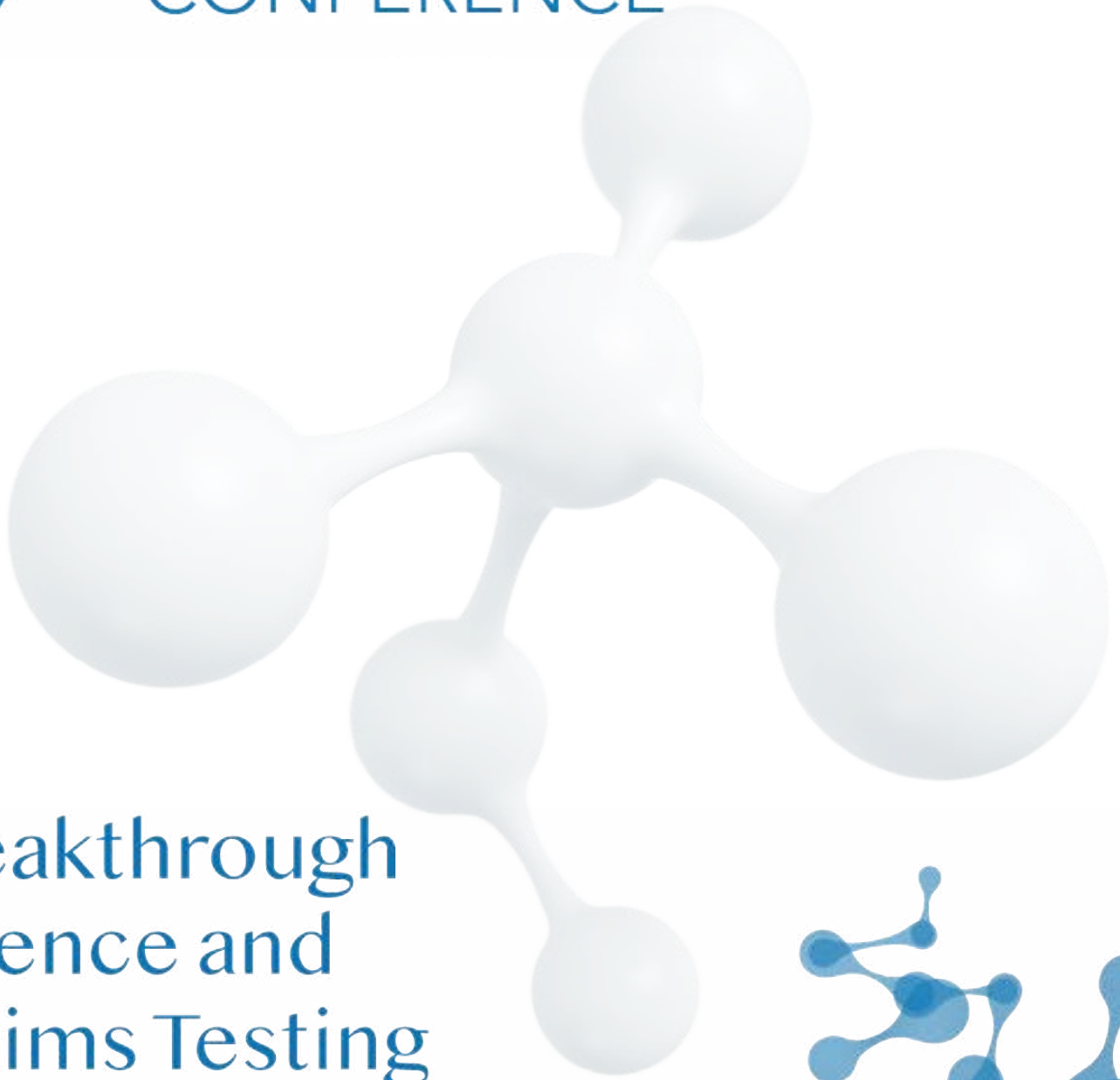




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Welcome to the SCS Annual Conference 2025!

Breakthrough Science & Claims Testing are key to success in the modern cosmetics industry. The SCS Annual Conference in 2025 will provide attendees with the latest discoveries and insights from leading research groups working in cosmetic science and claims testing in the UK and abroad.

It will bring together our leading scientists to share their latest discoveries and offer attendees a unique opportunity to expand their professional networks and build new collaborations.

Conference Agenda

Day One

Breakthrough Science & Claims Substantiation

Skin Science & Technologies

Hair Products & Devices

Day Two

Sensory Benefits & Testing

Breakthrough Claims Testing Methods



Conference Agenda

Conference Agenda

Day One - Morning Sessions

08.30 - 09.45

Registration, Coffee & Tea

09.45 - 10.00

Welcome to the Conference and Introductions

Session One - Breakthrough Science & Claim Substantiation

Chaired by Paul Cornwell

10.00 - 10.30

KEYNOTE: Cosmetic Claims: Past, Present, and Future - Navigating Science, Regulation, and Consumer Trust

Speaker - Dr Theresa Callaghan, Cosmetic Claims Development, Author & Scientific Affairs Specialist, Callaghan Consulting International

10.30 - 11.00

The landscape for advertising rules in the UK

Speaker - Nico Shaw Núñez, Director of Regulation, CTPA, UK

11:00 - 11.15 - Coffee & Tea Break

11:15 - 11:45

Future Claims – What Will we Say, How Will we Measure It and What Will it Mean

Speaker - Dan Whitby, Chief Scientist, Smink Laboratories, UK

11:45 - 12:15

The real consumer 'Job to be Done'? SO much more than a functional benefit...

Speaker - Dr Paul J Matts, Distinguished Fellow and Retired Vice President, R&D The Procter & Gamble Company, UK

12:15 - 12:45 - Expert Panel Debate

- Dr Theresa Callaghan
- Nico Shaw Núñez
- Dan Whitby
- Dr Paul Matts
- Chaired by Paul Cornwell

12.45 - 13.30 - Lunch

Conference Agenda

Day One - Afternoon Sessions

Session Two - Skin Science & Technologies

Chaired by Dr Gill Westgate

13:30 - 14:00

KEYNOTE: Dry skin – more than just a lack of water

Speaker - Dr Jonathan Crowther, Microscopist, Skin Scientist & Consultant, JMC Scientific Consulting Ltd, UK

14:00 - 14:20

Studying the effectiveness of anti-acne treatments using an in vitro human skin equivalent model

Speaker - Dr Nicola Kingswell, Scientific Director and Co-owner, LabSkin

14:20- 14:40

A novel 3D model for oily skin and acne skin care testing: Exploring the relationship between sebum and skin microbiota

Speaker - Alain Moga, Sales Director, QIMA Life Sciences, France

14:40 - 15:00

A Novel Upcycled Super-emollient Obtained from an Avocado Oil Co-product

Speaker : Magalie Cabannes, Application Laboratory Manager, Greentech

15.00 - 15.30 - Coffee & Tea Break

Session Three - Hair Products & Appliances

Chaired by Bernice Ridley

15:30 - 16:00

KEYNOTE: Conditioning our hair – a multiscale and interdisciplinary task

Speaker - Professor Zhenyu Zhang, Professor of Soft Matter Engineering, University of Birmingham, UK

16:00 - 16:20

Exploration of textured hair characteristics following lipophilic active applications.

Speaker - Gabriela Daniels, Programme Director, University College of the Arts London

16:20- 16:40

Bridging Consumer Perceptions and Technical Measurements: Assessing Hair Straightness and Alignment with Optical Imaging

Speaker - Murielle Mason, Research Associate, TRI Princeton, USA

16:40 - 17.00

Towards Customised Hair Care: An Objective, Multi-Method Assessment Characterizing Hair Type and Treatment Efficacy

Speaker - Mike Hindley, Research and Technology Specialist, Croda UK

17.00 - 19.00

Drinks Reception & Student Poster Competition

Conference Agenda

Day Two - Morning Sessions

08.30 - 9.00 - Registration, Coffee & Tea

09:00 - 09:30

Best Paper Award International Journal of Cosmetic Science, 2024 Winner

Awarded by SCS Preseident Dan Whitby

Mechanical epilation exerts complex biological effects on human hair follicles and perifollicular skin:

An ex vivo study approach

Speaker - Dr Marta Bertolini, Managing Director, QIMA Monasterium GmbH, Germany

Session Four - Sensory Benefits & Testing

Chaired by Tracey Saunderson

09:30 - 10:00

KEYNOTE: The future of sensory: claims, consumers and context in a transforming industry

Speaker - Lise Dreyfuss, Innovation Manager, SAM Sensory & Consumer Research, UK

10:00 - 10:20

Design of Pro-Vitamin E phosphate-loaded Solid Lipid Nanoparticles for Dermal Delivery

Speaker - Dr Mais Saleh, Associate Professor, Department of Pharmaceutics and Pharmaceutical Technology, Jordan

10:20 - 10:50 - Coffee & Tea Break

10:50 - 11:10

Niosomal Encapsulation of antioxidants: Carotenoids

Speaker - Professor Amal Ali Elkordy, Professor of Pharmaceutics, University of Sunderland, UK

11:10 - 11:30

A Novel Approach to Increasing SPF Protection and Providing Solutions to Improve the Spreadability of Formulations

Speaker - Aline Souza, Research and Technology Manager, Croda Europe Ltd

11:30 - 12:00 - Student Poster Award - presented by SCS President, Dan Whitby

12:00 - 13:30 - Lunch

Conference Agenda

Day Two - Afternoon Sessions

Session Five - Breakthrough Claims Testing Methods

Chaired by Susan Ayton

13:30 - 14:00

KEYNOTE: The state of the art and a crystal ball into what the future might hold for clinical studies on cosmetic products

Speaker - Andrew Kirby, Quality Manager and Scientific Adviser, Cutest Systems, UK

14:00 - 14:20

Investigating the Role of DNA Damage-Induced Cellular Senescence in Hair Follicle Aging: Towards Prolonged Hair Longevity

Speaker - Dr Marta Bertolini, Managing Director, QIMA Monasterium GmbH, Germany

14.20 - 15.00 - Coffee & Tea Break

15:00 - 15:20

A Multiscale Model of Hair Repair: Biomolecular Markers and Sensory Validation

Speaker - Elena Zanca, Head of R&D and Innovation, Hair Care, Davines Group, Italy

15:20- 15:40

Titanium Dioxide Actives Against Solar Light: Anti-photoaging at a Gene Expression Level

Speaker - Neil Dominic Pangilinan, PhD Student, University of Newcastle, UK

15:40 - 16:00

Closing Remarks from Paul Cornwell

Student Poster Competition

The Student Poster Competition is an important part of our Annual Conference. It provides a platform for students and scientists, new to the field of cosmetic science, to present their work to the conference attendees.

A QR code will be displayed by the posters, which will direct you to our voting software; this is how you will cast your vote.

Votes must be cast by 7pm on 2nd July 2025.

The votes will be tallied and the winners announced just before lunch on 3rd July 2025.

The Student Posters will be displayed in the Conference Room for the duration of the Conference.

The winning student will receive a £500 voucher.



Session One

Breakthrough Science & Claims Substantiation

Chaired by Paul Cornwell



Dr Theresa Callaghan

Cosmetic Claims Development, Author &
Scientific Affairs Specialist

Callaghan Consulting International

KEYNOTE: Cosmetic Claims: Past, Present, and Future – Navigating Science, Regulation, and Consumer Trust

Cosmetic claims are not just a tool for marketing—they are a dynamic intersection of science, regulation, and consumer trust. In this keynote presentation, we will journey through the history of cosmetic claims, from a time when marketing was largely unsubstantiated to the modern era, where scientific validation and regulatory oversight are paramount.

By examining the evolution of these claims, we will uncover key lessons that have shaped today's regulatory frameworks and industry practices. We will explore how consumer expectations, fuelled by an increasing demand for transparency and efficacy, are challenging the status quo and pushing the boundaries of traditional claims.

Looking to the future, we will examine the transformative impact of emerging technologies—such as advanced biometrics, AI-driven formulations, and in vitro testing—and their potential to redefine how claims are substantiated. What role will sustainability, ethical considerations, and the growing call for social responsibility play in shaping the cosmetic claims landscape?

This keynote will not only provide a comprehensive overview of where we've been and where we are but also challenge us to think critically about the ethical and regulatory complexities that lie ahead. Ultimately, it will be for scientists, regulators, and industry leaders to work together to ensure that future claims are not only scientifically accurate but also transparent, sustainable, and reflective of the values of tomorrow's consumers.

Theresa is a biochemist with a PhD from the Hebrew University of Jerusalem and has extensive international experience in the cosmetics industry. After a postdoctoral fellowship at the Pasteur Institute, she transitioned into corporate skin care research. Over her 35-year career, she has held senior R&D roles at LVMH, Unilever, Marks & Spencer, J&J, Evonik (Cosmoferm), Hill-Top Research, and proDERM (SGS).

In 2008, Theresa founded Callaghan Consulting International in Germany, focusing on cosmetic claims and scientific advancements, collaborating with ingredient suppliers and brands. She is a widely published author, and also known for her multi-lingual book "Help! I'm Covered in Adjectives: Cosmetic Claims & The Consumer," in its second edition, and has appeared on various radio shows and podcasts.

Theresa is on the editorial board of the International Journal of Cosmetic Science and is active in a number of professional societies including SCANCOS and The British Herbal Medical Association. She mentors graduates and industry new-comers, advises TKS Science Publisher, and writes a monthly Claims Insights column for Euro-Cosmetics magazine and LinkedIn, as well as a monthly ingredient technology article for BEAUTY STREAMS. Theresa is also a Covalo Ambassador.



Nico Shaw Núñez

Director of Regulation

CTPA

The Landscape for Advertising Rules in the UK

The UK has a fragmented but comprehensive system to manage effectively claims in relation to cosmetic products, including their functions and benefits.

It is therefore important to have a clear view of what the advertising rules are, who is there to enforce them, and what can happen when things go wrong.

The differences between function or performance claims and environmental claims will be drawn, casting also a view to some of the developments in green claims from the European Union and their possible impact to UK companies.

Nico joined the Cosmetic, Toiletry and Perfumery Association (CTPA) in 2019, bringing regulatory expertise from roles in manufacturing, branding, and consultancy within the cosmetics industry.

At CTPA, Nico is involved in the work of the association under the new UK Cosmetics Regulation and delivering on an ambitious Sustainability Strategy for a net positive cosmetics industry. On an international perspective, Nico leads the global programmes of the association seeking to promote UK industry by enhancing market access, supporting trade and reducing barriers. This includes supporting the UK Government as a member of advisory groups for the Department of Business and Trade.

By background, he studied Pharmacy at the University in Barcelona, specialising in Industrial Applications and Healthcare Law.



Dan Whitby

Chief Scientist SMINK Laboratories

Vice President Society of Cosmetic Scientists

Future Claims – What Will We Say, How Will We Measure It and What Will It Mean

Objective :

We are in a time of huge transition in both the world of beauty and the world of science.

The implementation of AI, the increase in the number of hybrid or decentralized studies and the adaptation of health tracking devices and scanners will play key roles in how we measure product efficacy in the future.

The rise of neurocosmetics, holistic health and a shift in focus from the face to total body skincare and beauty will give rise to new claim and ways of talking about products and product effects.

This presentation shares insights from published research not only from within the beauty sphere but also influences from industries which align and crossover into beauty such as healthcare, food and nutrition, wellness, climate change and the digital environment.

Combining multiple insights leads to the development of a credible vision of the future of product claims within the beauty industry.

Methods:

A review was undertaken of recent scientific publications related to beauty claims testing technologies and devices via the PubMed platform. Alongside this insights were also gathered across 12 key areas and then collated and curated into a thoughtful and evidence based view of the future of beauty, claims and methods for subjectively and objectively measuring how beauty products perform.

This will be based on the methodology described by futurist Rohit Bhargava in his book series “Non Obvious Megatrends How to see What Others Miss”, ISBN: 9781646871612

Conclusion:

The combination of a complete understanding of the beauty industry with recent publications in the scientific literature combined with consumer insights then thoughtfully curated and distilled will provide a fresh, new vision of where our industry will go and why in the next five to ten years.

Daniel has worked in the personal care industry for over 25 years in a variety of roles including formulation, new product development, innovation, technical marketing, and claims testing. He has developed several patented technologies, been responsible for the introduction of several innovative claims into the beauty marketplace and has presented at numerous cosmetic science events. A regular contributor to industry journals, he has a passion for trends analysis, ingredient innovation and understanding consumer interaction with products. An extensive industry network including journalists, bloggers, consultants, brand owners and scientists gives him a unique insight into what the future may look like for the beauty industry.

In his current role as Chief Scientist at SMINK Limited he combines a passion for discovering the latest scientific breakthroughs, with his knowledge of emerging trends, market insights and ingredients to ensure every product is thoughtfully conceived, highly efficacious and purpose led.

Daniel also lectures on the BSc and MSc cosmetic science courses at the University of Sunderland



Dr Paul J Matts

Distinguished Fellow and Retired Vice President, R&D

The Procter & Gamble Company

The real consumer 'Job to be Done'? SO much more than a functional benefit...

What does a claim such as “x% increase in skin firmness” even mean - in the absolute and, particularly, to consumers?

In this presentation I will argue that “Functional” claims are sterile, cold and inaccessible to the consumer - whom, ultimately, we under-serve.

Instead, I will propose a Holy Trinity where Functional claims are not only point-of-entry but wholly inadequate - and must necessarily be united with Emotional and Social components.

Paul joined Procter & Gamble (P&G) in 1988 as a PhD Microbial biochemist and spent the majority of his career leading various aspects of Skin Research, working across most of the Company's Operating Units (as he maintains that all of them touch the human skin in some way!). He retired from P&G in 2024 as R&D Vice President.

He is a Visiting Professor to the London College of Fashion and past Visiting Professor to the UCL School of Pharmacy. He is a past Chair of the Cosmetics Europe (CE) Sun Protection Methods Task Force, leading the standardisation of SPF and UVA methods and the current Vice-Chair of the CE Sun Protection Standing Committee.

In his spare time, he re-applies his skin biology expertise to resource-poor settings and, in 2012, co-founded an NGO in Ethiopia to help the 1.5+ million sufferers of Podoconiosis (non-filarial, lower-leg lymphoedema).

He is married to Ali, has 3 grown-up children and is recently a grandfather! He loves the outdoors... running, mountains, scuba-diving and, in 2013, bought an old, run-down property on the Isle of Mull which he thinks is a small piece of Heaven.

Expert Panel Debate

Chaired by Paul Cornwell

Speakers



Paul Cornwell



Dr Theresa Callaghan



Nico Shaw Núñez



Dr Paul Matts



Daniel Whitby



Session Two

Skin Science & Technologies

Chaired by Dr Gill Westgate



Dr Jonathan Crowther

Microscopist, Skin Scientist & Consultant

JMC Scientific Consulting Ltd

KEYNOTE: Dry Skin – More than just a lack of water

The majority of people will experience dry skin at some point in their lives and it can have psychological as well as physical impact on their lives.

However, while we call it 'Dry Skin' it is not as simple as just a lack of water, with a host of physical and chemical changes contributing to it.

This talk will provide an overview of dry skin, its causes, what it is (and is not) as well as how it is measured and assessed.

I have worked for over 20 years in the cosmetics industry, including Procter and Gamble and more recently with GSK. In 2012 I set up my own consultancy – JMC Scientific Consulting Ltd, based in Egham, UK. My experience ranges from new product research with novel materials, through to developing and running clinical studies to provide claims support data for product launches. Even when I was in a corporate environment I worked across multiple project areas at any one time to translate the needs of the individual teams into executable study designs and plans. Research areas worked on include moisturisers, cleansers, and hair removal methods (shaving, waxing, epilation, depilatory creams, light based hair removal). I now work with clients to help them understand how their products work and how to improve them, as well as spending my time researching novel methodologies and imaging techniques to help push the industry forward.

Photography has always been a passion of mine, and a current focus area for my research is UV imaging, and how it can be used to visualise skin and sunscreens. UV imaging is extremely challenging, with a unique set of complexities above and beyond standard colour photography, and my research often requires me to build equipment to help with my work where nothing suitable is commercially available. An example of this is my work from 2017-18 in which I built the first cross polarized UV imaging system, to enable imaging of sunscreen film morphology after spreading by eliminating the shine from the surface of the film. In 2020 I built a UV transmission microscope with the goal of imaging different sunscreen components to help with formulation development and optimization. I keep my website up to date with any non-confidential work I am doing, as I'm a firm believer that openness in scientific research is the best way to move it forwards.

I have a very hands on approach to science and am experienced with the operation and use of a wide range of skin testing equipment including Corneometer, Sebumeter, TEWL, Colourimetry, Confocal In-vivo Raman Spectroscopy (for hydration profiles, NMF and ceramide monitoring and ingredient penetration), photographic imaging techniques (UV, visible and IR), microscopy, skin grading, tape stripping and SEM, and clinical test design.

After building my expertise in the skin methods field I also became more involved with teaching the science of skin measurement, to audiences from Dermatologists to Journalists and Marketing groups. I am also strongly linked with Academic research, having overseen a number of projects with different universities. I have authored over 40 papers and book chapters, with an emphasis on skin measurement and imaging, and the validation of techniques to prove what they can (and in some cases cannot) do. I am also a reviewer for the International Journal of Cosmetic Science and other journals.

I graduated from Durham University with a BSc in Chemistry in 1994, and went on to do a PhD in Surface Modification and Analysis which I completed in 1997, and loved the research so much that I stayed on for an extra 3 years as a Post Doctoral research assistant. During this time I developed a strong Analytical chemistry background with a wide variety of surface analytical techniques (XPS, Auger, ToF SIMS, Raman, ATR-IR, SEM and TEM, AFM) for materials analysis, along with cold plasma treatment of materials for the manufacture of metal surfaces and ultra-low energy materials.

It is the 'cross discipline' background I have from working at the boundaries between chemistry, physics and engineering, which I have now applied to my assessment of skin. I apply a strongly analytical and critical approach to my work, and am known for being open and impartial and working with the highest integrity. I'm also a scientist through and through, and am driven to question and understand how the world works.

Please contact me if you want to know more – jonathan@jmcscientificconsulting.com



Dr Nicola Kingswell

Scientific Director and Co-Owner

LabSkin

Studying the effectiveness of anti-acne treatments using an in vitro human skin equivalent model

Labskin-S 3D in vitro human skin equivalent was populated with a whole skin microbiome sample donated by a volunteer presenting with adult acne post-pregnancy.

The microbiome sample was allowed to establish and proliferate on the surface of the Labskin-S. Test items were applied to the microbiome-skin constructs including a 5% benzoyl peroxide product, a 2% succinic acid product and a DPS control.

The results showed that the 2% succinic acid product was most effective in reducing the *C.acnes* present in the skin microbiome, but that it also elicited the greatest inflammatory response.

The study highlights the importance of evaluating microbiome modulating products in a skin equivalent model, not just to measure the effectiveness of microbe reduction but also the skin inflammatory responses.

Nicola is the scientific director and co-owner of Labskin Limited, where she manages the strategic direction of the company, as well as day to day operations. Nicola is responsible for leading R&D activities to drive innovation in the company, in line with client requirements. She oversees all client activities including technical sales, project scoping, project management and delivery.

Nicola is an experienced protein biochemist and cell biologist. She has held positions at some of the world's largest companies (Intertek, Labcorp, Eurofins) and some of the world's smallest companies (start ups and spin outs).

Labskin specializes in 3D full thickness human skin equivalents with the novelty of a dry stratum corneum for application of products directly onto the surface. Constructs include skin with melanocytes, models for atopic dermatitis, eczema and psoriasis, models for aged and young skin, as well as assays for cell potency assays and epidermis only models. Labskin operates as a contract research laboratory, providing analytical services to global clients in pharmaceuticals, home and personal care, and skincare and cosmetics.



Alain Moga

Sales Director

QIMA Life Sciences, France

A Novel 3D Model for Oily Skin and Acne Skin Care Testing: Exploring the relationship between sebum and skin microbiota

This study investigated sebocyte differentiation and lipid metabolism in acne vulgaris using the SEBO662AR cell line, a physiologically relevant in vitro model characterized by stable expression of a functional androgen receptor. The research aimed to evaluate its utility as a tool for advanced skin care testing.

Acne vulgaris is associated with irregular sebum production influenced by hormonal fluctuations, changes in the microbiome, and dietary factors. The study employed a differentiation mixture (Diff Mix) to simulate these imbalances and analyzed gene expression and lipid synthesis. The results revealed significant changes in gene expression related to sebocytes, as well as a notable increase in squalene accumulation, indicating the functionality of squalene epoxidase (SQLE). Importantly, the alterations induced by Diff Mix were reversible with specific inhibitors.

This work highlights the SEBO662AR cell line's value as a model for acne-related research. By modeling pathological sebum production, it serves as a suitable platform for studying lipid synthesis mechanisms, offering significant potential for skin care testing and product development targeting sebaceous activity.

Alain Moga is a seasoned life sciences professional with over two decades of experience.

He holds a degree in chemical engineering with a specialization in cosmetics and pharma/biotech.

Based in France, he co-founded Synelvia in 2009 and currently serves as the Sales Director and Head of Dermocosmetics at QIMA Life Sciences.



Magalie Cabannes

Application Laboratory Manager

Greentech

A novel upcycled super-emollient obtained from an avocado oil co-product

Cabannes Magalie¹ *, Piccirilli Antoine² Dr Berthon Jean-Yves¹ , Francolon Romain¹ 1 Greentech SA Biôle Clermont Limagne 63360 Saint Beuzire, France, 2 La Fabrique Végétale ,18 chemin de Tisson 86000 Poitiers, France,
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Synthetic silicones such as dimethicones, while valued for their smooth sensory and emollient properties, raise concerns due to their poor degradability and potential environmental accumulation. That is why, in the search of more sustainable and biocompatible formulations, there is a growing demand for natural alternatives to dimethicones.

The objective of that study was thus to fill these gaps developing an effective natural substitute to mimic, or at least approach, soft and emollient properties of dimethicones. Our interest focused thus on a novel semi-solid oil derived from avocado, specifically enriched in palmitic acid, which exhibits unique physico-chemical and functional properties suitable for use in dermatological and cosmetic compositions. A specific process of extraction, purification, and enrichment of fatty substances from the unsaponifiable fraction of avocado oil was used, resulting in the obtention of a stable, semi-solid lipid product (called here SSL) with high content of saturated fatty acids, as palmitic acid.

Characterization of the semi-solid oil polymorphism with gas chromatography and differential scanning calorimetry (DSC), confirmed its fatty acid composition (C16:0 Palmitic acid 35-45%, Palmitoleic acid 3-10% omega-7, C18:1 Oleic acid 40-60% omega-9, C18:2 Linoleic acid 5-15% omega-6); melting behavior, and oxidative stability (98 °C, 23h, Rancimat test; ISO EN 6886). Of interest, developed product SSL has a melting point higher than conventional avocado oil (45-55 °C), making it ideal for structuring formulations. Its semisolid nature enables it to act as a structuring agent, improving sensory feel and mechanical stability without requiring synthetic waxes or petroleum-based agents (silicones, paraffin oil).

Different studies were also conducted with SSL at 5 to 15% vs reference products such as paraffin oil substitute, dimethicone or avocado oil to assess its functional properties. These studies revealed a similar rheological behavior than paraffin with a visually richer aspect and without soaping effect. Another experiment was performed with SSL 5 % vs 5% dimethicone on 20 volunteers from 22 to 54 years old. Panelists described similar products in term of softness, richness, feeling and nourishing effect on skin.

Also, a moisturizing test was performed on 10 volunteers using a Corneometer[®] CM825 after a single application of an emulsion containing SSL 20% or paraffin oil 20%. A comparative effect was observed between both products after one hour, three hours and seven hours. Finally, an ex vivo study conducted on damaged strands hair revealed significant results (*p<0,05) with SSL on hair suppleness (+25%), hair softness (+25%) and hair nourishing (26%) contrary to classical avocado oil. These properties are related to its high content in palmitic acid. This study allows thus the development of a natural upcycled alternative to dimethicones showing comparable soft touch associated with strong emollient properties related to palmitic acid content. To complete these researches, a proteomic study is on going with SSL 5% on skin explants vs placebo in order to get an exhaustive vision of complementary skin biological properties. These researches provide a novel functional ingredient from avocado, rich in palmitic acid, with sensory, stabilizing properties in cosmetics skin and hair care.

Magalie Cabannes completed her Master's degree of fine chemistry specializing in flavors, perfums and cosmetics.

She joined Greentech in 2013 at the Head of the application laboratory. The laboratory is a technical support for the customers' formulation projects. Within the laboratory she offers formulas and advices to serve the actives of Greentech. Involved in the R&D process, she takes part to the development of natural origin functional ingredients.



Session Three

Hair Products & Devices

Chaired by Bernice Ridley



Prof. Zhenyu Jason Zhang

Professor of Soft Matter Engineering

University of Birmingham

KEYNOTE: Conditioning Our Hair – A multiscale and interdisciplinary task

Wednesday 2 July 15:30 - 16.00

Developing sustainable solutions for hair conditioning has been our focus for the past ten years, which involves a multiscale investigation covering both molecular, meso- and consumer scale measurements.

In this talk, I will focus on our recent work in utilizing botanical oil as alternative to conventional silicone, presenting the considerations on deposition, wetting, and lubrication properties.

Dr Zhenyu Jason Zhang is a Professor of Soft Matter Engineering at the School of Chemical Engineering, University of Birmingham.

With twenty years' research experience and expertise in investigating soft matter at surfaces and interfaces, he leads multiple large research programmes funded by UK Research & Innovation, EU Horizon Europe, the Royal Academy of Engineering, and forms strategic partnership with industrial collaborators including Procter & Gamble, Innospec, FiberLean Technologies.

He has a broad interest in tribology, surface/molecular interactions, and polymer physics, and applies them in practical applications such as Formulated Products, Surface Coatings, Healthcare Technologies, and Food Engineering.

He received the McBain Medal 2023 by Royal Society of Chemistry & Society of Chemical Industry in recognizing his accomplishment in colloids and interface research.



Gabriela Daniels
(Programme Director: Science)



Dr Yimeng Jiao

University College of the Arts London

Exploration of textured hair characteristics following lipophilic active applications

Authors: Temi-Lola Mahir, Yimeng Jiao, Diogo Baltazar, Maxi Heitmayer, Gabriela Daniels

Objective. This project explores leave-on product characteristics and hair tress testing methods of relevance to textured hair.

Materials and methods. Two non-ionic, oil-in-water emulsions were prepared. The Active formulation contained a triglyceride – triolein. The Control formulation contained the emulsification system only. The formulations were characterised via: texture analysis (cohesion and adhesion) using TA.XT Plus Texture Analyser (Stable Microsystems, UK), rotational and oscillatory rheology using Thermo Scientific™ HAARTEM Mars™ iQ Air rheometer (Cole-Parmer, UK). Ten Type 8 hair tresses were prepared from chemically and thermally untreated hair collected from two donors. The formulations were applied to the tresses following a defined protocol. The tresses were tested before, after one and after four repeated product applications via adaptations of wet combing and dry friction tests using fibre.one (Diastron, UK) and tri-point bending test using TA.XT Plus Texture Analyser (Stable Microsystems, UK).

Results. Product characterisation. The addition of triolein to the non-ionic emulsion increased the cohesion and adhesion properties of the emulsion. Both emulsions exhibited non-Newtonian shear thinning behaviour, however the Active formulation exhibited higher viscosity at all shear rates in line with the increased oil phase. The thixotropic nature of the formulations is desirable for leave-on products expected to maintain high viscosity at rest and break down rapidly under shear thinning conditions. The Active formulation also exhibited a better balance between structural stability at rest and deformation in response to force, suggesting superior suitability for a leave-on product. **Hair testing.** The tress test data was not symmetrically distributed hence the sign test was applied, testing if the directions of the median paired differences between two conditions are statistically significant. The following statistical directions of change in samples were detected: in the wet state, combing forces reduced in presence of product in comparison to untreated hair, the multiple Active applications causing further reductions from the single Control and single Active formulations. Multiple Active applications also reduced the dry friction of hair in comparison with untreated hair and single Control and Active applications. The Control formulation caused a reduction of hair stiffness in comparison with untreated hair, whilst the application of Active caused an increase in comparison with Control.

Conclusion. Leave-on emulsions for textured hair, reapplied multiple times between washing, have the capacity to reduce wet combing and detangling of hair. Higher quantity of lipophilic phase enhances this effect, which could be attributed to reduced inter fibre cohesion. In dry friction test, the triolein presence and repeated application also caused reduction in friction. This could be attributed to better hair surface coverage by the Active reapplications and the formulation's superior shear thinning property. The increase tress stiffness after multiple Active applications could be due to the higher firmness of the product contributing to the bending resistance of the hair fibres. Thus, this work identifies textured hair characteristics that could be altered via product applications and measured using tests commonly applied to straight hair. Further test adaptations, specifically to the dosing, are desirable to improve the data distribution and the measured magnitude of differences.

Gabriela Daniels is the Programme Director for Science courses at the London College of Fashion (LCF), the home of the longest standing specialised cosmetic science degree course in the UK, and an Honorary Lecturer in the Department of Computer Engineering at University College London (UCL).

She specialises in teaching and researching cosmetic science and has published peer reviewed research on hair-related topics. She also collaborates on interdisciplinary research aimed at responsible and inclusive cosmetic product design and has published and presented on these and other cosmetic-related subjects.



Murielle Mason

Research Associate

TRI Princeton, USA

Bridging Consumer Perceptions and Technical Measurements: Assessing Hair Straightness and Alignment with Optical Imaging

Mason, M.¹, Davies, T.², Ayton, S.³, Cornwell, P.A.¹

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Objective - Translating consumer perceptions of hair feel and appearance into technical measurements is crucial in hair research and in substantiating claims¹. However, very few published studies have been performed to validate these techniques through in-depth consumer research². The aim of this study was to correlate consumer language and perceptions related to hair straightness and alignment, with technical measures taken with optical imaging (the Rumba technique).

Methods - This study started with online qualitative research exploring the words and phrases used by consumers to describe the appearance of straight, wavy and curly hair. Panellists were asked to propose words and phrases that described the visual attributes of images of hair of varying alignment and straightness levels. This work involved five panels of 50 adult female consumers each in the US, UK, China, India, and South Africa. A second round of virtual surveys investigated how well consumer perception related to technical measures of these attributes on the Rumba by assessing the panellists' ability to differentiate the appearance of 15 hair swatches with different levels of alignment and straightness. In these tests, panellists were presented with multiple sets of three swatch images and ranked them according to different descriptive words and phrases identified in the qualitative research.

Results - Qualitative studies showed that the most popular words used by consumers to describe hair appearance included hair type descriptors like 'frizzy', 'straight', 'wavy', 'curly' while other language like 'shiny', 'dry', 'rough', 'smooth', 'conditioned', 'healthy', 'messy', and 'damaged' described hair quality. Surprisingly, 'alignment', a word preferred by hair scientists, was not frequently used by consumers. Alignment was only mentioned in about 0.4% of responses, as compared to the most popular words which were used in approximately 75% of panellist responses. Quantitative studies investigated the correlation between straightness, *S*, and alignment, *A*, values measured on the Rumba, with the consumer perceptions of 'frizz' and 'straightness'. They also tested the ability of consumers to discriminate between different levels of *S* and *A*, helping to define levels of consumer-perceptible change in these measures. Finally, the consumer-validated method was used to assess the impact of cosmetic treatments, styling methods, chemical and physical damages on the appearance of hair.

Conclusions - This study expands industry understanding of consumer language associated with hair appearance, and how well these descriptions compare to technical measurements of straightness and alignment.

References

1. Evans, T. (2020). Practical Aspects of Shampoo and Conditioner Testing. In: Practical Aspects of Cosmetic Testing: How to Set up a Scientific Study in Skin Physiology, Second Edition (Fluhr, J.W. Ed.) Springer-Verlag Berlin, Chapter 19, 207-227.
2. Assmus, U., Augustin, P., Henson, H., P., H., Lang, G., H., L., et al. (2008) Determination of the feel of hair after cosmetic treatment - sensory and objective test methods. IFSCC Magazine 11 (2), 121-128

Murielle Mason is a Senior Research Associate on the Hair Claims team at TRI Princeton, specializing in evaluations of hair appearance and breakage. Over the past year, Murielle has developed a standardized method for quantifying hair straightness, with applications to chemically and heat-treated hair. Today, she will be presenting her latest findings on the relationship between consumer perceptions of hair straightness and alignment and objective technical measurements.



Mike Hindley

Research and Technology Specialist

Croda Europe Ltd

Towards Customised Hair Care: An Objective, Multi-Method Assessment Characterizing Hair Type and Treatment Efficacy

A comprehensive, multi-method investigation into the structural and chemical diversity of often underrepresented hair types and their varied responses to bleaching and peptide-based restorative treatments. Here, the authors employed a suite of analytical techniques - including FTIR spectroscopy, thermal analysis (TGA and DSC), mechanical tensile testing - to systematically compare hair fibres under consistent experimental conditions, with proteomic analysis aiming to shed light on the impact of certain hair treatment. The findings reveal significant differences in molecular composition, thermal behaviour, and mechanical properties across hair types, particularly in response to damage and treatment, laying the groundwork for the development of more personalized and effective hair care solutions tailored to the unique characteristics of diverse hair types.

Graduated from the University of Hull in summer 2007 with a Masters degree in Chemistry (MChem). After leaving academia, Mike started work with Croda (Cowick Hall, Goole, UK) in the Personal Care sector working primarily within Hair Care gaining 17+ years' experience in the industry, but with some cross over into colour cosmetics and skin care.

Working now as the Research and Technology Specialist in Hair Care, Mike works on identifying new technologies and research partners to expand Croda's hair care portfolio as well as researching new testing capabilities and methods which can be used to make new and novel claims in the hair care market.



Poster Presentation

&

Drinks Reception



Dr Marta Bertolini

Managing Director

QIMA Monasterium GmbH

Mechanical epilation exerts complex biological effects on human hair follicles and perifollicular skin: An ex vivo study approach

Objective: Electrical epilation of unwanted hair is a widely used hair removal method, but it is largely unknown how this affects the biology of human hair follicles (HF) and perifollicular skin. Here, we have begun to explore how mechanical epilation changes selected key biological read-out parameters ex vivo within and around the pilosebaceous unit.

Methods: Human full-thickness scalp skin samples were epilated ex vivo using an electro-mechanical device, organ-cultured for up to 6 days in serum-free, supplemented medium, and assessed at different time points by quantitative (immuno-)histomorphometry for selected relevant read-out parameters in epilated and sham-epilated control samples.

Results: Epilation removed most of the hair shafts, often together with fragments of the outer and inner root sheath and hair matrix. This was associated with persistent focal thinning of the HF basal membrane, decreased melanin content of the residual HF epithelium, and increased HF keratinocyte apoptosis, including in the bulge, yet without affecting the number of cytokeratin 15+ HF epithelial stem cells. Sebocyte apoptosis in the peripheral zone was increased, albeit without visibly altering sebum production. Epilation transiently perturbed HF immune privilege, and increased the expression of ICAM-1 in the bulge and bulb mesenchyme, and the number of perifollicular MHC class II+ cells as well as mast cells around the distal epithelium and promoted mast cell degranulation around the suprabulbar and bulbar area. Moreover, compared to controls, several key players of neurogenic skin inflammation, itch, and/or thermosensation (TRPV1, TRPA1, NGF, and NKR1) were differentially expressed in post-epilation skin.

Conclusion: These data generated in denervated, organ-cultured human scalp skin demonstrate that epilation-induced mechanical HF trauma elicits surprisingly complex biological responses. These may contribute to the delayed re-growth of thinner and lighter hair shafts post-epilation and temporary post-epilation discomfort. Our findings also provide pointers regarding the development of topically applicable agents that minimize undesirable sequelae of epilation.

Keywords: epilation; hair growth; hair removal; hair treatment; inflammation; safety testing.

Dr. Marta Bertolini is the Managing Director of QIMA Monasterium GmbH, Münster, Germany, which is part of the QIMA Life Sciences Group, one of the leading CROs in the field of hair and skin research.

Guided by her mentor, Prof. Ralf Paus, she has built up a comprehensive, interdisciplinary proficiency in the entire field of dermatology. With over 15 years of experience and more than 50 publications, she is impassioned toward hair and skin immunodermatology and the use of pre-clinical experimental models to advance understanding of pathogenesis, target identification and efficacy studies.

She leads a robust team of 40+ scientists at QIMA Monasterium GmbH and fosters collaborations with industry partners, focusing on translational research.

Dr. Bertolini has received numerous awards and honors, including a research award from Alopecia Areata Deutschland e.V. (2018) and the Martha Schwarzkopf Award for Women in Science from Henkel (2022), and has been nominated as a World Expert "Hair" by Expertscape in 2021.

Session Four

Sensory Benefits & Testing

Chaired by Tracey Sanderson

Sponsored by :





Lise Dreyfuss

Innovation Manager

SAM Sensory & Consumer Research

KEYNOTE: The Future of Sensory: claims, consumers and context in a transforming industry

In a world where consumers demand both authenticity and relevance, the role of sensory and consumer science is rapidly evolving. This keynote will clarify what sensory and consumer claims are—and how they differ from performance and functional claims—while highlighting their growing strategic value in the cosmetic industry. Sensory claims in particular offer a more intuitive and emotionally resonant path to connect with consumers, bridging the gap between product experience and brand promise.

Looking ahead, the future of sensory lies in engaging the right consumers -those who bring quality, diversity, and depth to data. Advances such as psychographic profiling and more inclusive testing approaches are reshaping how we collect and interpret sensory data. New methods of engagement, including gamification and contextual testing, encourage more truthful, behaviorally anchored responses, and foster a stronger sense of participant inclusion.

This talk will also explore how AI is transforming the Sensory and Consumer research landscape -from participant targeting to data interpretation- and how cross-category sensory experiences (e.g., food influencing non-food perception) are opening new frontiers. As cosmetic scientists, embracing these shifts will be key to designing meaningful, transparent, and differentiating sensory claims in the years ahead.

Lise Dreyfuss is Innovation Manager at SAM Sensory & Consumer Research. Lise holds a Master's degree in Sensory Analysis from the University of Burgundy.

Alongside her role at SAM, Lise holds the Research Chair position at the ESN European Sensory Network plus Chairwoman of Sensory Analysis committees at AFNOR French Standardisation Association and ISO International Standardisation Organisation where she is leading standardisation in Sensory Analysis worldwide.

Lise has also been an Associate Professor in Sensory and Consumer Sciences for Innovation at Tours University in France since 2005.



Dr Mais Saleh

Associate Professor

University of Jordan

Design of Pro-Vitamin E Phosphate-loaded Solid Lipid Nanoparticles for Dermal Delivery

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This study aimed to investigate the feasibility of forming Tocopherol phosphate solid lipid nanoparticles (TP-SLN) and to evaluate their ex vivo skin penetration profiles and the effect on skin integrity by measuring trans-epidermal water loss (TEWL).

The SLN dispersions were prepared by phase inversion using a mixture of medium-chain triglycerides (MCT) and surfactants are Soybean lecithin and macrogol hydroxystrearate (PEG HS) which were used to stabilize SLN. The SLN dispersions were evaluated for encapsulation efficiency (EE) of TP, particle size, polydispersity index, and zeta potential.

Our results showed that the reduction in the SLN size and decrease in the surface charge with the addition of TP, indicates that amphiphilic TP is packed with surfactant in the shell of SLN, and provides higher physical stability. The TP-SLN (0.5% and 2%) significantly increased the flux (4 to 6-fold) and accumulative uptake (4-8 folds) over 6 h of α -TP through human skin membrane compared to the free TP control of equivalent concentration. The TP-SLN did not impair skin integrity after topical application. These findings revealed that the TP-SLN consisting of a Mixture of MCT, lecithin, and PEG HS could significantly increase the accumulative uptake of TP in the skin and showed a significantly enhanced skin delivery. These results indicate that the studied TP-SLN dispersions may be a promising carrier for the dermal delivery of TP.

Objective: The purpose of this study was to design Tocopherol phosphate-loaded SLN (TP-SLN) dispersion to enhance the dermal delivery of TP.

Method: The lipids in SLN are composed of a mixture of medium-chain triglycerides and surfactants are Soybean lecithin and macrogol hydroxystrearate which were used to stabilize SLN. The phase inversion method was performed to prepare the 0.5% and 2% TP-loaded SLN. The SLN dispersions were evaluated for encapsulation efficiency (EE), particle size, polydispersity index, and zeta potential.

Results: The SLN dispersions are physically stable with a low average size between 30 and 49 nm. The in-vitro release testing of TP from the TP-SLN dispersions was evaluated by synthetic porous PES membrane shows doubled the cumulative amount of 0.5% TP-SLN dispersion diffusion over 6 h was compared to 0.5% gel-like control (3.7 vs. 2.0 mg.cm⁻² h⁻¹). The ex-vivo penetration testing of TP from 0.5% and 2% TP-SLN dispersions, TP-SLN gel, and control aqueous solution was assessed using Franz diffusion cells fitted with human skins shows the TP-SLN dispersions (0.5% and 2%) result in improved permeation rate (4 to 6-fold) and accumulation over 6 h (4 to 8-fold) through human skin compared to the TP control.

Conclusion: The TP-SLN consisting of a Mixture of medium chain triglycerides, Soybean lecithin, and macrogol hydroxylstrearate could significantly increase the accumulative uptake of TP in the skin and showed a significantly enhanced skin delivery. These results indicate that the studied SLN may be a promising carrier for the dermal delivery of TP.

Dr. Mais Saleh is an Associate Professor in Pharmaceutical science/Cosmetics science at the Department of Pharmaceutics and Pharmaceutical Technology, University of Jordan. She received her Ph.D. in Pharmaceutical Science in 2019 from King's College London.

Her Ph.D. thesis focused on the Delivery of tocopherol phosphate nanomaterials into the skin to protect against ultraviolet radiation. During her Ph.D. project, she worked with Professor Stuart Jones's group in 2014 at the Institute of Pharmaceutical Science, Waterloo campus, and Professor Antony Young's group at St John Institute of Dermatology, Guy's Hospital.

Recently, her research interests have focused on the delivery of cosmetic actives into viable skin layers and the applications of nanotechnology such as solid lipid nanoparticles and liposomes in cosmetic formulations.

Dr. Mais Saleh is an author of 12 peer-reviewed papers and a member of the Society of Cosmetic Science (SCS), Cosmetosciences, and the Middle East Association of Pharmaceutical Medicine Professionals (MEAPP). She received a Postdoctoral scholarship at King's College London funded by the Scientific Research and Innovation Support Fund in Jordan for the year 2022.



Professor Amal Ali Elkordy

Professor of Pharmaceutics

University of Sunderland, UK

Niosomal Encapsulation of Antioxidants: Carotenoids

Nanoparticulate vesicles in the form of niosomes were prepared via the thin-film hydration method using Span 60 or Span 83 as non-ionic surfactants, with cholesterol as a vesicular membrane stabiliser and Solutol HS-15 as a co-surfactant.

The effects of surfactant type, cholesterol-to-surfactant molar ratio, and co-surfactant concentrations on antioxidants “carotenoids” entrapment efficiency (%EE), vesicle size, and polydispersity index (PDI) were investigated.

Results showed that Span 60-based formulations demonstrated superior vesicle formation, stability, and EE, particularly for β -Carotene, reaching up to 98%. In contrast, Span 83 did not form stable vesicles. The inclusion of Solutol HS-15 enhanced the encapsulation of Crocin, with 20 mol% yielding the highest EE% (81%), due to increased bilayer hydration and aqueous core expansion. Probe sonication effectively reduced vesicle size and improved PDI in most formulations, vesicle size was ranging from 170 to 520 nm.

The analysis revealed higher EE% for β -Carotene than Crocin, these findings confirm that Span 60-based niosomes, particularly when optimised with cholesterol and co-surfactants, are promising nanocarriers for antioxidant delivery with a potential application in cosmetology.

Amal is Professor of Pharmaceutics, School of Pharmacy and Pharmaceutical Sciences, University of Sunderland. Prof. Elkordy has a degree in Pharmacy and an MPhil in Pharmaceutical Technology, she obtained her PhD in Pharmaceutical Technology from the School of Pharmacy, University of Bradford.

She published a significant number of papers in the field of pharmaceutics, based on her experience in nanomedicines, antioxidants, and niosomal/liposomal delivery systems.

Amal supervised many PhD students to their successful completion, and she designed MSc Pharmaceutical and Bio-Pharmaceutical Formulations which is one of the few masters courses in the UK that covers biopharmaceuticals as well as pharmaceuticals. Prof. Elkordy acted as external examiner for more than 20 PhD examinations at different universities in the UK and for 23 research theses abroad.



Aline Moreira de Souza

R&T Manager

Croda Europe Ltd

A Novel Approach to Increasing SPF Protection and Providing Solutions to Improve the Spreadability of Formulations

This study introduces a new method to evaluate how well sunscreen formulations spread on the skin and how this affects their Sun Protection Factor (SPF).

Over 100 formulations have been developed and tested using a novel in-vitro spreadability technique involving robotic application and image analysis. A strong correlation between poor spreading, uneven UV filter distribution (measured via Raman spectroscopy), and low SPF performance was found. Conversely, well-spread formulations showed higher SPF and better UV filter distribution.

The findings validate this new technique as a reliable tool for improving sunscreen formulation by enhancing spreadability, which in turn boosts UV protection.

Aline Souza joined Croda in 2014 and is the current R&D Manager for the Photoprotection business, specializing in sunscreen development.

With over 20 years' experience in the chemical industry and more than 12 years in R&D for cosmetic formulations, she excels in formulating and substantiating claims in cosmetic products and raw materials.

Aline holds a Bachelor's degree in Chemistry and an MBA in Cosmetic Technology. She has presented numerous technical seminars at global cosmetics events, as well as articles publications, highlighting her expertise and contributions to sun care and personal care products.



Student Poster Awards

Chaired by SCS President, Dan Whitby

Session Five

Breakthrough Claims Testing Methods

Chaired by Susan Ayton

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Andrew Kirby

Quality Manager and Scientific Adviser

Cutest Systems

KEYNOTE: The State of the Art and a Crystal Ball into What the Future Might Hold for Clinical Studies on Cosmetic Products

In this talk I will discuss the current state of the art in measuring the benefits of cosmetic products in clinical studies. I will discuss the latest advanced instrumentation being used to collect data to understand how skin behaves and responds to products and how advanced image analysis and AI supported processes are enhancing our ability to evaluate skin.

I will also discuss the exciting opportunities brought by molecular biology, proteomics and lipidomics and how they can be routinely incorporated into clinical studies to reveal not only how skin is functioning, but also how products or the environment are altering the function at the molecular level. These new insights provide new targets for actives research, or new strategies for improving skin for consumer benefits. We are entering an exciting new age where we can prove in vivo the things that only previously could be demonstrated in cell culture models.

I will try to illustrate why this presents such an exciting opportunity for our industry to develop the next generation of innovative products that will bring new consumer benefits.

PhD pharmacist, Post Doc research in enzyme inhibition in dermatology and oncology, holder of multiple worldwide patents in microneedle and microparticle based drug delivery, and in NAD+ boosters.

Founder of several start-ups. Joined Cutest in 2022 after being a client, and revolutionised the company's processes by digitalisation and automation.

Recently completed a screenplay exploring the combined effects of AI and advances in reproductive technologies on society.



Dr Marta Bertolini

Managing Director

QIMA Monasterium GmbH

Investigating the Role of DNA Damage-Induced Cellular Senescence in Hair Follicle Aging: Towards Prolonged Hair Longevity

This study investigates the complex process of hair aging, particularly focusing on cellular senescence, a key hallmark of aging, triggered by environmental factors such as UV radiation and pollution.

We aimed to induce cellular senescence by causing DNA damage in hair follicle (HF) cultures *ex vivo* using BrdU treatment. BrdU significantly increased DNA damage and cellular senescence markers, which, in turn, led to a noticeable decline in hair shaft quality demonstrated by reduced hair shaft keratin production.

Functionally, this BrdU-induced cellular senescence resulted in a shortened hair growth phase and decreased proliferation of hair matrix keratinocytes.

These preliminary findings provide valuable insights into senescence-induced HF aging and may pave the way for targeted cosmetic interventions to promote hair health and longevity.

Dr. Marta Bertolini is the Managing Director of QIMA Monasterium GmbH, Münster, Germany, which is part of the QIMA Life Sciences Group, one of the leading CROs in the field of hair and skin research.

Guided by her mentor, Prof. Ralf Paus, she has built up a comprehensive, interdisciplinary proficiency in the entire field of dermatology. With over 15 years of experience and more than 50 publications, she is impassioned toward hair and skin immunodermatology and the use of pre-clinical experimental models to advance understanding of pathogenesis, target identification and efficacy studies.

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Elena Zanca

Head of R&D and Innovation Haircare

Davines Group

A Multiscale Model of Hair Repair: Biomolecular Markers and Sensory Validation

This presentation showcases a novel integrative model for evaluating hair fibre repair and restoration, bridging cosmetic efficacy with molecular integrity.

Through biochemical markers such as protein carbonylation and lipid restoration, the study quantifies structural recovery in hair exposed to chemical and environmental stressors.

These objective molecular results align with global sensory evaluations, capturing perceptible improvements in hair condition—both in professional salon treatments and at-home use.

By connecting deep biological repair with tangible, real-world benefits, this approach establishes a new scientific standard for validating haircare efficacy across consumer and professional applications.

Biotechnologist and cosmetic scientist, currently serving as Head of Research, Development, and Innovation – Hair Care at Davines SpA.

With over ten years of experience in the cosmetics industry, I specialize in the development of innovative hair care products, integrating biotechnological approaches and bioactive ingredients. I hold degrees in Industrial Biotechnology (University of Parma) and Cosmetic Science and Technology (University of Ferrara).

I have contributed to academic research on enzymatic and oligopeptide-based technologies as sustainable alternatives in hair treatments and have co-supervised master's theses in this field. Some work has been published in *Cosmetic Technology* and presented at international conferences such as the European Rheology Conference. I also regularly lecture on cosmetic product development at the Universities of Bologna and Ferrara, helping to bridge the gap between scientific research and industrial innovation



Dominic Pangilinan

PhD student

Translational and Clinical Research Institute
of Newcastle University,
in collaboration with Croda Europe Ltd.

Titanium Dioxide Actives Against Solar Light: Anti-photoaging at a Gene Expression Level

Titanium dioxide (TiO₂) is an inorganic sunscreen filter found in many mineral-based sunscreens, providing broad spectrum UV protection with a greater affinity for UVB.

It is therefore an active ingredient which can be optimised and employed to protect against photoaging.

In this presentation, titanium dioxide of different particle sizes, in oil dispersions, will be discussed in terms of blocking various wavelengths of the solar spectrum and alleviating UV-induced expression of various photoaging-associated genes.

The talk will draw from previous RNAseq findings in a paper published in last month's issue of The FASEB Journal.

Dominic is a final year PhD student at the Translational and Clinical Research Institute of Newcastle University, in collaboration with Croda Europe Ltd.

His project investigates the impact of UV on photoaging-associated signalling pathways in skin fibroblasts and the photoprotective effects of inorganic sunscreen filters at a genetic level.

The research conducted by Dominic is funded by the Biotechnology and Biological Sciences Research Council (BBSRC).



Poster Presentations
&
Student Poster Competition

Poster Presentations

From Folk Remedies to Modern Skincare: Uncovering the Anti-Inflammatory Power of *Epilobium angustifolium* and *Plantago major*

Jaana Alius, PhD Student, Liverpool John Moores University

Development of Sustainable Hair Conditioning Technologies

Thanmaya Arunkumar, PhD Student, University of Birmingham

Evaluating the Efficacy of Eye Creams: A Study on Skin Hydration Using the Epsilon™ Model E100



Lori Ciorte, Biox Systems Ltd

Hair Fibre Damage Repair: Internal Hair Repair Through Replenishing Amino Acids lost to Damage

Dr Colin Giles, Unilever

Investigating Sebocyte Differentiation and Lipid Metabolism in Acne Vulgaris Using the SEBO662AR Cell Line for Skin Care Research

Alain Moga, Sales Director, Qima Life Sciences



From Folk Remedies to Modern Skincare: Uncovering the Anti-Inflammatory Power of *Epilobium angustifolium* and *Plantago major*

Jaana Alius, PhD Student, Liverpool John Moores University

Background

In a world where skincare innovation often looks forward, this study looked back to the resilient flora of the Nordic and Baltic regions. Shaped by the growth conditions in Northern Europe – low temperatures combined with high UV radiation, *Epilobium angustifolium* and *Plantago major* have been trusted for centuries to heal and protect the skin. In this study, they are reimaged from traditional remedies for modern cosmetic science, investigating their ability to strengthen the skin barrier and reduce inflammation.

Objective

This study aims to investigate the anti-inflammatory properties of two plants based on Nordic ethnobotanical tradition and to see how they perform when formulated into a modern emulsion base.

Method

Using Soxhlet extraction followed by ethanol removal and glycerine stabilisation, we formulated each plant extract into a simple, skin-friendly emulsion. Controlled forearm tests measured transepidermal water loss (TEWL) and erythema at 0, 1, 2, and 24 hours, compared against a placebo base.

Results

Both botanical emulsions delivered better outcomes than the placebo, but one extract stood out for its rapid and sustained improvements in skin hydration and redness reduction. Interestingly, even the placebo showed minor benefits, highlighting the contribution of humectants and emollients to overall skin health.

Conclusion

The findings suggest that *Plantago major* holds remarkable promise despite its sensory challenges as a next-generation natural active. Bringing folklore wisdom to modern formulation science reveals new opportunities to innovate with authentic, plant-based skincare ingredients.

Development of sustainable hair conditioning technologies

Thanmaya Arunkumar¹, Yu Liu¹, Jennifer Mash², Peter Fryer¹, Zhenyu Jason Zhang¹

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2. Proctor and Gamble, Hair care, Business Innovation Centre, Mason OH 45040, USA

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Objective:

Hair conditioning involves depositing conditioning agents to the hair's surface to reduce friction and improve its appearance. Silicone oil (Si-Oil) is a key ingredient in conventional hair conditioners, providing lubrication and maintenance advantages. Sustainable bio-derived materials could help reduce environmental impact, but non-silicone conditioners often fall short in performance compared to silicone-based ones. The aim is to characterise silicone oil's spreading and wetting kinetics, the results of which could construct the framework for bio-derived oils.

Methods:

Spreading and wetting characteristics were analysed on contrasting substrates. The Wilhelmy plate method was used to determine the surface tension of 10 different silicone oils, and a Contact angle goniometer was used to monitor the spreading and wetting kinetics on hydrophilic (Glass) and hydrophobic (Teflon) surfaces, representing damaged and undamaged parts of hair. Various samples include PDMS oils (5cSt, 10cSt, 100cSt, 10000cSt) and six other industrial silicone oils. By analysing the interfacial tension and spreading kinetics on different surfaces, the spreading kinetics of silicone oils can be developed and validated, potentially serving as screening models for bio-derived oils.

Results:

Different models have been explored to describe the maximum spreading parameter $\beta_{\max} = D_{\max}/D_0$ as a function of non-dimensional numbers, such as the Reynolds number (R_e) and the Weber number (W_e). Most models in the literature are restricted for $R_e > 100$. Most of the experimental data in the set of selected silicone oils lie $R_e < 10$. This raised the need for a new model specific to high-viscosity samples. The scaling laws in the literature suggested that the spreading parameter β_{\max} scaled with R_e and W_e according to power law. After correlating and fitting the data with a power law, it was observed that β_{\max} scaled with $R_e^{0.05}$ and $W_e^{-0.3}$ for oils spreading on glass substrates. It was observed that W_e played a more dominant role in determining spreading effectiveness on glass compared to R_e , which could be attributed to a similar rheology. However, on Teflon, the spreading behaviour was found to be non-correlated with W_e and R_e . It was also observed that most of the oils spread better on hydrophilic substrates.

Conclusion and Future work:

The results emphasised the critical role of surface tension-driven forces in the spreading dynamics of the silicone oils. Most oils spread better on hydrophilic surfaces, representing the damaged part of the hair. Further, to establish a complete model for β_{\max} as a function of R_e and W_e , additional data points will be gathered by including oils with varying surface tension and viscosity. Further analysis will be focused on correlating R_e and W_e with the Si deposition data.

Evaluating the Efficacy of Eye Creams: A Study on Skin Hydration Using the Epsilon™ Model E100

Lori Ciorte, Biox Systems Ltd

The aim of this study was to measure the hydration of the skin around the eyes using the Epsilon™ Model E100 to characterize the efficacy of several commercially available eye creams.

The skin around the eyes is unique and requires special care due to its delicate structure. Eye creams play a crucial role in maintaining the health and appearance of this sensitive area by providing hydration, anti-aging benefits, reducing puffiness, minimizing dark circles, and protecting against environmental damage.

The Epsilon™ Model E100 is a cutting-edge instrument designed for precise skin hydration measurement. This device utilizes advanced contact imaging technology to map the near-surface dielectric permittivity (ϵ) of the skin, which is directly related to its hydration status [1]. The instrument allows simultaneous acquisition of image and hydration data, providing a comprehensive analysis of skin hydration levels. It is particularly useful for studying skin hydration due to its ability to filter out artefacts such as bad contact, lines, wrinkles, and surface water, ensuring accurate measurements [2]. This study highlights the importance of eye creams in maintaining skin health and demonstrates the efficacy of the Epsilon™ Model E100 in providing detailed and reliable hydration measurements.

Reference:

1. W. Pan, X. Zhang, E. Chirikhina and P. Xiao, "Skin Hydration Measurement Using Contact Imaging", SCC Showcase, New York, December 11 - 12, 2014.
2. L. Ciorte, "Epsilon™ Skin Hydration Measurement: the Power of the ϵ -Filter", Focus-LiveHydration, Skinobs-12-May, 2022.

<https://news.skinobs.com/wp-content/uploads/2022/05/Biox-Presentation-Focus-LiveHydration-Evaluation-Skinobs-12-May22.pdf>

Hair Fibre Damage Repair: Internal Hair Repair Through Replenishing Amino Acids lost to Damage

Dr Colin Giles, Unilever

Authors: Colin Giles*, Stephen Maguire, Richard Barfoot, Julie Roberts, Victoria Fraser, Arash Moghadam

OBJECTIVE: It is well known that the protein structure and integrity of hair fibres are depleted by a range of chemical, physical and environmental processes, including processes of hair colouring, bleaching, heat styling, UV/sunlight and excessive grooming. Proteomic studies previously reported have identified the levels and ratios of specific proteins and amino acids that are modified and depleted during these exposures. The intent of this study was to understand the impact and effectiveness on fibre repair of replenishing certain amino acids.

METHODS: A range of methods and techniques have been used to determine the impact on the physico-chemical properties of damaged hair fibres from amino acid actives delivered from a range of relevant hair care formats. Techniques have included Differential Scanning Calorimetry (DSC) to assess the integrity of the internal protein structure, FT Infra-Red spectroscopy to explore internal bonding, Raman spectroscopy to assess penetration, fatigue mechanical stress testing as well as sensorial and fibre surface measurements. The studies have included assessment of delivery from soaks, commercial shampoos, conditioners and rinse-off treatments

RESULTS: Results indicate that glutamic acid, which is one of the most prevalent amino acids lost from damaged hair is also one of the most effective amino acids in repairing hair, especially with regard to the internal structure and integrity of the hair fibre. Furthermore, the data indicates that the more water-soluble forms of glutamic acid are more effective than the pure acid form.

CONCLUSION: Chemical, mechanical and environmental factors all damage the protein structure of hair fibres leading to protein modification and amino acid loss, which in turn significantly reduces the integrity of the hair fibre ultimately leading to breakage and hair fall. Internal fibre repair through replenishment of key amino acids is not only feasible but is one of the most effective routes to delivering fibre repair.



Investigating Sebocyte Differentiation and Lipid Metabolism in Acne Vulgaris Using the SEBO662AR Cell Line for Skin Care Research

Alain Moga, Sales Director, QIMA Life Sciences

This study investigated sebocyte differentiation and lipid metabolism in acne vulgaris using the SEBO662AR cell line, a physiologically relevant in vitro model characterized by stable expression of a functional androgen receptor. The research aimed to evaluate its utility as a tool for advanced skin care testing.

Acne vulgaris is associated with irregular sebum production influenced by hormonal fluctuations, changes in the microbiome, and dietary factors. The study employed a differentiation mixture (Diff Mix) to simulate these imbalances and analyzed gene expression and lipid synthesis.

The results revealed significant changes in gene expression related to sebocytes, as well as a notable increase in squalene accumulation, indicating the functionality of squalene epoxidase (SQLE). Importantly, the alterations induced by Diff Mix were reversible with specific inhibitors.

This work highlights the SEBO662AR cell line's value as a model for acne-related research. By modeling pathological sebum production, it serves as a suitable platform for studying lipid synthesis mechanisms, offering significant potential for skin care testing and product development targeting sebaceous activity.



Student Poster Competition

Entrants & Abstracts

Student Poster Competition Entrants

Protein-Driven Hair Innovation: Advanced Formulation and Efficacy Evaluation of a Rinse-Off Conditioner with Hydrolysed Wheat and Keratin

Jo Yi Fung¹ and Cheng Shu Chaw¹ - School of Pharmacy and Pharmaceutical Sciences, Faculty of Health Sciences and Wellbeing, University of Sunderland, Sunderland SR1 3SD, UK

Multifunctional Binders in Cosmetic Compact Powders: A Comparative Study

Masayu Syarifah¹, Amanda Solaiman¹ and Paul Carter^{1*} - School of Pharmacy and Pharmaceutical Sciences, Faculty of Health Sciences and Wellbeing, University of Sunderland, Sunderland SR1 3SD, UK

Evaluating the Impact of Myristoyl Pentapeptide-17 in Hair Conditioner

Ashley Er Seen-Yi¹, Carly Musleh¹, Amanda Solaiman¹ - Department of Health Sciences and Well-Being, School of Pharmacy and Pharmaceutical Sciences, University of Sunderland, United Kingdom

Formulation and Evaluation of Body Lotions Containing Zinc Oxide and Titanium Dioxide as Mineral UV Filters

Cheok Yunye, University of Sunderland

Formulation and Optimisation of Lipstick: A Study Investigating the Effect of Wax Type on Sun Protection Factor (SPF) Boosting Properties

Lee Yee Xuan, Maegan¹, Shasha Amira Sharifuddin¹, Amanda Solaiman¹
¹ – School of Cosmetic Science, University of Sunderland, Sunderland SR1 3SD, UK

Exploration of oleogel for textured hair management

Ronika Juni-Gordon¹; Gabriela Daniels¹; Diogo Baltazar¹;
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The Impact of Colour on Olfactory Perception of Binary Fragrance Mixtures

Anna Sanguinetti¹; Mignon Cristofoli¹. ¹ London College of Fashion, University of the Arts London, United Kingdom.

Exploring the Effects of Keratin on Bleached Hair: A Study on Strength, Aesthetic Quality, and Molecular Changes for Formulation Approaches

Leonor de Alwis¹; Gabriela Daniels¹; Professor Mahbubal Hassan¹
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Exploring the use of Flaxseed Mucilage in Colour Cosmetics: Interactions with Red 40 Dye, Polyacrylate Crosspolymer-6 and Glycerin

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The Impact of Colour on Odour Perception in Binary Mixtures of Cis-3-Hexenol and Allyl Caproate at Varying Intensity Ratios

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Seeing Scents: The Cross-Modal Impact of Visual Cues on Fragrance Mixture Perception

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Ethylcellulose/ Castor Oil Oleogels: Potential Application in Coloured Complexion Cosmetics

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Evaluating the effect of wool-sourced proteins in hair with oxidative damage

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Exploring hair-strengthening effects of proteins on hair with varied oxidative damage: Part 1

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Comparative Rheological, Textural, and Sensory Characterisation of Starch-Based Rheology Modifiers in Cosmetic Emulsions. How do sensory attributes correlate with instrumental measurements with Starch Rheology Modifiers?

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Colour - Coded Scents: Crossmodal Perception In Complex Fragrances Mixtures

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Lignin as a means of developing highly elegant tinted mineral sunscreens with improved UV and HEVIS protection for addressing concerns in skin of colour

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Protein-Driven Hair Innovation: Advanced Formulation and Efficacy Evaluation of a Rinse-Off Conditioner with Hydrolysed Wheat and Keratin

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Purpose: Hair products enriched with proteins are widely used to repair hair damage by improving hair strength and imparting smoothness. Several commercial hair conditioners incorporate hydrolysed keratin and/or wheat proteins to maximise hair conditioning benefits, especially the low molecular weight hydrolysed proteins, which could penetrate the hair shaft to reinforce fibre strength and restore protein loss. This study aims to evaluate the performance of rinse-off deep treatment conditioners formulated using a binary blend of low molecular weight hydrolyzed wheat and keratin proteins and their efficacy on damaged hair. In addition, the physicochemical properties and stability of these protein-enriched conditioners will be examined.

Method: Oil-in-water conditioner was prepared by a hot homogenization method to form the emulsion base, and this was followed by the addition of heat-sensitive ingredients upon cooling. The conditioners include a control (base formulation without protein actives) and two formulations with different concentrations of proteins [Sample A1 (2% hydrolyzed wheat protein, 2% keratin protein), Sample A2 (4% hydrolyzed wheat protein, 2% keratin protein)]. The stability of conditioners was examined for organoleptic, pH, viscosity, and oil droplet size under different storage conditions. An automated tensile tester was used to determine the tensile properties of single hair fibres, while scanning electron microscopy was used to examine the surface characteristics of damaged hair specimens pretreated with different conditioners.

Results: All conditioners maintained an ideal pH (4.0–5.5) and acceptable rheological profiles at room temperature for 4 weeks and at an elevated temperature of 45 °C for 2 weeks. In freeze-thaw testing, only sample A1 showed phase separation during the second cycle of the thawing process. In oil droplet size evaluation, sample A2 maintained a uniform droplet size and distribution throughout the study, whereas slight droplet coalescence was observed in Sample A1. This indicates that Sample A2 has better stability. In tensile strength analysis, sample A2 with the highest amount of combined hydrolysed proteins significantly outperformed other formulations, improving the tensile strength to 181 MPa compared to 169.8 MPa in untreated hair, supported by ANOVA and post hoc testing ($p < 0.001$). No statistically significant differences were observed in the mean elastic modulus and percentage strain values. SEM analysis revealed noticeable conditioner deposition on the hair cuticle, particularly by samples A1 and A2, indicating improved surface conditioning.

Conclusion: This study showed synergistic effects of low molecular weight hydrolysed wheat and keratin proteins when formulated as rinse-off conditioners in enhancing damaged hair's mechanical strength and surface properties. In addition, the presence of protein blend at a concentration up to 6% in the conditioner showed good physicochemical properties and stability when subjected to different stressors. In summary, this work has demonstrated that multi-protein systems, when incorporated into rinse-off conditioners, can potentially optimise hair repair in damaged hair.

Multifunctional Binders in Cosmetic Compact Powders: A Comparative Study

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Objective: Binders play a crucial yet often overlooked role in compact powders by holding particles together and providing structural integrity. Serving as key compounds in maintaining the shape and stability of the formulation. Despite their importance, limited research exists on multifunctional binders, particularly in the context of cosmetic compact powders. This study investigates the effects of three multifunctional binders hydroxypropyl methylcellulose (HPMC), a commonly used binder with good compressibility and compatibility; boron nitride, known for its slip-enhancing properties; and sodium stearyl fumarate on the structure, cohesiveness, and durability of cosmetic compact powders.

Methods: Compact powders were prepared followed by evaluation through pressure testing (30 and 40 bar), angle of repose, drop tests (from 10 to 30 cm), bulk density and porosity analysis. These tests assessed the powders' flowability, compressibility, and durability.

Results: Among the binders tested, sodium stearyl fumarate demonstrated the best overall performance, with a 33° angle of repose, high resistance to breakage in drop tests, the lowest bulk density (1.51 g/cm³), and 33% porosity. These properties indicate a strong balance between mechanical strength and binding functionality.

Conclusion: These findings highlight sodium stearyl fumarate's potential as a multifunctional binder in cosmetic formulations. Given the limited research available on its use in compact powders, this study provides a promising foundation for further exploration of its applications in cosmetic science.

Keywords: Multifunctional binders; Cosmetic compact powders; Sodium Stearyl Fumarate; Flow; Durability; Bulk density; HPMC; Boron nitride.

Evaluating the Impact of Myristoyl Pentapeptide-17 in Hair Conditioner

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Objective: This research evaluates the incorporation of Myristoyl Pentapeptide-17, a synthetic lipopeptide known for its keratin-stimulating properties, into a rinse-off hair conditioner, by assessing its effects on both formulation stability and hair tensile strength. While peptide actives are increasingly popular in leave-on products, their efficacy and stability in rinse-off systems remain underexplored. This study directly compared an optimised base conditioner (F15), its peptide-enriched variant (F15+P(2)), and a shampoo-only control to elucidate the functional benefits and formulation implications of peptide inclusion in rinse-off emulsion systems.

Methods: Fifteen conditioner prototypes were initially developed using a hot/cold emulsification process, with F15 selected for its optimal consistency, emulsion stability, and pH profile. Myristoyl Pentapeptide-17 was incorporated at 3.00% w/w in F15+P(2) by pre-mixing the peptide in 2.00% distilled water before adding to the cooled emulsion (below 35 °C) to ensure uniform dispersion. Both F15 and F15+P(2) underwent accelerated stability testing via centrifugation at 1500 rpm for 5 minutes and pH evaluation to assess emulsion stability. Viscosity was measured using the Brookfield Viscometer, and particle size analysis was conducted using a BioBlue Digital Microscope set at x10 magnification. For tensile strength testing, virgin hair tresses were treated with shampoo only, F15, or F15+P(2). After standardised washing and drying, 30 hair fibres per treatment group were tested for minimum and maximum diameter, Break X (% Strain), and Break Y (Tensile Strength, MPa) using the FDAS770 Fibre Dimensional Analysis System and MTT690 Miniature Tensile Tester from Dia-Stron. Statistical analysis was conducted using One-way ANOVA.

Results: Both F15 and F15+P(2) demonstrated robust emulsion stability, with no visible creaming or phase separation following centrifugation, and maintained pH values within the optimal 4.5–5.5 range throughout the testing period. Viscosity testing confirmed non-Newtonian, shear thinning behaviour for both formulations, with F15+P(2) exhibiting higher viscosity and shear stress values, indicative of a thicker consistency. Particle size analysis revealed that both formulations exhibited an average particle size of < 6.88 µm and uniformly distributed particles, indicative of a well-stabilised emulsion with minimal risk of coalescence and phase separation. In tensile testing, all groups exhibited incremental increases in minimum and maximum diameter and break strain, but these differences were not statistically significant. However, F15+P(2) produced a statistically significant ($p = 0.0421$) enhancement in hair fibre tensile strength (Break Y: 180.10 ± 19.06 MPa) compared to F15 (171.70 ± 20.31 MPa) and shampoo only (167.70 ± 17.93 MPa). The findings suggest that Myristoyl Pentapeptide-17 does not compromise emulsion stability while improving hair's tensile strength.

Conclusion: Incorporation of Myristoyl Pentapeptide-17 at 3.00% in a rinse-off conditioner (F15+P(2)) displayed significant improvement in hair tensile strength. By reinforcing the keratin structure and strengthening the cuticle layer, the peptide enhances fibre cohesion and provides more resistance to breakage.

Formulation and Evaluation of Body Lotions Containing Zinc Oxide and Titanium Dioxide as Mineral UV Filters

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Objective: The demand for mineral-based sunscreens has increased due to rising consumer awareness of skin safety, environmental concerns, and regulatory shifts affecting chemical UV filters. This study aimed to formulate and evaluate the physicochemical stability and sun protection efficacy of oil-in-water (O/W) body lotions containing two commonly used inorganic UV filters, zinc oxide (ZnO) and titanium dioxide (TiO₂), at 5% and 10% concentrations. The objective was to investigate how varying concentrations of each UV filter affect SPF performance, formulation texture (spreadability), pH, rheology (viscosity and shear stress), and short-term stability (centrifugation), with the goal of optimising efficacy and user acceptability in mineral-based sunscreen emulsions.

Methods: Five formulations were prepared: two containing ZnO (5% and 10%), two with TiO₂ (5% and 10%), and one base formulation without any UV filter as a control. All samples were prepared in duplicate batches and stored under room temperature (24 °C) and elevated temperature (37 °C) conditions for four weeks. Physicochemical assessments included spreadability (via glass slide method), pH measurement, viscosity and shear stress (using a Brookfield viscometer), and centrifugation to evaluate physical stability. In vitro sun protection factor (SPF) and UVA/UVB ratio were measured using Labsphere UV-2000S and ISO-compliant PMMA plates. Data were analysed statistically using Welch's t-test to assess significant differences between concentrations and filter types.

Results: ZnO-based formulations demonstrated a significant concentration-dependent increase in SPF values. At 37 °C, the 10% ZnO sample (BL3-B) achieved an SPF of 13.52 ± 4.65 , markedly higher than the 5% ZnO counterpart (BL1-B: 3.86 ± 0.39 , $p = 0.006$). In contrast, TiO₂-based formulations did not exhibit statistically significant SPF enhancement between 5% and 10% (e.g., BL2-B: 6.02 ± 5.31 vs. BL4-B: 2.72 ± 0.37 , $p = 0.208$). ZnO formulations maintained near-neutral pH (6.827–7.097), indicating better skin compatibility, while TiO₂ formulations showed consistently acidic pH values (3.123–3.490), which could raise irritation concerns. Increased UV filter concentration resulted in higher viscosity and shear stress, especially in ZnO formulations, contributing to reduced spreadability. Despite these changes, all formulations exhibited shear-thinning behaviour, which enhances application performance, and remained physically stable during centrifugation testing. The control (BL5) maintained high spreadability but had negligible SPF, highlighting the necessity of UV-active ingredients for protection.

Conclusion: ZnO proved more effective than TiO₂ in enhancing SPF, but this came with challenges in formulation aesthetics, particularly in terms of viscosity and spreadability. TiO₂ showed better sensory attributes but limited UV performance. These findings emphasise the need to balance efficacy, pH stability, and cosmetic acceptability in mineral sunscreen design. Future work should explore long-term stability, in vivo SPF testing, and microscopic analysis of UV filter dispersion to better understand the role of particle aggregation in SPF variability and formulation performance.

Formulation and Optimisation of Lipstick: A Study Investigating the Effect of Wax Type on Sun Protection Factor (SPF) Boosting Properties

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Background: Lipsticks with integrated sun protection are increasingly sought after due to rising awareness of UV-induced lip damage. Achieving both effective sun protection and desirable cosmetic attributes presents formulation challenges. Waxes play a critical role in determining the structure, texture, and stability of lipsticks, as well as the retention and performance of the sunscreen agent. This study investigates how different wax combinations impact the performance of lipsticks containing Bis-Ethylhexyloxyphenol Methoxyphenyl Triazine, a photostable, oil-soluble, broad-spectrum UV filter.

Methodology: Lipstick formulations were prepared using beeswax as the base, with varying combinations of candelilla, carnauba, and paraffin waxes. Viscosity was measured using a Brookfield Viscometer (Spindle 64), and SPF was evaluated using the FDA 2007 in vitro method with a SolarLight Sunscreen Analyzer. Spreadability and ease of application were assessed on a porcelain tile, while pigment distribution was examined via light microscopy. Stability was evaluated after one month of storage at elevated temperature (40°C), refrigeration (5°C), and ambient temperature (25°C). The goal was to assess the influence of wax type on the consistency and SPF performance of the product.

Results: The highest SPF was recorded in Formulation 11 (Carnauba and Beeswax) with a mean SPF of 28.27, while the lowest was observed in Formulation 9 (Candelilla and Beeswax) at 7.30. One-way ANOVA revealed a statistically significant difference between formulations ($P < 0.05$). Viscosity values of the waxes ranged from 10.00 cP to 79.98 cP for all formulations, with a trend suggesting that higher viscosity generally corresponded to increased SPF values, though not uniformly. Coefficient of Variation (%CV) analysis indicated low variability for most formulations (%CV < 10%), except in those with greater wax complexity, which showed elevated %CV, suggesting reduced reproducibility.

Conclusion: The study demonstrates that wax composition significantly influences the photoprotective and cosmetic properties of lipsticks. Carnauba wax, when combined with beeswax and sunscreen active, gave the highest SPF values, suggesting enhanced film-forming properties and better UV filter retention. In contrast, formulations with Candelilla wax demonstrated lower SPF effectiveness, possibly due to its lower melting point and less occlusive nature. Viscosity also appeared to correlate with SPF. This study suggests a complex but critical relationship between formulation rheology and photoprotection efficacy.

Exploration of oleogel for textured hair management

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Afro-textured hair needs special care due to its unique structure. Afro-textured hair is naturally fragile, tightly coiled, and prone to dryness, making it more vulnerable to breakage during grooming.

Objective

This study explored use of oleo gels, semi-solid oil-based formulations, as a more effective and user-friendly alternative to traditional hair oils. This study explores ethyl cellulose-based oleo gels to enhance compatibility and reduce friction for better hair management.

Method

A semi-solid oleo gel with castor oil was formulated. It was compared to two other conditions: a castor oil, coconut oil mix, an active mix (consisting of Argan and Jojoba Oil), and castor oil with the active mix. All formulations were assessed for ease of application, spreadability, and stability over time. Hair tresses treated with leave-in olea gels were assessed for smoothness (friction) and softness (three-point bending test).

Results

The EC-based oleo gels demonstrated consistent rheological properties and maintained their structure at ambient temperatures. No phase separation was observed during the test period. These findings suggest that ethyl cellulose can effectively structure castor oil into a stable, semi-solid system suitable for application to hair fibres. Friction testing with a particular apparatus showed less combing resistance on tresses with the oleogel applied compared to controls (Hair tresses with no product). Hair mechanical responsiveness and flexibility were evaluated using a three-point bend test. According to the results, structured oils improve manageability, increase application, and lower the chance of breakage in textured hair care.

In conclusion, structuring oils with ethyl cellulose reduced combing friction in Afro-textured hair. The increased viscosity of the oleo gel allowed for more controlled application and may contribute to reduced mechanical damage during grooming.

The Impact of Colour on Olfactory Perception of Binary Fragrance Mixtures

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Objective: Previous research has shown that colour can influence perceived odour intensity, particularly in binary mixtures matched for perceptual strength (Arao et al., 2012). However, these findings were limited to a single odourant pair, isobornyl cyclohexanol and limonene, and did not consider how perceived intensity asymmetries might affect colour-odour interactions. The present study extends this work by testing additional odourants, citronellol and cis-3-hexenol, and examining colour effects across three mixture types. These include a perceptually balanced 1:1 blend and two unbalanced mixtures where one component dominates. This design enables investigation of colour's role in modulating perception under varying odour dominance, contributing to a more nuanced understanding of multisensory integration.

Methods: The study involved a minimum of 30 participants (aged 18–40 years, both male and female). Ethical approval was obtained from the university, and informed consent was secured. Exclusion criteria included anosmia, colour blindness, fragrance allergies, and age over 40. A Latin square design was used across all experimental phases. **Odour Detection Thresholds:** Initial odour detection thresholds for each molecule were estimated using the Flavor, Fragrance and Odor Simulator (Norgwyn Montgomery Software Inc., USA) and refined through triangle tests to confirm detection, relative to the base-solvent control. **Odour Identification:** Participants were presented with increasing concentrations of each odourant and asked to select the most appropriate descriptor from a predefined list (grassy, floral, sweet/fruity, citrus, woody, or undetectable). The concentration at which an appropriate descriptor was selected was recorded as the identification threshold. **Colour Association:** Following odour identification, participants selected a colour from an eight-colour board frequently associated with the odour molecules. The colour most frequently chosen for each odourant was designated as its associated colour. **Equivalent Intensity Matching:** To create perceptually balanced binary mixtures, one odourant (at its identification concentration) served as a reference. Participants compared five ascending concentrations of the alternate odourant. A weighted average of selections was used to identify the best intensity match. This was repeated at a higher reference concentration to produce two perceptual levels. **Final Phase – Colour Influence Testing:** Participants evaluated odour mixtures on coloured blotters (two associated, black, and white) to assess the effect of congruent and incongruent colour contexts on odour perception.

Results: The average odour detection threshold for citronellol was determined to be 0.01 $\mu\text{L}/\text{mL}$, while its identification threshold was 0.03 $\mu\text{L}/\text{mL}$. In contrast cis-3-hexenol exhibited a higher detection threshold of 0.70 $\mu\text{L}/\text{mL}$ and an identification threshold of 1.16 $\mu\text{L}/\text{mL}$. Most participants associated citronellol with a light yellow colour and cis-3-hexenol with green. These associations were used to investigate the impact of congruent colour cues on the perception of binary fragrance mixtures. Although some variation in previously established colour-odour associations was observed, there was no statistically significant effect of blotter colour on odour perception ($p > 0.05$) for Formulations A, B, C, or D across the four tested colours.

Conclusion: These findings suggest that, although colour-odour associations exist, their influence may be limited when applied to complex mixtures rather than isolated compounds. Nevertheless, this research contributes to a deeper understanding of multisensory interactions in olfaction and highlights the importance of testing crossmodal effects in realistic, formulation-based contexts. Such insights hold potential for enhancing the sensory appeal and consumer experience of fragranced products within the cosmetics industry.

Exploring the Effects of Keratin on Bleached Hair: A Study on Strength, Aesthetic Quality, and Molecular Changes for Formulation Approaches

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This project represents one stream of data collection within a larger study aimed at exploring and comparing the effects of two different proteins and varying glycerin levels on various characteristics of bleached hair. Hair care, especially for bleached hair, has become increasingly important as consumers seek solutions for oxidative damage. This study focuses on Protein B, an oxidized form of hydrolyzed keratin from sheep wool, to examine its effects on tensile strength, combability, friction, and frizz, providing valuable insights for improving hair care formulations.

Objectives:

The aim of this study is to assess the strengthening effects of Protein B on bleached hair, examining how different glycerin concentrations (30%, 40%, 50%) influence mechanical properties, and to evaluate the protein's potential in improving hair strength through quantitative methods.

Methods:

Hair samples were bleached and treated with Protein B solutions. Tensile strength, dry combing, dry friction, and volume & flyaway tests were used to assess hair strength and texture. FTIR spectroscopy analyzed molecular changes in the hair. Statistical analysis using SPSS evaluated the effects of protein type, glycerin concentration, and treatment time on hair properties.

Results:

Protein B significantly improved the tensile strength of bleached hair post-treatment, particularly at 50% glycerin concentration, indicating the protein's effectiveness in strengthening the hair's structural integrity. Friction was statistically significantly reduced between pre- and post-treatment, with glycerin concentrations of 30% and 50% showing a statistically significant difference. Specifically, friction was lower at 50% glycerin, suggesting that glycerin contributes to improving hair's manageability. However, combing values statistically significantly increased between pre- and post-treatment, with glycerin concentrations of 40% showing the most significant increase. This shows that the treatment resulted in rougher, less manageable hair. This outcome highlights the need for formulation approaches that incorporate additional plasticisers or conditioning agents to improve combability and overall hair smoothness.

In terms of frizz, measurements on bulk surface area and flyaway were reported. Protein B resulted in a smaller increase in bulk surface area, while flyaway values remained consistent. Glycerin concentrations did not significantly affect either flyaway or bulk surface area, suggesting that the primary effect of glycerin is on friction and combability, rather than on visual aspects like bulk or flyaway. These findings underline the potential of incorporating other ingredients in formulations to improve both the aesthetic and functional properties of treated hair.

Conclusion:

The oxidized form of keratin (Protein B) demonstrated strong tensile strength improvements in bleached hair, highlighting its potential for strengthening damaged hair. However, the limited aesthetic improvements suggest that as a protein solution, it may not provide the full range of desired cosmetic benefits. The inclusion of glycerin as a plasticiser, however, reduced friction, indicating that formulation strategies combining proteins with plasticisers could offer better overall performance for real-world applications. This study adds value to the cosmetic industry by providing a thorough understanding of the effects of protein treatments on hair. It emphasizes the need for formulations that include plasticisers and conditioning agents to improve both hair strength and manageability in future haircare products.

Exploring the use of Flaxseed Mucilage in Colour Cosmetics: Interactions with Red 40 Dye, Polyacrylate Crosspolymer-6 and Glycerin

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Objectives

This research aimed to investigate the potential of flaxseed mucilage (FSM), a naturally derived hydrocolloid from *Linum usitatissimum*, for use in dye-containing cosmetic formulations. This study explored its interaction with FD&C Red 40 dye, its film-forming behaviour, and the impact of polyacrylate crosspolymer-6 as a secondary film-former and glycerin as a plasticiser on its texture and performance. It aimed to provide insight into new applications for the naturally-derived polymer- which is often a waste by-product of linseed oil production- as a sustainable, functional ingredient for innovative colour cosmetic applications such as cheek tints and peel-off lip stains.

Methods

FSM was extracted, dried, and used to prepare six formulations: unmodified mucilage (SM), dyed mucilage (SMD), dyed mucilage with polyacrylate crosspolymer-6 as a secondary film former (SMDF), and dyed mucilage with glycerin at concentrations of 3%, 5% and 10% (SMDG3, SMDG5 and SMDG10). UV stability was assessed for SM and SMD over six weeks under three varying conditions of light exposure, using L^* , a^* , b^* , and overall colour change (ΔE) measurements. All formulations underwent 8-week accelerated stability testing, rheological analysis (oscillatory sweep), gel texture analysis (spreadability, firmness, stickiness, adhesion), dry-down time measurement, and mechanical property testing of dried films (flexibility, brittleness and stiffness).

Results

FSM demonstrated good compatibility with all formulation additives, with no signs of physical instability observed across any samples during the 6-week accelerated stability testing. However, ΔE values indicated perceptible colour changes in all samples, regardless of sunlight exposure, with statistically significant shifts in L^* , a^* and b^* values over time. Rheological testing confirmed viscous-dominant behaviour in FSM gels, with polyacrylate crosspolymer-6 and glycerin both increasing its overall rigidity, and glycerin increasing its spreadability. Gel texture analysis showed that polyacrylate crosspolymer-6 increased the firmness and stickiness, while glycerin reduced both but improved adhesion.

Mechanical testing of the dried films revealed that both SM and SMD produced brittle films; however, SMD exhibited greater stiffness, nearing that of SMDF, suggesting that Red 40 dye may influence film structure. Glycerin at 3-5% reduced brittleness and enabled flexible films- exhibiting properties which could be utilised for cosmetic peel-off applications.

Conclusion

This study demonstrated the feasibility of FSM as a natural alternative to synthetic polymers in colour cosmetics. Its compatibility with FD&C Red 40, film-forming ability, and adaptable textural and mechanical properties through glycerin or polyacrylate incorporation offer a versatile platform for innovative, long-wear colour cosmetics. This work opens up potential for FSM to be explored in a wider range of cosmetic formulations, addressing both sustainability and performance demands in cosmetic formulation.

The Impact of Colour on Odour Perception in Binary Mixtures of Cis-3-Hexenol and Allyl Caproate at Varying Intensity Ratios

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Objective

This study forms part of a broader investigation into the cross-modal effects of colour on odour perception. Previous research has shown that colour can influence perceived odour intensity, particularly in binary mixtures matched for perceptual strength (Arao et al., 2012). However, these findings were limited to a single odourant pair, isobornyl cyclohexanol and limonene, and did not consider how perceived intensity asymmetries might affect colour–odour interactions. The present study extends this work by testing additional odourants, allyl caproate and cis-3 hexenol, and examining colour effects across three mixture types. These include a perceptually balanced 1:1 blend and two unbalanced mixtures where one component dominates. This design enables investigation of colour's role in modulating perception under varying odour dominance, contributing to a more nuanced understanding of multisensory integration.

Methods

The study involved a minimum of 30 participants (aged 18–40 years, both male and female). Ethical approval was obtained from the university, and informed consent was secured. Exclusion criteria included anosmia, colour blindness, fragrance allergies, and age over 40. A Latin square design was used across all experimental phases.

Odour Detection Thresholds:

Initial odour detection thresholds for each molecule were estimated using the Flavor, Fragrance and Odor Simulator (Norgwyn Montgomery Software Inc., USA) and refined through triangle tests to confirm detection, relative to the base-solvent control.

Odour Identification:

Participants were presented with increasing concentrations of each odourant and asked to select the most appropriate descriptor from a predefined list (grassy, floral, sweet/fruity, citrus, woody, or undetectable). The concentration at which an appropriate descriptor was selected was recorded as the identification threshold.

Colour Association:

Following odour identification, participants selected a colour from an eight-colour board frequently associated with the odour molecules. The colour most frequently chosen for each odourant was designated as its associated colour.

Equivalent Intensity Matching:

To create perceptually balanced binary mixtures, one odourant (at its identification concentration) served as a reference. Participants compared five ascending concentrations of the alternate odourant. A weighted average of selections was used to identify the best intensity match. This was repeated at a higher reference concentration to produce two perceptual levels.

Final Phase – Colour Influence Testing:

Participants evaluated odour mixtures on coloured blotters (two associated, black, and white) to assess the effect of congruent and incongruent colour contexts on odour perception.

Results

The results confirm that blotter colour significantly influences the perceived intensity of binary odour mixtures, particularly when one component dominates strongly. While no significant colour effect was observed in the balanced 1:1 mixture ($p > 0.05$), significant modulation emerged in the 2:1 and 1:2 mixtures, indicating that colour–odour interactions are stronger when there is an imbalance in the dominance of the odour components. Specifically, green and black blotters tended to enhance fruity-sweet perceptions ($p < 0.05$) compared to yellow or white.

Conclusion

These findings build on previous research by showing that the influence of colour on odour perception is context-dependent and varies with the intensity and composition of the odour components. A colour that aligns with a specific scent when tested independently may evoke a different association when that scent is part of a mixture with a more dominant component. This suggests that our perception of smells is not fixed but can shift depending on how strong or noticeable each scent is in a combination, and how colour interacts with that balance.

Seeing Scents: The Cross-Modal Impact of Visual Cues on Fragrance Mixture Perception

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Objective

This study forms part of a broader investigation into the cross-modal effects of colour on odour perception. Previous research has shown that colour can influence perceived odour intensity, particularly in binary mixtures matched for perceptual strength (Arao et al., 2012). However, these findings were limited to a single odourant pair, isobornyl cyclohexanol and limonene, and did not consider how perceived intensity asymmetries might affect colour–odour interactions. The present study extends this work by testing additional odourants, γ -nonalactone and cis-3-hexenol, and examining colour effects across three mixture types. These include a perceptually balanced 1:1 blend and two unbalanced mixtures where one component dominates. This design enables investigation of colour's role in modulating perception under varying odour dominance, contributing to a more nuanced understanding of multisensory integration.

Methods

The study involved a minimum of 30 participants (aged 18–40 years, both male and female). Ethical approval was obtained from the university, and informed consent was secured. Exclusion criteria included anosmia, colour blindness, fragrance allergies, and age over 40. A Latin square design was used across all experimental phases.

Odour Detection Thresholds:

Initial odour detection thresholds for each molecule were estimated using the Flavor, Fragrance and Odor Simulator (Norgwyn Montgomery Software Inc., USA) and refined through triangle tests to confirm detection, relative to the base-solvent control.

Odour Identification:

Participants were presented with increasing concentrations of each odourant and asked to select the most appropriate descriptor from a predefined list (grassy, floral, sweet/fruity, citrus, woody, or undetectable). The concentration at which an appropriate descriptor was selected was recorded as the identification threshold.

Colour Association:

Following odour identification, participants selected a colour from an eight-colour board frequently associated with the odour molecules. The colour most frequently chosen for each odourant was designated as its associated colour.

Equivalent Intensity Matching:

To create perceptually balanced binary mixtures, one odourant (at its identification concentration) served as a reference. Participants compared five ascending concentrations of the alternate odourant. A weighted average of selections was used to identify the best intensity match. This was repeated at a higher reference concentration to produce two perceptual levels.

Final Phase – Colour Influence Testing:

Participants evaluated odour mixtures on coloured blotters (two associated, black, and white) to assess the effect of congruent and incongruent colour contexts on odour perception.

Results

The results showed that the perceptions of odour were comparable across all colour blotters ($p > 0.05$). However, green blotters, validated as the odour-congruent colour for cis-3-hexenol were associated with higher fruity/sweet ratings in cis-3-hexenol dominant blends. In contrast yellow blotters, despite being validated as congruent with γ -nonalactone, consistently produced lower ratings. While these associations only approached statistical significance ($p = 0.052$), they raise questions about the reliability of colour–odour congruence in complex mixtures.

Conclusion

These findings highlight the complexity of cross-modal interactions and indicate that while colour may slightly influence how odours are perceived, its effects are not always predictable and significant. These findings reinforce the importance of testing cross-modal interactions in final complex fragrance compositions.

This work forms part of a broader investigation into how colour influences odour perception. In each study, cis-3-hexenol is paired with a different odour molecule, using both equal and varying intensity combinations to examine the impact of colour cues on olfactory experience.

Ethylcellulose/ Castor Oil Oleogels: Potential Application in Coloured Complexion Cosmetics

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Objective:

This project investigated the feasibility of formulating novel water-free pigmented complexion products using ethylcellulose (EC) and castor oil (CO) based oleogels. Oleogels were optimised by modifying key parameters previously identified in the literature, including gelation temperature; EC solubility and oil phase composition; and the addition of a surfactant, sorbitan monostearate (SMS). Inorganic pigments were dispersed individually to create monochromatic concentrated bases and blended to develop a skin-tone shade. Additionally, dimethicone and caprylyl methicone were incorporated into the oleogel matrix, and their impact on gel rheology was evaluated.

Methods:

The rheological properties of the samples were evaluated using oscillatory amplitude sweeps. Complex modulus ($|G^*|$) was used to compare rigidity, while phase angle (δ) provided insight into viscoelastic behaviour of oleogels. Oscillatory frequency sweeps were conducted to measure storage modulus (G') and loss modulus (G'') as function of frequency. Selected samples also underwent texture analysis to measure firmness, work of shear, stickiness, and work of adhesion. Following 28 days of accelerated stability, oscillatory amplitude sweeps were repeated to assess mechanical changes over time.

Results:

The structure of oleogels was affected by the amount of the CO in the solvent, with 50% CO selected as optimal for stability and sensory aspects, considering the intended product application. Additional emollients, ethylhexyl palmitate (EHP) and coco-caprylate/caprinate (CCC), were incorporated into the oleogel formulations. EHP was observed to increase the stiffness of EC/CO oleogels, whereas CCC tended to soften the gel structure. Higher gel setting temperatures appeared to prevent oleogel fractionation, while the addition of SMS enhanced gel rigidity, potentially due to a plasticising effect or by formation of secondary supporting structures. Pigments and silicones were effectively incorporated into EC/CO oleogels, with dimethicone increasing the $|G^*|$ more significantly than caprylyl methicone. Additionally, silicones were found to reduce the stickiness of the oleogels. All oleogels showed no visible signs of instability, with only minor variations observed in $|G^*|$ and δ .

Conclusion:

Adjusting the solvent of EC oleogels with short-chain esters aligned the sensory properties more closely with those of coloured complexion products, making oleogels more suitable for this application. Inorganic pigments were successfully incorporated into EC/CO oleogels to create skin-tone shades. While SMS generally improved the mechanical properties of the oleogels, it also influenced their colour. The inclusion of silicones appeared to modulate the effect of SMS on oleogel rheology. Silicones improved the textural properties of the oleogel, but further additives should be explored to optimise both texture and sensory appeal, ensuring consumer acceptance. Overall, EC/CO oleogels have shown clear potential for use in colour cosmetics and support water-free, sustainable formulations.

Evaluating the effect of wool-sourced proteins in hair with oxidative damage

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This project represents one stream of data collection within a larger study aimed at exploring and comparing the effects of two proteins and varying glycerine levels on various characteristics of bleached hair. In this project, only results between hair tresses treated in protein solutions with 40% glycerine levels will be presented.

When hair is damaged, protein bonds are broken, and covalently bound lipids are removed resulting in increased hair breakage, porosity, polarity, hydrophilicity, difficulty in combing and detangling. To manage and repair this damage, consumers resort to products containing raw materials that, visually or structurally, mitigate the damage. Proteins are proven to impart shine, smoothness, and strength to damaged hair. High molecular weight proteins (>10kDa) improve shine by smoothing down the cuticle and repairing split ends temporarily as they are too big to penetrate the shaft. However, as molecular weight goes down, penetration potential increases. Hydrolysed and other low molecular weight proteins can penetrate the cortex, reducing damage in protein bonds and providing moisturising benefits. In addition and as previously mentioned, damaged hair has higher porosity and increased polarity, increasing protein binding and active when compared to non-damaged.

Objective

The purpose of this project was to compare the effects of 2 structurally different wool-sourced keratin-based proteins on different characteristics of bleach-damaged hair. The investigated proteins were a blend of keratin and hydrolysed keratin (Protein 1) and its oxidised variant (Protein 2).

Methods

Virgin Caucasian light-brown hair tresses were damaged by following a standardized bleaching method. Each protein was separately incorporated into 3 solutions with varying quantities of glycerine (30%, 40% and 50% of the protein's w/w%). A total of 6 different treatment solutions were made. 6 hair tresses were treated in each treatment solution under controlled conditions, with a total of 36 hair tresses treated. Dry friction, dry combing, difference in flyaways/frizz area (Δ FAF) at 30% and 80% humidity, tensile strength and FTIR analysis of all hair tresses were measured before and after treatment. Independent samples t-test analysis were performed for dry friction, dry combing and tensile strength and Mann-Whitney test analysis for Δ FAF.

Results

Combing work results between hair tresses treated in different proteins did not show a statistically significant difference. However, tensile strength was statistically significantly higher for tresses treated in Protein 2. In addition, results revealed that tresses also treated with Protein 2 resulted in a statistically significantly higher coefficient of Friction and lower Δ FAF when compared to Protein 1. These results suggest that Protein 2 is better at coating the hair fibres, smoothing down the cuticle, preventing electrostatic repulsion, improving hair alignment and preventing flyaways/frizz as well as improving hair strength. However, it also imparts lower hair smoothness than Protein 1 which might not be enjoyable by consumers, depending on its use.

Conclusion

Proteins continue to be an attractive active due to their demonstrated affinity which can be further finetuned based on their source, structure and context of hair treatment. This project's promising results, and the protein's sustainable origin and sourcing-mode provide initial insight into new active options for haircare.

Exploring hair-strengthening effects of proteins on hair with varied oxidative damage: Part 1

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Objectives

This project represents one stream of data collection within a larger study aimed at exploring and comparing the effects of two different proteins and varying glycerine levels on various characteristics of bleached hair. Keratin is a constant hot topic within the cosmetic and personal care industry. Remaining knowledgeable on keratin as an ingredient and its specification (such as variations/forms) are important to data collection and ultimately beneficial for cosmetic science society. This project researched and tested the effects of hydrolysed keratin.

Part 1: Protein 1 – Cynergy TK™. Hydrolysed keratins result from larger chained keratin structures breaking into smaller fragments. Cynergy TK™ is not small enough to penetrate through the hair shaft (approximately less than < 1000 Da). Taking this into account, this study's centring focus is the structural properties hydrolysed keratin can provide for hair, through conducting numerous instrumental tests to determine the level of effect on hair fibre strength before and after protein treatment.

A collective of previous academic research states how constant exposure to UV radiation causes oxidative stress resulting in oxidative damage of hair. This has had some effect on consumer purchasing behaviour, now more than ever, consumers are intentional. As concerns with global warming and neighbouring issues constantly increase amongst the public, consumers are more recently interested in what benefits they gain when using a chosen product. Consumer interest in personal care ranges from what exact ingredients are being included in formulations (such as actives) to what the next ground-breaking/innovative technology is. Proteins are examples of desirable ingredients consumers seek out, with keratin being one of the most used, especially within haircare.

Methods

Type-2 European tress samples were numbered, labelled and bleached (placed under laboratory conditions to ensure a controlled oxidation process). A myriad of instrumental tests were used: dry instrumental friction, dry instrumental combing, Shuffle Bolero, tensile strength and FTIR.

Results

Instrumental combing results displayed that there was a significant increase in friction data means, untreated ($M = 3.42$, $SD = 3.17$) to treated ($M = 6.90$, $SD = 1.83$), $t(27.25) = -4.028$, $p < .001$, indicating the treatment had a positive effect. An increase means more force was required to comb through protein-treated tress samples.

Instrumental friction tests demonstrated that there was statistical significance and a positive treatment effect. Levene's Test indicated that the assumption of equal variances was violated, $F(1, 34) = 5.20$, $p = .029$ (significance level, $p < .05$). Therefore, results will not assume equal variances. Work done (mm) of treated tresses ($M = 2.64$, $SD = .85$) required less energy to move when applying friction compared to untreated tresses ($M = .4.48$, $SD = .49$); $t(27.21) = 7.88$, $p > .001$.

These results can be interpreted that the application of hydrolysed keratin-incorporated formulations to hair, provides added smoothness to the hair's surface while providing hold and maintaining a degree of resistance against everyday mechanical forces.

The collection of all the statistical data together supports claims that hydrolysed keratin has strengthening effects on hair fibre in the form of 'hold'. This can be utilised to validate claims for cosmetic styling products aiming to promote 'hold' performance abilities/properties e.g. hair wax. This project provided additional data about keratin which may have future relevant use and contributions into the scientific field.

Comparative Rheological, Textural, and Sensory Characterisation of Starch-Based Rheology Modifiers in Cosmetic Emulsions. How do sensory attributes correlate with instrumental measurements with Starch Rheology Modifiers?

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Objective

Emerging data-driven methods that predict sensory attributes from rheological and texture measurements offer a more efficient and objective alternative for sensory evaluation.

Starch, a key biopolymer, has gained traction in cosmetic and personal care formulations. Its potential has been expanded through modifications, enabling performance comparable to synthetic polymers.

This study investigated the rheological, textural, and sensory properties of emulsions formulated with three starch-based rheology modifiers: hydroxypropyl starch phosphate (from potato and corn), and modified potato starch. The aim was to explore whether correlations previously reported between instrumental and sensory measurements for synthetic polymers also apply to starch-based systems.

Methods

Each formulation underwent flow and oscillatory rheology testing to determine viscosity at 100 s^{-1} , elastic modulus (G'), and yield strain at linear viscoelastic region (LVR). Texture analysis was performed to quantify firmness, stickiness, work of shear, and work of adhesion. A short-term in vivo sensory study with 34 participants evaluated five sensory attributes - elasticity, spreadability, thickness, stickiness, and residue. Pearson's correlation analyses were applied to assess relationships between instrumental and sensory data.

Results

Hydroxypropyl starch phosphate (corn) exhibited the highest viscosity ($1600.9\text{ mPa}\cdot\text{s}$) and elastic modulus (352.36 Pa), but the lowest yield strain (2.53%). It also demonstrated the greatest firmness (236.54 g) and stickiness (-285.65 g). Sensory evaluation showed that this formulation was perceived as the thickest, most elastic, and least spreadable, although not the stickiest. It was also rated lowest for residue.

Hydroxypropyl starch phosphate (potato) had the lowest viscosity ($975.5\text{ mPa}\cdot\text{s}$), elastic modulus (109.17 Pa), firmness (75.46 g), and stickiness (-66.81 g), alongside a moderate yield strain (3.67%). Sensory data indicated that it was perceived as the least elastic, thick, and sticky, with moderate spreadability and the highest perceived residue.

Potato starch modified presented intermediate rheological and textural values - viscosity ($1363.8\text{ mPa}\cdot\text{s}$), elastic modulus (214.15 Pa), firmness (114.68 g), and stickiness (-100.95 g) - but exhibited the highest yield strain (5.08%). Sensory results showed moderate ratings for elasticity, spreadability, thickness, and residue, but it was perceived as the stickiest among the formulations.

These results highlight the differences between different type of starch and the effect of their modifications. Instrumental-sensory correlation analysis for the corn-derived starch revealed significant negative correlations between viscosity and sensory elasticity ($r = -0.647$, $p = 0.043$), and between elastic modulus and both sensory elasticity ($r = -0.674$, $p = 0.033$) and stickiness ($r = -0.733$, $p = 0.016$). For the potato-derived starch, viscosity was negatively correlated with sensory thickness ($r = -0.633$, $p = 0.049$) and positively with sensory stickiness ($r = 0.642$, $p = 0.046$). No statistically significant correlations were identified for the modified potato starch formulation.

Conclusion

This study provides evidence that certain instrumental parameters can predict specific sensory perceptions in starch-thickened emulsions. However, inconsistencies across starch types and attributes underscore the need for standardised testing protocols and further investigation across a broader range of starches. These findings contribute to the development of more efficient, objective methods for sensory prediction in cosmetic formulation.

Colour - Coded Scents: Crossmodal Perception In Complex Fragrances Mixtures

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Objective

This study forms part of a broader investigation into the cross-modal effects of colour on odour perception. Previous research has shown that colour can influence perceived odour intensity, particularly in binary mixtures matched for perceptual strength (Arao et al., 2012). However, these findings were limited to a single odourant pair, isobornyl cyclohexanol and limonene, and did not consider how perceived intensity asymmetries might affect colour-odour interactions. The present study extends this work by testing additional odorants, ethyl maltol (EM) and cis-3-hexenol (Cis-3) and examining colour effects across three mixture types. These include a perceptually balanced 1:1 blend and two unbalanced mixtures where one component dominates. This design enables investigation of colour's role in modulating perception under varying odour dominance, contributing to a more nuanced understanding of multisensory integration.

Methods

The study involved a minimum of 30 participants (aged 18-40 years, both male and female). Ethical approval was obtained from the university, and informed consent was secured. Exclusion criteria included anosmia, colour blindness, fragrance allergies, and age over 40. A Latin square design was used across all experimental phases.

Odour Detection Thresholds:

Initial odour detection thresholds for each molecule were estimated using the Flavor, Fragrance and Odor Simulator (Norgwyn Montgomery Software Inc., USA) and refined through triangle tests to confirm detection, relative to the base-solvent control.

Odour Identification:

Participants were presented with increasing concentrations of each odourant and asked to select the most appropriate descriptor from a predefined list (grassy, floral, sweet/fruity, citrus, woody, or undetectable). The concentration at which an appropriate descriptor was selected was recorded as the identification threshold.

Colour Association:

Following odour identification, participants selected a colour from an eight-colour board frequently associated with the odour molecules. The colour most frequently chosen for each odourant was designated as its associated colour.

Equivalent Intensity Matching:

To create perceptually balanced binary mixtures, one odourant (at its identification concentration) served as a reference. Participants compared five ascending concentrations of the alternate odourant. A weighted average of selections was used to identify the best intensity match. This was repeated at a higher reference concentration to produce two perceptual levels.

Final Phase – Colour Influence Testing:

Participants evaluated odour mixtures on coloured blotters (two associated, black, and white) to assess the effect of congruent and incongruent colour contexts on odour perception.

Results

Triangle testing confirmed participants' ability to identify both EM and Cis-3, with descriptors aligning consistently with their expected profiles. Colour associations were predominantly yellow for EM and green for Cis-3. Across all EM: Cis-3 ratios tested; white blotters significantly enhanced the perceived intensity of fruity/sweet notes compared to black blotters ($p < 0.05$). Although yellow blotters showed a similar trend, the difference was not statistically significant ($p > 0.05$). Odour perception results for yellow, green, and black blotters were found to be comparable ($p > 0.05$).

Conclusion

These findings highlight that, despite a substantial body of literature supporting colour-odour associations, the complexity of fragrance mixtures can lead to unexpected outcomes. Rather than relying solely on established associations, colour choices should be empirically tested alongside the final product to ensure perceptual congruence and effectiveness.

This work forms part of a broader investigation into how colour influences odour perception. In each study, cis-3-hexenol is paired with a different odour molecule, using both equal and varying intensity combinations to examine the impact of colour cues on olfactory experience.

Lignin as a means of developing highly elegant tinted mineral sunscreens with improved UV and HEVIS protection for addressing concerns in skin of colour

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Objective:

To verify the ability of a lignin-based compound, lignin oleate, in boosting UV and HEVIS protection while simultaneously testing its ability as a colorant to create tinted mineral sunscreens with improved cosmetic elegance on dark and deep skin tones. The goal is to further elaborate on the potential of creating sunscreen formulations with high naturality and high protection values that can address several concerns unique to melanin-rich skin, and to further sunscreen innovation as well as highlight the necessity of DEI in the cosmetic industry.

Methods:

Tinted mineral sunscreens were developed, each with varying degrees of lignin oleate (0, 5, 10, and 15%). In vitro SPF, UVA-PF, and HEVIS measurements were taken of the sunscreen samples to assess the boosting capacity of the lignin oleate, while L*a*b values were also measured to assess the impact of the lignin oleate as a colorant in the samples as well.

Results:

The lignin oleate was found to boost the protection factor of the sunscreen formulas substantially, with 10% lignin oleate boosting the SPF value of a ZnO-only containing formula by 41% and the UVA-PF by 8%. The formula with 5% lignin oleate showed an SPF boost of a tinted formula with a 5.25% iron oxide mix by 29% with a UVA boost of 14% compared to the control tinted formula. The 10% and 15% lignin oleate formulas did show impact on the protection values of the formulas, respectively attaining a 13% and -31% SPF boost, the UVA-PF results showed a 7.4% and 47% decrease. In regards to the color impact, 5% lignin oleate in the tinted mineral formula obtained an ITA value of -45.19° compared to the -22.85° of the tinted control, illustrating a considerable deepening of the formula. The 10% and 15% formulas showed further minimal deepening at -53.75° and -56.22° . Considering the polymeric nature of the lignin oleate and its oleic acid base, the higher concentrations of lignin oleate presented significant viscosity increases, with the elegance and spreadability of the formulas declining as concentrations increased.

Conclusion:

While the UV protecting benefits of lignin have been reported, few studies exist showcasing the compound's boosting capabilities through the HEVIS spectrum, nor have any studies or market-ready products taken advantage of nor showcased its benefits as a colorant. We now have evidence illustrating the benefits and potential of utilizing lignin oleate as an effective booster in sunscreens while also being able to impart a significant colorant benefit for realistic shades for skin of colour. Formulations containing 5% lignin oleate show high promise in offering sufficient broad spectrum protection with a cosmetically elegant shade and texture, thus pushing the boundary of developing more innovative mineral sunscreen formulas for dark and deep skin tones in the future.



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We look forward to welcoming you
to our next SCS Annual Conference
which will be held in Liverpool
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