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"e-FACTORY OF SCIENCE"

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**THE BOOK
OF ABSTRACTS**

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The Book of Abstracts

April 06, 2024



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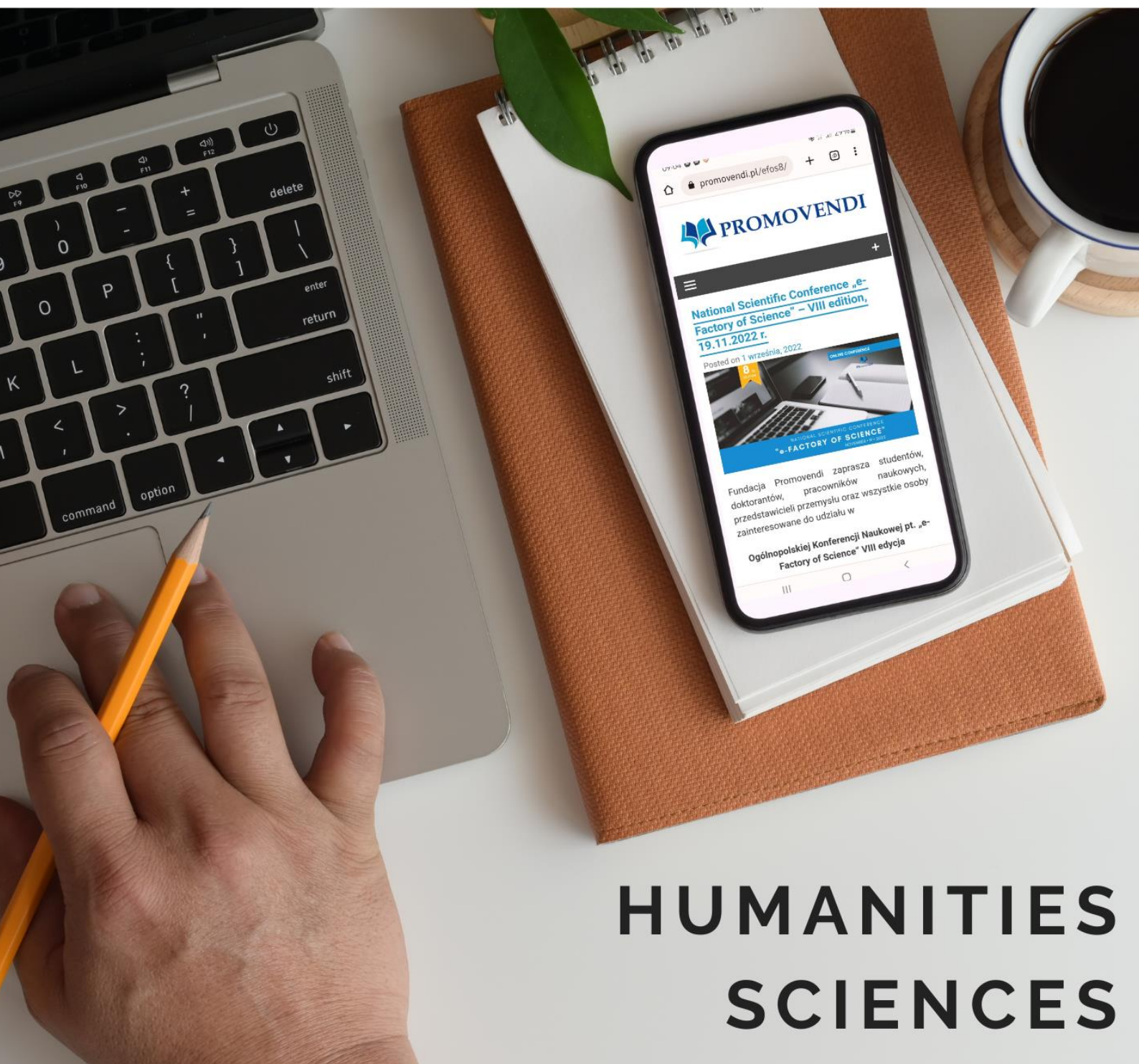
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ABSTRACTS OF PRESENTATIONS



**HUMANITIES
SCIENCES**



INCLUSIVE URBAN SPACES: DESIGNING FOR PEOPLE 60+

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A few words about the author(s):

Design student, interested in pro-social, inclusive and universal design.

Abstract:

This presentation explores the pivotal role of universal design principles in shaping urban spaces to accommodate the diverse needs of aging populations, focusing particularly on seniors aged 60 and above. By integrating concepts such as active ageing, ageing in place, and the therapeutic environment, it highlights the importance of creating inclusive environments that promote independence, social engagement, and overall well-being for older individuals. Key considerations such as accessibility, sense of security, social support, privacy, and the integration of nature into urban environments are discussed as essential components of age-friendly cities.

Keywords:

inclusive, urban, design, seniors



HOW TO RECOGNIZE IF SCIENTIFIC FILMS TELL THE TRUTH?

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A few words about the author(s):

I am student of Film and Television Production Organization within the framework of Individual Interdisciplinary Studies at the University of Silesia. I am interested in cinematography and theatre.

Abstract:

Contemporary media often present science in a format accessible to mass audiences, blending scientific facts with elements of popular culture. However, there is a significant distinction between popular science programs based on scientific evidence and those that propagate speculative theories. This presentation analyzes two television programs: "Ancient Aliens" and "Cosmos: A Spacetime Odyssey," to understand their approach to presenting science. "Ancient Aliens" focuses on hypothetical theories about ancient astronauts, while "Cosmos: A Spacetime Odyssey" narrates scientific facts related to astronomy and cosmology. The presentation compares the goals of the creators of both programs and suggests ways to verify the presented content. It also underscores the importance of a critical approach to information and the necessity of checking sources and the expertise of experts involved in creating scientific programs.

Keywords:

scientific films, parascience, fake news



ECONOMIC PSYCHOLOGY – ADVERTISING AND ITS IMPACT ON SHOPPING

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A few words about the author(s):

I am a first-year economics student at the Jan Grodek state university in Sanok. I am 33 years old.

Abstract:

My presentation talks about the economic psychology of advertising and its impact on shopping. I will show advertising goals, types of advertising, what are the functions of advertising. I also present an interpretation of the advertisement.

Keywords:

advertising, psychology, consumer, marketing, emotions



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THE IMPORTANCE OF EDUCATION AND PROFESSIONAL DEVELOPMENT IN THE SUCCESSION PROCESS IN FAMILY BUSINESSES

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A few words about the author(s):

The author is a PhD student at the Poznań University of Technology in the discipline of management and quality science. Her research interests include brand management and factors influencing succession in family businesses.

Abstract:

Education and professional development are essential to the succession process in family businesses and are key to passing on control and resources to the next generation. They provide potential successors with the necessary competencies to manage their business and preparing them for the challenges of the future. The current lack of workers on the labour market and the worsening demographic situation may result in a situation in which no immediate family member becomes the successor. It is also possible a situation when the company decides to keep the family property, but the successors hire an external manager. In each of these situations, the competencies of the potential manager and conscious career planning and professional development are crucial, which not only guarantee the selection of a suitable successor, but also the long-term stability of the business. The best result can be achieved by including succession planning with a conscious and well-founded career path and professional development based on the family business. Proper preparation of successors, requiring time and investment in formal education and practical experience, is crucial to the continuity of the company, regardless of whether the successor is a family or an external manager. For this reason, professional development and education should be seen as the foundation for the succession of family businesses, ensuring their sustainability and development for future generations.

Keywords:

family business, succession, professional development



LEVERAGING DIGITAL MARKETING CHANNELS IN EMPLOYEE RECRUITMENT

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A few words about the author(s):

A student of the SGH Warsaw School of Economics specializing in HRBP and a graduate of Wrocław University of Science and Technology. She professionally integrates HR, digital marketing, and the utilization of new technologies in business.

Abstract:

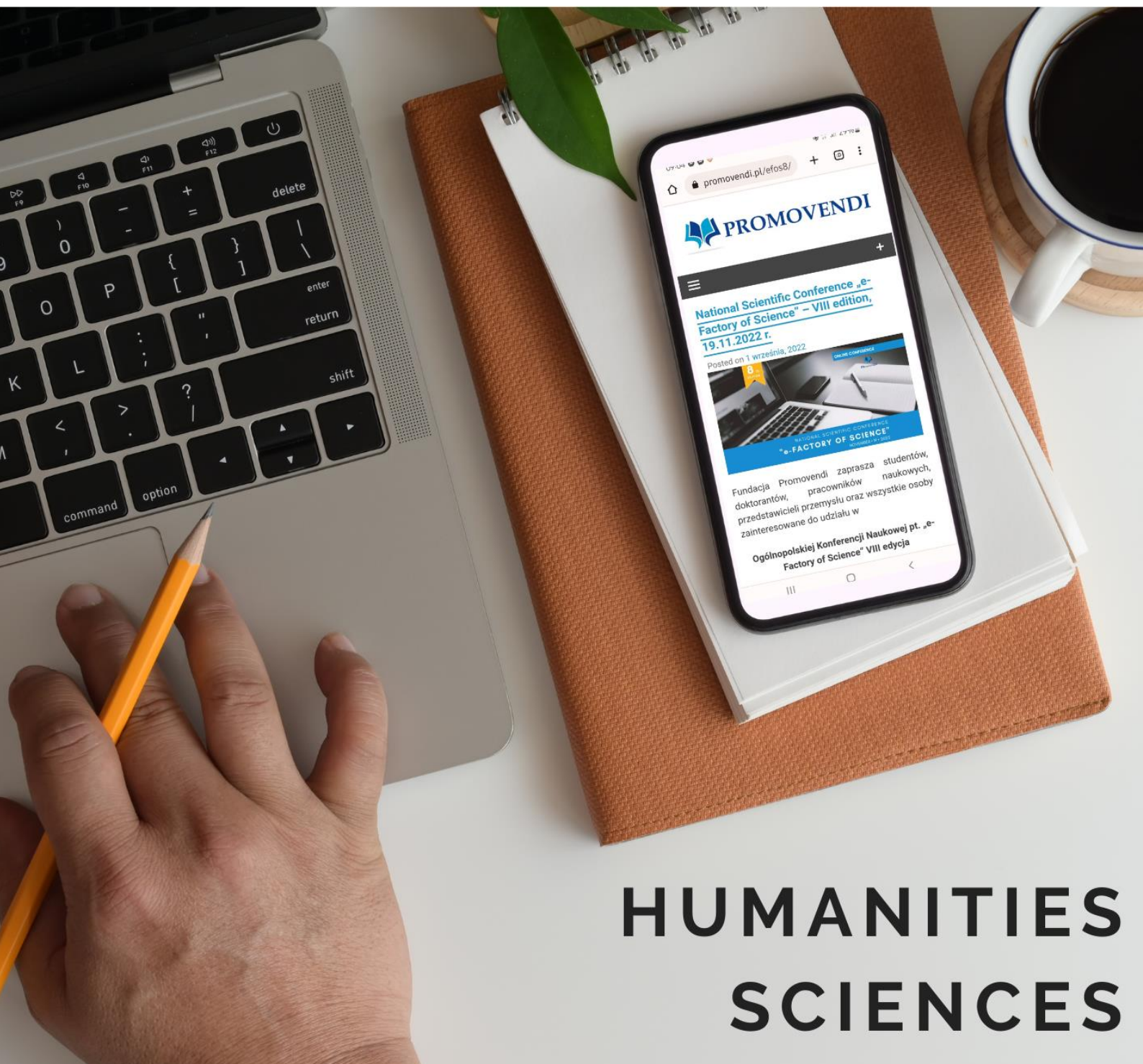
The accelerated digitization of HR processes within enterprises, driven by the ongoing advancement and widespread adoption of new technologies, has significantly transformed the landscape of talent acquisition. This exploration delves into the parallels between candidate acquisition processes and marketing methodologies, highlighting the convergence of HR and digital marketing realms and elucidating the similarities in targeting, engagement, and conversion strategies employed in both domains.

Furthermore, the presentation offers an extensive overview of the diverse array of marketing channels utilized in modern recruitment practices. Through case studies, the effective application of digital marketing channels, ranging from social media platforms to targeted advertising campaigns, in attracting and engaging top-tier talent will be illustrated. The presentation includes also insights into optimizing their recruitment strategies through the strategic integration of digital marketing channels, informed by real-world examples and industry best practices.

Keywords:

digital HR, talent acquisition, recruitment marketing

ABSTRACTS OF POSTERS



HUMANITIES SCIENCES



SUPPLIERS PROCESS MATURITY ANALYSIS IN THE AVIATION INDUSTRY

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A few words about the author(s):

I am in my fourth term of Business and Production Engineering studies at Poznan University of Economics and Business. Actively engaged in a student scientific circle, I contribute to various projects focusing on Sustainability and Quality Management.

Abstract:

Monitoring supplier performance is a key element in maintaining and improving product quality, as well as controlling the impact of an organization's actions on the environment. In integrated management systems, such as the Quality Management System (ISO 9001) and Environmental Management System (ISO 14001), supplier activity control is a standard requirement. Therefore, organizations seeking certification are obligated to conduct audits of their suppliers. The aim of this study was to thoroughly examine the process maturity among 22 suppliers of a British company specializing in the production of aircraft seats. The study focused on 12 key areas covering sales, planning, design, supplier management, production, quality control, customer service, and sustainability. Each area was further divided into 4 elements: people, tools, and performance indicators. Suppliers individually evaluated their performance in each element of every area using a 5-point scale. The study's findings revealed that suppliers rated sustainable development and responsibility as the lowest-performing processes, while sales, master planning, and sequencing were identified as the highest-rated processes. In conclusion, most suppliers demonstrated a predominant focus on ensuring the quality of their processes, highlighting a relative neglect of processes related to environmental and social responsibility.

Keywords:

Quality Management, Environmental Management, Process Maturity, Suppliers Assessment, Process Management

ABSTRACTS OF PRESENTATIONS



MEDICAL SCIENCES



MOLECULAR DETECTION OF VIRULENCE GENES AMONG ENTEROCOCCUS FAECALIS STRAINS ISOLATED FROM URINARY TRACT INFECTIONS

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A few words about the author(s):

Academic teacher at the Medical University of Lublin conducting microbiology classes with students of different faculties. The scientific interest includes mechanisms of antimicrobial resistance, bacterial virulence and enterococcal infections.

Abstract:

Enterococcus is a genus, which contains bacteria representing the natural microbiota. However, they may also be the cause of infections, such as urinary tract infections. One of the most important species of the genus is *E. faecalis*, which harbours different virulence factors and mechanisms of antibiotic resistance.

The study included 15 *E. faecalis* strains isolated from urine samples from outpatients with urinary tract infections (LuxMed Laboratory, Lublin). They were identified to the species level by using biochemical methods. Bacterial DNA was isolated using ultrasound. Next, the PCR reactions were carried out to check the presence of virulence genes such as aggregation substance, gelatinase, cytolysin, enterococcal surface protein and hyaluronidase. PCR products were visualized by electrophoresis.

Genes for gelatinase and aggregation substance were detected in 13 out of 15 strains (86.7%), enterococcal surface protein in eight (53.3%) and cytolysin in five (33.3%). There were no detected genes for hyaluronidase in any of the tested sample.

The prevalence of virulence genes among strains included in the study is high. All strains have at least one gene encoding one out of five virulence factors tested. However, isolates carrying all five genes tested were not detected. The most common virulence factors in *E. faecalis* were aggregation substance and gelatinase.

Keywords:

enterococcus faecalis, virulence factors, enterococci



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CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIBACTERIAL PROPERTIES OF THE AERIAL PARTS OF *ALCHEMILLA SPECIOSA* BUSER (ROSACEAE)

Sebastian Kanak (1)*, Wioleta Dołomisiewicz (1), Małgorzata Miazga-Karska (2), Barbara Krzemińska (1), Katarzyna Dos Santos Szewczyk(1)

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A few words about the author(s):

The authors work at the Faculty of Pharmacy. Their research focuses on phytochemical analysis of the biological activity of plant extracts.

Abstract:

Alchemilla speciosa is one of the representatives of the genus *Alchemilla* L. (F. Rosaceae Juss., subfam. Rosoidae Focke) including about 1,000 species, among which over 300 occur in Europe. The herb of *A. speciosa* is used in traditional medicine as a remedy for numerous ailments, namely: eczema, wounds, ulcers, dysmenorrhea, menopausal complaints as well as to improve metabolism. The aim of the study was to determine the chemical composition, antioxidant and antibacterial activities of various extracts obtained from the aerial parts of *A. speciosa*. Total Phenolic Content (TPC), Total Flavonoid Content (TFC), Total Phenolic Acids Content (TPAC) were analyzed spectrophotometrically and chemical composition were determined by LC-ESI-MS/MS. Antioxidant activity was tested using the DPPH• and ABTS•+ in vitro methods. The antimicrobial activity of extracts was examined in vitro against aerobic and anaerobic bacteria. Our results showed that methanol-acetone-water (3:1:1, v/v/v) extract have the highest content of polyphenols (206.438 mg GAE/g DE), flavonoids (141.371 mg/QE g DE) and phenolic acids (0.324 mg/CAE g DE). An LC-MS analysis revealed the presence of 27 compounds belonging to flavonoids and phenolic acids. Taking into consideration promising analytical results, this study seems to be of particular importance for a deeper understanding of using *A. speciosa* in traditional medicine, as well as would be useful for future medical application of this species.

Keywords:

Alchemilla, antioxidant, antibacterial, LC-ESI-MS/MS, polyphenols



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FETUIN A – A NOVEL MARKER OF METABOLIC DISEASES

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A few words about the author(s):

Authors of paper are 3rd year medical students. Much of the scientific work is collaborative with the student microbiology club supervised by Małgorzata Koziół- PhD in microbiology and Kamil Baczewski PhD, MD, a specialist in cardiac surgery.

Abstract:

According to the World Health Organization (WHO), cardiovascular disease (CVD) is one of the leading causes of death worldwide, contributing to the deaths of approximately 17.9 million people each year. Metabolic syndrome is one of the major risk factors for these diseases. This term refers to the coexistence of several risk factors, such as obesity, dyslipidemia, hypertension and insulin resistance, leading to an increased risk of type 2 diabetes and cardiovascular disease.

Fetuin-A, a factor secreted by adipose tissue, is an important factor in the pathogenesis of cardiovascular disease (CVD) and insulin resistance. Studies suggest that low levels of fetuin-A may be associated with a worse prognosis in patients after myocardial infarction (MI) and increased long-term CVD-related morbidity and mortality. In addition, high levels of fetuin-A may correlate with impaired glucose metabolism and insulin resistance, potentially leading to the development of type 2 diabetes. Adipokines, including fetuin-A, play an important role in the regulation of metabolism and may be a significant factor in the development of the metabolic syndrome. Studies of the mechanisms of action of fetuin-A and its potential clinical benefits are essential to better understand and use this protein in the context of cardiovascular health and diabetes management.

Keywords:

fetuin A, metabolic disease, cardiovascular disease, diabetes



MYCOLOGICAL SAFETY OF KOMBUCHA DRINK

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A few words about the author(s):

O. Kwiatkowska is a student in the final year of her master's studies in Biotechnology. I. Jonik holds her MSc degree in Chemistry. Dr. Sadok is an analytical chemist. Dr. Rachwał conducts research in microbiology.

Abstract:

The aim of the study was to investigate how the temperature of the kombucha fermentation process affects the development of mold and mycotoxin contamination. Kombucha fermentation was carried out at three temperatures: 17 °C, 22 °C and 25 °C for 14 days. Beverage samples were taken on different days of fermentation and microbiological cultures were performed on three media: wort agar, MRS and nutrient agar. Mold identification was performed using matrix-assisted laser desorption/ionization mass spectrometry technique with a time-of-flight analyzer (MALDI-TOF MS) and Biotyper software (Bruker). Mycotoxins were determined using a liquid chromatograph connected to a DAD detector or mass spectrometer. The results so far allowed us to conclude that the mold was grown on wort agar, and most of it developed from samples that came from fermentation carried out at 25 °C. The authors managed to identify the molds belonging to species *Aspergillus flavus* and *Aspergillus niger*. The kombucha samples were also analyzed in terms of contamination with selected mycotoxins such as aflatoxins and ochratoxin A and patulin. They are very dangerous to health and they cause a major health problems so it is important to monitor the conditions of the kombucha fermentation process. The obtained results will be helpful to assess the level of safety of consuming this drink prepared at home.

Keywords:

kombucha, mold, mycotoxin contamination, fermentation



CONTINUATION OF RUBELLA VACCINATION PROGRAM IN PREVENTION OF CONGENITAL INFECTION: A REVIEW OF THE CURRENT SITUATION

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A few words about the author(s):

The Author of this work is student attending 3rd year of medical faculty. I conduct a great deal of science work in Medical Microbiology Students Research Group supervised by Małgorzata Koziół, PhD in microbiology.

Abstract:

Rubella is a mild infectious disease caused by enveloped RNA virus included to the Rubivirus and Matonaviridae family. Pathogen is transmitted through respiratory droplets. Up to 25%-50% of infected people can be asymptomatic. Rubella virus belongs to TORCH pathogens (Toxoplasmosis, Others, Rubella, Cytomegally, Herpes) which infection we checked during pregnancy. Rubella infection during early pregnancy can cause fetal death or Congenital Rubella Syndrome (CRS). CRS can lead to many birth defects also known as the Gregg triad which includes congenital heart diseases, hearing impairment, and cataracts. Vaccines made it possible to reduce rubella cases, as well as congenital rubella declined, mostly in highly developed countries. According to the data Poland has one of the highest incidence rate of rubella in all of Europe, about 70% (in 2022). In 2020 Poland reported 98 cases; 2021/50; 2022/147; 2023/262, but only a few were laboratory confirmed. For the last few years, no cases of CRS were reported. Vaccination rate in Poland in 2020 was 80%; 2021/71%; 2022: range 70-90% 1st dose. One dose of rubella containing vaccine is about 97% effective at preventing rubella. According to the World Health Organisation 80% coverage of the first dose is enough to achieve herd immunity. The aim of this work was to present characteristics of Rubella virus infection and follow current vaccination situation of society in prevention CRS.

Keywords:

pregnancy, MMR, CRS, TORCH



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SURGICAL TREATMENT OF HYDROCEPHALUS CAUSED BY STRUCTURAL MALFORMATION OF THE CEREBELLUM

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A few words about the author(s):

My name is Katarzyna Bazylewicz. I am a doctor and currently I am doing my speciality training (residency) in Department of Imaging Diagnostics and Interventional Radiology in Independent Public Clinical Hospital No. 1 PUM in Szczecin.

Abstract:

There are many causes of congenital hydrocephalus. One of them is Arnold Chiari malformation. This congenital structural defect of the brain involving displacement of the structures of the posterior cerebellum through the occipital foramen into the spinal canal. The incidence of which is estimated at about 1/1,000 people, although due to better accessibility to imaging studies it is now being increasingly recognized. Currently, six types of Arnold-Chiari malformation have been distinguished, among which types 1 and 2 are the most common. The concavity of the cerebellar tonsils into the great aperture of the skull can cause impaired outflow of cerebrospinal fluid, resulting in noncommunicating hydrocephalus and increased intracranial pressure. In the course of the above condition, the following symptoms can be observed: headaches, difficulty swallowing, neck pain. To make a diagnosis of Arnold Chiari malformation, a reliable medical history, neurological examination and imaging studies (MRI) are most useful. In this presentation, I will introduce the topic of imaging diagnosis of Arnold Chiari malformation and present indications for surgical treatment and methods of treating the above defect and brain imaging after surgery.

Keywords:

Arnold Chiari malformation



THE FATE OF DRUGS IN THE ENVIRONMENT

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A few words about the author(s):

Scientific activity is related to the optimization and validation of chromatographic systems for API analysis, stability tests, the impact of UV-Vis radiation and determining degradation routes, as well as the possibility of API bioremediation.

Abstract:

Global pharmaceutical consumption continues to grow, especially in countries with the highest levels. Very often the antibiotics used in agriculture are the same ones that are used in human medicine. Antibiotics entering the environment may undergo biotic or abiotic degradation by hydrolysis or photolysis. However, since these drugs are often administered orally, they are most often insensitive to hydrolysis. Therefore, direct or indirect photolysis is considered to be the main cause of their degradation in aquatic ecosystems. Antibiotics and their transformation products released into the environment can change the structure of bacterial communities. Their presence in the environment, even in subthreshold doses, may be associated with chronic toxicity.

The current knowledge about the prevalence, ecotoxicity and threats to human health associated with the use of pharmaceuticals is far from complete. To ensure the environmental safety of new and existing substances, the environmental fate and potential effects of their release to the environment must be assessed. It should also include an assessment of the possible consequences for the ecosystem, not only its presence, but also of changes in concentrations of pharmaceuticals and their mixtures (e.g. in the form of photodegradation products). In fact, the lack of ecotoxicological data is reported to be a major obstacle to assessing the environmental risk of therapeutic drugs.

Keywords:

hydrolysis, photolysis, drugs, environment



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THE ROLE OF SAGITTAL ALIGNMENT OF THE SPINE IN MAINTAINING STRUCTURAL AND FUNCTIONAL INTEGRITY

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A few words about the author(s):

The main interests of the authors include physiology, biomechanics, and functionality of the human body.

Abstract:

The complex architecture of the human spine plays a crucial role in maintaining structural integrity and performing functional movement. Among its multifaceted features, the sagittal plane, representing curvature from front to back, is a significant factor in shaping proper body posture and overall spinal biomechanics. Understanding the relationship between the shape of the sagittal plane and its functional implications and pain perception has become a significant area of scientific research in recent years. This is especially relevant given the existence of many deviations from optimal body alignment, which arise from complex multifactorial causes.

This paper aims to delve into the complex relationship between the shape of the sagittal plane of the spine and its noticeable impact on structural and functional changes in individuals. The objective of this article is to determine the role of the sagittal plane of the spine and lumbopelvic parameters in maintaining structural and functional integrity, discuss the relationship between the lumbar spine position and lumbopelvic balance, and explore the pathogenesis of certain spinal dysfunctions.

Keywords:

spine, sagittal plane, functional integrity, structural integrity



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MEDICAL ROBOTICS IN GYNECOLOGY

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A few words about the author(s):

Joanna Huk - 2nd year medical student, others – 4th medical students. Student scientific society at institute of medical sciences.

Abstract:

In recent years, robotics has increasingly been applied in medicine, with its dynamic advancement enabling procedures to be performed utilizing medical robots, which were previously conducted using conventional methods. This article focuses on the application of medical robotics, particularly in gynecology. The review encompasses the key benefits of robotic techniques compared to laparoscopy, analyzing the distinctions between these two methods of gynecological surgery. The article discusses the drawbacks and limitations of medical robotics, identifying complications that may impact its effectiveness and dissemination. The final section summarizes and explores potential avenues for future advancements in medical robotics.

Keywords:

medical robots, robotics in gynecology, gynecological surgery



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A GLOBAL OUTBREAK OF MPOX – CLINICAL CHARACTERIZATION AND CURRENT EPIDEMIOLOGICAL SITUATION

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A few words about the author(s):

Authors of this work are students attending 2nd&3rd year of medical faculty. We conduct a great deal of science work in Medical Microbiology Students Research Group supervised by Małgorzata Koziół, PhD in microbiology.

Abstract:

While the world was dealing the COVID 19 pandemic, in July 2022, the World Health Organization (WHO) declared another viral disease- Mpox as public health emergency of international concern. The Mpox disease is a viral zoonotic infection caused by dsDNA virus called MPXV which is most commonly found in the central and western parts of Africa. Recent global outbreak showed that viruses can spread fast. Mpox is transmitted by rodents, monkeys but also human-to-human. The clinical manifestation include: fever, confusion, restlessness, 3-4 days later rash shows up located on face, chest, hands and covering the whole body. Its symptoms are quite close to smallpox, which is caused by the similarity of these pathogens. Currently increased population movement between continents for economic or tourist reason is a factor enabling for the spread of many viral infection. Cases of mpox outside endemic areas have been reported since 2003. Research on vaccines that strictly protect against MPXV is currently underway, but during outbreak ability to quickly and inexpensively test population and undertake treatment plays a key role. The COVID19 pandemic showed that every element is needed in the successful fight against infection. Mpox is real danger for public health and everything can change from week to week. Its spread should be constantly monitored and preventive measures taken. The aim of the study was to present the Mpox disease problem based on recent global outbreak.

Keywords:

MPXV, pandemic, zoonotic disease, viral infection



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LITERATURE REVIEW – IS A TATTOO A RISK DURING CENTRAL ANESTHESIA?

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A few words about the author(s):

Kacper Kazimierczuk and others – 4th year medical students, Joanna Huk – 2nd year medical student, Student scientific society at institute of medical sciences

Abstract:

Literature review – Is a tattoo a risk during central anesthesia?

The aim of this study is to summarize the current state of knowledge regarding anesthesia in the lumbar spine, where the skin is covered with pigment, and the risk of complications. A number of publications on the above-mentioned topics were reviewed based on the databases: PubMed and Google Scholar. The work focuses on existing cases and evidence whether central anesthesia through the skin where the tattoo is located poses a threat to the patient's health or life.

Keywords:

tattoo, central anesthesia, lumbar spine



LITERATURE REVIEW – CURRENT STATE OF KNOWLEDGE ABOUT WHIPPLE'S DISEASE

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A few words about the author(s):

Tomasz Klaudel, Jakub Sadowski, Michał Pelczarski, Michał Sikorski and Karolina Tomasik are students of scientific society at Institute of Medical Sciences.

Abstract:

The aim of this study is to summarize the current state of knowledge about Whipple's disease. Focusing on the characteristics of the materials and methods used as well as the results obtained and conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed, Embase and Google Scholar. The work particularly focuses on the pathogenesis of the above phenomenon, taking into account differential diagnosis and therapeutic procedures depending on the type of disease and leading symptoms.

Keywords:

Whipple's disease, Tropheryma whipplei, Treatment of Whipple's disease



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BIOCOMPATIBLE AND BIODEGRADABLE NOVEL COSMETIC RAW MATERIALS FOR COSMETIC AND BIOMEDICAL APPLICATIONS

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A few words about the author(s):

She is multidirectionally developing research on the synthesis of substances with cosmetic applications and on the comprehensive evaluation of the potential therapeutic efficacy of cosmetic substances and their impact on the environment.

Abstract:

The study focuses on the development of biocompatible and biodegradable novel bio-ferments for cosmetic and biomedical applications. Bio-ferments, which are innovative cosmetic raw materials, were obtained by fermenting plant materials with appropriate strains of the bacteria *Lactobacillus*. The benefits of lactic fermentation with natural herbs used for cosmetic and biomedical purposes were combined to get additional benefits, such as biodegradability properties, increased bioavailability, and biocompatibility of the final product.

Keywords:

biomedical applications, biocompatible, biodegradable, novel cosmetic raw materials



THE APPLICATION OF NITROGENOUS BASES AND NUCLEOSIDES IN DIETARY SUPPLEMENTS FOR ATHLETES

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A few words about the author(s):

Engineer of Biotechnology. Second year student of master's studies at the Gdańsk University of Technology, Faculty of Chemistry. Fitness instructor.

Abstract:

Nowadays, increasing number of dietary supplements are available on the market. In comparison to medical products, dietary supplements do not have to fulfil such very strict requirements as regards their health effects in humans. Here the supplements, which contain nucleosides are correlated and discussed. Nitrogenous bases and nucleosides are the main components of nucleic acids. Numerous studies suggest that products, which contain components of nucleic acids have a positive impact on athletes. In order to find out the state of knowledge about dietary supplements among people who keep an active lifestyle, the survey was designed and conducted. The survey consisted of 8 questions. The first part of the survey concerned the respondents – their gender, age and frequency of physical activity. The second part of the survey was focused on supplementation. The results turned out to be surprising. Among the respondents, men more often purchased the dietary supplements than women (87% vs. 62%). These results differed from statistical data provided by PMR Market Experts in 2019 showing that women more willingly chose dietary supplements than men (46% vs. 33%). People who are interested in physical activity seemed not to be aware of the importance of supplementation with components of nucleic acids. In summary, although the dietary supplements become more and more popular, consumers seem not always pay sufficient attention to composition and dosage of preparations they ingest.

Keywords:

dietary supplements, nucleosides, nitrogenous bases, sport, diet



COMMUNICATION MODELS OF THE DOCTOR-PATIENT-FAMILY RELATIONSHIP

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A few words about the author(s):

I am a student at Rzeszow University of Technology, Faculty of Physics and Applied Mathematics. I am in my fourth year of medical engineering, and I am interested in medical-related sciences.

Abstract:

The purpose of the study was to present different models of the doctor-patient-family relationship, taking into account changing legal and organizational regulations, with emphasis on the role of the family as an important subject of health care. The research methods used were document analysis and critical content analysis of publications. Conclusions were drawn on four models of doctor-patient-family relations, from a model that ignores cooperation with the family to a partnership model. The tasks and competencies of the family physician were discussed, situating family medicine between the second and third models of the doctor-patient-family relationship. Attention was drawn to the need for new training of doctors and nurses and a new vision of their role, where they should be the main advisors, consultants and professional guides of the family, engaging in traditional health tasks. In situations of sudden illness or health emergency, doctors remain the indispensable experts in treating and restoring health.

Keywords:

physician, patient, family, communications, organization of medical care



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APPLICATION OF 3D PRINTING IN MEDICINE

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A few words about the author(s):

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Abstract:

The aim of this study is to summarize the knowledge on the impact of technological development on the progress of medicine in the aspect of the use of 3D printing in modern therapeutic and educational strategies. A number of publications on the above topics were reviewed based on the databases: PubMed, Elsevier and Google Scholar. The study focuses on the use of 3D printing in many aspects, including planning surgical procedures, imaging knowledge of anatomical structures at early levels of education, developing personalized medical products dedicated to specific patients, improving therapeutic activities in specific fields of medicine.

Keywords:

3D printing, medical education, application in medicine



LITERATURE REVIEW, SUMMARY OF THE CURRENT STATE OF KNOWLEDGE ABOUT OSTEOPOROSIS

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A few words about the author(s):

Student Scientific Society at Institute of Medical Sciences.

Abstract:

The aim of this study is to summarize the current state of knowledge about osteoporosis. The disease is characterized by impaired structure and strength of the skeletal system, resulting in an increased risk of fractures. Focusing on the most important clinical issues, a systematic literature review was conducted to include key information on diagnosis, epidemiology, etiology, risk factors and therapeutic and prophylactic management. Considering the characteristics of the materials and methods included and the results obtained leading to the conclusions stated in each article, a systematic literature review was conducted using databases: PubMed, Elsevir and Google Scholar.

Keywords:

osteoporosis, osteoporotic fractures, densitometry, bisphosphonates



LITERATURE REVIEW, SUMMARY OF KNOWLEDGE ABOUT MUCOPOLYSACCHARIDOSIS TYPE 1

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A few words about the author(s):

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Abstract:

The purpose of this study is to review and summarize the current state of knowledge about mucopolysaccharidosis type 1. Considering the characteristics of the materials and methods included, as well as the results obtained and the conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed, Elsevier and Google Scholar. The work particularly focuses on the etiology and pathogenesis of the above phenomenon, taking into account diagnosis, etiology, differential diagnosis, and therapeutic procedures depending on the clinical course.

Keywords:

mucopolysaccharidosis type 1, lysosomal enzyme defect, hypertrophy and deformation of various connective tissue structures



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INIURIES TEENAGE FOOTBOLLERS PREVENTION AND RETURN TO THE GAME

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A few words about the author(s):

Janina Rzeszot, M.A. Physiotherapist, I work in home physiotherapy in Warsaw.

Abstract:

Warm-up routines are commonly used to optimize performance in soccer and prevent injuries. Lack of warm-up classes can have a detrimental effect on athletes' physical performance. Manipulating volume, intensity, and recovery can positively or negatively affect later results. Pathological changes in the musculoskeletal system. The findings suggest the presence of neurological sequelae to soccer play, even in college-level players. Age and gender affect ligament laxity and the ratio of quadriceps to hamstring strength. In girls after the first menstrual period, anterior cruciate ligament prevention programs should be implemented, consisting in improving the dynamic control of the knee joint by placing emphasis on strengthening the hamstring. The most common injuries affecting an athlete involve the skin. Almost all sport enthusiasts are at risk of developing traumatic skin diseases occur in specific sports. Almost all athletes interact with the environment to some degree. Athletes are at risk of developing both benign and malignant tumors. Outdoor sports enthusiasts are more likely to develop melanoma and non-melanoma skin cancer. Frequent use of sunscreen and protective clothing reduces and athlete's exposure to the sun. Football, a sport that is becoming increasingly popular in the United States, is a common cause of visits due to injuries. In 2000, approximately 144,600 children suffered football-related injuries, a percentage of 2,36 injuries per 1,000 children.

Keywords:

sport, injuries, footballers



REVIEW OF THE LITERATURE. CEREBELLAR ATAXIAS INHERITED IN AN AUTOSOMAL RECESSIVE MANNER.

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A few words about the author(s):

4th year medical students, student scientific society at institute of medical sciences.

Abstract:

The purpose of this study is to summarize the current state of knowledge about cerebellar ataxias inherited in an autosomal recessive manner. They constitute a group of diseases that require a multidisciplinary clinical and molecular approach. Focusing on the characteristics of the materials and methods used as well as the results obtained and conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed, Embase and Google Scholar. The work particularly focuses on the pathogenesis of diseases whose main symptom is cerebellar ataxia, taking into account the differential diagnosis and therapeutic procedures depending on the type of disease and leading symptoms.

Keywords:

ataxia, autosomal recessive, cerebellar ataxia, Friedreich's ataxia



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LITERATURE REVIEW – CURRENT STATE OF KNOWLEDGE ABOUT EISENMENGER SYNDROME

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A few words about the author(s):

4th year medical students, student scientific society at institute of medical sciences.

Abstract:

The aim of this study is to summarize the current state of knowledge on Eisenmenger syndrome. Focusing on the characteristics of the materials and methods used, as well as the results obtained and the conclusions contained in each article, a systematic literature review was conducted using databases: PubMed and Google Scholar. The work specifically focuses on the diagnosis and therapeutic management specific to the syndrome.

Keywords:

Eisenmenger syndrome, congenital heart disease, pulmonary arterial hypertension



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DIETARY SUPPLEMENTATION SUPPORTING THE TREATMENT OF DEPRESSIVE DISORDERS

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A few words about the author(s):

Scientific activity related to optimization of chromatographic conditions for analysis of biologically active substances in drugs and dietary supplements, as well as modification of physicochemical properties.

Abstract:

Throughout our lives, we all struggle with situations that force us to change our lifestyle, and even threaten our safety. The negative impact of human isolation has been proven many times, and a strong stressor such as pandemic or war, may exacerbate somatic ailments. Each person experiences this difficult time differently, but we all feel stress and tension. Research shows that in some forms of depression, chronic inflammation is observed, which activates the immune system and leads, among others to development of autoimmune diseases. Such a vicious circle deprives a person of the sense of making decisions. Due to the increasing occurrence of mood-worsening phenomena, such as depression, in modern societies, many authors point to changes in eating habits and lifestyle. At such times, it is worth reaching for substances that can help us improve our mood or support the treatment of depressive disorders. The most important ingredients which have the greatest impact on mood regulation include: tryptophan (substrate in formation of serotonin, one of the most important neurotransmitters), coenzyme q10 (stabilizes cell membranes, making them resistant to harmful factors), folic acid (affecting metabolism and regeneration of nerve cells), vitamins B6 and B12 (take part in regulation of serotonin synthesis and homocysteine metabolism), zinc and magnesium ions (regulation of immune system and activity of nerve cells) and omega-3 fatty acids (essential components of cell membranes).

Keywords:

depressive disorders, dietary supplements, mental health



LITERATURE REVIEW – CURRENT STATE OF KNOWLEDGE ABOUT HEMOCHROMATOSIS

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A few words about the author(s):

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Abstract:

The purpose of this study is to summarize the current state of knowledge on hemochromatosis. Focusing on the characteristics of the materials and methods used, as well as the results obtained and the conclusions contained in each article, a systematic literature review was conducted using following databases: PubMed, Embase and Google Scholar. The work particularly focuses on the operation of the pathogenesis of the above phenomenon, taking into account the differential diagnosis and therapeutic management and leading symptoms.

Keywords:

hemochromatosis, iron excess, HFE gene



REVIEW OF THE LITERATURE – PAROXYSMAL NOCTURNAL HEMOGLOBINURIA

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A few words about the author(s):

Szymon Wolaniuk, Kacper Kazimierzczuk, Joanna Huk, Samanta Ostrowska and Jakub Sadowski are students of scientific society at Institute of Medical Sciences.

Abstract:

The aim of this study is to summarize the current state of knowledge about paroxysmal nocturnal hemoglobinuria with particular emphasis on etiology, diagnostic procedure, clinical presentation, and modern therapies aimed at inhibiting the complement system. Focusing on the characteristics of the materials and methods used as well as the results obtained and conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed and Google Scholar.

Keywords:

Paroxysmal nocturnal hemoglobinuria, Eculizumab, Pegcetacoplan, PIGA gene, complement system



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CASE REPORT OF A 40-YEAR-OLD PATIENT WITH DEEP INFILTRATING ENDOMETRIOSIS (DIE)

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A few words about the author(s):

5th-year medical student at the Faculty of Medicine of the University of Opole, member of the Student Scientific Club of Gynecology and Oncological Genetics

Abstract:

INTRODUCTION: Endometriosis, affecting 7-15% of women, involves uterine mucosa growth outside the uterus. Diagnosis delays are common, and surgical treatment of endometriosis centres in Poland is lacking.

CASE REPORT: A 40-year-old patient diagnosed with deep infiltrating endometriosis (DIE) was admitted to the Department for planned laparoscopic anterior resection of the rectum. A history of gastrointestinal problems and very painful menstruation since the age of 13, as well as the ineffectiveness of painkillers and hormonal contraception. The endometriosis was diagnosed in 2008 and an anti-inflammatory diet and regular moderate physical activity were recommended, which according to the patient, alleviated the symptoms of the disease. Many tests were performed to treat infertility. In 2017, laparoscopic surgery for a chocolate cyst. Since 2022, the woman reported a significant increase in her symptoms and was referred to the ward for further treatment.

CONCLUSIONS: Deep infiltrating endometriosis (DIE) is a significant problem for patients suffering from it, as well as a diagnostic challenge for doctors. This disease affects a large number of women of reproductive age. Therefore there is a need to educate society, with particular emphasis on healthcare workers, about endometriosis to provide women with appropriate diagnostics, accurate diagnosis and optimal treatment. A properly selected diet and regular physical activity can alleviate the course of the disease.

Keywords:

endometriosis, DIE, gynecology, women

ABSTRACTS OF POSTERS



MEDICAL SCIENCES



IMPACT OF PHYSICAL ACTIVITY ON THE PREVENTION OF SCHIZOPHRENIA

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A few words about the author(s):

Master of Physiotherapy. Doctoral student at the Medical University of Lublin.

Abstract:

Schizophrenia is one of the most common mental illnesses in the world. According to the WHO, approximately 20 million people suffer from it. According to the current study, physical activity is one of the factors influencing the treatment of schizophrenia. Significant improvements in cardiorespiratory parameters and cognitive function have been observed in subjects, as well as an effect on positive and negative symptoms of schizophrenia.

Keywords:

schizophrenia physical activity



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ACCUMULATION OF BISPHENOL A® IN MUSHROOMS OF THE GENUS PLEUROTUS SPP.

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A few words about the author(s):

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Abstract:

The natural ability of mushrooms to absorb and accumulate all chemical substances present in their immediate environment has become a source of inspiration to undertake numerous scientific research in recent years. Nevertheless, mushrooms can accumulate both health-promoting substances, such as bioelements, and toxic substances - heavy metals and organic compounds, including Bisphenol A® (BPA). This organic chemical compound from the phenol group is widespread, although it has been withdrawn in the EU since 2010. It was used in the production of plastics or polyesters. Additionally, it was used in the food industry as an antioxidant and in cheaper cosmetics. Therefore, it is widely present in our environment. In the presented research work, the accumulation of Bisphenol A® in mushrooms of the genus *Pleurotus* spp. (*P. djamor*, *P. ostreatus*, *P. pulmonarius*) was investigated using the flow injection analysis (FIA) method. Moreover, the study determined the degree of its extraction into artificial digestive juices in the model digestive system in the prototype Gastroel-2014 device. The analysis showed that mushrooms accumulate BPA, regardless of the subsidized concentration, by over 90%, but also desorb the collected compound in a similar amount to digestive juices. Therefore, consuming mushrooms collected from polluted areas carries a serious danger resulting from the accumulation of this toxic compound in the human body.

Keywords:

absorption, accumulation, BPA, extraction, artificial gastric juice



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THE GENIUS OF CEFIDEROCOL

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A few words about the author(s):

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Abstract:

Bacterial drug resistance is a significant problem in current medical therapy. Infections caused by gram-negative bacteria (MDR-GNB) resistant to carbapenems have become difficult to control over the last fifteen years due to the increasing overuse of antibiotics as well as the lack of new therapeutic solutions (new antibacterial drugs). Despite their therapeutic effect, their use is limited due to increased allergic reactions in some groups of patients. A new alternative is an innovative cephalosporin – cefiderocol, with a unique mechanism of action of penetrating to the bacterial periplasmic space cell using the "Trojan horse" principle. It has a broad spectrum of in vitro activity against gram-negative bacteria, including multidrug-resistant (MDR) organisms such as carbapenem-resistant Enterobacterales. The mechanism of action of cefiderocol is based on siderophore activity. During an infection, the level of iron in the human body decreases. In turn, this element is necessary for the survival of bacteria, which try to absorb as much of it as possible, along with the related antibiotic. The presented work compares the use and properties of other groups of antibiotics and cefiderocol as an innovative cephalosporin. The degree of iron affinity for the tested drug was determined depending on the degree of Fe²⁺ and Fe³⁺ oxidation. It has been shown that the degree of oxidation has an impact on the bonding efficiency. The tests were carried out using stripping voltammetry.

Keywords:

antibiotic, gram-negative bacteria, iron, trojan horse



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ART THERAPY AND ITS IMPORTANCE IN MEDICAL STUDIES

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A few words about the author(s):

dr inż Małgorzata Gorzel, prof. AWP, academic teacher, art therapist. Aleksandra Tatarynow, Cosmetology student. dr Klaudia Jakubowska, academic teacher, nurse.

Abstract:

The aim of this study is to characterize art therapy in the context of a tool that reduces stress among medical students.

Students of the above-mentioned fields of study experience great tension resulting from an intensive study program, complex responsibilities, and sensitive situations related to contact with patients. Art therapy offers them a safe and creative environment in which they have the opportunity to explore and express their emotions, both positive and negative. The creative process allows you to reflect on your own experiences, understand emotions and find ways to deal with stress. Joint creative activities help build bonds between students, which may provide additional social support in difficult times.

Research confirms that art therapy brings numerous benefits, such as: reducing tension, improving mental well-being, and therefore increasing the ability to cope with difficulties.

To sum up, including art therapy in a support program for medical students may be an effective tool for promoting mental well-being and effective coping with stress in future professional work.

Keywords:

art therapy, stress, students, medical studies, emotions



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THERAPEUTIC AND CARE PROPERTIES OF PROPOLIS

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A few words about the author(s):

Marlena Warowna – cosmetologist, Edyta Kwilosz – nurse, Katarzyna Terejko – student.

Abstract:

Propolis is a sticky resin with irregular shapes consists of resins (50-85%), essential oils (4-15%), wax (12-40%), tannins (4-10%), flower pollen (5-11%), organic acids and alcohols, as well as flavonoid compounds and terpenes (5-30%). The aim of the work is to present the possibilities of using propolis in therapy and skincare.

Propolis has a wide range of therapeutic applications for many chronic diseases, especially autoimmune, neurodegenerative, gastrointestinal, cardiovascular, and respiratory diseases, as well as diabetes, gynecological issues, laryngological, and dermatological disorders (e.g., common acne). Its therapeutic properties include significant antibacterial, antiviral, antifungal, and antiprotozoal effects. Propolis holds an important place in wound healing, frostbite, burns, leg ulcers treatment, and as dressings post-surgical procedures as an antiseptic, regenerative, and disinfectant agent. Besides its beneficial properties, it is a significant allergen, especially among children.

In cosmetology, propolis is used at concentrations of 1-2%. It is mainly found in toners, facial cleansers, makeup removers, and cosmetic masks. Cosmetic products based on propolis are designed for the care of oily, acne-prone, sensitive, dry, and mature skin. Besides its numerous positive skincare properties, propolis may also have negative effects as it can induce allergic contact dermatitis in beekeepers and consumers predisposed to allergies.

Keywords:

propolis



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ANALYSIS OF WOMEN'S LEVEL OF AWARENESS REGARDING BREAST CANCER AND CERVICAL CANCER PREVENTION

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A few words about the author(s):

I am a student at Rzeszow University of Technology, Faculty of Physics and Applied Mathematics. I am in my fourth year of medical engineering, and I am interested in medical-related sciences.

Abstract:

The incidence of cancer of the female organs, including breast cancer, is on the rise, underscoring the need for prevention. The aim of the survey was to assess knowledge of breast cancer and cervical cancer and attitudes toward preventive examinations in a group of urban and rural women. The study included 297 women of different age groups and places of residence in the Greater Poland region. Using a survey questionnaire, the level of knowledge and performance of preventive examinations were assessed. Most of the women had general knowledge of female cancers, but only about 65.3% knew the principles of prevention. Despite this, 86.2% of women regularly performed breast self-examinations. About one in two respondents had mammograms every two years, and about 66.0% used breast ultrasound. In addition, 87.2% had had a cytological examination at least once, although 7.1% of the women could not remember their last visit to a gynecologist. Conclusions indicate that the women surveyed had good general knowledge of breast and cervical cancer prevention. Ladies from rural areas tended to have a greater range of information than city residents. The women surveyed regularly underwent gynecological and cytological examinations, although they were less likely to undergo mammography and breast ultrasound, but more likely to perform breast self-examinations.

Keywords:

breast examination, gynecological examination, cancer prevention



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USE OF MUD IN COSMETOLOGY

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A few words about the author(s):

Marlena Warowna – lecturer, cosmetologist, Alicja Kobus – student.

Abstract:

Mud is a type of peat belonging to peloids. Due to its biological properties, it is called "Polish black gold". Mud treatments have a long tradition in Poland and are included in spa programs. They are also an important item in wellness centers and beauty salons. Nowadays, many pharmaceutical and cosmetology companies have undertaken the production of mud preparations used in the care of face, body and hair skin. This raw material is a recipe ingredient, for example: creams, masks, scrubs, gels, tonics, serums, balms, shampoos, soaps, bath salts and toothpastes.

Keywords:

mud, peloid, treatments



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DRUG REPOSITIONING – NEW WAY OF USING OLD DRUGS

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A few words about the author(s):

Research interests focus on pharmaceutical sciences in the field of molecular modeling. They include predictive modeling of detailed mechanisms of action and pharmacological efficacy of biologically active compounds in safety pharmacology.

Abstract:

Bringing a new substance to the market takes about 15 years and involves huge costs. The potential drug candidate is estimated to cost \$3 billion. Traditional methods of searching for new substances require very time-consuming and long-term research. Traditional drug search methods are based on phenotypic screening or searching for a substance that affects a specific target. This target is directly related to the disease, and based on its structure, a substance is designed that can demonstrate biological activity by interacting with a given target. Drug repositioning, or searching for new indications for substances already available on the market, is increasingly used. This action allows us to shorten the time needed to introduce a new drug and its associated costs. For this purpose, computational methods are used. The computer repositioning process involves designing and testing automated programs that can generate hypotheses regarding new indications for a specific substance. The programs used may be based on the structure of the drug and its chemical and pharmacological analysis or on knowledge of the disease.

Repositioning has become the subject of great interest among pharmaceutical companies due to the lower risk of failure and reduced costs of the entire repositioning process compared to de novo drug design. So far, These activities have resulted in many new registrations for known medicinal substances.

Keywords:

repositioning, computational methods, in-silico research

ABSTRACTS OF PRESENTATIONS



TECHNICAL AND NATURAL SCIENCES



NOVEL METHODS FOR EVALUATING KNIFE PERFORMANCE

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Cutlery Solutions Michał Brzeski

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A few words about the author(s):

The research was conducted by the group of scientists and engineers from the Research and Development Center of Cutlery Solutions under the framework of the EU project no. POIR.01.01.01-00-0815/17 under the supervision of Prof. Piotr Brzeski.

Abstract:

Employees working in food processing plants, particularly in meat and fish processing facilities, often face significant physical strain when using hand knives for manual tasks. This prolonged exposure to both static and dynamic loads can result in musculoskeletal disorders (MSDs).

The quality and sharpness of knives play a crucial role in the burden placed on workers and the efficiency of their work. To optimize sharpening methods and compare the durability and quality of knife edges, it is essential to utilize objective indicators of sharpness that accurately reflect real working conditions.

Numerous studies have attempted to assess knife sharpness objectively using specific experimental apparatus. However, existing methods, such as those outlined in the EN ISO 8442-5 standard, often face criticism due to their lack of realism. In practice, simpler methods like the Brubacher Edge Sharpness Scale (BESS) or testing devices such as ANAGO Knife Sharpness Tester are much more popular. However, all the above tests poorly simulate real working conditions that led to a growing need for more reliable indicators.

This presentation focuses on the new apparatus and method developed by Cutlery Solutions to accurately evaluate knife edge sharpness ISS (Initial Sharpness Score) and its rate of degradation - SPS (Sharpness Persistence Score). We showcase the novelty of our approach and compare it to existing methods, shedding light on its advantages and potential impact on the industry.

Keywords:

knife sharpness, edge retention, sharpness assessment



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THE INFLUENCE OF KC AND CMC ON STABILITY OF THE AQUEOUS ILT SUSPENSIONS

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A few words about the author(s):

Ewelina Godek – PhD student at the PhD School of Quantitative and Natural Sciences at UMCS. Elżbieta Grządka – assistant professor. Interests include the physicochemistry of the dispersed systems, as well as the stability of the colloidal systems.

Abstract:

The aim of the study was to compare the influence of cationic cellulose and anionic carboxymethyl cellulose on the stabilizing and flocculating properties of aqueous illite suspensions. Stability measurements were carried out using the spectrophotometric method. To determine the most likely stability mechanism, measurements of the adsorption amount were performed using the spectrophotometric method. The results show that both polymers can adsorb on the surface of a clay mineral. However, the adsorption amount of KC is greater than that of CMC. This is due to the fact that the interactions between cationic cellulose and negatively charged illite are stronger than those between anionic carboxymethyl cellulose and negatively charged illite. In the case of KC, adsorption is electrostatic, whereas CMC is adsorbed on the ILT surface in a non-electrostatic manner (hydrophobic and Van der Waals interactions). Both KC and CMC improve stability of the aqueous illite suspensions. The stability of the tested systems increases with increasing polymer concentration. In the case of KC, the most likely stabilization mechanism is electrosteric stabilization. However, in the case of CMC, due to the fact that the amount of adsorption is lower than in the case of KC, the most likely stabilization mechanism is electrosteric stability in combination with depletion stability.

Keywords:

stability, adsorption, cationic cellulose, carboxymethylcellulose, illite



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MODERN SAPONIN-BASED BIOSURFACTANTS AS AN ALTERNATIVE TO THE CURRENTLY USED DETERGENTS

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A few words about the author(s):

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Abstract:

Increasing water pollution from surfactants requires the immediate development of advanced biosurfactants to successfully replace currently used detergents. A modern biosurfactant should have several key properties, i.e. high surface activity to allow a dispersed system with minimal biosurfactant content. It must be a biocompatible and hypoallergenic compound that can be used not only in industrial processes but also in cosmetics and medicine. The most important characteristic of a biosurfactant should be the ease of removal of the compound from the aqueous environment or controlled biodegradation once the compound has served its purpose. The above criteria are met by saponin mixtures. Saponin is a plant-derived compound which makes it biodegradable and therefore safe for humans and the environment. In this study, parameters such as surface tension and dilatational surface rheology of saponin-based aqueous solutions with additives of other compounds that are hydrogen bond donors or acceptors modulating the surface properties of saponin, i.e. glycerol, choline chloride and urea, were analysed.

Keywords:

biosurfactants, water pollution, saponin



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INNOVATIVE APPROACHES FOR MODIFICATION OF NATURAL FIBERS THROUGH ATRP METHODS

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A few words about the author(s):

Eng. Katarzyna Kisiel is a master's student working in the Chmielarz Research Group in the field of development of atom transfer radical polymerization towards synthesis of functional materials.

Abstract:

Throughout history, people have relied on natural fibers for the manufacture of clothing and furniture. As confidence in the production of high quality continues to grow, it is essential to constantly search for new ways to enhance fiber properties. Polymer modification stands as the most promising strategy, as it can completely change the characteristics of the material. The utilization of atom transfer radical polymerization (ATRP) enables the acquisition of polymers possessing distinct architectures, alongside precise control over molecular weight and narrow molecular weight distribution. Therefore, we present an overview of the current development of natural origin materials and their prospects in the field of fiber modification by ATRP. Applications for these modified materials include wound dressings, materials for water-oil separation, and drug delivery.

Financial support from Ministry of Education and Science under the program " Student research clubs create innovation" (Contract no: SKN/SP/569572/2023).

Keywords:

natural textiles, textiles functionalization, smart materials, atom transfer radical polymerization



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A STUDY OF QUANTITATIVE STRUCTURE-ACTIVITY RELATIONSHIP (QSAR) FOR EC50 OF SULFONAMIDES

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A few words about the author(s):

I am deepening my knowledge in machine learning, with a particular interest in QSAR methods. My fascination with these methods stems from the motivation to optimize time in creating new chemical compounds and reduce the amount of animal testing.

Abstract:

Sulfonamides are widely used in human and veterinary therapy and released into the environment. Sulfonamides and their metabolites, released into the environment, significantly impact aquatic organisms, particularly green algae, due to their sensitivity to these compounds. Furthermore, according to the most recent literature review sulfonamides can cause adverse health effects in human, including increasing trend in the prevalence of infertility obesity increasing antibiotic resistance. Computational methods (so-called in silico methods) provide enormous support to the traditional experimentally based methods for chemical risk assessment of various groups of chemical substances, including sulfonamides. The main advantages of in silico methods are: decreasing the time and cost of studies as well as reducing the number of necessary testing on laboratory animals. One of the most commonly used computational method is the Quantitative Structure - Activity Relationships (QSAR). In order to identify the key structural and/or physicochemical features governing the acute toxicity of selected sulfonamides and sulfonamide potentiators towards *Escherichia coli*, I developed and validated the predictive QSAR model. Based on the obtained results, I pointed out that among the key molecular descriptors related to *E. coli* acute toxicity are: the dipole moment and the volume of the sulfonamide molecule. The conclusions are directly in line with previous findings.

Keywords:

QSAR, sulfonamides, PCA, MLR, acute toxicity



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MODIFIED ALUMINIDE COATINGS

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A few words about the author(s):

The author of more than 50 papers about thermodynamics of alloys and protective coatings. She elaborated the model of predicting thermodynamic properties of ternary alloys on the basis of thermodynamic properties of binary alloys.

Abstract:

The application of protective aluminide coatings is an effective way to increase the oxidation resistance of the treated parts and prolongs their lifetime. The addition of small amount of noble metals (platinum or palladium) or reactive elements such as: hafnium, zirconium, yttrium and cerium has a beneficial effect on oxidation behavior. This beneficial effect includes an improvement of adhesion of alumina scales and reduction of oxide scale growth rate.

Palladium and hafnium or zirconium modified aluminide coating were deposited on pure nickel based superalloys Mar M247 and CMSX-4 using the electroplating and CVD methods. All coatings consisted of two layers: an outer, β -NiAl phase and the interdiffusion one. The interdiffusion layer on pure nickel consists of the γ' -Ni₃Al phase and of the β -NiAl phase on the superalloy. Palladium dissolved in the whole coating, whereas hafnium and zirconium formed inclusions on the border of the layers. Inclusions containing refractory elements were observed in the interdiffusion zone.

Samples were subjected to cyclic oxidation test at 1100 °C for 250 h.

Oxidation resistance of the palladium, Hf+Pd and Zr+Pd modified coatings deposited on but is better than the oxidation resistance of the non-modified one. Zirconium or hafnium could retard θ -Al₂O₃ to α -Al₂O₃ transformation and improve spallation resistance and scale adherence by blocking Al ions diffusion.

Keywords:

aluminide coatings, modification, CVD method



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STRUCTURAL OPTIMIZATION OF CROSS-LAMINATED TIMBER LAYERS WITH AIR VOIDS TO INCREASE THERMAL INSULATION

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A few words about the author(s):

The author is a civil engineer, head of the Research and Development Office of Polskie Domy Drewniane S. A. Conducted research includes the design of new building materials, modification of glue-laminated timber and fire safety of structures.

Abstract:

Research on the CLT (cross laminated timber) with air voids conducted by PDD S. A. was a part of the project POIR.01.01.01-00-0076/21 „Development of technology of structural panels made of cross-laminated pine wood from the Polish territory, with an increased class of reaction to fire, for the needs of multi-storey wooden building industry.” The project is co-financed by the European Union from European Regional Development Fund – Activity 1.1.: Enterprise R&D projects; sub-activity 1.1.1: Industrial research and development work carried out by enterprises.

Air voids weaken the load-bearing capacity of the structure, but increase its thermal insulation. In CLT construction, it is possible to use weakened structural sections in the elements that stiffen the slab - in the transverse layers of CLT panel.

The presented research include the results of the structural analysis of CLT with air voids, the computational impact of modifications on thermal insulation and the economic benefits resulting from the implementation of the designed solution.

Keywords:

CLT, thermal insulation, air voids



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FORECASTING THE VALUE OF TIME SERIES – COMPARATIVE ANALYSIS OF A SELECTED MACHINE LEARNING ALGORITHM AND AN ARTIFICIAL NEURAL NETWORK MODEL

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A few words about the author(s):

Lukasz Sroka, fourth-year student of the doctoral school of the University of Economics in Katowice. Bachelor's degree in Economics and Business Analytics. Master's degree in Finance and Accounting.

Abstract:

The aim of the speech is to present the results of a simulation analysis of artificial neural networks and the XGBoost machine learning algorithm in order to determine which method is characterized by a lower level of time series forecast errors. The analysis was performed using a simulation study on a sample of 1,000 artificially generated time series. The analyzed XGBoost algorithm and the ANN artificial neural network model were intended to prepare forecasts for five subsequent periods, then these forecasts were compared with the actual implementations of the time series. Studies have shown that the use of artificial neural networks ANN to predict future observations generated lower levels of MAPE, MAE and RMSE errors than in the case of the XGBoost algorithm. The research results can be used by both investors and enterprises to better adapt their business decisions to changing market conditions by using a model with less forecast bias. The original contribution of the analysis lies in the comprehensive comparison of the forecasts generated by the XGBoost algorithm. Moreover, thanks to the use of simulated artificial time series, it was possible to test each algorithm for various market conditions.

Keywords:

Artificial Neural Network, XGBoost, time series, forecasting, simulation



IMPLEMENTATION OF RESEARCH AND DEVELOPMENT (R&D) PROJECTS FOR THE AUTOMATION AND ROBOTIZATION OF PRODUCTION PROCESSES IN THE RAILWAY SECTOR

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A few words about the author(s):

The author is the chief technologist and designer responsible for all research, development and implementation projects in the industry.

Abstract:

The presentation describes the issues related to the implementation of research and development works and their subsequent implementation in industry around the world by CADESIGNER ENGINEERING Sp. z o.o. Particular attention was paid to projects financed from European Union funds allocated for research, development and investment activities. The research methods used in the material are material analysis sources and a case study.

Keywords:

financial resources, projects, research and development, investments



ALUMINIDE COATINGS ON HOT PARTS OF AIRCRAFT ENGINES

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A few words about the author(s):

M. Zagula-Yavorska is an expert in aluminide coatings characterization.

Abstract:

Aluminide coatings have been applied in turbine engines to improve their high temperature oxidation resistance and hot corrosion resistance. Turbine engines are made from nickel based superalloys. The low aluminum content in the chemical composition of superalloys is a reason of their fast oxidation at service temperature. As a result, the lifetime of engines has been shortened. Three major processes, by which aluminide can be deposited include: pack cementation, vapor phase aluminizing and chemical vapor deposition (CVD). One of the steps, which is common in these three processes is the generation of vapors containing aluminum. The vapor phase is transported to the chamber and reacts with the alloy which forms the aluminide coating. Aluminide coatings rely on formation of the β -NiAl phase on the surface of the alloys. Aluminum from the coatings reacts with oxygen from the air forming α -Al₂O₃ at their surface, which protects the substrate from oxidation.

Keywords:

aluminizing, coatings, substrate



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VACUUM EVAPORATOR FOR CARAMEL MASS

Andrzej Bartczak

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A few words about the author(s):

Andrzej Bartczak – Marketing and Sales Director at the Fabryka Maszyn Spożywczych "SPOMASZ" Pleszew S.A.

Abstract:

Fabryka Maszyn Spożywczych SPOMASZ Pleszew S.A., expanding and improving the offer of its products in 2018-2020 under the Smart Growth Operational Program under Measure 1.1: R&D projects of enterprises of the Smart Growth Operational Program 2014-2020 co-financed by the European Regional Development Fund, implemented a project entitled: The universal evaporator for sugar and sugar-free caramel masses. As a result of the research and development work, the universal evaporator for caramel masses was developed, and universality should be understood as high flexibility in terms of product range options. The universal evaporator for caramel masses is intended for production of caramel masses: sugar-free based on isomalt, milk sugar, milk-free sugar, fat milk sugar. The device uses, among others:

- an innovative method of heat exchange through a heating mixer,
- a specially shaped stirrer serves as an additional heat exchange surface, which increases intensity of a cooking process,
- a method of finding and maintaining the boiling point of the product,
- continuous measurement of the caramel mass thickening degree, enabling production of caramel mass with repeatable color, taste and consistency parameters.

The solution is protected by the Patent Office of the Republic of Poland under application number: P.431258, entitled: Evaporator for sugar and sugar-free caramel masses.

Keywords:

vacuum evaporators for caramel mass, sugar free based – on – isomalt mass, milky sugar and fat mass, confectionery industry



MATAN – THERMOMECHANICAL MATERIAL ANALYSIS PYTHON PACKAGE

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A few words about the author(s):

Interested in programming, Finite Element Methods and polymer science.

Abstract:

Nowadays, Python is one of the most popular programming languages, even in non-informatics fields like mechanical engineering, due to its simplicity, and computer analysis solvers using FEM methods are part of almost all components, albeit access to material data is sometimes hard due to inadequate data in the datasheets, problems with calculations, inconsistent information, etc. To overcome this problem, the Python package was created, which allows to calculate the stress, strains, tensile modulus, and other properties from force and elongation data from a machine. For now, it includes only polymer tests according to the ISO-527-1 standard, but in the future, other standards should be included.

Keywords:

material science, mechanical parameters, polymer



OPTIMISATION ALGORITHM FOR MONITORING METRO TRANSPORT TRACTION ELECTRICITY CONSUMPTION – ESSENCE IN RAILTOPOMODEL

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Abstract:

The state of traction electricity (TE) consumption of metro (subway) transport is one of the key issues of contemporaries challenges. Fitting into the vision of the future of the sustainability development systems (SDS). The main objective of the scientific research work is to define an optimisation algorithm for monitoring the unit consumption of metro transport traction electricity – relevant to the RailTopoModel (RTM). The implementation of which used an integration of research methods. In the current energy consumption equation – as a new and innovative approach – applied five variants that take into account the movement resistances values of the metro trains. Metro I variant: for tractive effort – startup, Metro II variant: for tractive effort – braking, Metro III variant: for metro trains of the Metropolis type, Metro IV variant: using a constant value for the basic movement resistances force, the constant movement resistances to motion and the coefficient of air resistances, Metro V variant: for metro trains according to Alstom. The results of the work have confirmed their validity. The optimisation algorithm for monitoring the traction electricity consumption of metro transport – essence in RailTopoModel, represents a progression, while having an important impact in the extension of knowledge and for future scientific research work.

The elaboration was prepared under the research subvention of the AGH University of Krakow, No. 16.16.150.545 in 2024.

Keywords:

metro, subway, RailTopoModel, energy consumption, movement resistances



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NON-STEROIDAL ANTI-INFLAMMATORY DRUGS IN THE AQUATIC ENVIRONMENT: PHYTOREMEDIATION POSSIBILITIES

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A few words about the author(s):

I am a graduate of the University of Łódź in the field of biology. My scientific interests in general are mainly related to the ecology and environmental protection.

Abstract:

Non-steroidal anti-inflammatory drugs (NSAID) are a class of medications, commonly used due to their analgesic, antipyretic and anti-inflammatory effect. NSAIDs are released into the environment from various sources, most often sewage from factories producing pharmaceuticals, municipal sewage from hospitals, clinics and households. Pharmaceuticals in the environment may pose a threat to all forms of life, including people. Phytoremediation is a technique that uses plants to remove pollutants from the environment. Phytoremediation can be applied to a wide range of contaminants, including heavy metals, organic substances and radioactive elements. As technology continues to develop and new plant species with increased potential to accumulate organic pollutants are researched, phytoremediation will likely become an increasingly important tool for protecting ecosystems. The aim of this work is to present the possibility of using phytoremediation to reduce the NSAIDs pollution in the aquatic environment.

Keywords:

phytoremediation, aquatic environment, NSAID, pharmaceuticals



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THE MOST COMMON POISONINGS IN PETS – REVIEW WORK

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A few words about the author(s):

My name is Adrianna Michniewicz and I am a fifth year student of veterinary medicine at the Faculty of Veterinary Medicine at UWM in Olsztyn. In my free time, I am a member of scientific club in pathomorphology at university and Veterinary Internists.

Abstract:

Poisoning in pets is common and can pose a serious threat to their health and safety. This presentation aims to provide a comprehensive source of information on the most common cases of poisoning in dogs and cats. An extensive database of patients diagnosed with poisoning was used for the study. As part of my analysis, I focused on the most common sources of poisoning, such as potted plants, food, medicines and cleaning products. The paper identified common toxic substances and the most common symptoms of poisoning. In addition, the issues of first aid for poisoning, treatment options, prevention and education of animal owners were discussed, highlighting the dangers associated with unknowingly exposing animals to the risk of poisoning. Diagnosis of the first symptoms of poisoning plays a key role in effective treatment. Therefore, it is important to educate owners about the symptoms of poisoning and to make them aware that many potentially hazardous substances for their pets are in their own environment, which may prevent future poisoning.

Keywords:

poisoning, dog, cats, treatment, symptoms



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THE EFFECT OF 4-VINYLGUAIACOL AND 4-VINYLSYRINGOL ON THE DEGRADATION OF BIOACTIVE COMPOUNDS IN PLANT BIO-OILS DURING STORAGE WITH EXPOSURE TO LIGHT

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Abstract:

The research materials were 3 commercial cold-pressed oils (flaxseed (FO), borage seed (BO), evening primrose seed (EPO)) stored under natural conditions (exposed to light) for 3 months at room temperature without and with 800 ppm of vinyl phenolic derivatives (4-vinylguaiacol (4-VG), 4-vinylsyringol (4-VS)). The oil samples (fresh and oxidized) used to assess of the content of bioactive compounds: unsaturated fatty acids, squalene, phytosterols, tocopherols, carotenoids (chromatographically), and phenolic compounds (spectrophotometrically).

It was stated that the phenolic acid derivatives applied inhibit the degradation of bioactive compounds in bio-oils, which may provide nutritional and health benefits. The additives effectively protect unsaturated fatty acids during oxidation; 4-VG seems to be more effective in BO, 4-VS in FO and EPO, and 4-VG and 4-VS protected in particular γ -linolenic acid in BO and EPO. Most of the native tocopherols were retained after the addition of additives, but 4-VG increased the loss of plastochromanol-8 and γ -tocopherol in FO. These additives generally protected squalene and carotenoids, except 4-VG in BO. They also reduced the loss of phytosterols, but 4-VS accelerated the degradation of campesterol in FO and EPO as well as stigmasterol in FO and BO. Both additives were almost entirely consumed during the storage test (up to 95% in 4-VG and 75% in 4-VS).

This study was funded by the National Science Centre, Poland (Project No. 2018/31/N/NZ9/01273).

Keywords:

bio-oil, bioactive compounds, vinyl phenolic derivatives, natural conditions of storage, light



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LOGISTICAL PROBLEMS IN THE STATE FIRE SERVICE DURING FIREFIGHTING OPERATIONS

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A few words about the author(s):

I graduated from a technical school with a specialisation in logistics in 2021. I am currently a management and production engineering student and a member of the Qualitas student club. I am interested in logistics and sustainability.

Abstract:

The fire brigade is a professional, uniformed, and equipped with specialized gear formation, dedicated to combating fires, natural disasters, and other local hazards. This formation enjoys the highest level of public trust. Logistics plays a crucial role in the functioning of firefighting operations, as it can facilitate firefighting actions and influence their effectiveness. Preventing problems during such operations is extremely important. The main factors that firefighters point out as emerging issues during firefighting operations are insufficient forces and resources, issues related to fuel for fire trucks, problems with radio communication, and issues with securing the operational area.

Keywords:

fire brigade, firefighters, logistics

ABSTRACTS OF POSTERS



TECHNICAL AND NATURAL SCIENCES



INNOVATIVENESS OF THE 3D SCANNER PROJECT FOR CUSTOM ORTHOPEDIC INSOLES PRODUCTION

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A few words about the author(s):

Mechatronics engineer, robotics programmer, mechatronics student.

Abstract:

Faced with the growing need for innovative methods in the diagnosis and production of orthopedic insoles, the 3D scanner project represents a breakthrough solution. This study presents the application of advanced 3D scanning technologies and geometry analysis to support the production of personalized orthopedic insoles. The focus is on developing an innovative device that uses a laser scanning head, designed to scan patients' foot impressions and convert the obtained data into a three-dimensional CAD file format. The goal is to significantly increase the accuracy and efficiency of the insole design process by precisely mapping the foot's geometry. The project's innovativeness is expressed through the adaptation of modern 3D scanning technologies, which not only improve the accuracy of the insoles' fit but also speed up their design process. Thanks to collaboration with experienced specialists in the field, the project provides tangible benefits for patients and medical professionals while promoting an innovative approach in orthopedics without incurring high costs.

Keywords:

3D scanning process, 3D modeling



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USE OF MICROMETER SCREW TO ADJUST Z AXIS OFFSET IN 3D PRINTER

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A few words about the author(s):

The author is student of the West Pomeranian University of Technology studying – mechatronics, affiliated with the student's mechatronics scientific society "SKNM".

Abstract:

This poster characterizes the operation of 3D printers, introducing the viewer to the topic of incremental manufacturing machines. The problem of calibration of the table plane and nozzle height in this type of devices was marked. A modification to significantly speed up the time of calibration of the device was presented, its construction, principle of operation and the process of installation in a 3D printer were described in detail.

Keywords:

3D printer, Z axis, micrometer screw



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DESCRIPTION OF 3D PRINTER MODIFICATION INVOLVING THE USE OF A MICROMETER SCREW TO ADJUST THE Z AXIS OFFSET

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The author is a final-year student of mechatronics at the West Pomeranian University of Technology, a member of the student mechatronics scientific society "SKNM".

Abstract:

The poster presents the design of modifying the Z-axis end sensor of a 3D printer by adding a micrometer screw to improve Z-axis offset adjustment. The paper presents the design itself, the installation process, discusses the adaptability of this solution to a wide range of 3D printers, and presents and discusses the results of a test measuring the calibration time of a 3D printer before and after applying the discussed modification.

Keywords:

3D printer, micrometer screw, bed leveling



SOLUTIONS APPLIED IN THE 3D SCANNER PROJECT FOR CUSTOM ORTHOPEDIC INSOLES

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Third-year student of Mechatronics at the West Pomeranian University of Technology in Szczecin. His focus lies in 3D printing and the design of mechatronic devices.

Abstract:

The aim of the presented project is to showcase advanced 3D scanning technology using the wapp3D scanning head, dedicated to the precise modeling of objects with complex shapes, particularly focusing on the production of personalized orthopedic insoles. The 3D scanner, employing advanced laser light projection measurement techniques, enables contactless data acquisition about an object's shape. Thanks to the use of H-BOT type kinematics, controlled by two stepper motors, the device offers precise movement of the scanning head, resulting in exceptional measurement accuracy. The scanner's structure, based on an aluminum profile frame and a toothed belt drive, ensures stability and smooth movement, essential for effective scanning. The electronics are based on the Bigtreetech SKR V1.4 mainboard with an STM32 microcontroller and Marlin firmware, allowing for flexible device movement programming in G CODE. This process ends with data being saved as a point cloud on an SD card, facilitating easy transfer and processing. Dedicated software allows for the conversion of data into the STL format, crucial for reverse engineering and 3D modeling, which is fundamental to creating personalized orthopedic insoles. The presented project demonstrates how modern 3D scanning technology can significantly contribute to improving patients' quality of life by precisely tailoring medical aids to their individual needs.

Keywords:

3D scanner, orthopedic insoles, reverse engineering, H-BOT kinematics, personalized healthcare



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PERSPECTIVES OF DEVELOPMENT FOR A MICROMETRIC SCREW FOR OFFSET REGULATION IN A 3D PRINTER

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A few words about the author(s):

Third-year student of Mechatronics at the West Pomeranian University of Technology in Szczecin. His focus lies in 3D printing and the design of mechatronic devices.

Abstract:

This poster presents a multifaceted approach to the development of the micrometer screw in 3D printers, focusing on improving usability, mechanical functionality, ease of operation, personalization, and community engagement. Proposed directions for development include integration with automatic calibration systems, designing modular mechanical solutions, online education, development of intuitive user interfaces, simulation software, adaptation of technology for various applications, and promotion of community-driven project development. The proposed enhancements aim to increase value for users by streamlining the printing process, enhancing mechanical durability, simplifying operation, and customizing to individual needs. Through a holistic development approach, the project has the potential to become a comprehensive innovation in the field of 3D printing.

Keywords:

3D printing, micrometric screw, additive manufacturing, z-axis, precision



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NEW ZEIN-BASED MATERIAL AS NANOSTRUCTURED DRUG DELIVERY SYSTEM

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A few words about the author(s):

Marzena Kaliszewska-Kozak is a graduate of Nanostructures Engineering. She received her master's degree from the University of Warsaw. She currently works at NanoSanguis S.A. as an Organic Chemist.

Abstract:

Zein is a biodegradable biopolymer that occurs naturally in nature. It is a hydrophobic protein derived from corn. It has the ability to self-organize into nanoparticles (NPs) in an aqueous environment and can be used as a drug carrier. However, targeted drug delivery, in addition to drug encapsulation, requires attachment of targeting moieties to zein structure, while currently existing methods based on ECD/NHS chemistry are characterized by low yield. Another obstacle related with zein NPs application is its relative instability, which hampers the purification from unencapsulated drugs and coupling reactions with targeting molecules.

Therefore, the aim of this study was to develop a novel approach for zein modification allowing attachment of desired molecules with accompanying stability improvement. For this purpose, we performed zein carboxylation, which increased the stability of NPs, but did not improve the coupling efficiency. Therefore, we subjected zein to a second modification with trichlorotriazine (TCT), a compound containing three substitutable chlorine atoms. We found that zein carboxylation allowed to avoid its crosslinking during reaction with TCT. The final carboxylated and TCT-modified zein retained the ability to self-organize into NPs. The modifications had no significant impact on NPs size.

This work has been supported by Polish National Centre of Research & Development as a part of EuroNanoMed III project (grant number ENM3/V/33/Antineuropatho/2023).

Keywords:

zein, zein nanoparticles, carboxylation, trichlorotriazine modification



CALOGENESIS INDUCTION OF SALIX VIMINALIS FROM FLORAL AXIS

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A few words about the author(s):

Enthusiast of botany in molecular and general aspect. Mostly focused on molecular pathways in plant signaling and also practical application of biotechnology achievements in daily life.

Abstract:

Willows (*Salix* sp.) are fast-growing plants, often used, among others, to produce biomass for energy purposes, which translates into reduced exploitation of non-renewable energy sources. Willows are often used in phytoremediation and environmental protection. Additionally, a number of compounds with therapeutic effects have been identified in the tissues of plants from the *Salix* genus, which determines their use in medicine.

In *in vitro* cultures, callus tissue, i.e. a group of poorly differentiated cells formed at the site of injury, has a wide application potential. Callus is often used to prepare cell suspension cultures. Callus tissue also mediates the process of indirect organogenesis, able to give rise to *de novo* unipolar structures, such as shoots and roots, and bipolar structures - somatic embryos.

One of the most frequently used species for purposes related to obtaining renewable energy sources is *S. viminalis*.

The work focused on examining the impact on the callogenesis process and the cytological quality of the obtained biological material.

Keywords:

Willows, tissue culture, callogenesis, *Salix viminalis*



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DEVELOPMENT PERSPECTIVES OF THE INNOVATIVE 3D SCANNER PROJECT FOR ORTHOPEDICS

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A few words about the author(s):

A student majoring in mechatronics. Main interests are autonomous vehicles, most often the person responsible for the source code of projects, due to his passion for programming.

Abstract:

The introduction of an innovative 3D scanner into orthopedic diagnostics and the process of creating personalized orthopedic insoles leads to significant optimization and efficiency in the medical sector. The implementation of this technology allows for the precise adjustment of insoles to the individual needs of patients, shortening production cycles and reducing operational costs. The project, currently in the phase of testing kinematics and optimizing device performance parameters, aims to increase the precision and speed of scanning through the development of H-BOT kinematics and integration with the drive interface. Development perspectives include the automation of data transmission, cooperation with industry partners, and the expansion of 3D scanning technology applications to other medical fields. In the long term, the project aims to introduce additional diagnostic features, which could revolutionize the detection and treatment of orthopedic pathologies.

Keywords:

3D scanner, orthopedic diagnostics, H-BOT kinematics



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AVAILABLE ANTIFUNGAL TREATMENTS FOR CANDIDA AURIS INFECTIONS

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A few words about the author(s):

We are students of veterinary medicine.

Abstract:

Candida auris has emerged as a formidable global health threat, exhibiting multidrug resistance and the ability to cause severe invasive infections. This knowledge abstract explores the current landscape of antifungal treatments for *Candida auris* infections, delving into the challenges posed by the rise of resistant strains. Various classes of antifungal agents, including azoles, echinocandins, and polyenes, are discussed in terms of their efficacy, limitations, and potential mechanisms of action against *Candida auris*.

Azoles:

Fluconazole is an azole antifungal commonly used to treat *Candida* infections. However, many *Candida auris* strains have shown resistance to fluconazole, limiting its effectiveness.

Echinocandins:

Drugs like caspofungin, micafungin, and anidulafungin belong to the echinocandin class. Echinocandins are often considered a first-line treatment for *Candida auris* infections due to their effectiveness against many *Candida* species. However, resistance to echinocandins has been reported in some *Candida auris* isolates.

Understanding the available antifungal arsenal and its limitations is crucial for clinicians, researchers, and public health professionals aiming to combat the spread of *Candida auris* infections. This knowledge abstract serves as a concise overview, offering a comprehensive snapshot of the current state of antifungal treatments for *Candida auris*, laying the groundwork for informed decision-making in clinical practice and research initiatives.

Keywords:

Candida auris, azoles, Echinocandins



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THE ROLE OF SHBG PROTEIN IN THE REGULATION OF THE MULTIPOTENCY OF EQUINE STEM CELLS

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A few words about the author(s):

Natalia Rogosch, a 5th-year bioinformatics student, member of the scientific circle "Interdyscyplinarne Koło Naukowe Biomedyków". Prof. dr hab Krzysztof Marycz and dr Magdalena Zyzak are academic supervisors at the Department of Experimental Biology.

Abstract:

SHBG is a protein synthesized mainly in the liver and it is responsible for the transport of sex hormones such as testosterone, reducing their bioavailability and biological activity. Considering the biological properties of this protein, we decided to test whether it can regulate metabolism and mitochondrial dynamics in multipotent stromal cells isolated from equine adipose tissue (EqASCs).

Investigating the role of SHBG protein in the regulation of ASCs multipotency by analyzing differences in the expression of genes that regulate mitochondrial biogenesis, seems particularly important in the context of obesity. Indeed, mitochondria have a crucial role in the energy processes in the cells, and dysfunction in their function can lead to metabolic dysregulation and the development of metabolic diseases such as obesity, which in turn can further lead to diabetes, heart disease and many others. Using cell cultures and molecular biology methods, the analysis of expression of genes involved in mitochondrial metabolism and dynamics, and accumulation of protein products of major mitochondrial regulators was analyzed. We determined differences in the type of mitochondrial ultrastructural changes in EqASCs and EqASCs treated with exogenous SHBG protein.

Our study showed that the SHBG protein is probably involved in regulating biogenesis, metabolism, and mitochondrial dynamics processes, suggesting its potential therapeutic role in the treatment of obesity-related conditions.

Keywords:

SHBG, stromal cells, adipose tissue, metabolism, obesity



ONLINE EDUCATION: DEVELOPMENT OF E-LEARNING PLATFORMS AND EFFECTIVENESS OF REMOTE LEARNING

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A few words about the author(s):

A student of computer science at the Opole University of Technology.

Abstract:

Online education is the process of acquiring knowledge and skills via the Internet, involving short training modules and real-time remote lectures. Its popularity is growing due to technological advances, flexibility in time and space, lower costs and the need to provide learning under COVID-19 pandemic conditions. Accessibility to diverse user groups, asynchronicity or lack of college enrollment are also important benefits. Research shows that remote learning can be just as effective, and sometimes even more effective, than traditional lectures, encouraging greater student engagement and increasing student satisfaction.

Keywords:

e-learning, remote learning



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GEOGRAPHICAL DISTRIBUTION AND PREVALENCE OF CANDIDA AURIS

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A few words about the author(s):

Veterinary students.

Abstract:

Candida auris, an emerging multidrug-resistant fungal pathogen, poses a significant global health threat. This study investigates the geographical distribution and prevalence of *C. auris* across diverse regions. Utilizing epidemiological data and molecular analysis, we aim to elucidate patterns of spread and identify potential risk factors. Our findings reveal distinct regional variations in *C. auris* prevalence, suggesting both local and global factors influencing its dissemination. Furthermore, genomic analysis provides insights into the genetic diversity and potential antifungal resistance mechanisms. Understanding the geographical dynamics of *C. auris* is crucial for developing effective strategies for its containment and mitigating the impact on public health. This research contributes valuable information to the ongoing efforts in combating the spread of this elusive and resilient pathogen.

Keywords:

Candida auris, fungus



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IDENTIFICATION OF BACTERIA ISOLATED FROM BIOAEROSOLS COLLECTED FROM PUBLIC PLAYGROUNDS IN LUBLIN

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Marcin Skowronek (3), Rafał Łopucki (3)

Faculty of Medicine, the John Paul II Catholic University of Lublin, Poland:

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A few words about the author(s):

S. Strawa is student of Biotechnology. D. Oleksiak received his M.Sc. degree in Biotechnology. Dr Sadok is conducting research using mass spectrometry. Dr M. Skowronek is microbiologist. Dr R. Łopucki is environmental biologist.

Abstract:

Bioaerosols are airborne particles that contain living organisms, such as bacteria, ranging from 0.001 to 100 μm in diameter. Here, we attempted to evaluate the microbiological quality of air in the public playground located in Lublin (Poland) during the summer season. Bioaerosols were collected for 10 minutes using the portable biological air sampler (Coriolis μ) into cones filled with sterile collection liquid (surfactant in low concentration). This sampler is capable of collecting particles as small as 0.5 micrometers. After centrifugation, the sediment was subjected to microbiological analysis. Bacterial culture was conducted using various media. Isolates were identified using the Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry technique (MALDI-TOF MS), and the obtained mass spectra were further evaluated using Biotyper software (Bruker). In addition to *Bacillus* sp, the bacteria of the genera *Enterococcus*, *Staphylococcus*, *Pantoea*, and *Escherichia* were also found.

The project is financed from the state budget, granted by the Minister of Education and Science under "Student Science Clubs Create Innovations" (SKN/SP/570395/2023).

Keywords:

playgrounds, bacteria, air quality, microbiology, MALDI-TOF MS



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SOFTWARE DEVELOPMENT BASED ON AGILE METHODOLOGY

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A few words about the author(s):

Computer Science engineer, Project Manager and Software Developer.

Abstract:

Agile methodology is a way of organizing work on projects, which is based on dividing tasks into short stages and promotes regular collaboration and improvement. It was created in 2001 as a result of a meeting of people interested in various software development methodologies. Written down in the form of a manifesto and a dozen principles, it has become the basis for a flexible approach to work in the software development industry and has implementations as Scrum or Kanban, among others.

Keywords:

Agile, Kanban, Scrum, software development



ASTAXSANTHIN IN THE COSMETOLOGY INDUSTRY

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A few words about the author(s):

Amelia Szczepańska is a second-year biotechnology student, interested in topics related to cosmetology, but also other fields related to human health.

Abstract:

The review paper prepared concerns the use of astaxanthin in the cosmetology industry. Astaxanthin-a carotenoid with a distinctive red colour-is discovering many new applications. It may have antioxidant activity by helping to neutralise free radicals and protect skin cells from oxidative damage caused by external factors. The research described here was conducted on a group of 42 female students at Inha University in Selu, Korea. The study involved healthy female students with an average age of 21, 5 years and an average BMI of 21.6, who were divided into three groups who were given 0, 4 and 8 mg of astaxanthin daily, respectively, for eight weeks. The results obtained by the scientific teams showed that astaxanthin supplementation has a positive effect on the condition of the body's cells, thus the skin cells. It reduces the biomarker of DNA damage (8-OHdG in plasma), increases the activity of cytotoxic NK cells, and reduces the concentration of C-reactive protein in plasma, parameters that suggest the anti-ageing properties of this substance. In conclusion, astaxanthin may reduce oxidative damage and delay skin cell ageing.

Keywords:

astaxanthin, ageing, health



POLYMER BASED COATINGS FOR POLYCARBONATE NANOPOROUS MEMBRANES

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A few words about the author(s):

Michał Szkop completed his PhD in the area of biochemistry. He gained scientific experience at the University of Potsdam, Warsaw University of Life Sciences, Institute of Experimental Biology in Warsaw, as well as in biotechnology companies.

Abstract:

Polycarbonate nanoporous membranes enable selective transport of molecules of various sizes through pores, which makes them particularly useful in biomedical devices, filtration applications, as well as tools for controlled drug release. When using membranes in in vitro/in vivo applications, the transport of larger biological molecules is restricted, which leads to biofouling phenomenon, i.e. the physical adhesion and accumulation of various biological substances on the membrane. This may lead to the clogging of the membranes pores and impairing their selective transport performance. To avoid this, membrane surfaces can be modified by introducing different surface coatings based on polymers, which form mechanical barrier or alter surface properties, reducing attraction forces of the molecules toward membrane. Therefore, the aim of this study was to assess the possibility of introducing various coatings on the surface of polycarbonate membranes. Selected polymers included dextran, poly(ethylene glycol), poly(acrylic acid), polyvinylpyrrolidone, polydopamine and graphene oxide. The introduction of these coatings was confirmed via various techniques, including i.e. water contact angle, SEM and FTIR measurement. Additionally, the influence of the modifications on the diffusion parameters of the membranes was examined.

This work has been supported by Polish National Centre of Research & Development as a part of EuroNanoMed III project (grant number ENM3/IV/1/INTREPIDUS/2021).

Keywords:

polycarbonate nanoporous membranes, polymer coatings



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OVERVIEW OF CANDIDA AURIS, ITS DISCOVERY AND CLASSIFICATION

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A few words about the author(s):

Veterinary students.

Abstract:

This presentation unfolds a nuanced exploration of *Candida auris*, an eminent multidrug-resistant fungal pathogen, beginning with its seminal discovery in 2009. Navigating through the genomic intricacies, we delve into the pathogen's dynamic genetic diversity and its formidable mechanisms of antifungal resistance. The classification nuances within the *Candida* genus are scrutinized, emphasizing the imperative role of advanced molecular techniques in accurate identification. Insightful discussions extend to the clinical realm, spotlighting *Candida auris*'s pivotal role in healthcare-associated outbreaks and its ominous correlation with heightened mortality rates. This comprehensive examination of discovery, classification, and clinical ramifications equips researchers and healthcare practitioners to effectively grapple with the multifaceted challenges posed by *Candida auris* in both clinical and public health domains.

Keywords:

Candida auris, fungus



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RECOVERY OF GLYCOLIC ACID FROM BRINE WASTEWATER BY ADSORPTION

**Betina Wąsik, Marcin Makula, Przemysław Bartoszewicz,
Sławomir Napiórkowski, Katarzyna Zielińska***

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A few words about the author(s):

The authors of the poster are employees of the Łukasiewicz Research Network – Institute of Heavy Organic Synthesis "Blachownia" and work in the Catalytic Processes Research Group.

Abstract:

The circular economy aims to manage resources in a way that minimises the generation of waste. In the context of water and wastewater management, the circular economy approach implies the reuse of water and waste generated during processes and wastewater treatment. Wastewater often contains valuable substances that can be reused. One example of such a substance is glycolic acid.

The Łukasiewicz Research Network – Institute of Heavy Organic Synthesis "Blachownia" focuses on the removal of organic substances from wastewater and the determination of the content of these substances in sewage.

In this poster we present the results of a study on the effect of the amount of adsorbent on the removal rate of glycolic acid from aqueous solution and the effect of the presence of sodium chloride on the adsorption process on supports (ion exchange resins A103S and A1496).

Keywords:

glycolic acid, adsorption, wastewater treatment, ion-exchange resins



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SYMPTOMS AND CLINICAL PRESENTATIONS OF CANDIDA AURIS INFECTIONS

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A few words about the author(s):

We are veterinary students.

Abstract:

Candida auris, an emerging fungal pathogen, has gained attention due to its ability to cause severe infections, especially in healthcare settings. The symptoms and clinical presentations associated with *C. auris* infections can vary, posing challenges in timely diagnosis and treatment.

Symptoms:

Fever: Most patients with *C. auris* infections experience fever, often the primary symptom indicating an underlying systemic infection.

Chills: Rigors and chills are common manifestations, reflecting the body's response to the invasive nature of the infection.

Clinical Presentations:

Bloodstream Infections: *C. auris* frequently causes bloodstream infections, leading to sepsis. This can be a critical condition requiring prompt medical attention.

Skin Infections: Superficial skin infections, including persistent and difficult-to-treat rashes, may occur. Skin involvement can vary from mild to severe.

Respiratory Infections: While less common, *C. auris* can cause respiratory infections, presenting as pneumonia or tracheobronchitis, particularly in immunocompromised individuals.

Understanding the diverse clinical presentations and challenges in diagnosing *C. auris* infections is crucial for healthcare professionals to initiate timely and appropriate interventions, considering the evolving nature of this emerging fungal pathogen. Ongoing research aims to enhance our understanding of *C. auris* and improve diagnostic methods for better patient outcomes.

Keywords:

Candida auris, symptoms, clinical presentations



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HYDROGENATION OF SUGARS TO SUGAR ALCOHOLS OVER HETEROGENEOUS CATALYSTS AS A PROMISING WAY OF TREATING LIGNOCELLULOSIC BIOMASS

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A few words about the author(s):

Kamila Zaborowska is a PhD candidate at the AGH Doctoral School, where she works on developing the catalysts for hydrotreating biomass-derived compounds. Her scientific hobbies include heterogeneous catalysis, biomass processing and physical science.

Abstract:

Sugar alcohols can be obtained via hydrogenation of saccharides derived from lignocellulosic biomass. Hydrogenation of D-glucose, D-fructose and D-xylose has been broadly studied because of their applications in food industry, cosmetics and pharmaceuticals. Sorbitol and xylitol are commonly used as sucrose substitutes for people with diabetes, and also as additives, e.g. in toothpaste, since they do not cause cavities. The hydrogenation process is carried out in batch or continuous flow reactors, in the temperature of 80-180 °C, under hydrogen pressure 10-125 bar and in the presence of a catalyst. The most studied catalysts are transition metals: Ni, Mo and precious metals: Ru, Pt, Pd, both supported on Al₂O₃, SiO₂, metal oxides or carbon supports. Recently, the carbonaceous supports gained a special interest, due to their inert surface chemistry, stability and cost-efficiency. The parameters that influence the overall performance of the catalyst and yield of products in the hydrogenation process are: temperature, hydrogen pressure and residence time or reaction time. For example, the increase of temperature may enhance the catalyst activity and product yield, but wrongly selected temperature can cause deactivation and formation of side products. The residence time should be adjusted to achieve the highest possible conversion of sugar feedstock. In this study, numerous variables that contribute to the efficiency of the hydrogenation of sugars into sugar alcohols are presented.

Keywords:

lignocellulosic biomass, hydrogenation, sugars, sugar alcohols, hydrogenation catalyst



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EXTENDED REAL ESTATE OFFER CLASSIFICATION USING LARGE LANGUAGE MODEL TO QUANTIFY PROPERTY FEATURES FROM DESCRIPTION

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A few words about the author(s):

Karolina Zięba-Kulawik is a landscape architect and a GIS specialist focusing on remote sensing and 3D LiDAR technology. She obtained PhD in urban forestry (specialisation: geoinformatics) at the University of Agriculture in Krakow.

Abstract:

Property value depends on multiple factors, some, like surface or number of rooms, are easy to quantify, but others, like amenities or views, are often described. Large Language Models (LLMs) offer an opportunity to quantify data from text descriptions and, as such, present a new way of analysing real estate offers to identify factors determining the price. An LLM is a type of artificial intelligence (AI) program that can recognise and generate text. LLMs use machine learning called deep learning (DL) to understand how characters, words and sentences function together. DL involves the probabilistic analysis of unstructured data, which ultimately makes it possible to recognise differences between pieces of content without human intervention. We are proposing a new method of classifying non-standard house and apartment characteristics to identify additional quantifiable dimensions that can be used in pricing estimation. Based on the analysis of real estate offers retrieved from websites in Luxembourg or cross-border regions, we try to confirm if factors such as greenery or proximity to services can be extracted from the descriptive section.

Keywords:

LLM, artificial intelligence, deep learning, property adverts, green spaces



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