

Cosmetics & Toiletries®

SEPTEMBER 2026

The Definitive Peer-Reviewed Cosmetic Science Resource

Allured business
media

Advancing Hyper-
Personalized
Cosmetics

Inside the
Landmark FDA
Approval of BEMT

Brands Take
Stress Relief
to the Skin

Peptides and their Longevity Potential

Cosmetics & Toiletries®

The Definitive Peer-Reviewed Cosmetic Science Resource



**Don't miss an issue!
Subscribe Today!**





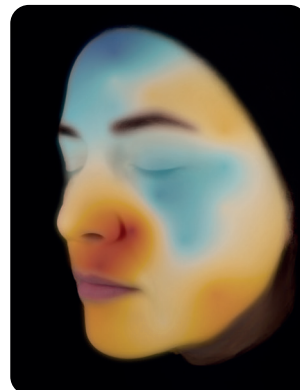
Silk-inspired bioactive for climate-adaptive beauty



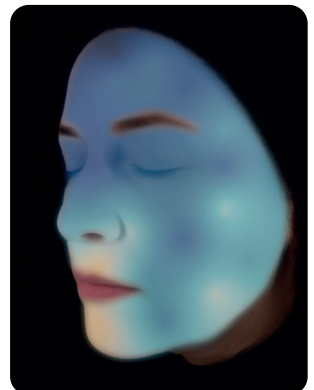
Silkaress™

Resilience wrapped in softness

- Boosts skin resilience against climatic stressors
- Provides a silk-like protective effect
- Improves hydration, comfort, and well-being
- Derived from organic white mulberry leaves



Placebo



Silkaress™



CONTENTS | C&T

September 2026 | Volume 141, Number 7

6 Editor's Note

Slow it Down

7 Industry Insight

Beauty Brands Take Stress Relief to the Skin

48 Ad Index

Market Intelligence

8 Product Roundup

12 Expert Opinions on Skincare Gets Clinical with the Rise of Dermocosmetics

Industry experts give their thoughts on the rise in cosmetic products backed by dermatologists.

Regulatory

14 Decoding Beauty Breakthroughs:

Coty Files Patents for Protect + Repair Sunscreens

by K. Culliney

18 The 25-Year Journey:

Inside the Landmark FDA Approval of BEMT

by C. D'Ruiz

Research

22 Unlocking Nature

The Secrets of Effective Botanical Extracts

by J. M. Marsh, et al.

28 Faster, Better Healing

Galactomannans from *Ceratonia siliqua* as a Novel Solution for Wounded Skin

by L. Verzeaux, PhD, et al.

ON THE COVER

Images by master1305 and Siarhei at Adobe Stock



facebook.com/CandTmagazine



@cosmeticsandtoiletries



Cosmetics & Toiletries



AlgaSurge™

The ocean's secret for natural plumpness and dewiness



Dual-action marine active combining HA-like hydration with PDRN-like regeneration. Visible plumpness in 24 hours. Outperforms hyaluronic acid. Resists enzymatic breakdown. 100% vegan. Superior performance meets sustainability—this is next-generation skincare.



**Blue
biotechnology
origin**



Fast action
Significantly visible
benefits after single
use! Within 1 hour!



**High & Low
MW sulfated
polysaccharide**



**Vegan PDRN
source**

Up to +34%

Skin radiance
& dewiness

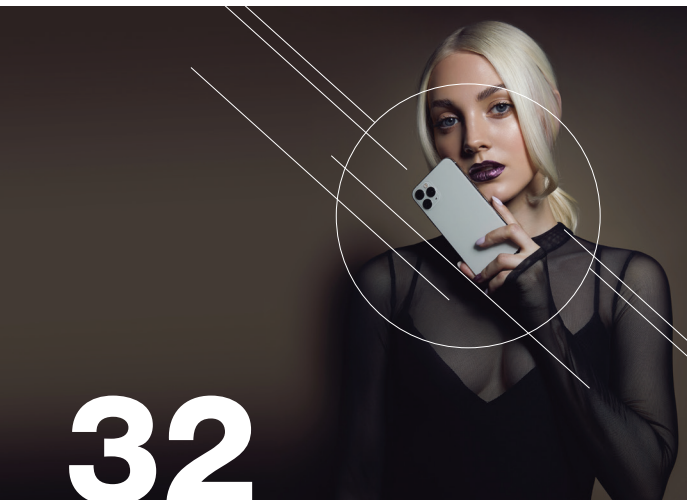
Up to +57%

Plumpness

Up to -67%

Wrinkle count





Testing

32 Advancing Hyper-Personalized Cosmetics

A Dual Approach Combining Regulatory Methodology and Live A/B Performance Testing

by T. Navarro, et al

Formulating

40 Next in Skin

Rethinking Facial Aging, Aesthetic Interventions and Skin Health

by K. Steventon Ph.D.

44 Peptides and Their Potential Within Longevity Skincare

by R. Mallon

DM17 Read the Label

Drunk Elephant Protini Powerpeptide Resurfacing Serum with Lactic Acid

by M. N.G. de Mul



facebook.com/CandTmagazine



@cosmeticsandtoiletries



Cosmetics & Toiletries



Peer-reviewed content, designated by this icon, ensures the insights we deliver are vetted, sound and reliable for readers.

EDITORIAL

Content Director

Emmanuel Henderson | 1-630-344-6020/ehenderson@allured.com

Managing Scientific Editor

Emily Little | 1-630-344-6058/elittle@allured.com

ADVERTISING SALES

Group Publisher

Jeb Gleason-Allured | 1-630-344-6069/jallured@allured.com

New Business

Development Manager

Jolly Patel | 1-630-344-6061/jpatel@allured.com

Advertising Production Specialist

Sarah Slivinski | 630-344-6057/sslivinski@allured.com

Business Intelligence Specialist

Ethan Grisham | 1-630-344-6039/egrisham@allured.com

AUDIENCE DEVELOPMENT

Audience Development Manager

Sam Attebery | sattebery@allured.com

Subscriber Customer Service

cosmeticsandtoiletries@allured.com

DESIGN

Assistant Design Manager

James Fergus

CORPORATE

Partner & CEO

George Fox

Partner & President

Janet Ludwig

Marketing & Creative Director

Kim Fry

Financial Director

Joseph Mumbu

OTHER ALLURED PRODUCTS

Beauty Launchpad
Global Cosmetic Industry
MedEsthetics

Perfumer & Flavorist+
Skin Inc.
Cosmetics & Toiletries Allē Awards



Cosmetics & Toiletries (ISSN 0361-4387) is published monthly (except February, August, & December) by Allured Business Media - 336 Gundersen Drive, Suite D, Carol Stream, IL 60188-2403. Periodicals Postage paid at Carol Stream, IL and additional mailing offices.

POSTMASTER: Send address changes to COSMETICS & TOILETRIES, Attn: Audience Development, 336 Gundersen Drive, Suite D, Carol Stream, IL 60188-2403. Give both the new and old addresses. Allow two months for change to become effective.

Subscriptions: Subscribe online at www.cosmeticsandtoiletries.com.

Print subscriptions are free to qualified individuals in the United States. If you do not qualify for a free print subscription and would prefer the print, it is available at a cost. Contact us for more information.

Missing Issues: Allured Business Media/Cosmetics & Toiletries do not replace missed or lost issues. Additional copies are available for a price. Contact us for more information.

Customer Service: For both the US and internationally, we are available 9AM - 5PM CST, Monday-Friday via email. Email: cosmeticsandtoiletries@allured.com or see our "Contact Us" page on www.cosmeticsandtoiletries.com.

Allured Business Media makes all attempts to publish accurate information; however, this publication may contain technical inaccuracies or typographical errors. The reader assumes all risks concerning the suitability and accuracy of the information within this publication. Allured Business Media assumes no responsibility for and disclaims all liability for any such inaccuracies, errors or omissions in this publication and in other documentation referred to within or affiliated with this publication.

Copyright 2026: Reproduction in whole or in part without permission is strictly prohibited.

Cosmetics & Toiletries and *C&T* are registered trademarks of Allured Publishing Corporation.



Solutions for
compromised skin

SILAB Softcare, a department fully dedicated to the care of compromised skin

SILAB Softcare has a strong commitment to health. Intended for the dermo-cosmetic and dermatological markets, its active ingredients respond to cutaneous disorders by reactivating the biological mechanisms of healthy skin.

Atopic dermatitis

AD-RESYL®

The natural solution dedicated to atopic skin

From mondo grass (*Ophiopogon japonicus*)

Acne

ACNESIUM®

The daily care for acneic skin

From pomegranate (*Punica granatum*)

Lesion

CICACTYL®

The care for wounded or damaged skin requiring repair

From carob (*Ceratonia siliqua*)

efficacy

safety

naturality

SLOW IT DOWN



Be honest: how many times have you told yourself, “If I could just slow down and have one day to myself, I’d feel better?” We’re all going a thousand miles an hour, shifting from one task to the next, and we very rarely just take a moment to stop and smell the roses, so to speak.

This month’s issue of *Cosmetics & Toiletries* is all about slow aging and finding cosmetics that work SPECIFICALLY for what you need. As the industry shifts towards a longevity focus and addressing the cellular causes of aging, formulators are looking for ingredients and technologies with a scientific approach. This is also where the personalization trend comes into play; how can formulators make a product just for one consumer based on their specific needs?

In our cover story, Rachel Mallon of Oriflame Cosmetics discusses peptides and their potential uses in longevity skincare. She explains that the things that define “health” and “wellness” have evolved drastically, and it’s important for cosmetics companies to keep up with that evolution.

The Expert Opinions column for this month is all about dermocosmetics, hybrid products that bridge the gap between traditional cosmetics and clinical dermatology. This is an area that I’m particularly interested in, and it was so insightful to read all of the responses from our industry partners. There is a clear demand for science-backed, clinically effective skincare, and we’re only at the beginning of its boom.

Thomas Navarro and his team at Prose have written an article on the company’s dual approach to hyper-personalized products through regulatory methodology and live A/B performance testing. Their direct-to-consumer model allowed them to create a “formulation architecture” for each category, helping them navigate complex regulatory frameworks. I highly recommend this article for a peek into how personalization is truly possible.

For Industry Insights, I wrote about beauty brands creating anti-stress cosmetics and how research on cortisol levels in skin is making its way into actual formulations. I won’t lie, writing this article made me want to have a spa day, and I hope you feel the same effect reading it.

Slow aging isn’t about stopping the aging process; it’s about going with the body’s biological processes and addressing the core issues, stopping to take a moment and take stock of what’s going on. So this is my invitation to you to slow down as you read this month’s issue. Put on a face mask and a playlist that brings joy. It’ll be worth it.

C&T



Emily Little
Managing Scientific Editor
elittle@allured.com

SCIENTIFIC ADVISORY BOARD

Eric Abrutyn, TPC² Advisors Ltd.

Isabelle Castiel-Higounenc, Ph.D., PharmD., L’Oréal R&I

Jean-Christophe Choulot, Pharm.D., Caudalie

Kelly Dobos
Consultant and Professor, Univ. of Cincinnati

Zoe Diana Draelos, M.D.
Dermatology Consulting Services

Angela R. Eppler, Ph.D.
Suave Brands Co. (formerly Haleon/GSK)

Trefor Evans, Ph.D.
TA Evans LLC/TRI Princeton (ret.)

Linda C. Foltis
Consultant (formerly Function of Beauty)

S. Peter Foltis, Pharm.D., Consultant

Mindy Goldstein, Ph.D.
Mindy S. Goldstein Ph.D. Consulting

Hemali Gunt, Ph.D. (formerly Burt’s Bees)

Lindsay Hymson Schechter, Kenvue

John Jiménez, Pharm.D.
Belcorp Colombia

Howard I. Maibach, M.D.
University of California, San Francisco

Prithwiraj Maitra, Ph.D., AbbVie

Jennifer Marsh, Ph.D., Procter & Gamble

Marc Pissavini, Ph.D., Coty-Lancaster

Steve Schnitger, Ph.D.
Consultant (formerly The Estée Lauder Cos.)

Ron Sharpe (formerly Amway)

Leslie C. Smith, Ph.D., La Perla Beauty

Katerina Steventon, Ph.D.
Skincare Consultancy Ltd.

AKshay Talati, Pharm.D., Goop

Peter Tsois, The Estée Lauder Cos.

Gill Westgate, Ph.D.
Consultant and University of Bradford, UK

Jane Yoo, M.D.
dual-board certified dermatologist, Mohs surgeon

Shuliang Zhang, Ph.D., Coty, Inc.

Tao Zheng, Ph.D., The Estée Lauder Cos.

BEAUTY BRANDS TAKE STRESS RELIEF TO THE SKIN

The lines between the beauty industry and the wellness space are becoming more and more blurry. Cosmetic formulators are borrowing ingredients and trends from wellness practitioners and vice versa. Research in skin health has demonstrated a linkage between cortisol levels in the skin and stress, and brands are taking notice.

“As beauty and inner wellness become more and more interconnected, there will be heightened attention towards products and ingredients that promote natural symbiosis and mental wellbeing,” said Dr. Gervaise Gerstner, chief medical officer at Virginskin. “In fact, it has been found that your skin and nervous system share the same embryonic origin, with high chronic stress being reflected on the skin.”

And younger consumers, ever aware of new trends and shifting mindsets, are looking for stress relief from their cosmetics. Gen Z and millennial consumers reported spending more on discretionary wellness purchases than older generations, according to data from McKinsey & Company¹. These purchases range from massage devices to IV drips to cosmetic procedures.

As consumers turn to self-care and wellness to enhance their overall wellbeing, cosmetics can play an essential role in relieving stress and offering a calming experience. From addressing the visible signs of stress on the face to incorporating scent science, beauty brands are making waves in creating truly anti-stress cosmetics.

Stress as a Visible Sign of Aging

When someone feels stressed or anxious, cortisol levels increase, which can degrade skin proteins and break down the moisture barrier. These effects manifest in visible signs of aging.

“People increasingly recognize that stress is not only psychological,” said Yulia Yakovleva, head of marketing and brand management at Instytutum. “It can worsen acne, eczema, psoriasis, itch, hair shedding, skin sensitivity and barrier dysfunction. This creates a simple consumer logic: if stress affects my skin, then my skincare should help my skin cope with stress.”

Instytutum is marketed as a “result driven skincare” brand, founded by anti-aging and longevity scientist Dr. Natalia Bobok. The brand uses this research on cortisol levels and its effects on skin to inform its formulations. In fact, the brand even ran its own large-scale study on the subject.

“A key step for the brand was our large-scale study on stress and skin, involving more than 12,000 participants,” Yakovleva said. “The findings helped us better understand how stress is reflected in the skin – including fatigue, dullness, dryness, redness, puffiness, dark circles, increased sensitivity and weakened barrier function. This research became an important foundation



for our transition toward working not only with visible signs of aging, but with the biological age and adaptive capacity of the skin.”

According to a review article published in the journal *Cureus*, the hypothalamic-pituitary-adrenal (HPA) axis is at the center of stress/skin interactions². When the HPA axis is activated under stress, the skin induces pathological immune responses, leading to neurogenic inflammation. Further, mast cells in skin play a key role in these interactions, as their activation can trigger inflammation, itching and alterations in barrier function.

Even luxury brands are taking on the anti-stress trend in their new

launches. Lancôme launched its Hydra Zen collection in 2020 with an emphasis on addressing the visible signs of stress on the skin. The collection includes a hyaluronic acid toner and three moisturizer formats, all formulated with Centifolia rose. Other brands, such as Dr. Dennis Gross, Dermalogica and Aveda have added products to their portfolios to address visible stress signs.

Gentle and Soothing and Sensory

When it comes to specific applications for anti-stress products, a few examples rose to the top. Moisturizers were a common answer, with its immediate connection to barrier repair and hydration. Other experts answered that masks and eye patches are the most suitable due to their association with self-care and wellness. The common thread among all of these examples: a sensory benefit.

“Product formats that offer a sensory benefit enhance the experience and form that instant connection between the mind and the body, creating a conscious pause,” said Amanda Kahn, general manager at NEOM Wellbeing. “So, formulations that feel luxurious, cooling, create a tingle or warmth or simply smell incredible all help to induce that ‘drop your shoulders’ moment.”

Increased research in the role of scent and mood has increased the number of products with “mood enhancing” properties. Scents like lemon and grapefruit are intended to increase energy and awaken optimism, while scents like lavender and chamomile are known for calming properties and are often used in sleep-aid products. For example, Dove’s Anti-Stress Beauty Bar combines a gentle cleanser with a calming scent.

“Dove Anti-Stress Beauty is thoughtfully made to moisturize your skin, leaving you feeling calm from head to toe,” the brand’s website states. “Infused with a blue chamomile and oat milk scent, our anti-stress bar also has a calming scent that’ll help you unwind as you cleanse.”

Consumer data from Mintel shows that fragrances that improve mood are becoming more popular in online conversations, with over 2,200 mentions in 2025³. Further, Mintel’s analysts predict that by 2030, beauty products will not just enhance mood and emotions, but actively regulate them.

Gentle cleansers are also becoming increasingly popular for stress relief. In fact, Yakovleva with Instytutum said that it’s an essential piece of the puzzle.

NEOM Wellbeing conducted its own study on the effects of its fragrances on mood and emotion.



Image courtesy of NEOM Wellbeing

“Cleansing is often underestimated in anti-stress skincare,” they said. “If a cleanser is too aggressive, it can increase dryness, sensitivity and barrier disruption – exactly the conditions associated with stressed skin.”

Cleansers hold the largest share of the soothing skincare product market, according to a market report from Fact.MR⁴. The market for soothing skincare products is growing across the world, with a projected worth of \$72.4 billion by 2036 at a compound annual growth rate of 3.8%.

Beauty brand harmonie launched The Caring Cleanser, which claims to help relieve stress while cleaning the skin. The cleanser includes ingredients like the brand’s proprietary Resurrection Concentrate for a gentle cleanse without a stripping feeling. Additionally Tower 28’s SOS Gel Cleanser has been certified by several organizations, including the National Eczema Association and National Rosacea Society, for its gentle cleaning power.

The Beauty-Wellness Venn Diagram

If I were to draw a Venn diagram for the similarities and differences between the beauty industry and the wellness industry, it would almost be a circle. These two areas are increasingly converging and overlapping, creating a demand for cosmetic products with anti-stress benefits.

“The intersection of neuroscience and cosmetics is one of the most exciting frontiers in the industry right now,” Khan said. “For a long time, the beauty industry relied on sensory experience and consumer perception to validate efficacy. Neuroscience is changing that entirely, giving brands the tools to measure and prove the physiological and neurological impact of their [products] in a way that was never previously possible.”

By using neuroscience, cosmetic chemists can now quantify certain aspects of formulation that were previously subjective. There is an opportunity to definitively show a reduction in stress, from the repair of the moisture barrier to a reduction in wrinkles to a boosted radiance.

Maybe cosmetics can’t fix everything related to stress; one moisturizer isn’t going to miraculously cure burnout. But perhaps using these products can allow us a moment of respite in a chaotic world. We can use our daily routines to slow down, to breathe and to take care of ourselves.



Virginskin's portfolio relies on botanical actives for its effects.

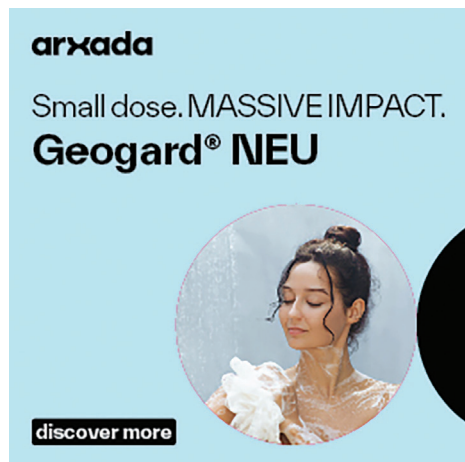
References

1. McKinsey & Company, Future of Wellness 2025, <https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/future-of-wellness-trends>
2. Bobok N, Taskesen T. Stress-Induced Changes of the Skin: A Narrative Review. *Cureus*. 2025 Nov 7;17(11):e96285. doi: 10.7759/cureus.96285.
3. Mintel, 2026 Global Beauty & Personal Care Predictions, <https://www.mintel.com/insights/beauty-and-personal-care/beauty-trends/>
4. Fact.MR, Soothing Skin Care Products Market Forecast and Outlook 2026 to 2036, https://www.factmr.com/report/soothing-skin-care-products-market?spm=a2700.accio_bizSeo.0.0.1266122eEd8kR5

C&T

PRODUCT ROUNDUP [Ingredients, Equipment & Services]

Highlighting innovative ingredients, services and products



Geogard NEU

Arxada

<https://explore.arxada.com/geogard-neu-ad>

Discover Geogard NEU, our multifunctional product protection platform. Designed for today's rinse-off formulations with ultra-low use levels, neutral pH performance, broad formulation compatibility and application flexibility.



DavosLife Rejuéclat

KLK OLEO / Davos Life Science

www.klkoleo.com/davoslife/skin-care

Reveal revitalized, youthful-looking skin with DavosLife Rejuéclat. Powered by next-generation Vitamin E Tocotrienols, it helps combat oxidative stress, supports skin firmness, hydration and radiance, while enhancing skin resilience for a visibly brighter and healthier complexion.



DermalRx LuShield NAT

Biocogent

<http://biocogent.com/NAT>

DermalRx LuShield NAT (INCI: Propanediol (and) *Osmanthus fragrans* Flower Extract) is a sustainably sourced *Osmanthus fragrans* extract that targets the molecular causes of early skin aging. By inhibiting 95% of Advanced Glycation End Product (AGE) formation, it helps protect collagen and elastin, improves firmness and elasticity and visibly enhances skin tone, clarity, brightness and overall skin quality.



RonaCare AP

Susonity

<https://www.susonity.com/US/en/product/PM/130163>

RonaCare AP is a high-performing, long-lasting antioxidant that helps protect skin from ROS, light-induced radicals, pollution and lipid oxidation. It supports formulation stability, helps stabilize UV filters and maintains efficacy without causing discoloration—making it suitable for skincare, sun care, scalp, hair and color cosmetics.

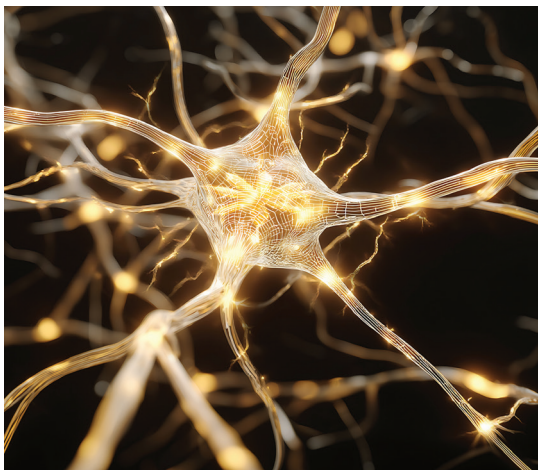


Multivitamin Gut Support

TOSLA

<https://toslagroup.com/>

Liquid supplement formulated to support digestive comfort, gut barrier integrity and nutrient absorption. At its core is PHGG, clinically valued prebiotic fiber that nourishes beneficial gut bacteria and promotes intestinal balance. Combined with vitamins, amino acids, aloe vera, ginger and licorice extract, it delivers comprehensive daily digestive support in ginger-mint flavor.

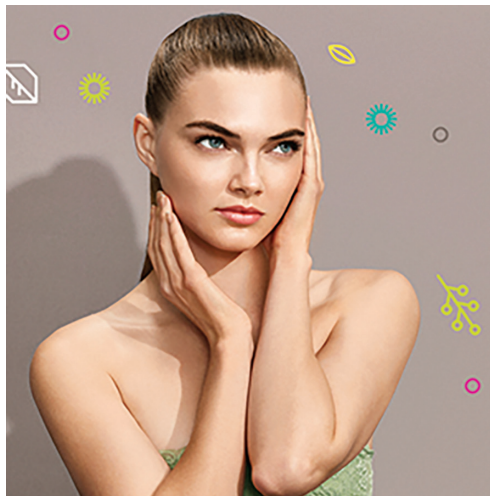


Gavient PY-GL

JAKA Biotech

<https://www.jakabiotech.com/gavient-py-product/>

Gavient PY-GL (INCI: Hydroxypropyl Cyclodextrin (and) Hydroxypropyl Methylcellulose (and) *Paris yunnanensis* Rhizome Extract (and) Disodium EDTA) is a natural active ingredient extracted from *Paris polyphylla* var. *yunnanensis*. It modulates the activation of multiple cutaneous receptors to inhibit the production and signaling induction of glutamate, thereby alleviating cutaneous discomfort, improving skin sensitivity, simultaneously enhancing the skin barrier, and reducing erythema responses.



Collapeptyl biofunctional

Ashland

https://www.ashland.com/industries/personal-and-home-care/skin-and-sun-care/collapeptyl-biofunctional?utm_source=C%26T+text+ad&utm_medium=collapeptyl+300x300&utm_campaign=PHC26+ADV+Cosmetic+and+Toiletries+

Collapeptyl biofunctional (INCI: Water (and) Glycerin (and) Cellulose Gum (and) Hydrolyzed Sodium Hyaluronate (and) Tripeptide-1 (and) Hexapeptide-9) is the first-ever hyalupeptide hybrid, mimetic and booster to 20 skin collagen types for instant glass-like glowy skin and wrinkle appearance correction. This vegan, PFAS-free, 99.7% natural collagen peptide solution delivers unparalleled synergistic performance and powers a dual action. It combines sensorial effect with instant and long-lasting visible benefits.

JD Jojoba Esters 70

Jojoba Desert

<https://www.jojobadesert.com/jd-jojoba-esters-70/>

JD Jojoba Ester 70 (INCI: Jojoba Esters (and) Hydrogenated Jojoba Oil) is a high-melting, oil-free emollient designed to provide structure and stability in sticks and anhydrous systems. It helps deliver mechanical strength, maintain integrity and improve glide while enhancing formulation stability. It also supports skin hydration and helps prevent product drying over time, ensuring long-lasting performance.





LexFeel Enhance MB

Inolex

https://www.inolex.com/products/lexfeel-enhance-mb?utm_source=C%26T&utm_medium=product+roundup&utm_campaign=LexFeel+Enhance+MB&utm_id=Natural+Sensory+Emollients

Now cleared for U.S. sunscreens, bemotrizinol is a crystalline solid that can fall out of solution at high filter loads. LexFeel Enhance MB (INCI: Diheptyl Succinate (and) Propylene Glycol Dibenzoate (and) Capryloyl Glycerin/Sebacic Acid Copolymer) forms a polymer network that reduces recrystallization potential for BEMT, EHT and other organic UV filters, so high-SPF formulas stay stable with an elegant, cushion-soft feel.



Macro'Age

Seppic

<https://www.seppic.com/product/macro-age>

Macro'Age (INCI: Water (and) Propanediol (and) *Macrocystis pyrifera* (Kelp) extract) is an active from our exclusive biotechnology Celebrity allowing the isolation and cultivation of *Macrocystis pyrifera* in its rare form to reveal pro-aging benefits. Macro'Age supports the full process of inflammation resolution needed to avoid Inflamm'aging. Our ingredient demonstrates superior efficacy vs. placebo and hero ingredients (retinol & bakuchiol).



Dragosine green

Symrise

<https://www.symselect.com/ingredients/permalink/symrise-dragosine-green>

Dragosine green (INCI: L-carnosine) is a new generation cosmetic ingredient for skin longevity using 100% plant derived L-carnosine. Supporting prejuvenation and well-aging concepts, it delivers 360° exposome protection helping preserve skin quality and resilience. Produced via green biotechnology, it combines the proven efficacy of an established molecule with an improved natural-origin profile.

The 2027 C&T Allē Awards submissions are open!

Package your innovation for a
chance to be recognized!



www.alleawards.com/live2027

Submissions close October 1st, 2026



EXPERT OPINIONS

Skincare Gets Clinical with the Rise of Dermocosmetics

Industry experts give their thoughts on the rise in cosmetic products backed by dermatologists.

CLAUDIA BARBA, PHD, TECHNICAL SERVICES
MANAGER, BEAUTY AND PERSONAL
CARE - NORTH AMERICA, INGREDIENTS
+SPECIALITIES FROM UNIVAR SOLUTIONS

PHILIPPE DAIGLE, PORTFOLIO MANAGER,
ACTIVE INGREDIENTS, LUCAS MEYERS
COSMETICS BY CLARIANT

DR. HOWARD EPSTEIN, TECHNICAL
DIRECTOR, COSMETIC ACTIVES INNOVATION
AND APPLICATIONS, SUSONITY

GIADA MARAMALDI,
GLOBAL CATEGORY MANAGER,
BOTANICAL ACTIVES AND
INTEGRATED SOLUTIONS LEAD / KACEY
BRIDES, MARKETING MANAGER, GIVAUDAN



When walking through the cosmetics aisle at any given store, the phrase “backed by dermatologists” shows up on most packages. There is a clear demand for products founded in science and evaluated by doctors. The rise of dermocosmetics is an extension of the slow aging trend; consumers want to target skin issues at the cellular level rather than just covering them up.

hen walking through the cosmetics aisle at any given store, the phrase “backed by dermatologists” shows up on most packages. There is a clear demand for products founded in science and evaluated by doctors. The rise of

Image by Sebastian Duda at Adobe Stock

The global dermocosmetics market was valued at \$39 billion in 2025 and is expected to grow to \$85.7 billion by 2035, according to a market report from Global Market Insights. This represents a compound annual growth rate of 8.4%, largely driven by innovation through R&D and biotechnology to meet consumer demand. Further, Euromonitor's Voice of the Consumer: Beauty survey from 2023 showed that 30% of respondents purchase dermocosmetics for skin health benefits, and 24% purchase them for better alignment to their skin type.

Cosmetics & Toiletries solicited the insight of experts from across the industry to learn more about the rise in dermocosmetics and what this means for formulators in the future.

- Claudia Barba, PhD, technical services manager, beauty and personal care - North America, Ingredients +Specialties from Univar Solutions

- Philippe Daigle, portfolio manager, active ingredients, Lucas Meyers Cosmetics by Clariant
- Dr. Howard Epstein, technical director, cosmetic actives innovation and applications, Susonity
- Giada Maramaldi, global category manager, botanical actives and integrated solutions lead / Kacey Brides, marketing manager, Givaudan

What current trends are you seeing in dermocosmetics and dermatologist-backed products in the beauty and personal care industry?

Claudia Barba [CB]: Dermocosmetics continue to gain momentum as consumers seek products that combine clinically proven efficacy with high levels of safety and tolerability, particularly for sensitive and reactive skin. Today's consumers



science-forward skincare innovation from the research labs at Biocogent

TRUST YOUR CELLS to learn and restore



RNActivate™ W 

Precisely targets the skin's "wrinkle miRNA"

Boosts collagen, elastin and fibrillin synthesis

Clinically proven to reduce key signs of aging

RNActivate™ W is a next-generation active powered by RNA epigenetic technology. Using Biocogent's proprietary delivery system, it targets the skin's "wrinkle microRNA" with precision-engineered antagomiRs that restart collagen, elastin, and fibrillin production. This restores the skin's structural foundation — improving firmness, elasticity, thickness, and smoothness. Backed by compelling in vitro, ex vivo and clinical data, RNActivate W delivers visible wrinkle reduction and universal improvement across key signs of aging.

LEARN
MORE!

Biocogent

Biocogent LLC, New York USA



©2026 Biocogent, LLC.
®/® - Trademark of Biocogent, LLC.
® - Registered in the U.S. Patent and Trademark Office and in other countries.



The global dermocosmetics market was valued at \$39 billion in 2025.

are looking for science-backed solutions that help deliver visible results while supporting long-term skin health.

A major area of focus is skin barrier health and resilience, driving demand for ingredients such as ceramides, peptides, niacinamide, and advanced hydration technologies. Evidence-based actives, including vitamin derivatives and retinoids, remain highly relevant due to their well-established benefits. We are also seeing increased interest in minimalist formulations, microbiome-friendly products, and at-home treatments designed to enhance the consumer experience.

Another important trend is the evolution of dermocosmetics beyond purely functional products. Consumers now expect effective formulations that also provide an enjoyable sensory experience, creating opportunities for products that balance dermatological performance with cosmetic elegance.

Philippe Daigle [PD]: The clearest signal we're picking up in dermocosmetics and dermatologist-backed products is the "medicalization of beauty". Consumers are increasingly looking

for cosmetic products that either replicate the visible benefits of aesthetic procedures without their cost, downtime, or invasiveness, or complement professional treatments by enhancing and prolonging their results while minimizing side effects such as redness, irritation, and discomfort. This evolution is already visible on the market, with products using the language and codes of aesthetic medicine through names such as "Needless Serum" or making references to injectables and laser treatments.

What future directions might these trends take? Where is there potential?

Howard Epstein [HE]: The next generation of dermocosmetics may be built around "protect by day, restore by night." Daytime formulas can focus on defense against UVA, UVB, ambient blue light, infrared exposure and pollution. Nighttime products can prioritize barrier support, moisturization, soothing and repair, when skin may be more prone to dryness and itching.

There is also growing potential for sunscreens that extend beyond UV protection. While

Images by paullynn; siththiphong at Adobe Stock

BEMT strengthens UVA and UVB coverage, it can be paired with complementary technologies designed to address high-energy visible light and oxidative stress.

Giada Maramaldi / Kacey Brides [GM/KB]:

Looking ahead, dermocosmetics will become increasingly integrated into the patient journey, extending beyond treatment support to prevention, maintenance, and long-term skin health, longevity. Insights from our recent survey of dermatologists across eight major markets indicate their growing demand for science-backed products that complement aesthetic procedures, improve recovery, and sustain results over time. We also expect significant growth in personalized solutions tailored to emerging needs amongst consumer groups, particularly GLP-1 users or peri/menopausal women seeking support for skin elasticity, firmness, and healthy aging. Advances in biotechnology, regenerative ingredients, and precision skincare will create new opportunities.

How are consumer trends and insights shaping these trends?

[CB]: Consumer expectations are a major driver of innovation in this category. Today's consumers are highly informed, actively researching ingredients and looking for transparency, safety, and substantiated claims before making purchasing decisions.

There is growing demand for products that address concerns such as sensitive skin, barrier protection, healthy aging, and overall skin wellness. Consumers increasingly value dermatologist recommendations, clinical testing, and visible results. At the same time, they are unwilling to compromise on product aesthetics or user experience.

As a result, brands are developing formulations that combine scientific credibility with appealing textures, elegant formulations, and clear performance benefits, helping bridge the gap between beauty and skincare therapy.

[HE]: Consumers are already comfortable with regimen-based beauty, as seen in the popularity of Korean skin care and product layering. Chronotherapy builds on that behavior by giving each step a clearer biological purpose. Instead of simply adding more products,

consumers can use the right function at the right time.

Consumers are also seeking products that feel credible, dermatologist-aligned and easy to understand. Clear day-and-night positioning can make complex science more accessible while helping brands differentiate crowded portfolios.

What are the main challenges in this space? Where are the opportunities to innovate?

[PD]: This shift is redefining what "proof" means in the cosmetic industry. It's no longer enough to demonstrate efficacy against a placebo; brands now want ingredients benchmarked head-to-head against the procedures they're meant to mimic or support. That demands a new generation of clinical protocols, with comparative trials and endpoints that speak the same language as dermatologists and aesthetic practitioners.

Speed of efficacy is also becoming a decisive purchasing factor, with visible improvements expected within as little as seven days. This creates significant opportunities for highly concentrated active ingredients, optimized delivery systems, and next-generation peptides capable of producing rapid and visible biological effects.

[GM/KB]: One of the biggest challenges is meeting the growing demand for clinically proven, visible results in an increasingly complex ecosystem. Today, innovation is no longer limited to supporting dermatological procedures; it must also consider a rapidly expanding landscape of professional and at-home devices, from lasers and radiofrequency treatments to LED masks and microcurrent technologies. Each device activates distinct biological pathways, creating both complexity and opportunity for ingredient developers. The next frontier will be designing actives that work synergistically across these mechanisms to deliver unprecedented performance. Those who can bridge biotechnology, skin biology, and device compatibility will unlock the most meaningful innovations in dermocosmetics.

C&T



KEY POINTS

- Coty has patented formulations designed to simultaneously protect skin from full-spectrum solar radiation while offering repair or thermoprotection.
- Experts note that while the concept is sound, it faces significant challenges, including the need to prove that these topical ingredients can successfully penetrate the skin to reach deeper epidermal cells.



Decoding Beauty Breakthroughs:

Coty Files Patents for Protect + Repair Sunscreens

Kacey Culliney,
freelance columnist

International beauty major Coty has developed dual-power sunscreens that offer full-light protection while simultaneously repairing damage – a smart principle but one that will need solid in vivo science and clear consumer communication, say experts.

Published in June 2026, the two international patents (I & II) outline formulations designed to simultaneously protect skin from solar radiation while offering full-light repair or full-light thermoprotection. Both blends use herbal and fruit extracts in combination with amino acids, antioxidants, and a postbiotic or melatonin, for repair and thermoprotection aspects—ingredients that work synergistically with more traditional UV filters and light reflectors, Coty said.

Skin Aging, Skin Senescence and Thermal Aging

“There remains a need for sun protection compositions that not only protect from solar radiation but also repair the damage that is caused by solar radiation even in the presence of a sunscreen,” Coty wrote in its first patent filing.

Published in June 2026, the two international patents outline formulations designed to provide both protection and repair.

According to the company, residual thermal damage occurs to skin exposed to sunlight from ultraviolet B (UVB) and infrared (IR) rays, even when it is protected by UV filters. Coty's work, it said, has shown that a "skin thermoprotecting agent" can therefore be used to protect the skin from this "residual thermal damage".

"There remains a need for sun protection compositions that not only protect from solar radiation but also provide full-light thermoprotection in the wavelength range 280 to 1400nm, thus protecting the skin from sun rays reaching it as well as from their consequences, including heat damages induced by IR rays," the company wrote in its second patent filing.

Coty's first formulation centers on a blend of creatine, bifida ferment lysate, and/or *Sechium edule* fruit extract to repair DNA damage to the skin caused by full-light exposure, tackling both skin aging and skin senescence. "Without beyond bound by theory, it is believed that the repair derives from the repair action of bifida ferment extract against damage caused by UVB radiation and the repair action of *Sechium edule* fruit extract against damage caused by UVA radiation, both further supported by the energy booster action exerted by creatine," Coty wrote. "The inventors have further found that *Sechium edule* fruit extract helps repair damage caused by UVB and blue light, beyond what [was] known in the art."

The second formulation utilizes glutathione, Red salvia extract, *Physalis angulate* extract and/or melatonin to synergistically provide thermoprotection against heat-driven damage caused by full-light radiation, tackling oxidative stress and thermal aging.

Coty said the protect and repair formulations are suitable for a range of topical formats, including emulsions, suspensions, gels, creams, ointments, and aerosol foams, as well as powders, sprays, and foundations. The inventions can also be used in a transdermal patch format or via intradermal or subcutaneous administration, the company said.

The Expert View: The Pros and Cons of Simultaneous Protection and Repair

Two independent experts were contacted to discuss the true potential of Coty's inventions designed to offer simultaneous repair and protection from full-light solar radiation.

Antony Young, expert on ultraviolet (UV) radiation and DNA photodamage and Emeritus Professor of Experimental Photobiology at St John's Institute of Dermatology, King's College London, said both concepts are certainly possible.

Offering simultaneous protection and repair within one formulation, and using natural products to do so, is a "good idea in principle," Young said, and "should not be too difficult; it just needs good experimental design."

A full quality assessment, however, requires *in vitro* work to be proven *in vivo*, he said. "What works *in vitro* does not necessarily work *in vivo*. Any agent that affects DNA damage/repair must be able to penetrate the skin to reach the important target cells, which are most likely to be in the basal layer, for example, the deepest layer of the epidermis."

Uli Osterwalder, sun protection expert and founder of consulting firm Sun Protection Facilitator, said there is certainly "contradiction and conflict" in scaling and marketing dual-acting protect and repair formulas.

"UV filters must act at the surface, whereas repair happens inside the skin," Osterwalder explained, which could cause hurdles from a formulation point of view and also make it a "rather difficult sell to the consumer."

The global sun care products market is expected to reach \$16 billion by 2030.

Source: Grand View Research





Coty said the protect and repair formulations are suitable for a range of topical formats.

Repair post-exposure also makes sense, he said. "Our body and all nature in general is adapted to the daily sun/no sun cycle. A lot of repair is happening when we sleep."

For Young, though, the concept of repairing and protecting simultaneously is important, given repair is not 100% accurate. "The damage itself, before repair happens, is likely to trigger other adverse effects," he said, including mutations that are persistent. Evidence also shows that damage still occurs after the ultraviolet radiation (UVR) exposure stops.

Thermal damage, however, is not a significant concern "in the scale of things," according to the expert. "I have never been convinced that thermoprotection is necessary, at least with normal sunlight exposure."

Looking ahead, Osterwalder said the danger of dual-action sun care formulas is that they can distract from "the core task of sunscreens," which is to

protect against UV radiation that causes erythema and skin cancer.

"As chairperson of the Technical Standardisation Committee *ISO/TC 217 Cosmetics*, we developed methods to measure the SPF and the UVA-PF, but we did not develop a method to measure, for example, Blue Light protection. There is a reason for that. We prioritize our work. The most important and urgent work is on UV-Radiation," the expert said.

While Visible Light (VL) protection was discussed, given there are damaging effects that deserve to be protected against, the committee found no reason to "get active" on future developments here yet, nor on Infrared (IR) light exposure. "Any future work has to be based on scientific evidence and a consensus among the committee members." **C&T**



CoValence[®]
Laboratories



Raw Beauty
HAS A FORMULA
covalence.com



KEY POINTS

- The FDA's approval of bemotrizinol as a sunscreen active is the first new ingredient added to the over-the-counter sunscreen monograph since the 1990s.
- Although BEMT has been available globally for years, its recent GRASE status finally enables U.S. manufacturers to incorporate this photostable, broad-spectrum UV filter into innovative sunscreen formulations.

Carl D'Ruiz, senior manager, North America Beauty
& Care Advocacy and Business Development,
dsm-firmenich

The 25-Year Journey: Inside the Landmark FDA Approval of BEMT



Editor's note: On June 9, 2026, the U.S. Food and Drug Administration (FDA) announced the addition of bemotrizinol (BEMT) to its list of permitted sunscreen active ingredients. This marks the first new ingredient added to the over-the-counter sunscreen monograph since the 1990s.

Bemotrizinol has been used as a sunscreen ingredient in Europe and many other regions around the world for years. The proposal for FDA approval was submitted by dsm-firmenich, under the tradename PARSOL Shield.

Carl D'Ruiz, senior manager of North America Beauty & Care Advocacy and Business Development at dsm-firmenich, played a significant role in the approval. He has been a staunch advocate for enhanced sun protection regulations, and he has been rooting for BEMT for many years.

Cosmetics & Toiletries asked D'Ruiz to share his story about BEMT and what this monumental approval means not only to him, but to the industry as a whole.

My journey with BEMT actually began more than 25 years

ago. In the late 1990s, while working at Ciba Specialty Chemicals, the original inventor of the molecule, I was involved in supporting the studies and regulatory activities that led to its approval in Europe and subsequently around the world. I also participated in the effort to bring BEMT to the United States through the FDA's Time and Extent Application (TEA) process, which was initiated in 2005.

From the beginning, BEMT stood out as a truly innovative UV filter. Its broad-spectrum protection, excellent photostability and extensive global safety record made it a significant advancement in sun protection technology. Yet despite its successful adoption across global markets, it remained unavailable to American consumers for many years.

In many ways, my joining dsm-firmenich in 2018 represented a continuation of a mission that had started more than a decade earlier. One of the company's goals was to obtain FDA approval for BEMT and finally complete the work that had begun with the TEA submission in 2005. The opportunity to help finish that journey was both professionally exciting and personally meaningful.

The FDA approval process for BEMT (PARSOL Shield) proved to be a long and complex endeavor. Shortly after joining dsm-firmenich, we engaged with the FDA to obtain alignment on the regulatory path forward after reviewing prior agency correspondence and findings associated with the TEA. At that time, the anticipated approval pathway involved filing an Investigational New Drug (IND) application under the Sunscreen Innovation Act.

From the beginning, BEMT stood out as a truly innovative UV filter.

However, the landscape changed significantly with the passage of the CARES Act in 2020, which included FDA OTC drug reform provisions and introduced a new fee-based pathway for sunscreen active ingredients through a Tier 1 OTC Monograph Order Request (OMOR). As a result, much of the IND package that had been assembled had to be restructured and reformatted to meet the new OMOR requirements. This was an unexpected and time-consuming challenge for the team.

The timing also coincided with the COVID-19 pandemic, which made conducting the required clinical studies, including Maximum Usage Trials (MUST), especially difficult. The data package we generated was designed around the FDA's most recent 2016 and 2018 guidance recommendations, and every major study protocol required review and agreement

with the agency before execution. Those discussions were rigorous and often lengthy, but they ultimately helped ensure that the data package would meet FDA expectations.

One of the most rewarding aspects of the journey was collaborating with a broad community of scientists, dermatologists, formulators, toxicologists, and regulatory experts. We spent considerable time sharing the science behind BEMT and discussing the benefits of modern UV-filter technology. Given BEMT's established history of safe use around the world, there was strong interest in finally making this innovation available to U.S. consumers.

The "eureka" moments came not from a single breakthrough, but from the steady accumulation of achievements along the way. Successfully completing the required studies, securing alignment on protocols, adapting to changing regulations, and navigating nearly a year of detailed FDA information requests all reinforced our confidence that the science would ultimately prevail.

That moment finally arrived in June of this year when the FDA issued a Final Order determining that PAR-SOL Shield (BEMT) is GRASE—Generally Recognized

Bemotrizinol is a chemical filter that offers broad-spectrum sunscreen protection.

Source: FDA



Package your Innovations today for 2027!

Cosmetics & Toiletries
ALLE AWARDS



www.alleawards.com/live2027

Submissions close October 1st, 2026



as Safe and Effective. For everyone involved, it was an extraordinary milestone. It represented the first approval of a new UV filter in the United States since 1999 and opened the door for the introduction of more advanced sunscreen technologies that have been available globally for many years.

Looking ahead, the next step is enabling sunscreen manufacturers to incorporate PARSOL Shield into innovative formulations that don't currently exist in the US and bring those products to market. We are excited about the opportunity to provide consumers with access to more advanced sun protection options and help support improved skin cancer prevention and public health outcomes.

Reflecting on the experience, it truly has been an epic journey. Few professional opportunities allow someone to be involved at the inception of a technology, contribute to its development over decades, and ultimately help bring it to regulatory approval. From supporting BEMT's original registrations at Ciba Specialty Chemicals to helping lead the FDA approval effort at dsm-firmenich, I have been fortunate to witness the full arc of its story.

What I will remember most, however, is the people. This achievement was only possible because of the dedication, expertise, and perseverance of colleagues across dsm-firmenich and around the world. Scientists, regulatory experts, clinical teams, toxicologists, formulators, commercial leaders, and many others worked tirelessly over many years through changing regulatory landscapes, a global pandemic, and numerous unexpected challenges. Their commitment never wavered.

I am deeply grateful to have been part of such an exceptional team and to work for a company that had the vision and courage to invest in long-term innovation when the path forward was far from certain. The FDA's Final Order declaring PARSOL Shield (BEMT) GRASE is a remarkable milestone—not just for our company, but for public health and sunscreen innovation in the United States. More than anything, it stands as a testament to what can be accomplished when talented people unite around a common purpose and refuse to give up.

C&T



- ◆ Relieve skin redness in 15min with multi-effect repair to regain skin radiant glow.
- ◆ Precisely target 4 major factors for skin redness, validated by patented technology.
- ◆ BiphaGDE+ MIPuriTec dual-core techniques for enrichment and purification.
- ◆ Core ingredient extracted from 'Cinderella' of the plant world - Saururus Chinensis.





KEY POINTS

- To identify high-performing extracts, it is essential to deeply analyze the phytochemical composition of botanicals and correlate these specific chemical profiles with their functional benefits in hair care.
- Botanical quality varies due to factors like growing conditions, climate, and processing methods; regular, detailed analysis is necessary to maintain consistent performance across different batches and suppliers.

Peer-reviewed

Jennifer M Marsh, Sonja L Knowles,
Rui Fang, Goutham Padmakumar Sarala,

Monique SJ Simmonds; *P&G*



Images by Prathankamrap at Adobe Stock

Unlocking Nature:

The Secrets of Effective Botanical Extracts

In 2019, Procter and Gamble (P&G) with Royal Botanic Gardens, Kew (RGB Kew) in London wrote an article about the importance of understanding the chemistry that supports the functional benefits of botanical extracts that are used in hair care products. This was written as part of our journey to identify extracts that deliver meaningful benefits, and we noted some of the important watch-outs for using these materials. These included regulatory restrictions, safety considerations, adulterations with other botanical materials and the need to evaluate a range of extracts from any given species of plants.

We learned a lot during the past six years, especially the importance of understanding the phytochemistry of a selected extract and its participation in the chosen mechanism of action. In this follow-up article we share what we have learned and how we have used these insights to ensure we use high quality extracts moving forward.

Looking Back: Important Considerations for Botanicals

The first area we covered in our original article was the importance of ensuring compliance with regulatory requirements and only using sustainable sources for our extracts. An important part of this is CITES (Convention of International Trade in Endangered Species of Wild Fauna and Flora) regulations that help in the protection of plants that are threatened by non-sustainable cultivation

We learned the importance of understanding the phytochemistry of a selected extract and its participation in the chosen mechanism.

practices. This resource has lists of species that are covered by Appendix I (highly threatened), Appendix II (threatened, but manageable trade) and Appendix III (threatened in specific countries).

It is critical when reviewing this database to have the correct Latin scientific name for the plant. For example, the majority of the 592 species of *Aloe* (POWO, 2026)¹ are included in Appendix II, which means international trade is permitted but it is regulated to ensure its trade is sustainable. There are also several *Aloe* species included in Appendix I which means no trade is permitted (*Aloe albida*, *Aloe polyphylla*, *Aloe suzannae*, and *Aloe helenae*). However, *Aloe vera* (synonym *Aloe barbadensis*) is the most common form of aloe used in cosmetics. It is now grown commercially and is specifically excluded from the CITES appendices and is not subject to these trade restrictions.

The other important consideration we discovered was a clear understanding of where the plant was grown and whether it was considered to be an indigenous plant from a specific country (i.e., a species that occurs naturally in a specific country or region and has evolved there over thousands of years). Depending on the country in question, a Prior Informed Consent (PIC) agreement might be needed before any research or commercialization of a plant starts as well as Access & Benefit Sharing (ABS) considerations. These agreements are governed by the Convention of Biological Diversity and Nagoya Protocol International treaties that create the legal frameworks that ensure the fair and equitable sharing of benefits from the use of genetic and associated traditional knowledge. These laws vary by country and cover the use of these genetic materials in both research and commercialization and may involve payments for use of these plants in products.

Due to the variation in laws between countries, P&G had to understand sources of all our botanicals and make sure we were compliant with all ABS laws.

An example was the inclusion of pequi oil in Herbal Essences products, where P&G worked with the Brazilian authorities to ensure Herbal Essences complied with ABS laws, as pequi (*Caryocar brasiliense*) is an indigenous plant from the Cerrado region of Brazil.

The second important consideration is a safety assessment of botanicals, and we shared our assessment protocol where we consider a tiered approach based on the concentration of phytochemical constituents of concern found in plants.² This approach proved to be successful as we have qualified new botanicals for use in our products. A related concern was the possibility of product alteration which would not only impact performance but could also introduce materials with very different safety profiles. For our high volume botanicals, we also initiated regular analyses using LC-MS/MS methods to compare ongoing extract quality.

The third part of the previous article was concerned with the question of functionality – how we can ensure that we select the best extract to deliver the desired benefit. This is the space where we had the most learning. As we qualified more materials, it became a requirement to correlate in detail the phytochemical composition of our botanicals with their performance. Without this understanding we could not identify the best extracts and ensure we have on-going quality to deliver the required benefits.

Testing Tea Extracts and Antioxidants

P&G's first research project with RGB Kew in this area was on *Camellia sinensis* i.e. tea extracts. Tea is known to have high antioxidation benefits driven by its composition of polyphenols including catechins and proanthocyanidins.³ Many companies supply tea extracts to the cosmetics industry, and we easily gathered sixteen tea extracts from various suppliers to test, including both green and white tea extracts.

The phytochemistry of tea can vary among cultivars and varieties, the season the leaves are picked and

The global botanical extracts is expected to reach \$16.34 billion by 2034.

Source: Fortune Business Insights



how the leaves have been processed. White tea is minimally processed (withered/sun-dried) from young leaves and buds, whereas green tea is heat-treated (steamed/pan-fired) from mature leaves. Differences in the processing methods influence the phytochemistry composition are also observed.⁴ These differences can alter the antioxidant properties of the extracts. Another difference in the suppliers extracts was the extracts themselves – whether they were diluted or concentrated extracts. As we compared the extract efficacy to scavenge a peroxy radical via use of the ORAC assay (Oxygen Radical Absorbance Capacity) we saw a clear delineation between concentrated and dilute extracts (see **Figure 1**).⁵ This difference makes sense, as most of the extracts contained a similar profile of phytochemistry, but the concentration of the phytochemicals was lowered in the diluted extracts. In our following projects we tried to target concentrated extracts as a priority.

Once we had identified the concentrated extracts, we screened the extracts against relevant hair care endpoints. Our initial tea project was focused on antioxidants, which is why we used ORAC testing as a fast initial screening protocol. In parallel, work was ongoing to understand the oxidation mechanism relevant to hair and how to measure these changes. This mechanism involved creating model systems and measurements on hair.⁶ For example, P&G demonstrated that radical damage to hair proteins in the presence of UV is significantly higher in high humidity when the free radicals are more mobile.⁷ This then informed future testing.

In the tea work we used a hair biomarker fragment of the cuticle S100A3 protein ($m/z = 1278$) to screen protection of protein oxidation by the tea extracts. This enabled us to measure performance of the tea extract in the presence of UV. To correlate the benefit with individual phytochemistry in the extracts and understand why a specific extract has superiority, we then needed to create data identifying all the different phytochemistry in each tea extract. RBG Kew used their analytical expertise in natural

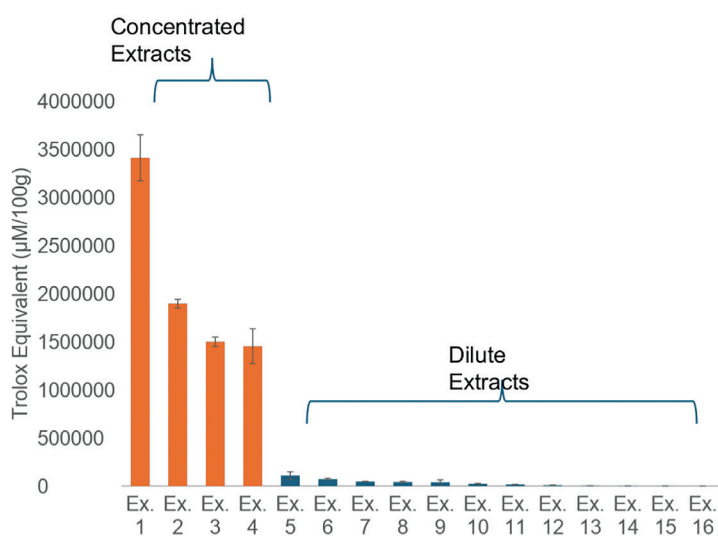


Figure 1. ORAC Scores (Trolox Equivalents $\mu\text{M}/100\text{g}$) for 16 White & Green Tea Extracts



**Don't miss an issue!
Subscribe Today!**



product chemistry to detect all the individual chemistries in the extracts. The majority of compounds were then identified based on mass spectrometry analysis and standards available in RBG Kew's mass spectral library.

● **Table 1. A list of the 33 phytochemicals recorded in the 10 extracts of rosemary**

Number	Compound Names	MW
R-1	Quinic acid	192
R-2	Caffeic acid	180
R-3	Selgin-3-glucoside	478
R-4	Hesperidin	610
R-5	Hispidulin-7-O-glucoside	462
R-6	Luteolin-7-O-glucuronide	462
R-7	Rosmarinic acid	360
R-8	Selgin-glucosyl-glucuronide	654
R-9	Selgin-rutinoside	624
R-10	Circimaritin glycoside	476
R-11	Luteolin-3'-acetyl-O-glucuronide	504
R-12	Luteolin	286
R-13	Selgin (3'-O-methyltricetin)	316
R-14	Hispidulin	300
R-15	Unknown-A	N/A
R-16	Unknown-B	N/A
R-17	Hispidulin isomer	300
R-18	Cirsimaritin	314
R-19	Rosmanol Isomer I	346
R-20	Luteolin-7,4'-dimethyl ether (or isomer)	314
R-21	Rosmanol	346
R-22	Rosmanol Isomer II	346
R-23	Genkwanin	284
R-24	Rosmanol Isomer III	346
R-25	Carnosol isomer	330
R-26	Salvigenin	328
R-27	Rosmadial isomer I	344
R-28	Rosmanol methyl ether	360
R-29	Carnosol	330
R-30	Apigenin-7,4'-dimethyl ether	298
R-31	Rosmadial isomer II	344
R-32	Carnosic Acid	332
R-33	12-methoxy-carnosic acid	346

Each of the tea extracts contained more than 40 molecules that were identified along with their relative abundance. Multivariate analyses (heatmap and correlation analysis) were performed to determine which molecules are responsible for driving the measured benefit data. (–)-Epicatechin and procyanidin B

had the greatest correlation coefficients, which suggest that the catechin and procyanidin cluster, especially (–)-epi-catechin (with coefficient 0.94), contains the key antioxidant compounds in the tea samples that contribute to the ORAC scores. In fact, most catechins in the tea samples significantly correlate ($p < 0.001$) with the ORAC scores. In contrast, other chemistries in tea such as theobromine and theogallin showed lower correlations to the ORAC scores and 3-O-(E)-caffeoylquinic acid showed no correlation to ORAC scores.

Superiority of the lead tea extract was shown in UV testing, and ORAC antioxidant testing confirmed we can link fundamental mechanisms of action with specific phytochemistry in botanical extracts and ultimately to consumer relevant benefit spaces.

Testing Grapeseed Extracts and Color Fade

We repeated this type of study with Grapeseed extracts but in this case our defined benefit space was color fade.⁸ Again, we defined the mechanism of action and correlated performance with phytochemistry composition of six grapeseed extracts. Only concentrated extracts were chosen in this work and we investigated another key variable observed within botanical extracts. The differences in performance were also detected between batches of material from the same supplier.

It is well known in the literature that plant phytochemistry will vary according to the climate and environmental conditions during plant growth. It is important to understand this variability so we can ensure that extract quality and performance is maintained.

In this study, we looked at five batches of the same grapeseed extract and



It is well known in the literature that plant phytochemistry will vary according to the climate and environmental conditions during plant growth.

analyzed their phytochemicals and quantified their abundance using the same method as for the tea extracts. In addition, we measured the UV color fade benefit. This allowed us to analyze which of the extract components are critical for the measured hair benefit and to understand the variability of these critical components in each of the received batches. The key chemicals responsible for the benefit were the procyanidins and catechins (similar to chemistries we identified in the tea extracts) and these were highly correlated between the six extracts ($R^2 > 90\%$). However, when this same correlation was performed with all the chemicals identified in the extracts, this correlation was only moderately high ($R^2 = 50\text{-}60\%$). This suggests that some of the phytochemicals do not contribute to the hair benefits of the grapeseed extracts. These analyses gave us confidence that across batches from different grape harvests, the key phytochemical responsible for the color fade benefit was consistent, even if the overall phytochemistry profile changed. This was confirmed when the ORAC scores and color fade benefit data showed high coherence across all the extracts.

Testing Extraction Processes and Performance

In our third botanical extract project, we investigated how the extraction process can determine extract

composition and performance. For this project we investigated rosemary, another botanical well known for its antioxidant and hair and scalp benefits.⁹ In this case, we were studying solvent extracts of the dried rosemary plant leaves using either polar or non-polar solvents to access well-documented chemistries such as rosmarinic acid, carnosic acid and carnosol.¹⁰ Very different phytochemicals would be accessed from rosemary if we had used steam distillation as an extraction protocol (e.g. essential oil monoterpenes and terpenoids). As in the tea and grapeseed projects we identified high concentration rosemary extracts and used LC-MS/MS to identify components that made up the 10 extracts studied (see **Table 1**). It was clear when we ordered the phytochemicals by their hydrophobicity (see **Figure 2**) and created a heat map based on the peak intensities of each of the 33 phytochemicals in the rosemary extract that each extract had a very different phytochemical profile.

We tracked this difference to different solvent systems used for extraction. Extracts 01, 02, 03, 09 and 10 were extracted by more polar solvents, such as water, to concentrate the extract in the more hydrophilic chemistries. In several of the extracts, additional analytical manipulation was also used to standardize specific chemistry, as was

done in this case with rosmarinic acid (see **Figure 3**). Extracts 05 and 09 were extracted with more non-polar solvents, such as ethanol, to extract the phytochemicals such as carnosic acid and carnosol that are more hydrophobic. Both of these extracts were also standardized in carnosic acid. Extracts 04

and 07 have both hydrophilic and hydrophobic components and have used super critical fluid extraction methods to get these profiles. This extraction method involves using a fluid (usually CO₂) above its critical temperature and pressure, giving it solvent-like properties to extract compounds from solids or liquids. It

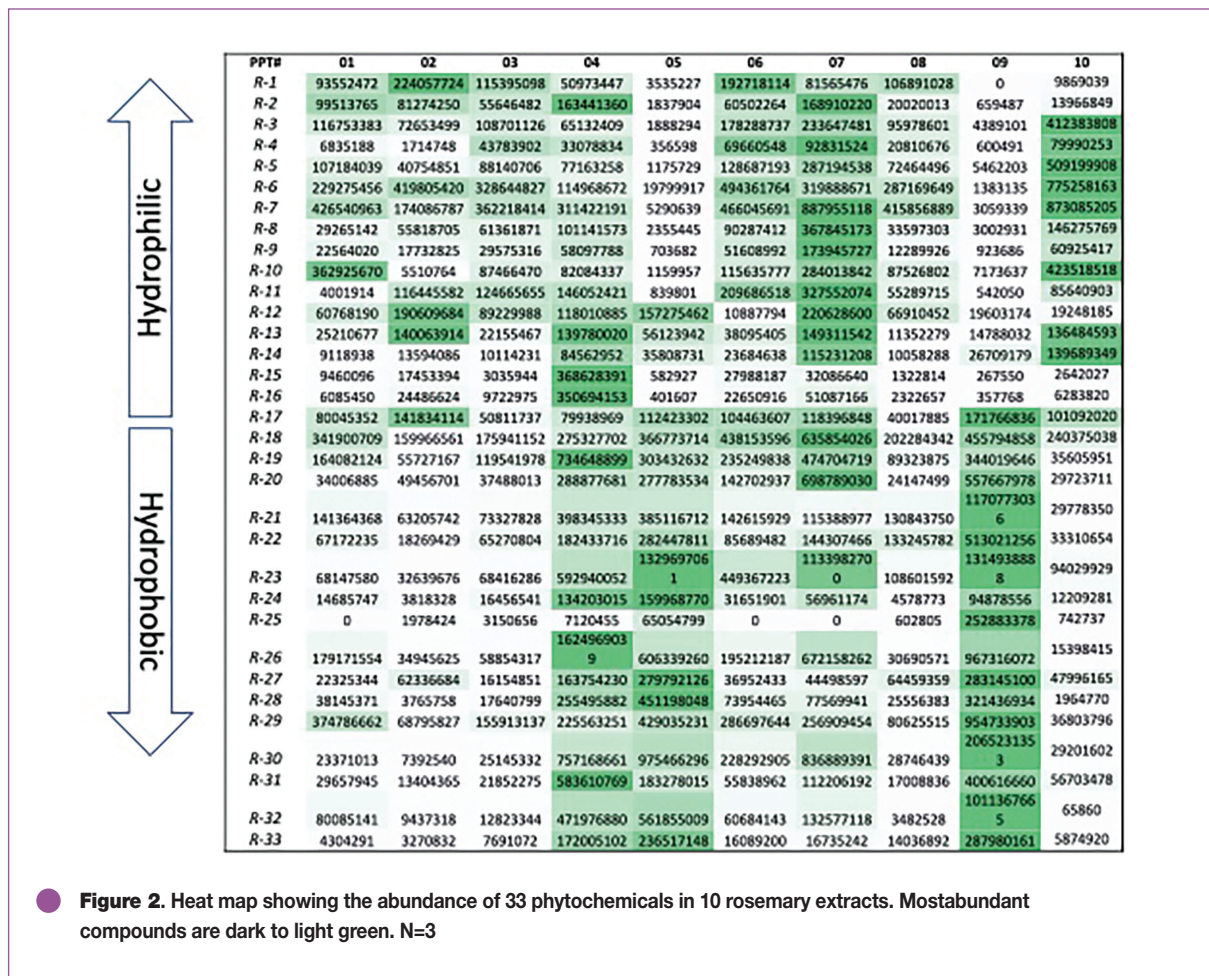
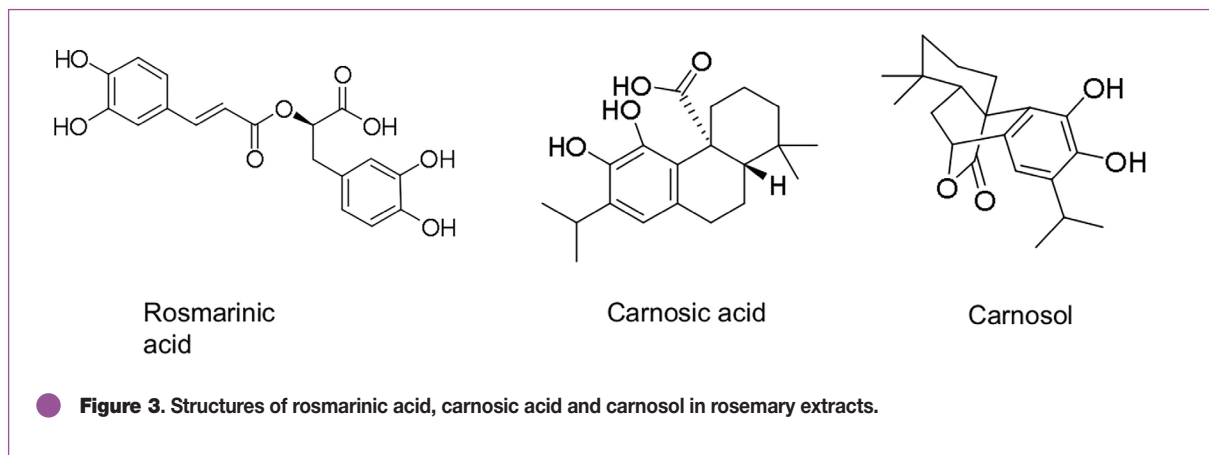


Figure 2. Heat map showing the abundance of 33 phytochemicals in 10 rosemary extracts. Most abundant compounds are dark to light green. N=3



can often solubilize a wider range of materials than typical solvents such as water or ethanol typically used to extract botanical ingredients.

Several of these extracts were standardized by the suppliers in either rosmarinic acid or carnosic acid, which are well known as key antioxidants in rosemary. Choosing one of these extracts is very attractive as a lead material because it helps us ensure high activity from every batch we receive. We also tested both rosmarinic acid and carnosic acid in our ORAC antioxidant and hair testing and compared these individual materials to the botanical extracts. In addition, we confirmed the mechanism by which these materials act as antioxidants in model system studies as we did for the tea and grapeseed extracts.¹¹

These three examples share how the expertise in hair science at P&G and that of natural product chemistry at RBG Kew enables us, as a team, to identify high-quality, high-performing botanical extracts with antioxidant benefits. We have learned how to control for batch-to-batch variability based on different growing conditions and how to take advantage of different extraction protocols to maximize concentration of specific chemistries and optimize performance.

We have also demonstrated similar benefits from this approach in understanding the detailed composition of triglyceride oils. These oils like shea butter, coconut, argan and almond oil are widely used in the hair industry and, as with the antioxidant extracts, we want to make sure we understand their compositions in detail and use this to choose the optimum oil for the benefit we require. Most analysis completed on oils look just at the fatty acid composition profile of the oils, but we wanted to understand the full complex di- and triglyceride composition. RBG Kew developed a method in which LC-MS was used to detect the oil components, where each triglyceride is fragmented to its MS2 spectra featuring constituent fatty acids. This information can then be used to identify the triglyceride structure (see **Figure 4**).

With this analysis we could more accurately characterize the oil composition of the different botanical oil options and correlate this with performance in the areas of lubrication

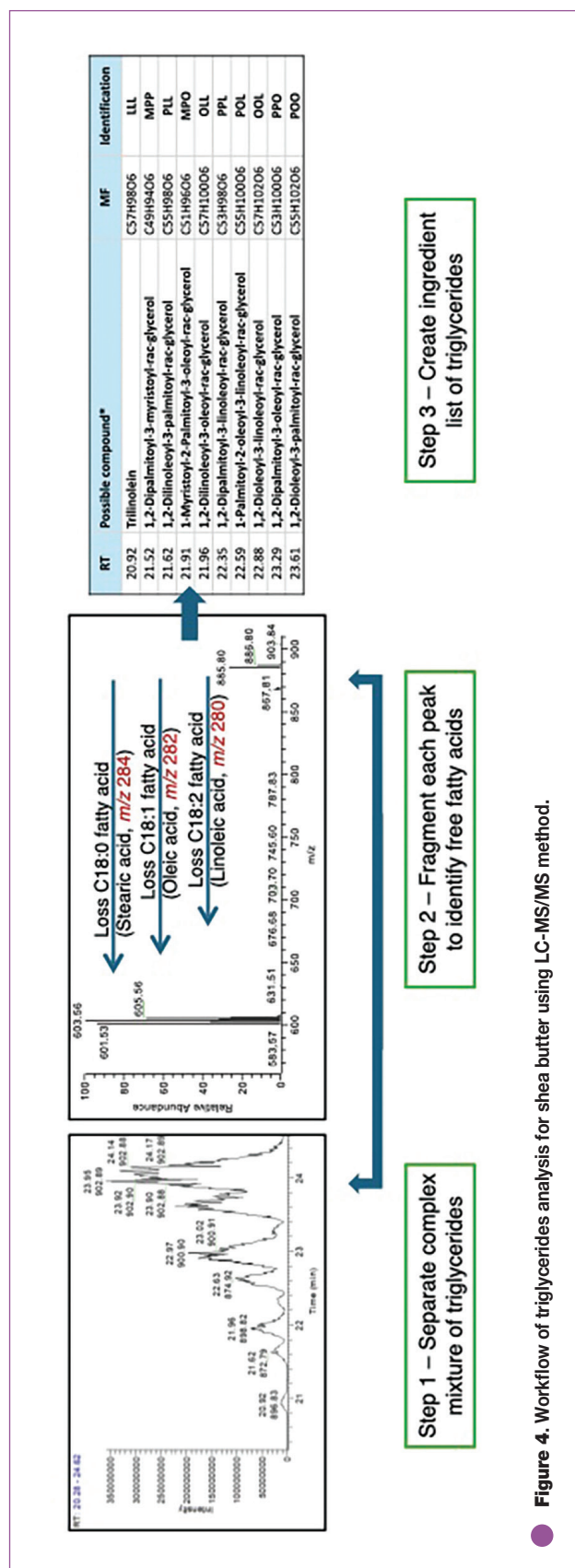


Figure 4. Workflow of triglycerides analysis for shea butter using LC-MS/MS method.



Rosemary extract is known for its hair and scalp benefits.

and strength.¹² It was also very useful to compare oils that have similar compositions so that they could potentially be used interchangeably in formulations to deliver the same benefit.

Conclusion

In closing, we have learned a lot in the past five years and more importantly developed the knowledge that allows us to identify high quality and high performing botanicals to deliver benefits to our product users.

References

1. POWO (2026). "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; <https://powo.science.kew.org/> Retrieved 02 January 2026.
2. Roe, A.L., McMillan, D.A, Mahony, C, (2018). A tiered approach for the evaluation of the safety of botanicals used as dietary supplements: an industrial strategy, *Clin Pharm Ther* 104(3) 446-457
3. Cabrera C, Gimenez R, Pez MCL. Determination of tea components with antioxidant activity. *J Agric Food Chem*. 2003;51(15):4427-4435.
4. Fang R, Redfern SP, Kirkup D, et al. Variation of theanine, phenolic, and methylxanthine compounds in 21 cultivars of *Camellia sinensis* harvested in different seasons. *Food Chem*. 2017;220:517-526.
5. Stephanie L. Davis, Jennifer M. Marsh, Casey P. Kelly, Lijuan Li, Cheryl S. Tansky, Rui Fang, Monique S. J. Simmonds, Protection of hair from damage induced by ultraviolet irradiation using tea (*Camellia sinensis*) extracts, *J Cosmet Derm*, 2021,14387
6. Jennifer M Marsh, Stephanie L Davis, Rui Fang, Monique SJ Simmonds, Phillip Groves, Victor Chechik, UV oxidation: mechanistic insights using a model system, *J Cosmetic Sci*, 2021, 72, 697-710
7. Philip Groves, Jennifer M Marsh, Yiping Sun, Tanuja Chaudhary, Victor Chechik, "Effect of humidity on photoinduced radicals in human hair" *Free Radic. Med. Biol.*, 2018, 121, 20-25
8. Sonja L Knowles, Wei Sheng, Stephanie Davis, Vincent P Sica, Christopher J Pulliam, Timothy R Baker, Lijuan Li, Jennifer M Marsh, Rui Fang, Guillermo F Padilla-Gonzalez, Monique SJ Simmonds, Color Protection from UV irradiation of artificial dyes with grape seed (*Vitis vinifera*) extract, *Journal of Photochemistry and Photobiology*, 2022, 10, 100113
9. Marsh JM, Li L, Knowles S, Locker KC, Pearson K, Bacon R, Kozak K, Laughlin T, Schwartz JR. Scalp condition improvement with botanical extracts possessing chemical and physical antioxidant activity. *International Journal of Cosmetic Science*. 2025 Apr;47(2):297-304.
10. Jennifer M. Marsh, Shane Whitaker, Lijuan Li, Rui Fang, Monique S. J. Simmonds, Nikolaos Vagkidis, Victor Chechik, The key phytochemistry of rosemary (*Salvia rosmarinus*) contributing to hair protection against UV, *Int J Cosmet Sci*. 2023, 45(6) 749-760
11. Vagkidis, Nikolaos, Jennifer Marsh, and Victor Chechik. "The role of polyphenolic antioxidants from tea and rosemary in the hydroxyl radical oxidation of N-acetyl alanine." *Molecules* 28.22 (2023): 7514.
12. Jennifer M Marsh, Shane Whitaker, Tim Felts, Chris Cowans, Shikhar Gupta, Srdan Masirevic, Rui Fang, Monique SJ Simmonds, Gu Chen, Haibo Jiang, Penetration of oils into hair, *Int J Cosmet Sci.*, 2024, 46(6), 905-917

C&T

WE'RE...SKIN, HAIR, NAILS and FRAGRANCE

For...Scientists,
Business Owners,
Brand Managers
and More

SKINX INC.

GLOBAL
COSMETIC
INDUSTRY

Cosmetics
&Toiletries

perfumer
&flavorist

MedEsthetics

BEAUTY
LAUNCHPAD

**Allured Brands,
from head to toe.**

Allured business
media



KEY POINTS

- Tested on a wounded, vascularized and immunocompetent 3D skin model, galactomannans from *Ceratonia siliqua* act on the four biological events of the skin healing proliferation phase.
- The efficacy of the ingredient was substantiated through rigorous testing on a 3D skin model, followed by clinical trials that confirmed its therapeutic performance in human subjects.

Faster, Better Healing:

Galactomannans from *Ceratonia siliqua* as a Novel Solution for Wounded Skin

ound healing is a universal issue of fundamental importance in the field of medical care.

Globally, about 300 million patients are in fact afflicted with chronic skin lesions and 100 million patients have traumatic cutaneous wounds¹. One study has reported that among the 100 million new scars formed every year, about 10% become pathological². Thus, a deterioration of the healing process is a major concern for public health as this toll continues to grow. Consequently, promoting healing of damaged skin, restoring the functions of tissues and minimizing the esthetic impact of scars are a major challenge to clinical care³⁻⁵.

From a biological standpoint, the healing process of the skin depends on three phases⁶. The inflammatory phase is the onset of the healing process and lasts about three days, with hemostasis and mobilization of immune defenses at the site of the wound. Neutrophils and macrophages infiltrate the wound and eliminate bacteria and debris by phagocytosis. Macrophages also participate in amplifying the inflammatory response required to commence the proliferation phase^{5,7}.

Then, there is the proliferation phase that lasts about two weeks. This phase promotes repair of the vascular network and the development of new connective tissue and involves several biological processes. The proliferation phase requires the substantial activation of keratinocytes,



Peer-reviewed 

Laurie Verzeaux, PhD, Mélanie Mangier, PhD,
Breugnot J., PhD, Aymard E., PhD, Closs B., PhD,
SILAB; Moulin VJ, PhD,
CHU de Quebec-Université Laval Research Center

Globally, about 300 million patients are afflicted with chronic skin lesions and 100 million patients have traumatic cutaneous wounds.

fibroblasts, macrophages and endothelial cells to carry out re-epithelialization, deposit of the matrix and angiogenesis^{3,8}. During this phase, a reduction of inflammation also occurs to initiate the final phase of the healing process⁹.

Finally, the remodeling phase is when granulation tissue matures into scar tissue. It can last several months to several years after the injury. In this phase, the dermal matrix is remodeled to promote the return to the initial state of the tissue's architecture and resistance. Gradually, more substance is added to the extracellular matrix, a denser collagen structure appears, cellularity decreases, and the vascular network becomes organized^{3,10,11}.

Scientific progress in the field of healing has shown that the proliferation phase, involving granulation tissue formation, angiogenesis, re-epithelialization and inflammation resolution, is critical for tissue healing. Existing *in vitro* models often fail to replicate the complex interactions between vascular, immune, and cutaneous cells during the wound healing process, due to the challenges associated with co-cultivating these cell types. This research focuses on the development of an *in vitro* 3D skin model enabling to study skin healing dynamics and to substantiate the mechanism of action of a natural active ingredient.

Experimental Design

Development of a 3D Skin Model

Normal human fibroblasts were seeded at 37°C for 28 days until dermal sheets formed. Normal human keratinocytes were then seeded on a portion of the dermal sheets and cultivated at 37°C for four days. Two dermal sheets and one dermis/epidermis sheet were layered. Endothelial and immune cells from the dermis of a donor were placed between the sheets.

After ten days of culture at 37°C (D0), a vascularized immunocompetent 3D full thickness skin model was obtained (VI SILABSKIN FT). To mimic skin healing characteristics, it was later wounded with a biopsy punch. It was then systemically treated with a natural active ingredient (Galactomannans (GM) derived from *Ceratonia siliqua*) at 0.05% for seven days.

Study of the Granulation Tissue Formation

The secretion of growth factor TGF- β was analyzed on D3 post-injury by ELISA assay and the syntheses of the markers α -SMA, fibronectin, tenascin-C and collagen III were determined on D7 post-injury by immunohistofluorescence.

Study of the Vascular Network

The secretion of growth factor VEGF was analyzed on D3 post-injury with an ELISA assay. The density of the vascular network was determined on D7 post-injury by an immunohistofluorescence (marker CD31 specific to endothelial cells) and visualized by Light Sheet microscopy.

Study of Inflammation

The inflammatory secretome was analyzed on D3 post-injury by ELISA assay and the population of M2 macrophages was studied on D7 post-injury using double labeling by immunohistofluorescence (CD206/CD68 labeling specific to M2 macrophages)¹² and visualized by Light Sheet microscopy.

Study of Re-epithelialization

The secretion of growth factors KGF and FGF was analyzed on D3 post-injury with an ELISA assay. The syntheses of markers of the basal membrane, of cohesion and of epidermal differentiation were determined on D7 post-injury by immunohistofluorescence.

Results

Formation of Granulation Tissue

Fibroblasts are responsible for the formation of granulation tissue. Due to their migration capacities,

The global wound care market reached an estimated value of \$25 billion in 2025.

Source: Grand View Research



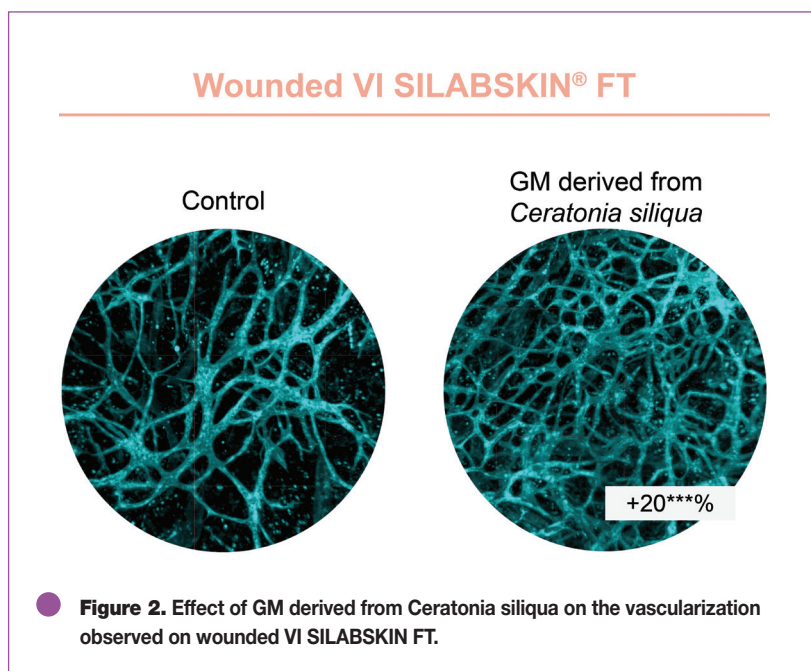
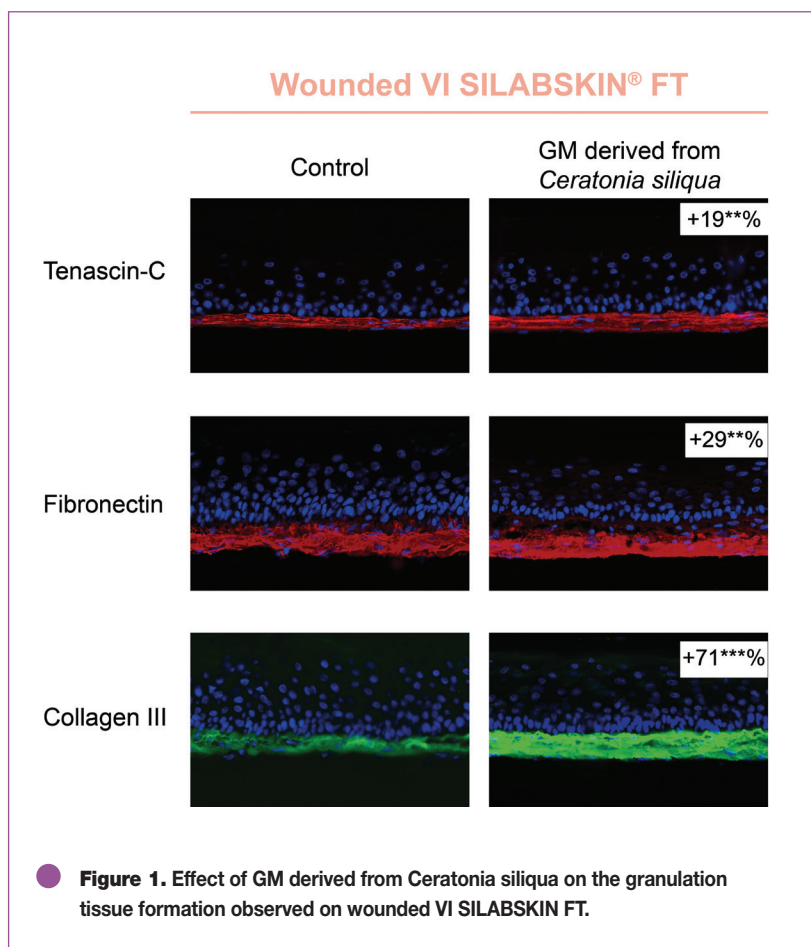
they enter the wound zone and proliferate there, primarily under the influence of growth factor TGF- β (Transforming growth factor-beta). In the presence of GM derived from *Ceratonia siliqua*, the secretion of TGF- β is increased by 18% ($P < 0.001$). A portion of the fibroblasts recruited specializes and differentiates into myofibroblasts characterized by increased expression of α -SMA, a protein conferring the acquisition of strong contractile properties. GM derived from *Ceratonia siliqua* increases the synthesis of α -SMA by 62% ($P < 0.05$). **Figure 1** reveals that this active ingredient also increases tenascin-C, fibronectin and collagen III, three biological markers of the granulation tissue formation, by 19% ($P < 0.01$), 29% ($P < 0.01$) and 71% ($P < 0.001$) respectively.

Action on the Vascularization

The cutaneous healing process requires vascularization of newly formed tissue. The number of blood vessels in the dermis increases as granulation tissue continues to form. GM derived from *Ceratonia siliqua* increases the secretion of VEGF by 19% ($P < 0.001$). **Figure 2** reveals that this active ingredient also increases the density of the vascular network by 20% ($P < 0.001$).

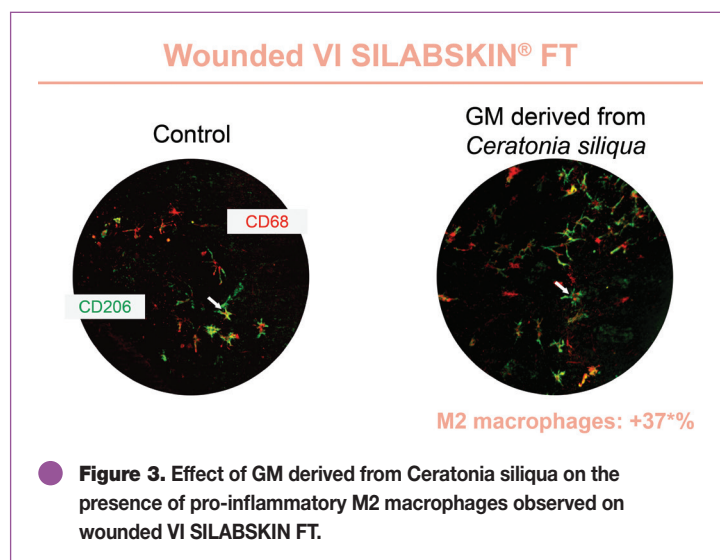
Reduction of Inflammation

The healing process is affected by a wide variety of pro-inflammatory molecules required to initiate the granulation tissue formation, angiogenesis and re-epithelialization. On the contrary, an excess of inflammatory factors may cause a delay in healing or even the formation of pathological scars. Among the cellular players involved in the control of inflammation, macrophages are transformed from a M1 pro-inflammatory phenotype in



the inflammatory phase into a M2 anti-inflammatory pro-regenerating phenotype in the proliferation phase. This transition contributes to restoring functional cutaneous tissue and is indispensable for optimal healing^{9,13}.

GM derived from *Ceratonia siliqua* decreases the secretion of the pro-inflammatory markers IL-8, IL-6, IL-1 α and TNF- α by 37% ($P < 0.001$), 27% ($P < 0.001$), 36% ($P < 0.05$) and 24% ($P < 0.001$) respectively. Moreover, this active ingredient increases the presence of M2 macrophages by 37% ($P < 0.05$).

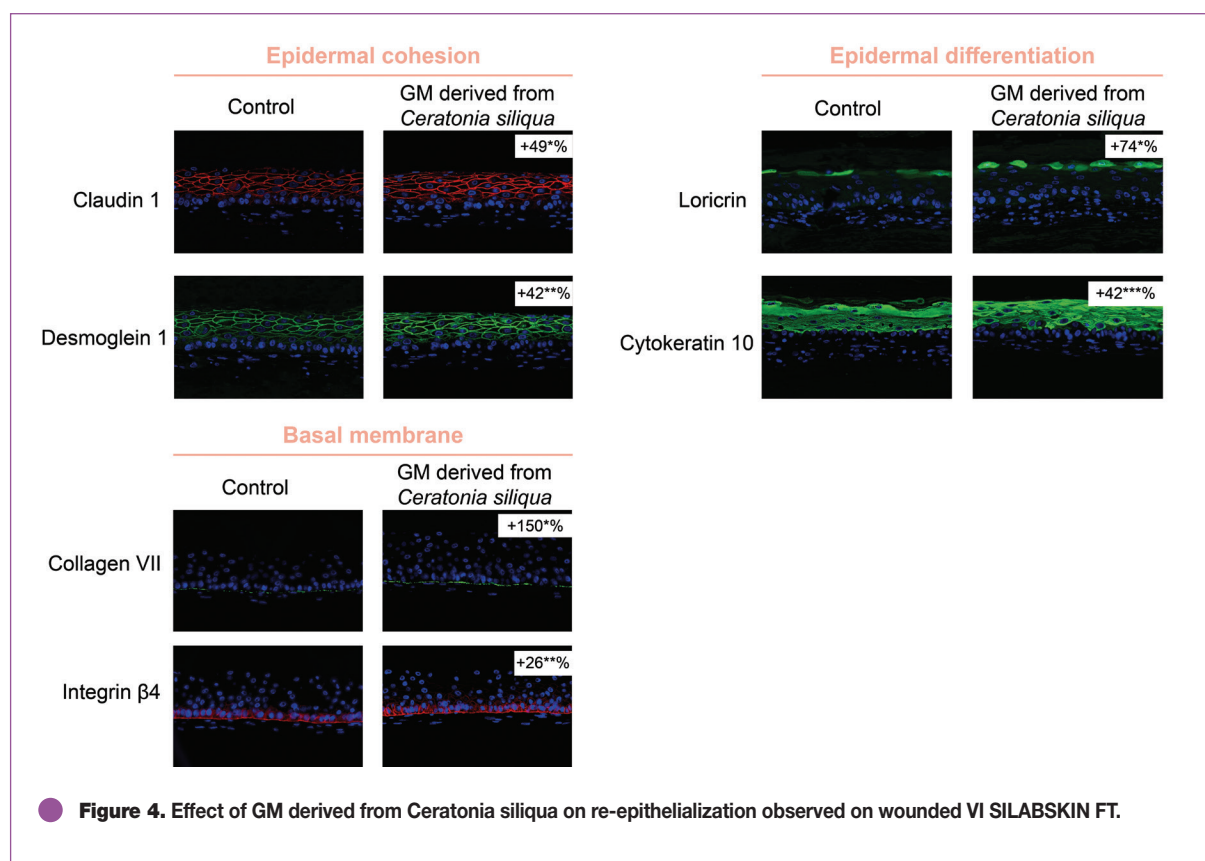


Re-epithelialization

Re-epithelialization is an essential biological mechanism to heal skin wounds by enabling regeneration of the epidermis. Keratinocytes play a predominant role in this process. They migrate, proliferate and differentiate to recreate a new functional epidermis solidly anchored in the newly formed basal membrane. The cellular and molecular processes participating in initiating, maintaining and completing re-epithelialization depend on growth factors such as KGF and FGF^{7,14,15}.

According to the results, GM derived from *Ceratonia siliqua* increases the secretion of FGF and KGF by 55% ($P < 0.01$) and 15% ($P < 0.01$) respectively.

Figure 3 shows that this active ingredient





A link has been shown between an increased expression of collagen III and regeneration potential.

also improves epidermal cohesion and differentiation as well as the basal membrane organization.

Discussion

The mechanism of action of a natural active ingredient (GM derived from *Ceratonia siliqua*) was demonstrated on an original *in vitro* 3D skin model that integrates the characteristics of the skin healing proliferation phase. Myofibroblasts guarantee the maturation of granulation tissue by synthesizing a new extracellular matrix primarily composed of collagen III and proteins required for repair of the dermis, such as fibronectin and tenascin-C¹⁶. Myofibroblasts bind to fibronectin and collagen fibrils, causing contraction of the wound. This indispensable phenomenon for the healing process reduces the surface of the wound to repair and improves the mechanical resistance of the surrounding tissues^{7,8,10}.

Beyond their role as dermal repair factors, fibronectin and tenascin-C can regulate other biological mechanisms required in the healing process. They in fact promote angiogenesis and re-epithelialization of the wound. Tenascin-C is also involved in the progressive reduction of inflammation at the site of the wound by regulating the phenotypic transformation of macrophages into cells with an anti-inflammatory profile^{3,7,17,18}.

In addition, a link has been shown between an increased expression of collagen III in the dermis and augmented regeneration potential following an injury. A recent study has shown that collagen III is an essential regulator of re-epithelialization, the activation of fibroblasts and of matrix architecture when skin wounds are healing. Collagen III promotes wound closure, thereby improving the efficacy and quality of

the healing process¹⁹. By acting on the secretion of these biological markers, GM derived from *Ceratonia siliqua* improves the 4 biological events of the proliferation phase.

The duration and severity of the inflammatory response affect healing quality. Although moderate inflammation favors wound repair, a more intense and chronic inflammatory phenomenon leads to a delay in healing, or even to the development of keloids or hypertrophic pathological scars^{6,9,13}. Macrophages play a fundamental role in each phase of healing because of their capacity to modulate the extent of inflammation in the tissue. They in fact exhibit different phenotypes, or polarization states, generally classified as pro-inflammatory (M1 macrophages) or anti-inflammatory (M2 macrophages). During the inflammatory phase occurring immediately after the wound, the phenotype of macrophages is primarily pro-inflammatory M1. M2 macrophages participate in the regeneration of damaged tissue by promoting angiogenesis and deposit of the extracellular matrix. It has been described that deregulating the polarization of macrophages can reduce healing quality. Indeed, larger quantities of the factors secreted by pro-inflammatory M1 macrophages were found in pathological scars^{9,14,20}. By acting on macrophages polarization and favoring the M2 phenotype, GM derived from *Ceratonia siliqua* reinforces their anti-inflammatory and pro-regenerating actions.

Re-epithelialization is an indispensable mechanism to restore an effective barrier function after an injury and, following its progression, is used as a parameter to define success of the healing process. Accelerating the reformation of a robust epidermal barrier is therefore a necessary prerequisite for any solution

intended to repair wounded or damaged skin¹⁵. A kinetic study has revealed that GM derived from *Ceratonia siliqua* tested on wounded VI SILABSKIN FT accelerated wound closure (re-epithelialized surface: +34%) 30 hours after creating the wound and lead to the complete closure at t46h in comparison to the control.

This active ingredient displays a double performance on repair dynamics by accelerating the rate of repair and improving the quality of repair. A clinical study was conducted on adult Caucasian volunteers with skin lesions resulting from a mechanical aggression that stripped the upper layers of the epidermis. This model is commonly used to assess the beneficial effects of wound healing treatments²¹. Formulated at 0.5% and 1% in a gel, GM derived from *Ceratonia siliqua* promoted recovery of the damaged cutaneous barrier as of the first day of application. This active ingredient acts promptly after application, thereby attenuating cutaneous erythema associated with skin lesion, with a significant improvement within two days of application with the formula at 1% and after four days with the formula at 0.5%. It also improves the quality of healing by significantly limiting the appearance of scabs and signs of skin drying.

Conclusion

This active ingredient is a novel solution for damaged skin in people of all ages. Resulting from six years of research, these galactomannans obtained from carob gum offer support to the healing process of wounded or damaged skin requiring repair. The ingredient is perfectly tolerated, and its therapeutic efficacy has been clinically demonstrated in a cohort of Caucasian adult subjects with skin lesions resulting from mechanical aggression.

As of the first day of application of the product, the damaged barrier function is already significantly improved. As a result of this rapid effect on the barrier, it significantly attenuates erythema resulting from the injury and improves the quality of healing. This active ingredient accelerates healing and drying and scabs are reduced. It is an effective care product combining rapidity of action and efficacy in the care of wounded or damaged skin requiring repair.

References

- Mehdipour Chari, K. *et al.* Applications of blood plasma derivatives for cutaneous wound healing: A mini-review of clinical studies. *Regen. Ther.* 27, 251–258 (2024).
- Li, S., Ding, H., Yang, Y., Yu, B. & Chen, M. Global research status of pathological scar reported over the period 2001–2021: A 20-year bibliometric analysis. *Int. Wound J.* 20, 1725–1738 (2022).
- Fernández-Guarino, M., Hernández-Bule, M. L. & Bacci, S. Cellular and Molecular Processes in Wound Healing. *Biomedicines* 11, 2526 (2023).
- Manchanda, M. *et al.* Metabolic Reprogramming and Reliance in Human Skin Wound Healing. *J. Invest. Dermatol.* 143, 2039–2051.e10 (2023).
- Eming, S. A., Martin, P. & Tomic-Canic, M. Wound repair and regeneration: mechanisms, signaling, and translation. *Sci. Transl. Med.* 6, 265sr6 (2014).
- El Ayadi, A., Jay, J. W. & Prasai, A. Current Approaches Targeting the Wound Healing Phases to Attenuate Fibrosis and Scarring. *Int. J. Mol. Sci.* 21, 1105 (2020).
- Rodrigues, M., Kosaric, N., Bonham, C. A. & Gurtner, G. C. Wound Healing: A Cellular Perspective. *Physiol. Rev.* 99, 665–706 (2019).
- Wilkinson, H. N. & Hardman, M. J. Wound healing: cellular mechanisms and pathological outcomes. *Open Biol.* 10, 200223 (2020).
- Mahmoud, N. N. *et al.* Investigating Inflammatory Markers in Wound Healing: Understanding Implications and Identifying Artifacts. *ACS Pharmacol. Transl. Sci.* 7, 18–27 (2024).
- Mamun, A. A., Shao, C., Geng, P., Wang, S. & Xiao, J. Recent advances in molecular mechanisms of skin wound healing and its treatments. *Front. Immunol.* 15, 1395479 (2024).
- Thiruvoth, F. M., Mohapatra, D. P., Kumar, D., Chittoria, S. R. K. & Nandhagopal, V. Current concepts in the physiology of adult wound healing. *Plast. Aesthetic Res.* 2, 250–256 (2015).
- Horiba, S., Kami, R., Tsutsui, T. & Hosoi, J. IL-34 Downregulation-Associated M1/M2 Macrophage Imbalance Is Related to Inflammation in Sun-Exposed Human Skin. *JID Innov. Skin Sci. Mol. Popul. Health* 2, 100112 (2022).
- Gao, M. *et al.* Regulation of inflammation during wound healing: the function of mesenchymal stem cells and strategies for therapeutic enhancement. *Front. Pharmacol.* 15, 1345779 (2024).
- Nirenjen, S. *et al.* Exploring the contribution of pro-inflammatory cytokines to impaired wound healing in diabetes. *Front. Immunol.* 14, 1216321 (2023).
- Rousselle, P., Braye, F. & Dayan, G. Re-epithelialization of adult skin wounds: Cellular mechanisms and therapeutic strategies. *Adv. Drug Deliv. Rev.* 146, 344–365 (2019).
- Gardeazabal, L. & Izeta, A. Elastin and collagen fibres in cutaneous wound healing. *Exp. Dermatol.* 33, e15052 (2024).
- Mauroux, A. *et al.* Angiogenesis and full thickness wound repair in a cell sheet-based vascularized skin substitute. *Acta Biomater.* 187, 123–137 (2024).
- Wang, Y., Wang, G. & Liu, H. Tenascin-C: A Key Regulator in Angiogenesis during Wound Healing. *Biomolecules* 12, 1689 (2022).
- Stewart, D. C. *et al.* Type III Collagen Regulates Matrix Architecture and Mechanosensing during Wound Healing. *J. Invest. Dermatol.* 145, 919–938.e14 (2025).
- Wang, Z.-C. *et al.* The Roles of Inflammation in Keloid and Hypertrophic Scars. *Front. Immunol.* 11, 603187 (2020).
- Wilhelm, K.-P., Wilhelm, D. & Bielefeldt, S. Models of wound healing: an emphasis on clinical studies. *Skin Res. Technol. Off. J. Int. Soc. Bioeng. Skin ISBS Int. Soc. Digit. Imaging Skin ISDIS Int. Soc. Skin Imaging* 23, 3–12 (2017).

C&T

Cosmetics &Toiletries®

The Definitive Peer-Reviewed Cosmetic Science Resource

Tune In!



Cosmetics & Toiletries'
On-demand Webcasts

www.cosmeticsandtoiletries.com/multimedia



KEY POINTS

- A made-to-order, direct-to-consumer (DTC) model enables cosmetic brands to manage complex regulatory compliance for millions of personalized formulas while leveraging live consumer data to de-risk physical product renovations.
- Compliance with global cosmetic regulations is secured by testing critical formulations using standard industry protocols.

Thomas Navarro, Marie Mignon, Milène
Chasseur, Camille Cléro, Romane Ricardou,
Anne-Sophie Brac De La Perrière;
Prose

Advancing Hyper- Personalized Cosmetics:

A Dual Approach Combining Regulatory Methodology and Live A/B Performance Testing



The demand for personalized personal care products has grown significantly, driving the beauty industry to develop highly tailored cosmetic solutions^{1,2}. Leveraging artificial intelligence (AI) and modular formulation

principles, brands can now customize products to address specific hair and skin needs from thousands to millions of possible ingredient combinations.

This technical paper highlights two fundamental capabilities of a hyper-personalized cosmetic brand operating through a made-to-order, direct-to-consumer (DTC) business model:

- **Industrial-Scale Regulatory Management:** The capability to systematically design, validate, and document compliance for millions of customized formulas.
- **Agile Formulation Optimization:** The capability to seamlessly de-risk and validate physical ingredient upgrades across bespoke formulas using real-world consumer data.

Hyper-personalization in cosmetics requires robust, scale-ready methodologies that maintain high standards of safety, quality, and performance.

Historically, achieving these capabilities has been hindered by two major challenges. First, under strict global frameworks such as the European Cosmetic Regulation (EC No. 1223/2009)³, every single formulation variant placed on the market must undergo a full safety and quality assessment. Second, when introducing formula renovations - such as substituting raw materials or upgrading active ingredients across personalized formulas - predicting how consumers will perceive these changes across highly diverse, customized profiles is notoriously difficult.

Traditionally, the cosmetic industry relies on well-established, regulatory-requested standard tests to clear safety, quality, and performance, typically evaluated in controlled environments with small clinical panels.

This paper presents a comprehensive, two-part framework that unites these standard testing requirements with the unique digital advantages of a made-to-order DTC model. First, we outline a risk-based methodology developed to ensure safety and regulatory compliance. Second, we present a live, large-scale A/B testing methodology (online controlled experimentation inspired from the software engineering⁴) designed to validate performance upgrades in personalized products directly in consumers' everyday lives.

Experimental Design

Part I: Regulatory Compliance, Safety and Quality Methodology

To establish regulatory compliance across millions of potential product variations without testing every single iteration individually, a robust, risk-based validation protocol is required. This methodology leverages standardized testing protocols well-

established in the cosmetic industry and requested by regulatory bodies to secure the entire customized formulation space. This work presents a comprehensive and scalable approach developed by a multidisciplinary team of toxicologists, regulatory experts, and formulators, illustrated through the case of a personalized conditioner.

The Formulation Architecture Model

A "Formulation Architecture" is established for each product category (e.g., a personalized conditioner) by mapping all eligible ingredients and defining their precise concentration boundaries.

Rather than testing every unique consumer formulation, a multidisciplinary team of toxicologists and formulators identifies three types of formulations for standardized testing:

- **Texture Formulations:** To establish a general formulation behavior baseline.
- **Realistic Formulations:** Mirror the most common customization patterns that reflect major consumer needs.
- **Critical Formulations:** Represent the most challenging combinations identified through expert-driven risk profiling.

Standard Industry Testing Protocol

These designated formulations are subjected to a rigorous, industry-standard testing matrix to generate the necessary data to build robust regulatory files (such as the Product Information File [PIF] in Europe) and the toxicological safety assessment (such as the Cosmetic Product Safety Report [CPSR] in Europe):

- **Microbiological Safety:** Challenge testing according to the ISO 11930:2019⁵ standard, where formulations are defined as critical based on the risk profile of their ingredients, specifically their potential to support microbial growth or diminish preservative effectiveness (e.g., water-based, protein-, or sugar-rich actives).
- **Physical Stability & Compatibility:** Evaluated under accelerated conditions (40°C for three

The global direct-to-consumer personalized haircare market was valued at \$18 billion in 2025

Source: InsightAce Analytic



months) and real-time conditions (12 months at room temperature, 4°C, and -18°C) in final packaging to monitor physical and chemical integrity and container-content interactions.

- **Ocular & Dermal Tolerance:** In vitro ocular irritation testing on reconstructed human epithelial tissue models and 48-hour patch tests, as well as in-use safety evaluations under dermatological supervision.
- **Efficacy Evaluation:** To support core performance or specific product claims, efficacy is assessed through in vitro/ex vivo testing, use tests or clinical studies. As an example for a conditioner, hair breakage (a key performance indicator) is evaluated using an automated grooming simulator. Hair tresses with different textures treated with various formula combinations containing minimal to maximal conditioning actives (n=10 per group) undergo 2,000 combing cycles to measure the average reduction in broken fibers compared to untreated controls, analyzed via a Student's t-test at a 95% confidence level.

Part II: Live A/B Performance Testing Methodology

While traditional laboratory testing confirms safety and baseline efficacy, a made-to-order DTC brand can deploy live A/B testing to validate actual consumer-perceived performance during formula renovations across bespoke routines. This methodology is illustrated through a performance-focused renovation of personalized conditioners, where the original conditioning silicone was replaced by a cationic silicone crosspolymer (Silicone Quaternium-16/ Glycidoxo Dimethicone Crosspolymer, supplied as a 25.5% aqueous dispersion with Undeceth-11, Undeceth-5, Propylene Glycol, Acetic Acid and Benzyl Alcohol) to enhance overall consumer satisfaction and boost targeted conditioning benefits (e.g., softness, detangling and repair benefits for damaged hair).

Live Test Design

The A/B test was integrated directly into the brand's e-commerce platform, a method uniquely enabled

BEAUTY
LAUNCHPAD.

Cosmetics
&Toiletries

GLOBAL
COSMETIC
INDUSTRY

MedEsthetics.

perfumer
& flavorist

SKINX INC.

WE'RE...SKIN,
HAIR,
NAILS
and
FRAGRANCE

For...Scientists,
Business Owners,
Brand Managers
and More

Allured business
media

by the made-to-order DTC model. Every customer completed an online consultation defining their specific hair type, goals and preferences. When their bespoke conditioner was formulated, consumers were randomly assigned, blinded to their group allocation, to receive one of two customized physical variations:

- **Formula A (Control):** Personalized conditioners formulated with the original conditioning system.
- **Formula B (Test):** Personalized conditioners incorporating the new silicone ingredient, tailored to their individual profile.
- Allocation Ratio: 70% control to 30% test.

A total of 82,447 survey responses were captured (n = 60,090 control, n = 22,357 test).

Performance Evaluation

Three weeks after product delivery, consumers received a digital survey prompting them to rate the personalized product's overall performance and specific conditioning benefits on a 1–5 scale. Collected data were analyzed using two complementary statistical approaches: Chi-square tests comparing Top2Box (ratings of 4 or 5) and Bottom2Box (ratings of 1 or 2), with a significance threshold set at $p < 0.05$, and a Bayesian statistical analysis to strengthen the robustness of conclusions. Error bars in figures represent 95% confidence intervals.

Results

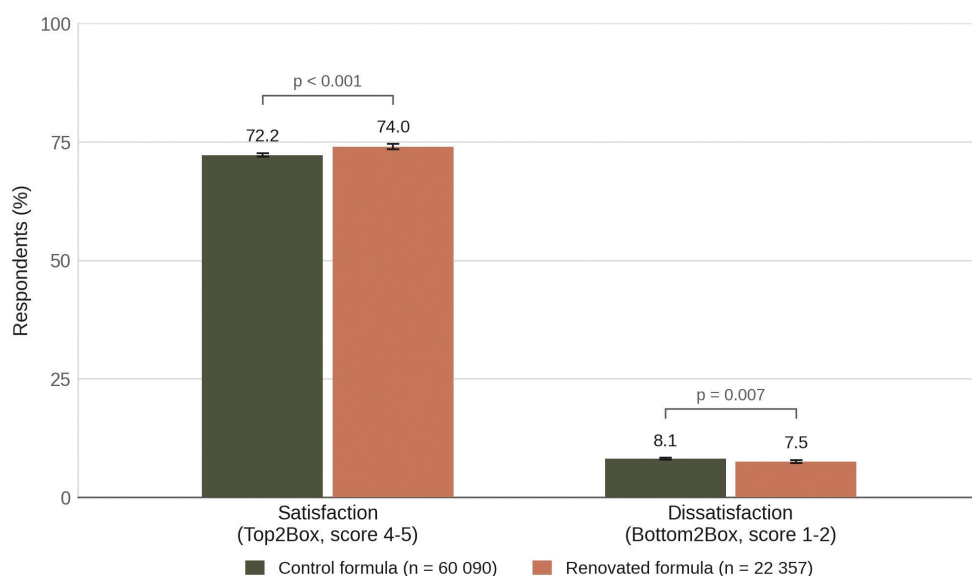
Part I: Compliance Assessment

Standard industry evaluations of the personalized conditioner's critical formulations met all acceptance criteria across:

- **Antimicrobial Preservation:** All tested critical formulations (including those packed with high concentrations of microbial nutrient sources like proteins and sugars) successfully met Criterion A of the ISO 11930:2019 standard.
- **Stability & Packaging:** The formulas maintained physical stability (pH, viscosity, and color) under accelerated and real-time conditions with no packaging degradation.
- **Tolerance:** Standard evaluations confirmed dermatological and ocular tolerance.
- **Instrumental Hair Breakage:** For a conditioner, the automated grooming simulator showed a statistically significant reduction in broken hair fibers across all texture variations (even those formulated with minimal conditioning actives), fully supporting the product's core efficacy claims.

Part II: Consumer-Perceived Performance in Personalized Formulas

Integrating the new silicone into the personalized conditioner formulas resulted in statistically significant improvements:



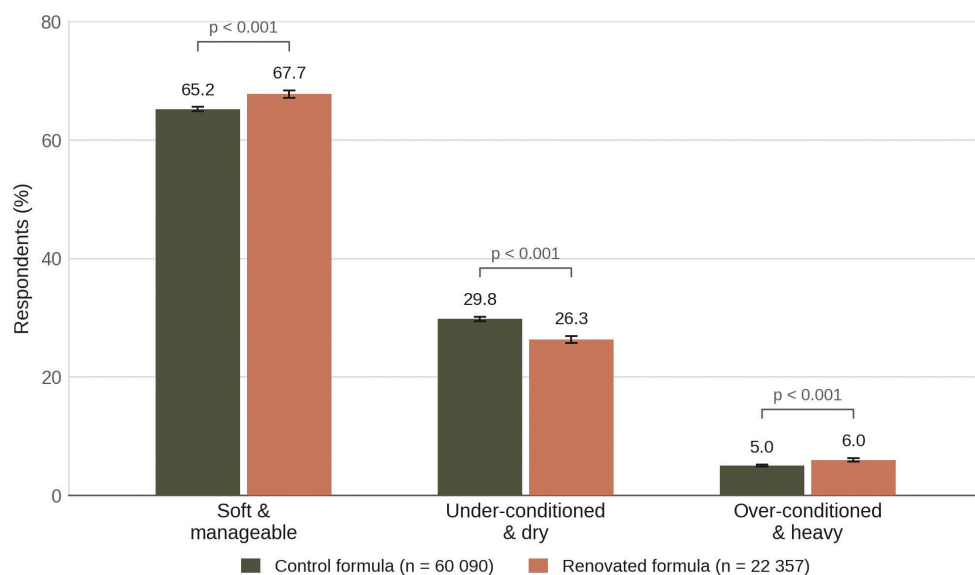
● **Figure 1.** Comparison of overall satisfaction (Top2Box and Bottom2Box scores) between control and renovated personalized conditioner formulas integrating the new silicone.



A formulation architecture is established for each product category by mapping all eligible ingredients and their concentration boundaries.

- **Overall Consumer Satisfaction:** The personalized Formula B incorporating the new silicone achieved 74% overall satisfaction (Top2Box) compared to 72.2% for the personalized control group. Dissatisfaction (Bottom2Box) fell from 8.1% for the control to 7.5% for the renovated personalized formula.

- **Perceived Conditioning Efficacy:** Reports of dry, under-conditioned hair declined from 29.8% (control) to 26.3% (Formula B), while reports of soft and manageable hair rose to 67.7% (compared to 65.2% for the control), consistent with improved conditioning performance delivered by the new ingredient in tailor-made products.



● **Figure 2.** Comparison of perceived conditioning benefits between control and renovated personalized conditioner formulas integrating the new silicone.

Reports of over-conditioned, heavy hair rose slightly, from 5% to 6%, reflecting the intended shift toward greater conditioning.

- **Statistical Significance:** A Chi-square test of difference confirmed that the renovated formula demonstrated statistically significant improvements. A Bayesian posterior probability analysis further supported these results, showing a 99.7% probability that the test group had a lower proportion of dissatisfied consumers (Bottom2Box) than the control, and a 100% probability that the test group had a higher proportion of satisfied consumers (Top2Box) compared to the control group.

Discussion

The integration of standard testing and large-scale A/B testing highlights how a made-to-order DTC beauty brand can master both regulatory compliance and physical product development across custom formulations in ways that cannot be achieved through conventional retail distribution.

Mastering the Regulatory Frontier at Scale

First, the regulatory framework resolves the impracticality of individually testing millions of custom formulas. By establishing a master Formulation Architecture and identifying the “critical formulation” (the most challenging combination of ingredients), toxicologists can rigorously evaluate safety and stability boundaries using standard, regulatory-requested tests.

Once this critical envelope has been assessed as safe, the toxicologist can confidently approve the entire customized range and validate a comprehensive and robust regulatory file. This demonstrates that compliance can be scaled across the full set of permitted formulation combinations using standard industry protocols.

Leveraging the DTC Loops

Second, the made-to-order DTC channel bridges the gap between controlled laboratory settings and real-world consumer experiences. Conventional industry tests (such as combing simulators or small clinical panels) confirm product efficacy but cannot replicate how a new active or functional ingredient behaves across thousands of different personalized formula combinations under real-world usage conditions.

By testing the renovated personalized conditioners (incorporating a new silicone) in a randomized, consumer-blinded setting directly within the DTC distribution loop, the brand collected over 82,000 real-world evaluations. This volume provides an empirical

sample size that conventional consumer testing panels could not match. The data confirmed that incorporating a new silicone into custom formulas significantly enhanced targeted conditioning benefits - reducing dry hair complaints and boosting softness across diverse consumer profiles - demonstrating the second capability: using physical-digital closed-loop data to validate performance upgrades in personalized cosmetics with high statistical confidence.

Methodological Considerations and Future Perspectives

From a methodological standpoint, because consumers were blinded to their allocation, observational bias is minimized, although INCI lists on pack are theoretically and legally accessible. Furthermore, while three-week post-use evaluations capture acute satisfaction and immediate hair performance, future research avenues could explore longitudinal tracking over extended periods (e.g., six to 12 months) to assess long-term cumulative benefits across customized routines.

Conclusion

Hyper-personalization in cosmetics requires robust, scale-ready methodologies that maintain high standards of safety, quality, and performance.

As demonstrated in this paper, a made-to-order DTC model allows this complexity to be managed by harnessing two essential capabilities:

- Establishing a risk-based regulatory framework that secures the formulation space by testing critical combinations using industry-standard protocols.
- Deploying a live, e-commerce-integrated A/B testing model to collect real-world consumer feedback at scale and validate performance renovations within personalized product lines.

Together, these capabilities provide a practical framework for continuous product optimization and consumer satisfaction in the expanding beauty-tech sector.

References

1. Di Gesu, R. (2024). *Personalised facial skincare is worth \$4bn in the US*. Mintel Beauty & Personal Care.
2. Lee, H. J. (2022). *Patent insights: personalised beauty*. Mintel Beauty & Personal Care.
3. Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009 on cosmetic products (recast), OJ L 342, 22.12.2009, pp. 59-209
4. Quin, F., Weyns, D., Galster, M., & Costa Silva, C. (2024). A/B testing: A systematic literature review. *The Journal of Systems and Software*, 211, 112011
5. International Organization for Standardization. (2019). *Cosmetics - Microbiology - Evaluation of the antimicrobial protection of a cosmetic product* (ISO 11930:2019)

C&T

Cosmetics & Toiletries®

The Definitive Peer-Reviewed Cosmetic Science Resource



**Don't miss an issue!
Subscribe Today!**





KEY POINTS

- The next evolution of skin health should be about a more integrated understanding of the face itself.
- This moves the conversation away from simple volume replacement and toward achieving healthier, more resilient tissue function.

Next in Skin:

Rethinking Facial Aging, Aesthetic Interventions and Skin Health

by Katerina Steventon, Ph.D.

ne of the conversations I find myself having more frequently in the clinic nowadays is not about wrinkles, pigmentation or radiance. It is about curating the face as a living, aging structure.

Consumers' Choice

Facial aging follows recognizable patterns involving changes in skin, soft tissue and underlying structure. Increasingly, consumers

The future of facial aesthetics lies in a “pro-aging” approach that focuses on supporting the skin’s biological capacity for repair and regeneration.

seeking to address their aging concerns are navigating an overwhelming choice in terms of skincare products, supplements, injectables and other aesthetic interventions, with very little understanding of the cumulative results. They are often making decisions feature by feature, and each with a different practitioner — correcting an increasingly prominent nasolabial fold, unevenness of the upper lip line due to aging, the under-eye area due to lack of sleep or flattened cheeks following weight loss — without necessarily understanding the wider biological and structural changes affecting the skin and the tissues beneath.

Attempting to correct individual signs of aging over time can alter the overall appearance of the face, particularly when interventions are undertaken for years without considering the broader structural and age-related changes occurring across the face. Alongside aesthetic procedures, consumers are also navigating increasingly sophisticated skincare routines involving multiple products, active ingredients and layering approaches tailored to different skin types and concerns, adding a further layer of complexity to their decision making.

The challenge is that the face continues to age across multiple interconnected compartments. Bone remodels, fat compartments shift, muscles change their activity patterns and the skin itself undergoes structural and functional alterations. Dental interventions can influence facial support structures and proportions, while changes in oral architecture may affect the positioning of soft tissues across the lower face. Yet consumers often focus on a particular feature rather than seeing the face as an integrated biological system. In affluent circles, one practitioner can have oversight of a client’s facial aging, monitor these changes objectively and discuss their subjective impact in line with clinical opinion. However, in many cases consumers consult multiple practitioners at one time.

Technologies Advance in Time

In advertising, on social media and increasingly in public life, we see faces with “work done” looking less harmonious with time. This is not always the result of poor practice, but rather reflects the cumulative effect of multiple interventions performed with good

intentions, using technologies and techniques that were considered advanced at the time. Aesthetic medicine evolves rapidly. New understanding of facial anatomy, lymphatic drainage, tissue biomechanics and long-term tissue behavior continues to emerge, often changing how previous treatments are viewed.

In the clinic, I recommend skincare routines that work alongside all other modalities — mindfully excluding massage in areas regularly treated with Botox and navigating around skincare advice given by other practitioners. We now know that some fillers may remain within tissue far longer than originally anticipated. Imaging studies have demonstrated detectable hyaluronic acid filler years after placement, raising important questions about cumulative treatment planning and long-term tissue behavior⁶. Filler migration is another increasingly recognized phenomenon. Scientific literature describes several potential mechanisms through which filler movement may occur, with changes sometimes becoming apparent months or even years after treatment and influencing facial contours and proportions^{4,7}.

As understanding of long-term filler persistence and migration continues to evolve, cumulative effects of repeated interventions over time should always be considered. Growing awareness of long-term filler persistence and migration has prompted discussion within the field of aesthetic medicine about reassessment of past treatments and long-term treatment planning, but the decision-making is still in the hands of the consumer. If repeated interventions require us to think more carefully about the long-term behavior of tissues, they also raise a broader question: how can we better support the skin’s own capacity for repair and regeneration throughout the aging process?

The global facial aesthetics market is valued at \$8 billion in 2026.

Source: Data Bridge Market Research



Evolving the Pro-Aging Conversation

I believe the conversation around skin health and aging needs to evolve. I believe that skincare and interventions should be viewed as part of an overall strategy to support facial skin quality, structure and function, rather than a simple replacement of lost volume or correct individual features. Increasingly, the focus should shift to regeneration, repair and supporting the skin's own biological capacity.

From a systems biology perspective, aging and repair are intimately connected processes. Aging skin demonstrates reduced regenerative capacity, altered inflammatory responses and slower healing. Moreover, many of the cellular pathways involved in aging also play critical roles in tissue repair. The relationship is not straightforward. Certain biological processes that contribute to visible aging can simultaneously support healing and regeneration. This highlights an important trade-off within human biology: mechanisms that help protect and repair tissues may also contribute to age-related changes later in life^{3,6}. This perspective shifts the discussion away from simply filling, lifting or freezing tissue and moves it towards supporting healthier tissue function, achieving balance and understanding when less may be more appropriate.

There is also a psychological dimension at play. Facial appearance strongly influences perceptions of age, health and vitality. Perceived age is influenced by both biological and environmental factors, and age-related facial characteristics contribute significantly to how individuals are assessed by others¹. Facial aging follows recognizable patterns that can be identified by both human observers and computational models².

When facial appearance changes in ways that differ from expected age-related characteristics, it does not look “natural.” The relationship between facial appearance and age perception is complex and shaped by multiple biological and environmental influences¹. While people may not always be able to articulate why a face appears different, they are responding to subtle changes in the relationships between facial structures and age-related cues.

Integrated Approach to Skin Health and Aging

An increasing interest in maintaining facial tissue quality, supporting skin function and preserving facial individuality requires collaboration across disciplines. Dermatologists, aesthetic practitioners, dentists, facial surgeons, beauty therapists and skincare scientists all hold different pieces of the puzzle. Consumers do not experience their face through professional silos but as one connected biological structure.

Perhaps the next evolution of skin health and skincare is not simply the development of more efficacious products, but a more integrated understanding of the face itself — one that recognizes the interconnected biology of aging, repair and appearance. Ultimately, healthy aging is not about making a face look younger; it is about helping people age in a way that preserves function, appearance and a recognizable sense of self.

References

1. Clatici, V. G., Voicu, C., Voaides, C., Rosca, A. E., Tataru, C. P., Dalle, C., & Tatu, A. L. (2017). Perceived age and lifestyle: The specific contributions of biological and environmental factors to facial ageing. *Clinical, Cosmetic and Investigational Dermatology*, 10, 191–202. <https://doi.org/10.2147/CCID.S103180>
2. Georgopoulos, M., Panagakis, Y., & Pantic, M. (2018). Modeling of facial aging and kinship: A survey. *Journal of Visual Communication and Image Representation*, 58, 528–549. <https://doi.org/10.1016/j.jvcir.2018.11.004>
3. Khalid, K. A., Tan, J. J., Kabir, M. H., Chowdhury, S. R., & Islam, M. T. (2022). Aging and wound healing of the skin: A review of clinical and pathophysiological hallmarks. *International Journal of Molecular Sciences*, 23(23), 14837. <https://doi.org/10.3390/ijms232314837>
4. King, M., & Bassett, S. (2015). Filler migration: A number of mechanisms to consider. *Journal of Clinical and Aesthetic Dermatology*, 8(12), 27–32.
5. Master M, Azizzadeh A, Master V. *Hyaluronic acid filler longevity in the mid-face: a review of 33 magnetic resonance imaging studies*. *Plast Reconstr Surg Glob Open*. 2024;12:e5934.
6. O'Reilly, S., O'Connor, R., Murphy, M., et al. (2024). Aging, senescence, and cutaneous wound healing—A complex relationship. *Frontiers in Immunology*, 15, Article 1382212. <https://doi.org/10.3389/fimmu.2024.1382212>
7. Wollina, U. (2023). Filler migration after facial injection—A narrative review. *Cosmetics*, 10(4), 115. <https://doi.org/10.3390/cosmetics10040115>

C&T

The 2027 C&T Allē Awards submissions are open!



www.alleawards.com/live2027

Submissions close October 1st, 2026



THE LEADING EVENT IN ASIA PACIFIC FOR PERSONAL CARE INGREDIENTS

in-cosmetics™ asia

Bangkok
3-5 November
2026



Where personal care ingredients
and creators come together



Source
novel
ingredients
from 770+
suppliers



Touch
and try the latest
innovations to
inspire your next
cosmetic creation



Connect
R&D experts
to perfect your
formulation
skills



Discover
Asia Pacific's
future
personal
care trends

REGISTER TO ATTEND AND FIND OUT MORE
www.in-cosmetics.com/asia/



Built by
RX
In the business of
building businesses



KEY POINTS

- Strategic combinations of peptides can influence multiple anti-aging pathways simultaneously, offering a multifunctional solution for well-aging.
- The development of the “Oriptide-3” triple-peptide complex demonstrates the efficacy of using complementary bioactive peptides.

Peer-reviewed 

Rachel Mallon, scientific communications manager,

Oriflame

Peptides and Their Potential Within Longevity Skincare



statement that health is “not merely the absence of disease and infirmity” but instead is “a state of complete physical, mental and social well-being.”¹ There is growing evidence,

that it means to be “well” has evolved in recent years – and what defines health has broadened, as evidenced by the World Health Organization’s

too, that consumers now appreciate what it means to have good wellbeing beyond physical associations alone, connecting to emotional states as well as mental and even spiritual wellbeing²⁻⁴.

People are living longer and proactively taking greater control of their own health and wellbeing outcomes, willing to invest time, attention and money in an effort to live those extra years with vitality. As part of this evolution, we have also seen a shift in the consumer



People are living longer and proactively taking greater control of their own health and wellbeing outcomes.

perception of health and aging within the beauty and skincare spheres. Accelerated in no small part by the COVID-19 pandemic, this behavior has seen the concept of self-care placed firmly at the centre of many consumers' wellness routines. In fact, in the modern world, self-care is not so much a luxury but often a core element of daily life. Beauty and skincare have become pillars of self-care, often elevated from routine habits to essential, meaningful rituals as consumers embrace the multi-factorial nature of beauty, and the notion of healthy skin as a proxy for all-body health^{2,5}.

In addition, consumers are placing greater demands on brands to deliver tangible, science-backed results with their products, and looking for greater transparency in the methods used to deliver these results, as they want firm evidence of effect before committing to purchase. Global market reports, including Oriflame's *Inside Beauty* report, indicate that increasingly consumers associate beauty with overall wellbeing and actively seek products with proven scientific claims^{2,6}.

As a result, the narrative within skincare has moved from reactive anti-aging interventions to proactive, strategic approaches instead. Therefore, longevity skincare has emerged as a strong front-runner that may yet overtake anti-aging. Though overlapping in some regards with anti-aging concepts, longevity skincare's focus primarily looks beyond the surface level and superficial aesthetics, to the underlying mechanisms of aging, in an attempt to slow functional decline and extend the health of skin. Influenced by longevity science – the study of biological pathways that extend health span – by targeting the root causes of aging at the molecular and cellular levels, longevity-based formulations promise not just

visible improvements alone, but also deeper and more sustainable skin health in the longer term⁷.

DNA repair, extracellular matrix (ECM) remodeling, autophagy, senescence regulation, energy metabolism and oxidative stress pathways are some of the mechanisms that longevity skincare seeks to address⁷.

Skin and Aging Processes

We know that skin aging is driven by a combination of intrinsic factors – the natural consequence of chronological aging, influenced by genetics – and extrinsic factors encompassing environmental exposures such as UV radiation and pollution, and lifestyle insults including poor nutrition and alcohol consumption, as well as psychological stress⁸. All of these factors, over time, increase the body's oxidative load and accelerate the breakdown of vital skin components.

Oxidative stress has a critical role in the aging process that stems from an imbalance of unstable free radicals generated through exposure to UV, pollution and metabolic processes. Consistent oxidative stress can damage cellular structures, including lipids, proteins and DNA, which in turn negatively impacts the structure and optimal function of skin⁹.

Mitochondrial inefficiency also impacts aging. Mitochondria, often referred to as the cell "powerhouse," are responsible for producing ATP (adenosine triphosphate), the energy-carrying molecule or energy currency of the cell. By capturing and releasing energy it supports and fuels processes required for repair and regeneration. As mitochondria become less efficient with age, ATP production falls, leading to slower wound healing, reduced cell turnover and a weakened defence against environmental insults¹⁰.

Impaired proteostasis – the inability to maintain a balanced production, folding and clearance of proteins – is another critical skin aging biomarker that results in the accumulation of damaged or misfolded proteins within skin cells. This accumulation results in the disruption of cellular function and weakening of the skin's structure, which then manifests as loss of elasticity, increased wrinkling and uneven texture¹¹.

The anti-aging products market is projected to grow from \$59 billion in 2026 to \$108 billion by 2033

Source: Grand View Research



Cellular senescence, a state in which cells lose their ability to divide and function optimally, further contributes to skin aging. Senescent cells accumulate over time, secreting inflammatory factors that can degrade surrounding tissue and impair skin repair processes¹².

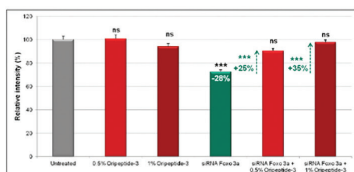
These processes correspond with the “hallmarks of aging” – a set of fundamental and interconnected processes widely recognised through expanding gerontological research that collectively provide a framework to understand how we age⁷. They represent intricate cellular and molecular changes that affect skin structure, function and health.

It is by understanding and targeting these biomarkers and hallmarks that longevity skincare aims to preserve skin integrity and delay or prevent the onset of visible aging signs. Ingredients such as antioxidants and peptides are often incorporated into formulations to help mitigate oxidative damage, support protein homeostasis and enhance cellular energy production^{13–15}.

Peptides for Skin Longevity

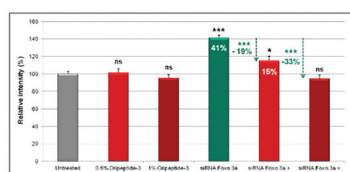
Peptides – short chains of amino acids – act as fundamental building blocks for key skin proteins, including collagen and elastin. Within topical

Lamin A Support of nuclear integrity



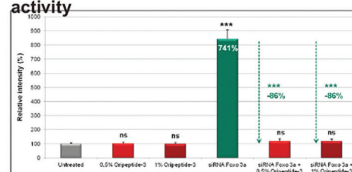
Lamin A expression was restored toward baseline levels following Oripeptide-3 treatment

Vimentin Support of cytoskeletal organisation



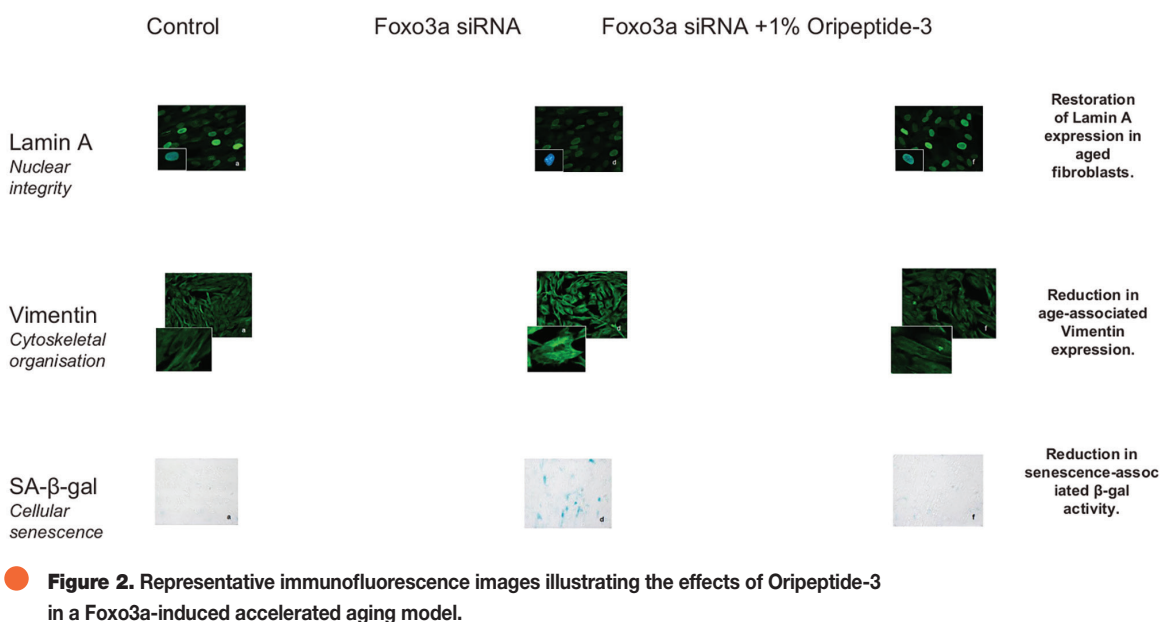
Oripeptide-3 reduced age-associated increases in Vimentin expression.

SA-β-gal Reduction of senescence-associated activity



Oripeptide-3 markedly reduced SA-β-gal activity in aged fibroblasts

Figure 1. Effects of Oripeptide-3 on key biomarkers of cellular aging.





As public discourse around health and aging evolves, a new marketing language in skincare is beginning to take hold.

cosmetic formulations, peptides also serve as signalling molecules or biological messengers, capable of initiating cascades of cellular activity^{13–16}.

Through these signalling functions, peptides can influence a wide range of processes that support skin's youthful function, resilience and overall health. Depending on their sequence and structure, peptides can stimulate collagen synthesis, support antioxidant defence systems, promote repair mechanisms, reinforce the extracellular matrix, improve dermal–epidermal cohesion and modulate inflammatory pathways^{14–17}.

This multifunctionality, and their relative compatibility with other actives, gives peptides broad appeal in longevity-oriented skincare formulations. However, peptide activity is highly sequence-dependent, and subtle structural differences can lead to markedly different biological outcomes, highlighting the importance of targeted peptide selection and combination strategies¹⁷.

A Triple-Peptide Complex for Anti-Aging and Longevity

The development of Oriptide-3 (also called the triple peptide complex) began with the objective of creating a multifunctional peptide complex capable of addressing several biological processes that deteriorate with age and contribute to the progressive decline of skin structure and function. Rather than focusing on a single aging mechanism, the formulation strategy was based on combining

peptides with complementary biological activities, reflecting the multifactorial nature of skin aging.

Oriptide-3 is composed of three naturally derived bioactive peptides. The first is a collagen-like peptide, selected for its ability to support extracellular matrix (ECM) remodelling and dermal–epidermal junction (DEJ) integrity. The second is a rice-derived tripeptide (Arg-Gly-Ser) shown to support cellular energy metabolism through effects on ATP production and calcium-dependent signalling pathways. The third component is a wheat-derived cysteine-containing peptide with antioxidant properties, capable of protecting proteins and DNA from oxidative damage¹⁸.

The biological activity of this triple peptide complex has been investigated through a combination of in vitro, ex vivo and clinical studies. In an in vitro study, Byrne et al. assessed the ability of the complex to stimulate collagen IV synthesis in human dermal fibroblasts aged in culture to represent mature cells¹⁸. Collagen IV is a major structural component of basement membranes and plays a critical role in maintaining mechanical stability and metabolic communication at the DEJ, an area known to be compromised in photoaged skin. Fibroblasts treated with the complete peptide complex showed a significant increase in collagen IV production compared to untreated controls, whereas the individual peptides, when tested alone at equivalent concentrations, did not elicit a comparable response. This finding demonstrated a synergistic effect of the peptide combination rather than a simple additive action¹⁸.

To assess whether these mechanistic effects translated into visible skin benefits, the same study program included controlled clinical evaluations. In a four-week double-blind, placebo-controlled, split-face study involving women with moderate photoaging, topical application of a formulation containing the triple peptide complex resulted in significant reductions in wrinkle number, surface area and depth compared to placebo, as measured by skin replica profilometry¹⁸. These findings were reproduced in a twelve-week monadic use study, which also demonstrated statistically significant improvements in skin roughness parameters and expert-graded wrinkle severity.

More recent biological investigations have extended the understanding of the triple peptide complex beyond ECM-focused effects and into processes associated with skin longevity. In ex vivo human skin, topical application of the complex at 1% significantly increased LC3 expression, a marker associated with autophagosome formation, suggesting support of autophagy-related pathways known to decline with age¹⁹.

In parallel, Oriptide-3 was shown to significantly restore ATP levels in a reconstructed human epidermis model subjected to mitochondrial stress, indicating support for cellular energy metabolism under conditions designed to mimic aging-related fatigue¹⁹. No modulation of upstream epigenetic regulators such as SIRT1 or Dicer/Drosha was observed, suggesting that the peptide complex acts primarily by reinforcing functional resilience mechanisms rather than altering global epigenetic programming.

Taken together, these findings demonstrate that the triple peptide complex addresses multiple interconnected biological processes relevant to skin aging. By supporting basement membrane integrity, cellular energy availability under stress, and pathways linked to proteostasis and autophagy, Oriptide-3 aligns with emerging longevity skincare principles that focus on preserving skin function and resilience over time.

Case Study: Restoring Cellular Resilience in an Accelerated Aging Model

Newer data investigating the biological activity of Oriptide-3 indicate that its effects extend across several hallmarks of aging that influence how skin functions, adapts and maintains vitality over time. These findings further support its relevance for longevity-focused skincare, where the objective is not only to improve visible signs of aging, but also

to preserve the underlying biological processes that support long-term skin health.

Biological evaluations have shown that the triple peptide complex significantly reduces SA- β -galactosidase activity, a widely used biomarker of cellular senescence^{18,19}. Senescent cells accumulate progressively with age and contribute to tissue dysfunction by secreting pro-inflammatory mediators that impair repair processes and degrade surrounding structures¹². A reduction in senescence-associated activity suggests the promotion of a healthier cellular environment with improved capacity for renewal and resilience.

Oriptide-3 has also been shown to increase levels of lamin A, a structural protein essential for maintaining nuclear integrity and genomic stability¹⁸. Age-related alterations in nuclear architecture are associated with increased susceptibility to DNA damage and impaired cellular repair mechanisms. By supporting lamin A expression, the complex may help reinforce nuclear stability and cellular resistance to stressors linked to biological aging.

In addition, Oriptide-3 was found to support proteostasis through increased expression of the 20S proteasome, a key component of the cellular protein degradation machinery¹⁸. Proteostasis declines with age, leading to the accumulation of damaged or misfolded proteins that interfere with optimal cell function¹¹. By enhancing proteasome-related activity, the triple peptide complex supports protein quality control and the efficient removal of intracellular waste, processes essential for maintaining cellular functionality over time.

Autophagy, the skin's intrinsic recycling and detoxification pathway, also declines with age and is increasingly recognised as a critical contributor to cellular aging and longevity⁷. In ex vivo human skin, topical application of the complex at 1% significantly increased LC3 expression, a marker associated with autophagosome formation, indicating support of autophagy-related pathways¹⁹. Restoration of autophagy supports cellular renewal, efficient waste disposal and long-term tissue integrity.

Mitochondrial dysfunction represents another central hallmark of aging, with declining mitochondrial efficiency directly impacting ATP availability and cellular energy balance¹⁰. In a reconstructed human epidermis model subjected to mitochondrial stress, the triple peptide complex significantly restored ATP levels, demonstrating support for cellular energy metabolism under conditions designed to mimic

aging-related fatigue¹⁹. Adequate ATP availability is essential for skin processes including repair, barrier maintenance and recovery from environmental stress.

Collectively, these findings demonstrate that the triple peptide complex Oriptide-3 extends its activity beyond conventional anti-aging targets. By modulating biomarkers associated with cellular senescence, genomic stability, proteostasis, autophagy and mitochondrial function, Oriptide-3 supports core biological processes linked to cellular stability and long-term skin functionality. These mechanisms align closely with emerging longevity skincare principles and illustrate that Oriptide-3 acts at the level of fundamental molecular and cellular pathways, rather than solely at the visible skin surface.

Future Perspectives

As societal perceptions shift, aging is no longer a ‘dirty word’, framed as something to resist or fear. Consumers are embracing longevity lifestyles which promise an alternative future, in which growing older does not equate to inevitable physical and cognitive decline. As public discourse around health and aging evolves, a new marketing language in skincare is beginning to take hold, with terms like ‘pro-aging’ and ‘well-aging’ replacing the traditional ‘anti-aging’ narrative²⁻⁴.

Looking ahead, the future of beauty lies in integrative longevity approaches that bring together biology, technology and lifestyle. Advancements in AI-driven diagnostics, built around individual biomarkers, including microbiome testing, are expected to accelerate the move toward hyper-personalised routines⁷. These technologies may allow for more dynamic assessment of skin condition over time and improved alignment between product selection and individual biological needs.

Beyond this, there is considerable untapped potential across other established hallmarks of aging not reviewed here, such as epigenetic alterations, stem cell exhaustion, deregulated nutrient sensing, altered intercellular communication and microbiome imbalance⁷. Many in the industry are beginning to explore whether influencing these processes could eventually contribute to changes in biological age. Companies developing skin-specific “biological clocks” using DNA-methylation signatures, RNA profiling or proteomic markers are already signposting a not-so-distant future in which measuring, and potentially improving, biological age becomes a legitimate target for cosmetic innovation⁷.

Market forecasts also anticipate longevity beauty to grow by roughly 7–10 % annually, and as new

bioactives emerge with the potential to enhance ‘skin span’, they will inevitably face heightened scrutiny as consumer demand for transparent test methods and science-backed efficacy continues to rise^{5,6}. The medicalization of beauty also looks set to continue exerting its influence, with ingredients such as exosomes already generating excitement due to their success in aesthetic dermatology; however, rigorous evidence for plant-derived exosomes in topical cosmetic formats remains limited^{14–17}.

The growth of “wellbeauty” or nutricosmetics is similarly likely to continue its momentum. Pairing topical peptides and antioxidants with ingestible formats such as collagen peptides holds appeal, as these approaches may offer additional or complementary benefits^{13–17}. Yet one of the greatest challenges ahead lies in translating complex molecular and cellular changes into improvements consumers can see and feel. With most anti-aging clinical studies capturing relatively short-term outcomes, the industry must now consider how to credibly validate both short- and longer-term benefits related to skin and hair health in a way that remains scientifically robust and transparent.

References

1. Constitution of the World Health Organization
2. Oriflame (2025). Inside Beauty – The Intersection of Beauty & Wellbeing
3. McKinsey & Company (2025). The Future of Wellness Survey
4. Global Wellness Institute (2024). Global Wellness Economy Monitor
5. Euromonitor. Beauty Consumer Trends 2025
6. Mintel (2025). Beauty and Personal Care Retailing
7. Klingnam W. et al. (2025). Longevity cosmeceuticals as the next frontier. *Frontiers in Aging*
8. Jenkins G. (2002). Molecular mechanisms of skin aging
9. Hensley K., Floyd R. (2002). Reactive oxygen species and aging
10. Martic I. et al. (2023). Mitochondrial dynamics in skin aging
11. Gorouhi F., Maibach H. (2009). Proteostasis and aging skin
12. Campisi J. (2013). Cellular senescence and aging
13. Lupo M., Cole A. (2007). Cosmeceutical peptides
14. Zhang L., Huang Y. (2025). Peptides as master keys to skin aging
15. Martínez V., Patel R. (2025). Cosmeceuticals for anti-aging
16. Fields K. et al. (2009). Bioactive peptides
17. Gorouhi F., Maibach H. (2009). Role of topical peptides
18. Byrne A.J. et al. (2010). Synergistic action of a triple peptide complex. *Journal of Cosmetic Dermatology*
19. Oriflame / Ashland (2025). Oriptide-3 biofunctional skin longevity – biological evaluation

C&T

Cosmetics & Toiletries®

The Definitive Peer-Reviewed Cosmetic Science Resource



**Don't miss an issue!
Subscribe Today!**





KEY POINTS

- The serum contains 10% lactic acid to exfoliate and firm skin.
- The serum contains 77 ingredients, one of the highest counts among 2,500 cosmetic products evaluated.

Read the Label:

Drunk Elephant Protini Powerpeptide Resurfacing Serum with Lactic Acid



Marc N.G. de Mul,
Measured Innovation LLC

In his story "Chromium",¹ Italian writer and chemist Primo Levi relates how he added ammonium chloride to a chromate-based anti-rust primer formulation to neutralize the excess base in the pigment and stabilize the product. Decades later, a colleague told Levi about a strange anti-rust recipe calling for ammonium chloride. Levi realized he was the chemist who introduced the ammonium chloride, which was still in the formula even though it no longer had a function, since the defective basic chromate that made

Images courtesy of Drunk Elephant

Drunk Elephant claims skin texture, radiance, and elasticity benefits based on a clinical study with 31 participants.

it necessary was long gone. It remained in the recipe since no one had seen a reason to remove it.

Generally, formulators should strive to achieve desired product claims with the lowest number of ingredients possible. This lowers both formula cost and the potential for ingredient interactions that may cause instability and skin irritation. In this edition of Read the Label, we study the Drunk Elephant Protini Powerpeptide Resurfacing Serum with Lactic Acid, a formulation with 77 ingredients. Based on a cosmetic ingredient count using Claude AI, this is one of the highest numbers of ingredients among 2,500 cosmetic products evaluated.²

With the help of Claude AI, it is possible to group several ingredients together as supplier blends with a high degree of confidence. Likely blends used by Drunk Elephant are listed in table 1. Nearly all blend ingredients correspond to the ingredients listed on the Protini serum INCI list, the exceptions being 1,2-hexanediol in BIO-Placenta, which does not appear on the label, and the X50 peptide, which the label names Copper Palmitoyl Heptapeptide-14. Counting each blend as one ingredient, and counting water and glycerin separately because both are present well above the levels the blends could contribute, 45 ingredients remain. This is still high for a serum, but most likely there are other not easily identified blends that would reduce the total ingredient count even more.

Product Claims

Drunk Elephant claims skin texture, radiance, and elasticity benefits based on a clinical study with 31 participants. This study is said to show that 100% of panelists had more radiant skin after 4 weeks and that 100% showed improved elasticity after 8 weeks of use. Further, 93% had smoother skin after 8 weeks.

There were also barrier strengthening and wrinkle reducing benefits after 8 weeks, but these were not quantified, and the measurement method was not disclosed. The clinical study report that would mention the study methodology, statistical significance, blinding, placebo effects, etc. is not available; we have to take the clinical benefits at face value.

The skin radiance and smoothness benefits can be supported by the 10% lactic acid chemical exfoliation system at a pH of 3.5. Lactic acid is an alpha hydroxy acid with a pKa of about 3.86, so at a pH of 3.5 it will be mostly in the free acid form, which penetrates the stratum corneum more easily. At 10% the lactic acid is expected to be a strong exfoliator, weakening the bonds between corneocytes on the skin surface, leading to a skin surface that feels and looks smoother. It may cause stinging and redness, especially when combined with other skin resurfacing actives.

Drunk Elephant states on its website that the serum is infused with nine “signal peptides” to “exfoliate and firm skin.” However, the ingredient list shown below has 12 peptides or polypeptides, which may be an oversight because they are spread out over several supplier blends. The company offers no evidence that the peptide system acts as anything else than a humectant.

The supplier blends (Matrixyl, PRODEW, etc.) have their own supporting claims and claims support. For example, Matrixyl 3000 led to significant improvements in wrinkle size and density over a placebo in a supplier clinical study³. Similarly, X50 Antiaging is supported by a clinical study with 30 volunteers that reported a 33% wrinkle reduction after four weeks. However, these studies cannot support finished product claims, which must rely on serum testing, especially in a formula with 10% lactic acid, where exfoliation and hydration can explain many of the same visible benefits attributed to the peptide complexes.

The serum contains several hydrating ingredients: glycerin, sodium PCA, amino acids, hyaluronates, panthenol, sodium lactate and Tremella polysaccharide. Some of these may also contribute to strengthening

Lactic acid is the most widely occurring natural organic acid in nature.

Source: Clinical, Cosmetic and Investigative Dermatology



the skin barrier in combination with linoleic acid, phytosphingosine and phospholipids. In addition to the clinical evidence, the barrier strengthening claim would be more convincing with a barrier measurement, such as a transepidermal water loss assessment.

Other than the emollients and humectants, the Protini serum contains several botanical extracts and oils (Glycine Max Seed Extract, *Sclerocarya birrea* Seed Oil, *Camellia sinensis* Seed Oil, *Nymphaea alba* Root Extract and others), which are probably not part of supplier blends. These are usually presented as antioxidants.

There is also a three-preservative system of phenoxy-ethanol, sodium benzoate and chlorphenesin, supported by multifunctional boosters including ethylhexylglycerin, caprylyl glycol, pentylene glycol, phenylpropanol and glyceryl caprylate. Some of these may not be intentionally added, but rather be part of one of the supplier blends listed in **Table 1**.

Conclusion

Protini Powerpeptide Resurfacing Serum shows why a long ingredient list does not mean that every ingredient was carefully selected by a formulator. Many of the 77 ingredients derive from supplier blends of peptides, amino acids and botanical materials. These blends bring their own claims and supporting studies, but that evidence does not automatically apply to the finished serum.

The product's most clearly supported benefits, smoother texture and greater radiance, are most likely driven by 10% lactic acid at pH 3.5, supported by a strong moisturizing system. The peptides and botanical actives may contribute to longer-term anti-aging effects, but solid claims support has not been offered. The high ingredient count would be more meaningful if the product claims were supported by published independent product testing.

Table 1. Possible ingredient blends used in the Protini serum (source: Claude AI)

Ingredient Trade Name	Supplier	Ingredient INCI	Recommended Use Level in Leave-on Product
PRODEW 500	Ajinomoto	Sodium PCA, Sodium Lactate, Arginine, Aspartic Acid, PCA, Glycine, Alanine, Serine, Valine, Proline, Threonine, Isoleucine, Histidine, Phenylalanine, Water	0.2 – 2.0%
Matrixyl 3000	Sederma (Croda Beauty Actives)	Glycerin, Water, Butylene Glycol, Carbomer, Polysorbate 20, Palmitoyl Tripeptide-1, Palmitoyl Tetrapeptide-7	3-10%
Matrixyl synthe'6	Sederma (Croda Beauty Actives)	Glycerin, Water, Hydroxypropyl Cyclodextrin, Palmitoyl Tripeptide-38	2-10%
BIO-Placenta	LABIO	Bacillus/Folic Acid Ferment Filtrate extract, Lecithin, Acetyl Glutamine, sh-Oligopeptide-1, sh-Oligopeptide-2, sh-Polypeptide-1, sh-Polypeptide-9, sh-Polypeptide-11, Sodium Hyaluronate, Caprylyl Glycol, Butylene Glycol, 1,2-Hexanediol, Water	3%
X50 Antiaging	Infinitec	Lactic Acid/Glycolic Acid Copolymer, Copper Heptapeptide-14 Pantothenate, Heptapeptide-15 Palmitate, Polyvinyl Alcohol	n/a
Kollaren BG 100	Lucas Meyer Cosmetics	Water, Butylene Glycol, Dextran, Tripeptide-1	1-10%
PhytoCellTec Symphytum	Mibelle Biochemistry	Symphytum Officinale Callus Culture Extract, Isomalt, Lecithin, Sodium Benzoate, Aqua / Water	0.4-1%

Ingredient List

Water/Aqua/Eau, Glycerin, Lactic Acid, Dicaprylyl Carbonate, Squalane, Sodium Hydroxide, Glycine Max (Soybean) Seed Extract, Sclerocarya Birrea Seed Oil, Camellia Sinensis Seed Oil, Sodium PCA, Caprylic/Capric Triglyceride, Borago Officinalis Seed Oil, Tremella Fuciformis Polysaccharide, Tocotrienols, Sh-Oligopeptide-1, Sh-Oligopeptide-2, Sh-Polypeptide-1, Sh-Polypeptide-9, Sh-Polypeptide-11, Copper Palmitoyl Heptapeptide-14, Heptapeptide-15 Palmitate, Palmitoyl Tetrapeptide-7, Palmitoyl Tripeptide-1, Palmitoyl Tripeptide-38, Palmitoyl Hexapeptide-12, Tripeptide-1, Pyrus Malus (Apple) Fruit Extract, Propanediol, Sodium Hyaluronate, Panthenol, Sodium Hyaluronate Crosspolymer, Sodium Lactate, PCA, Alanine, Arginine, Glycine, Histidine, Isoleucine, Phenylalanine, Proline, Serine, Threonine, Valine, Adenosine, Nymphaea Alba Root Extract, Bacillus/Folic Acid Ferment Filtrate Extract, Symphytum Officinale Callus Culture Extract, Dextran, Oryza

Sativa (Rice) Bran Oil, Linoleic Acid, Linolenic Acid, Butylene Glycol, Acetyl Glutamine, Coconut Alkanes, Coco-Caprylate/Caprates, Pentyleneglycol, Isomalt, Lecithin, Xanthan Gum, Aspartic Acid, Phytosphingosine, Phospholipids, Glycine Soja (Soybean) Sterols, Tocopherol, Citric Acid, Lactic Acid/Glycolic Acid Copolymer, Polyvinyl Alcohol, Phenoxyethanol, Sodium Benzoate, Hydroxypropyl Cyclodextrin, Polysorbate 20, Caprylyl Glycol, Phenylpropanol, Chlorphenesin, Carbomer, Glyceryl Caprylate, Ethylhexylglycerin

References

1. Primo Levi, "Chromium" in "The Periodic Table", translated from the Italian by Raymond Rosenthal, Schocken Books, New York, 1984.
2. Unpublished data, available from the author.
3. Karl Lintner, "Compositions containing mixtures of tetrapeptides and tripeptides", World Patent WO/2005/048968 (2005).

C&T

Cosmetics
& Toiletries
ALLÉ AWARDS

The 2027 C&T Allé Awards submissions are open!

www.alleawards.com/live2027

Submissions close October 1st, 2026





ON THE COVER
Images by master1305 and Starhei at Adobe Stock

Biocogent LLC	info@biocogent.com	www.biocogent.com	13
Clariant (Canada) Inc.	info@lucasmeyercosmetics.com	www.lucasmeyercosmetics.com	3
CoValence, Inc.		www.covalence.com	17
Gattefossé USA		www.gattefosse.com	1
in-cosmetics Asia		www.in-cosmetics.com/asia	43
INOLEX, Incorporated			9
JAKA Biotech Co., Ltd.	yankie@jakabiotech.com	www.jakabiotech.com	21
Silab	silab@silab.fr	www.silab.fr	5

Cosmetics &Toiletries®

The Definitive Peer-Reviewed Cosmetic Science Resource

Tune In!



Cosmetics & Toiletries'
On-demand Webcasts

www.cosmeticsandtoiletries.com/multimedia

The 2027 C&T Allē Awards submissions are open!

Package your innovation for a
chance to be recognized!



www.alleawards.com/live2027

Submissions close October 1st, 2026

