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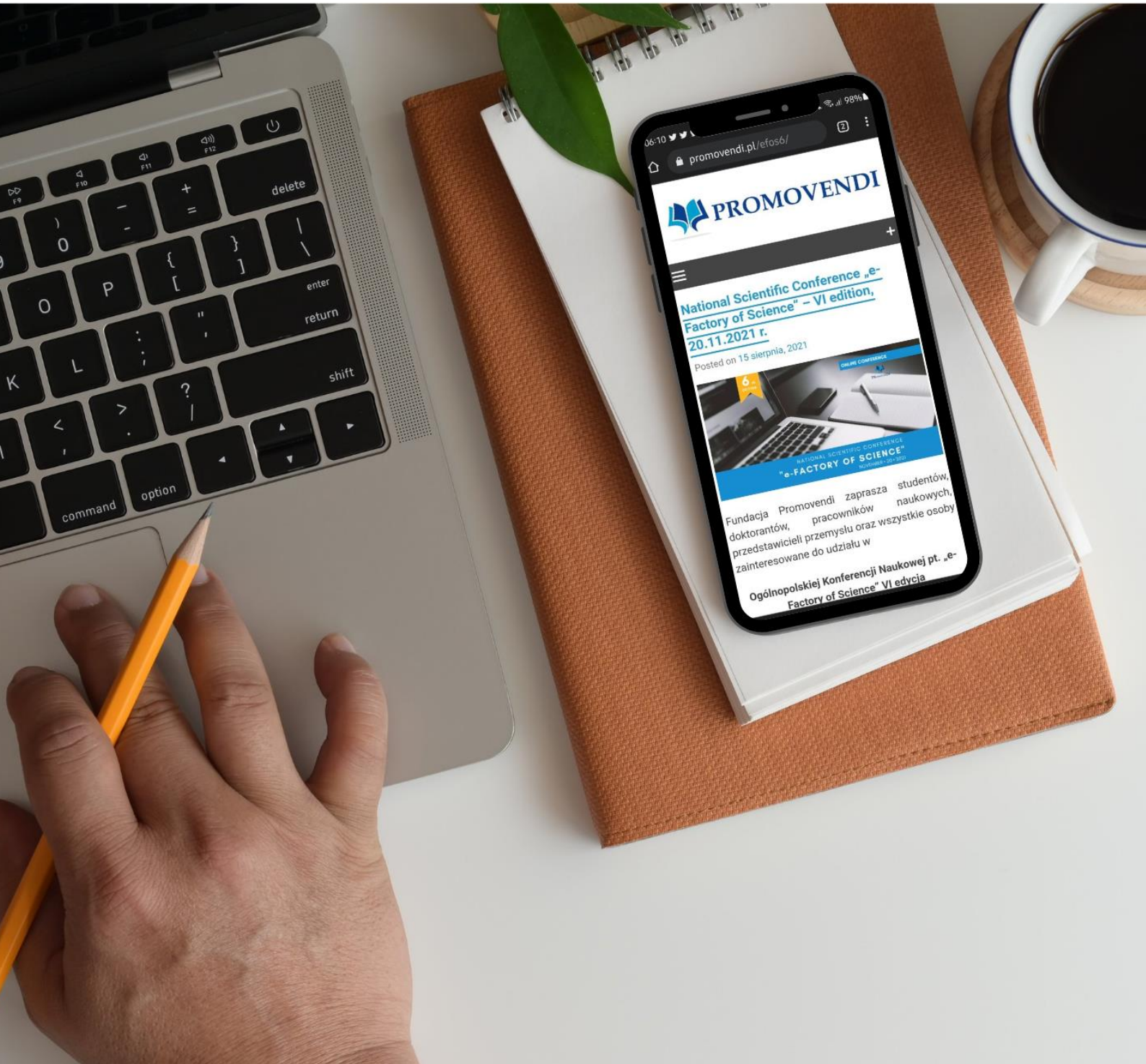

THE METHOD OF DISINFECTING AIR IN AIR CONDITIONING AND VENTILATION SYSTEMS USING NANO COLLOIDAL SILVER

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A few words about the author(s):

R&D Engineers in TTA TECHTRA.

Abstract:

In modern times we observe a rising interest in using colloidal silver as a disinfecting agent. In the presentation, we discuss a novel approach to disinfecting ventilation and air conditioning systems. We present the first prototype of a mobile device capable of fulfilling such tasks by generating silver colloid solution in situ. The general working principles of our device are shown, such as the fluidic and electrical systems involved, are shown. Furthermore, we present the results of the performed biological tests which confirm the antibacterial properties of the colloidal silver we produced using the method of electrolysis.

Keywords:

silver colloid, disinfection

THE INFLUENCE OF THE TYPE AND IONIC STRENGTH OF THE BACKGROUND ELECTROLYTE (NaCl AND $MgCl_2$) ON STABILIZATION AND FLOCCULATION OF THE COLLOIDAL SYSTEM CONTAINING CARRAGEENAN AND NANOCLAY

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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:

Nanoclays (N-SM) are natural clay minerals with a structure similar to montmorillonite with the chemical formula $(Na,Ca)_2(Si_4O_{10})(OH)_2nH_2O$. Unlike conventional clays, nanoclays have at least one dimension in the nanometer range. Replacing natural inorganic cations in clays with other organic cations changes the surface properties and improves their adsorption capacity. Due to their non-toxicity and environmentally friendly, N-SM are used as excellent adsorbents, catalysts and antimicrobial agents. Nanoclays are also used in the production of cosmetics.

Carrageenan (Car) is a biopolysaccharide obtained from red seaweed: fronds and red algae containing numerous sulphate groups in structure. It comes in the form of mucus. Carrageenan is used in the food industry as a stabilizer and thickener. It is also used as a gelling agent in the preparation of desserts with a low sugar content and in the production of hydrogels.

In the experimental part, the influence of the type and ionic strength of the background electrolyte on stability of the colloidal systems containing carrageenan and nanoclay was investigated. NaCl and $MgCl_2$ with ionic strengths of 0.001, 0.01 and 0.1 were used as background electrolytes. Stability measurements were performed using the spectrophotometric method (UV-VIS). The stability mechanism was determined on the basis of adsorption studies. Additionally, the zeta potential measurements were carried out to investigate the electrokinetic properties of the systems.

Keywords:

nanoclay, carrageenan, stability, adsorption, colloids

EFFECT OF PYRETHROIDS ON THE LIPOLYTIC ACTIVITY OF BEAUVERIA BASSIANA

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A few words about the author(s):

My name is Anna Litwin. I am a PhD student at the Department of Industrial Microbiology and Biotechnology of the University of Lodz. My main research topic is entomopathogenic fungi and their relationships with synthetic insecticides.

Abstract:

The infectivity of entomopathogenic fungi in insects depends largely on the activity of lytic enzymes. During the infectious process, the first barrier against an entomopathogenic fungus is the outer lipid layer of the epidermis, therefore lipases are the first enzymes secreted by the fungus. Phospholipase C deserves special attention as it is involved in the degradation of phospholipids in insect cell membranes.

The aim of the study was to determine the effect of pyrethroids on the lipolytic activity of the entomopathogenic fungus B. bassiana.

The activity of lipase and phospholipase C was determined on the basis of the substrate's decomposition leading to the formation of p-nitrophenol (p-nitrophenyl palmitate and p-nitrophenylphosphorylcholine, respectively).

The presence of pyrethroids was found to increase the lipolytic activity of B. bassiana although not all substances caused significant changes. Moreover, it was observed that the lipolytic activity of B. bassiana increased with the incubation time. Cyhalothrin and cypermethrin enhanced the activity of phospholipase C.

It was documented that the addition of pyrethroids did not inhibit the lipolytic activity of B. bassiana, and cypermethrin even increased this activity. Further tests should be carried out to determine whether pyrethroids interfere with the infectious process of B. bassiana.

The research was financed from the grant of the National Science Center of Poland under the number 2016/23/B/NZ9/00840.

Keywords:

lipolytic activity, pyrethroids, entomopathogenic fungi

BEAUVERIA BASSIANA OXIDATIVE STRESS PROTEINS INDUCED BY THE PRESENCE OF PYRETHROIDS

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My name is Anna Litwin. I am a PhD student at the Department of Industrial Microbiology and Biotechnology of the University of Lodz. My main research topic is entomopathogenic fungi and their relationships with synthetic insecticides.

Abstract:

Entomopathogenic fungi are affected by many abiotic factors in their environment, including harmful substances commonly used in agriculture. These fungi, during interaction with toxic agents, experience oxidative stress. Entomopathogens have developed adaptive mechanisms allowing them to survive in an unfavorable environment. Enzymes (e.g., catalase, superoxide dismutase or glutathione s-transferase) play a very important role in response to oxidative stress.

The aim of the study was to identify proteins produced in response to oxidative stress in entomopathogenic fungi B. bassiana treated with insecticides from the group of pyrethroids. Two-way electrophoresis of intracellular proteins isolated from a B. bassiana culture was performed at two time points: after 48 and 168 hours of incubation. Selected proteins were digested and identified using a Maldi TOF/TOF mass spectrometer. Based on the NCBI databases, the presence of proteins involved, inter alia, in cellular response to oxidative stress such as catalase, peroxidase, superoxide dismutase, glutathione S-transferase, thioredoxin reductase, peroxiredoxin was identified. Herein, we present the characteristics of the most important antioxidant proteins.

The research was financed from the grant of the National Science Center of Poland under the number 2016/23/B/NZ9/00840.

Keywords:

oxidative stress, entomopathogenic fungi, Beauveria bassiana

DEVELOPMENT OF WOODEN FURNITURE INTEGRATED WITH HEATING DEVICE BY USING THIN-FILM TECHNOLOGY

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A few words about the author(s):

Anna Martin is a PhD student of material engineering at Poznan University of Technology. Her research area is focused on carbon nanomaterials, especially on thin carbon films containing polymers and surfactants.

Abstract:

One of the fastest growing industries at present is home automation. The development of home automation leads to computerization of individual functional elements, e.g. by controlling parameters such as temperature, humidity or lighting.

The aim of the work was to build a prototype of a non-upholstered furniture with a heating feature. For this purpose, a heating element produced by the thin-layer method was used. The element was placed between the furniture board and a decorative layer. That allows for the production of furniture containing heating elements without changing their aesthetic and functional values.

The production of furniture with the heating feature is possible by using the technology of thin-layer heating elements. The elements are based on electroconductive carbon materials such as graphene, graphite or carbon nanotubes. Thin-film heating elements are made of suspensions containing carbon nanomaterial, stabilizing compound and solvent subjected to the process of ultrasonic mixing. The suspension is then spread on the substrate by a spray-coater or an automatic paint applicator. Current flowing through a thin carbon layer connected to an external power source is releasing Joule's heat that causes rise of temperature of the layer. Therefore, implementation of carbon film to any furniture causes its heating.

Acknowledgments: This work was financially supported by The National Centre for Research and Development as part of the project TANGO-IV-A/0014/2019-00.

Keywords:

carbon nanotubes, graphite, thin films, heater, wooden furniture

POLYMORPHISM OF RITONAVIR – WHAT WE ACTUALLY KNOW? COMPUTATIONAL AND EXPERIMENTAL ANALYSIS

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Abstract:

Polymorphism is a phenomenon of one chemical compound existing in several crystallographic forms, depending on the conditions, like temperature and pressure. Polymorphic form of a pharmaceutical compound in a tablet determines bioavailability of the substance and hence, its curing effect. Computational modelling helps to predict these crystallographic structures and to verify the existing ones, as well. The object of this study was ritonavir, an antiretroviral medication used to treat HIV/AIDS.

A combination of the DFT(Density Field Theory)-based simulations and various experimental methods, like DSC (Differential Scanning Calorimetry), FT-IR (Infrared), PXRD (Powder X-ray diffraction) and 13C NMR (Nuclear Magnetic Resonance) has been used. Both the geometry optimization and thermodynamic parameters calculations have been performed. We have shown that the latter are essential to properly analyze the polymorphic structures of ritonavir.

We found that none of the four ritonavir structures deposited in the Cambridge Crystallographic Data Centre base is right. Already a couple of papers about ritonavir's crystallographic structure and phase transitions based on these wrong structures have been published. This leads to wrong assessment of ritonavir's polymorphism. As a polymorphic phase transition could take place under changing conditions of a tableting process, a false knowledge on the polymorphic forms can lead to unwanted or dangerous clinical effects.

Keywords:

polymorphism, DFT, phase transition, NMR

HISTORY AND OVERVIEW OF ANTIPSYCHOTIC DRUGS

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A few words about the author(s):

I am a fourth-year student at the pharmaceutical faculty. I am interested in drugs that work on the nervous system.

Abstract:

The presentation will present a short history of modern psychiatry and pathophysiology of some mental diseases. The most important element will be to focus on old and new antipsychotic drugs, discuss their scope of action and physiological mechanisms. I will pay particular attention to the side effects of these drugs. It will be important how work on new drugs has increased the effectiveness of treatment and reduced side effects.

Keywords:

mental disorders, psychiatry, neuroleptics

REWARD SYSTEM IN PSYCHOPATHY

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A few words about the author(s):

Psychology student at SWPS University with a Bachelor's degree in Quantitive Methods. I believe psychology is a beautiful way to have science discover a beauty of the nature.

Abstract:

Psychopathy is a personality disorder which is accompanied by emotional (lack of empathy or guilt, superficial charm, coldheartedness) and behavioral (inability to take responsibility, failure to comply with norms, and a disturbed decision-making process) disruptions. The set of abnormal characteristics in psychopathy is related to structures which largely overlap with the reward system - a neuronal complex of structures, processing stimuli in terms of their importance (rewarding / punishing) for the individual. The study of interrupted reward processing in the midbrain, cortex and limbic system may provide a valuable guidance in modeling the phenomenon of psychopathy. The starting point is though to integrate the results of research on this phenomenon and this was the main goal of the presentation. Reviewed articles prove that striatum, amygdala, insula, anterior cingulate cortex, orbitofrontal and ventromedial prefrontal cortices seem to have alternated structural or functional characteristics. According to the existing work on behavioural and structural data, explaining the dysfunction of the reward system sheds new light on the key hypotheses about the emotional and behavioral dimensions of psychopathy.

Keywords:

psychopathy, reward system, structural and functional alertations

APPLICATION OF THE MOLECULAR ELECTRON DENSITY THEORY TO DESCRIBE THE REACTIVITY OF NITRILE N-OXIDES AND SELECTIVITY OF THEIR REACTIONS WITH SELECTED PI-DEFICIENT UNSATURATED COMPONENTS

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A few words about the author(s):

Chemistry is my passion since the middle school. I love being a scientist and my goal is to invent something that would help people in a daily life.

Abstract:

Molecular Electron Density Theory (MEDT) is a new, powerful tool that could be used to predict the reactivity and mechanism of many organic reactions. In following paper the MEDT was used to describe the nature of addents in [3+2] cycloaddition which provides five membered heterocycled compounds – isoxazoles and their analogs. Isoxazoles are widely used bio-active components. What is more isoxazoles are used in many important organic transformations, for example in the stereocontrolled synthesis of β-lactam antibiotics, β-amino acids, C-disaccharides, as well as imino or amino polyols The most popular group of dipoles in [3+2] cycloaddition – nitrile N-oxide was characterised. Reactivity and behaviour of nitrile N-oxides in the reactions with selected pi-deficite components was studied. Following paper provides an overview of the available literature.

Keywords:

nitrile N-oxides, MEDT, DFT, chemical reactivity, computational chemistry

THE CLINICAL SIGNIFICANCE OF A PREVIOUSLY UNDESCRIBED ACCESSORY SUBSCAPULARIS MUSCLE

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A few words about the author(s):

Nicol Zielinska – medical student from Poland; Łukasz Olewnik – professor from Poland, physiotherapist, anatomist; R.Shane Tubbs – professor from the USA, neuroanatomist; Marko Konschake – professor from Austria, anatomist.

Abstract:

An accessory subscapularis muscle is among the morphological variations of the SM, but it is a really rare variant. Depending on its course it may have various clinical significance. ASM can impose pressure on the posterior cord or nerves arising from it, leading to intense pain and problems with shoulder movement. This additional muscle may also lead to quadrilateral space syndrome. Patients usually suffer from pain and loss of sensation in the shoulder region.

Keywords:

accessory subscapularis muscle, compression, additional structure, quadrangular space syndrome, nerves

EXPLORING THE EPIPHYTIC AND ENDOPHYTIC BACTERIAL COMMUNITIES OF SEEDS OF DIANTHUS CARTHUSIANORUM GROWING ON METAL POLLUTED AND UNPOLLUTED SOILS

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A few words about the author(s):

Joint PhD in cooperation with Hasselt University in Belgium. Scientific research focused the physiology of plant functioning under stressful conditions. Interests include plant anatomy, microbial community, genome sequencing.

Abstract:

A metallicolous (M) ecotype of Dianthus carthusianorum L. originating from a metalliferous waste heap left over from Zn-Pb mining in Bolesław (southern Poland) exhibits genetically established enhanced metal tolerance compared to a nonmetallicolous (NM) ecotype from unpolluted habitats in Pliszczyn (eastern Poland). Plants are colonized by an enormous diversity of microorganisms. Endophytic and epiphytic microbiomes are recognized as very important in respect to stress tolerance and plant growth. Seeds can vertically transmit endophytic microorganisms that can assist next generations to cope with environmental stresses. The research focused on investigating the epiphytic and endophytic seed microorganisms in M and NM ecotypes of D. carthusianorum. The communities of epiphytic and endophytic seed microorganisms were sterile isolated from seeds collected in 2011, 2016, and 2018. Isolates were identified by comparative sequencing of 16S rRNA amplicons using the Illumina Mi-Seq method. Evaluation of plant growth promotion (PGP) potential was determined based on the nitrogen fixation, phosphates solubilization by bacterial isolates. Pure cultures of the tested bacterial isolates were also checked for metal tolerance traits. Over 60% of the tested isolates were able to perform nitrogen fixation, could dissolve phosphates, and were tolerant to Cd and Zn. The results confirmed the important role of bacteria in the growth and development of plants under metal stress.

Keywords:

Dianthus carthusianorum, microorganisms, metals

THE IMPORTANCE OF LEPTIN IN CARCINOGENESIS

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A few words about the author(s):

I am a PhD student at Ludwik Rydygier Collegium Medicum in Bydgoszcz, Faculty of Medicine.

Abstract:

Leptin is a hormone released by the body's fat cells. Its level positively correlates with fat mass. It is often referred to as the hunger or satiety hormone. Leptin is primarily responsible for the long-term energy regulation through the leptin receptor, and also has functions related to fertility and immunity. Fluctuations in leptin concentration predispose to cardiological, metabolic and endocrine disorders and more and more often it influences carcinogenic processes. Many studies show the importance of leptin in many types of cancer. The literature review will summarize the current knowledge on the pro-inflammatory adipokine leptin and its influence on many cancer-related processes (cancer progression, cell proliferation, metastasis, angiogenesis).

Keywords:

karcinogenesis, leptin,leptin receptor, obesity

NEUROENDOCRINE TUMORS – SYMPTOMS, DIAGNOSIS AND TREATMENT OF CARCINOID TUMORS

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Ludwik Rydygier Collegium Medicum in Bydgoszcz Nicolaus Copernicus University in Toruń

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A few words about the author(s):

I am a PhD student at Ludwik Rydygier Collegium Medicum in Bydgoszcz, Faculty of Medicine. Medical biology is our passion.

Abstract:

Carcinoid tumors are the most numerous group of neuroendocrine tumors that are located in the gastrointestinal tract (85%) or in the lung (10%). Carcinoid tumors are hormonally active neoplasms (they release hormones, biogenic amines), and metastases occur depending on the location of the tumor. Multiple type I endocrine neoplasia and cigarette smoking are a predisposing factor for carcinoid tumors. Carcinoid tumors can arise in any place where there are neuroendocrine cells that release active hormonal substances. More than 10% of patients have no or no symptoms, and the slow tumor growth prevents the tumor from being diagnosed until the age of 65. The diagnosis is usually accidental, e.g. during surgery for indications other than a neurendocrine tumor. Therefore, it is important to observe all emerging symptoms and look for diagnostic markers that would detect neuroendocrine tumors at an early stage.

Keywords:

carcinoid, carcinoid syndrome, neuroendocrine tumors

SYNTHESIS AND CHARACTERIZATION SUPERABSORBENT POLYMERS MADE OF STARCH, ACRYLIC ACID, ACRYLAMIDE, POLY(VINYL ALCOHOL), 2-HYDROXYETHYL METHACRYLATE, 2-ACRYLAMIDO-2-METHYLPROPANE SULFONIC ACID

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A few words about the author(s):

Since 2012, he has been working at the Polish company Plastica Ltd., which is part of the TZMO Group. In 2018, she began doctoral studies in chemistry at the Faculty of Chemistry of the Nicolaus Copernicus University in Toruń.

Abstract:

Three polymers with excellent absorption properties were synthesized by graft polymerization: soluble starch-g-poly(acrylic acid-co-2-hydroxyethyl methacrylate), poly(vinyl alcohol)/potato starch-g-poly(acrylic acid-co-acrylamide), poly(vinyl alcohol)/potato starch-g-poly(acrylic acid-coacrylamide-co-2-acrylamido-2-methylpropane sulfonic acid). Ammonium persulfate and potassium persulfate were used as initiators, while N,N0-methylenebisacrylamide was used as the crosslinking agent. The molecular structure of potato and soluble starch grafted by synthetic polymers was characterized by means of Fourier Transform Infrared Spectroscopy (FTIR). The morphology of the resulting materials was studied using a scanning electron microscope (SEM). Thermal stability was tested by thermogravimetric measurements. The absorption properties of the obtained biopolymers were tested in deionized water, sodium chroma solutions of various concentrations and in buffer solutions of various pH.

Keywords:

semi-interpenetrating network hydrogel, biomaterial, superabsorbent polymer, hydrogel, graft copolymerization

INTERPERSONAL DIFFICULTIES IN PEOPLE WITH CLUSTER A PERSONALITY DISORDERS

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A few words about the author(s):

Psychology student, Jan Kochanowski University in Kielce.

Abstract:

One of the basic social competences is the development of correctly functioning interpersonal relationships. The skill of maintaining the satisfying social ties is hindered in people who meet the criteria of schizotypal, schizoid and paranoid personality disorders. Individuals suffering from these disorders are highly suspicious of other people and uncomfortable with establishing relationships. This paper presents difficulties in building the correctly functioning interpersonal relationships, encountered by people with Cluster A personality disorders characterized by the odd-eccentric form.

Keywords:

personality disorders, interpersonal relationships

INFLUENCE OF IONIC LIQUID ADDITION ON THE RACEMIZATION OF SECONDARY ALCOHOLS

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A few words about the author(s):

I am a PhD student at the Faculty of Chemistry at the Silesian University of Technology. My research interests are based on the process of dynamic kinetic separation of secondary alcohols with the participation of ruthenium complexes.

Abstract:

Every year the demand for enantiomerically pure chemical compounds increases. To fullfill these needs, methods of obtaining optically pure chemical compounds are being developed and improved. One such method is the dynamic kinetic resolution process. This process is based on two transformations: the racemization reaction carried out by a mechanical catalyst and the enzymatic catalysis reaction. It is extremely important for the racemization reaction to run as efficiently as possible, leading to the formation of the smallest possible amount of by-products, providing the enzyme with the right substrate. It has been proven that ruthenium complexes perform well as a catalyst for the racemization reaction, especially in the case of secondary alcohols. Moreover, it has been proven that a small addition of an ionic liquid significantly increases the dynamics of the reaction.

Kim M.J. et all. 2004. Green Chem. 6:471-474
Kim N. at all. 2005. Org.anic Letters 7:4523-4526
Gibbins E. J. at all.2005. Synlett 19:2993-2995

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Keywords:

dynamic kinetic resolution, racemization, ruthenium complex, ionic liquid, enantiomer

EFFECT OF PRE-TREATMENT AND DRYING PARAMETERS ON PROPERTIES OF DRIED CARROT SNACKS

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A few words about the author(s):

I am a first year PhD student at the Institute of Food Sciences of Warsaw University of Life Sciences (SGGW). I am currently focusing on defining the scope of research for my doctoral dissertation. I am interested in various drying techniques.

Abstract:

The study attempts to evaluate the influence of pre-treatment and drying parameters on the physicochemical properties of dried carrots. Fresh carrots and those subjected to preliminary thermal treatment, i. e. blanching for 1 and 3 minutes and osmotic dehydration for 15 and 30 minutes, were dried using four methods: convection drying, microwave-convection drying, microwave-vacuum drying and sublimation drying. Preliminary investigations concerned the determination of carrot drying parameters for individual methods in order to obtain high-quality dried carrots with respect to the degree of water removal and color attractiveness. The obtained droughts were analyzed for selected physicochemical properties.

The use of pre-treatment before drying had a significant effect on weight loss, water activity, color brightness L* and the maximum breaking strength of dried carrot. A significant effect of the initial osmotic dehydration time on the weight loss in dried carrots was also observed. The drying method had no significantly effect on weight loss and work in the drought breaking test and the carotenoid content. From the point of view of the technological process of obtaining dried fruit and vegetable snacks, it is important to choose the method of pre-treatment and drying and the conditions of conducting both processes. This allows for the modification of the properties of the drought and obtaining the drought with the most desirable properties from the consumer's point of view.

Keywords:

carrot snacks, pre-treatment, blanching, osmotic dehydration, drying

IMMOBILIZED LACCASE IN REMOVAL OF DYES FROM AQUEOUS SOLUTIONS

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A few words about the author(s):

Katarzyna Jankowska studied Chemical Technology at Poznan University of Technology and graduated her PhD in 2021. Biotechnology and enzyme immobilization are her scientific interests.

Abstract:

Laccase, due to its oxidation properties, can convert phenolic compounds, such as dyes, to their derivatives. Therefore, this enzyme plays an important role in environmental protection, mainly due to the possibility to degrade hazardous pollutants from surface waters and wastewaters. Based on that, it was decided to produce new biosystems based on immobilized laccase and next applied them for removal of dyes, such as C.I. Reactive Black 5, C.I. Reactive Blue 4 or C.I. Reactive Blue 19 from model aqueous solutions at various process conditions, such as temperature, pH and reaction time. The obtained results decidedly showed that the systems with immobilized laccase are able to degrade dyes from water even with 100% efficiency.

Keywords:

laccase, electrospun fibers, immobilization, dyes, decolorization

MDA (MALONDIALDEHYDE) CONCENTRATION AS AN INDICATOR OF LIPID PEROXIDATION IN LEAVES OF SELECTED COTONEASTER SPECIES

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A few words about the author(s):

PhD students in pharmaceutical and natural sciences, research is focused on phytochemical analysis and biological activities of selected Cotoneaster species as well as the adaptation of plants to growth in areas contaminated with heavy metals.

Abstract:

Oxidative stress results in stimulation of lipid peroxidation which is known to be a chain of the oxidative destruction of lipids and conformational changes within membrane proteins. Estimation of lipid peroxides in leaf tissue can be determined in terms of MDA (malondialdehyde) content by TBA (thiobarbituric acid) reaction. Malondialdehyde assay is a diagnostic test for the estimation of MDA – the lipid peroxidation product which is one of the major TBA reactive metabolites. The current study was undertaken to establish the malondialdehyde (MDA) level in leaves of selected Cotoneaster species (C. nebrodensis, C. roseus, C. hissaricus and C. hsingshangensis) cultivated in the Maria Curie-Skłodowska University (UMCS) Botanical Garden in Lublin. Thereby lipid peroxidation as well as the intensity of stress factors affecting investigated plants were estimated. The present study suggests that C. hsingshangensis and C. roseus are affected by unfavorable environmental conditions, which indirectly leads to production of ROS as well as induces lipid peroxidation. It seems that the enhancement in lipid peroxidation in the leaves of investigated species can be associated with the influence of abiotic stresses and leads to modifies in various membrane properties e.x. permeability and enzyme activity.

Keywords:

Cotoneaster, lipid peroxidation, oxidative stress, ROS, MDA

EVALUATION OF THE RELIABILITY OF THE RULER DROP TEST PERFORMED BY MIXED MARTIAL ARTS FIGHTERS IN IMMERSIVE VIRTUAL REALITY

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A few words about the author(s):

Alan Langer – MMA fighter, S&C coach, PhD student; Jacek Polechoński – physical education teacher, physiotherapist, PhD.

Abstract:

Psychomotor abilities tests are generally performed with the use of simple agility tests or computer laboratory tests. It seems that immersive virtual reality (IVR) allows to combine both this methods of measurement. The Ruler Drop Method (RDM) is one of the simple tests to evaluate reaction speed that can also be performed in IVR. The main aim of the research was to assess the reliability of RDM implemented in IVR on the group of mixed martial arts (MMA) fighters. 32 MMA fighters were tested. The test was to catch the falling ruler in IVR. The intraclass correlation procedure was used to assess the reliability of the measurements. Results. Intraclass correlation coefficient (ICC) for the right hand was ICC=0.79 and for the left hand it was ICC=0.74. In this both cases, indicates was good reliability. Conclusions. RDM performed in IVR can be considered a reliable test in the group of MMA fighters. It seems that the IVR environment can be useful for the design and execution of psychomotor tests.

Keywords:

catch the ruler test, ruler drop method, immersive virtual reality, IVR, MMA fighters, reliability, reaction speed

HYBRID CONDUCTIVE MATERIALS BASED ON LIGNOSULFONATES AND NANO-PARTICLES OF NOBLE METALS WITH INCREASED ELECTROCATALYTIC PROPERTIES

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Amanda Leda, Tomasz Rębiś, Patrycja Płócienniczak and Grzegorz Milczarek are scientifically associated with the Institute of Chemistry and Technical Electrochemistry at the Poznań University of Technology.

Abstract:

The continuous development of the field of science, which is nanotechnology, means that the search for materials of nanometric dimensions is underway. The combination of inorganic and organic compounds is aimed at creating hybrid systems with increased functionality. The increasing exposure of humans to toxic compounds makes it necessary to detect and monitor them in real systems.

In the first stage of this work, hybrid materials were synthesized, multi-wall carbon nanotubes/lignosulfonate/palladium and multi-wall carbon nanotubes/lignosulfonate/ platinum, which were used as a matrix for the construction of sensor systems. Numerous electrochemical tests have been carried out, with the use of cyclic voltammetry in order to conduct a general electrochemical characterization of materials, and then the behavior of the obtained systems towards electrocatalytic reduction of nitro compounds such as 1,2-dinitrobenzene, 1,3-dinitrobenzene and 1,4-dinitrobenzene.

The GC/MWCNT/LS/NPd/1 and GC/MWCNT/LS/NPt/1 material has been shown to have electrocatalytic properties towards electro-reduction of the described analytes, which indicates that it can be used as a matrix of a sensor system for the detection of hazardous substances.

In the future, further studies of materials showing electrocatalytic properties are planned, including the influence of environmental conditions and tests on real analytes solutions.

Keywords:

platinum nanoparticles, palladium nanoparticles, electroreduction, nitro compounds

WORK AS A VOLUE IN HUMAN LIFE

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A few words about the author(s):

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Abstract:

The article presents the issue of work that is an extremely important value in human life in ethical terms. Work is not only a source of income, it is also a value that allows the individual to develop himself. It is worth emphasizing that work produces not only material goods, but also introduces valuable and intended changes in the environment. Working persons should have a sense of their own dignity or personality, be aware of the responsibility and freedom they have, and be aware of humanity quite often subjected to the test of time in work phenomena. In the final part, I presented research on whether work for people is of value.

Keywords:

human work, value, ethics, profession, survey

ASSESSMENT OF MOBILITY AND ECOTOXICITY OF SELECTED HERBICIDAL IONIC LIQUIDS IN SOILS

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Abstract:

Dicamba (3,6-dichloro-2-methoxybenzoic acid) is a popular herbicide substance. On the one hand, dicamba has beneficial herbicidal properties, but it is also a very toxic substance and is characterized by high mobility in soil and limited sorption capacity.

The aim of the study was to assess the ecotoxicity and migration of herbicidal ionic liquids based on cations of natural origin (betaine and choline) and herbicide anion (dicamba).

In the first stage, the influence of herbicidal ionic liquids in soils profiles was investigated. For this purpose, sorption and leaching processes occurring in various taxonomic soils were analyzed.

In further studies, the herbicidal properties and antimicrobial activity of the tested compounds were analyzed against selected model plants. Then, as part of the assessment of antimicrobial activity, tests were performed against model soil microorganisms.

In conclusion, it has been proven that a cations of natural origin enables the increase of sorption capacity and limitation of herbicide mobility in soil. At the same time, herbicidal activity was confirmed and toxicity towards microorganisms was excluded. On the basis of the obtained results, it was found that herbicidal ionic liquids containing the betaine or choline cation and the dicamba anion are compounds that may constitute a promising alternative to standard herbicide preparations.

Keywords:

herbicidal ionic liquids, ecotoxicity, sorption, leachability, antimicrobial activity

MULTI-ENZYMATIC CASCADE FROM IMMOBILIZED ENZYMES

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A few words about the author(s):

The goal of our research team is to turn homogeneous into heterogeneous so that the impossible becomes possible. We deals with immobilization of catalyst on the silica carriers to make processes less cost consuming and more green.

Abstract:

Nowadays there is strong emphasis to run the reaction according to the rules of green chemistry. The use of biocatalysts instead of chemical catalysts ensures stereospecificity of products, decreases reaction steps and the number of toxic side products. Enzyme immobilization provides heterogeneity of biocatalyst that enables easy separation of the enzyme from solvents and reaction products which ensure reuse of the same biocatalyst and usually increase the thermal and operational stability of enzyme.

Many enzymatic processes require two or even more enzymes, which work together in one cascade and produce the desired compound (product). There are generally three multienzymatic immobilization systems: stepwise, mixed and coimmobilization.

Herein, we examined multienzymatic cascade of 3 enzymes: D-amino acid oxidase from Rhodotorula gracilis, commercially available catalase and transketolase from Geobacillus stearothermophilus, which were immobilized on silica monoliths. Their activity was checked in one-pot cascade of L-erythrulose synthesis.

Acknowledgments: The support of the National Science Centre (NCN, Poland) for this work under grant No. UMO-2016/23/B/ST8/00627 is gratefully acknowledged.

[1] Qingzhi Ji, et al., Process Biochem., 2016, 51, 1193-1203
[2] M. Lorillere, et al., Green Chem., 2016, 19
[3] M. L'efant, et. al., Adv. Synth. Catal., 2019, 361, 2550

Keywords:

multienzymatic cascade, immobilized multienzymatic systems, immobilization, silica monoliths

CONTENT VALIDITY OF THE PROPOSED MOTOR COORDINATION TESTS TO BE IMPLEMENTED IN IMMERSIVE VIRTUAL REALITY

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A few words about the author(s):

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Abstract:

The content validity was assessed for the descriptions and illustrations of 17 motor coordination tests to be implemented in the virtual reality environment. The tests include motor tasks assessing the following abilities: reaction speed (5), time-space orientation (2), rhythmization (1), differentiation of movements (3), motor adjustment (1), combining movements (3), and balance (2). The evaluation was carried out using the Delphi method based on the knowledge, experience and opinion of 10 experts (academic teachers with a PhD or postdoctoral degree in physical culture sciences). All experts participating in the evaluation of the tests unanimously agreed that each of the proposed tests will measure what it is supposed to measure. Therefore, the content validity of the tests was fully confirmed.

Keywords:

motor coordination tests, immersive virtual reality, validity

HYBRID GLASSES DOPED WITH METAL PHTHALOCYANINE – INFLUENCE OF SOL-GEL CONDITION ON STABILITY OF LUMINOPHORE IN THE GLASS MATRIX

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Barbara Popanda completed her Master studies in Chemistry in 2019 at the University of Opole. From October 2019 she is a PhD student at AGH in Kraków.
Marcin Środa is a specialist in the glass technology. He is a professor of AGH in Kraków.

Abstract:

Metal phthalocyanine was incorporated into the hybrid glass by the sol-gel method using protic solvents and aprotic solvents. The effect of alkaline condition with NaOH addition or NH_4OH addition (one-stage process) and acid-alkaline condition with CH_3COOH-NH_4OH and HCl-NaOH (two-stage process) was analyzed. Additionally, dry agent was added into the sol to check the influence of this compound into drying and stability of phthalocyanines in the sols. UV-Vis spectroscopy was used to study stability of metal-phthalocyanines in the sols. The highest stability of phthalocyanines in the glass was obtained for synthesis with protic solvent in the presence of the alkaline catalyst. The lowest stability of phthalocyanines were observed when the aprotic solvents were used. The structure and optical properties of the gels were studied by SEM, FTIR and thermoluminescence (TL), respectively. The thermal stability of the materials was analyzed by TG-DSC methods. The different ways of fabrication, i.e., kind of solvent and catalyst affect the optical properties of different metal-phthalocyanines in the glass matrix. The best optical results were observed for samples based on a two-stage process. However, metal-phthalocyanine substituted with siloxane groups shows a few order more stability in the glass matrix, whereas unsubstituted metal-phthalocyanine is rather unstable in the sol-gel matrix in time.

Keywords:

ORMOSIL, phthalocyanine, sol-gel, thermal stability, thermoluminescence

MODELING OF POLYADDITION PROCESS IN THE SYSTEM OF ONE MONOFUNCTIONAL AND TWO DIFUNCTIONAL MONOMERS USING MONTE CARLO METHOD

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A few words about the author(s):

The author is a student at the Rzeszów University of Technology.

Abstract:

Polyaddition is a step-growth process in which no small molecule is eliminated during the course of reaction. In this polymerization, a polymer is formed by reactions of functional groups of one monomer with functional groups of another monomer, which involves the migration of hydrogen and the formation of the polymer repeat unit.

A well-known example is the migration of a hydroxyl hydrogen atom to nitrogen from the isocyanate group, thus forming urethane group. The formed polymer molecule has a low degree of polymerization. In step-growth polymerization long-chain polymers are obtained only at high conversion.

In this study, Monte Carlo method was used to model the polymerization process. Individual reactions were chosen according to the probability values calculated from the input parameter values.

The aim of this study was to develop a model of the polymerization process, to investigate the influence of the values of reaction rate constants on the distribution of mers sequences in polymer macromolecules and the impact of the amount of monofunctional monomer on the number-average degree of polymerization. The simulation results obtained are presented in graphical form.

Keywords:

polyaddition, Monte Carlo method

VITAMIN D IN THE DAILY CLINICAL PRACTICE

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A few words about the author(s):

Julia Ruszkiewicz – 5th year student of medicine at Collegium Medicum im. Ludwika Rydygiera w Bydgoszczy Uniwersytetu Mikołaja Kopernika w Toruniu.

Abstract:

Vitamin D exists in nature in the form of vitamin D2 (ergocalciferol) and D3 (cholecalciferol). The source of ergocalciferol are products of plant origin, while products of animal origin are source of cholecalciferol. The research conducted so far shows that that the vast majority of society is deficient in vitamin D, and especially FAT people are exposed. Striving for its correct values can be very important in treatment of many diseases and should be of interest to doctors of various specialties. Large importance is attached to the prevention of osteoporosis - it has been proven that supplementation with calcium and vitamin D significantly reduces overall bone loss. In case of autoimmune diseases (juvenile systemic lupus erythematosus, autoimmune inflammation of the thyroid gland) normal levels of vitamin D in the body reduces the activity of the disease and relieves its symptoms. Vitamin D also has a beneficial effect on the course of pregnancy - adequate concentration in the body of a pregnant woman reduces the risk of miscarriage, preeclampsia and gestational diabetes. When it comes to type 2 diabetes, vitamin D supplementation may delay the progression of the disease at its early stage, and in case od people suffering from arterial hypertension contributes to a decrease in both systolic and diastolic blood pressure.

Keywords:

vitamin D, suplementation, prevention, treatment

APPLICATION OF A BASKET FIXED BED REACTOR FOR HETEROGENEOUS PROCESSES

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A few words about the author(s):

The goal of our research team is to turn homogeneous into heterogeneous so that the impossible becomes possible. We deals with immobilization of catalyst on the silica carriers to make processes less cost consuming and more green.

Abstract:

Heterogeneous catalysis, including biocatalysis with immobilized enzymes, is a significant part of the chemical industry. Application of a heterogeneous catalyst allows to reduce process costs, e.g. due to the ease of catalyst separation, multiple use and waste reduction through simplifying of final product purification. Most of these is related to the type of reactor used in a given process. Such a reactor should ensure proper mixing of the reactants while protecting the catalytic bed against mechanical damage. Common used reactors, such as stirred tank reactors (STR) and packed bed reactors (PBR), do not meet these requirements. One of the commercial solutions of this issue is the rotating bed reactor (RBR) of SpinChem® [1]. It combines STR's and PBR's features and enables the catalyst to be packed in a rotating chamber, while ensuring proper mixing and contact of the catalyst with the reactants. In the current research, we propose an alternative patent-pending reactor (application no. P.435055) - a basket reactor with a fixed catalyst bed (FBR), which was investigated in biocatalytic heterogeneous processes and then compared with commercial RBR of SpinChem®.

Acknowledgements: The project was financed from BKM funds granted on the basis of contract no. 04/030/BKM21/0057.

References:
[1] SpinChem® is a registered trademark by Nordic ChemQuest AB, Sweden, www.spinchem.com, 2016 (Accessed 25.10.2021)

Keywords:

heterogeneous process, heterogeneous catalyst, fixed bed reactor, immobilization, immobilized enzyme

VEO WEATHER ROUTING – AN INNOVATIVE ALGORITHM FOR CALCULATING ROUTES BASED ON WEATHER, MAP AND POLAR PLOTS OF YACHTS

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A few words about the author(s):

Andrzej Kępys – GIS Architect, OpenStreetMaps Poland President; Ernest Syska – Marine Navigation Applications Product Manager.

Abstract:

The work demonstrates the adaptation of the Dijkstra algorithm to the marine navigation called VEO Weather Routing. This mechanism is used to solve the problem of determining the sea route in terms of weather data, navigable characteristics of the yacht - with automatic avoidance of land with high efficiency and precision. The full calculation procedure in both phases of the algorithm's operation was presented. As a result, a significant time gain was proved on the route marked with the use of the constructed mechanism in relation to the route marked by hand.

Keywords:

Weather Routing, Marine Navigation, Dijkstra algorithm

DEPRESSION AS A XXI CENTURY DISEASE

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A few words about the author(s):

A graduate of Managment studies, currently a Psychology student.

Abstract:

By 2030 will be the most common disease in the world. Depression can affect anyone, regardless of gender, age, background or status. Women are twice times more likely to suffer from this disease. It is one of the leading causes of suicide. The background can be multidimensional: genetic, biological or social. The problem is underestimated, and sick people are not adequately cared for and have no support from their relatives.

Keywords:

depression, psychology, disease

CAUSES AND CONSEQUENCES OF CHRONIC STRESS

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A few words about the author(s):

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Abstract:

Stress is a defensive reaction of the body when it is subjected to mental or physical stresses. There can be many factors behind this, including psychological, sociological, biological, and physical. Stress can be positive and motivating. It is then referred to as eustress. It is chronic stress that is dangerous to health and life, as it causes the development of many diseases. It also lowers intellectual performance and hampers everyday functioning.

Keywords:

stress, chronic stress

EFFECT OF CHITOSAN ON BIOCHEMICAL BLOOD PARAMETERS AND INTESTINE MORPHOMETRIC PARAMETERS OF COMMON CARP (CYPRINUS CARPIO L.)

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Ewa Ziółkowska – PhD student and teaching assistant in Bydgoszcz University of Science and Technology; Joanna Bogucka and Magdalena Stanek - associate professor in Bydgoszcz University of Science and Technology.

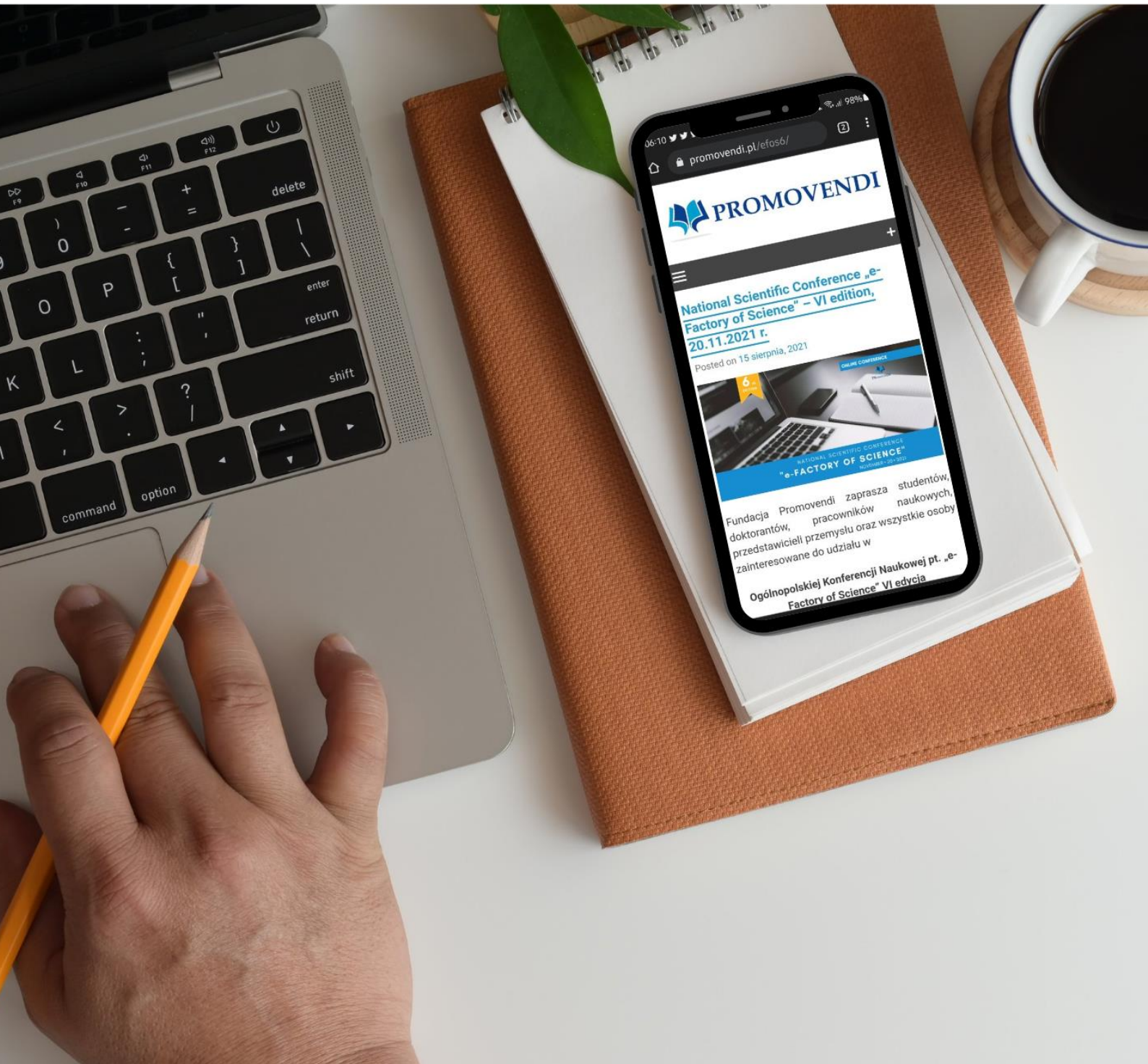
Abstract:

The aim of the study was to evaluate the effect of chitosan supplementation on blood biochemical parameters and intestinal histological parameters in common carp. The breeding part was carried out at Experimental Station for Feed Production Technology and Aquaculture in Muchocin, Poland. 576 carp fry with an average body weight of 63 g were used for the experiment. Fish were divided into three groups: the control group - basic feed (C), CH1 group -the fish were fed with basic feed with 1% addition of chitosan and CH2 group -with 2% addition of chitosan. After 60 days, 12 individuals were caught from each group. Immediately after euthanasia, blood samples were collected for biochemical analyzes, and the proximal and distal intestine was collected for histological analyzes. Statistical analyzes showed that chitosan, both in 1% and 2% doses, significantly reduced the level of LDL and Fe in the serum of fish compared to the control group. Whereas, supplementation of 2% chitosan resulted in a statistically significant decrease in the level of TCH with a simultaneous increase in ALP and P. The addition 1% and 2% doses of chitosan resulted in a significant increase in the depth of the intestinal crypts in the distal intestine. There was also a significant increase in muscularis thickness in the distal intestine after the addition of 1% chitosan. The analyses showed no significant effect of the addition of chitosan on the histological parameters of the proximal intestine of the fish.

Keywords:

chitosan, common carp, intestine, biochemical blood parameters, histology parameters

ABSTRACTS OF
POSTERS



ACTIVATED BIOCHAR AS AN ADSORBENT OF ORGANIC POLLUTANTS FOR WATER AND WASTEWATER TREATMENT

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A few words about the author(s):

Beata Barczak – chemical engineer (GUT, 2021). Areas of academic interest: instrumental methods in chemical analysis, energy recovery of waste biomass, pyrolysis, physical and chemical activation of carbon materials.

Abstract:

The use of biomass, especially waste biomass, as an alternative energy source is a very important issue today. Pyrolysis is a process of thermal degradation of raw material and one of its products is biochar. This product is mainly distinguished by its high carbon content, and by improving its quality through activation, it can be more widely used. Activated biocarbon has a strongly developed surface and porous structure, and as an adsorbent, it can be used as a pollutant sorbent.

Chemical activation is one way of improving the quality of carbon materials by applying high temperature and an activator, e.g. KOH. This method allows to obtain sorption materials with the highly developed specific surface area of more than 1100 m^2/g. Another important parameter characterizing activated carbons is the adsorption capacity of the model pollutant by the analyzed sorbent, which allows quantifying the ability to adsorb an organic compound from an aqueous solution.

Pyrolysis of waste biomass, which consisted of corn cobs (without kernels) and cherry kernels, was performed. The results of the study of the adsorption capacity of organic pollutants from the aqueous phase by the activated with potassium hydroxide biocarbons are presented. An aqueous solution of Rhodamine B was used as a model pollutant. The effect of waste biomass type on the adsorption capacity of organic pollutant is discussed based on the study.

Keywords:

pyrolysis, chemical activation, waste biomass, activated biocarbon, adsorption

CONVOLUTIONAL NEURAL NETWORKS

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A few words about the author(s):

PhD student at Opole University of Technology in the scientific discipline of mechanical engineering. Area of interest is application of artificial intelligence in production engineering.

Abstract:

The aim of the study was to show types of convolutional neural networks (CNN) and their advantages. In this poster we present types of CNN and their features. Deep learning networks are well known for their usefulness, but not everybody knows, that depending on the input data and the goal we want to achieve, we can use different solutions. There are three types of CNNs depending on filter move: 1 dimension, 2 dimensions and 3 dimensions. In 1 dimension CNN filter moves in one direction, the input are figures (time series) and it is often use for time series classification. In 2 dimension CNN filter moves in two directions, as input it uses images in black and white, the output is assigning input data to one of the predetermined classes. CNN with 3 dimensions filter moves on 3 axis and it gives ability to classify colour images (RGB), videos or even Functional magnetic resonance imaging (fMRI), to predetermined classes. Convolutional neural networks can be used for many purposes. The effectiveness of their operations, i.e. the level of probability that the input data belong to a given pre-defined class, depends on the structure of the network itself - number of layers, size filter, applied reduction function.

Keywords:

convolutional neural networks, artificial intelligence

COMBINING MATERIALS IN 3D PRINTING: INFLUENCE OF 3D PRINTING PARAMETERS ON ADHESION BETWEEN TWO DIFFERENT POLYMERS: PLA AND TPU

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Emila Brancewicz-Steinmetz is a student of Material Engineering Master's studies at Lodz University of Technology. She is focusing her academic work on surface coating engineering, as well as 3D Printing, numerical methods, and analysis.

Abstract:

3D Printing enables the rapid prototyping and production of complex geometries. 3D Printer in FDM technology allows printing with two nozzles, which creates an opportunity to produce multi-material elements during one process. Production with the use of two nozzles allows obtaining specific mechanical parameters of the objects. Printing from two materials requires special consideration of the interface zone generated between their geometrical boundaries. The aim of this poster is to present the possibility of printing with PLA and TPU, using commercially available filaments and software to obtain the best possible bond strength in reference to printing parameters, surface pattern, due to roughness of the material contact surface, and the order of layer application. The best variants of patterns combinations were distinguished. Well-chosen printing parameters can prevent a drop in parts efficiency, when compared to component materials, which might be severe, depending on the materials combination.

Keywords:

FDM, multi-material printing, shear strength, TPU, PLA

INVESTIGATION OF RHEOLOGICAL PROPERTIES OF SELECTED MAGNETORHEOLOGICAL MATERIALS

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Anna Fenyk is PhD student at the Department of Inorganic and Analytical Chemistry of the University of Lodz. Scientific interests: inorganic chemistry, magnetochemistry, electrochemistry, environmental analytics, ecology.

Abstract:

Magnetorheological materials are a type of intelligent materials, whose properties change rapidly and reversibly under the influence of an external stimulus such as a magnetic field. When a magnetic field is applied, the magnetic particles form a chain structure along the direction of the field lines, increasing the viscosity of the fluid, causing it to change from a liquid to a solid-like state. The rheological properties of such liquids depend on the concentration, density and size of the particles, their distribution and shape, the properties of the carrier fluid, the additives used, the temperature and other factors. The interdependence of all these factors is very complex, but it is important in determining how to optimize the performance of these materials for specific applications. The rapid development and interest in these materials results from their wide application in many fields of industry, science and technology, influencing the design and operation of many devices used in our everyday life.

Keywords:

magnetorheological materials, magnetic field, application

3D PRINTING WITH MIXES WITH HIGH-ALUMINA CEMENTS – STATE OF ART

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A few words about the author(s):

The group of authors consist of two Civil Engineering students and a tutor. On our project we are working at the West Pomeranian University of Technology in Szczecin.

Abstract:

3D printing is the new, alternative method for creating concrete constructions. Nowadays it is more and more often used instead of current technologies. This modern method also appears to be more efficient than the ones used until now. Materials, which are used for three-dimensional printing, must fulfill requirements from standards, just as materials used in conventional execution. In this article it is described which specific requirements should the concrete mixture fulfill in order to be used in 3D printing and what are the opportunities of using aforementioned method. Furthermore, in the article there are included restrictions for materials used in 3D printing such as maximum height of the printed element. Another aspect appearing in the article concerns high-alumina cements as an alternative binder in the concrete mixture.

Keywords:

3D printing, high-alumina cement, alternative constructing

TEXTURAL AND SORPTION PROPERTIES OF ACTIVATED CARBONS PRODUCED FROM SCOTCH PINE AND COMMON OAK BY PHYSICAL ACTIVATION

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I am MSc Engineer of chemical technology with specialization in inorganic chemical technology. I graduated West Pomeranian University of Technology in Szczecin. Currently I am PhD student at ZUT Doctoral School.

Abstract:

Actually, serious problem poses high emission of CO_2, which is cause of many climatic changes. In industry in the object of CO_2 utilization are carried out adsorption processes where as an adsorbents are used primarily activated carbons. Adsorbents can be produced from various raw materials, about different quality and prices. One of the most available and cheap precursor is wood. Activated materials could be used for another gas utilization – e.g. C_2H_4, which is named plant hormone. C_2H_4 is emitted by climacteric plants and regulates ripening processes.

The series of highly porous activated carbons were produced from two types of trees commonly appearing on the territory of Poland – Scotch Pine and Common Oak. Porous structure was determined by X-ray diffraction and volumetric adsorption analysis of N_2 and CO_2 at -196°C and O^{o}C, respectively. CO_2 and C_2H_4 uptakes were measured by thermogravimetric method at 30°C in temperature swing mode. The highest sorption capacity at 30°C for CO_2 reached 2.73 mmol/g and for C_2H_4 3.79 mmol/g. In addiction physical activation led to highly development specific surface area, which for not activated sample produced from wood of Scotch Pine and Common Oak was 3 m^2/g and 4 m^2/g respectively. For samples after activation step at 900°C this parameter reached 1246 m^2/g and 1194 m^2/g.

Keywords:

activated carbon, wood, physical activation, CO_2 uptake, C_2H_4 uptake

THE TORTOISESHELLS AND THEIR REDNESS GENE

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Abstract:

The color of domestic cat's pelage depends on several genes and it is also the result of modification of two pigments: eumelanin (black pigment) and pheomelanin (yellow pigment). There is a redness gene locus on the X chromosome. It has two alleles. One of them (the „O" allele) blocks the production of eumelanin. The „o" allele does not block eumelanin production. These kinds of genes are called epistatic genes which mask the action of other genes. Males have only one X chromosome, therefore the color of red will appear only in the presence of the „O" allele. Females, however, have two X chromosomes. If she has both alleles, her coat will be tortoiseshell. The present thesis is a review article.

Keywords:

cat, genes, chromosomes, alleles, tortoiseshell

THE IMPACT OF RESIDENCE ON DIETARY HABITS OF STUDENTS OF STATE UNIVERSITY OF APPLIED SCIENCES IN NOWY SACZ DURING PANDEMIC COVID-19

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A few words about the author(s):

The authors are lecturers at the State University of Applied Sciences in Nowy Sacz.

Abstract:

Socioeconomic factors can exert a great impact on food choices. However, diet choice is a complex area. There are a number of factors that affect the population's and an individual's choice of food. Our aim was to describe the influence of place of residence on dietary habits of PWSZ students in Nowy Sacz during the COVID-19 pandemic. The research was a survey which included questions concerning dietary habits, frequency of meals, consumption of specific groups of products and BMI was calculated. Most respondents consisted of the students of the first year, living in a countryside. There were significant differences in the value of BMI index and eating behavior between women and men living in the countryside and in the city.

The most frequently indicated factors determining dietary habits during pandemic were limited possibility to move around, distance learning and remote work, stress, and restricted family contacts. There was a growth of salty and sweet snacks consumption, as well as coffee and a slight decrease in meat, cold cuts, and pulses consumption.

Keywords:

place of residence; dietary habits, students, COVID-19, body mass index

PHARMACOLOGICAL EFFICACY AND PHARMACOKINETIC OF PDE4/7 INHIBITORS IN MICE WITH EXPERIMENTAL SEPSIS

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A few words about the author(s):

The author works in the Department of Pharmacokinetics and Physical Pharmacy, at the Jagiellonian University. His research interest is the application of novel phosphodiesterase inhibitors in sepsis models, as well as pharmacokinetic studies.

Abstract:

Sepsis is a syndrome caused by a dysregulated host response to an infection. It is characterized by the extensive release of cytokines and reactive oxygen species. Recent studies have shown that sepsis has a significant impact on pharmacokinetics of drugs used in the treatment of this condition. The first goal of this study was to evaluate the pharmacological effect of phosphodiesterase inhibitors (BRL-50481 and rolipram) administration in mice with sepsis induced by cecal ligation and puncture. The second goal was to examine the effect of sepsis on concentrations of phosphodiesterase inhibitors in serum and selected organs. The levels of cytokines (TNF-α, IL-1b, IL-6, IL-10, MCP-1, MIP-1a and RANTES) were measured in serum using Milliplex Map Kit. LC-MS/MS was used to determine the concentration of the tested phosphodiesterase inhibitors in serum and selected organs. The results of the experiment show a statistically significant increase in the concentrations of all tested compounds in mice with experimental sepsis. It can be explained by the development of hypodynamic phase of sepsis, which leads to a decreased cardiac output, microcirculation, liver perfusion, enzymatic activity and renal glomerular filtration.

Keywords:

sepsis, phosphodiesterase inhibitors, pharmacokinetic, mice

POST-COVID TRANSFORMATIONS IN COMMUNICATION AND EDUCATION

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A few words about the author(s):

Sylwia Romanowska-Jonio – academic teacher, early school education teacher, therapist for people with Special Educational Needs. Scientifically interested in the identity of adolescents, media in education, communication, anthropology.

Abstract:

Education and communication fill a huge role in everyday life and the perception of culture. These two areas work closely together. The purpose of poster is to show the changes in communication and learning, that have occurred in time and space, before and after remote classes.

Keywords:

education, communication, Covid-19

IDENTIFICATION AND ANALYSIS OF THE CONTENT OF MICROVESICLES SECRETED TO THE EXTRACELLULAR SPACE BY FIBROBLASTS IN THE CONTEXT OF REGULATION OF PHYSIOLOGICAL ROLE OF FBP2 IN THE HEART

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A few words about the author(s):

The authors are from the Department of Molecular Physiology and Neurobiology, University of Wrocław, Ewa Stefanik is a master's student, Łukasz Pietras is a PhD student. They teamed up to work on the role of FBP2 in mitochondrial mobility. The team is led by Agnieszka Gizak.

Abstract:

Mitochondria provide the energy necessary for fueling physiological processes in the cell. To deliver ATP to sites of the greatest demand for it, mitochondria are actively transported along microtubules using motor proteins from kinesin and dynein families, and a number of adaptor proteins. This process is crucial for proper functioning of the cell, and is especially important in contractile cells such as cardiomyocytes. The present work focuses on the role of FBP2 in the process of mitochondria trafficking in HL-1 cardiomyocytes. FBP2 is a regulatory enzyme of gluconeogenesis but it is also a multifunctional protein involved, among others, in the protection of mitochondrial membrane polarity. Results of the recent studies conducted at the Department of Molecular Physiology and Neurobiology, University of Wrocław suggest that FBP2 participates in the regulation of mitochondrial transport in cardiomyocytes. Partial silencing of FBP2 expression in HL-1 cells results in a marked decrease in the rate of mitochondrial trafficking along the cytoskeleton. Additionally, microvesicle-packed factors secreted by fibroblasts co-cultured with cardiomyocytes, which stimulate the relocation of FBP2 from the HL-1 nucleus into the cytoplasm and thus, increase the pool of FBP2 that can interact with mitochondria, also alter the rate of the cellular transport of the organelles. Identification of the factor(s) responsible for the observed changes is in progress.

Keywords:

mitochondria, cardiomyocyte, FBP2, cardiac fibroblast

3D PRINTING WITH MIXES WITH HIGH-ALUMINA CEMENTS

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The group of authors consisting of two Civil Engineering students and a tutor. On our project we are working at West Pomeranian University of Technology in Szczecin.

Abstract:

Development of concrete 3D printing technology increased fast in last few years. The popularity of this method of constructing elements made it looks for new solutions. One of the most important aspects is Set time of concrete. It is very important to print layers one by one without making breaks between. That is why we need to control the open time and set time of printed mixture. This article presents research on combining alumina cement with Portland cement to use with 3D printers. It also shows us how does that mixture reacts when used with Limestone powder, fly ash and superplasticizer. The article discusses the results of tests on different mixtures. Research has shown that thanks to using alumina cement, it is possible to control set time of concrete, depending on the needs.

Keywords:

3DCP, high-alumina cement, alternative constructing

ACTIVATION – NOT A JOKE. DO IT! ACTIVATION METHODS IN WORK WITH PRESCHOOL CHILDREN

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A few words about the author(s):

Student of The Maria Grzegorzewska University, in the field of Special Education, focused on early intervention for child development.

Abstract:

Taking into account the changes in the way society thinks about children - their needs, opportunities to support them in their development and their rights - the role of the teacher is also transforming. The teacher's task is to effectively convey his knowledge to pupils, the teacher should follow their interests and fully use their cognitive potential. As a result, in working with children, verbal methods - especially from talks - are being abandoned in favor of activation methods, the intention of which is teaching by doing. The pre-school period is a time of great curiosity among children and the willingness to co-create it, which provides an excellent space for the teacher to introduce these methods at work.

Keywords:

activation methods, preschool children

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