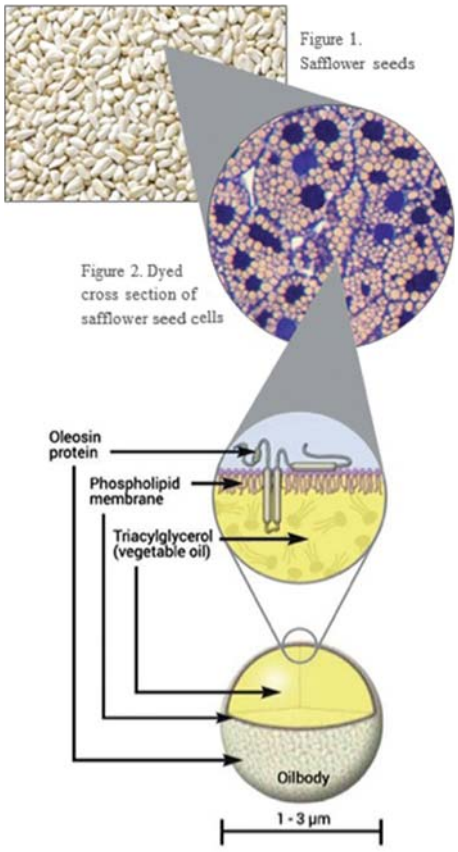



Figure 3. Safflower oleosome

Hydresia® Dulcé can emulsify its weight in oil.

Hydresia® oleosomes can be used as a dispersant and emulsifier in inorganic sunscreens to reduce whitening. Additionally, they can contribute up to 80 minutes of water resistance, naturally without additional additives.

Oleosomes deliver their contents onto the skin surface over time via gradual release for improved aesthetics in nearly all personal care applications, including alcohol hand sanitisers. The addition of glycerin, as in Hydresia® G2, can extend this benefit.

## What are Oleosomes?

Oleosomes are storage structures (1-3 µm in size) within plant seeds, that store and protect the oil energy source for the germination process.

They consist of a core of vegetable triglyceride oil, surrounded by a phospholipid monolayer with an oleosin protein coat (1% of weight). Oleosins are proteins that consist of both hydrophilic and hydrophobic domains, that are surface active (surfactant- like) and as such, they exhibit unparalleled emulsification efficiency, even at low levels.

## How are Oleosomes Isolated?

Botaneco isolates oleosomes fully intact without chemical modifications, unlike all other primary emulsification systems on the market today.

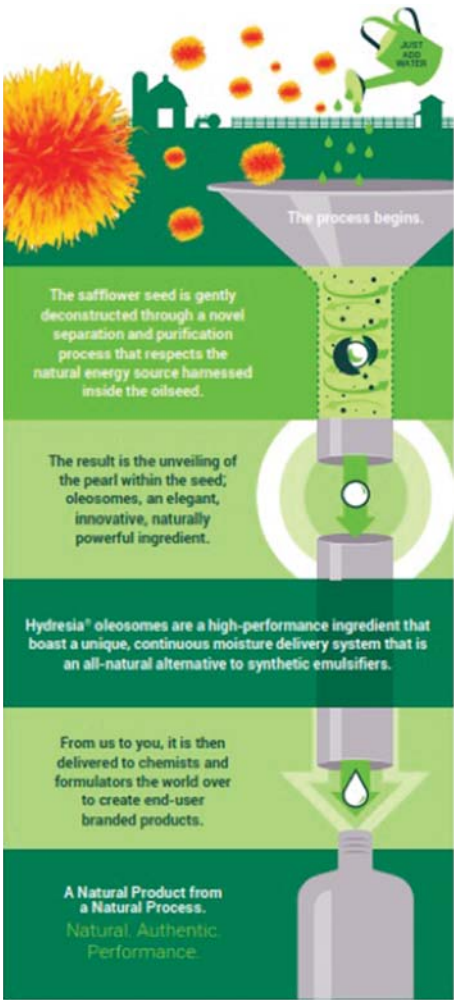
The Hydresia® oleosome portfolio contains three key products:

**Hydresia® SF2** – Safflower oleosome delivery system that functions to improve the aesthetics of all formulations for unparalleled efficacy in personal care.

**Hydresia® G2** – Long-lasting moisturisation and emulsifying traits as a result of delayed release of oils and vitamins, supplied by safflower oleosomes.

**Hydresia® Dulcé** – Luxurious long lasting moisturisation and emulsifying traits as a result of delayed release of emollient almond oil and vitamin E, supplied by sweet almond oleosomes.

*For more information or samples, please contact:* Jeanette Padilla – Business Manager, A S Harrison & Co at Jeanette.padilla@harrison.com.au or +61 (0)2 8978 1004.



# the risky business of risk management

by James Gillard

**Risk Management** is important to your business success. Knowing your risks will help you get the right insurance cover to protect your business against loss, damage, business interruption, employee liability and general liability. Inadequate insurance may cause large unexpected expenses or, worst case scenario, the inability to continue operating.

**Risk management involves 3 parts:**

- Identifying the risks. Some risks are major and others are not. Identifying potential risks to your business can be a challenge in itself. Start by asking the question – What if… ? What could go wrong?
- **Assess your identified risks.** What is the likelihood the risk will affect my business? What are the consequences to the business? Are these major, moderate or minor?
- **Develop a strategy to deal with the risks.** Develop a cost-effective plan which gives you details of the causes, consequences, and alternative options including:
  - Avoid the risks – is it possible to avoid the risk, but still achieving similar goals?
  - Reduce the risks – is it possible to reduce the risks if you cannot avoid them?
  - Transfer the risk – Can the risks be transferred to another party or by way of insurance? With some risks you may find that there is nothing you can do about them but to accept them.

**You don't know what you don't know.** For example, your power supply to your factory is routed via your neighbor's factory so that any disruption to your neighbor's power supply will result in a power failure at your premises, interrupting your production activity.

Business owners need help to identify significant risks which may not be obvious. An insurance professional, such as an Insurance Broker, deals with risk analysis and risk mitigation on a daily basis and is therefore well placed to

advise and assist.

One of the most important ways to protect your business against a significant loss is having sufficient Business Insurance. An experienced Insurance Broker who understands your business industry can provide you with professional advice to get the right policy cover.

Business insurance can be divided into three categories

| | |
|---|---|
| Assets & Revenue Insurance | Building & Contents<br>Glass breakage<br>Fire<br>Machinery & Equipment breakdown<br>Goods in transit<br>Motor Vehicle<br>Money<br>Theft<br>Business Interruption |
| Liability Insurance | Public liability & Product Liability<br>Professional Indemnity/Medical Malpractice |
| Personal & Workers Insurance | Workers compensation insurance<br>Income protection<br>Personal accident, Illness insurance |

The insurance cost is minimal compared to the consequences of the unexpected. If you are unsure about your current coverage and need a Professional Advisor to review your policy or risk, please contact the friendly team at IME Insurance Brokers – Insurance Made Easy for personal assistance to discuss your own individual circumstance 1800 641 260 or visit us www.imeinsurance.com.au

# Tips for exporters of branded personal care products

by Gint Silins

Most, if not all, personal care businesses dream of exporting their branded products around the world (eg. USA, Europe, China, New Zealand, Disneyland, Japan and South Korea). Those that do export rarely ever speak of an incident-free 'journey', and sometimes major incidents are due to issues with branding/trade marks.

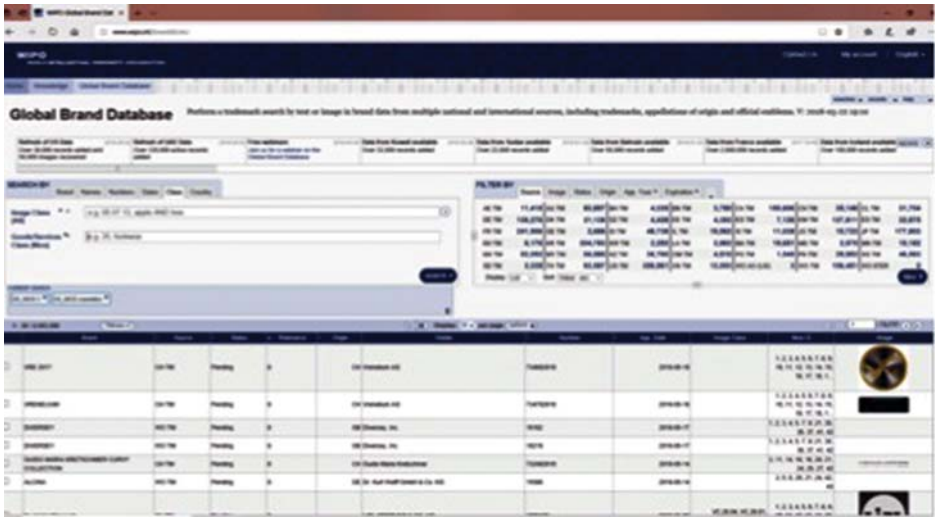
Let me put this nebulous concept into real-world terms: You begin to export branded product, only to find that: (1) your brand can't be used in that country because it is the same or too similar to a third-party brand already being used/registered in that country; (2) your brand has been pinched and you can't get it back; (3) you can't protect your brand from being copied by others; (4) your brand is a poor choice (culturally unacceptable) for a particular non-English speaking country; or (5) a native-language equivalent/version of your brand is used by a third-party and becomes more popular than your English brand, and there is nothing you can do about it.

Of course, the upshot of all of this is that you may need to go back to the drawing board and re-brand your product, which is both an expensive and time-consuming exercise. This article will hopefully help exporters minimise the likelihood of such incidents arising.

## (1) Your brand can't be used because it is the same or too similar to a third-party brand already being used in that country

Just because you can use your trade mark in Australia does not mean that you can use it abroad, because a third-party may have registered or unregistered ('common law') rights in that same, or similar, trade mark.

The only way of assessing its availability is to conduct searches of the marketplace. Is someone using the trade mark or something very similar to it in the country of interest? For starters, conduct searches on the internet for third-party use of the same or similar trade mark. Also, conduct searches of national trade mark databases, if available.




My suggestion is that you carry out searches on the internet using, for example, Google word searches or Google image searches, and then engaging a professional to review those results. Likewise, carry out searches of the national trade mark database, but I suggest that a professional legal advisor carry out and advise on that search. Note that there is no free-to-search world-wide trade marks database. However, WIPO's Global Brand database covers many countries. Its URL is provided below, as is the URL for WIPO's Directory of Intellectual Property Offices.

WIPO's Global Brand Database: http://www.wipo.int/branddb/en/

WIPO's Directory of Intellectual Property Offices: http://www.wipo.int/directory/en/urls.jsp

## (2) Your brand has been pinched and you can't get it back

The best you can do to avoid this dilemma is to file for trade mark registration in each country in which you intent to use the trade mark, before you actually start using the trade mark in that country. Some countries, such as China, have a 'first-to-file' rule, which means that the first person/company to file for registration of a trade mark is usually deemed to be the owner of that trade mark. This usually means that filing first in China will trump earlier use of that same mark in China, but there can be exceptions – eg. the trade mark was already well-known in China at the time the trade mark application was filed, or the trade mark applicant had a business relationship with the actual owner and the trade mark application was filed in 'bad faith'.

I recently searched the official Chinese Trade Marks database and was surprised to see how many recognisable brands of well-known and not so well-known Australian companies had been registered by Chinese opportunists. It seems Chinese opportunists realise that Australian businesses are ever-increasingly looking to China as a must-try marketplace, and so are making educated guesses as to which trade marks they ought to register in China. So, for relatively low cost they apply for registration of those trade marks.

There are, however, provisions under the Chinese trade mark law for 'winning back' or 'knocking out' a trade mark. For example, (1) registration of a trade mark can be opposed prior to it being registered, (2) a trade mark registration can be invalidated on certain grounds, and (3) a trade mark registration can be cancelled if not used in the preceding 3-year period. Other countries usually have similar laws.

If China or any other first-to-file country is on your radar for export, you would be wise to register your trade mark as soon as possible, before it is pinched.

## (3) You can't protect your brand from being copied by others

Not all trade marks are registrable, so not all marks can be protected from being copied. Just because you have registered your trade mark in Australia does not mean that you can register it abroad. This is because either: (i) the trade mark consists of a word, image or other element or feature that renders the trade mark descriptive, misleading, scandalous, unclear or otherwise unregistrable; or (ii) protection for the same or similar trade mark has already been sought by a third-party in the country of interest.

The only way of assessing its registrability is to conduct searches of national trade mark databases, if available. My suggestion is that you carry out searches of the national trade mark database, but I also suggest that a professional legal advisor carry out and advise on that search. Also, a legal advisor will be able to say whether the very nature of the trade mark will raise issues with regard to its registrability. For example, trade mark elements such as 'ORGANIC', 'NATURAL', 'AUSTRALIAN MADE' and "SINCE [INSERT YEAR]" can cause registrability issues in some countries.

## (4) Your brand is a poor choice (culturally unacceptable) for a particular non-English speaking country

Yes, I have seen this happen time and time again, even when brand consultants are engaged at the brand-design stage. My suggestion is that you seek as much input on this as you can get, especially from a trusted agent in the non-English speaking country of interest.

When choosing a native language trade mark equivalent of your English brand, your choices typically include (i) creating a literal translation, (ii) creating a phonetic translation, or (iii) creating both a literal and phonetic translation. The 'stronger' brands are usually those that sound the same as the English trade mark and make reference to a defining characteristic of the brand or have a positive meaning in the culture of that country.


### (5) A native language equivalent/version of your brand is used by a third-party and becomes more popular than your English brand, and there is nothing you can do about it

When selling product in a country such as China where the majority of the population does not speak English, it is possible -if not likely- that a native language equivalent/version of the English brand may become more successful that the original English brand.

Hence, when selling branded product in a non-English country, you should think about using and registering both the English brand and the native language equivalent/version of that brand. If a third-party registers the native language equivalent/version of your English brand in a first-to-file country such as China, then there may be little or nothing that you can do about it, even if you are the registered owner of the English brand.

## Help is out there

Various government and non-government agencies offer assistance, including financial assistance, with export. The following websites are a good place to start should you be interested in pursuing your export dream.

Export Council of Australia: https://www.export.org.au/

Austrade: https://www.austrade.gov.au/

EFIC: https://www.efic.gov.au/

Ai Group: https://www.aigroup.com.au/business-services/trade/tradestart/

DFAT: http://dfat.gov.au/trade/exporters-and-importers/Pages/find-export-grants-and-financial-assistance.aspx

Department of Industry, Innovation and Science: https://www.business.gov.au/assistance

*[This article is intended to provide general information only and the contents should not be relied upon as legal advice for any specific case.]*


- Sunscreen Testing
- UVA Testing
- Chemistry
- Stability Testing
- In-Vitro Tests
- Clinical Studies
- Hair Testing
- Consumer Research

Dermatest has recently joined the Eurofins testing group. With over 45 years experience in cosmetics and 27 laboratories worldwide, serving the cosmetic industry and in continuous expansion. This dynamic resource allows us to offer an even broader scope of testing and development services.

Eurofins | Dermatest Pty Ltd
20-22 King Street, Rockdale NSW Australia
P. +61 2 9556 2601
F. +61 2 9556 3361

eurofins | Dermatest

www.dermatest.com.au
https://www.eurofins.com/cosmetics/

# DRUGS VS COSMETICS

by Tina Aspres


Each year we see a mere ten to twenty new drugs licenced and approved by the regulatory agencies such as the TGA (Australia) and the FDA (USA) for human use – with tens of thousands of other drug candidates having fallen by the wayside. The research and development journey of a new drug would have taken approximately ten to fifteen years with a cost of approximately $1 billion dollars plus invested to bring that drug to market. Drugs make pharmaceutical claims and a licence is required in order to manufacture pharmaceuticals. Pharmaceuticals are strictly regulated and scrutinised where any claims made need to be validated and substantiated. It must be proven that the drug is both safe and efficacious for human use and it must be manufactured in an approved registered GMP facility.

In contrast, we see tens of thousands of cosmetic and personal care products launched each year. The cosmetic industry is a fast-paced industry focused on the discovery of novel ingredients for use in cosmetic and personal care products, often on a tight budget and timeline. These products are launched in a relatively short period of time, they may also make claims – with an increasing number making claims that are more like a drug than a cosmetic – but often these claims are not validated or substantiated. The cosmetic industry is highly unregulated and unscrutinised, and in comparison to the pharmaceutical industry, it is self-regulated and relies on the integrity of the manufacturer/brand owner.

Unlike pharmaceuticals, in Australia, cosmetics do not require approval by the TGA before going to market nor does one require a licence to manufacture cosmetics. Cosmetic products do not require pre-market authorisation for safety and efficacy, nor do they require to be manufactured in an approved GMP registered facility. Although not mandatory, there is an expectation that products brought to market are manufactured in a clean and suitable facility and that they have undergone appropriate testing for safety, stability and efficacy. Whilst the industry is predominantly 'self-regulated' Australia is not completely void of regulations. Cosmetic products are 'regulated' by NICNAS and the Australian Competition and Consumer

Commission (ACCC) in Australia. NICNAS administers the Australian Inventory of Chemical Substances (AICS). It is up to the manufacturer/brand owner to ensure all chemicals that are used are permitted for use in Australia and they know how they are to be used and be aware of any restrictions or conditions for use. Manufacturers will often (but not always) provide scant 'scientific support' of any claims made upon request, but such data is in no way comparable to global clinical trials attached to pharmaceuticals which are clear and transparent. Manufacturers are increasingly being warned by regulators regarding the claims that are being made for products as being false and deceptive. Where one pharmaceutical company alone spends up to $1 billion in research and development on one sole product, in contrast, global cosmetic companies spend billions of dollars in advertising their cosmetic products to the consumer.

In Australia, there is a clear distinction of what defines a product as a cosmetic and what defines a product as a therapeutic good (including drugs and medicines) purely based on the intended use as defined by the manufacturer. Cosmetic products are defined under the Industrial Chemicals (Notification and Assessment) Act 1989 and the Trade Practices (Consumer Product Information Standards) (Cosmetics) Regulations 1991 and therapeutic goods are defined in the Therapeutic Goods Act 1989.

There is increased pressure to bring to market 'innovative' and 'functional' products. The unofficial term 'cosmeceutical' was coined to imply 'active, science-based', 'biologically' or 'physiologically' active cosmetics – aka therapeutic cosmetics, dermo-cosmetics, skinceuticals, scientifically proven ingredients – and the definition has further evolved to include a cosmetic that may have or is 'purported' to have medical or pharmaceutical properties – in other words – it is implied that a cosmeceutical is a cosmetic with pharmaceutical properties. Cosmeceutical, however, is not a legal or approved term.

When developing new products, many cosmetic companies walk a very fine line between formulating for efficacy and marketing claims. Products are often marketed in such a way using drug-like (pharmaceutical) claims. Bold claims such as 'reversing and correcting aging by actively repairing DNA damage', use 'stem cell treatment', works at the 'cellular level', 'activate collagen synthesis', 'repair skin damage' or 'treat wrinkles' so effectively that the cosmetic product is claimed to be "better than Botox™' – (which implies it is better than a neurotoxin, intramuscular injection approved by the TGA as a wrinkle treatment) abound. These describe physiological effects that occur in the structure or function of the body that are reserved for "drug" products.

It is, however, not implied that scientifically proven skin ingredients do not exist – they do exist – but these require a prescription eg tretinoin or botulinum toxin – they are classified as drugs, and have overcome all the regulatory hurdles as imposed by the regulators and they have been approved for their specific indication.

Other active ingredients such as peptides and antioxidants are being increasingly researched and used in cosmetic products, but often testing has only been carried out in vitro and results may not necessarily translate the same when used in vivo. Human studies are poorly designed, involve small groups and do not stand up to the rigors of properly controlled pharmaceutical trials. Just because an ingredient has been proven to work in vitro at concentration X% does not mean it will work in a formulation at the same concentration in vivo or even be active in a formulation. Often the concentration of these ingredients used is less in products due to cost than what was used in vitro and other times, less effective derivatives of these ingredients may be used. Pseudoscience is used as a marketing strategy to entice consumers into purchasing a product.

If a cosmetic brand wants to make a pharmaceutical claim, there should be no objection. They should however, seek approval for a New Drug Application (NDA) just the same as any other pharmaceutical product and undergo the same rigorous process and substantiate and validate their claim if they wish to make pharmaceutical or medical claims.

The road to getting a drug registered is long and hard and it is estimated that less than 10% of drugs developed by pharmaceutical companies will actually end up making it on to the market. The reason is that most do not manage to pass all the hurdles before even getting close to being approved for sale. In contrast, cosmetic products are not registered and there are no such hurdles for cosmetic products coming to market.

The first step if a molecule shows any signs of promise is it is patented at the early stage in the development process to prevent any competitor from copying it. A patent is valid for 20 years and will cover the intellectual property of the molecule, its manufacturing process, formulation and even its use. Patenting allows the pharmaceutical company (sponsor) that developed the molecule time to recover its development costs and try to also recoup development costs of drugs that failed during the testing phase. It can take anything from ten up to fifteen years before a drug is registered and a substantial period of the patent has already expired by this time, so not a lot of time is available to try and recoup costs as well as to make a profit. Once a patent on a drug has expired, a company may seek an extension of the patent protection period for up to five and a half years. However, once a drug's patent has expired, a generic version may be produced by a competitor and marketed at a cheaper price.

Before a drug comes even close to being tested on humans, it is first tested on animals. This pre-clinical testing helps test the effects of the drug on vital organs and to observe how toxic the drug is at different doses. Once this hurdle has been overcome, a company needs to apply to the regulatory authorities for an Investigational New

Drug Approval (IND) to allow the drug to be experimentally tested in humans before a marketing application for the drug has been approved. The IND application is reviewed by the regulatory authority for safety to assure that no research participant is subjected to an unreasonable risk. Ethics approval also is required before any clinical testing is commenced. Once an IND is approved, the drug must then go through three phases of human trials – clinical trials – to test for safety and efficacy before it is approved for sale.

Phase I is the first time the effects of a drug are studied in humans. At this stage it is all about the safety of the drug. A small sample of 10 up to about 80 healthy volunteers are enlisted to trial the drug to establish its toxicity over a range of doses based on the results observed form the animal studies. If the drug is considered safe, it then goes on to the next phase of testing. The duration of Phase I may last anything from one month to one year.

Phase II of the testing focuses on the clinical efficacy of the drug – whether the drug treats the target condition or minimises its effects – can the drug do what it is claimed to do. Several hundred patients with the condition are included in the trial sample and if there is evidence of benefit to patients with an acceptable level of side effects the drug will then progress to Phase III studies. The duration of Phase II trials vary from one to two years and can cost millions of dollars. Only one third of IND's make it past Phase II trials.

Phase III is ultimately the most important phase of drug testing and the last stage before a drug sponsor can seek approval from regulatory drug agencies – TGA or FDA – before it goes to market. Phase III is where drug researchers seek a definitive answer on both the drug's efficacy & safety. The number of participants involved and the duration of the study vary, depending on the product and target condition. Hundreds and even thousands of subjects may be involved, depending on the disease, and often multiple centres around the globe are set up and participate. The testing conditions now closely resemble the clinical setting the drug is intended for. This provides a realistic picture of how the drug will perform in clinical use. The information obtained in this phase will also be important for marketing the drug when the time comes. In order to prove a drug's efficacy against the current standard of care (treatment available) without bias the trial is a randomised control trial. Randomised control trials randomly divide subjects into two separate groups. One group of subjects involves taking or using the new drug while the other group is a control group – where they either don't receive any treatment at all – placebo – which appears to be the treatment but has no active ingredient or the standard treatment available at the time of the trial. The two groups are randomly allocated to ensure the effects shown in a trial are the results of the drug itself rather than other factors such as age, lifestyle choices, environment, or gender. To make sure that effects are not boosted or impeded by the patient or the investigator knowing which treatment they are receiving, trials are generally blinded. Where possible the researchers and treating doctors, nurses and pharmacists are also blinded so no one knows what treatment the subject is receiving until the results are collated. Once the drug completes phase III successfully, it generally gets approved for sale and the product is launched. The duration of Phase III trials vary from two to four years. The cost of these trials is in the tens to hundreds of millions of dollars.

Once successful testing has been conducted, a company will file for a New Drug Approval (NDA) to obtain registrations for sale of the drug. Sufficient evidence needs to be provided to the regulator to establish the drug is safe and effective, the benefits outweigh the risks and the proposed labelling is appropriate. Truckloads of data is provided to the regulator to support the drug claims and it can take them one to two years to process before an approval is provided.

But testing does not stop even once a drug has received regulatory approval (market authorisation). This is when phase IV begins. This is the final safety measure (on going market surveillance trials) on a drug and focuses on the long-term effects, potential use for treatment in other conditions, compare/combine it with other treatments available or new populations for use eg paediatrics. These studies generally involve a wider population receiving the drug. Even after a drug is approved, it remains under expert surveillance. All side effects observed in patients taking a drug must be recorded and listed in the package insert.

Once a pharmaceutical has been approved and marketed, it inevitably becomes a trusted treatment option for a condition or disease it was proven to help for years to come. In contrast, cosmetic manufacturers/brand owners 'turnover' products at a rapid rate in order to stay ahead of competitors, satisfy the latest trends and to meet consumer demand. The definitions of drug and cosmetic are clearly defined, but cosmetic marketers are continually crossing the line, misleading and being deceptive with the use of pseudoscience and 'puffery'. If a company wants to market or promote a product with drug claims as if the product is approved as a drug, then they should consider carrying out appropriate testing using legitimate, controlled studies that are appropriately powered to assess their product to prove their claim and published in peer reviewed journals. Whilst drug regulations are extremely strict and scrutinised and cosmetic regulations are unscrutinised, maybe the time has come for regulators to consider creating another category for such products that want to make pharmaceutical type claims but don't fit specifically into either category but have strict and specific criteria somewhere in between a drug and a cosmetic, but the product is regulated by the TGA. This may be desirable path for some but not an option for most. Be careful what you wish for.

# the overdose

by Rebecca Akhyani

In an attempt to create a perfume of innovative new character a perfumer may try adding one material at a level much higher than was previously accepted. This practice of overdosing a material has led to the creation of numerous classic perfumes.

The classic example of an overdose is found in one the most classic of perfumes, Chanel no.5. As with all things surrounding Gabriel Chanel, rumour and mystery abound while the truth may never be fully known. Was the overdose of aldehyde in Chanel no.5 a happy accident or the work of genius? The straight-chain aliphatic aldehydes, simply known as the Aldehydes in perfumery, make up a group of fragrance materials with an intense and waxy character. They exist in abundance in nature in the essential oils of citrus fruits, herbs and even flowers in trace amounts. And since the beginning of modern perfumery aldehydes have been incorporated into fragrances as material in their own right. One theory which persists is that when compounding Chanel no.5 the perfumer, Ernest Beaux, accidentally used a dilution of Aldehyde C11 which was 10 times the intended strength. The resulting effect was one which pleased both the perfumer and his client. Chanel no.5 became the archetype for an entire family of fragrances known as the floral aldehydes.

In Davidoff's Cool Water for Men, an epitome of masculine fragrance, we find the overdose of the material Dihydromyrcenol. This material has a very fresh character with herbal and citrus-lime facets as well as a slight metallic aspect, making it an ideal enhancement to the Fougere/Aromatic accord which is based around the combination of lavender and citrus. Dihydromyrcenol became increasingly popular in the 1970's and 80's making it synonymous with masculine scents of that era. It was used at ever increasing amounts, with Cool Water topping the charts at approximately 20% Dihydromyrcenol.

The Gourmand trend in perfumery is said to have taken off after the resounding success of Thierry Mugler's Angel, a perfume based on fairy floss, chocolate and treats of the fairground. However, the overdose in this perfume is not the vanilla or the caramel, it is in fact an overdose of patchouli, approximately 30%, which the perfumer added to balance the sweet notes and add sensuality. The patchouli also represents the sawdust and earthy aspects of a fairground.

Baby Doll by Yves Saint Laurent is another great example of the overdose. This perfume pairs rose with black currant to give a youthful fruity floral. Baby Doll uses around 7% of the Firmenich specialty Cassis Base 345B, which is a berry-like, green, fruity, floral compound resembling black currant buds and tropical fruits. The note remains incredibly popular today and is the jumping off point for floral and Chypre fragrances such as Twilly by Hermes, Gabrielle by Chanel and Si by Armani.

Rose oxide is a fragrance material with a metallic green note which adds a distinct rose character to perfumes. In the 2007 perfume Chloe it is both overdosed and combined with a strong aquatic accord to create a modern classic, a genuine reinvention of the rose.

In 1990 Martin Gras of Dragoco writes about the overdose of Ambroxan, beginning to be used at levels around 1%. Today, and very much in keeping with the woody-amber trend we are seeing this smooth, masculine amber note being used at levels of up to 7%.

# **popular** food packaging making a **big** footprint in the cosmetics **space**

by Steve Welsh

Pouches have been used in the food industry for many years but are now making a major impact within the beauty industry. Recently improved technology and clever designs are meaning that pouches have become a great alternative from standard cosmetic packaging applications.

At Weltrade Packaging we assess any packaging to a number of key performance indicators to make sure we can:

1 Have the confidence to sell you a great alternative, backed up with our service that we are trusted for.

2 Meets your safety needs for the package.

3 Packaging that will give you great presence to help boost sales.

We are all in the numbers game, looking to sell more units and thus helping you build your brand.

This month, we wanted to explain pouch applications for the cosmetics space and what the benefits are for your consumers and for your brand. There are many reasons to use a pouch for packaging but the four main benefits for the consumer are:

1 **Safety:** Pouches are safe, virtually unbreakable, so there is no risk of them causing injury and are highly visible if they have been tampered with prior to purchase.

2 **Convenience:** Light weight yet robust they are easy to use, easy to transport, easy to pour, and you can have transparent windows to tell the consumer when they need to buy more.

3 **Shelf life:** When your product is stored in a pouch it has a built-in oxygen, moisture and light barrier, meaning as a consumer you have confidence to know the product is safe fresh and hygienic. Furthermore, our pouches can have a zipper which can be re-sealed to keep the product fresh.

4 **Disposal:** Easy to use and easy to dispose, contents can be squeezed out and when emptied, they fold down meaning little space is lost in disposal.

While these are great for the consumer, as a brand the benefits come to you in three ways:

1 **Safety:** The primary purpose of any packaging is maintaining the safety of your product from the packing date to the date the consumer has finished using it. With pouches there is no glass

which means there is a low possibility of leaking. Pouches are sealed at the time of filling meaning if tampered with after it leaves your controls it is readily noticeable.

2 **Light Weight:** Being an extremely light weight option for packaging, the energy used to store and transport is very low. Not only great for the environment but really cost effective too. Whether you distribute your products via post, courier or general freight, the savings will help your bottom line.

3 **Design Capabilities:** It has to look good, right? This boosts sales. With the range of decoration options available, gloss or matte, view window, screen printing, labelling, matte inks, styles for shelf presence and many more, the design capabilities available for pouches have never been so high.

In the past, you use to have to order a minimum of 30,000 units, but now Weltrade Packaging can supply as little as 5000 or 10,000 units per print.

Whether it's a sample or a retail pack that you are to looking package, consider a pouch. Yes, there is a myriad of options but our trusted team will guide you through the best material, and design options open to you to make sure your next packaging selection will work for you.

As always reach out on 07 5597 0102 or info@weltradepackaging.com.au we love to discuss your packaging needs.

**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.

eurofins | Dermatest

## STEPS

**1. Paracentrotus lividus**

**2. Seriatopora hystrix**

Eurofins Dermatest Pty Ltd
20 - 22 King St
Rockdale NSW Australia
ph 61 2 9556 2601
info@dermatest.com.au
www.dermatest.com.au

# No. 30 Reef Safe Sunscreen

The **toxicity** and the **biodegradability** of a substance are the two main characteristics needed to be studied in order to confirm lack of impact impact of a substance or a product on the marine ecosystems. Adding to a toxicity tests, the ecotoxicity assays and the biodegradability parameter give more details regarding a product, such as a sunscreen, which has the potential to end up in the up environment.

## Ecotoxicity Tests in Marine Environment

- Marine Algae *(Phaeodactylum tricornutum):* NF EN ISO 10253
- Crusteceans copepods *(Acar3a tonsa):* FD ISO 14669
- Crusteceans *(Artemia salina):* from FD ISO 14669
- Amphipods *(Corophium arenarium):* NF ISO 16712
- Bacteria *(Vibrio fischeri):* NF EN ISO 11348-3
- Bivalves *(Oysters: Crassostrea gigas):* NF ISO 17244
- Echinoids *(Paracentrotus lividus):* from EPA 1008 Purple urchin
- Coral test *(Seriatopora hystrix):* Intern Method

## Biodegradability Tests

There are a number of these to choose from and at least one should be considered …

- **OECD 301** Readily biodegradability:
- **OECD 301A:** DOC Die-Away
- **OECD 301B:** CO2 Evoluton (Modified Sturm Test)
- **OECD 301D:** Closed Bôle
- **OECD 301F:** Manometric Respirometry
- **OECD 302** Inherent Biodegradability:
- **OECD 302B:** Zahn-Wellens/ EVPA Test

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

# TroyCare™

TROY
Personal Care

*...a beautiful beginning*

*The Natural Choice for Antimicrobial Protection*

TROY
The Gold Standard for Performance

## *TroyCare™ LSB*

Introducing TroyCare™ LSB, an organic acid based preservative solution offering safer broad-spectrum protection. Effective across a wider pH range than other organics, TroyCare™ LSB is a series of low color, odorless preservatives for use in even the mildest end-use products. Combined with the portfolio of TroyCare™ Customized Preservative Solutions, Troy offers formulators a full range of protection options.

Visit us at **troycare.com**
info.anz@troycorp.com

CONCEPT
Exclusive Australian Distributor
sales@conceptchemical.com.au

# sunscreen highlights

by John Staton

# Cost effective sunscreen product development

Test costs associated with sunscreen product development can be significant. Set out below is a flow path that is usually the most cost-effective approach to this multi-step process. This plots the product development path through each of the necessary steps. It should assist formulators as well as anyone who is approaching a project in this area of new product development. Fig 1. below is the flow chart recommended for the process.

**Proposed Formulation:** An estimation of both SPF and Broad Spectrum performance can be calculated on line by accessing one of several sites which allw calculation of bboth of these values, based on the concentrations of the combined actives. [1], [2].

**Stability Challenge – Cycling:** Starting with the formulation itself, it is good practice to conduct short-term stability testing before even submitting a sample for SPF efficacy testing. At the very least, temperature looping, that is, cycles of 40°C to 4°C should be conducted. It is not uncommon to see samples arrive for testing with obvious instability issues, the most common of these being broken emulsions or crystals of active/s present in the product.

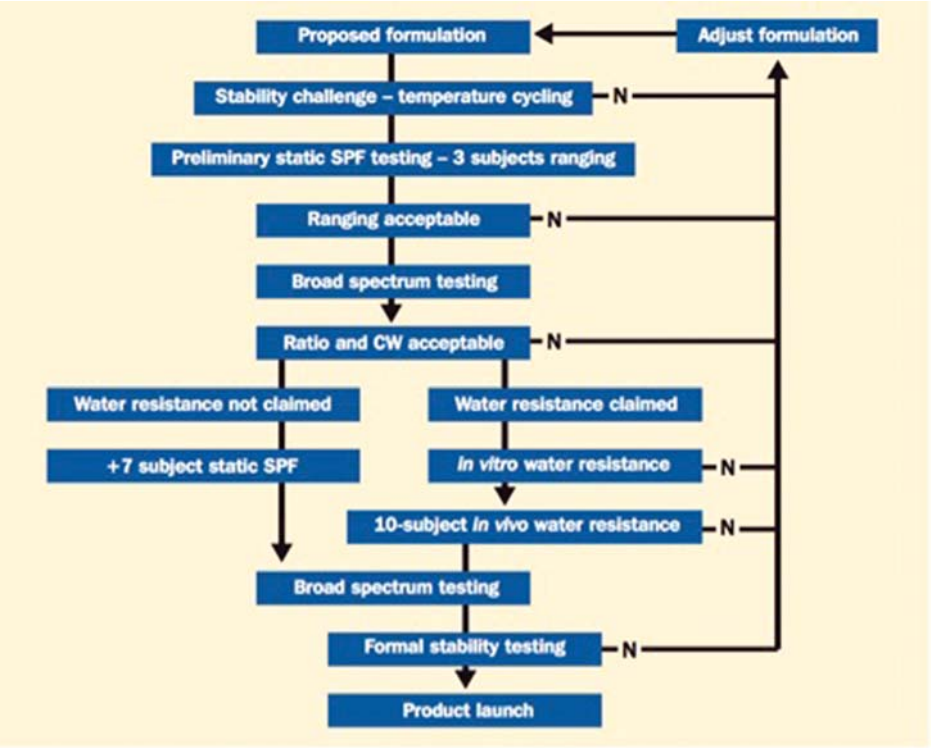
**Preliminary Static SPF Testing:** Resist the temptation to run SPF testing beyond preliminary test subject numbers before conducting a broad spectrum (UVA) test, as there will be not only disappointment but also wasted costs if the SPF test is competed to a full 10 subject panel, only then to discover that the formulation fails this less expensive and much more rapid turn around in vitro test.

If the formulation makes it past these first three hurdles, then more intensive stability testing should be initiated.

**SPF Ranging Acceptance:** The preliminary SPF results should be reviewed at this point, taking into consideration that…

a. there should be at least three consecutive results showing consistency in the SPF number.
b. the final mean SPF should be +/- no more that around 10% of valid preliminary data.

**Broad Spectrum Testing (ISO 24443):** This requires the measured SPF value achieved to date and is not valid if



based only on expected and unmeasured number. As it needs the static and not water resistant SPF value, there is no need to conduct water resistance testing up to this point.

**Ratio and Critical Wavelength Results:** These are extrapolated from the broad spectrum scan, between 290 nm and 400 nm and are required values for compliance with the Broad Spectrum

**Water Resistance is to be Claimed:** If this claim is required, then, it is necessary to consider which markets the product is targeted for. If only for Australia, then there is no need to complete any more static testing. However, many other markets require concurrent static and water resistant testing, so both must now be run in parallel to complete the required minimum 10.

**Broad Spectrum Testing based on full SPF test Completion:** The results for measurement of this earlier in the development path should be very close to these values. Most often, it is not necessary to repeat the ISO 24443 test a second time as the result should closely match and a small recalculation of earlier results often suffices.

**Formal Stability Testing:** The protocol for this will be dependent on both regulatory and specific company requirements. Typically, it will be more detailed for therapeutic than for cosmetic sunscreens. As this step involves by far the most costs, the steps above should be covered off before this too far advanced.

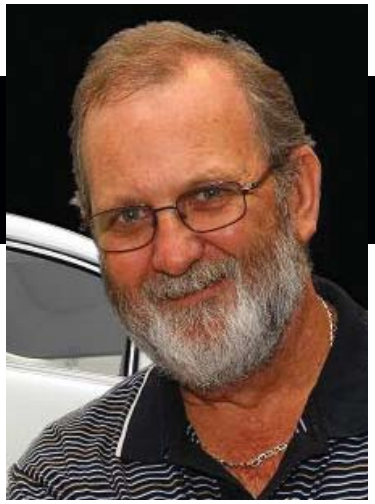
**Product Launch:** The risks of distribution of product prior to this are obvious, but with all boxes ticked, it is time to go to market!

## References


1 https://www.sunscreensimulator.basf.com/Sunscreen_Simulator/Login_show.action

2 https://www.sunscreen-optimizer.com/

3 ISO 24443: Determination of Sunscreen UVA Protection in-vitro



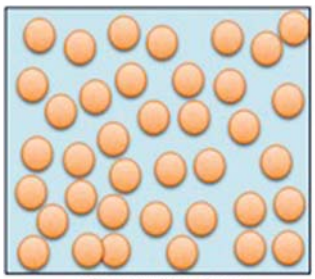
## Part 41 –

by Ric Williams

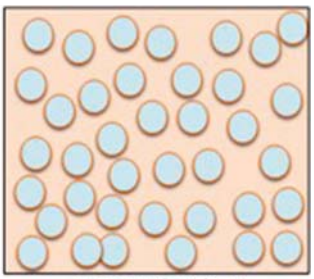
# Formulation

### Emulsion Type

While this seems to be of minor importance some specific conditions exist.



Oil-in-Water Emulsion



Water-in-Oil Emulsion

For **oil-in-water emulsions** the stability (as mentioned earlier) plays a more major part with unstable oil-in-water emulsions being better penetrators, particularly where lipophilic drugs are used.

It has been found that for hydrophilic drugs increased absorption is achieved from very stable **water-in-oil emulsions**, provided the internal phase has very small micellar structure. This is probably due to the ionic nature of the drug being shielded from the ionic character of the surfactants in the intercellular channel thereby reducing the tendency for the drug to be trapped in the stratum corneum. It also assists when the drug must pass through the lipid layers deeper in the skin.

For lipophilic drugs very stable water-in-oil emulsions seem to be better for sunscreens in that they stay on the surface and do not penetrate readily. More unstable water-in-oil emulsions are better in aiding penetration.

It is unfortunate that most water-in-oil emulsions are not aesthetically pleasing being more a "greasy" feel.

To overcome this **multiple emulsions** are used.

Water-in-Oil-in-Water Emulsion

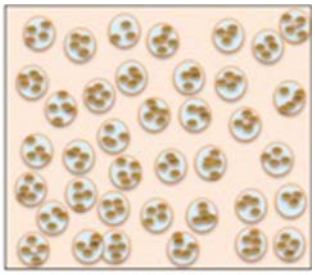
Water-in-Oil-in-Water multiple emulsions are also used where two hydrophilic drugs are required which may be incompatible with each other eg where one is acidic and the other basic or different pH's are required for stability of each. Here one is dissolved in the internal water phase and the other dissolved in the external water phase with the interlaying oil phase protecting one from the other. Nonionic emulsifiers must be used and one generally makes the internal water-in-oil phase very stable with the oil-in-water combination being somewhat less stable. Water-in-oil-in-water emulsions have the dual benefit of containing a very small micellar structure of a water-in-oil emulsion with the

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.

more aestheticically pleasing feel of an aqueous phase as the external phase.

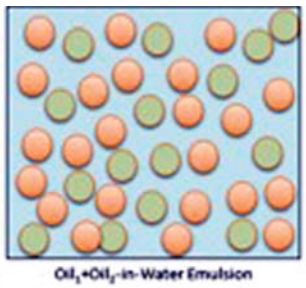
Although the two oil phases can be the same, only containing different incompatible actives, Oil-in-Water-in-Oil emulsions are generally where the internal oil phase is different to the external oil phase, in that the internal oil phase contains an emollient or drug that is susceptible to oxidation, while the external oil phase is a light pleasant oil that has a nice feel on the skin.

Oil-in-Water-in-Oil Emulsion



$Oil_2$-in-Water-in-$Oil_1$ Emulsion

Another form of multiple emulsion is where you have two separate discreet oil phases emulsified into the one aqueous external phases.



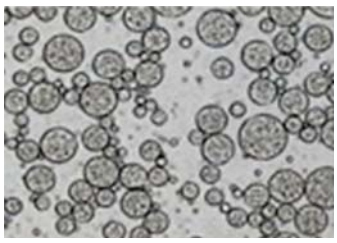
$Oil_1$+$Oil_2$-in-Water Emulsion

Still further examples of Multiple Emulsions are:

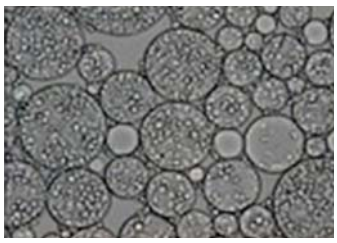
A Where this photomicrograph is an example of an oil-in-oil-in-oil emulsion (O/O/O) comprising Castor Oil – in – Silicone – in – Castor Oil

B Where this photomicrograph is an example of an oil-in-oil-in-water emulsion (O/O/W) comprising Castor Oil – in – Silicone – in – Water

**A**



**B**



## pH

Skin has a normal pH of about 5.5 so what does "pH balanced" mean. To maintain skin that is pH 5.5 (normal balance) you should not add any product that is either acidic or alkaline, ie use a pH of 7.0 to maintain the balance.

Skin that is oily has a pH of less than 5.5 (down to pH 4.0), due to high levels of skin's fatty acids with pH of 4 being the pH of pure skin's fatty acids, and hence requires something with a pH which is slightly alkaline to raise the pH back to 5.5

Skin that is dry has a pH of more than 5.5 (up to pH 7.0), due to low levels of skin's fatty acids with pH of 7.0 having no fatty acids, and hence requires something with a pH which is slightly acidic to lower the pH back to 5.5

pH values should differ with product type.

| | | |
|---|---|---|
| Cleansers | 7 – 9 | to assist the removal of fats and oils |
| Toners | 3 – 5 | to counteract the cleanser |
| Moisturisers for Dry Skin | 4 – 6.5 | (see above) |
| Moisturisers for Normal skin | 6.5 – 7.5 | (see above) |
| Moisturisers for Oily skin | 7.5 – 8.5 | (see above) |

While this is the theory on non-active product usage when you come to look at skin delivery/penetration it is best to select a pH where the water-soluble "drug" is in its neutral form, that is, no ionic form of the drug should be available, hence avoid the polarity problem mentioned earlier.

## Surfactants (Emulsifiers)

### Soaps

Originally Soap was the first emulsifier used. Sodium Stearate however has some major drawbacks. It is somewhat insoluble actually causing the product to gel at levels above 5% (Note; 8% is used to solidify products such as deodorant sticks), it has low oil carrying capacity and it is only effective in alkaline conditions (otherwise it hydrolyses back to the fatty acid).

Later Triethanolamine Stearate was used proving to be more soluble and hence higher levels could be used (also increasing the oil carrying capacity). The pH was also lower but still in the mild alkaline region for best stability.

Modern soaps recommended are from vegetable/organic origin eg. Sodium Palm Kernalate, Sodium Olivate.

### Anionic Surfactants derived from Fatty Alcohols

***With Sulfation*** *eg Alkyl Sulphates eg. Sodium Lauryl Sulfate, Sodium Coco Sulfate and Ammonium Lauryl Sulfate, Alkyl Benzene Sulfonates eg. Sodium Alkene Benzene Sulfonate, Alkyl Ether Sulphates eg. Sodium Laureth Sulphate, Ammonium Laureth Sulphate*

***Without Sulfation*** *eg. Sodium Stearoyl Glutamate, Sodium Cocoyl Glutamate, Sodium Stearoyl Lactylate, Sodium Lauroyl Lactylate, Sodium Cocoamphoacetate, Fatty Acid Sulfosuccinates, Fatty Acid Isethionates, Acyl Sarcosinates, Methyl Acyl Taurides.*

With the advent of synthetic surfactants in the 1950s Sodium Lauryl Sulfate was used (Aqueous Cream BP) although the use of Sodium Lauryl Sulfate provides such stable emulsions that they do not absorb into the skin readily. Sodium Lauryl Sulfate, or it's analogues, are best used for

cleansers or sunscreens that you do want to absorb into skin. pH was also lower with an ideal range of 5.5 to 8, lower than 5.5 hydrolysis occurs with loss of emulsification power.

### Alkylglucosides

*eg. Decyl Glucoside, Lauryl Glucoside, Cetearyl Glucoside, Sucrose Cocoate, Sucrose Stearate. Protein Derived Anionics eg. Cetearyl Wheat Straw Glycosides, Potassium Palmitoyl Hydrolyzed Wheat Protein, Potassium Lauroyl Wheat Amino Acids*

Modern anionic type surfactants with many good emulsification properties (less effective than anionics) but mainly used due to their "natural" character.

### Cationics

eg. Cetrimide, Distearyldimethyl Ammonium Chloride, Benzalkonium Chloride, Benzethonium Chloride, Cocodimonium Hydroxypropyl Hydrolyzed Wheat Protein, PCA Ethyl Cocoyl Arginate,

Cationics have been used to a minor extent particularly where the additional benefits of antiseptic efficacy is desired. These have not had widespread acceptance due to their poor stability profile, cationic surfactants being poor emulsifiers. The BP lists Cetrimide Cream BP. Still they are substantive to skin and may assist in holding the drug on the skin to aid absorption.

### Nonionics

Ethoxylated Nonionics eg. Laureth-8, Ceteareth-20, PEG-400

Polysorbates eg. Polysorbate 20

Sorbitan Esters eg. Sorbitan Stearate

Later the use of Cetomacrogol 1000 (or now called Ceteareth-20) or ICI's extensive development of ethoxylated fatty alcohols and Sorbitan derivatives allowed nonionic emulsions to be formed having a wide range of pH values, excellent penetration characteristics and a vast range of applications (from Water-in-Oil emulsions to Wetting Agents to Oil-in-Water emulsions to Solubilised Oil Phases depending on the Hydrophilic-Lipophilic Balance (HLB) chosen). The BP contains formulations for Cetomacrogol Cream BP and Sorbolene Cream BP.

### Condensation products

eg. Brassicyl Isoleucinate Esylate, Cetearyl Olivate, Sorbitan Olivate, Cocoyl Proline, Glyceryl Laurate, Polyglyceryl-2 Dipolyhydroxystearate

Modern nonionic type surfactants with many good emulsification properties but mainly used due to their "natural" character.

### Glyceryl Esters of Fatty Acids

eg. Glyceryl Mono Stearate, Glyceryl Distearate, Ethylene Glycol Distearate

Primarily used as co-emulsifiers in Oil-in-Water emulsions or primary emulsifiers in Water-in-Oil emilsions. Stability varies hence the HLB of the surfactant blend must be carefully calculated in order to provide the correct emulsification.

### Lecithin and Lecithin derivatives

Lecithin, Ceramides, Sphingolipids and Phospholipids (that are used in the formulation of Liposomes) that are used as co-emulsifiers, stabilizing most emulsions.

### Inulin and Inulin derivatives

Eg. Inulin Lauryl Carbamate – a non-ionic, polymeric-based surfactant system derived from chicory inulin.

It can be used as an emulsion stabiliser for o/w emulsions, as a dispersant for hydrophobic particles (Zinc Oxide and Titanium Dioxide) and in the production of foams.

### Emollients

The basic structure of an emulsion is well known but the selection of emulsifiers and lately the selection of the emollient are undergoing much closer scrutiny.

Again early emulsions, reported in such august publications as the British Parmacopoeia, used an emollient phase based on Paraffin Liquid (or Mineral Oil), Petrolatum and Paraffin Wax. These are extremely stable (being predominantly alkanes) but the penetration is very poor, because they are these large stable molecules. Moisture barrier, cleansing, low cost extender, oily feel, available over a wide viscosity range. Viscosity ranges from very thin oils to petrolatum (paste like) to the high melting point waxes (candle wax). The oils are used as emollients (higher quantities of lighter oils are used in skin cleansing systems as the lighter oils are considered drying when used alone, while dissolving skin borne oils), petrolatum as a greasy protectant (in barrier creams or night creams) or ointment base and wax is used in creams as a thickener or lip care a stick base.

Vegetable oils became popular, particularly during the 70s with the push towards so-called "Natural" materials.

Natural Triglycerides (Oils) – Mostly plant origin now (Almond, Apricot, Argan, Avocado, Canola, Jojoba, Linseed, Olive, Peanut (or Arachis), Rice Bran, Rosehip, Sesame and Sunflower Oils) although animal origin (Lard, Tallow and Mink Oil) and fish origin (Cod Liver Oil, Shark Liver Oil (Squalene), as well as other fish oils) have been used. They are moisturisers, feel modifiers, viscosity modifiers and provide "natural" ingredient listing on the label.

Natural Triglycerides (Waxes) – Beeswax, Ceresin wax, Candelilla Wax and Castor Wax are used in oil based sticks to create the solid base. Beeswax is also used extensively in skin care creams as a skin feel component and thickener.

Still the vegetable oils, although offering a slight

improvement in absorption (probably because they were more compatible with the triglycerides found in the skin lipids), were still quite slow to absorb.

Jojoba Oil is an interesting emollient, used as a replacement for whale oil and its derivatives. What's interesting about it is that it isn't actually an oil, but rather what they call a wax ester. Why do we care? Because out of all of the compounds in nature, this wax ester is the most similar to human skin oil (sebum). It is theorized that applying jojoba to the skin can "trick" the skin into thinking it is producing enough oil, thus balancing oil production. Another benefit for us is that jojoba oil is non-comedogenic.

Lanolin & Lanolin Derivatives – are non-harmful animal origin, obtained by rinsing the wool grease from the cut sheep's wool clip. This extraction process is conducted anyway to purify the wool before conversion into cloth and the use of the by product (lanolin) has been going on for centuries. Its effect on skin is very similar to human skin sebum and has additional benefits of containing some cholesterols (moisturising), Ergosterin (Provitamin D) and about 14% of Lanolin Alpha Hydroxy Acids.

It's uses are as natural moisturisers, penetrating conditioners, emulsifiers and stabilisers, spreading agents, co-solvents, lubricants, pigment wetters, solublisers as well as cutting the greasy feel of other materials, with the derivatives providing specialised skin effects.

Its major advantage is that it absorbs four times its own weight in water hence its excellent moisturizing ability.

An interesting oil, finding its way into some formulations, is Emu Oil. Due to Emu Oil's lack of phospholipids it appears to be an excellent oil for skin penetration, and as an anti-inflammatory commonly used in preparations for arthritis.

Aliphatic Alcohols eg. Cetyl Alcohol, Stearyl Alcohol – generally of plant origin, providing a moisture barrier, film formation, while providing velvety feel and slip. Combinations provide mechanism for viscosity control. These do little for absorption only used for their ability as co-emulsifiers or for their consistency contributing factor.

Fatty Acids eg. Stearic Acid, Myristic Acid are typical soap formers with alkalis (to form cleansers or emulsifiers), by themselves provide "vanishing" properties, moisture barriers and pearlising effect. Combinations with aliphatic aclohols provide mechanism for viscosity control.

Omega 3 And Omega 6 Fatty Acids (sometimes referred to as Vitamin F, although they are not strictly vitamins) are fatty acids with 18 carbon atoms in the chain and double bonds between the third and fourth carbons or the sixth and seventh carbons, respectively. Omega 3 And Omega 6 Fatty Acids cannot be synthesized by the body hence a dietary intake of oils such as fish oil, etc. are essential in supplying these compounds.

Synthetic Esters eg. Decyl Oleate, Octyl Palmitate

Synthetic, Moisture barrier, penetrating conditioner, dry feel, spreading agent.

Isopropyl Esters eg. Isopropyl Myristate, Isopropyl Palmitate

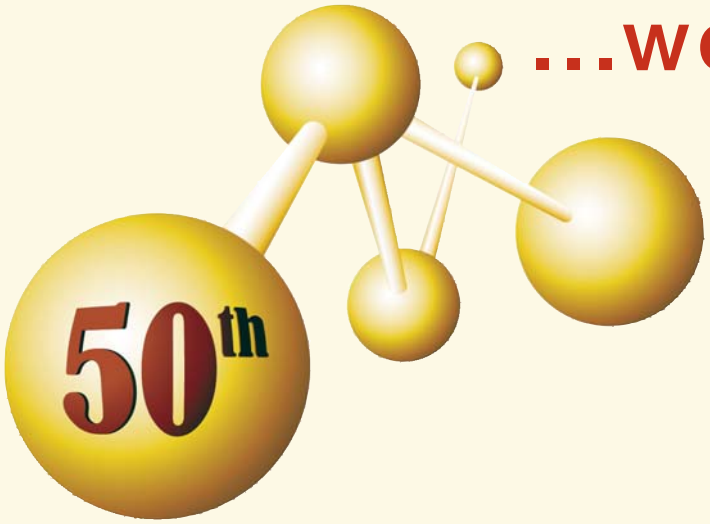
Synthetic, Moisture barrier, penetrating conditioner, dry feel, spreading agent.

The 60s and 70s saw the expansion of synthetic esters (condensation products made from short chain fatty acids with short chain fatty alcohols, a typical example would be Decyl Oleate). The widespread use of Isopropyl Myristate and Isopropyl Palmitate in the 70s was halted recently with the discovery that they implicated in the formation of adult acne (ie are comedogenic materials). Still, it must be said that not all synthetic esters are comedogenic, but it can also be said that they offer the cosmetic chemists a vast array of options to affect the percutaneous absorption of cosmetic products. For those who wish to pursue this area I will refer you to an award winning paper by Dr Johann Weichers (of Uniqema Holland) titled "Formulating for Efficacy" where he outlines a procedure for selection of water phase and oil phase in relationship to drug type, for best efficacy.

When considering emollients, it is known that short chain emollients (lower molecular weight oils) and straight chain emollients have better absorption characteristics than longer chain or branched chain emollients. Emollients that are polyunsaturated also seem to have better penetration characteristics than unsaturated emollients. If they have better penetration characteristics they also seem to assist with drug delivery.

*Next issue is Part 4 of Drug Delivery from Cosmetic Emulsions – Percutaneous Absorption Enhancers*

# ...work and play at 50th Conference




Ray Townsend presenting the first 50 Years of the ASCC

Kate Paulette

Gordana Gacic with Tasha Grima


Curtis Crasto with Perry Romanowski

Brian Eccesfield and Jane Tervooren, Princeton Consumer Research

L-R David Koehl, Global Business Manager, Troy Corporation Gerard Velayuthen CFO, Marten Hauville CEO Concept, Simon and Hannah – Concept, Matthew Thomas – Troy Corporation

L-R John Staton, Matthew Quigley, Joey Tan, George Orban and Jennifer Wan, Eurofins


Brenntag Stand

Who do you think this characterteur is of? See Page 55

Helen Pearce accepting the Lester Conrad Award for Emily Holt from Perry Romanowski


Johnathan Coeur, Coptis with Ric Williams

L-R Sanaz Zahiri Synergie, Giz Travers Trapeze and Zoe Kontogiannis Synergie Skin


Ingredients Plus Stand winner of the “Best Stand Award”

Giz Travers just out of hospital… You can’t keep a good gal down

L-R Sitanun Rattanavattanathorn (Jan), Jo George, Sunny Ankulkar, Nopparat Pornrattanapitak (Nui), Natalia Allam and Kiersten Olsen

John Warby accepting his Life Membership from Robert McPherson, ASCC President

L-R Anna Trinidad-Nicolas, Paul Castles, Sharon Morse-Greene, Armelle Sebbag, Vivianne Wu, Rachel Finch, Avenir


Back Row L-R Eliza Garton, Andrew Alchin,Steve Morris, Ronnie Srour, Simon Penhaligan. Front Row: Vanessa Cordina and Christopher Yeap


Paul Castles “dressing” Timm Zabel, Dr Straetmans GmbH

Francesca Cradduck accepting the Peter Strasser Award from ASCC President Robert McPherson and Valentine Guillet

Winner receiving the Concept Chemicals prize from Marten Hauville

Brian Eccesfield with Lucia Sermetz Szyszko

# Laser Spectroscopy for Suncare Applications:

## Tracking the Photostability of Avobenzone with Sunscreen Filters and Emollients in Real Time

**by Emily L. Holt[1,2], Michael D. Horbury[2], Michael Staniforth[2], Juan Cebrián[3], Laurent A. Blasco[4], Vasilios G. Stavros[2]**

[1] Molecular Analytical Science Centre for Doctoral Training, University of Warwick, Coventry, CV4 7AL, UK

[2] Department of Chemistry, University of Warwick, Gibbet Hill Road, Coventry, CV4 7AL, UK

[3] Lipotec SAU, Calle Isaac Peral, 17 Pol. Ind. Camí Ral, 08850 Barcelona, Spain

[4] Lubrizol Advanced Materials Inc, 9911 Brecksville Rd, Brecksville, OH, 44141, USA

Avobenzone (INCI: butyl methoxydibenzoylmethane) is commonly included within sunscreen formulations to provide broadband UVA protection to consumers. This ingredient is known to be photounstable and has gained notoriety for its complex photochemistry, which is induced upon exposure to ultraviolet (UV) light. This incident radiation can cause photoproducts of avobenzone to form; these new structures are unable to absorb UVA radiation as efficiently, thus the efficacy of a formulation is decreased. The present collaborative study between the University of Warwick and Lubrizol Advanced Materials seeks to enhance the understanding of what causes instability of sunscreen constituents on a molecular level, with avobenzone as the focus. The premise is to inform the design of more photostable sunscreens via a bespoke spectroscopy approach.

The laser spectroscopy method used for this study has been utilised previously to explore the photoprotection properties of a wide range of sunscreen filters in isolation: benzophenone-3 and octocrylene being prominent examples[1,2]. This collaboration extends this work by combining avobenzone with such UV filters and emollients in solution, to determine the influence upon its photostability at different temperatures from the instant that radiation is absorbed. A so-called "bottom up" approach is implemented; starting with simple mixtures, the complexity of the avobenzone solutions is gradually increased, to determine the effect of the additional component on the photostability of avobenzone. Our industrial and academic partnership also seeks to understand how these laser methods can be applicable for commercial sunscreen development, including whether it may offer a more accurate, precise and quantitative tool for evaluating sun protection factors (SPFs).

## Ultrafast Laser Spectroscopy

Ultrafast transient (UV-visible) electronic absorption spectroscopy (TEAS) is the full name of the analytical method used herein, which is being explored as a new approach for improving the SPF and UVA ratings of a sunscreen product. TEAS essentially enables the user to obtain a time- and temperature-resolved UV-visible spectrum of sunscreen molecules in their excited state (the state reached upon absorption of solar radiation).

A brief introduction to the technique is as follows: the technique simulates exposure to solar radiation by using an ultraviolet laser pulse, known as the pump pulse, to photoexcite sunscreen constituents in the sample as they flow through a heated sample cell. Then, relative to the pump pulse, a time-delayed ($\Delta t$) probe pulse passes through the sample; its role is to measure the difference in absorption (in mDOD, where OD denotes optical density) between the pumped (photoexcited) and unpumped (not photoexcited) samples. A visual representation of the pump and probe pulses arriving at the sample cell is given in Figure 1. The time delay is varied between each measurement, and a difference spectrum is collected at each time delay after sample has been replenished. Difference spectra can then

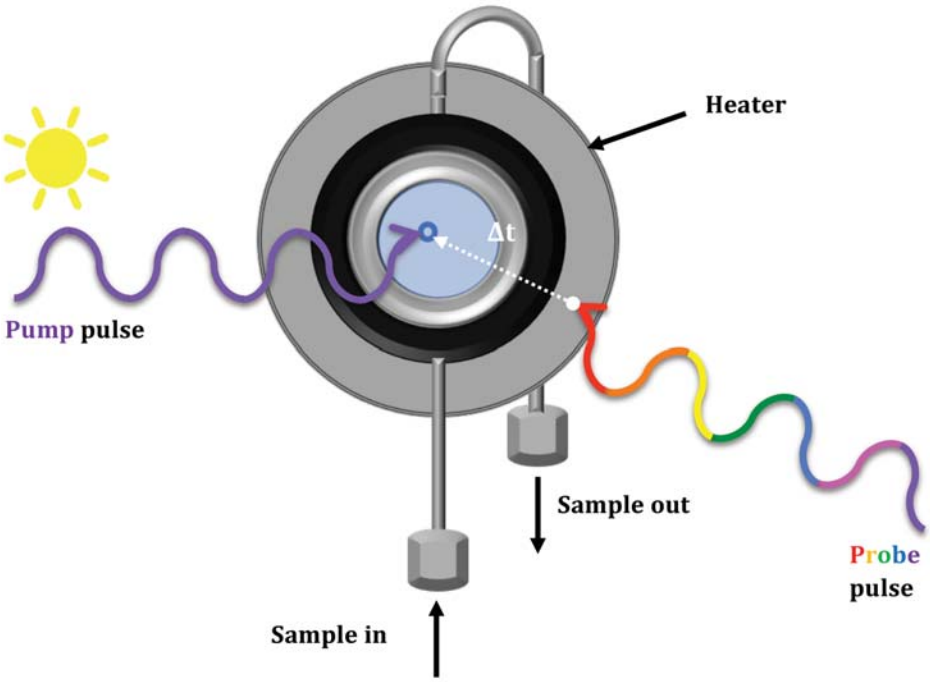



Figure 1: Schematic of the heated flow-through sample cell that is used for the time- and temperature-resolved ultrafast spectroscopy experiments. The pump and probe pulses (as labelled) arrive at the sample cell at a defined time delay (0 ≤ Δt ≤ 2 ns) from one another.

be collated, which essentially gives a relaxation profile of the molecule as it evolves over time (this evolution over time is termed *dynamics*). Such difference spectra are both a function of wavelength (330 – 675 nm) and time (0-2 nanoseconds (2 x $10^{-9}$ s, or 2 ns)). The short pulse widths of the pump and probe pulses facilitate time-resolution on the order of femtoseconds (10-15 s, or fs); this capability is used to its full advantage to observe the photoprotection mechanisms on a molecular level occurring within the avobenzone mixtures tested, in real-time.

A selection of TEAS spectra of octocrylene, obtained by this pump-probe technique with the solution at room temperature, are presented in Figure 2. Octocrylene was chosen because, at least in the photochemical sense, it clearly displays characteristics of an ideal sunscreen filter. The large, positive (+mDOD) feature indicates that a phenomenon known as excited state absorption (ESA) is taking place within the molecule. In context, this means that the octocrylene molecules are absorbing a large quantity of incident UV radiation, which in a formulation would prevent harmful solar rays from causing damage to the skin. Another preferable feature to look for is a rapid decay in signal, which demonstrates that the molecule can dissipate its assimilated energy very quickly away from the skin. A return to baseline signal after 10 picoseconds ($10^{-12}$ s, or ps) indicates that > 99% of the original molecules have returned to their original (ground) state prior to their absorption of light; this is extremely fast for molecules of this type. In a formulation setting, this indicates that this ingredient has not degraded during the relaxation process. Consequently, it can continue to absorb solar wavelengths of light and offer protection to the consumer.

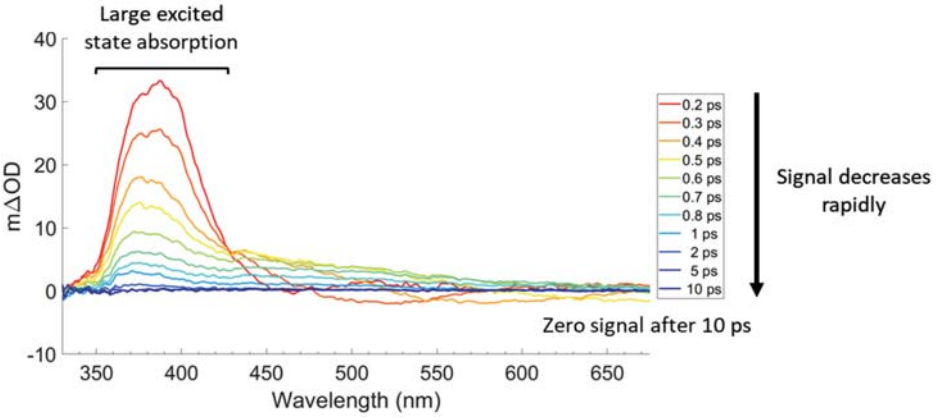



Figure 2: Selected TEAS transients to show the photodynamics of octocrylene at each given time point. Key features of these transients are labelled on the diagram.

The remainder of this paper demonstrates the first temperature-resolved TEAS measurements, which have been introduced to investigate the photochemistry of avobenzone induced at realistic human skin surface temperatures. This entirely new experimental capability allows the dynamics taking place within a sunscreen product upon application to be mimicked more closely and determines the effect of temperature upon the photostability of a sunscreen.

## Experimental

All solutions described in this work were photoexcited with a pump pulse of 350 nm, around the peak absorption of avobenzone. The probe pulse is a broadband white-light pulse spanning the spectral range of 330 – 675 nm. Each experiment was conducted with the temperature set to 40oC, to represent the most extreme value for the skin surface temperature. All solution components (excluding solvents) were suggested and provided by Lubrizol Skin Essentials. The concentration of avobenzone in each solution was 2 mM.

## Results

TEAS spectra collected for this study, along with corresponding mDOD signal traces that are plotted across all wavelengths at a given time point (i.e. difference spectra at significant pump-probe time delays, known herein as *transients*) are available for reference in Figure 3 and in the Appendix (Figures A1 – A2).

## Stage 1: Avobenzone Only

The first proof-of-concept measurements were carried out on two solutions of avobenzone: one in methanol and the other in cyclohexane.

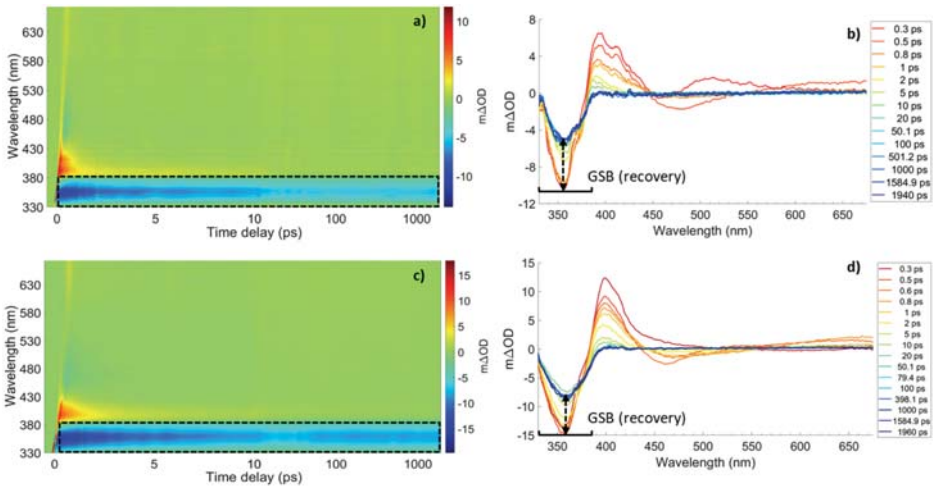



Figure 3: Raw TEAS spectra (false colour heat map) followed by selected transients (vertical slices of heat map) at given time delays for 2 mM avobenzone solution, a), b) in methanol and c), d) in cyclohexane, with the GSB features highlighted.

These solvents were chosen due to their different polarities, being polar and non-polar respectively. In each case, the main feature of interest was the extent of the ground state bleach (GSB) recovery; the most stable UV filters will have a GSB recovery close to 100%, as seen in octocrylene alone (see Figure 2 where the measure signal returns to baseline). The corresponding TEAS spectra obtained are shown in Figure 3.

The GSB recovery (indicated in Figure 3b) at 40°C in cyclohexane was found to be 49%, and the equivalent value in methanol (Figure 3d) was 44%. This suggests that the non-polar environment facilitates a *better* recovery of avobenzone in solution at skin surface temperatures. As a result, for the TEAS measurements that follow, methanol was used as the solvent to determine whether any additional ingredients could improve the initial recovery percentage. For reference, the recovery values were calculated by finding the average percentage change in peak heights between 345 – 360 nm, after pump-probe time delays of 1 ps and 1900 ps in each spectrum.

## Stage 2: Avobenzone with UV Filter

Three mixtures containing avobenzone were tested, the additional UV filters were: octocrylene, ethylhexyl methoxycinnamate (EHMC) and homosalate (shown in this order below).

In each mixture, the ratio for the maximum approved FDA concentrations of each ingredient was preserved. The key results from these experiments are shown in Table 1, with the TEAS data shown in Figure A2.

| Added UV Filter | Ratio AB: Filter (by weight) | GSB recovery |
|---|---|---|
| Octocrylene | 3:10 | 35% |
| EMHC | 3:7.5 | 36% |
| Homosalate | 1:5 | 36% |

Table 1: Key results obtained from TEAS measurements of avobenzone in methanol, in combination with an additional UV filter

In each case, a reduction in the GSB recovery of avobenzone within the mixture was demonstrated (cf. 44% avobenzone in methanol).

One possible explanation for this reduction in avobenzone recovery can be found when the lifetimes of each relaxation mechanism featured within the molecules (given by time constants) are investigated more closely. Each time constant, extracted via kinetic analysis techniques, gives details of the length of time that each 'step' in the overall relaxation mechanism persists for. In these mixtures, the excited state depletion time was between 2 – 3 ps, approximately double the length of the equivalent time constant for avobenzone in methanol alone (calculated separately). This suggests that, due to the slower relaxation of avobenzone to return to the ground state, the molecule is more likely to degrade due to other competing relaxation pathways, thus its stability is compromised. However, and importantly, these results show TEAS to be a promising technique to quantitatively determine photostability. It will therefore be used to carry out further work to ascertain the causes of this increased excited state lifetime. Following this, optimisation will be carried out to find the most photostable sunscreen combination, whilst offering broadband UV protection.

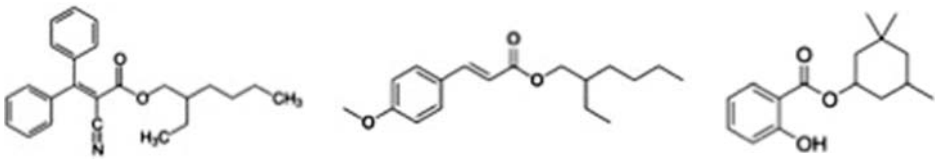
## Stage 3: Avobenzone with UV Filter and Emollient

The next phase was to determine the effect of adding an emollient upon the stability of the least stable mixtures from Stage 2. The emollient chosen was diisopropyl adipate (DIA), and for each of these measurements the solvent environment was 80% w/w methanol to 20% DIA, once again to preserve the maximum safety margin for the emollient in a real formulation. The key results from these experiments are shown in Table 2.

| Added UV Filter | Ratio AB: Filter (by weight) | GSB recovery |
|---|---|---|
| Octocrylene | 3:10 | 34% |
| Homosalate | 1:5 | 37% |

Table 2: Key results obtained from TEAS measurements of avobenzone in methanol and diisopropyl adipate, in combination with an additional UV filter

These results show that the presence of the emollient had little effect upon the photostability of avobenzone when octocrylene or homosalate are present, although a slight improvement was demonstrated in the case of the homosalate mixture. The reason for the slight changes in GSB recovery has been attributed to the mild changes in polarity of the solvent environment. Consequently, DIA maintains the stability of the active ingredients. In



terms of formulation development, this can be considered a success, as this ingredient can be included in products without having concerns about its effect on the UV filters contained within it. Further tests will be carried out on several different emollients to find out whether this finding is consistent; if this is found to be the case, there is great flexibility for the formulator to select the most appropriate components for their sunscreen product.

## Conclusions

This work has successfully demonstrated the capabilities of TEAS as a technique to explore the effects upon the photostability of avobenzone in solution when additional sunscreen ingredients are included, via a "bottom-up" approach. All measurements were conducted at realistic skin surface temperatures, a feature that has not previously been demonstrated, which has been critical for determining the potential photochemistry that occurs once a sunscreen is applied.

At Stage 1, it was shown that a non-polar setting may offer the best environment for avobenzone recovery when the solution is heated. Thereafter, methanol was chosen as the solvent for the next stage, to determine whether the addition of any additional ingredients would improve recovery. The UV filters added at Stage 2 all adversely affected the recovery, with a decrease of around ten percent observed. This was attributed to the increase in time for the excited molecules to relax to the ground state, therefore facilitating more opportunity for molecular degradation. However, further investigation is needed to understand why this is the case. Once these factors have been identified, optimisation of a photostable UV filter combination can begin. At Stage 3, the emollient diisopropyl adipate was added to the solvent environment and little effect on stability was seen, with the slight changes most likely due to small differences in solvent polarity. This is certainly a positive outcome, it implies that DIA can be added to a formulation without concern for the stability of the active ingredients

These early results represent a successful proof-of-concept that TEAS can be applicable for commercial sunscreen development applications. The collaboration between the University of Warwick and Lubrizol will continue beyond these first steps, to find the combination of ingredients that have the most positive impact upon avobenzone at each stage. The complexity of the solutions will continue to be increased towards a full formulation, by replacing the volatile solvent with sunscreen components, such as thickening agents. The introduction of thin film methodologies will make these studies possible; this will not only continue to push the boundaries of the current state-of-the-art technique, but further mimic the application of a product to the skin.

This study invites both industry and academia to expand their knowledge and expertise in not only the applicability of ultrafast laser spectroscopy to sunscreen developers, but also develop a better understanding of the factors that would improve the performance of a final product. From the early work shown here, it appears that using TEAS as a complementary analysis tool alongside others that are well-established in the cosmetic industry, will lead to increased SPF and UVA ratings for the formulations of the future.

## References


1 L. A. Baker, M. D. Horbury, S. E. Greenough, P. M. Coulter, T. N. V. Karsili, G. M. Roberts, A. J. Orr-Ewing, M. N. R. Ashfold, V. G. Stavros, J. Phys. Chem. Lett., 2015, 6 ,8, 1363–1368

2 L. A. Baker, M. D. Horbury, V. G. Stavros, Opt. Express, 2016, 24, 10, 10700-10709


## Acknowledgements


Emily Holt thanks the Engineering and Physical Sciences Research Council for a PhD studentship through the EPSRC Centre for Doctoral Training in Molecular Analytical Science, grant number EP/L015307/1.

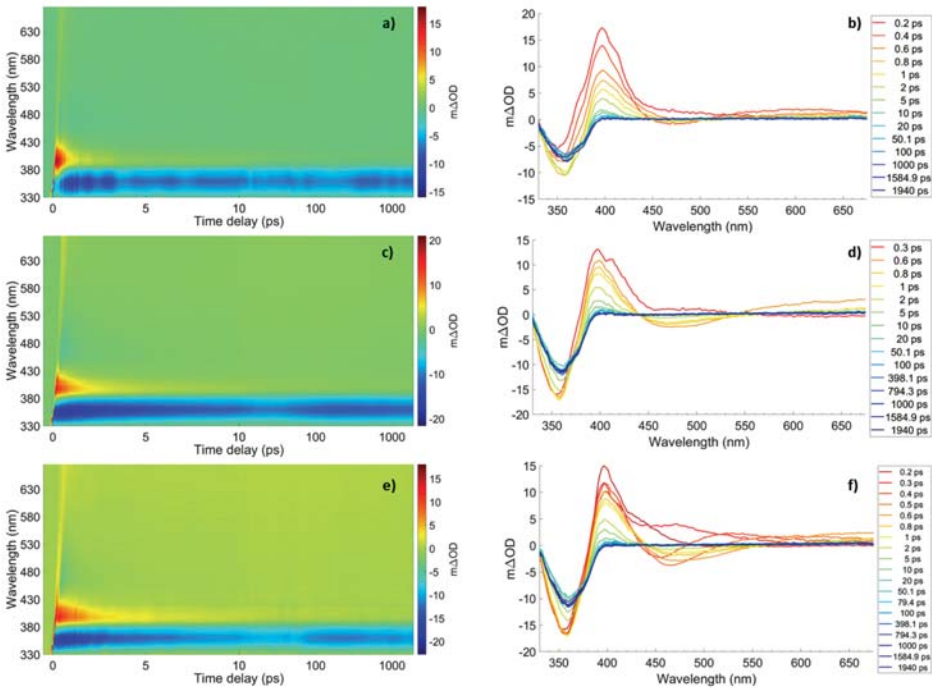




Figure A1: Raw TEAS spectra (false colour heat map) and selected transients for 2 mM avobenzone solutions in methanol with added UV filter: a), b) octocrylene, c), d) ethylhexyl methoxycinnamate and e), f) homosalate

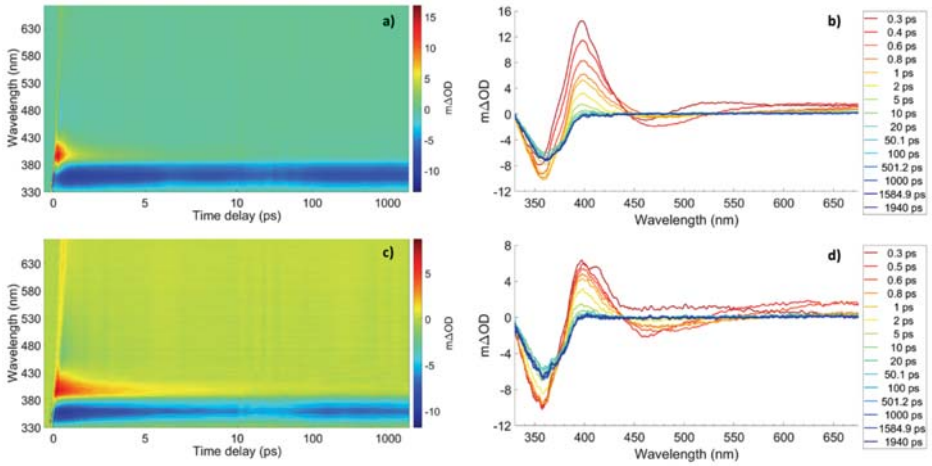



Figure A2: Raw TEAS spectra (false colour heat map) and selected transients for 2 mM avobenzone solutions in 80% w/w methanol, 20% w/w diisopropyl adipate solvent environment with added UV filter: a), b) octocrylene, c), d) homosalate

# Cosmetic Chemistry in the Internet Age

## A Scientists Guide to Effective use of the Internet

**Perry Romanowski**
**Element 44 Inc**
President US Society of Cosmetic Chemists

Today, I want to talk to you about how technology has changed the job of a cosmetic formulator and what you need to do to adapt to those changes. There are 5 areas in which the job of the cosmetic chemist has changed significantly. These include Education, Research, Innovation, Outsourcing, and Career Development.

In this talk I'm going to cover ways in which you can use the Internet to get educated more quickly, get problems solved, come up with new ideas, find out what consumers want from your products, and how to get more done.

### Education

It used to be that new people who came into the industry had university degrees in chemistry or chemical engineering. Sometimes they might have earned advanced degrees, but it was rarely the case that they had any information about what it meant to be a formulator or how to do the job. Everything that you learned, you learned on the job. And usually, you had to learn from a curmudgeonly, seasoned colleague who often looked at you as competition who might some day take their job. Needless to say, many chemists were ill-prepared and had a hard time learning how to formulate. And it used to be to get further education you had to go to the library or attend a continuing education event. Of course, these are still worth attending but you can get more information online than ever before.

### Research

And the way we do research has changed too. In the past when a chemist needed to research a specific topic for a project they might go to the library, find books, look through old magazines or microfiche to get what they are looking for. Learning resources were limited to old, difficult-to-decipher books like Harry's Cosmeticology or the Handbook of Cosmetic Science and Technology. Starting formulations were limited to what you could find in a supplier's formulary or something published in one of the monthly trade journals. And if you wanted to learn about new technologies, you had to go to trade shows or meet with suppliers to get this information. But today almost any information you need can be found without leaving your desk chair.

### Innovation

Innovation is another area in which cosmetic chemists are expected to perform. To come up with new product ideas, it used to be that you had to look through magazines, think of ideas yourself, maybe pick up an idea from a friend, family member or supplier. The ideas were often redundant and not particularly innovative. In fact, most new product ideas seemed to come from a marketing person who recently made a trip down the beauty aisles of their favorite store or heard something about a popular product from their beautician. That's changing.

### Outsourcing

Another thing that is changing is the kinds of tasks that chemists have to do themselves. When I first started as a formulator, we had to do everything. This included coming up with ideas, creating formulas, making batches, testing batches, filling bottles, scale-up, doing all the paperwork and more. As our company got bigger we hired on some specialists but the chemist was still ultimately responsible for getting everything done. And at smaller companies, the chemists are still relied on to do most everything. But there are resources on the Internet that can turn a one-woman lab into a whole army of workers.

## Career

Finally, the job of managing your career as a cosmetic chemist has also changed. It used to be that you had to go to conferences and present papers to build your reputation. You had to publish in journals and magazines to get anyone's attention. Today, you can eliminate the middleman and publish yourself. You can get on TV. If you produce content about an obscure enough subject, you will show up at the top of a Google search and become the world's defacto expert on the subject.

Times have changed. The old way of being a cosmetic chemist has morphed into a new way. And the Internet has made it happen.

## Key Internet Tools

Let's look at some of the resources on the Internet reviewing what they are and how they can be used as tools to make the job of a cosmetic formulator easier.

There are five main types of tools you can find on the Internet which can be used to make you a better, more productive formulator. These include:

- Information & Resource Websites,
- Search Engines,
- Blogs & Forums,
- Outsourcing Sites, and
- Social Networking sites.

I'll go through and explore each of these then explain how to use them for improving specific areas important to cosmetic chemists.

## Information & Resource Websites

We'll begin with information and resource websites. The Internet is filled with billions of pages of information on almost any conceivable topic you wonder about. In fact, in a recent Netcraft Web Server Survey they found that in January 2018 there were over 1.8 billion websites. Of course, many of those are filled with junk information however, there are a number of resource and information websites that are useful for cosmetic chemists.

I should first mention a site like Wikipedia which strives to be an open encyclopedia that anyone (within limits) can write. This crowdsourcing of knowledge has proven surprisingly accurate for a number of topics. Particularly, for non-controversial topics related to science.

There are dozens of websites where you can learn information about cosmetic science topics, get a basic education in chemistry, marketing, or other helpful topics for formulators. Plus, you can keep up with the latest news affecting the cosmetic industry.

Now, time doesn't permit me to go through every site that I think is helpful, so I'll focus on just a few. At the end of this talk I'll provide a link where you can get a listing of what I think are the most useful websites for cosmetic chemists.

## Cosmetic Industry Specific Websites

There are a number of websites dedicated specifically to the cosmetic industry. If you are looking for raw material information nearly every raw material supplier has a website. It used to be they would only list contact information, and they were cagey about the information that they shared. But now most good suppliers will also provide direct ingredient information. There are so many suppliers that I can't mention them all however, I can mention a few of the aggregator sites that contain listings of many suppliers. While there is no single source that lists all the raw material companies and the products they have available, there are a couple of sources that can get you started.

*Cosmetic Bench Reference* —
produced by Cosmetics and Toiletries

*Happi Buyers Guide* —
with both contract manufacturers and raw materials

*PCPC Buyers Guide* —
They list suppliers for over 3800 raw materials with international sourcing.

*ULProspector* –
Perhaps the most extensive aggregator of cosmetic industry raw materials. They have listings from hundreds of suppliers complete with whitepapers, datasheets, and the ability to order samples.

## Regulatory websites

Another useful area for cosmetic formulators is finding information about regulatory issues. The most difficult thing about cosmetic regulations for cosmetic scientists is that few people know definitive answers about the rules. They are almost always open to interpretation so your actions will depend more on what your company regulatory expert or consultant thinks than on what the regulating agency thinks. Unfortunately, I've found most regulatory departments are set up to tell you what you can't do, rather than help you figure out what you can do.

The best way to combat this regulatory obstacle is to find the answers yourself. The Internet provides numerous resources for directly finding regulatory information about cosmetics. In Australia, the Department of Health has an entire site dedicated to telling you the rules of making and selling cosmetics. Other useful sites include the FDA in the United States and the EU Commission covering rules common throughout Europe. With these sites you can get answers yourself much more quickly than you could doing things the old way like working with consultants or your own regulatory department.

## Education websites

Remember when I said that most cosmetic chemists are not well-prepared to be formulators when they first start in the industry? That's because much of the information about formulating was held secret within companies. There were definitely a few useful books around but these were expensive and required some background knowledge to get the most out of them. But the educational area of cosmetic science has really blossomed.

There are a number of online sources for learning how to formulate. Here in Australia there is the Institute of Personal Care Science which, from the videos I've seen, does a great job. The Society of Cosmetic Scientists in the UK has a Distance Learning program in cosmetic science which is excellent. And I would be remiss if I didn't mention my own course Practical Cosmetic

Formulating which gives a basic background to cosmetic formulating. Courses like these were not available just a few years ago.

I should also mention that there are a number of great websites for learning almost any topic you want. Numerous universities have posted full courses online. And these are free to go through. One of my favorite sources for learning any general topic is the Khan Academy. This was a website created by Khan and with backing from the Gates Foundation has expanded to teach people worldwide.

Youtube is another source for some excellent information about cosmetic formulating and cosmetic science in general. If you want to see how products are actually formulated a number of cosmetic chemists and companies have posted videos which are highly instructive.

Of course, the ease at which these types of things can be created has lead to the propagation of a lot of lower quality courses and information, but if you are a discerning student you should be able to find useful information for learning to formulate.

## Cosmetic News websites

As a formulator, it is important to keep up with the latest news going on in the cosmetic industry. The old way was that you waited each month for a magazine to come across your desk and you read it at your leisure. This kept you updated but you might be weeks behind important news. The new way to keep up with what's going on in the cosmetic industry is to follow the various cosmetic industry news sites. Website magazine sites like CosmeticsDesign.com, Happi.com, Cosmetics&Toiletries, and GCI all provide up-to-date news about the most important things going on in the cosmetic industry.

Plus, you can also keep up with the latest beauty magazines like Allure, New Beauty, Elle, and more. All of these websites publish a news feed which lets you keep up on the latest happenings in the world of cosmetics.

## Keeping track of it all

Of course the real challenge is keeping track of all this information. It's definitely not easy. But it is much easier than it used to be. Before you would have to visit all of those websites every day to see if there was something new. But now you can subscribe to websites and read them through an RSS feed. RSS stands for Really Simple Syndication. This just means that when a website publishes something new, they send you an alert. If you have an RSS reader like Feedly, you can keep track of all the new information coming out. There is still a ton of information and you can easily get bogged down, however if you organise your time and stay focused on what you want to accomplish, it can be a great time saver.

## Search Engines

With over 4 billion pages of content on the Internet, you can easily get overwhelmed by useless information. That is why the development of search engines was such an important tool for users. Now, I'm certain you've all heard about Google since it is the biggest, most often used search engine and worldwide brand. It lets you find things on the Internet using the concept of keywords. Keywords are just the things you type in the search bar. Whichever web page Google deems the most relevant to the keywords you type, that is what page they list. The way Google ranks pages based on your queries is quite interesting and could be an entire talk itself but for our purposes suffice it to say that the more popular a page is for a related term, the more likely Google will list it in the search results.

## Specialised search engines

Of course, when you are researching it is often better to narrow down things a bit. For this reason Google and other companies have produced specialised search engines. You can use these options when looking for specific information. For example, Google Scholar searches an index of scientific journals, patents and other scholarly publications. When you search with this tool you'll find what the scientific experts have found and filter out all of the bloggers or internet marketers.

## Other search engines

For scientists another interesting search engine is WolframAlpha. This tool helps you figure out scientific questions by using AI and the resources of the Internet. For example, if you were looking for a pH indicator, you can go to this search engine and look specifically for "indicators that change color at pH 4." And you'll get a list of them. This can be very handy.

## Competitive information

Perhaps the other most important search engines for formulators are the sites Amazon, Ebay and Alibaba. Amazon is great for finding beauty products and what is popular. This can help you in new product development but also in competitive research. Typically, you can find list of ingredients for most any product on Amazon. You can also find the same on Ebay. These sites are great for competitive research. For finding supplies of ingredients, Alibaba is a great place to start. Now, you'll have to be careful when using Alibaba since the quality of some of the things on there are suspect, but Alibaba is a huge company experiencing incredible growth. There are certainly a lot of people finding valuable deals on Alibaba.

## Google Trends

One really interesting search engine tool that Google produces is called Google Trends. Since they've been in the search business since 1996, Google has over 20 years of data about people's search habits. You can look at this data to see just how popular a topic is over time. This can help you identify ingredient trends which may help with innovation. Take for example, Moroccan Oil.

## Google Trends example

Here is a chart of the search interest in the term Moroccan Oil since 2004.

You can see there was no interest then in 2010 there was this huge spike in activity. Now, if we compare a similar term like Argan Oil you can see that it is even more popular. But both of them were little known until interest started growing in 2010. So, this tool gives you a chance to identify new ingredient trends before they really get big. An amazing thing is that this tool lets you check by region so you can focus only on Australia or other places in the world that are of interest to you and your company.

## Blogs & Forums

Alright, we've talked about websites and search engines. Now, I'd like to talk about another type of tool you might find useful blogs and forums. Blogs are essentially websites that are usually written by a single person or small group of people. They are typically written about a specific topic and the ones that affect the cosmetic industry the most are Beauty Blogs. These are essentially websites written by consumers, or beauty professionals, where they talk about beauty products and their experience with them. When blogs first started out people would just write about products they liked. Then PR agencies discovered how popular bloggers were and started sending them free samples. People would write about the products and brand owners took notice. Now these beauty bloggers and their video counterparts (vloggers who publish on YouTube) are helping to shape the success and failure of new product launches. It used to be that beauty magazines were the biggest influencers. Now, it seems that beauty bloggers are more important.

## Launches

In fact, they've been so successful that a number of these beauty bloggers have teamed up with mainstream companies and created their own beauty brands. The most popular would be Michelle Phan who teamed up with L'Oreal to create a beauty product line.

## Forums

While blogs are great for finding out what certain beauty influencers think is important and hot, another useful type of tool for formulators are beauty forums. A forum is just a place where people from all over the world can chat about any topic on the theme of the forum. From the cosmetic industry standpoint, the most popular forum is Makeup Alley. On this website you can find reviews of products, problems people have, and new products people are interested in. This is direct, unfiltered consumer research. And this can have a direct impact on the types of products you launch. When I was at Alberto Culver in the innovation group, we scanned through beauty blogs and forums and discovered early on the "no poo" or "co-wash" strategy of skipping shampoos and using conditioners to wash hair. Interestingly, we found that VO5 was a popular choice. Eventually, this lead to the development of a few different products like rinse-free shampoo, dry shampoo, and a co-wash product for our Tresemme line.

## Reddit

Another interesting option which is essentially a forum is Reddit. Now Reddit is a site that has thousands of different themed topics but it really is a forum for people to talk about topics they find interesting. There are a few related to the cosmetic industry including

*Reddit.com/r/makeupaddiction* – where people talk about their makeup. It has over 500,000 subscribers

*/AsianBeauty* – where you can see discussions about asian beauty products. (188,000 subscribers)

*/skincareaddiction* – people talk about skin care products. With over 480,000 subscribers

The point is, if you want to learn about what consumers think about products and the problems that they are having, these sites are a great place to go.

## Chemists Corner

And of course if you want to talk about formulating and get cosmetic formulation questions answered you can try out the Chemists Corner forum. There are over 6000 members with over 4000 discussions. There are chemists from around the world who trade advice and answer questions specifically related to formulating.

The nice part about all these blogs and forums is that they are usually free. It still amazes me how much time users put into their responses since no one is getting paid.

## Social Networks

Now back about 10 years ago when I started getting involved in all this Internet stuff, blogs and forums were the best places to find consumers and information about cosmetic products and their use. And they are still useful but the rise of social media sites has created another space where people hang out. There are a ton of social media sites and I can't cover them all so I'll just focus on the ones that I think are most important to cosmetic formulators. These include sites like LinkedIn, Facebook, Twitter, Instagram, and Youtube.

## LinkedIn

For anyone working in the industry, LinkeIn is one of the best sites to participate in, at least in terms of your career. You can think of LinkedIn as a place to put your resume online and where you can connect with other people who you've worked with in the past. For cosmetic formulators it's a great way to find out who the other formulators are in the country or world. You can also find out the companies that hire cosmetic chemists. And LinkedIn also gives you an opportunity to build your reputation as an expert. You can join chat groups where you can post content or participate in discussions about specific topics related to the cosmetic industry. In the old days you used to have to build your reputation by giving talks and writing articles in trade journals. Now, you can post in LinkedIn and boost your reputation much more quickly. I think every chemist should be on LinkedIn. Especially if you intend to one day retire from the corporate world and become a consultant.

## Facebook

I'm certain you all know about Facebook and how it's ruining the world. But seriously, Facebook has become a useful tool where you can learn about product trends, people's beauty problems, and lots of other things affecting the beauty product industry. And if you are an entrepreneur, Facebook can be used to create a community and sell your products.

Some of the things you can do with Facebook is connect with experts or other people in the industry. You can also participate in discussion groups about beauty products or formulating. There are numerous options but some that I find useful are Making Skin Care page or the Cosmetic Experimenter group.

Now, the problem with sites like Facebook and LinkedIn are that you can't be anonymous so you may not be able to talk about specific problems. But you can still get useful information.

## Twitter / Instagram

Other important social media sites include Twitter and Instagram. Twitter is a service that allows you to post short comments about any subject and broadcast it out to your followers. Your followers can reply and you can have a whole discussion about any subject with someone you've never met across the entire world. It's really quite amazing. And it can be done in nearly real time. For formulators this is a great way to keep up on what is going on in the cosmetic industry. You can find out about trade shows, news, new ingredients, and anything else that might affect the cosmetic industry. You can also seek out experts and get advice from them if they are active on twitter. In fact, there are a number of cosmetic chemists active on Twitter. A great way to use Twitter is to find websites and articles that will be useful.

Instagram is another social media site of note. Essentially, this is a service in which people post pictures. I only mention this service because it is particularly popular with beauty products and people who buy beauty products. In fact, whole businesses have been built on the power of Instagram to get people excited about a product. As a formulator, you can use Instagram to find out what consumers are interested in and get an idea of what you might want your products to look like.

There are certainly other social media sites but those are the ones that at the moment I think are most important. And if you look at the stats for Australia, those are the most popular ones too.

## Outsourcing Sites

The final type of website tool I'll talk about are outsourcing sites. One of the most challenging things about being a cosmetic chemist is that you often have to do all the work yourself. Well, that's where outsourcing sites come in. Outsourcing sites are websites in which people offer their services for a variety of jobs.

If you need help in formulating, you can find cosmetic chemists on sites like Ozlance.com or Freelancer.com. You can also find people to design labels, write advertising copy or even be a lab technician for a day. And if you need a bunch of bottles filled or someone to stand in line and get you concert tickets you can try a website like Fiverr.com. For five bucks you can find someone who will do almost anything.

## Open Innovation

One of the biggest challenges for formulators is solving technical problems. Often you'll have a problem that will be outside your area of expertise or would take so much time that you can't fit in finding the solution to your regular work schedule. For this you can use open innovation platforms. These are essentially crowdsourced ways to solve technical problems. The open innovation website has a community of "solvers" who have different technical backgrounds and you post your challenge. They work on potential solutions and you pay them when you get something that solves the problem. In theory, it can be a great way to expand your lab's technical ability without spending a lot of money. A platform like Innocentive has had some success in the cosmetic industry completing projects with P&G, Unilever and other large and small companies.

Admittedly, these sites are still in the early phase of development but they could become an important tool for formulators in the coming years.

## Five Challenges Cosmetic Formulators Face

Alright, now that I've gone through some of the most useful tools on the Internet let me review how these sites can impact the five most important areas for cosmetic chemists including Education, Research, Innovation, Productivity, and Career Development.

## Education – Learning how to formulate

As I said in the pre-Internet days people had to learn formulating from the other people they worked with. Or maybe they get tips from technical services guys of their suppliers. But much of the learning about formulating was done by trial and error with limited guidance. Today, when you want to learn how to develop the skill of formulating pretty much any type of product you can get information about the background cosmetic science, starting formulas, raw materials and even troubleshooting tips without leaving your desk. You can participate in free webinars, virtual trade shows, university level courses, and even listen to podcasts to make you a better formulator.

The time it takes to develop an expertise in any formulation area is incredibly reduced. You can find tutorials on making products online and even go through entire courses. Of course, there is a lot of junk and misinformation out there so when learning online, you need to remain skeptical. You still need to come to conferences like these, attend continuing education courses and visit trade shows. But the online tools can rapidly get you up to speed on a variety of topics.

## Research

Research has changed too. The days of going to libraries and reading magazines are past. Today, you can use tools like ULProspector to find out about new ingredients. You can use use RSS feed readers to keep up on the relevant cosmetic industry news. You can use Amazon to find competitive information about ingredients and claims. You can use Google Patents to see what novel combinations people are coming up with. And you can use Blogs, Forums, and Social Media sites to do consumer research that used to be the purvey of market research companies. You literally can find out almost anything about any subject freely available on the Internet. This can make researching much faster and more efficient.

## Innovation

Innovation is another area in which cosmetic chemists are expected to perform. The old way of brainstorming your own ideas or getting tips from friends, family members or suppliers can be enhanced by using information about trends gleaned off sites like Google trends, Reddit or MakeupAlley. And you can even use these sites to float new ideas out into the public sphere to see if there is any interest. Open innovation sites like Innocentive can also be used to solve technical challenges that might not be solvable by your lab.

## Getting Things Done

In the area of productivity, tools from the Internet can drastically impact your ability to get things done and be productive. You can hire people to do temporary assignments without going through a temp agency. You can hire professionals to design packaging, find sources of materials, clean your lab or even go filter through your email. Virtual assistants have the potential to free up all the time you need to develop that great next thing.

## Career building

Finally, the job of managing your career has become much easier. You no longer have to rely on headhunters to find new opportunities for you. Although they still can. You no longer have to rely on trade journals to publish articles to develop your reputation as an expert. You can bypass the journals and start publishing your own blogs or social media outlets. You can develop fans and followers and start showing up at the top of search engines for whatever topic you want to become an expert at. There's a card game I play and if you search for "greatest euchre player" Now, I'm a good player but it's debatable whether I'm the greatest. However, anyone searching Google will think so. If you want to become an expert at some topic about cosmetic science, you just need to start publishing about that topic.

## Internet tips

Now, before I finish I want to give you some tips about using the Internet that I've found helpful. There is a lot of information provided for you and it is easy to get overwhelmed. I can't tell you how many hours I've wasted on fruitless discussions on Facebook or Twitter. Or how much time I burn just answering emails. If you are not careful you can be highly unproductive using the Internet even though you might feel busy.

The first tip is to *limit your time spent online*. Since the Internet can't mix products for you and can't actually develop a new product idea, you have to sometimes turn it off to be productive. You should especially turn off any alerts or pings you might receive from websites. There is nothing more destructive to productivity than an alert that tells you you have a new email or text message. Get control of your attention and Internet time.

To that end, when you are online *focus on a specific goal*. If you are on social media have a specific goal. Even if that goal is to update yourself on the latest news or to connect with a colleague. Before you get online, decide what you want to accomplish then go online, get what you need, then get off. You have to be disciplined because these websites are designed to suck you in. They want you to get distracted and spend more time on their sites. Remember, time spent online is less time spent being productive.

Which brings me to my third tip, *focus on problem solving rather than information consumption*. If you are trying to learn how to do something then watching that 20+ minute video on Youtube is worthwhile. But if you are working on a hair care project don't spend your time on a video explaining how to make sunscreens. It will be educational but not particularly productive. Watch that video when you have a project to develop a sunscreen.

Now, I've listed a number of websites here but there are so many more that are useful which I just couldn't get to. So, I put together this helpful ebook which lists all of these websites and more. You can get it by going to the following link and downloading the free book, The Best Internet Resources for Cosmetic Chemists. And I'd suggest you read it offline.

## Finish

The job of the cosmetic chemist is already changing. Technology is having a tremendous impact on formulators and beauty product companies and this will only increase in the near future. Things that used to take weeks or months to get done, can now take minutes. And that is going to start to be expected. There are a number of tools online available to everyone that can make your job faster, easier, and make you more innovative and productive. So, now you have the information. And as Jack Welch said "Your ability to learn, and translate that learning into action rapidly, is the ultimate competitive advantage."

Now, go out there, embrace the internet tools available to you and become the greatest cosmetic chemist that you can be.

# Oh My!? What did you say?

## (Attention IMPORTERS AND SUPPLIERS OF COSMETIC INGREDIENTS) (Attention MARKETING PROFESSIONALS)

**by Wendy Free**

Since 1989 The Therapeutics Goods Administration (TGA[1]) has had limited powers when it comes to prosecuting individuals and business that unlawfully advertise or promote goods for therapeutic purposes.

Essentially there were two options; you might get a warning or you could be subject to criminal prosecution (with fines and/or imprisonment); no middle ground. Since the latter option is viewed as quite extreme TGA did not pursue this avenue often, but NO MORE…

As is 1st July 2018; there will be a new system, underpinned by changes to the Theraputic Goods Act and Regulations.

**Why am I telling you this? It may affect you and your business substantially!**

Let's start by looking at what defines *therapeutic*?

The Act[2] in part says

**"therapeutic goods"** means goods:

*(a) that are **represented in any way to be,** or that are, whether because of the way in which the goods are presented or for any other reason, **likely to be taken to be:***

*(i) for therapeutic use; or*

*(ii) **for use as an ingredient** … in the manufacture of therapeutic goods; or …*

and

***"Therapeutic use"** means use in or in connection with:*

*(a) preventing, diagnosing, curing or alleviating a disease, ailment, defect or injury in persons; or*

*(b) **influencing, inhibiting or modifying a physiological process in persons;** or …*

Where as a cosmetic is

*a substance or preparation intended for placement in contact with any external part of the human body, including: the mucous membranes of the oral cavity; and the teeth; with a view to:*

- altering the odours of the body; or
- changing its appearance; or
- cleansing it; or
- maintaining it in good condition (also see Part C of the Guidelines) ; or
- perfuming it; or
- protecting it; or…..

So if, for example an ingredient make a claim that it "reduces the activity of melanocytes"; this could be reasonably be construed as 'modifying a physiological process in persons' and by extension; therapeutic use.

Other examples might include claims such as "upregulation of (named) genes"; and description of metabolic process such as "TGF-b. Activator of WNT/b -catenin signalling" and "This encoded protein is a component of a membrane complex that modulates canonical WNT signalling".

To the average formulator (and myself), the latter phrases are essentially meaningless other than being 'science-y' and thus substantiating. But in a new regulatory environment they could spell *Trouble.*

(These changes can also applies to finished cosmetics, but for brevity I've elected to not include examples.)

Replacing the old all or 'nothing' system will be a new, tiered system[3] coupled with a new Advertising Code, and complaints management system. Most importantly for the cosmetic industry will be consideration of the new sanctions.

As before, low-level one off breaches will be redressed with issuing of a compliance notice, education, guidance and an enhanced level of monitoring.

Where there are ongoing breaches; the TGA will issue a warning letter (FDA style); and the perpetrator given 14 days to respond; if the response is not acceptable, direction and infringement notices can be issued. These are civil breaches of the Commonwealth Crimes Act, and attract financial penalties.

If high-level breaches occur, (for example advertising a prohibit representation such as cancer) or there are repeated breaches, TGA will take immediate action in issuing notices as civil penalties. For offences deemed to be critical…which the TGA state to be *"extensive or targeted advertising that is likely to lead to harm or injury if the claims made are relied upon. Non-compliant advertising that raises public health concerns or undermines accepted public health messages";* then a range of civil and criminal penalties will be applied.

What are the penalties?

Under the Commonwealth Crimes Act, at present each penalty unit is valued at $210 for an individual and 5x that (ie $1050) for a corporation. Each type of infringement has an assigned number of penalty units assigned.

For example

- Failure to respond to a notice given by the TGA to provide information about goods (Act 8(2)) attracts 60 penalty units; so $12,600 for an individual and $63,000 for a corporation.
- The following also (individually) attracts 60 penalty unit fines; publishing an unapproved advertisement, publishing an advertisement that does not comply with the advertising code, and the like

*However if a person imports* "therapeutics goods" into Australia and they are not included in the ARTG, and they don't comply with an applicable standard (for example being made in a TGA licensed manufacturing facility), its possible that 4,000 penalty units ($840,000 for an individual and $4,200,000 for a corporation) and/or 5 years imprisonment may be applied (per breach).

Of course these penalties are targeted at medicines, however they could equally be applied to products that make "medicinal claims".

As previously the system will include a (optionally anonymous) complaints based system; Australian's hate a 'dobber' and they loathe participation in this type of system, but some times in business all is 'fair in love and war'.

However, unlike in the past where there was an intermediary body that often overlooked 'cosmetics' all complaints will now be handled by the TGA directly, bureaucrats who have published KPI and do not have the legal option to 'overlook' certain circumstances.

So the take home message is an unpalatable one.

For both consumer and ingredient suppliers, the regulations have changed, it may be that without change you'll be caught up in a system designed to ? protect consumers, ? raise money for the government … and ultimately to tone down 'improper' marketing messages (however true, correct and scientifically valid they might be).

For more information; see the TGA website or contact me (obligation free) at

qualitymatterssafetymatters.com.au

Wendy Free B.Sc M.Tech Mngt MASM MRACI FAOQ

Quality Matters Safety Matters Pty Ltd
0439 782 869

## References

1 http://www.tga.gov.au

2 Therapeutic Goods Act 1989 No. 21, 1990

3 https://www.tga.gov.au/tga-presentation-update-therapeutic-goods-advertising-reforms

## …work and play at 50th Conference


Paul Castles and Ray Townsend

# An innovative approach for performant and sustainable cosmetic oily actives: the oléo-éco-extraction

**by Philip Jacobs and Anne Rossignol-Castera**

HALLSTAR, 120 S Riverside Plaza, Suite 1620, Chicago, Illinois 60606, USA

Phone: +65 9731 9463 Fax: +65 6773 3158 philip@philipjacobsassociates.com

## Introduction

The classical vegetable extracts are powders or hydro-alcoholic solutions and must be diluted or stabilised before they can be used in final cosmetic products. On the contrary, the oily extracts are very easy to formulate in emulsions or even in anhydrous products. Moreover, the oily form is naturally bioavailable and has a high skin tolerance because the lipidic biomolecules have an optimal affinity and transport through the stratum corneum. Cosmetic formulations require oily ingredients with high quality, high stability and high activity. To achieve this challenge, a new generation of vegetable based oily actives is obtained with oleo-eco-extraction. This new intensified green process is founded on the knowledge of the solvent properties of the vegetable oils and the theory of polar paradox of antioxidants, that both explain the possibility to extract and organise apolar and more polar molecules in an oil.

## Polar paradox and extractant properties of vegetable oils

Concerning the efficacy of antioxidants in different lipid media, the "polar paradox" theory was proposed by PORTER [1] and FRANKEL [2] to explain the phenomenon in antioxidant studies, which states that non polar antioxidants like tocopherols are more effective in more polar media, while polar antioxidants like ascorbic acid are more effective in less polar media such as bulk oils [3] [4]. The polar antioxidants preferentially located at the oil-air and oil-water interfaces are more effective in oxidative inhibition than non polar ones that are dissolved in the lipid phase (figure 1). Based on this theory, Oléo-

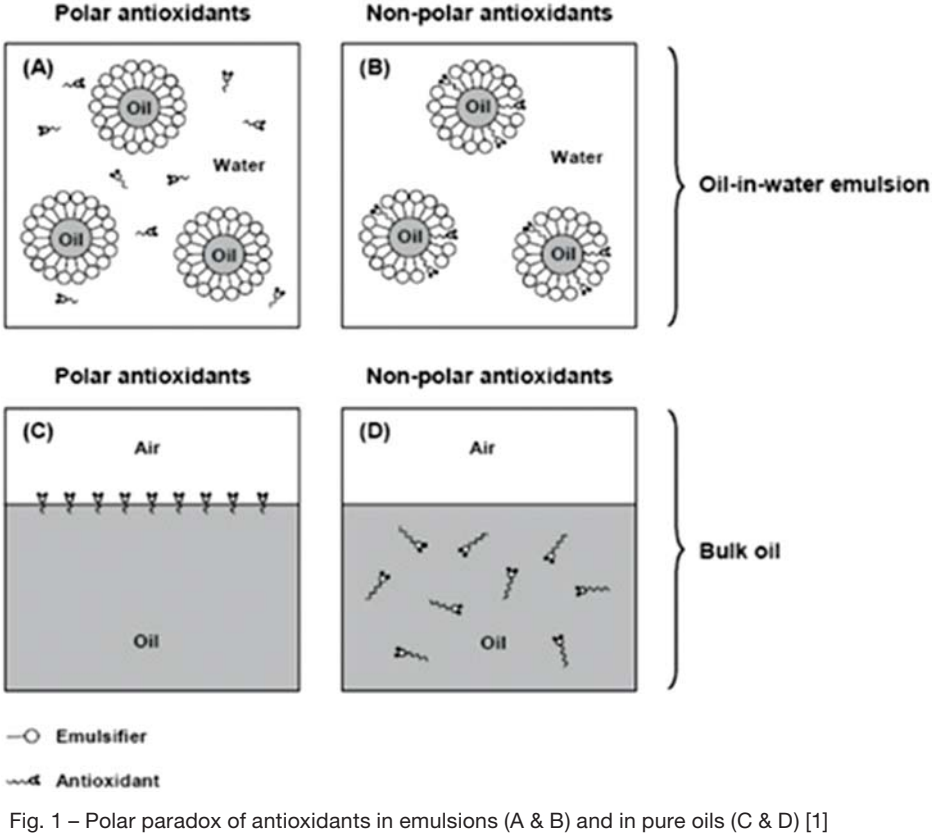



Fig. 1 – Polar paradox of antioxidants in emulsions (A & B) and in pure oils (C & D) [1]

eco-extraction proposes to use vegetable oils as alternative extractants of apolar and more polar molecules like phenolic compounds from plants. The aim is to obtain lipidic complex system of both polar and apolar bioactive molecules with synergistic effects to get biological activities for the skin.

The physical and chemical properties of the vegetable oils are influenced by their composition in fatty acids and unsaponifiable compounds (phytosterols, fatty alcohols, tocopherols, triterpens…) and the presence of minor polar lipids (free fatty acids, monoglycerides, diglycerides, phospholipids) and traces of water. Virgin oils are richer in minor polar lipids and water traces than refined oils. These minor compounds can self-assemble and interact with other molecules like phenols to form different types of thermodynamically stable structures called colloidal associations or aggregates: reverse micelles, micro-emulsions, lamellar structures and cylindrical aggregates [5]. The reverse micelles in vegetable oils are generally formed by surfactants or amphiphils having low HLB value s, such as free fatty acids, monoglycerides and diglycerides. However, phospholipids having an intermediate HLB of 8 can also form reverse micellar or lamellar structures in a non-aqueous medium.

To understand how modulate the extractant power of an oil, here are some results on the solubility, in term of dispersion and stabilisation, of phenols from olive leaves in different virgin and refined vegetable oils. The olive phenols are oleuropeine, hydroxytyrosol, tyrosol and some phenolic acids. The solubility is studied by simple maceration at 40°C during 3 hours with 15% m/m of grinded dried olive leaves. The phenol content is determined using Folin–Ciocalteu spectrophotometric method [6].

The glyceridic refined oils (peanut, rapeseed, sunflower, grape seed, coconut oils) are strictly nonpolar systems, which constituted of more than 98% or 99% of triglycerides, that give a low extraction yield less than 15% of the total olive leaves phenols. Jojoba oil is composed of 98% of esters containing long-chain eicosenoic acids and fatty alcohol of erucic or eicosenoic acids. It is therefore a very nonpolar liquid fat which is unfavorable to the extraction (13.3% of yield). The avocado oil yielded higher (26%) because of its typically high unsaponifiable content, which is 4-6% on average in comparison with 1-2% for other oils. This unsaponifiable fraction comprises triterpenic alcohols and phytosterols that provide free hydroxyl functional groups which are capable of promoting extraction of phenolic compounds in oils. Among the refined vegetable oils, the highest yield (27%) obtained with flaxseed oil could be explained by its high content of polyunsaturated fatty acids, which could give itself a low viscosity so that higher diffusivity help to increase the extraction yields. It is interesting to notice that castor oil can be considered as polar oil for extracting phenolic compounds from olive leaves with a high yield (73%). It is a unique vegetable oil with 91% of hydroxy fatty acids which offer a high reactivity, density and viscosity. For classical glyceridic oils, the results show that the extraction yield is less correlated with the unsaturation than the type refined/virgin oil. In virgin oils, the presence of water traces and amphiphilic compounds, or compounds with alcohol or acid groups (i.e. free fatty acid, partial glycerides, phospholipids, phytosterols, etc.), even though they are in low concentrations, can increase the extraction yield of phenols.

In order to increase the extraction yield, we compare the effect of addition of 5% of an amphiphilic co-extractant able to form colloidal systems or aggregates at supramolecular size in oil. The addition of glyceryl stearate allows an increment in phenols extraction yield by a factor of 1.5 to 2.5, while the addition of soya lecithins by a higher factor of 5. The presence of the phosphate group in lecithin endows with an even more polar character, which allows a larger interface creation and a stronger interaction with phenolic compounds that leads to a higher phenols extraction yield. It is interesting to notice that the extraction yield of adding glyceryl oleate is slightly higher than that of adding glyceryl stearate. This could be due to the unsaturated structure of glyceryl oleate that gives itself a lower viscosity for higher diffusivity of phenolic compounds into vegetable oils. Another surfactant, the polyglyceryl-3-diisostearate (PG3DS) increases the extraction efficiency and also the formation of aggregates (figure 2). The structuration of the oil in presence of PG3DS has been demonstrated by the technique of Small Angle X-ray Scattering (SAXS). We analyse the PG3DS aggregation in oils as a function of the polarity and the water content of the oil and finally we demonstrate the link between aggregation and polar antioxidant solubilisation capacity (work not published). The structuration increases with the level of PG3DS from 5% to 20% in the oil (figure 3).

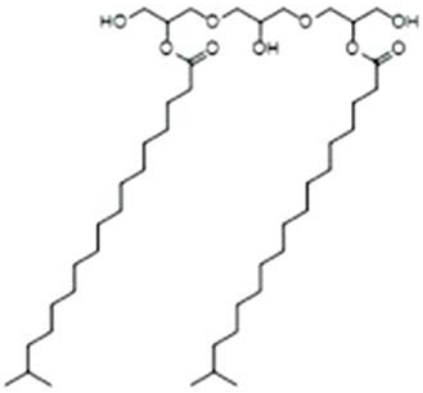



Fig. 2: Polyglyceryl-3-diisostearate (PG3DS) chemical structure

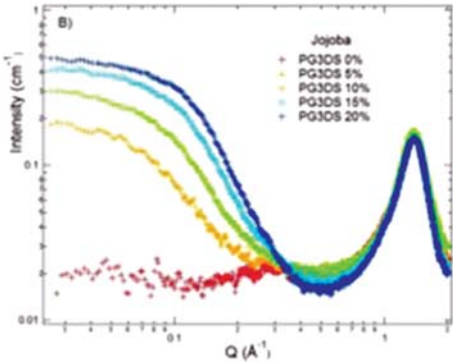



Fig. 3: Small Angle X-ray Scattering graphs of jojoba liquid wax (non polar oil) without and with aggregation due to polyglyceryl-3-diisostearate (PG3DS) at a dose of 5, 10,15 and 20% w/w in jojoba liquid wax.

## Oleo-eco-extraction (OEE) for cosmetic actives

These experimental results obtained by simple oily maceration and based on the polar paradox of antioxidants show that vegetable oils could be alternative green extractants for the extraction of phenolic compounds from olive leaves or from any other vegetable source. The presence of water in small quantity and the addition of a co-extractant in the oil is able to better extract and then organise as stable colloidal systems, the apolar and more polar molecules from a plant.

Finally the patented oleo-eco-extraction (OEE) is an intensification process adding physical energy to have a high performant process to extract biomolecules from a vegetable source in a short time and to concentrate them without degradation or oxidation [7]. Like all eco-processes, oleo-eco-extraction (OEE) is based on six principles: (i) the use a physical process : ultrasound at low frequency (25 kHz) and microwave at high density energy (6kW) (ii) the use of renewable plant resources in respect of biodiversity (iii) the use of a natural or biosourced solvent : vegetable oil and agrosourced co-extractant (iv) the reduction of the waste production and the valorisation of the co-product (v) the reduction of the energy consumption : short process less than 30 min (vi) the prevention of pollution and the production of a stable and high quality eco-extract. Oily extract is non oxidised because all the process is conducted under nitrogen and stable because enriched in polar (phenols from plant) and apolar (tocopherols from oil) antioxidants. Oleo-eco-extraction (OEE) respects the naturality of the plant because the process is soft without chemical reaction. We can give an example with OEE Oak Root Extract that is a synergistic extraction of triterpenic molecules and polyphenols from oak tree by a virgin coconut oil rich in Medium Chain Triglycerides (MCT). Non-phototoxic, non-cytotoxic, hypo-allergenic, stable, liposoluble and organically certifiable, OEE Oak Root Extract can be used in all anti-aging, protective and soothing treatments for sensitive and reactive skin. It's the first active lipidic complex that at low doses can reduced inflammation by more than 60%, while preserving the integrity and suppleness of the epidermis. This active has been patented on the basis of its proven dual action anti-inflammatory and anti-radical efficiency in vitro and in vivo. OEE Oak Root Extract is active on one of the principal biomarkers responsible for the cellular mechanisms of inflammation: the cytokine Tumour Necrosis Factor-alpha or TNF-α. A local increase in the concentration of TNF-α is responsible for the appearance of signs suggestive of inflammation. On the skin, this results in vasodilatation associated with the presence of erythema and oedema. Tested between 1% and 3% on retinal cells and confirmed in cultures of human keratinocytes, OEE Oak Root Extract with a dose-dependent activity, reduced by as much as 68% the secretion of TNF-α. A clinical study has demonstrated that a twice-daily application of a cream containing 5% of active prevented the formation of photo-induced redness after UV-A & UV-B exposure.

This example shows the perfect balance between sustainability and performance of oleo-eco-extraction based on the extraction power of vegetable oils and a green intensified technology.

## References


[1] Porter W.L. Paradoxical behavior of antioxidants in food and biological systems. In Antioxidants: Chemical, Physiological, Nutritional and Toxicological Aspects; Williams, G.M., Princeton Scientific: Princeton, NJ, 1993; pp 93-122.

[2] Frankel E.; Huang S.W.; Kanner J.; German J.B. Interfacial phenomena in the evaluation of antioxidants: Bulk oils vs emulsions. J. Agri. Food Chem. (1994), 42, 1054-1059.

[3] Frankel E.N. Oxidation in multiple phase systems. In Lipid oxidation; The Oily Press, Dundee, Scotland, 1998; pp 161-185.

[4] Shahidi F.; Zhong Y. Revisiting the polar paradox theory: a critical overview. J. Agri. Food Chem. (2011), 59, 3499-3504.

[5] Xenakis A.; Papadimitriou V.; Sotiroudis T.G. Colloidal structures in natural oils. Corr. Opin. Colloid. In. (2010), 15, 55-60.

[6] Li Y.; Fabiano-Tixier A.S.; Ruiz K., Bauduin P., Rossignol-Castera A.; Diat O., Chemat F. Comprehension of direct extraction of hydrophilic antioxidants using vegetable oils by polar paradox theory and small angle X-ray scattering analysis. Food Chem. (2015), 173, 873-880.

[7] Rossignol-castera A. Method for extracting non-volatile compounds, International patent WO112760A1, 2010.

**EXCLUSIVE LINE**
**MADE IN GERMANY**

PATENTED

# SOFT AROMA FACIAL STEAMER

- INTEGRATED FACE & BODY BRUSH
- BUILT IN HERB SIEVE
- INSTANT STEAM
- QUICK HEATING
- ELECTRONIC CONTROL PANEL
- THREE SPEED SOFT STEAM MEMORY
- FULLY ADJUSTABLE STEAM PIPE
- 2 ½ LITRE PLASTIC WATER TANK
- EASY REFILL
- SAFE & EASY TO OPERATE
- AUTOMATIC TIMER & SHUTDOWN
- ENVIRONMENTALLY FRIENDLY
- ENERGY SAVING

**ULTRASOUND**

**MICRO-NEEDLING**


DISTRIBUTED BY
GERMAN MADE BEAUTY PTY LTD

**GERMAN MADE BEAUTY**

www.germanmadebeauty.com.au | info@germanmadebeauty.com.au

T 02 8331 8933

# Defy the signs of ageing


# ikonique®

Intelligent Skincare™

www.ikonique.com.au

1300 IKONIQUE 456647

Interested in becoming an accredited ikonique® stockist?
Contact us via our website for details
or email sales@ikonique.com.au

AUSTRALIAN MADE AND OWNED