ABSTRACTS BOOK
OF THE
INTERNATIONAL SYMPOSIUM
OF COSMETIC AND FLAVOR
PRODUCTS

EDITORS:

Maria Lungu (COORDINATOR)

Carmen Zaharia **Anca Mihaela Mocanu**

Corina Cernatescu **Elena Niculina Dragoi**

Claudia Cobzaru

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OF THE 16th INTERNATIONAL SYMPOSIUM OF COSMETIC AND FLAVOR PRODUCTS

JUNE 4th-5th 2026
IASI, ROMANIA

25th ANNIVERSARY EDITION

”COSMETOLOGY – TRADITION, INOVATION, SUSTENABILITY”

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INTERNATIONAL FEDERATION OF THE SOCIETIES OF COSMETIC CHEMISTS
ROMANIAN SOCIETY OF COSMETIC CHEMISTS
”CRISTOFOR SIMIONESCU” FACULTY OF CHEMICAL ENGINEERING AND ENVIRONMENTAL PROTECTION
”GHEORGHE ASACHI” TECHNICAL UNIVERSITY OF IAȘI

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ABSTRACTS BOOK

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TOPICS

1. Natural and synthetic ingredients for cosmetics, flavor, food products, household chemicals, and personal care products
2. Formulations. Progresses and perspectives. Sustainability
3. Pharmaceutical and parapharmaceutical. Dermatocosmetics
4. Biomaterials and biotechnologies
5. Product evaluation and safety testing. Microbiology and toxicology.
6. Legislation, ethics

ABSTRACTS BOOK

The 16th International Symposium on Cosmetics and Flavour in Romania, "Cosmetology – Tradition, Innovation, Sustainability," is organized between June 4th and June 5th, 2026, in Iasi, Romania, by the Romanian Society of Cosmetic Chemists (SRCC) and the "Cristofor Simionescu" Faculty of Chemical Engineering and Environmental Protection of the "Gheorghe Asachi" Technical University of Iasi and will be held in a hybrid format.

This is an anniversary event, as we are celebrating 25 years of activity by the Romanian Society of Cosmetic Chemists, the only professional association of its kind in Romania.

The symposium devoted the entire range of cosmetic and toiletries, flavours, and household chemicals, addressing issues related to scientific research, development, and industrial practice, as well as marketing and legislation. At the same time, we highlight concerns regarding the sustainability of the production, processing, and use of pharmaceutical and cosmetic products, in accordance with European and global standards. Through a cutting-edge scientific program, its multi- and interdisciplinary nature, and the dynamic nature of the discussions, the event is aimed equally at experienced specialists and young researchers with an interest in the field, as well as small manufacturers of cosmetics and personal care products, who will have the opportunity to present their products during a special session.

The event will contribute substantially to identifying the most effective forms of mutually beneficial cooperation between individuals and companies in Romania and abroad.

President,

Professor dr. eng. Maria LUNGU

ABSTRACTS BOOK

TABLE OF CONTENT

POSTERS

ABSTRACTS BOOK

ABSTRACTS BOOK

CONFERENCE

FROM TESTING TO CLAIM-VALIDATE COSMETIC PRODUCT EFFICACY

Speaker: **Yiannis Kapetanstratakis, Chemist, MSc**
Quality Assurance & Control Systems Laboratories, Metamorfosi, Grecia

In today's highly competitive cosmetic market, brands rely on strong and compelling claims to differentiate their products and attract consumers. These claims shape consumer expectations, creating a promise of performance that products are expected to fulfill. But how can we ensure that these promises are truly supported by evidence? What methods are available to demonstrate product efficacy, and what regulatory frameworks govern claim substantiation?

This presentation will explore the critical link between testing and claims, addressing key questions on how cosmetic product performance can be effectively validated. We will review the range of available testing methodologies and discuss the regulatory requirements that underpin credible and compliant claims.

Yiannis Kapetanstratakis holds a Bachelor's Degree in Chemistry from the University of Patras, Greece. He also studied Forensic Science at Strathclyde University Glasgow, UK.

In 2012 he joined the QACS LAB team where he gained knowledge in the Microbiological, Stability laboratories and then moved to Risk Assessment. Yiannis now heads the Regulatory and Clinical departments. He is Key Account manager for a number of clients with a focus on Business Development.

Yiannis is a member of the Hellenic Society of Toxicology and the Forensic Science Society and is a Board Member of the Greek Society of Cosmetic Scientists. He also represents ERPA (European Responsible Person Association) at European Commission's Sub-Group on Borderline Products, CPNP and SPF.

CONFERENCE

STUDY OF THE SKIN MICROBIOME, FROM "PATHOGENIC AGENT" TO TOPICAL PRO-, PRE- AND POST-BIOTICS

Speaker: **Anca Dragomirescu, Professor Dr, UMFT**
Faculty of Pharmacy, Dermatopharmacy Cosmetology, Iasi, Romania

We are 350 years away in time from when the inventor of the optical microscope van Leeuwenhoe, would observe the first microorganisms and over 100 years from when the fathers of modern microbiology Louis Pasteur and Robert Koch described microorganisms. They demonstrated the relationship of microorganisms with diseases (contagious diseases) and proposed the first vaccines. Since then and until relatively recently, generations of doctors have grown up and practiced with the belief that microorganisms (bacteria, viruses, fungi) are exclusively PATHOGENIC AGENTS. Gradually and timidly, it was understood that there is some benefit from them, materialized in the production of vaccines and natural immunization (antigenic memory).

Currently, we are witnessing a revolution in medical thinking, witnessing the knowledge of the interrelationships between the microbiome (cutaneous, intestinal, respiratory) and the host, recognizing the multiple benefits generated by a balanced microbiome.

In fact, regarding the skin microbiome, we currently know of ecological interactions for both parties (host and microorganisms), both beneficial and detrimental, more precisely: mutualism, commensalism, parasitism, amensalism and competition. The study of the skin microbiome also extends to notions of skin histology, more precisely the secretory glandular type, which generates the ecological niches of the microbiome.

The interesting part is that microorganisms bring benefits, strengthening the host's immunity, through three major mechanisms:

- directly inhibit pathogenic organisms (by occupying space, consuming nutrients and producing *antimicrobial peptides*),
- contribute to the education and strengthening of local and systemic adaptive immunity (by regulating the production of local cytokines and influencing regulators for T lymphocytes that have reached the skin level),
- develop innate immunity (by producing AMPs, - anti-microbial peptides -, in addition, it contributes to the strengthening of the epidermal barrier).

All these findings have led to the development of probiotic cosmetic active ingredients (with live microorganisms - extremely rare, but especially lysed probiotics), prebiotics (substances that nourish the commensal microbiome), postbiotics (metabolites of commensal bacteria) and microbiome-friendly cosmetic active ingredients.

This paper exemplifies these ingredients, both from the perspective of this classification and their indication (oily acne-prone skin, hyperhidrosis, rosacea, damaged skin barrier).

CONFERENCE

PHENOLIC COMPOUNDS RELEVANT TO COSMETOLOGY

Speaker: **Gabriela Tătărîngă, Professor PhD**,
"Gr. T. Popa" University of Medicine and Pharmacy, Iasi, Romania

Phenolic compounds represent a complex group, widely exploited for their potential to exert beneficial effects on the skin and they are recognized as valuable ingredients in skin care products.

The biological activity of these derivatives on the skin depends on their physicochemical properties and their ability to penetrate the epidermal barrier.

Phenolic derivatives offer a multi-targeted approach to combat skin aging through different mechanisms: neutralizing reactive oxygen species, reducing inflammation, preventing collagen degradation, protecting DNA from direct and oxidative damage, regulating melanin synthesis, etc.

The beneficial effects *in vitro*, as well as evidence from *in vivo* studies, highlight the huge potential of polyphenolic extracts as active ingredients in topical formulations for the prevention and reduction of UV radiation damage and skin aging.

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CONFERENCE

INULIN-BASED COSMETIC FORMULATIONS: FROM PREBIOTIC FUNCTIONALITY TO ADVANCED SKIN DELIVERY SYSTEMS

Speaker: **Anca Daniela Raiciu, Assoc. Prof. PhD**,
"Titu Maiorescu" University, Faculty of Pharmacy, Bucharest, Romania
Pharmacist and Chemist,
Commercial Director Hofigal Export-Import S.A.,
President Planta Romanica Employers' Association.

Inulin, a naturally derived fructan polysaccharide, has emerged as a multifunctional ingredient in modern cosmetic science, combining prebiotic activity with valuable technological properties. This paper highlights the role of inulin in the design of advanced cosmetic formulations, focusing on its ability to support skin microbiome balance while enhancing product performance. From a biological perspective, inulin acts as a selective substrate for beneficial skin microorganisms, contributing to microbiome modulation and reinforcing skin barrier function. Simultaneously, its physicochemical characteristics enable its use as a stabilizing agent, texture modifier, and carrier for active compounds in diverse cosmetic systems.

Recent developments emphasize the incorporation of inulin into innovative delivery platforms, including hydrogels, nanoemulsions, and hybrid supramolecular systems, where it facilitates controlled release and improves the bioavailability of active ingredients. These attributes position inulin as a promising component in next-generation, microbiome-friendly skincare products.

The present work discusses formulation strategies, functional benefits, and current challenges associated with inulin-based cosmetics, underlining its potential to bridge natural origin ingredients with scientifically validated performance in the evolving cosmetic industry.

Keywords: inulin, prebiotic cosmetics, skin microbiome, cosmetic formulations, controlled release systems, hydrogels, bioactive delivery

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CONFERENCE

COMPLIANT AND SAFE BY DESIGN

Speaker: **Zoran Gavric**,
Scientific Director & Founder, Principal Safety Assessor
The Regulatory Company PRIMS Compliance Software, Olanda

In this practical technical session, The Regulatory Company will show how cosmetic products can be developed to be compliant and safe by design from the very start. Rather than treating compliance and safety assessment as a final hurdle before launch, we will explain how these should guide formulation, product design and decision-making throughout development.

The session will focus on five key building blocks for first-time-right product development: robust ingredient data, early identification of contaminants and regulated constituents, safety assessment against realistic exposure scenarios, timely creation of mandatory label and safe-use texts, and continuous monitoring to keep products compliant over time. Together, these elements form a more reliable and scalable approach to cosmetic compliance.

Using practical examples, we will demonstrate how PRIMS supports this way of working by connecting raw material data, exposure assumptions, assessment logic and documentation in one structured workflow. This helps teams identify critical issues earlier, improve consistency, reduce late-stage rework and stay inspection-ready throughout the product lifecycle.

Ideal for safety assessors, regulatory teams, R&D professionals and brand owners, this session offers a clear and practical perspective on how to future-proof cosmetic product safety and compliance through smarter design, better data and digitally enabled processes."

ORAL PRESENTATIONS

THERAPEUTIC VALENCES OF BIOMIMICRY IN SKIN BARRIER RESTORATION FOR PATIENTS WITH ATOPIC DERMATITIS

Andrea Badale
University of Medicine and Pharmacy of Oradea

Introduction

Atopic dermatitis (AD) is a complex chronic inflammatory pathology characterized by severe epidermal barrier dysfunction, microbial imbalance (dysbiosis), and impaired cellular communication. Conventional dermocosmetic approaches, often focused on passive occlusion, frequently prove insufficient for the long-term management of symptoms. In this context, biomimicry emerges as a frontier strategy, offering active restoration solutions that replicate the skin's natural physiology.

Objectives

This theoretical paper analyzes the synergistic potential of integrating postbiotics and exosomes into biomimetic delivery systems (lamellar emulsions). The primary objective is to demonstrate how this triadic approach can restore cutaneous integrity at structural, biological, and formational levels.

Methodology

A synthesis of recent scientific literature (2020-2026) was conducted, focusing on exosome biotechnology, the role of bacterial metabolites (postbiotics), and the architecture of liquid crystal emulsions. The analysis centered on the interaction mechanisms between these compounds and the deficient components of the atopic barrier (filaggrin, ceramides, antimicrobial peptides).

Content and Discussion:

The paper highlights three fundamental pillars of biomimetic intervention:

1. **Physical Restoration:** The use of Multi-Lamellar Emulsions (MLE) that replicate the spatial organization of intercellular lipids, ensuring seamless integration into the stratum corneum.
2. **Biological Modulation:** Incorporation of postbiotics to acidify the cutaneous pH and restore microbial balance, thereby limiting *Staphylococcus aureus* colonization.
3. **Cellular Reprogramming:** Leveraging exosomes as messenger nanovesicles capable of delivering growth factors and micro-RNA directly to keratinocytes, stimulating the endogenous synthesis of structural proteins.

Conclusions

The proposed theoretical model demonstrates that advanced biomimicry transcends the limits of classical hydration. Combining lamellar structures with postbiotics and exosomes offers a superior non-invasive therapeutic strategy, capable of "re-instructing" atopic skin to regain its barrier function. This paradigm opens new perspectives in formulating next-generation dermocosmetic products oriented toward regenerative medicine.

Keywords: atopic dermatitis, biomimicry, exosomes, postbiotics, lamellar emulsion, skin barrier restoration.

INTEGRATED INFORMATION SYSTEM FOR COSMETIC PRODUCT SAFETY ASSESSMENT AND DOCUMENTATION GENERATION ACCORDING TO REGULATION (EC) NO. 1223/2009

Domițian Ioan Pasca
DMI Corp SRL Cluj-Napoca

Abstract

Cosmetic product safety assessment and compliance documentation preparation according to Regulation (EC) No. 1223/2009 represent complex processes requiring the integration of toxicological data, regulatory restrictions, and exposure-related parameters. Manual management of these workflows involves substantial time consumption, the use of fragmented data sources, and an increased risk of inconsistency in toxicological and regulatory interpretation.

This paper presents the development of an integrated information system designed for cosmetic product safety assessment and automated generation of technical and regulatory documentation. The platform utilizes data processing and correlation algorithms integrating information from COSING, SCCS, IFRA, and ECHA databases for ingredient identification, restriction verification, and toxicological assessment support.

The system enables automated SDS/MSDS import and processing, extraction of ingredient concentration ranges, calculation of SED (Systemic Exposure Dose) and MoS (Margin of Safety) parameters, automatic allergen identification, and compliance evaluation for multiple regulatory frameworks. The platform integrates artificial intelligence-based functionalities to optimize assessment workflows and standardize compliance processes.

The obtained results highlight the potential of digitalization and automation in cosmetic safety assessment by reducing processing time, improving data traceability, and increasing consistency in regulatory safety documentation.

THERMOREVERSIBLE HYDROGELS AS POTENTIAL MATRICES FOR THE INCORPORATION OF MELOXICAM AND ESSENTIAL OILS

Ioana-Alexandra Plugariu[1], Luiza Grădinaru[1], Alexandra Lupu [1], Claudia Maxim[2], Irina Roșca[1], Irina Popescu[1], Maria Bercea[1]

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Abstract

Polymeric systems used as matrices for drug and essential oil incorporation represent attractive therapeutic options for various chronic, localized inflammatory conditions. Topical administration is often preferred for its advantages, including prolonged release of active ingredients, avoidance of gastrointestinal and hepatic passage, elimination of cardiovascular adverse effects, and increased patient compliance.

Meloxicam is an active substance in the class of nonsteroidal anti-inflammatory drugs (NSAIDs), with analgesic, antipyretic, and anti-inflammatory properties, and is a selective inhibitor of COX-2. The anti-inflammatory activity of meloxicam is superior to that of classical NSAIDs, such as diclofenac and piroxicam, but its low solubility in most solvents and zwitterionic character limit its use. There are no topical meloxicam products available in Europe.

Thermoreversible polyurethane-based hydrogels offer the advantage of easy incorporation of poorly soluble substances through the amphiphilic matrix, temperature-induced gelation, and ensure a controlled release of the active substance, an aspect sought in the case of a chronic pathology. Topical meloxicam-based formulations contain various absorption promoters and other excipients, such as triethanolamine, poly(vinylpyrrolidone), poly(ethylene glycol), or hydroxypropyl cellulose, which influence the release profile of the active substance.

A series of essential oils (including copaiba, monarda, German chamomile, tea tree, frankincense, eucalyptus, and oregano) was also incorporated, and the resulting hydrogels are stable over time. Eucalyptus essential oil acts as an absorption promoter, affecting the skin barrier and increasing the availability of the active substance at the site of action. Oregano essential oil provides antifungal properties.

The formulations obtained were evaluated against a commercial meloxicam gel from Mexico, with promising results for the therapeutic support of chronic inflammatory topical conditions.

The authors gratefully acknowledge financial support from PN-IV- P6-6.1-CoEx-2024-0196 project financed by The Executive Agency for Higher Education, Research, Development and Innovation Funding (UEFISCDI).

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MICROSCOPIC ANALYSIS OF SECRETORY TISSUES IN SPECIES BELONGING TO THE LAMIACEAE FAMILY

Maria Izabella Radu, Cornelia Bejenaru, Antonia Blendea
University of Medicine and Pharmacy, Craiova

Introduction

Medicinal plants belonging to the Lamiaceae family represent an important source of volatile oils used in aromatherapy, due to their beneficial effects on the human body. Volatile oils are found in glandular trichomes, where they are both secreted and stored. The study of these secretory tissues provides essential information regarding the aromatic and therapeutic potential of medicinal plants.

Objective

The aim of this study is the comparative microscopic analysis of secretory structures at the leaf level (glandular trichomes), correlated with the structure of the plant material.

Materials and Methods

Transverse sections were performed on leaves obtained from aromatic plants such as mint, lavender, and rosemary. The microscopic preparations were treated with specific stains in order to achieve differential staining of the various tissue types present, then analyzed using a binocular light microscope and photographed. The types of secretory tissues (glandular trichomes) and the anatomical structure of the leaves were evaluated.

Results

Lavandula angustifolia Mill. (lavender) exhibits leaves with an equifacial bifacial structure, hypostomatic, provided with diacytic stomata and glandular trichomes with a short stalk and a mono-, bi-, tetra-, or octocellular gland. *Mentha* × *piperita L*. (peppermint) has leaves with a bifacial dorsiventral structure, hypostomatic, provided with diacytic stomata and secretory trichomes with an octocellular gland. *Rosmarinus officinalis L*. (rosemary) presents leaves with a bifacial dorsiventral structure, hypostomatic, provided with diacytic stomata and secretory trichomes with a spherical mono- or tetracellular gland.

Conclusions

Medicinal plants from the Lamiaceae family are highly important therapeutic sources due to the presence of volatile oils in glandular trichomes. The glandular trichomes identified in the three species exhibit different structural characteristics. The highest prevalence is observed in glandular trichomes with an octocellular structure. The leaf structure, as plant material, differs among the three species.

Keywords: aromatic plants, secretory tissues, essential oils, aromatherapy, microscopic analysis

FROM CULTURE TO FORMULATION: AN INTEGRATED APPROACH TO *ROSMARINUS OFFICINALIS* FOR COSMETIC APPLICATIONS

Daniela Haidu[1], Manuela Crișan[1], Mariana Suba[1], Ildiko Bută[1], Luminița Crișan[1], Camelia Oprean[2]

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[2] "Victor Babes"University of Medicine and Pharmacy, Faculty of Pharmacy, Timisoara

Abstract

Natural resources are increasingly valued, and the reorientation of the modern consumer towards nature determines a clear need for alignment between the sectors involved in product development. Each segment of the market: agriculture, research and industry knows both its potential and limitations. The inflection points between these areas become essential for the creation of coherent flows, allowing uniform traceability and the development of value- and functionally aligned products.

In Romania, interest in aromatic and medicinal plant crops is growing, supported also by funding programs. However, there is a gap between the results of academic research, often very in-depth and expensive, and their applicability on an industrial scale. The lack of a common language and simplified technological solutions limits the efficient transfer to industry.

The present study proposes the development of an integrated technological flow, easily adaptable for technological transfer, having as a starting point extracts from *Rosmarinus officinalis*, originating from different cultivation areas. Various extraction methods and solvents used were investigated, followed by the characterization of the extracts by analytical techniques (FT-IR, GC-MS, determination of the total content of phenolic compounds), stability studies (UV-VIS photodegradation, pH variations, thermal stability), *in silico* computational evaluation and evaluation of antioxidant activity.

The initial results will be complemented by the evaluation of antibacterial activity, cytotoxicity on fibroblasts and formulation directions, in order to define a profile with industrial applicability for the sustainable valorization of plant resources, from raw material to finished cosmetic product.

Keywords: rosemary extracts, cosmetic applicability, analytical methods

ADVANCED TOPICAL FORMULATIONS: DESIGN AND CHARACTERIZATION OF FREEZE-DRIED WAFERS

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Abstract

Freeze-dried wound dressings are advanced topical systems characterized by a highly porous structure, high exudate absorption capacity, and the ability to form a gel-like matrix upon hydration, allowing a sustained release of active compounds. These properties make them appropriate for chronic and exuding wounds, where moisture balance and controlled local delivery are critical.

In this study, a Quality by Design strategy was used to develop liposome-loaded freeze-dried wafers as advanced delivery systems. Liposomes incorporating *Rosmarinus officinalis* and *Thymus marschallianus* extracts were prepared through thin-film hydration method, followed by sonication. The lipososmes were characterized in terms of particle size, polydispersity index, zeta potential, and encapsulation efficiency. The encapsulation efficiency, expressed as total polyphenolic content, was 68.98% for *Thymus marschallianus* liposomes and 64.84% for *Rosmarinus officinalis* liposomes.

The liposomal dispersions were incorporated into polymeric matrices based on guar gum and hydroxyethyl cellulose, together with mannitol, hyaluronic acid, and glycerol, and then subjected to lyophilization to obtain porous wafers. Twelve formulations were prepared based on an experimental design and futher analyzed to evaluate the influence of formulation variables on critical quality attributes, including hydration behavior, mechanical strength, adhesiveness, and structural integrity. Texture analysis was used as the main tool to assess mechanical characteristics and to establish correlations between formulation composition and functional properties.

The results indicated that incorporating liposomes into freeze-dried matrices led to a synergistic effect, combining controlled drug delivery with the high absorption capacity of porous structures.

Funding: This research was financially supported by Iuliu Hatieganu University of Medicine and Pharmacy, Cluj-Napoca, Romania, Grant 32154/15/16.12.2024.

GELS BASED ON POLYSACCHARIDES, AMINO ACIDS AND EUTECTIC SOLVENTS WITH POTENTIAL COSMETOLOGY APPLICATIONS

Lorena-Elena Grigoriu, Alexandra Croitoriu, Diana Elena Ciolacu, Alexandru-Mihail Serban, Alina Gabriela Rusu, Loredana-Elena Nita

"Petru Poni"Institute of Macromolecular Chemistry, Department of Natural Polymers, Bioactive and Biocompatible Materials, Iasi

Abstract

Carrageenan, a polysaccharide extracted from red algae, acts in topical gels as a biocompatible texturizing agent, capable of forming a protective hydrocolloid barrier on the skin surface [1]. In formulations that include amino acids, its polymeric structure allows it to retain moisture within the stratum corneum, while enabling the controlled release of active compounds. Its rheological behavior ensures a uniform application, improve formulation stability and support skin hydration without disrupting the integrity of the natural barrier [2]. Eutectic solvents represent a sustainable and efficient alternative for the amino acids solubilization, overcoming the limitations of conventional solvents through their high capacity to form hydrogen bonds. Their incorporation into gels facilitates the dispersion of hydrophobic amino acids, which are usually difficult to incorporate into aqueous solutions.

In this study, gels based on carrageenan and essential amino acids, such as tryptophan and glutamic acid, were developed in order to obtain materials suitable for skin hydration applications. This synergistic combination provides enhanced protection against oxidative stress, while promoting deep and sustained hydration, contributing to the preservation of skin elasticity and barrier function. The obtained results demonstrate that the formulated gels have applicability in cosmetology.

Acknowledgements: This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CCCDI -UEFISCDI, project number PN-IV-P7-7.1-PED-2024-1788, within PNCDI IV.

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NEW TECHNOLOGIES INVOLVED IN THE CHOICE AND PERSONALIZED FORMULATION OF COSMETIC PRODUCTS

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Abstract

The main objective of this study was to highlight the new technologies that have been developed to help in the selection and personalized formulation of cosmetic products. With the evolution of artificial intelligence, various beauty softwares have emerged that have revolutionized the way makeup is approached, offering personalized, high-tech solutions that greatly improve our beauty routines. These softwares include a range of digital tools and applications designed to innovate the makeup and beauty industry.

These new technologies use: artificial intelligence, virtual reality and augmented reality with functions of either a virtual trial that allows the consumer to "test" makeup products at home, or an artificial intelligence-based skin care analysis that provides personalized recommendations. Virtual Try Ons is virtual trial software that uses artificial intelligence and virtual reality tools, and allows users to virtually experiment with different makeup products, thus helping them find the shade or style of makeup that suits them. The way the software works is simple, first using facial recognition technology to map the user's features and then virtually applying the right makeup. The skincare analysis tools are based on artificial intelligence and help users understand their skin's needs, providing cosmetic product recommendations and personalized routines. This app uses a video camera to scan your face to analyze skin conditions and adjust the formula of your skincare products for optimal results.

AI Foundation Shade Matcher is software that uses a combination of facial recognition and color matching algorithms to identify the perfect shade across various cosmetic brands. Face Analyzer is an artificial intelligence-based tool that analyzes facial features to suggest contouring techniques, eyebrow shapes, and even makeup styles tailored to individual face shapes. Auto Hair Analysis & Virtual Color Try Ons is similar to virtual makeup trials, this software has also been developed that allows users to experiment with different hair colors digitally, can even analyze a user's hair type and recommend personalized hair care products and treatments.

In conclusion, whether it's AI-based tools, virtual reality, or smart beauty devices, the future of cosmetics is based on technology.

Keywords: smart technologies, analysis, characterization, experimentation.

THE IMPACT OF SEMISOLID TOPICAL BASES ON QUERCETIN RELEASE AND TRANSDERMAL PERMEABILITY

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Abstract

Quercetin is a bioactive flavonoid with well-documented antioxidant, anti-inflammatory, and skin-regenerating properties, making it a promising candidate for topical and transdermal delivery. However, its topical efficacy is limited by poor water solubility and reduced skin permeability.

Therefore, we aimed to conduct a comparative study by developing and evaluating three semisolid formulations containing 1% quercetin (organogel, hydrogel, and lipophilic cream) in order to assess how different excipients can influence its release, skin permeation, and overall topical efficacy. Several types of membranes, including natural and synthetic membranes, were used to assess quercetin diffusion and identify the most suitable vehicle for transdermal delivery. The organogel showed the highest quercetin release after 24 hours, followed by the hydrogel and cream.

The poloxamer-based organogel also provided high skin permeation and sustained diffusion. Overall, this study demonstrates the critical role of the semisolid base in modulating the release and skin permeation of active compounds, highlighting that vehicle selection can significantly influence the therapeutic efficacy of topical formulations.

Keywords: quercetin, skin, organogel, hydrogel, lipophilic cream

INFLUENCE OF SOLVENT POLARITY IN THE DEVELOPMENT OF LICORICE ROOT EXTRACTS FOR COSMETIC APPLICATIONS

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Abstract

Licorice root (*Glycyrrhiza glabra* L.) is widely used in cosmetic formulations due to its anti-inflammatory, antioxidant, soothing and skin-protective properties, while glycyrrhizin and related triterpenoid compounds contribute to its potential applications in skin care and hair care products.

In this study, nine cosmetic-compatible hydrophilic and lipophilic solvents were used to obtain licorice root extracts by ultrasound-assisted extraction or Soxhlet method. The obtained extracts were evaluated in terms of glycyrrhizin content and *in vitro* antioxidant activity. The results showed that solvent polarity strongly influenced the extraction efficiency. Ethanol 50° provided the highest glycyrrhizin content, followed by propylene glycol and glycerol.

Lipophilic extracts showed lower antioxidant activity compared with hydrophilic systems. Hydrophilic extracts obtained with PEG 400, propylene glycol or ethanol 50° exhibited radical scavenging activity above 85%. Overall, the study highlights the importance of solvent selection in the development of licorice root extracts intended for cosmetic use.

Keywords: licorice root extract, skin, cosmetic formulations, hydrophilic systems

POSTERS

NUTRICOSMETICS IN INCREASING THE EFFECT OF COSMETICS - VITAMIN D, MORE THAN A VITAMIN

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Abstract

In an attempt to consolidate and increase the effect of cosmetic actives, research has proposed a large, continuously growing family of nutritional actives for skin homeostasis, in oral administration, called NUTRICOSMETICS. This category began timidly with the name: *oral cosmetics* or *beauty pills*. Even though there is no accepted definition of them, international scientific data platforms present relevant and recent studies on them.

Since the most studied are the fat-soluble and water-soluble vitamins, the present study focuses on the role of vitamin D. With the discovery of the VDR receptors, it was understood that the most notable favorable effects of vitamin D are extra-calcemic, including the skin (and the skin immune system), muscle tissue and the central nervous system (role in cognition). Beyond being a simple vitamin, today it is considered to be a sterol hormone, based on considerations related to chemical structure, endogenous synthesis, metabolism and receptors.

This presentation, after an extensive analysis of recent scientific literature, systematizes the role of orally administered vitamin D in skin health, in the prevention of skin conditions (or as an adjuvant treatment), as well as in longevity. The paper highlights aspects such as:

- the influence of vitamin D on immunocompetent skin cells,
- the role of vitamin D as a supplement in the treatment of psoriasis,
- the relationship of vitamin D with atopic dermatitis,
- the protection of vitamin D against (photo)aging,
- some aspects related to longevity: the protection of vitamin D against sarcopenia and the effect on muscle mass reconstruction, the role in maintaining cognition and geroprotection, including the prevention of telomere shortening.

Keywords: nutricosmetics, vitamin D, skin cells

TISSUE EFFECTS OF PEELING ACTIVES

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Introduction

Chemical peels represent one of the most widely used procedures in aesthetic dermatology and modern cosmetology, being applied in the treatment of skin photoaging, pigmentation disorders, post-acne scars, and other dermatological conditions. The accelerated development of the cosmetic industry has led to the emergence of new categories of active ingredients promoted as alternatives to classical peels, which requires the reevaluation of the actual biological mechanisms involved in their effects on the skin.

The aim of the present study was the comparative analysis of the tissue effects produced by different categories of agents used in peeling procedures, as well as highlighting the main current trends and controversies in recent scientific literature.

Materials and Methods

The study was conducted as a narrative meta-analysis based on specialty literature identified in the international databases PubMed, Scopus, Web of Science, and Google Scholar. Articles published between 2000 and 2024 were analyzed, with emphasis on recent studies regarding the histological, inflammatory, and regenerative mechanisms associated with peeling procedures.

Results and Discussions

The results highlighted that the effectiveness of peeling agents cannot be explained exclusively by the molecular size of the active substances, as is frequently promoted in the cosmetic industry. Skin penetration is simultaneously influenced by molecular weight, pH, lipophilicity, the vehicle used, and the integrity of the epidermal barrier. It was also demonstrated that classical chemical peels produce complex effects that go beyond simple exfoliation, including the activation of inflammatory mediators, fibroblast stimulation, extracellular matrix remodeling, and neocollagenesis. Recent literature highlights the role of interleukin-1 alpha in epidermis-dermis communication and in post-peeling regenerative processes.

New non-keratolytic regenerative therapies, enzymatic exfoliants, polyhydroxy acids, and Spongilla peeling were also comparatively analyzed, and important controversies were identified regarding their actual mechanisms of action and comparative clinical efficacy.

Conclusions

The conclusions of the study support the fact that classical chemical peels remain the main therapeutic standard; however, the future of the field is oriented toward personalized therapies, combinations of active ingredients, and the development of safer and better standardized regenerative technologies.

Keywords: chemical peeling; tissue effects; epidermal regeneration; alpha-hydroxy acids; polyhydroxy acids; skin penetration; neocollagenesis; dermato-cosmetology

NANOTECHNOLOGY-BASED DELIVERY SYSTEMS WITH PLANT EXTRACTS USED AS ANTI-AGING DERMATOCOSMETICS

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Introduction

Skin aging is a complex process influenced by oxidative stress and UV radiation exposure, leading to the degradation of collagen and elastin. Plant extracts rich in bioactive compounds exhibit antioxidant and anti-aging effects; however, their applicability is limited due to poor stability and low bioavailability.

Materials and Methods

A review of recent scientific literature was conducted using databases such as MDPI and PubMed, by selecting articles published between 2020 and 2025. The keywords used included: „*nanocarriers*, *plant extracts*, *anti-aging*, *dermatocosmetics* and *skin delivery systems*".

Results

The analyzed studies highlight the use of various delivery systems such as alginate–chitosan coated nanoliposomes, nanostructured lipid carriers, and hybrid carbohydrate–lipid systems to improve the stability and skin penetration of active compounds. Flavonoids from bamboo leaves incorporated into nanoliposomes demonstrated enhanced skin permeability and significant anti-aging effects, while raspberry polyphenols and extracts based on salicin and hederacoside C showed improved anti-aging and photoprotective properties.

In addition, bioactive compounds such as bakuchiol, epigallocatechin gallate (EGCG), resveratrol, and curcumin have demonstrated significant anti-aging effects, including stimulation of collagen synthesis, inhibition of its degradation, and reduction of hyperpigmentation. Nanoencapsulation of these compounds leads to increased stability, enhanced skin penetration, and improved efficacy, as observed in encapsulated bakuchiol formulations and nanostructured systems for EGCG and curcumin, which enhance antioxidant and photoprotective effects.

Conclusions

Nanotechnology-based delivery systems represent a promising strategy for enhancing the efficacy of plant extracts in anti-aging dermatocosmetics. The integration of these technologies enables optimal utilization of bioactive compounds; however, further studies are required for standardization and long-term safety evaluation.

HEMP OIL EXTRACTS. COMPARATIVE STUDIES

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Abstract

Hemp (*Cannabis sativa*) is a plant with a complex chemical composition, rich in active compounds, renowned for its ability to improve the symptoms of atopic dermatitis and other skin conditions, such as psoriasis and acne, while also contributing to the fortification of the skin's natural barrier and increasing its resistance to infections. Among the most representative products is hemp seed oil, notable for its high content of Omega-3 and Omega-6 fatty acids, obtained through cold pressing or solvent extraction and alcoholic extracts derived from fresh buds.

In this study, a comparative analysis of the quality of hemp seed oil was performed, based on the extraction method used: solvent extraction and cold pressing. Generally, solvent extraction is used to extract oil from oilseeds with a low oil content, such as hemp, as well as from certain highly permeable seeds with a high fat content. In the case of the hemp seeds, the oil extraction was carried out under hot conditions using n-Hexane (boiling point 68–69°C). To determine the quality of the oil obtained, it was subjected to analyses such as: acidity index, iodine index, peroxide index and saponification index. At the same time, for comparisons, the same analyses were also performed on cold-pressed hemp oil from a local producer.

The analyses results confirmed that both oils have a high content of polyunsaturated fatty acids (PUFAs), particularly characterized by high concentrations of linoleic acid (Omega-6) and alpha-linolenic acid (Omega-3).

Keywords: solvent extraction, hemp oil, cold pressing

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OINTMENT WITH OIL EXTRACT OF CELANDINE

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Abstract

Greater Celandine (*Chelidonium majus* L.) is a versatile plant found both in the wild and in cultivation, which develops over a vast area, from plains to mountain regions up to altitudes of 1,000 meters. Its complex chemical profile consists of over 70 compounds and 24 macro- and microelements, including alkaloids, flavonoids, saponins, vitamins, minerals, aromatic and aliphatic acids, phytosterols, and alcohols. Due to its chemical composition, the plant possesses significant pharmacodynamic properties with numerous medical applications.

The objective of this study was to obtain a celandine extract and incorporate it into a pharmaceutical product. As a plant material for obtaining extracts and their use in pharmaceutical products, dried celandine was chosen, which was purchased from a natural health store. Before use, it was crushed in order to release volatile oils and facilitate the penetration of the solvent into the plant's cell membrane. Cold-pressed olive oil and refined sunflower oil were chosen as solvents, both purchased from the supermarket. Among the extraction methods, maceration at room temperature was chosen because it is very advantageous from an economic point of view and can be carried out very easily. The celandine oily macerates were analyzed in terms of acidity, saponification and peroxide index (specific analyses of vegetable oils), and refractive index and were used to prepare the ointment.

The results indicated that the oily extract obtained by maceration is effective for preparing a celandine ointment - an affordable product, easy to apply and with demonstrated benefits for skin health

Keywords: celandine, oily macerate, ointment, maceration

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LEMON OILY MACERATE: PREPARATION AND USES IN PHARMACEUTICAL AND COSMETIC PRODUCTS

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Abstract

Lemon is widely recognized for its high concentration of vitamin C, limonene and other essential bioactive compounds, constituting a valuable raw material for obtaining extracts for the pharmaceutical and cosmetic industries. In cosmetic formulations, lemon extract acts as a high-performance active agent, due to its brightening and purifying properties, while in the pharmaceutical field it is valued for its antiseptic and therapeutic benefits.

The objective of this study was to obtain a lemon oily macerate and its integration into pharmaceutical and cosmetic formulations, characterized by simplicity in preparation and ease of application. Lemon peel was used as the plant material, which was ground and dried in an oven at T=40°C for 1 hour. Among the vegetable oils, refined sunflower oil purchased from a supermarket was chosen. Lemon extracts can be obtained through several methods, and among these, cold maceration was selected because it is more economical and easy to perform. Then the resulting oily macerate was used to prepare a cosmetic cream and an ointment-two products with great potential care and the treatment of skin conditions.

The results demonstrate that the oily macerate obtained through an efficient extraction process can be successfully incorporated into various pharmaceutical and cosmetic products, ensuring them also a significant nutritional and functional value.

Keywords: lemon peel, oily macerate, cosmetic cream, ointment

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PEPPERMINT OIL EXTRACT WITH APPLICATIONS IN THE MANUFACTURE OF PHARMACEUTICAL AND COSMETIC PRODUCTS

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Abstract

Peppermint extract is a versatile ingredient, valued for its remarkable refreshing, antiseptic, and analgesic properties. In the pharmaceutical industry, it is predominantly used due to its menthol concentration, being effective in alleviating muscular and joint pain, neuralgias, as well as in treating superficial mycoses or minor skin infections. In the cosmetic sector, the extract is appreciated for its ability to stimulate peripheral microcirculation and for its refreshing aromatic profile.

The objective of the present study was to obtain an oily peppermint extract and incorporate it into pharmaceutical and cosmetic specific formulations, namely a pharmaceutical unguent and a cosmetic cream. Among the extraction methods, maceration at room temperature was selected, using previously dried and ground peppermint plant as the material and sunflower oil as the solvent. The extraction was carried out for 14 days, and after filtering the mixture and pressing the residue, the oily peppermint extract enriched with plant compounds was obtained, making it suitable for use in the preparation of cosmetic and pharmaceutical products. In this regard, the oily peppermint extract was used in the preparation of cosmetic cream and ointment, two products beneficial for the skin due to its properties.

The results demonstrate that, through an optimized extraction process, a high-quality natural extract can be obtained, suitable for use as a raw material in both the cosmetic and pharmaceutical industries. Furthermore, the oily peppermint extract was demonstrated a great applicability in the preparation of sweets.

Keywords: peppermint, maceration, oily peppermint extract, sunflower oil

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NATURAL AND SYNTHETIC LIP BALM FORMULATION: A COMPARATIVE STUDY

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Abstract

Lip balm is an essential cosmetic product for maintaining lip health, performing multiple functions such as deep hydration, forming a protective barrier against environmental factors, and preventing dehydration. Given its frequent use, the quality of ingredients is essential, although the current market is dominated by affordable synthetic products that often lack nutritional value.

This work aims at the formulation and comparative analysis of two types of lip balm: one based on calendula and peppermint extracts and the other on synthetic ingredients. First, an oily plant macerate was obtained. Maceration was chosen as the extraction method because it is a simple procedure that can be performed at room temperature. For the maceration process, sunflower oil purchased from a supermarket was used, as well as a mixture of dried peppermint and calendula flowers, which were purchased from a natural health store. After obtaining the plant extract, the lip balm was prepared according to a recipe from the literature. It has the following ingredients: beeswax, vitamin E, vitamin A, beetroot pigment, and the oily calendula and mint extract. For comparison, a lip balm was also prepared from the following ingredients: beeswax, vitamin E, vitamin A, carmine and petroleum jelly from the market.

The results demonstrated the superior quality of the lip balm obtained with the plant extract, providing increased nutritional intake due to the regenerative and soothing properties of the plants.

Keywords: calendula, peppermint, maceration, oily extract, sunflower oil

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VALERIAN (*VALERIANA OFFICINALIS*): A CURRENT PHARMACOTHERAPEUTIC PERSPECTIVE. LITERATURE REVIEW

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Abstract

Valerian (*Valeriana officinalis*) is one of the most appreciated medicinal plants worldwide, officially recognized for its remarkable sedative and anxiolytic properties. This perennial species has a wide distribution area, being native to the geographical regions of Europe and Asia. From a phytotherapeutic point of view, interest is focused exclusively on the roots and rhizomes; after drying, these develop a specific, intense, and persistent olfactory profile.

The chemical composition of the plant is complex and variable, being determined by factors such as geographical origin, pedoclimatic conditions, harvesting time and processing methods. From a phytochemical point of view, the root and rhizome of the plant contain a variety of bioactive compounds, responsible for its known pharmacological effects, especially the sedative and anxiolytic ones. Also, the plant presents a wide spectrum of biological activities, being recognized in phytotherapy, mainly for its effects on the central nervous system. Its pharmacological properties are the result of a complex interaction between bioactive compounds, especially valerenic acids and their derivatives. However, valerian extracts are also of great importance, as they can be used in the cosmetic industry to formulate products for skin care, such as premature aging, wrinkles and dryness.

The present study evaluates pharmacotherapeutic potential of the plant in managing various conditions, while also exploring methods for obtaining standardized extracts that can serve as raw materials for the formulation of innovative pharmaceutical products.

Keywords: valerian, plant extract, extraction methods

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BASIL OILY MACERATE – PREPARATION AND INCORPORATION INTO PHARMACEUTICAL AND COSMETIC PRODUCTS

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Abstract

Basil is an aromatic plant highly valued in the food industry, recognized for both its distinct olfactory profile and its benefits on the digestive system. Due to its antibacterial, anti-inflammatory and antioxidant properties, this plant can be used in the pharmaceutical and cosmetic industries for its healing effect, prevention of skin infections and skin-soothing properties.

The objective of the present study was to obtain a basil oily macerate and its incorporation into pharmaceutical and cosmetic formulations, easy to prepare and apply. The basil oily macerate was obtained by macerating the plant in sunflower oil at room temperature. It has all the properties of the plant and can be used in the preparation of cosmetic and pharmaceutical products. Among these, the ointment and cold cream were chosen, two products that are easy to prepare and apply, and highly beneficial for the skin. Also, the products do not have preservatives, which classifies them in the category of natural products with a limited shelf life.

The results demonstrate that the basil oily macerate, obtained through an accessible and cost-effective extraction process, can be successfully incorporated into products such as ointment and cold creams, providing them with valuable nutritional support and increased functionality. Moreover, basil extract can also be used in the preparation of sweets, which have a distinct taste and special properties.

Keywords: basil, oily macerate, basil extract, sunflower oil

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THE INFLUENCE OF FORMULATION FACTORS THAT NEGATIVELY AFFECT THE CUTANEOUS APPLICATION OF DERMATOCOSMETIC PRODUCTS

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Introduction

The composition of dermocosmetic products is a central determining factor for cutaneous tolerability and therapeutic compliance. Various formulation-related factors: such as the lipid/aqueous phase ratio, the type of emulsifiers, the presence of solvents, preservatives, fragrances and colorants, as well as the pH and the proportion of bioactive components in the formulation - significantly modulate the cutaneous response and the clinical acceptability of the product.

Materials and Methods

This work is theoretical in nature and is based on a narrative synthesis of the literature published over the last seven years (2019–2026), identified through indexed databases (PubMed) and open-access journals (MDPI). Studies addressing the relationship between excipients and the skin barrier were selected, with the main criteria being clinical relevance and the availability of data on TEWL (trans epidermal water loss) and skin hydration level.

Results

Recent data confirm that formulations with a high lipid load and a markedly occlusive profile, particularly those containing oils and esters with comedogenic potential, may favor the onset or exacerbation of acneiform lesions and induce sensory discomfort in patients with seborrheic skin. In contrast, vehicles with low emollient content, often rich in alcohol or volatile solvents, are associated with increased TEWL and decreased hydration, worsening xerosis and the sensation of tight skin, especially in the context of sensitive or atopic skin. The physicochemical stability of the emulsion and the nature of the emulsifiers directly influence tolerability: certain surfactants can disrupt the lipid structure of the stratum corneum and induce irritation, which has driven the development of emulsions containing next-generation emulsifiers. Preservatives, fragrances, and certain colorants remain among the main causes of cosmetic contact dermatitis, and it is therefore recommended to limit their quantitative use and to employ alternative systems with a lower allergenic risk. When the formulation pH deviates from the physiological range, in the presence of high concentrations of acids or retinoids, it can potentiate erythema and desquamation, particularly in the absence of soothing and barrier-repairing ingredients.

Conclusions

Current trends in dermocosmetic formulation focus on vehicles tailored to the skin biotype

and underlying pathology, with a deliberate reduction of the irritant and allergenic load of excipients. There is an increasing interest in the use of emulsifiers and solvents with a reduced impact on the stratum corneum, together with the systematic incorporation of ceramides, fatty acids, and anti-inflammatory or soothing agents, which collectively enhance both clinical efficacy and patient compliance. Through these strategies, dermocosmetic products are consolidating their role as essential adjuvant tools in contemporary dermatologic practice.

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ADVANCED ELECTROSPUN PVA/PULLULAN NANOFIBERS INCORPORATING RESORBABLE BIOACTIVE AGENTS FOR ENHANCED WOUND HEALING

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Abstract

Wound management remains a significant clinical challenge, particularly in the case of burns, chronic wounds, and skin injuries associated with tissue loss. Conventional dressings often provide limited therapeutic functionality, highlighting the need for advanced materials capable of actively promoting healing while preventing infection.

In this context, the present study explores the development of novel electrospun nanofibrous membranes based on Polyvinyl Alcohol (PVA)/Pullulan matrices loaded with resorbable active principles, designed for advanced wound care applications. Electrospinning technology was employed to fabricate micro- and nanofibrous membranes with controlled morphology and high surface area, mimicking the structure of the extracellular matrix. The incorporation of bioactive compounds, including antimicrobial and therapeutic agents, aims to enhance healing through controlled release mechanisms, improved biocompatibility, and modulation of the wound microenvironment. The developed materials were systematically characterized in terms of morphology and physicochemical properties.

The results demonstrate that the inclusion of resorbable active agents significantly influences fiber morphology and functional performance, leading to improved antimicrobial properties and enhanced potential for tissue regeneration. The proposed materials offer promising perspectives for improving patient outcomes, reducing infection risks, and enabling cost-effective and patient-friendly treatment strategies, particularly in the management of burns and chronic wounds.

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EXPLORING THE ANTIOXIDANT POTENTIAL OF FUNGAL EXOPOLYSACCHARIDE-BASED HYDROGELS ENCAPSULATED WITH OLEUROPEIN

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Abstract

Phytocompounds are bioactive secondary metabolites derived from plants that have become essential components of modern cosmetic formulations. Oleuropein, the most abundant phytocompound in unripe olives and olive leaves, is recognized for its antioxidant, anti-inflammatory, and antimicrobial effects. Despite their remarkable bioactivity, phytocompounds have the major disadvantage of being susceptible to oxidation in the presence of light, heat, or oxygen. This disadvantage is often overcome by encapsulation in various polymeric matrices, which improves their stability and even their bioavailability.

In this context, to encapsulate Oleuropein and preserve its free-radical-scavenging capacity after encapsulation, bicomponent hydrogels were developed using a fungal exopolysaccharide and cellulose.

The presence of the exopolysaccharide in the matrices provides a higher swelling capacity and a more uniform pore distribution, which positively influences the encapsulation efficiency and the bioavailability of the bioactive compound. Moreover, its antioxidant properties are not affected by the encapsulation process, leading to the conclusion that the matrices developed in this study may have applicability in the dermato-cosmetic field, due to their ability to increase local skin hydration and protect against oxidative stress.

Keywords: phytocompounds, oleuropein, skin, hydrogels

CYCLODEXTRIN INCLUSION COMPLEXES FOR ENHANCED PHOTOPROTECTION: QUERCETIN AND EMERGING NATURAL ANTIOXIDANTS

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Background

Sunscreens protect skin against ultraviolet radiation (UVR), but UV filters cannot completely block it, as SPF 50+ filters only ~98.3%. Antioxidants act as a second layer of defense, penetrating the *stratum corneum* to scavenge UV-induced reactive oxygen species (ROS) in deeper layers. They enhance in vivo SPF, reduce DNA damage and photoaging, and extend photoprotection into Visible (VIS) and Near-Infrared (NIR) ranges [1,2].

Quercetin (QER) and Natural Compounds

Among natural polyphenols, QER is a promising dermatocosmetic due to its antioxidant, anti-inflammatory, and UVA-absorbing properties. By preventing ROS formation and direct DNA damage, QER alleviates UVB-induced photoaging [3,4], inhibits collagen degradation and tyrosinase activity, and reduces photodegradation of the UVA butyl methoxydibenzoylmethane/UVB octyl methoxycinnamate (BMDBM/OMC) filter combination without affecting performance [1]. Growing concerns regarding synthetic ingredients drive research into natural alternatives like epigallocatechin gallate (EGCG), rutin, apigenin, luteolin, resveratrol, ferulic acid, curcumin, silymarin, carotenoids, oils, propolis, niacinamide, and vitamins C and E. Although not Food and Drug Administration (FDA)/European Union (EU)-approved UV filters, their use is limited by poor solubility, low stability, oxidation, and reduced bioavailability. Advanced delivery systems can overcome these limitations [1,3].

Advanced Delivery through Inclusion Complexes (IC)

Cyclodextrins (CDs) are cyclic oligosaccharides with a hydrophilic exterior and hydrophobic cavity, forming ICs with poorly soluble compounds. Native β-CD and derivatives, especially hydroxypropyl β-CD (HP-β-CD), enhance stability, solubility, safety, and controlled release in pharmaceutical and cosmetic formulations. CDs stabilize UV filters against photodegradation and reduce deep skin penetration. β-CD improves the photostability of oxybenzone, octocrylene, avobenzone, and ethylhexyl methoxycinnamate, while randomly methylated-β-CD (RM-β-CD) optimizes 4-methylbenzylidene camphor (4-MBC) solubilization and photostability. Encapsulation of avobenzone in HP-β-CD retains >70% of the filter on the skin surface. HP-β-CD and sulfobutylether-β-CD (SBE-β-CD) increase oxybenzone solubility up to 1049-fold and reduce percutaneous absorption. Complexation of avobenzone, oxybenzone, and ensulizole with β-CD reduces percutaneous flux 4 to 15-fold, while HP-β-CD improves benzophenone-3 stability while decreasing cellular penetration. Overall, β-CD increases SPF by up to 19.6%, and 5% HP-β-CD-oxybenzone formulations achieve SPF 30 protection [1]. Beyond

chemical filters, complexing QER with CDs enhances its photoprotective properties. Methyl-β-CD (Me-β-CD) increases QER aqueous solubility and photostability without affecting its antioxidant or metal-chelating activity [2]. Analytical and *in vitro* studies show QER forms more stable complexes with HP-β-CD and hydroxyethyl-β-CD (HE-β-CD) than with native β-CD, following the stability order HP-β-CD > HE-β-CD > β-CD. *In vivo*, QER/HP-β-CD IC shows superior protection against UVB damage by reducing epidermal hyperplasia, inhibiting collagen degradation, and promoting collagen synthesis [4].

Perspectives, Sustainability, and Conclusions

Encapsulation enables integrating complex natural matrices, like onion peel extracts (OPE), grape pomace (providing in vitro SPF 10–15), tea, coffee, and olive waste into high-performance, sustainable sun care, valorizing agro-industrial by-products [5,6]. Integrating β-CD, HP-β-CD, and SBE-β-CD into formulations, boosts UV filter photostability and SPF, minimizes systemic risks, and addresses solubility and instability issues of QER and other polyphenols. Ultimately, CD-based ICs provide a versatile, sustainable strategy for developing safer, high-performance, and ecologically responsible sunscreens.

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THE USE OF VITAMINS TO ENHANCE THE ANTIBIOTIC DELIVERY IN WOUND DRESSING APPLICATIONS

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Abstract

The incorporation of vitamins into hydrogels for wound dressing applications emerged as a promising strategy to enhance antibiotic delivery, combat antimicrobial resistance, and accelerate tissue regeneration. Vitamins act not only as nutritional aids but also as synergists, increasing the efficacy of antibiotics and reducing oxidative stress in the wound microenvironment. Various vitamins (such as A, C, and E) play an important role in different stages of wound healing. They are frequently loaded into wound dressings to create a pro-healing environment [1]. Formulations combining multiple vitamins (e.g., P + K + E vitamins) along with antibiotics have demonstrated a strong synergistic effect against resistant bacteria [2]. New dressings incorporating vitamins are engineered to release both the vitamin and the antibiotic in a sustained manner [3], improving bioavailability and providing long-term protection.

In the present work, composite hydrogels were prepared by using poly(vinyl alcohol) (PVA) and two polyurethane (PU) structures. Two sets of physical hydrogels were formulated for various PVA/PU ratios: the first used a lysine-diisocyanate-based PU, and the second used hexamethylene diisocyanate as the NCO component of PU. By applying freezing/thawing cycles to PVA solutions, networks with a stable structure and good mechanical strength are formed. On the other hand, water-soluble polyurethanes generate hydrogels as the temperature increases, but they present poor hydrophilicity and mechanical properties [4]. A synergistic combination of PVA and PUs can generate smart materials with new functionalities [3,4].

The composite PVA/PU hydrogels were characterized from a morphological, structural, and rheological point of view. Also, the swelling behavior and the release of thiamine (vitamin B) and neomycin (antibiotic) in simulated physiological conditions at 37°C were monitored. The synergistic combination of vitamins and antibiotics in wound dressings changes the release profile, provides a faster wound contraction and promotes tissue regeneration, reduces scarring, and improves re-epithelialization, leading to better cosmetic outcomes.

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A SUSTAINABILITY APPROACH TO ORAL CARE: FORMULATION AND CHARACTERIZATION OF A GEMMOTHERAPY- BASED BIOACTIVE TOOTHPASTE WITH REMINERALIZING ACTIVITY

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Abstract

Toothpaste is classified as a cosmetic product under Regulation (EC) No 1223/2009, being primarily intended for oral hygiene and the maintenance of enamel integrity. In a previous study conducted by our research group, a toothpaste formulation developed based on naturally derived and sustainable components, incorporating mineral active ingredients, demonstrated a significant remineralization effect under controlled experimental conditions.

Based on these results, the present work aimed to further develop this formulation by incorporating gemmotherapy extracts obtained from *Metasequoia glyptostroboides* and *Abies alba*. The selection of these extracts was based on their traditional use in gemmotherapy in relation to mineral balance and tissue support, which may be relevant for products designed to maintain enamel integrity.

The enriched toothpaste was prepared by incorporating the extracts into the previously validated mineral matrix. Preliminary physicochemical and rheological assessments, including pH, viscosity, consistency, homogeneity, physical stability, phase separation/syneresis, density, and rheological behavior, confirmed the compatibility of the gemmotherapy extracts with the toothpaste matrix, resulting in a homogeneous and physically stable prototype with suitable consistency for oral care application. The next stage of the study will involve a comparative evaluation of the remineralization potential of the enriched formulation versus the original mineral-based toothpaste.

This work proposes a natural-origin enrichment strategy for a previously validated oral care cosmetic formulation and provides a basis for further investigation of gemmotherapy extracts in enamel-supporting toothpaste systems.

Keywords: sustenable toothpaste, bioactive formulation, gemmotherapy extracts, enamel integrity, remineralization potential, oral care.

NATURAL EXTRACTS AS ACTIVE INGREDIENTS IN MODERN COSMETICS: FROM TRADITIONAL SOLVENTS TO NATURAL EUTECTIC SYSTEMS

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Abstract

Plant extracts are assuming an increasingly important role in the development of modern cosmetic formulations, due to their content of secondary metabolites with antioxidant, anti-inflammatory and skin-protective properties. From the perspective of their use as active ingredients, the effectiveness of an extract cannot be attributed solely to the plant material, but must be considered in relation to the extraction method, the solvent system employed and the compatibility of the resulting extract with the final cosmetic matrix. In current practice, hydroalcoholic, glycolic and oil-based extracts remain widely used, each system presenting specific advantages and limitations in terms of selectivity, extraction yield and stability of bioactive compounds. In this context, Natural Deep Eutectic Solvents (NADES) represent a direction of growing interest, owing to their tunable polarity, low toxicity and capacity to solubilize phenolic acids, flavonoids and other phytochemicals relevant for dermocosmetic applications.

The present work aims to highlight the importance of solvent selection in obtaining plant extracts with functional cosmetic value. Particular attention is given to the transition from conventional extraction systems to NADES-based extracts and to the way this choice influences phytochemical composition, biological potential and formulation behaviour.

Overall, the study supports the need for an integrated approach, in which extraction strategy, formulation design and cosmetic safety requirements are considered as interdependent steps in the development of natural active ingredients.

Keywords: Natural extracts, NADES, Plant-derived actives, Dermocosmetics, Phytochemical profile, Extraction methods, Formulation compatibility

CURCUMIN IN COSMETICS - IMPROVEMENT OF PHYSICOCHEMICAL AND BIOPHARMACEUTICAL CHARACTERISTICS

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Abstract

Curcuma longa is a well-known plant species not only in Asia but also worldwide, due to its therapeutic and medicinal benefits. Curcumin (C21H20O6) (CMN) is the main phenolic pigment extracted from turmeric, the powdered rhizome of plants belonging to the Curcuma genus. It is a hydrophobic molecule, insoluble in water (solubility 30 nM) and poorly soluble in hydrocarbon solvents [1]. Although CMN exhibits high therapeutic potential, its applications are limited by its physicochemical characteristics, which classify it as a BCS class IV compound [2]. Curcuma longa extract has traditionally been used in skincare formulations as a beautifying and anti-aging agent. Recent studies suggest that CMN protects skin cells against solar UV radiation and sunburn through antioxidant and anti-inflammatory mechanisms [3].

In order to increase the therapeutic potential, efficiency, and to modulate the pharmacological activity of CMN, various techniques have been employed, such as the development of nanoformulations, co-crystals, or complexes through encapsulation in cyclodextrins (CDs), all of which contribute to enhancing the bioavailability, solubility, and permeability of the phytocompound [1,2,4,5].

CDs are widely used as efficient delivery systems for naturally derived bioactive compounds with applications in medicine, the food industry, and cosmetics. CDs are cyclic compounds obtained through the enzymatic degradation of starch, with the most common natural types being α, β, and γ, composed of 6, 7, and 8 glucopyranose units, respectively. Their toroidal ring-shaped structure, similar to a truncated cone and characterized by a hydrophilic exterior due to hydroxyl groups and a relatively apolar inner cavity, enables them to encapsulate hydrophobic compounds, thereby increasing their solubility. CDs also contribute to protecting encapsulated substances against degradation, improving their stability. Recent studies highlight the expansion of their applications due to their versatility and efficiency [4,5].

Encapsulation of CMN within the β-CD cavity led to the formation of inclusion complexes (ICs), which aggregated through hydrogen bonding and generated stable nanoparticles with dimensions of approximately 200 nm. This newly formed structure resulted in crystalline phases

different from those of free CMN and significantly improved the physicochemical stability of the compound. Furthermore, encapsulation increased the bioavailability of CMN by facilitating its absorption and enhancing its efficiency in pharmaceutical, cosmetic, and nutritional applications [4].

CMN is one of the molecules for which encapsulation and controlled-release strategies using CD-based polymers have been investigated. It has been incorporated into epichlorohydrin-β-CD polymers to obtain CMN-containing hydrogels, resulting in formulations that significantly improve its water solubility while simultaneously reducing particle size, which may favor skin permeability [5].

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BIO-INSPIRED HYBRID SERICITE PLATFORMS FUNCTIONALIZED WITH AMINO ACIDS FOR POLYPHENOL DELIVERY IN SUSTAINABLE COSMETIC APPLICATIONS

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Abstract

Clay minerals have attracted increasing interest in cosmetic and dermato-cosmetic formulations due to their biocompatibility, high surface area, adsorption capacity, and favorable rheological properties, making them promising platforms for the incorporation and delivery of bioactive compounds in topical systems. In particular, layered aluminosilicates offer versatile surface chemistry that can be tailored through organosilane fictionalizations to improve their interaction with organic molecules and enhance loading performance. Although polyphenols derived from natural extracts are extensively explored as active ingredients in sustainable cosmetic formulations—owing to their antioxidant, anti-inflammatory, and anti-aging properties—their limited stability and bioavailability necessitate the development of robust delivery systems capable of ensuring protection and controlled release.

In the present study, a bio-inspired surface engineering strategy was employed by grafting natural amino acids (glycine, □-alanine, and arginine) onto a sericite mineral support previously functionalized with 3-aminopropyltriethoxysilane (APTES). This approach aimed to generate hybrid interfaces with enhanced affinity for polyphenols extracted from red clover (*Trifolium pratense*). Structural analyses confirmed the success of the functionalization process, while the Folin-Ciocalteu method highlighted the significant influence of the amino acids nature on the polyphenol loading capacity. Morpho-structural characterization was performed using Fourier-transform infrared spectroscopy (FTIR) and UV-Vis spectroscopy to confirm the deposition of active compounds, scanning electron microscopy (SEM) to investigate surface morphology, and thermogravimetric analysis (TGA) to monitor thermal stability and structural modifications.

The results underscored the crucial role of extraction conditions (alcoholic vs. hydroalcoholic) in modulating the interaction and stability of red clover compounds on the amino acid-modified sericite. The resulting hybrid materials demonstrate substantial potential for integration into "green" cosmetic formulations. These systems provide enhanced protection of polyphenols against oxidative degradation and facilitate controlled release upon the skin, effectively combining the remineralizing benefits of sericite with the potent antioxidant properties of red clover extract.

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Keywords: sericite, hybrid materials, amino acids, red clover polyphenols, sustainable cosmetics

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SUSTAINABLE POLYMER DESIGN IN MODERN COSMETICS

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Abstract

Modern cosmetic science is being redefined by a transition toward green processing and structural sustainability.

This study explores advanced polymer science by incorporating potent active ingredients—Royal Jelly, Vitamin C, and Allantoin—into biocompatible delivery systems. Royal Jelly represents a nourishing milky secretion rich in 10-HDA fatty acid, the MRJP (1-9) protein family, polyphenols, and vitamins, which collectively combat inflammation and promote rejuvenation [1,2]. Topical administration of Vitamin C significantly enhances the cutaneous healing process and reduces the incidence of hypertrophic scars [3]. Allantoin, sourced from comfrey root or maple, complements these effects through its proven moisturizing, soothing, and cicatrizing properties [4]. To ensure targeted delivery, we utilized the properties of Chitosan, Alginate, and Hyaluronic Acid to create enhanced biomaterials, thin-films for localized wound care and gel-cream systems for topical application. These systems were characterized by using various techniques: dynamic light scattering and optical microscopy to determine particle size and morphology; contact angle measurements to assess surface wettability; FT-IR and UV-Vis for identifying chemical bonds and molecular properties; and rheology in order to investigate the viscoelastic properties of the materials.

Preliminary results indicate that these polymeric matrices maintain the stability of the active ingredients. This research develops sustainable systems that enhance the delivery of active compounds, providing a high-efficacy, green approach to skin regeneration and therapeutic care.

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NANOSTRUCTURED HYBRID SYSTEM BASED ON HYDROXYAPATITE AND POLYMERS FOR COSMETIC APPLICATIONS

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Abstract

In recent years, the dermato-cosmetic industry has evolved from simple moisturizing formulations to complex skincare systems capable of functionally interacting with the skin's surface. In this context, the use of biomimetic materials that mimic the natural composition of tissues has become an area of interest. Although hydroxyapatite is a mineral compound used predominantly in the biomedical field, particularly in bone regeneration and dentistry due to its remarkable biocompatibility, research indicates potential for applications in the cosmetics industry as well.

Thus, the present study aims to develop and characterize a hybrid nanocomposite hydrogel intended for cosmetic applications, based on hydroxyapatite, Carbopol, and active ingredients. Hydroxyapatite was incorporated to impart biomimetic properties and structural stability to the hydrogel, while also acting as an agent for microtextural and optical correction of the skin surface. The polymer network ensures superior bioadhesion and the availability of active ingredients, which complement the formula with their soothing and moisturizing effects. To evaluate the interactions between the components and the stability of the hybrid system, the samples were analyzed using physicochemical and structural methods. FT-IR spectroscopy was used to confirm the incorporation of the components into the polymer matrix. Surface morphology and pore distribution were investigated using scanning electron microscopy (SEM). Additionally, the material's stability and behavior under temperature variations were evaluated through thermal degradation studies.

The results demonstrate the successful preparation of a homogeneous hydrogel with potential for improving the appearance of skin tissue.

Keywords: calcium phosphates, hydroxyapatite, hydrogel, nanocomposite, skin tissue

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FORMULATION AND EVALUATION OF A HYDRATING AND REPAIRING DERMATO-COSMETIC GEL

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Abstract

Since the integrity of the skin barrier is frequently compromised by environmental factors or aggressive dermatological treatments, the objective of this study was to formulate and evaluate a dermato-cosmetic gel capable of providing deep hydration and accelerating epidermal regeneration through a synergistic complex of bioactive substances. The formulated gel is designed for daily skincare, acting as a moisturizing, soothing, and repairing agent with beneficial effects for normal, combination, and oily skin types, due to its hydrophilic base, lightweight texture, and rapid absorption. Furthermore, the formulation can be used as an adjuvant for acne-prone skin, as hydrophilic gels are non-comedogenic and do not promote sebum accumulation. The selected formula demonstrated remarkable physical stability and optimal sensory properties. Data analysis revealed a progressive reduction in transepidermal water loss, correlated with an increased water retention capacity in the upper layers of the epidermis. The presence of lipid precursors favored a rapid restoration of the hydrolipidic film, accelerating the cutaneous regeneration process without inducing undesirable occlusive effects.

This research highlights the importance of the rigorous selection of active principles to achieve an optimal dermo-repairing effect. The developed hydrogel represents a viable alternative in skincare protocols for severely dehydrated and sensitive skin, offering a balance between biochemical performance and cosmetic compliance.

Keywords: skin barrier, dermato-cosmetic hydrogel, epidermal regeneration, lipid precursors

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EXPERIMENTAL DEVELOPMENT OF A BIFUNCTIONAL COSMETIC MATRIX: SYNERGY BETWEEN ACTIVE INGREDIENTS

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Abstract

The present experimental research aims to develop and characterize an anti-aging facial serum formulated with a complex of complementary active ingredients. Serum-type cosmetic products are highly valued for their high concentration of active ingredients, lightweight texture, and rapid absorption, representing an optimal delivery system for bioactive substances into the skin. The formulation process focused on achieving a stable, homogeneous, and safe system for topical application by closely monitoring critical process parameters such as temperature, reaction time, and pH. To validate the quality of the final product, physico-chemical and microbiological analyses were conducted in accordance with the regulatory standards applicable to cosmetic products. These analyses play a decisive role in quality validation, ensuring that the bifunctional matrix is not only effective but also safe for the user. Measurements of the physiological pH and rheological profile confirm the stability of the formula and its ease of application, while accelerated stability tests anticipate the product's behavior over the long term.

The evaluation results demonstrate that the proposed formulation is not merely a transport vehicle for active substances, but an advanced delivery system that respects cutaneous physiology and visibly improves the skin's barrier function. Thus, the developed serum represents an effective and safe topical solution, ready to be integrated into modern anti-aging and restorative skincare protocols, offering an ideal balance between biochemical innovation and the user's sensory experience.

This research has demonstrated the successful design and realization of a bifunctional cosmetic matrix that combines pharmaceutical rigor with current dermo-cosmetic requirements. By utilizing a synergistic complex of active ingredients, a product with optimal physico-chemical stability and high bioperformance was obtained, capable of meeting the specific needs of skin requiring deep hydration and repair.

Keywords: anti-aging facial serum, bifunctional matrix, accelerated stability, bioactive ingredients, physico-chemical and microbiological control

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BIOPOLYMER SYNERGY IN THE FORMULATION OF TOPICAL GELS FOR DERMATO-COSMETIC APPLICATIONS

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Abstract

The structural matrix was developed by combining two texturizing agents with complementary properties: one providing optical clarity and rheological stability, and the other for its ability to form a protective, moisturizing film. Bioactive principles were incorporated into this base, including a keratolytic and healing agent, as well as components providing freshness and a soothing effect on the skin. Stability tests, physiological pH measurements, and spreadability analyses were conducted to determine the ease of application. The resulting formula exhibits a homogeneous texture with optimal viscosity that facilitates uniform application. The presence of active substances enhances the re-epithelialization process and offers a mild anesthetic and anti-pruritic effect without destabilizing the polymer network. Organoleptic analysis confirmed high compliance, with the gel leaving a sensation of comfort post-application without an occlusive film—an essential aspect for user compliance in cases of inflamed or sensitive skin.

The integration of active principles into a hybrid biopolymer base represents an efficient strategy for obtaining a versatile dermo-cosmetic product with superior performance. The resulting matrix represents an innovative alternative in dermo-reparative formulations, being particularly indicated for the management of skin affected by solar erythema or post-procedural mechanical irritations.

Keywords: hydrophilic bifunctional gel, hybrid bio-polymer base, skin barrier regeneration, reepithelization.

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DEVELOPMENT AND COMPARATIVE EVALUATION OF CONTROLLED-RELEASE GEL SYSTEMS FOR DERMATO-COSMETIC APPLICATIONS

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Abstract

Gel-based dermato-cosmetic products are widely used in skincare, particularly for facial application, due to their lightweight texture, rapid absorption, and ability to efficiently deliver active substances. In this context, the aim of this study is the formulation and comparative evaluation of two controlled-release dermato-cosmetic gels based on synthetic polymers containing bioactive ingredients. The first formulation is primarily intended for intense hydration, maintenance of skin elasticity, and antioxidant protection. The second formulation is oriented towards the care of acne-prone skin, playing a role in regulating sebum secretion and addressing skin imperfections. Both systems were obtained using the same polymer as a gelling agent and were designed to allow for the controlled release of the active ingredients. The rheological and functional stability of the systems is supported by the polymer matrix utilized. Spectroscopic evaluation via FTIR analysis highlighted the presence of characteristic functional groups and indicated the compatibility of the components within the gel matrix. The comparative analysis of the two formulations highlights functional differences correlated with their composition, as both systems exhibit suitable properties for topical dermato-cosmetic applications.

In conclusion, the developed systems represent promising alternatives for the formulation of modern cosmetic products with controlled release of bioactive ingredients, tailored to specific dermatological needs.

Keywords: comparative dermato-cosmetic gels, synthetic gelling polymers, component compatibility, FTIR spectroscopy/compatibility study

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STUDY ON THE FORMULATION AND STABILITY OF A DERMO-COSMETIC GEL WITH DESENSITIZING AND REPARATIVE EFFECTS

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Abstract

The modern aesthetic industry demands topical solutions that provide not only care but also effective comfort management during and after invasive cosmetic procedures (tattoos, chemical peels).

This study proposes the development of a multipurpose gel focused on the synergy between instantaneous soothing and the structural regeneration of the skin barrier. The research focused on creating a lightweight, fast-absorbing matrix, integrating several active pillars: The first, utilized in an optimal concentration to reduce local sensitivity and ensure a discomfort-free experience by alleviating stinging or burning sensations. The second, a recognized humectant agent, stimulates cellular proliferation and accelerates the self-repair process of irritated skin, restoring its elasticity and healthy appearance. The third, integrated for its dual role as an intense moisturizer and penetration enhancer, facilitates the absorption of active ingredients and prevents post-procedural dehydration through its hygroscopic effect. The formulation results highlight a high stability profile, with one of the active components playing a critical role in preserving the rheological properties of the gel over the long term. The finished product features a non-greasy, cooling texture that does not interfere with the subsequent application of other skincare products or sun protection. This gel represents an evolution in dermo-cosmetic care, offering a comprehensive solution for users seeking rapid and aesthetic recovery after aggressive treatments. The strategic combination of desensitizing and regenerative agents defines a new standard of efficacy in soothing reactive and stressed skin.

Keywords: invasive cosmetic procedures, multipurpose post-procedural gel, structural skin regeneration, penetration enhancer, reactive and stressed skin

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MAGNETIC PARTICLES-MANUFACTURING TECHNOLOGIES AND APPLICATIONS IN COSMETIC PRODUCTS

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Abstract

In recent decades, the cosmetics industry has experienced accelerated development thanks to advances in nanotechnology and smart materials. Among the most exciting innovations is the use of magnetic particles in cosmetics. These particles offer special properties to care and makeup products, contributing to the effectiveness of active ingredients, improving texture and the emergence of new application methods. Magnetic particles are materials that respond to the action of an external magnetic field. In cosmetics, they are used both for aesthetic effects and for the controlled transport of active substances to the skin or hair. The development of these technologies has led to the emergence of magnetic masks, advanced cleansing products and intelligent active ingredient release systems. Magnetic particles used in the cosmetics industry can be micro or nanometric in size and are made of various ferromagnetic or superparamagnetic materials. The types of magnetic particles used in cosmetics are magnetic iron oxide, superparamagnetic nanoparticles, magnetic composite particles and magnetic microcapsules. Manufacturing magnetic particles requires strict control over size, shape, and magnetic properties. The methods used to manufacture magnetic particles include the coprecipitation method, the hydrothermal method, the microemulsion method and surface functionalization. One of the applications of magnetic particles in cosmetics involves their use in the formulation of magnetic facial masks containing iron oxide particles and nutritional ingredients. The removal of the mask is done with the help of a special magnet and has the following benefits: deep cleansing, stimulating blood circulation; gentle exfoliation and intense hydration. Magnetic particles are also used in anti-aging creams and serums because they stimulate microcirculation, promote the penetration of active ingredients and contribute to skin regeneration. In the field of hair care, magnetic particles are used in products to transport nutrients to the scalp, deep cleanse and fix active ingredients on the hair. Magnetic particles are used in decorative products because they can create special effects in: magnetic nail polishes, eyeshadows and eyeliners. An example of a special effect is represented by "cat eye" nail polishes, where magnetic particles create luminous patterns and special reflections.

In conclusion, magnetic particles represent an important innovation in the modern cosmetic industry and due to their special properties, they allow the development of more effective, more attractive and more performing products.

Keywords: magnetic particles, manufacturing, applications, innovation.

MULTIFUNCTIONAL INGREDIENTS IN COLOR COSMETICS

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Abstract

Multifunctional ingredients represent a key concept in decorative cosmetics, enabling the simultaneous achievement of aesthetic performance, formulation stability, and skin-related benefits. Their integration reflects the contemporary evolution of colour cosmetics hybrid systems that combine visual enhancement with functional efficacy.

The present paper highlights several multifunctional ingredients used in cosmetic formulations. These ingredients may combine multiple auxiliary functions, including the improvement of texture, stability, dispersion, spreadability, and sensory performance, as observed in ingredients such as lauroyl lysine, lignin-based biopolymers, cyclopentasiloxane, and dimethicone.

However, certain multifunctional ingredients may also exert cosmetic active effects, directly enhancing skin hydration, skin appearance, protective capacity, or overall skin condition, as illustrated by pentylene glycol, caprylyl glycol, pyrrolidone carboxylic acid, lauromacrogol 400, and betaine.

Keywords: decorative cosmetics, multifunctional ingredients, skin

ADVANTAGES OF ENCAPSULATING VEGETABLE PIGMENTS THROUGH THE SPRAY-DRYING TECHNIQUE IN COSMETIC FORMULATIONS

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Introduction

Pigments extracted from plants, such as chlorophylls, carotenoids or flavonoids, are increasingly appreciated for their benefits on the health and appearance of the skin, but they have a vulnerable point: instability to light, heat and oxygen.

Beyond the aesthetic aspect, these compounds quickly lose their bioactive properties, if not properly protected. Spray-drying technology thus appears as a reference solution, managing to transform sensitive liquid extracts into stable and easy-to-handle powders, compared to other techniques.

Materials and Methods

This analysis is based on a systematic review, which filtered data from the specialized literature, from the years 2020-2025, using the Scopus and Google Scholar databases.

The analysis included 93 relevant articles, most of which are recent research, focusing on the interaction between the plant source, the choice of wall materials required for the encapsulation process and the technical drying parameters. The keywords used were: natural pigments, spray-drying, wall material, instability, encapsulation.

Results

Research has shown that the success of pigment encapsulation depends on the equipment used, the optimal conditions of the drying process and especially on the hydrophilic or hydrophobic properties of the bioactive compounds. The industrial standard, used for superior pigment retention performances, are represented by maltodextrin and gum arabic, which are obtained through hybrid systems that combine polysaccharides with proteins.

A critical aspect analyzed is temperature management: although a hotter air flow makes the process more efficient, it can become destructive for thermosensitive pigments, which requires fine tuning, in order not to compromise bioactivity.

Conclusions

The spray-drying technique remains an essential pillar for the integration of natural colors into everyday cosmetics, providing stable formulations that ensure vibrant and long-lasting colors. The future of research is directed towards the use of unconventional biopolymers and the optimization of process algorithms, with the aim of obtaining pigments with extended stability and a much more precise release from cosmetics used on the skin.

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THE ENVIRONMENTAL IMPACT OF WASTE FROM THE COSMETICS INDUSTRY

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Abstract

The cosmetics market is characterized by a diverse range of products, including skincare, haircare, toiletries, fragrances, and decorative cosmetics. Among these, the skincare segment holds the largest share of the European market (28-43%), reflecting consumers' growing concern with maintaining skin health and appearance.

Consumers under the age of 40, as well as those over 40, show an increased interest in gathering information about cosmetics and personal care products. According to data published by Euromonitor International, care products are primarily perceived as essential goods purchased on a consistent basis, while a significant portion of decorative cosmetics is associated with premium or luxury items, bought more occasionally. Regarding consumer interest as reflected by online searches, foundation ranks first in the decorative cosmetics category, followed by mascara and eyeliner. Products such as lipstick and eye shadow record lower search shares. In the personal care category, shampoo generates the highest consumer interest, followed by hair dye, face cream, and shower gel.

We conducted a one-month study on the consumption of cosmetic products, as well as consumer awareness, image, and loyalty toward major personal care and cosmetic brands. The majority of the youth (50 girls and boys) who participated in this study are between 15 and 20 years old and are students at the "Petru Poni" Technological School.

From the study conducted on the consumption of cosmetic products, it is shown that girls consume the highest proportions of the following: deodorant (40%), shampoo (31.5%), shower gel (30%), day cream (20%), body lotion (11.5%), and hair dye (3.9%). Toothpaste is used by both boys and girls at a rate of 80%. Waste originating from cosmetic product packaging is not biodegradable, occupies a large amount of space, and pollutes soil and water. If not recycled, this packaging waste can become source for the spread of diseases.

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FUNCTIONALIZED AZOPOLYMERS FOR INNOVATIVE DERMATOLOGICAL AND COSMETIC APPLICATIONS

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Abstract

The present work explores the properties of light-sensitive azopolysiloxane systems containing nucleobase moieties introduced through adenine and thymine functionalization. The polymeric materials were designed by incorporating azobenzene chromophores into flexible polysiloxane chains, enabling light-induced molecular rearrangements and surface pattern formation under controlled irradiation conditions. Particular attention was directed toward the influence of nucleobase type on polymer mobility, surface-relief development, and structural stability.

The obtained results indicate that adenine-containing films promote higher light-induced mobility and more efficient mass transport, while thymine-functionalized materials exhibit enhanced structural stability due to stronger intermolecular hydrogen-bonding interactions.

Due to the flexibility of polysiloxane chains, the light-induced behavior of azobenzene groups, and the possibility of controlling surface nanostructuring, these materials may represent promising candidates for functional surfaces with possible dermato-cosmetic relevance. Their tunable morphology and structural stability could provide perspectives for the development of surface-engineered materials with adaptable optical and functional properties.

Keywords: azopolysiloxane systems, polymeric materials, dermatological and cosmetic applications

THE STUDY OF AN ECOLOGICAL EXTRACTION PROCESS DESIGN FOR POLYPHENOL FROM *MELISSA OFFICINALIS* USING NADES

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Abstract

Melissa officinalis, commonly known as lemon balm, is a perennial aromatic plant valued for its pleasant lemon-like aroma as well as its therapeutic properties, particularly its calming and antioxidant effects. In the context of the growing interest in sustainable and environmentally friendly extraction methods, this study investigates the use of Natural Deep Eutectic Solvents (NADES) for the extraction of polyphenolic compounds from this species.

NADES represent a promising alternative to conventional organic solvents due to their biodegradability, low toxicity, and high efficiency in solubilizing bioactive compounds. In this research, various extraction parameters-such as solvent composition, solid-to-liquid ratio, extraction time, and temperature-were evaluated in order to optimize polyphenol yield.

The results indicate that the use of NADES leads to an efficient extraction of phenolic compounds, comparable to or even superior to classical methods, while simultaneously reducing environmental impact. The obtained extracts exhibit a high antioxidant content, confirming the potential of lemon balm as a valuable source of bioactive compounds for applications in the pharmaceutical, food, and cosmetic industries.

This study supports the implementation of NADES as an innovative and sustainable solution for phytochemical extraction processes, opening new perspectives for the valorization of plant-based resources.

Keywords: Natural extracts, NADES, Plant-derived actives, Dermatocosmetics, Phytochemical profile, Extraction methods

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