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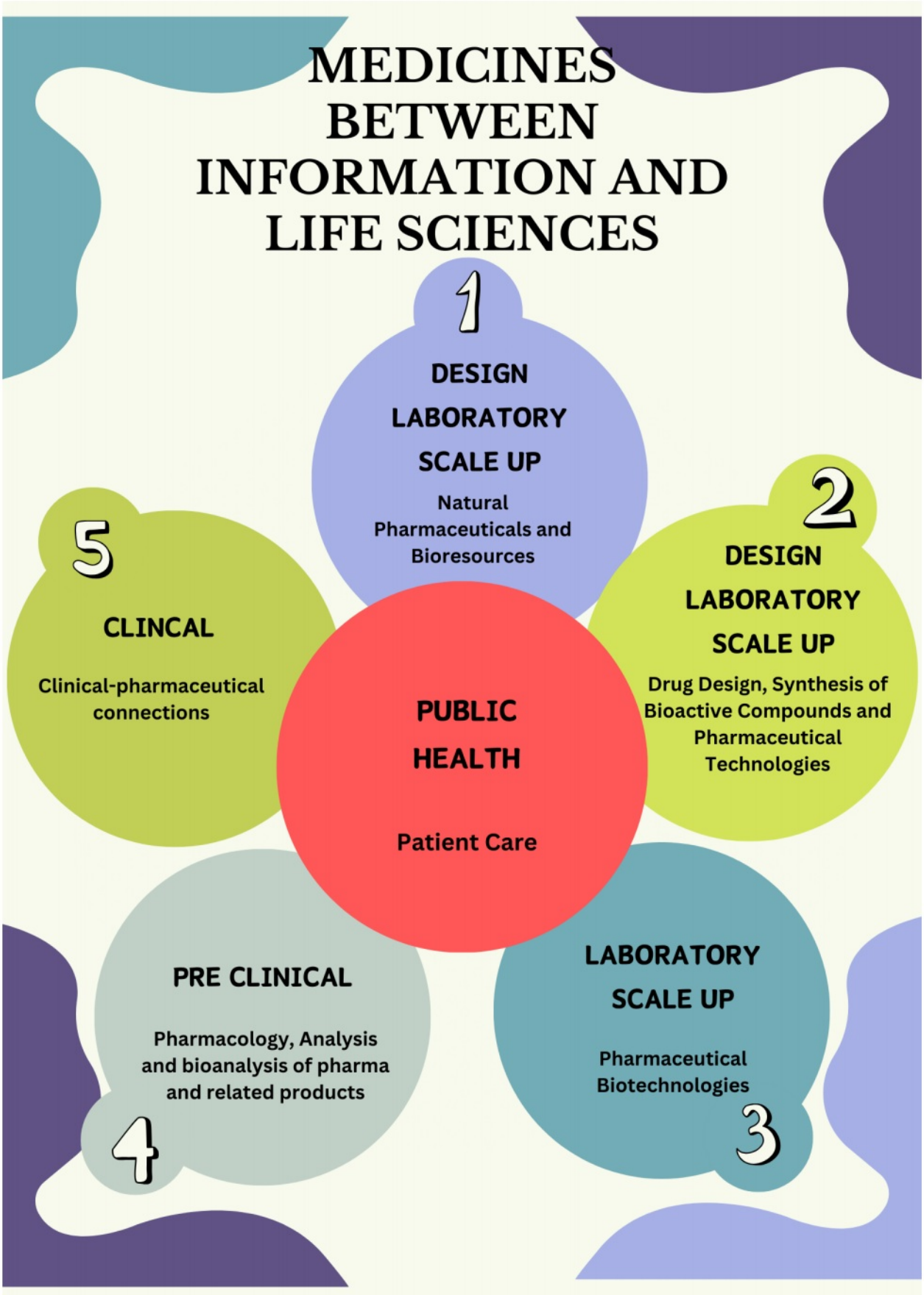

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Phytotherapy as a bridge between life and information sciences

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KEYWORDS: phytotherapy; medicinal plants; bioinformatics; pharmacognosy; evidence-based medicine; artificial intelligence.

ABSTRACT

Phytotherapy, the medical application of plant-derived compounds, represents a key field at the intersection of life sciences and information sciences. In life sciences, it relies on pharmacognosy, phytochemistry, and clinical research to explore bioactive molecules and their therapeutic mechanisms [1,2]. Advances in information sciences, particularly in bioinformatics and cheminformatics, enable systematic classification of medicinal plants, prediction of pharmacological effects, and identification of interactions [4,6,8]. Artificial intelligence further contributes to evidence-based validation by integrating data from ethnopharmacology, preclinical studies, and clinical trials [3,7]. Genomic and multi-omics approaches also provide valuable insights into medicinal plant resources and their molecular complexity [6]. Furthermore, the integration of phytotherapy with biodiversity science highlights its relevance for sustainable healthcare and drug discovery [8]. This convergence strengthens the scientific foundation of phytotherapy, ensuring reproducibility and expanding its applicability in modern medicine.

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On the Modelling of Blood Dialysis by Analogy with a Heat Transfer Case

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KEYWORDS: Dialysis; Hemodialysis; Transfer analogies; Coil heating model; Mathematical modeling; Peritoneal hemodialysis simulation.

ABSTRACT

The analogy between heat and mass transfer allows for converting heat transfer experiment results to analogous ones for mass transfer processes. This arises from the similarity of the equations governing the mass and heat transport processes. The analogy between the cooling of a warm liquid flowing through a coil in a perfectly mixed cold liquid [1] and the membrane blood dialysis with a perfectly mixed dialysis medium is used in this paper [2]. Specifically here, the mathematical model of heating through the coils of a perfectly mixed liquid is particularized to the case of blood dialysis in a hollow fiber membrane with perfectly mixed dialysate. First simulation cases consider the transfer of species (urea and creatinine, respectively) from blood to a fixed dialysate volume through a tubular hollow fiber membrane with a fixed mass transfer area. This hemodialysis case corresponds, for the most part, to peritoneal hemodialysis [3]. It shows what are the factors and parameters that must be considered in this case and brings simulation cases related to cyclic peritoneal hemodialysis [4]. Our model is new relative to ones overviews of computational models on peritoneal dialysis (PD). All general and individual aspects of the PD models aim to simplify, enhance, and accelerate the integration of modeling into clinical practice to promote a better understanding of device-patient interaction. Our paper's temptation can be considered in the sense of developing a new mathematical model of PD, near other existing models in this problem, where the focus on the problem essence is as strong as possible. The paper contains in the introduction references to the history of hemodialysis, and the final part gives references in relation to the chemical engineering problems of devices that are thought to be the artificial kidney.

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Chalcone Derivatives and Strawberry Fruit' Extracts are Effective in Human Bowels' Protection

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KEYWORDS: phloridzin; phloretin; 4-methylchalcone; strawberry extracts; Caco-2 line.

ABSTRACT: Chalcone derivatives are among the most active compounds of the flavonoid subclasses. Yet, the screening studies to quantify the effects of chalcone derivatives within a plant extract are scarce; one possible approach is to design experiments using controlled amounts of chalcone derivatives added to a specific plant extract. This strategy helps to better elucidate and quantify their potential cytoprotective or cytotoxic effects. Furthermore, chalcone derivatives are less stable and are typically present in very small quantities in green plants; hence, they are likely to be lost during the technological processes. Accordingly, adding pure chalcones to a final vegetal extract (plant-derived product), could lead to a more stable combination than the initial product. Besides, vegetal extracts contain many other small understudied active molecules. For example, the gas-chromatographic (GC-MS) analysis of the 40% ethanolic extract from strawberry fruits in the present study has revealed three main small volatilizable compounds of real pharmacological interest: 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one, 2-pyrrolidinone5-(cyclohexylmethyl), and hexadecanoic acid, respectively. Based on these data, the present work aims, first of all, *in silico* pharmacokinetic and medicinal chemistry data referring to the ability of three main chalcone derivatives (phloridzin, phloretin, 4-methylchalcone metabolic series) and other three top compounds found in the ethanolic extract from strawberry fruits (i.e., 2,3-dihydro-3,5-dihydroxy-6-methyl-4H-pyran-4-one, 2-pyrrolidinone 5-(cyclohexylmethyl), and hexadecanoic acid) to interfere with the activity of P-glycoprotein (P-gp) transporter and five main cytochrome P450 (CYP) enzymes in humans; chalcone derivatives also were studied for their inhibitory potential upon Bcl-2, TNKS1, and COX-2 molecular tumor targets. Secondly, the present work aims to study the cytoprotective and anti-proliferative activity of the strawberry fruit' ethanolic extract (S) alone and in combination with the three chalcone derivatives (pure compounds also solved in 40% ethanol), in the range 1 to 50 µg active compounds *per* 1 mL test sample. This way, *in silico* results have revealed possible limitations in the practical use of chalcone derivatives, due to their potential to interfere with the activity of CYP enzymes in humans. At the other side, *in vitro* results concluded that phloridzin (Phd) alone as well as phloridzin combined with S are ineffective on intestinal cells. Differently, phloretin (Phl) aglycone alone or in combination with strawberry extract (S) indicated real advantages by effectively protecting intestinal cells in humans; 4-methylchalcone (4-MeCh) metabolite combined with S indicated no advantages, while the pure compound 4-MeCh exhibited augmented inhibitory effects, becoming a great candidate for new combinations with anticancer drugs. Altogether, current studies [1,2] recommend the use of phloretin as a nutraceutical ingredient in preventing the occurrence of intestinal inflammation and culmination of disease into colitis-associated colorectal cancer.

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Developing quince wine production process, assessing wine characteristics and beneficial properties

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KEYWORDS: quince wine; beneficial properties; wine composition; production process.

ABSTRACT

In recent years, the global demand for fruit-based alcoholic beverages has grown steadily, driven by consumers' interest in novel sensory experiences, phytocompounds, and wine market development [1]. Among these products, quince (*Cydonia oblonga*) wine remains one of the least investigated, with limited research addressing its production process. The present study focused on the quince wine production technology encompassing its design, analytical characterization, microbiological control, and sensory evaluation to establish a well-defined framework for possible industrial quince wine manufacturing.

Two quince varieties were used: a commercial cultivar from Turkey and a bio-certified Romanian cultivar, processed both as fresh and frozen fruit. The fermentation process was carried out using quince juice and sucrose and subsequent inoculation with *Saccharomyces cerevisiae* var. *bayanus* and fermented for ten days and six months for primary and secondary fermentation, respectively. Throughout the process, CO_2 release was monitored as an indirect indicator of sugar consumption and ethanol production.

Comprehensive analyses of the final wines included alcohol concentration, titratable acidity, residual sugar, total soluble solids, sulfite content, total polyphenols, flavonoids, antioxidant activity as well as wine chemical profile through HPLC-PDA. Microbiological assays confirmed the absence of yeast and mold proliferation in the final products. Sensory evaluation involved structured tasting sessions supported by a consumer opinion survey, which provided quantitative data on flavor, aroma, color, as well as overall acceptability.

Also, to discriminate between wine several characteristics principal component analysis was applied, and the wines with the best features were identified.

Results demonstrated that quince wines produced via proposed process reached alcohol contents, displayed balanced acidity, and different residual sugar. Sulfite concentrations were below legal thresholds, and bioactive compound levels were noteworthy, suggesting a good antioxidant potential. The consumer survey results indicated a positive consumers' perception.

In conclusion, quince wine production confirms a consistent manufacturing process ensuring physicochemical quality, microbiological safety, and consumers' taste adaptability. The developed technological protocol, coupled with comprehensive analytical validation, offers a viable model for the commercial exploitation of quince wine as a niche, a high-value product in the fruit wine sector.

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Alkaline mineral reserve or the key to blood pH stability

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KEYWORDS: alkaline minerals; blood pH; acid-base balance; diet; mineral supplementation.

ABSTRACT

Theoretically speaking, the human body requires daily nourishment consisting of 75% alkaline-potential foods and 25% acid-potential foods. In this equation, alkaline minerals must also be considered, as they represent a rapid-response force to adjust potential deviations of blood pH. Currently, the ratio is practically reversed, with 75% acid-potential foods and only 25% alkaline-potential foods.

The intake of alkaline minerals is vital because the ingested acids (from meat and dairy products) must be neutralized with the help of alkaline minerals (Ca, Mg, K, Na, etc.). The alkaline mineral reserve represents an operative alternative for maintaining the blood pH at a constant optimal value. Preventing alkaline mineral deficiency protects us from critical situations. For example, when the alkaline reserve is depleted, the human body is forced to use its own Ca and Mg stores from bones, scalp, nails, hair, and blood vessels — with all the consequences that arise from this situation.

Residual buildup increases continuously, starting from childhood; by the age of 14, adipose tissue is already saturated with waste products.

In conclusion, residual accumulation occurs through the evolution of three concomitant events: neutralization of acids, depletion of alkaline minerals, and formation of residues.

A number of conditions are known to result from an excess of acid-potential foods (meat and milk): *(1)* Osteoporosis and rheumatism, *(2)* Varicose veins and rheumatism, *(3)* Baldness and stroke, *(4)* Baldness and myocardial infarction, *(5)* Varicose veins and systemic atherosclerosis, *(6)* Osteoporosis and systemic atherosclerosis. The alkaline mineral reserve can be built through mineral intake, for ages 15–45 in women (fertile period) and 10–90 in men, using: APIOSTEOMARIN, ASCO-OSTEOMARIN ELIDOR, and MINERALVEG.

For women who have passed the physiological fertile period and entered menopause, we recommend: MENOMARIN D (depression), MENOMARIN B (hot flashes), MENOMARIN N (neurosis), and MENOMARIN FORTE.

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Hippophae rhamnoides L. [Elaeagnaceae] extracts as potential sources for natural pharmaceuticals

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KEYWORDS: sea buckthorn; fatty acids; phytocarriers; skin regeneration; anti-inflammatory.

ABSTRACT

Sea buckthorn is a medicinal plant, valued for its therapeutic properties. Its fruits and seeds are rich in bioactive compounds, both hydrophilic and lipophilic, with strong antioxidant, anti-inflammatory, and regenerative potential. Our expertise falls into three complementary research directions: (1) purification of fatty acid fractions from seed oil and their testing for skin cells regenerative effects; (2) evaluation of whole seed oil on normal and dysplastic keratinocytes, under basal conditions and UVA exposure, to determine its proliferative and antioxidant impact; and (3) encapsulation of the ethanolic fruit extract into nanostructured phytocarriers and analysis of its anti-inflammatory effects on cellular models. Our experimental findings showed that fatty acid–enriched fractions, particularly those containing palmitic and α-linolenic acids, have proliferative and regenerative effects on normal skin cells [1]. Whole seed oil exhibited a pro-proliferative effect on both normal and dysplastic keratinocytes, while concurrently reducing cell migration; under UVA exposure, it further enhanced the expression of the fatty acid transporter CD36, a marker associated with tumorigenic behaviour [2]. Extract-loaded phytocarriers were highly biocompatible and significantly reduced IL-8 and IL-6 secretion [3]. Overall, sea buckthorn emerges as a valuable source of bioactive compounds acting synergistically to support skin regeneration and modulate inflammation.

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Extraction and characterization of ulvan for the stabilisation of Au nanoparticles

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KEYWORDS: ulvan; polysaccharide; gold nanoparticles.

ABSTRACT

Gold nanoparticles (Au NPs) have various uses in biomedical applications, including drug delivery, biosensing or bioimaging [1]. This study presents the synthesis of Au NPs using natural compounds as an alternative to conventional methods for the obtaining of colloidal Au. Therefore, ulvan was extracted and characterised and further used as stabilizing agent for the successful synthesis of Au NPs. Ulvan is a water-soluble polysaccharide and its structure consists of uronic acids, such as glucuronic and iduronic acid, and other sugar moieties like rhamnose, xylose and glucose [2]. Ulvan is obtained from the cell walls of green algae from the genus *Ulva*. The seaweed *Ulva lactuca* is highly abundant in the Black Sea, therefore it is a valuable and sustainable resource for the obtaining of this polysaccharide. Previous reports show that ulvan has also a potential use in biomedical application due to its biological effects, like anti-inflammatory, antioxidant or anti-viral activities [3].

Ulva Lactuca seaweed was extracted with water at high temperature and autogenous pressure to obtain ulvan. The physico-chemical characterisation of the extract was performed using various techniques, such as FT-IR spectroscopy, wide-angle XRD, DSC and TGA, SEM-EDX. Composition of the polysaccharide extract was evaluated in terms of total carbohydrate content, protein content and uronic acids content. The amount of sulphate groups in the polysaccharide extract was assessed using barium chloride-gelatin method. After complete characterisation, the ulvan extracted from *Ulva lactuca* was used to obtain Au NPs. This green synthesis method yielded Au NPs that were characterised by UV-Vis spectroscopy, DLS, and SEM.

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Allantoin-based films modulated by stearic acid as plasticizer

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KEYWORDS: allantoin; thin films; characterization.

ABSTRACT

Allantoin (Alla) represents an active ingredient extracted from multiple sources such as comfrey root, maple, or black salsify, and is well-known for its effectiveness in treating several medical conditions like burns, dermatitis, wounds, or keloids. It has moisturizing, soothing, and wound-healing properties, hydrates the skin surface, promotes cell regeneration, and can help reduce irritation and edema. Stearic acid (SA) is an alcohol-soluble saturated white fatty acid, characterized by emollient, emulsifying, and lubricating properties. Stearic acid-based films demonstrate higher hydrophobicity and effective moisture barrier properties than other types of materials [1]. Existing research indicates that the hydrophobic modification of films with fatty acids is highly desired and intensively studied [2]. However, little is known about the structures and properties of modified films with SA as a plasticizer. In this study we explored the possibility of embedding Alla in thin hydrolyzed collagen-sodium alginate (HCol-NaAlg) films modified with varying SA contents, obtained through a casting method. We examined the surfaces of the samples using contact angle measurements, supplemented by DLS measurements on neat samples and FT-IR spectroscopy to explore spectral shifts in the substrates. The preliminary results are promising and are considered a solid groundwork for future investigations.

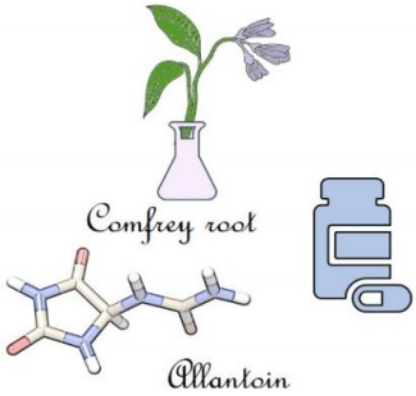

Figure 1. Allantoin. Natural source and applications.

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Evaluation of polyphenolic content, antioxidant activity, and phytochemical profile of *Origanum vulgare* extracts and volatile oil

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KEYWORDS: polyphenols; *Origanum vulgare*; antioxidant; chromatographic fingerprint.

ABSTRACT

Medicinal plants are valuable natural renewable resources. The optimal utilization of these resources is crucial for developing innovative products such as food supplements and cosmetics, which can positively impact the population's living standards. This paper presents the polyphenolic content through both qualitative analysis (HPTLC—High-Performance Thin Layer Chromatography) and quantitative assessment (Folin–Ciocalteu assay), as well as the evaluation of antioxidant activity using DPPH and TAC assays for tincture, hot and cold hydroalcoholic extracts, and volatile oil obtained from Origanum vulgare. The HPTLC analysis was conducted according to TLC Atlas—Plant Drug Analyses (Wagner H, Balt S. 1997). HPTLC studies were performed on 20 x 10 cm Silica Gel 60 F254 plates, with the mobile phase being ethyl acetate–acetic acid–formic acid–water (100:11:11:27, v/v/v/v) for polyphenols and vanillin–sulfuric acid for volatile oil, developed on the CAMAG HPTLC system. Caffeic acid (Rf = 0.97), chlorogenic acid derivatives (Rf = 0.79, 0.85), and flavonoid derivatives (Rf = 0.25, 0.40, 0.45, 0.61) were identified in the hydroalcoholic extracts. In the volatile oil, the identified compounds included thymol (Rf = 0.55), caryophyllene (Rf = 0.51), linalool (Rf = 0.33), terpineol (Rf = 0.22), and terpene hydrocarbons near the surface (Rf = 0.97-0.98). The oil also contains β-phellandrene, germacrene D, ocimene, α-terpinene, and α-farnesene. The total phenolic content was similar for the hydroalcoholic extracts obtained through hot and cold extractions and was significantly lower for the tincture. *Origanum vulgare* is an important source of antioxidant compounds. Given this and the scientific results regarding its therapeutic potential, this species is an important resource for bio-products that can improve the population's health.

Funding: This work was carried out through the NUCLEU Program within the National Research and Innovation Strategic Plan 2023-2027, carried out with the support of MCID, project no PN 23-28 02 01.

In silico drug design, molecular docking studies, synthesis and antimicrobial evaluation of some desfluoroquinolone compounds

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KEYWORDS: desfluoroquinolones; drug design; molecular docking; antimicrobial agents.

ABSTRACT

The paper presents original contributions in the drug design, molecular docking, synthesis [1], and evaluation of antimicrobial activity of some desfluoroquinolones [2,3]. The obtained compounds have been analyzed by physicochemical methods (1H-NMR, 13C-NMR, IR, thin layer chromatography). The antimicrobial activity has been evaluated against Gram-positive (*S. aureus, E. faecalis*) and Gram-negative (*K. pneumoniae, P. aeruginosa*) microorganisms. Desfluoroquinolones HPQ202, HPQ203 and HPQ206 demonstrated a microbicidal effect on the Gram-positive strains investigated. Regarding Gram-negative bacteria, *P. aeruginosa* was found to be the most sensitive to the action of compounds HPQ202 and HPQ203. However, these compounds did not show microbicidal activity against the *K. pneumoniae* strain, suggesting a possible specificity towards *P. aeruginosa*.

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New biologically active dihydropyrimidine derivatives and its potential use for the functionalization of hydrogels for topical applications

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KEYWORDS: dihydropyrimidine compounds; antibacterial; antiviral; hydrogel.

ABSTRACT

Dihydropyrimidine compounds are calcium channel blockers of the nifedipine-type and have anticancer, antimicrobial, antiviral, anti-inflammatory, antidiabetic, analgesic, antioxidant, neuroprotective activities etc [1, 2].

The main objective of this study is to determine the antibacterial, antiviral and antioxidant activities of six ethyl 4-(2-R-phenyl)-6-methyl-2-oxo-1,2,3,4-tetrahydropyrimidine-5-carboxylate derivatives, where R is: (**1**) 3-OH; (**2**) 2-OH, 3-OCH_3; (**3**) 2-Cl; (**4**) 4-Cl; (**5**) 3-Cl; (**6**) 2-naphthyl. These compounds were synthetized through Biginelli synthesis in the laboratory. Their structures were confirmed by the ^{1}H and ^{13}C-NMR spectra.

To determine the antimicrobial activity of the compounds, the diffusimetric antibiogram method was adapted, using reference strains: *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922 and *Pseudomonas aeruginosa* ATCC 27853. Antiviral activity screening was performed on *HeLa* cells, adapting the SR EN 14476+A2 standard. The MTT method was used for establishing the cytotoxicity. The antioxidant activity was determined by the ABTS method.

The compounds had an antibacterial effect on the *Ps. aeruginosa* strain. The *E. coli* strain was less sensitive; *S. aureus* strain was resistant. Good antibacterial activities were shown compounds (**1**), (**4**), and (**6**), which had good cell viability, too. The tested hybrids inhibited virus replication in cells by at most approximately 1 half logarithm. (**6**), (**2**), and (**4**) are the most potent derivatives. Antioxidant activity values of the derivatives do not significantly differ and are close to the value calculated for the compound with unsubstituted phenyl.

Derivatives (**1**) and (**6**) are good candidates for the functionalization of hydrogels with topical administration and antimicrobial activity.

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Influence of Ag and Au nanoparticles on properties of resulting biomaterials based on functionalized mesoporous silica

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KEYWORDS: metallic nanoparticles; mesoporous silica; wild bilberry leaves extract.

ABSTRACT

Mesoporous silica has been used in recent decades as a carrier for the delivery of biologically active compounds [1] due to its outstanding properties, such as large pore volume, possibility of the surface functionalization with organic moieties and biocompatibility. Gold nanoparticles (AuNPs) are widely applied in diagnosis and treatment approaches, like point-of-care testing [2] or photothermal therapy [3], while silver nanoparticles are well known for their antimicrobial activity [4]. In this study, colloidal AuNPs and AgNPs were first prepared and then loaded onto the pore network of mesoporous silica functionalized with 3-mercaptopropyl and 3-aminopropyl groups, respectively. The resulting silica-based materials were further used as carriers for a polyphenolic wild bilberry leaves extract prepared in ethanol by solvothermal extraction under additional argon pressure.

The extract encapsulated in Au or Ag-modified mesoporous silica did not show cytotoxicity on human HaCat keratinocytes up to a treatment dose of 50 µg/mL. An improved antioxidant activity of the extract incorporated in proposed supports was observed compared to the free extract, assessed on HaCat keratinocytes. Inflamed THP-1 monocytes treated with wild bilberry extract free and encapsulated in Ag or AuNPs-modified silica supports secreted a lower amount of pro-inflammatory TNF-α cytokines, a better anti-inflammatory potential being observed in the case of the sample containing AuNPs.

Acknowledgement: Financial support from UEFISCDI (Romania) through the project no. 48PED/2025 is highly acknowledged.

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Design and Evaluation of Pullulan Acetate Nanoparticles as a pH-Responsive Drug Carrier System

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KEYWORDS: pullulan; nanoparticles; pH-responsive; drug delivery system.

ABSTRACT

Nanoparticles (NPs) are widely recognized as versatile drug delivery systems that enhance therapeutic efficacy through controlled and targeted release [1,2]. This study aimed to develop and evaluate pullulan acetate-based nanoparticles for the pH-sensitive delivery of 5-fluorouracil (5-FU), with and without folic acid functionalization, to improve drug release in tumor-like acidic environments.

Pullulan was biosynthesized via fermentation using *Aureobasidium pullulans* and chemically modified to obtain pullulan acetate. 5-FU-loaded pullulan acetate nanoparticles (PA-NPs) were prepared by double emulsion and characterized for entrapment efficiency, size, and polydispersity index using spectrophotometric and dynamic light scattering techniques. The nanoparticles showed appropriate physicochemical properties for drug delivery. Drug release studies in phosphate-buffered saline at pH 5.0 and 7.4 demonstrated that non-functionalized PA-NPs exhibited a lower 5-FU release compared to folic acid-functionalized PA-NPs, with both showing enhanced release in acidic conditions. A mild burst release, more pronounced in functionalized nanoparticles, was likely due to surface-bound 5-FU. Maximum drug release occurred after 24 hours, with functionalized nanoparticles demonstrating superior release profiles over non-functionalized ones.

These findings highlight the potential of folic acid-functionalized pullulan acetate nanoparticles as an effective pH-sensitive platform for targeted cancer therapy.

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Development and Characterization of a Polyphenol-Rich Emulgel Incorporating Radish Sprout Extract with Antioxidant Activity

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KEYWORDS: emulgel; radish sprout; polyphenol; topical applications.

ABSTRACT

Radish sprouts are young, nutrient-dense seedlings of the radish plant (Raphanus sativus), known for their rich content of bioactive compounds, including polyphenols, vitamins, and antioxidants, which contribute to their potential health and skincare benefits [1]. The aim of this paper is to formulate a polyphenol-rich emulgel containing radish sprout extract. A novel emulgel formulation was developed using Carbopol and xanthan gum as gelling agents, incorporating glycerin, propylene glycol, arnica oil, calendula oil, vitamin E, menthol, and sodium hydroxide. The active ingredient consisted of a radish sprout (Raphanus sativus) extract obtained using an ethanol/water (80:20 v/v) solvent system, with a quantified total polyphenol content of 3.16 mg gallic acid equivalents (GAE)/g fresh weight and an antioxidant activity of 6.59 mM Trolox equivalents/g fresh weight. The resulting emulgel demonstrated desirable physicochemical and sensory properties. It exhibited a homogeneous, smooth texture, with a pale-yellow color and a characteristic, slightly herbal odor. Texture Profile Analysis (TPA) confirmed a consistent and spreadable matrix suitable for topical application. The pH of the formulation was measured at 5.11, making it compatible with the skin's natural pH range. These results support the potential of radish sprout extract as a valuable active ingredient in antioxidant-rich dermocosmetic formulations, with the emulgel matrix offering a stable and effective delivery system.

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Microbial biomineralization: chemical interplay

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KEYWORDS: microbial biomineralization; anaerobic respiration; enzymes.

ABSTRACT

Biomineralization is the process by which living organisms produce minerals (crystalline/amorphous). This phenomenon is widespread in all six taxonomic kingdoms, providing essential functions for the host (e.g. defence, structure, nutrition etc.). Interestingly, bacteria produce biominerals belonging to almost all 8 classes of minerals (i.e. native elements, silicates, oxides, sulphides, sulphates, halides, carbonates, phosphates, and mineraloids), showing an exceptional metabolic plasticity. Some examples of biominerals include iron minerals (e.g. magnetite/Fe_3O_4), polymorphs of $CaCO_3$, struvite ($NH_4MgPO_4 \cdot 6H_2O$), monoelements (e.g., Au^0, S^0, Se^0), and sulfides (e.g., AsS, PbS) [1].

Some bacteria and archaea produce cellular energy via the anaerobic respiration of metals and metalloids, producing intra- and extracellular biominerals [2]. Certain biominerals (e.g. elemental sulfur/S^0) function as storage compounds; others, like elemental Se/Se^0, may increase the density and the buoyancy of bacteria harboring them. Sometimes, these solid precipitates are quite different from their mineral counterparts in terms of size, density, surface charge, and stability. Here, we explore the biomineralization of arsenic (As), iron (Fe), sulfur (S), and selenium (Se), which result from microbial respiratory processes. The oxyanions of As, S, and Se are used as terminal electron acceptors by specialized bacteria and archaea, providing significant amounts of energy under anoxic and nutrient-limiting conditions [3]. These transformations result in the formation of various types of arsenic and iron sulfides, S^0 and Se^0, and these biominerals will be the focus of this presentation.

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Review: Use of *Saccharomyces* and non-*Saccharomyces* yeasts in biotechnology

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KEYWORDS: Saccharomyces; non-Saccharomyces; beer, wine, minerals.

ABSTRACT

This paper aimed to investigate the utilisation of *Saccharomyces* and non-*Saccharomyces* yeast strains in different fermentation processes.
Yeasts are widely used in biotechnology to obtain active and inactive biomass that is further successfully used alone or in co-culture in brewing and wine production, as well as to obtain food supplements and bakery products.

Recent studies have drawn attention to the use of autochthonous yeasts for wine and beer production. Umurzache et al. (2023) obtained wines with higher trans-resveratrol concentrations using autochthonous wine yeast. Vrinceanu et colab. (2025) addressed a critical gap by investigating the double functionality of different yeast strains, including autochthonous wine yeast, evaluating their efficacy as probiotic agents in craft beer production.

It is also known that yeasts have been used as food supplements by enriching with zinc, selenium, and chromium through various biotechnology processes, providing a superior alternative to inorganic and organic supplements due to their high efficiency, safety, and reduced environmental impact (Barbulescu et al., 2020). In addition, brewer's yeast is used for the production of proteins, amino acids, and vitamins, and since it is the richest known source of organic chromium, it has been used in the treatment of diabetes for over a hundred years. Therefore, yeasts can be successfully used to obtain valuable compounds for biotechnology.

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Bacterial Cellulose (BC) composite membranes/natural active pharmaceutical principles for moist wound management

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KEYWORDS: bacterial cellulose; biocomposite membranes; plant extract; biomedical application.

ABSTRACT

Biopolymers are receiving increasing attention as wound dressing materials owing to their potential therapeutic performance and drug-loading and release capabilities. Although the BC has been functionalized with different antimicrobial polymers and nanomaterials for wound dressing applications, its functionalization with bioactive materials of plant origin is still a scarcely explored area. Currently, numerous researches are being carried out worldwide to discover new natural products and new active pharmaceutical formulations dedicated to the treatment of wounds. Thus, natural products obtained from various plants play an essential role in the field of health and medicine, due to their diversity and pharmacological potential.

This paper refers to the obtaining of composite membranes based on bacterial cellulose and natural active pharmaceutical principles : BC/activator mix from white dead nettle extract Lamium album 10%/Lentinula edodes mushroom extract 2% and Hyaluronic acid 0.2%, in the form of bioactive dermatological patches. These patches have the advantage of combining active principles from the white dead-nettle extract, rich in bioactive compounds (flavonoids, polyphenols, iridoids, tannins, phenolic acids) with those from the edible mushroom Shiitake extract and hyaluronic acid, in well-established ratios, which confers good physicochemical and biological stability to the patch, with wound-healing and reepithelialization capacity. They are intended for topical treatment of skin lesions, by supporting local hydration and ensuring a local antiseptic and nutritive environment. The selected natural extracts (white dead-nettle and mushrooms) as natural active pharmaceutical principles, were extracted by an ecological extraction method – MAE (Microwave-Assisted Extraction) and subsequently used in fermentative processes for producing composite membranes of bacterial cellulose functionalized in situ. To carry out the complete biotechnological process to obtain BC composites, the necessary work steps and methodologies were followed, in accordance with CBI no. A00264/25.06.2025. Composite membranes obtained by microbial biosynthesis BC/impregnated with natural active pharmaceutical principles showed antimicrobial activity against *Escherichia coli* ATCC 8739. These can be considered a new type of antimicrobial dressing associated with novel healing properties and, consequently, can lead to improvements in health status and quality of life, as well as to the economic development of the pharmaceutical/dermatological/dermatocosmetic industry.

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Bioprospecting *Monascus* Pigments: Cytotoxicity Profiles and Skincare Potential

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KEYWORDS: fungal polyketides; cytotoxicities; skincare potential.

ABSTRACT

Coloured polyketides derived from Monascus species exhibit bioactivities of interest for dermato-cosmetic applications. Despite their antioxidant and antimicrobial potential, concerns regarding cytotoxicity and stability limit their use. This study aims to evaluate physicochemical properties and cytotoxic profiles of six representative polyketides to assess their suitability as skincare ingredients [1-3].

Three types of coloured pyketoides (I,e red, orange and yellow) were biosynthesised by *M. purpureus, M. ruber*, and a high-yield *Monascus* strain using solid-state fermentation on rice. Extracts were analysed in silico (SwissADME) for lipophilicity, permeability, and predicted absorption. Cytotoxicity was determined on HaCaT keratinocytes exposed to extract dilutions for 24 h and 48 h, and IC_{50} values were estimated by linear and nonlinear regression models.Results. All compounds were predicted to be lipophilic, with low skin permeation (log Kp –5 to –7), and as non-substrates for P-glycoprotein. Yellow polyketides from M. purpureus and *M. ruber* exhibited moderate cytotoxicity (IC_{50} ~20–46 µg/mL), while the high-yield strain produced extracts with substantially higher IC_{50} values (144–660 µg/mL). Orange polyketides showed weaker cytotoxicity (IC_{50} 218–384 µg/mL for *M. purpureus, M ruber*; > 1 mg/mL for the high-yield strain). Red pigments demonstrated stronger cytotoxicity, particularly after 48 h exposure. Overall, polyketides derived from the high-yield strain consistently displayed the lowest cytotoxic effects.

The combined in silico and in vitro assessments indicate that *Monasc*us-derived polyketides, especially those from a high-yield strain, exhibit favourable dermato-cosmetic potential due to low cytotoxicity and limited skin penetration. However, pigment instability, particularly in unsaturated red and orange compounds, warrants further formulation studies before application in skincare products.

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Proliferative and Immunomodulatory Effects of *Perilla*-Based Products on Human Cells

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KEYWORDS: Perilla extract; cytotoxicity; cell proliferation; immunomodulation; antiallergic activity.

ABSTRACT

Perilla frutescens (L.) Britt., an edible and medicinal plant is rich in rosmarinic acid, flavonoids, terpenoids, and omega-3 fatty acids has documented anti-inflammatory, antioxidant, anti-allergic, and immunomodulatory activities [1–3].
This study investigated the effects of several *Perilla frutescens*–derived products on cell proliferation and cytotoxicity in human immune and tumor cell models. Tested products included: an antiallergic formulation (P1), powders (P2, P3), a hydro-glycerol–alcoholic extract (P4), and a formulated antiallergic extract (P5).
Experiments were conducted according to ISO 10993 standards for biological evaluation of medical devices. Preparations were applied to cultures of human monocytic-macrophage cells (ATCC CRL-9855), Jurkat T lymphocytes (CRL-2899), and HepG2 hepatocellular carcinoma cells (HB-8065). Cell viability and proliferation were quantified using the MTS assay.
All tested preparations induced a dose-dependent proliferative effect in monocytic-macrophage cells, with P1 showing the strongest activity and P5 a moderate effect. Similar stimulation was observed in Jurkat T lymphocytes, confirming the immunostimulatory capacity of all extracts. Cytotoxicity remained low, though P5 displayed slightly higher inhibitory activity than other products. In HepG2 tumor cells, all preparations promoted proliferation, indicating a potential safety concern for patients with active malignancy.
Perilla-based formulations enhance immune cell proliferation, supporting their use as antiallergic and immune-supportive agents. However, they also stimulate tumor cell growth, highlighting a safety concern. While generally low in cytotoxicity, the proliferative effect on cancer cells warrants caution in therapeutic use and further investigation.

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Algal Extracts and Gold Nanoparticle Formulations: Preliminary Biological Insights

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KEYWORDS: algal polysaccharides; nanoparticle; cytotoxicity.

ABSTRACT

Algal biomass represents a promising source of bioactive compounds (and environmental applications. However, their biological properties remain underexplored [1-3]. The studies performed provide preliminary biological evaluations of crude algal extracts and gold-enriched formulations derived from selected micro- and macroalgae.

Four algal species (*Porphyra umbilicalis, Undaria pinnatifida, Cystoseira barbata, Chlorella sp.*) were subjected to hot aqueous extraction to yield polysaccharide-rich bioproducts. Parallel formulations were obtained by introducing Au^{3+} cations to the extracts, facilitating the formation of gold nanoparticles (< 34 nm) in some cases. *In vitro* cytotoxicity was assayed on tumour cell lines (Caco-2, HepG2) following 24 h exposure.

In the samples with gold, nanoparticle formation (< 34 nm) was confirmed for formulations derived from *Porphyra sp.* and *Undaria sp.*. Among the crude bioproducts, those from *Porphyra sp.*, *Undaria sp.* and *Chlorella sp*. showed cytotoxic effects toward Caco-2 cells after 24 h, while only the *Cystoseira* derivative affected HepG2 cells. The gold formulations showed no appreciable cytotoxicity under the same conditions.

In conclusion, algae-derived polysaccharide extracts and the gold formulations display diverse and selective cytotoxicity profiles. The absence of toxicity in gold-enriched samples and nanoparticle formation suggests potential for further development in biosensing or biomedical context.

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Potential Biotechnology Strategies for Antibiotic Wastewaters: Bioremediation Using *Trichoderma sp.*

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KEYWORDS: bioremediation; antibiotic pollution; cosmetic industry wastewater.

ABSTRACT

Antibiotics are among the most widely used classes of compounds, frequently encountered in both human and veterinary medicine, as well as in cosmetic products. Consequently, aqueous effluents from medical facilities and the cosmetics industry often contain significant concentrations of antibiotics. A considerable proportion of these pollutants reaches the environment, disrupting the balance of aquatic and terrestrial ecosystems [1–2]. In this context, the present study aimed to evaluate the bioremediation potential of aqueous solutions contaminated with antibiotics using two *Trichoderma* species [3].

Aqueous solutions of ciprofloxacin or climbazole were treated with *Trichoderma asperellum* and *Trichoderma harzianum* at room temperature under continuous agitation. Residual antibiotic concentrations were periodically measured using HPLC-MS. The data obtained were integrated into mathematical models developed with SYSTAT software to estimate the time required for maximal antibiotic reduction.

Trichoderma asperellum can reduce ciprofloxacin concentration up to 5 µg/L after 4000 h. In contrast, *Trichoderma harzianum* showed limited efficiency, decreasing the ciprofloxacin concentration up to 198 µg/L. Regarding climbazole, commonly found in wastewater from the cosmetics industry, preliminary results indicated a reduction trend; specifically, *Trichoderma harzianum* can reduce the antifungal antibiotic load up to 1 µg/L after 1000 hours of exposure.

For aqueous systems contaminated with antibacterial antibiotics such as ciprofloxacin, *Trichoderma asperellum* can reduce the concentration up to 5 µg/L after 4000 h. For systems contaminated with antifungal antibiotics such as climbazole, *Trichoderma harzianum* can reduce the concentration up to 5 µg/L within 1000 hours.

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The antimicrobial potential of biosurfactant produced by *Candida lipolytica* ICCF 214 strain

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KEYWORDS: microbial surfactants; yeast; waste substrate; antimicrobial activity.

ABSTRACT

Introduction: Biosurfactants (BS) are surface-active compounds synthesized by microorganisms, offering advantages such as biodegradability, biocompatibility, low toxicity, and stability under diverse environmental conditions. Due to these properties, BS have attracted significant attention for applications in medicine (as antibacterial, antiviral, and antifungal agents), cosmetics, food, detergents, textiles, petroleum recovery, bioremediation, and agriculture [1]. Among BS-producing microorganisms, *Candida* species are generally recognized as safe (GRAS) by the FDA and can efficiently produce biosurfactants [2,3]. Therefore, this study investigates the antimicrobial potential of the biosurfactant produced by *Candida lipolytica* ICCF 214, providing insights into its potential applications in medical, food, and industrial sectors.

Material and methods: *Candida lipolytica* ICCF 214 was cultivated on a substrate containing 10% waste frying oil and 10% glucose as carbon sources, supplemented with 0.2% yeast extract as a nitrogen source, 0.02% $MgSO_4 \cdot 7H_2O$, 0.02% KH_2PO_4, and 0.1% NH_4NO_3. The biosurfactant produced was isolated and partially purified, then evaluated against *Staphylococcus aureus* ATCC 6538 and *Escherichia coli* ATCC 8739 using the agar diffusion bioassay (cylinder-plate method). Zones of inhibition were measured, confirming antibacterial activity with variable diameters against the tested strains.

Results and discussions: The biosurfactant produced by *Candida lipolytica* ICCF 214 exhibited strong antimicrobial activity, producing inhibition zones of 40 mm against *Staphylococcus aureus* and 26 mm against *Escherichia coli*.

Conclusions: These results demonstrate the remarkable antibacterial potential of the biosurfactant produced by *C. lipolytica* ICCF 214, underscoring its prospective applications as an antimicrobial agent in the medical, pharmaceutical, and food industries.

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Antimicrobial activity of biosurfactants produced by *Candida species*

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KEYWORDS: *Candida* strains; biosurfactants; antimicrobial properties; pathogenic microorganisms.

ABSTRACT

Biosurfactants synthesized by *Candida* species have attracted considerable attention due to their notable antimicrobial properties. These compounds, especially sophorolipids, are of interest for potential applications in the pharmaceutical and biomedical fields [1]. This work aims to provide an overview of the antimicrobial activity of biosurfactants derived from *Candida,* with an emphasis on their spectrum of action against pathogenic microorganisms. The paper involved an up-to-date review of the literature using various open-access scientific databases, following keywords such as *Candida* strains, biosurfactants, sophorolipids, and antimicrobial activity. Literature data indicate that biosurfactants produced by *Candida bombicola*, *Candida apicola*, and *Candida tropicalis* exhibit strong inhibitory effects against Gram-positive and Gram-negative bacteria, such as *Staphylococcus aureus*, *Escherichia coli*, *Listeria monocytogenes*, *Bacillus subtilis*, and *Pseudomonas aeruginosa* [2]. In addition, biosurfactants produced by *Candida lipolytica* display significant antimicrobial activity against *Streptococcus agalactiae* and *Streptococcus mutans*, broadening the potential applications of these compounds in biomedicine and other fields [3]. In conclusion, this review highlights the antimicrobial activity of biosurfactants derived from *Candida* species, underlining their effectiveness against a wide range of bacterial pathogens and their relevance for future biomedical applications.

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Biotechnological applications of biosurfactants produced by *Pseudomonas* strains

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KEYWORDS: biosurfactants; *Pseudomonas* strains; biotechnological applications.

ABSTRACT

Biosurfactants are amphiphilic molecules synthesized by various microorganisms, *Pseudomonas spp*. being recognized as major producers of rhamnolipids, a class of glycolipid biosurfactants with remarkable physicochemical and biological properties. Due to their biodegradability, low toxicity, and high stability under extreme environmental conditions, rhamnolipids represent promising eco-friendly alternatives to synthetic surfactants in diverse biotechnological applications [1].

In this study, we conducted a comprehensive review of recent literature focusing on rhamnolipids produced by *Pseudomonas* strains. Data were collected from open-access scientific sources to highlight their production processes and their biotechnological applications. The literature survey reveals that rhamnolipids produced by *Pseudomonas spp.* have demonstrated versatile applications in multiple sectors. They are highly effective in environmental biotechnology, including the bioremediation of hydrocarbon-contaminated soils and waters, and in enhanced oil recovery. In the food industry, rhamnolipids act as emulsifying and stabilizing agents, improving the texture and extending the shelf life of products. In pharmaceutical and cosmetic industries, they exhibit antimicrobial and anti-biofilm properties, supporting the development of novel therapeutic formulations and skincare products [2-4].

Rhamnolipids produced by *Pseudomonas* strains offer significant biotechnological potential, combining biological activity with physico-chemical stability. Their versatility across environmental, industrial, and biomedical sectors underscores their role as sustainable alternatives to chemical surfactants.

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Microbial resources for a circular bioeconomy: from waste valorization to high-value bioproducts

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KEYWORDS: microbial bioprocesses; waste valorization; bioactive compounds; circular bioeconomy.

ABSTRACT

The transition toward a circular bioeconomy requires innovative biotechnological approaches to convert agro-industrial and food waste into high-value bioproducts, minimizing environmental impact while promoting economic growth. Microbial resources play a central role in this process, offering diverse metabolic pathways leading to the bioconversion of complex organic substrates into valuable compounds. Data collected from scientific literature were analyzed to highlight microbial production of bioactive metabolites.

Microbial strains demonstrate the capacity to produce high-value bioproducts from various waste substrates, including waste oils. For example, *Pseudomonas aeruginosa* efficiently synthesizes rhamnolipids, while *Candida lipolytica* produces sophorolipids. *Bacillus subtilis* serves as a source of industrially relevant enzymes, such as amylases and proteases, applicable in bioremediation and diverse industrial processes, and *Rhizobium* species contribute to sustainable agriculture through nitrogen fixation and biofertilizer production [1-4].

Integrating microbial bioprocesses into circular bioeconomy frameworks facilitates sustainable waste valorization and the production of eco-friendly bioproducts. These strategies underscore the potential of biotechnology to support renewable bio-based industries and promote environmentally sustainable economic development.

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Physicochemical and pharmaco-toxicological evaluation of conductive textiles

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KEYWORDS: conductive textiles; analysis; cytotoxicity, in vitro assay.

ABSTRACT

Conductive textiles are functional products having, depending on their complexity, the potential to act as passive (detect), active (detect and respond), or very smart (detect, respond, and adapt) systems. A set of such materials were produced knitting technology with conductive yarns, based on Shieldex 2-Ply HC+B TPU, Shieldex Ply, Shieldex (STATEX), AgSIS-Lib40, Sprinox (Ugitex), and DA 5340 and DA 5359 (FILIX).

Further, the physico-chemical properties of these materials were characterised. Tensile strength, abrasion resistance, washing durability were evaluated. Also, SEM, EDX and FTIR analysis were used. Biological testing was performed to evaluate in vitro the potential cytotoxic effects of the materials. As experimental models were used human monocyte-macrophage cells and Jurkat cells. For the exposure of the cells, samples of the conductive textiles were dispersed in culture medium (RPMI 1640), achieving for each one a concentration of 100 mg/mL. The samples were dispersed on the cells, at concentrations of 40 and 10 mg/. After 48 or 96 hrs, the cultures were evaluated for cell viability, using the MTS assay.

The cell viabilities after 48 and 72 hrs exposure were as seen in the table.

Product	SC cells 48h		SC cells 72h		Jurkat cells 48h		Jurkat cells 72h	
Dose	10mg/ml	40mg/ml	10mg/ml	40mg/ml	10mg/ml	40mg/ml	10mg/ml	40mg/ml
Shieldex 2 PLY	101.92	62.18	78.24	32.49	76.18	70.55	84.88	34.40
Shildex 2 PLY HC+B -10t	100.32	54.01	73.69	37.01	82.54	72.85	80.03	42.76
DA 5359	102.40	67.63	89.70	52.93	88.47	85.73	85.73	69.44
DA 5340 11t	96.63	57.53	75.50	38.61	92.09	89.24	89.24	42.12
DA 1490	90.71	63.62	77.15	40.34	84.02	81.15	81.15	51.70
Lib40-AgSiS	91.35	39.58	84.17	24.29	62.27	50.96	50.96	22.63
Sprinox-13t	85.10	47.76	69.39	37.77	64.42	70.29	70.29	36.69

As it appears from the table, the least damage was produced by DA 5359 and Da 5340, followed by the Shieldex products. The most probable mechanisms by which the effects on the cells were produced could be by activation of oxidative stress mechanisms.

Active packaging films based on chitosan, NaDES, and neem extract

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KEYWORDS: chitosan; NaDES; bio-plastics; extracts, neem extract.

ABSTRACT

Considerable efforts are being made worldwide to replace plastics with bioplastics, at least in food packaging applications [1]. In this context, chitosan films have been studied due to remarkable properties of chitosan: antibacterial, biodegradable, non-toxic, stable thermally and chemically stable. The main challenges with such films are mechanical properties, stability, water vapor permeability, and generally good barrier properties against moisture transfer [2]. Due to their attractive properties, natural deep eutectic solvents (NaDES) have been studied as plasticizer to obtain polysaccharides films with improved properties [3,4]. At the same time, NaDES can be efficient agents for extracting bioactive substances from various matrices [5].

The aim of this work was to investigate the potential use of choline chloride (ChCl)-Glycolic Acid (GA) (1:2) as plasticizers for chitosan films. Also, this NaDES was investigated as an extraction agent for polyphenols from neem leaves for the preparation of active chitosan biofilms. In this study, we prepared, by the casting method, films with 44 -70 % NaDES, as well as films with 50% NaDES incorporating extracts from neem leaves (*Azadirachta indica*).

The chitosan films were characterized using thermogravimetry, differential scanning calorimetry (DSC), FTIR spectroscopy, and photoluminescence (PL) spectra, which reveal the formation of hydrogen bonds between chitosan and NaDES. The optical, mechanical, antioxidant properties and water vapor permeability (WVP) were also determined, showing that the polyphenolic components from the extract were integrated into the polymer structure – NaDES and contribute to better film properties.

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The study of thermophysical properties for binary mixtures of propylbenzene and linear/cyclic ketones at $T = 298.15$ K, with applications in the pharmaceutical industry

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KEYWORDS: thermophysical properties; ketones; aromatic hydrocarbons; binary mixtures.

ABSTRACT

The thermophysical properties, as densities, speeds of sound, and refractive indices, for pure compounds: *n*-propylbenzene, cyclopentanone, and diethylketone (3-pentanone), as well as for their two binary mixtures, have been measured at several temperatures between T = (298.15 to 318.15) K and atmospheric pressure P = 0.1 MPa. The values obtained from experimental measurements have been correlated by the Jouyban-Acree model with good accuracy.

From the density and speed of sound data, the thermodynamic properties, namely: the excess molar volumes, the partial or apparent molar volumes, the isentropic compressibilities, the excess isentropic compressibilities, and the excess molar isentropic compressibilities, have been calculated.

From the experimental refractive index data, the deviations in refractive indices, the molar refractions, and the excess molar refractions have been computed.

The excess properties have been reported graphically at T = 298.15 K, over the entire range of composition. All the thermodynamic properties have been correlated by the Redlich-Kister polynomial equation. The results were analyzed in terms of molecular interactions and structural effects, occurred between the components of the mixtures.

The knowledge of the thermodynamic properties of the *n*-propylbenzene with normal/cyclic ketones binary mixtures, has special importance for specific processes in the pharmaceutical industry.

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Comparative Analysis of Ascorbic Acid and Antioxidant Potential in Aronia, Sea Buckthorn, Goji, and Cranberry Juices

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KEYWORDS: Vitamin C; Ascorbic acid; Antioxidant capacity; Natural fruit juices.

ABSTRACT

Vitamin C (ascorbic acid) is one of the most important micronutrients involved in maintaining human health, playing a crucial role in antioxidant processes, immune system stimulation, and the prevention of pathologies associated with oxidative stress. In the context of the growing interest in healthy nutrition and chronic disease prevention, the assessment of vitamin C intake and the monitoring of product quality are priorities for both nutritional sciences and public health.

The present study aimed to comparatively analyze the vitamin C content and antioxidant capacity of natural juices obtained from *Aronia melanocarpa*, sea buckthorn (*Hippophae rhamnoides*), goji (*Lycium barbarum*), and cranberries (*Vaccinium macrocarpon*). Determinations were performed using titrimetric and spectrophotometric assays in order to highlight the differences in biochemical profile and antioxidant potential among samples. Results indicated significantly higher concentrations of vitamin C in aronia and sea buckthorn juices, with values ranging between 96.80 and 138.84 mg/100 mL, confirming their status as some of the richest natural sources of ascorbic acid. Antioxidant capacity tests further confirmed the superior value of aronia juice, with a DPPH inhibition rate of 92.58%, an IC_{50} value of 22.84 µg/mL AAE, and a FRAP activity of 154.48 µmol Fe^{2+}/mL, while the other samples showed moderate, yet nutritionally relevant activities.

These findings demonstrate that natural fruit juices represent valuable sources of bioactive compounds with potential health benefits. Furthermore, the applied methods, despite differing in complexity, proved to be reliable and efficient tools for product characterization. Ascorbic acid can therefore be considered an important marker for assessing the nutritional and functional quality of fruit-based beverages, with implications for promoting healthy lifestyles and supporting the development of value-added food products.

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Cytotoxic and Virucidal Potential of *Lilium* spp. macerates on Tumor Cell Lines and Viral Strains

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KEYWORDS: *Lilium* spp.; cytotoxicity; cell cycle; virucidal activity; natural products.

ABSTRACT

Natural products represent a valuable reservoir of bioactive molecules with therapeutic potential in oncology and infectious diseases [1]. Lily bulbs, traditionally used in Asian medicine as remedies for respiratory and inflammatory conditions, represent an underexplored source of secondary metabolites with relevant pharmacological potential [2]. Our previous investigations have demonstrated that hydroalcoholic macerates of *Lilium* spp. bulbs are particularly rich in phenolic and flavonoid compounds, with antioxidant and antibacterial activity. *Lilium* "Dark Secret" (LD-70) and *Lilium asiaticum* "White" (LA-70) present superior phytochemical content and biological activity. The present study aims to evaluate the cytotoxic and virucidal properties of selected *Lilium* spp. macerates, thus extending their potential applications from antioxidant and antimicrobial agents to antitumor and antiviral candidates. Human osteosarcoma MG63 and laryngeal carcinoma HEp-2 cell lines were used to assess antiproliferative effects, while adenovirus type 5 (ADV5) and *Echovirus served* as viral models. Cell viability assays (CellTiter 96®) demonstrated a dose-dependent reduction in proliferation, with IC_{50} values ranging from 4.57% *Lilium* "Dark Secret" (LD-70) to 8.79% *Lilium robina* (LR-70), confirming the cytotoxic potency of the extracts compared with the ethanol control. Flow cytometry revealed concentration-specific effects on cell cycle progression: at 10%, extracts induced S-phase arrest, whereas at 1% they promoted G0/G1 accumulation, suggesting dual modulatory mechanisms. Direct virucidal assays indicated significant inhibitory activity, with LD-70 reducing ADV5 titers by up to 3 log $TCID_{50}$ and *Lilium* "Sunset boulevard" (LG-70) decreasing *Echovirus titers* by more than 4 log on HEp-2 cells. Ethanol alone also exhibited moderate virucidal action, emphasizing the importance of solvent controls in antiviral testing. In conclusion, *Lilium* spp. bulb extracts exhibit promising cytotoxic and virucidal activities, supporting their potential as natural candidates for the development of novel antitumor and antiviral agents.

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Apparent molar volumes, isentropic compressibilities, and optical properties study of L-Alanine and D-Glycine in aqueous D-Fructose solvent at 298.15 K temperature with applications in the pharmaceutical industry

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KEYWORDS: thermodynamics study; optical properties; amino acids; aqueous D-fructose solvent; ternary blends.

ABSTRACT

In the ternary systems of L-Ala and D-Gly+D-Fructose+water, the correlating equations for density, speed of sound, apparent molar volumes, and isentropic compressibility are presented and tested using measured experimental data. The molality of stock (D-Fructose+water) binary solvent is 0.265 mol kg^{-1}. The molality of amino acid solutes is between 0.2 and 0.9 mol kg^{-1}. The values of the molar refraction of alanine and glycine in aqueous D-fructose solution were computed based on the refractive index experimental results. Morever, by density functional theory (DFT) at ωB97XD/6-31 G + (d, p) level, a computational investigation in water and in vacuum of dipole moment and molecular polarizability is presented for L-Alanine and D-Glycine as solutes. The calculated deviations in the last significant digits are also reported.

The volumetric properties of amino acid in water and water + D-Fructose mixture are discussed in terms of the hydration/dehydration effect of the solvent upon the amino acid, and hydrogen bonding effect. The knowledge of the thermodynamic properties of the L-Alanine and D-Glycine solutes in D-Fructose + H_2O solvent is very important for the processes involved in the pharmaceutical industry.

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Thermodynamics properties study of salicylic acid in the binary (triclocarban+ethanol) solvent with applications in the cosmetic industry at 298.15 K temperature

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KEYWORDS: physicochemical properties; salicylic acid; triclocarban; ethanol solvent; ternary mixtures.

ABSTRACT

Thermophysical properties such as density, speed of sound, and refractive index were measured in the ternary (salicylic acid + triclocarban + ethanol) mixture at (0.00009 and 0.00014) mol kg^{-1} molality of binary (triclocarban + ethanol) solvent [1] and at the temperature of 298.15 K. The studied molality of salicylic acid solute is between (0.01 and 0.09) mol kg^{-1}.

The volumetric, acoustic, and optical properties versus solvent molality in the mixture were useful in understanding the nature and the extent of interaction between the solute and solvent molecules. The thermodynamic behavior indicates the presence of interactions between salicylic acid and the ethanol + triclocarban binary solvent at two different molalities and at 298.15 K temperature. The computed deviations are also reported in the present study. The distribution of salicylic acid in binary (triclocarban-ethanol) mixture is commonly found in cosmetic treatments [2].

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Epigenetic Modulation Enhances Anticancer Drug Responses in K1 Thyroid Cells

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KEYWORDS: epigenetics; thyroid cancer; methylation; cytokine release; drug response.

ABSTRACT

Thyroid carcinomas display marked phenotypic heterogeneity shaped by genetic and epigenetic mechanisms. As epigenetic regulation critically influences tumour progression, therapeutic response, and prognosis, targeting these pathways has become a major focus in oncology. This study evaluated single and combined treatments with anticancer agents, natural compounds, and epigenetic modulators on methylation regulators, global DNA methylation, and cytokine release in the K1 thyroid cancer cell line.

K1 cells were treated for 48 h with SAHA and 5-Aza-C, alone or combined with CPt, Dox, Pxl, Ava, or Qct. Cytotoxicity, apoptosis, and cell cycle distribution were assessed; global methylation quantified by LINE-1 ELISA; DNMT1/3A/3B and EZH2 expression by qRT-PCR; and IL-6/TNF-α release by ELISA. Fixed drug concentrations were applied (50 µM CPt/Qct, 0.5 µM Pxl/Dox, 20 µg/mL Ava, 5 µM SAHA/5-Aza-C).

SAHA, 5-Aza-C, Dox, Ava, and Qct reduced S-phase fractions (2.3–14.2%), while CPt and Pxl decreased G0/G1 (to 47–54%) and raised proliferation indexes (55–63%). Combinations of SAHA+5-Aza-C with Dox, Ava, or Qct further enhanced G0/G1 arrest, whereas those with CPt or Pxl increased G2/M (45–65%). Apoptosis was induced by all drugs, most strongly by SAHA, Dox, Ava, and Qct, with SAHA+Dox and 5-Aza-C+Dox showing maximal effects (total apoptosis 14–22%).

TNF-α release increased markedly (138–595%), especially with Pxl or combinations involving Dox, CPt, or Pxl, while IL-6 responses were lower: SAHA elevated release (202%), 5-Aza-C had moderate effects, and CPt consistently reduced IL-6. DNMT1 and DNMT3B were strongly upregulated by SAHA+Dox, 5-Aza-C+Pxl, and 5-Aza-C+Qct (3.3–4.5-fold), with concurrent EZH2 downregulation. Global methylation correlated positively with EZH2 ($r = 0.33$, $p = 0.021$) and negatively with DNMT3B ($r = -0.26$, $p = 0.042$).

These coordinated epigenetic changes highlight the therapeutic potential of combining epigenetic modulators with cytostatic agents, suggesting a strategy to overcome resistance and improve outcomes in thyroid cancer.

A Protocol for Alzheimer's Disease

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KEYWORDS: Alzheimer's disease; neurodegeneration; oxidative stress; glutamate; herbal treatment.

ABSTRACT

The etiopathology of Alzheimer's disease is multifactorial, with cognitive degradation developing on a background of numerous metabolic vulnerabilities. Beta-amyloid deposits formation at the level of synapses leads to disruption of the normal nerve cell function with severe repercussions for memory and cognition. Due to the progressive loss of specialized neuronal cells, this neurodegenerative disease requires the earliest possible therapeutic intervention in order to counterbalance lipid peroxidation, microglia activation, and the deposition of beta-amyloid.

Neuronal destruction is triggered by glutamate through two pathways: (1) the first pathway involves oxidative excitotoxicity mediated by glutamate receptors, initiated by excessive ionic Ca influx and disturbance of ionic calcium homeostasis, and (2) the second pathway involves oxidative destruction triggered by reactive oxygen species (ROS), which is connected to cysteine release via the glutamate/cysteine antiporter ratio.

As therapeutic approaches, we propose the use of URSOMAX, which contains Taraxacum, *Allium ursinum* and *Urtica dioica* extracts; Neuroforte (containing *Ginkgo biloba*, lecithin, sea buckthorn, pollen, propolis); and Green Walnut (*Juglans regia* immature fruit).

Alzheimer's disease overlaps with many other effects of modern civilization, and without a radicalization of therapeutic attitudes, results will continue to lag behind expectations.

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Cellulite – The Nightmare of the Modern Woman

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KEYWORDS: cellulite; acid-base balance; mineral reserve; diet.

ABSTRACT

Ancient Greece, the origin of the Olympic spirit, can be rediscovered in the most refined symbols of bodily beauty, which were avidly adopted by both Ancient Rome and the incomparable Italian Renaissance. One may rightfully wonder why the statues of antiquity or the paintings of the Renaissance never depicted women suffering from cellulite — a condition that today affects 80–90% of the female population between the ages of 16–18 and 75 years old.

THE ANSWER IS SIMPLE: BECAUSE IT DID NOT EXIST.

This condition is the result of an acidic diet, which profoundly disturbs the essential acid/base ratio in the body. Cellulite can be defined as dermo-hypodermic dystrophy, produced by localized deposits of adipose tissue under the skin. It presents with a characteristic "orange peel" appearance, with small dimples and depressions at the skin level.

The three major domains required for proper human physiological functioning are:

1. Regulation of the acid-base balance
2. Regulation of water balance (60% of the human body consists of water)
3. Regulation of the alkaline mineral reserve

Treatment includes:

1. Eliminating foods that trigger acid formation: sweets, animal proteins, fats
2. Administering sufficient fluids to eliminate salts through the renal and skin pathways, as well as uric, oxalic, tannic, lactic acids, etc.
3. Administration of APIOSTEOMARIN ELIDOR
4. ASCO-OSTEOMARIN ELIDOR
5. MINERALVEG ELIDOR
6. Local applications of ELIDOR ANTI-CELLULITE GEL (containing ivy extract)

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Spectrophotometric Methods for Cortisol Determination from Saliva

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KEYWORDS: Cortisol; spectrophotometric methods; Prussian blue dye; blue tetrazolium dye.

ABSTRACT

Cortisol is a glucocorticoid hormone, secreted by the adrenal cortex to regulate blood pressure, glucose levels, and, in general, the metabolism. It is the major stress hormone in humans and an important biomarker for detection and monitoring of evolution of developing mental illnesses, or highlight the severity grade of stress-related illnesses [1, 2].

The aim of the study is to determine the cortisol levels in saliva samples by two spectrophotometric methods, using as the colorimetric indicator dyes: Prussian blue and blue tetrazolium (BT), respectively.

The following parameters have been optimized for both variants: concentration of reagents, temperature and reaction time, solvent nature. Absorbance calibration curves were obtained as a function of cortisol concentration with good correlation coefficients ($r^2 > 0.99$). Cortisol concentrations (expressed in nmol/L) were determined from the saliva samples collected from human volunteers and a comparison between the results obtained by the two methods and values reported in the literature were made. The method with Prussian blue dye allows for cortisol determination within 0.5 – 10 μg/mL domains of cortisol, and with a relative standard deviation (RSD) = 9.1% (n = 10) when cortisol concentration is 10 μg/mL. The second method (with BT dye) allows for hormone determination within 0.2 – 1 μg/mL of cortisol domain, and with a RSD = 0.75% (n = 10) when cortisol concentration is 1 μg/mL. The cortisol levels in the different saliva samples analyzed ranged between 64.8 ± 6.5 and 200 ± 20 nmol/L by the first method and between 25.7 ± 2.6 and 46.1 ± 4.5 nmol/L by method with BT dye.

The method using BT pigment is more sensitive method than method with Prussian blue dye for the measurement of salivary cortisol.

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Biosynthesis of microbial inulinase using a strain of *Aspergillus niger*

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KEYWORDS: microbial inulinase; enzymatic activity; protein concentration; *Aspergillus niger,* enzymes.

ABSTRACT

Inulinases (1-β-D-fructan fructanohydrolases) have diverse applications and can therefore be used in industries such as food (in the production of high fructose syrup and other types of sweeteners), pharmaceutical (in the biosynthesis of compounds such as citric and lactic acid) and biofuels (in the production of bioethanol, butanol). Due to their qualities, but also because they can be obtained in fermentations with media that use industrial waste (from the food industry, in particular), these enzymes remain the focus of attention of the scientific community.

In the present study, the production of microbial inulinase was monitored on various types of liquid media using a strain of *Aspergillus niger*. Fermentations were monitored by periodic determinations of pH, protein concentration, enzymatic activity and biomass. The obtained results reveal the fact that the producing strain developed best on the medium with 8.5% carob. During the fermentation, the protein concentration reached a maximum of ~0.9 mg/mL and the maximum enzyme activity was ~6.0 U/mL.

The results obtained indicate the potential of *A. niger* strain as a viable inulinase producer and its possible application in the amelioration of metabolic and nutritional disorders by improving the processing of dietary fructans.

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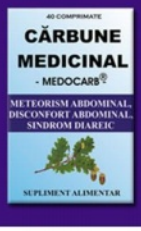
ELIDOR

In prezent, **AXA MICROBIOM - CREIER** a devenit un concept extrem de important, mai ales in mecanismele patogenetice din bolile neurodegenerative si, drept urmare, poate deveni si un target terapeutic, in corectarea unor statusuri disbiotice care afecteaza sistemul nervos central grav.
S-a demonstrat ca simptomele bolii Alzheimer se pot transfera la organisme tinere prin transplantul de microbiom, prin prezenta bacteriilor cauzatoare de inflamatie, astfel incat microbiomul reprezinta un pivot in declansarea si producerea bolii Alzheimer. Inflamatia crescuta, produsa de bacteriile in intestin este corelata cu declinul cognitiv la pacientii cu boala Alzheimer.

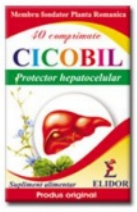
INTELEGAND ROLUL MICROBIOMULUI, IN STADIILE PRECOCE ALE DEMENTEI, CONCLUZIONAM CA TRATAMENTUL PREVENTIV POATE EVITA DEGRADAREA NEUROCOGNITIVA PRIN ABORDARE

DETOXIFIEREA INTENSIVA, RAPIDA, PROFUNDA si EFICIENTA. Binomul frectie **MaxFLUrex – Ortogel** este pompa de suctiune pentru factorii inflamatori cantonati in periferie. Acestia sunt drenati si dirijati spre caile renale, apoi eliminati. Metodologia practica este simpla: initial frectia MaxFLUrex se aplica prin masaj sistematic pe intreaga suprafata cutanata cu antrenarea grupelor musculare cate 5-7 min, cu pauze de 15 min. Urmeaza aplicatia de Ortogel, pe aceeasi suprafata cutanata. Sedintele de masaj se repeta la intervale mai scurte (3h) sau mai lungi (6-8h) in functie de gravitatea bolii.

Noi am asociat intotdeanuna cu **DEPUREX si PUROFORT,** combinatie numita ***„formula de detoxifiere”***.



În compoziția **Cărbunelui Elidor**, identificăm ***compuși fenolici s***olubili în apă, cu masă moleculară între 500-3000. ***Taninii*** au calități astrigente, bactericide și fungicide. Caracterul antiseptic este condiționat de prezența ***polifenolilor.*** Nivelul de tanini în ghindă nativă (netratată termic) este de 11,69%, iar după tratamentul termic, nivelul de tanini ajunge la 8,55% (deci se pierde 3,14% din conținutul taninilor) (dr Sveto Rakić Belgrad). Subliniem că, în urmă tratamentului termic, fenolii au rămas la un nivel crescut, ceea ce permite produsului final să exercite ***activități antioxidative.*** Activitatea antioxidantă implică funcții biologice vitale: ***antimutagene antiinflamatorii, antiaging, antineoplazice.***



CICOAREA - este hepatoprotector, creste satietatea, scade rezistenta la insulina, creste metabolismul lipidic, contine acid cicoric, acid clorogenic, polifenoli. Este ***gastroprotector, antiinflamator, antidiabetic.***
ANGHINAREA, are activitate complexa, ***hepatoprotectoare, anticarcinogema, antioxidativa, regleaza nivelul colesterolului, hipoglicemianta.*** Are efecte ***hepatoprotectoare la pacientii cu steatoza hepatica nonalcoolica si efecte salutare pe ficatul alcoolic.*** Reduce colesterolul total la pacientii cu colesterolemie.
CICOBIL - un produs **ELIDOR** aflat pe piata romaneasca de cativa ani si care reprezinta un instrument performant in reglarea subtila a metabolismului lipidic, glucidic, ca si a functionalitatii cerebrale

Am utilizat **VENOFLUID** la femei cu vârste cuprinse între 25-85 ani, care prezentau edeme mai mult sau mai puțin vizibile rămână în ortostatism, în cursul serii pot prezența dureri accentuate, de la nivelul gleznei până la genunchi, care la nivelul membrelor inferioare. Aplicația matinală de **VENOFLUID** determina dispariția edemelor funcționale din zona respectivă. Mai mult, persoanele care în timpul zile sunt obligate, prin profilul meseriei, să persistă în timpul nopții și pot afecta calitatea somnului. Administrarea de **VENOFLUID**, înainte de culcare, la nivelul membrelor inferioare, oferă pacienților un somn confortabil, fără dureri. Sunt foarte multe cazuri, de pacienți tratați cu **VENOFLUID**, cu rezoluția acestui sindrom dureros, disfuncțional de insuficientă venoasă.

Activitatea medicala, desfasurata peste treizeci de ani, la Spitalul Floreasca, a creat determinarea identificarii unor solutii practice pentru pacientii internati in stare extrem de grava, in numeroase cazuri, comatosi.

Impreuna cu dr Ovidiu Bojor am fondat Planta Romanica, unde a existat un schimb permanent de idei.

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