

National Scientific Conference

SCIENCE RESEARCH AND DEVELOPMENT

III edition

October 26, 2019 - Warsaw



National Scientific Conference
„Science Research and Development”
III edition

The Book of Abstracts

Lodz, October 26, 2019



National Scientific Conference
"Science Research and Development"
III edition
October 26, 2019
Warsaw



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CONFERENCE INFORMATION

The National Scientific Conference „Science Research and Development”
is organized especially for you.

The Conference has an interdisciplinary character. It is addressed to young scientists, starting with first and second degree students, through Ph.D. students, to people who have obtained a doctoral promotion in the last 3 years.

Our initiative aims to create opportunities for exchange of experiences and good scientific practices by representatives of the scientific community. Additionally, it aims to underline the important role of young researchers in the development of Polish science.

In the Conference, two types of participation are possible: passive or active, with active participation giving the opportunity to choose an oral presentation or poster. The conference materials will be published in the form of the Book of Abstracts and Book of Conference Articles with assigned ISBN numbers.

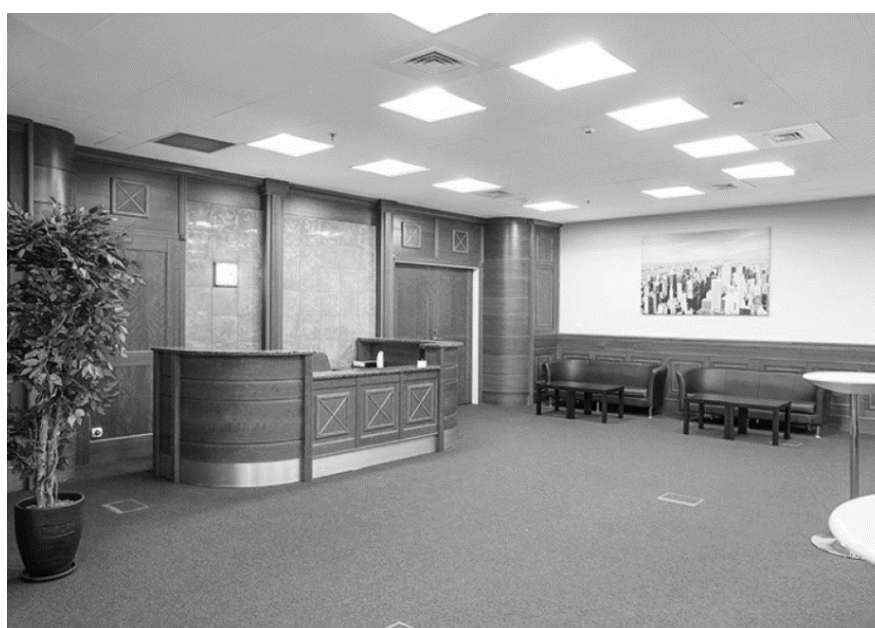
Scientific part of the Conference is supervised by Scientific Committee which contains of doctors and independent research workers from various Polish and foreign universities and industry representatives.



CONFERENCE PLACE

The Golden Floor Plaza Conference Center is a Warsaw business and conference complex located at Aleje Jerozolimskie 123a. The location of the object provides convenient approach from all parts of Warsaw and from all parts of Poland due to the close location of the Central Railway Station and the Warsaw Ochota Station.

The Center consists of many modern conference rooms that provide the highest requirements for workshop, conference and symposia organizers.





CONFERENCE SCHEDULE

The Golden Floor Plaza Conference Center

Aleje Jerozolimskie 123a, Warsaw

October 26, 2019 (Saturday)

09:00 – 14:00	Registration	
10:00 – 10:20	Opening of the Conference	
10:30 – 11:30	Poster Session	
P-01	Chmielewski Marek Wachowski Sebastian Nojek Alicja	Mobile setup for high temperature resistance tests of door frames
P-02	Janusz Joanna, Janusz Aleksandra	Participation of bone morphogenetic protein 7 (BMP-7) and soluble adhesion molecule ICAM-4 (sICAM-4) in occurrence and development of endometriosis
P-03	Malińska Marzena	Occupational and non-occupational risk factors for musculoskeletal disorders among computer workers
P-04	Malińska Marzena	The influence of physical effort and the temperature on the physiological cost men aged 60+
P-05	Mikołajczyk Aleksandra	Synthesis and antitumor activity of novel pyrimidin-4-amine derivatives
P-06	Młynarczyk Magdalena	Firefighters heat load vs. the specialised clothing
P-07	Piotrowska Agata	Investigation of thermal stability in the new proton conductor - pyrazolium hemimellitate
P-08	Szarek-Iwaniuk Patrycja	An analysis of the quality, spatial location (distribution) and influence of urban green spaces – Tczew city case study
P-09	Szarek-Iwaniuk Patrycja	Cooperation networks as a factor of socio-economics development of small towns
P-10	Wiśniewska Kornela	Changes in platelet aggregation during storage
P-11	Zalewska Adrianna Maria	Microalgae – the producers of some important compounds for several industrial sectors
11:30 – 11:45	Coffee Break	
11:45 – 13:15	Workshop “Basics of Design Thinking”	
13:15 – 14:00	Dinner	
Plenary Session		
14:00 – 14:10	Turkowska Izabela	The use of mass spectrometry in medicine
14:10 – 14:20	Turkowska Izabela	The role of vitamins. Quantification of vitamin C
14:20 – 14:30	Zielińska Maja	Neuromotor immaturity in early school children – issue analysis
14:30 – 14:40	Frączek Paulina	Renal involvement in Sjogren's Syndrome- case report
14:40 – 14:50	Krzyżanowska Natalia	Spirometra spp. as the causal agent of human parasitosis
14:50 – 15:00	Malec Mirosław	Vitamin D - deficiency and overdose
15:00 – 15:10	Rzeszot Janina	Impact of exercise in senior physical activity



15:10 – 15:20	Babiak Wioleta	The influence of nitrogen stress on the synthesis and flocculating activity of exopolysaccharides from <i>Eustigmatos magnuus</i>
15:20 – 15:30	Krekora Magdalena	The effect of cinnamic acid and its derivatives on changes in the structure of gluten proteins
15:30 – 15:40	Lisiecki Mateusz	Habitat selection of the crested lark <i>Galerida cristata</i> in agricultural landscape of western Poland
15:40 – 15:50	Rumińska Weronika	Effect of different oil pomaces addition on the gluten proteins structure studied by spectroscopic methods
15:50 – 16:00	Salamon Wojciech	Magnetic properties of BiFeO ₃ thin films
16:00 – 16:10	Nowak Mariusz	Mobile device for biomechanic and kinematic assessment of human body
16:10	End of the Conference	



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POSTER SESSION



MOBILE SETUP FOR HIGH TEMPERATURE RESISTANCE TESTS OF DOOR FRAMES

Marek Chmielewski, Maciej Waclawik, Alicja Nojek, Sebastian Wachowski*

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A few words about the authors:

The authors of this work are the members of a research team funded in 2018 and composed of two material scientists and two constructors. Their aim is to develop innovative safe and fire protection doors.

Abstract:

Modern requirements of high quality and resistance towards elevated temperatures, i.e. in the case of fire, of household and office doors are rising demands for application of modern technology and new materials in door industry. In order to follow the dynamics of the market, especially in the case of fire protection door, it is essential to seek for novel functional materials. Important part of implementation of new technologies and materials is to develop a method verifying the actual improvement induced by chosen modifications. As a natural consequence a demand for an on-site-available devices for fireproof tests emerges. The device should be able to verify and parametrize whether or not product upgrades result in the actual improvements of fire resistance. In this work we present a practical setup for high temperature resistance measurements. The device allows contact and non-contact measurements of temperature profiles in-plane and across the door frames filled with novel fireproof materials in a temperature conditions typical for indoor fires.

The work is a part of the project no POIR.01.01.01-00-1149/17 entitled "Development of innovative system of aluminium fire protection profiles". The project is implemented under Measure 1.1 R&D projects of enterprises Sub-measure 1.1.1 Industrial research and development carried out by the enterprises of the Intelligent Development Operational Program 2014-2020 co-financed by the European Regional Development Fund.

Keywords:

functional materials, fireproof materials, door frames



PARTICIPATION OF BONE MORPHOGENETIC PROTEIN 7 (BMP-7) AND SOLUBLE ADHESION MOLECULE ICAM-4 (SICAM-4) IN OCCURRENCE AND DEVELOPMENT OF ENDOMETRIOSIS

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A few words about the authors:

Joanna Janusz, MD–PhD, Aleksandra Janusz, MD–PhD, Zdzisława Kondera-Anasz, professor, MD–PhD, Head of the Chair and Department of Immunology and Serology, Medical University of Silesia in Katowice, Poland.

Abstract:

Endometriosis is a disease of unknown origin, characterised by the presence of active mucosa of the uterine body outside of its normal location. What still remains unknown are the mechanisms facilitating the adhesion of endometrial cells to the peritoneum, allowing them to move into faraway locations in the body, thus initiating the ectopic development of that tissue and letting it survive. The molecules participating in intercellular interactions and interactions between cells and extracellular matrix cells as well as in the processes of angiogenesis and apoptosis are bone morphogenetic proteins (BMP) and intercellular adhesion molecules (ICAM).

The study aimed to determine whether BMP-7 and sICAM-4 participate in the occurrence and development of endometriosis.

In the peritoneal fluid of 60 females with endometriosis (at stage 1, 2, 3 and 4) and 20 females from the reference group, the BMP-7 and sICAM-4 concentrations were determined with the ELISA method.

A very statistically significant increase in the sICAM-4 and BMP-7 concentrations was found compared to those concentrations in the reference group ($p < 0.0001$). This was mostly evident in females with stage 1 and 2 endometriosis.

Changes in the concentration of the studied parameters show that they play a role in the occurrence and development of the disease.

Keywords:

bone morphogenetic protein, soluble adhesion molecule, endometriosis



OCCUPATIONAL AND NON-OCCUPATIONAL RISK FACTORS FOR MUSCULOSKELETAL DISORDERS AMONG COMPUTER WORKERS

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Abstract:

Work performed in a sitting position, despite the fact that it does not require a lot of physical effort, performed in a long time and in the wrong position can be the cause of many musculoskeletal disorders (MSD). Musculoskeletal disorders are currently a common problem in the working population. The aim of the study was to determine the impact of occupational and non-occupational risk factors for musculoskeletal disorders depending on gender office workers.

Surveys conducted among 2 thousand office workers with an average age of 42.5 years (SD=13.7). Research on 5 different questionnaires, regarding the occurrence of musculoskeletal pain (Nordic Questionnaire), occupational and non-occupational risk factors (e.g. own questionnaire assessing lifestyle and ergonomics of computer work, Job Content Questionnaire, IPAQ).

48.3% of respondents complained about the occurrence of MSD in the last year, especially neck and back pain were most frequently mentioned (17% respectively). The risk of occurrence of MSD was statistically significantly determined by: age, gender, family status, BMI, education, work experience, position and an ergonomic workplace. Statistically significantly more often exposed to the occurrence of MSD are women, in particular the low back, the thoracic spine region and neck.

Prevention of MSD should be oriented to create worksite programs promoting healthy lifestyle and education in the field of ergonomics, organization at work and stress management.

Keywords:

musculoskeletal disorders, computer workers, life style



THE INFLUENCE OF PHYSICAL EFFORD AND THE TEMPERATURE ON THE PHYSIOLOGICAL COST MEN AGED 60+

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Abstract:

The amount of accumulated heat in the body is a determinant of thermal load, which results not only from a physical effort but also can be related to the surrounding environment. In order to verify whether and to what extent the high temperature of the environment during physical exercise affects on a load of a human organism, the study was conducted in a climatic chamber under controlled conditions. Studies were performed at CIOP-PIB in the group of volunteers (10 men in average age 31 years (± 1.0) and 10 men in age 61.7 years (± 1.44)). Each of volunteers took part in 4 variants of test taking into account two levels of physical effort with intensity of 30% and 50% physical capacity ($VO_2\max$) performing medium-heavy and heavy work, respectively, in the environment feeling of thermal comfort (t_a : 14 °C; 17 °C) and heat (t_a : 25 °C; 28 °C). The main factor differentiating the body's response was the physical effort. Men aged 60+ obtained statistically lower average values of oxygen consumption (VO_2/kg), higher average values of the weighted skin temperature (T_{sk}) and energy expenditure (EE) during exercise compared to young men. Data analysis indicates a 27% difference in metabolic rate during light and medium work 60+ men, and 29% for hard and very hard work ($p < 0.05$).

Demands of work, especially hard work, should take into account the age of the employee. Performing the same effort by 30+ and 60+ employees is much more aggravating among older workers.

Keywords:

physical effort, elderly workers, energy expenditure



SYNTHESIS AND ANTITUMOR ACTIVITY OF NOVEL PYRIMIDIN-4-AMINE DERIVATIVES

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A few words about the authors:

As the employees of the Wrocław Medical University we are involved in synthesis and biological testing of new compounds which could serve in future as a treatment of diseases for which there is currently no effective cure.

Abstract:

Cancer is a group of diseases caused by uncontrolled cellular growth and tissue damage. They also have the ability to invade surrounding tissues and to metastasize to distant areas of the body. Only cardiovascular diseases are causing greater mortality rate than those connected with cancer. Thus new ways of treatment are needed, preferably by targeted therapy because of its higher specificity.

New chemotherapeutic agents are constantly synthesized and many of them are heterocyclic structures. The pyrimidine derivatives have already shown many biological activities, amongst which the anticancer potential is of a great interest. In our lab we synthesized a series of pyrimidin derivatives containing in their structure an amino group in position 4 and a hydroxymethyl or carboxyl group in position 5. To the amino group various substituents have been attached.

In vitro studies were performed using neutral red cell cytotoxicity assay on two tumor cell lines (human cervix epitheloid carcinoma (HeLa) and human hepatoma (Hepa)). Mouse fibroblasts (L929) were used to determine the effect of new derivatives on normal cells. The analysis of the results led to the selection of three compounds, which showed the highest cytotoxicity against cancer cells. It has also been shown that the effect of these compounds on both tumor lines differs depending on the origin of the cell line. Further studies for precise molecular mechanisms of action and potential therapeutic usage should be undertaken.

Keywords:

anticancer agents, pyrimidine derivatives, drug discovery



FIREFIGHTERS HEAT LOAD VS. THE SPECIALISED CLOTHING

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A few words about the author:

Since 2009 works in CIOP-PIB, where interested in thermal interaction between the human body and the surrounding environment in various workplaces. Her research experiences include study with the human subjects as well as the thermal manikins.

Abstract:

The heat load is one of the main causes of death among firefighters. During work at high temperature, physiological processes are initiated in the human body to reduce body temperature. Excessive increase in body temperature can reduce the ability to assess the situation or lead to mistakes at work. Therefore, the aspect of properly selected clothing that allows heat exchange between the human and the environment is very important.

One of the factors affecting the heat exchange between human and the surrounding environment is the thermal insulation (heat protection) of the clothing. In the tests carried out at CIOP-PIB with the use of a thermal manikin, the thermal insulation of the currently used special clothing was measured. Based on the obtained results, the firefighter's heat load was estimated by the following indicators: PMV - used to assess thermal comfort and WBGT, taking into account four classes of metabolic rate. For medium, heavy and very heavy work ranges of comfort temperature for mentioned activities have been determined. Calculations were made for activities carried out during the performance of official duties, not related to fire fighting.

Based on the test results and calculations, it was shown that special clothing is a barrier in heat exchange between the user (human) and the environment.

Keywords:

heat load, PMV, WBGT, thermal insulation



INVESTIGATION OF THERMAL STABILITY IN THE NEW PROTON CONDUCTOR - PYRAZOLIUM HEMIMELLITATE

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Scientific work financed from budget funds for science in 2017-2020 as a research project under the "Diamentowy Grant" program.

Abstract:

Proton conductors are the group of materials that have been intensively studied in recent years. Such materials could be used as an electrolyte in the fuel cells. Proton conductor has to be thermally stable and should have medium and weak strength hydrogen bonds. In this case, new salt was synthesized from heterocyclic molecules: pyrazole as a base and hydrated hemimellitic acid. In our investigation of the thermal stability of this salt, we used DSC and TGA measurements and Raman spectroscopy. Moreover, hydrogen bonds analysis was performed using QTAM and Hirshfeld surface analysis. We have carried out the DFT calculations of the potential energy scan. Besides, the proton diffusion pathway was analyzed. Hydrated pyrazolium hemimellitate salt crystallizes in the monoclinic system and C2/c space group. The analysis of hydrogen bonding network shows that this salt may be classified as conductors in which protons are transported between two molecules according to the Grotthuss mechanism. Analysis of electron density at critical points in the framework of Bader's theory showed that in the crystal structure there are two types of intermolecular hydrogen bonds: weak and intermediate hydrogen bonds. The contribution of H...O interaction is 46.2, 40.2, 59.9% for hemimellitic acid, pyrazole, water molecules, respectively. Calculation of energy barriers for rotation of each molecules showed that activation energy is low and in range from 0.9 to 1.2 eV.

Keywords:

proton conductors, thermal stability, hydrogen bonding network, DFT calculations



AN ANALYSIS OF THE QUALITY, SPATIAL LOCATION (DISTRIBUTION) AND INFLUENCE OF URBAN GREEN SPACES – TCZEW CITY CASE STUDY

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A few words about the authors:

Authors are professionally involved in spatial planning, land management, geography, landscape and regional studies.

Abstract:

Green spaces are a crucial element of the city system. The distribution of urban green spaces is often historically determined. The natural environment of the city is the basis for its sustainable development. Green spaces have a beneficial influence on health, social relations, economic development and human well-being.

Rapid urban growth negatively affects natural green spaces. The reduction of green spaces is related to investment activity, the loss of biodiversity, forest areas reduction etc. The aim of the study was to determine the quality, spatial distribution and influence of urban green spaces on the example city of Tczew in northern Poland. The study covers several basic stages of research – the analysis of strategic and urban planning documents, field inventory (with the Green Space Record), statistical and comparative analyses, and the graphic presentation of data collected.

A favorable arrangement of green space in the examined city was found. Most residents can enjoy high-quality greenery. The presented methodology can be implemented in cities with a similar size and space structure. This is important in the context of rational management of green areas, consistent with the principles of sustainable development and spatial order.

Keywords:

city, urban green space, availability of urban green spaces, distribution of green urban spaces, Green Space Record



COOPERATION NETWORKS AS A FACTOR OF SOCIO-ECONOMICS DEVELOPMENT OF SMALL TOWNS

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A few words about the author:

I am professionally involved in spatial planning, particularly at a regional level. My research interests concern urban planning, socio-economic geography, local and regional development, and the use of mathematical and statistical methods.

Abstract:

The goal of cities is to search for the most effective development model that best fits its needs and local conditions (regardless of its size and role in the settlement hierarchy). In addition to meeting needs at regional and national level, cities have to adapt social and economic changes as well as processes that take place in the global arena. Global changes create new opportunities for collaboration between towns and cities around the world. Small towns can create cooperation networks to increase their competitive advantage relative to large cities, and to promote regional growth. Many small towns join organizations that strive to increase the members' growth prospects, resolve social and economic problems. The growth of towns and cities in cooperation networks is based on individual development scenarios that are based on the members' endogenous resources and the aim is to improve the local inhabitants' quality of life. The results of the study indicate that local and regional cooperation and participation in local associations and organizations stimulate the development of cities. Cities differ considerably in socio-economic development.

Keywords:

small towns, socio-economic development, cooperation networks, Cittaslow



CHANGES IN PLATELET AGGREGATION DURING STORAGE

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A few words about the authors:

The authors are scientists and PhD student in Department of Medical Laboratory Diagnostics in Wrocław Medical University. Presented results were obtained during studies carried out as a part of PhD projects.

Abstract:

Platelet concentrates (PCs) require specific storage conditions and they have short use-by date – from 5 to 7 days. Quality of PCs decline during storage which is called platelet storage lesions.

Evaluation of platelet aggregation during storage of non-filtered and leukocyte-depleted PCs.

Six PCs prepared in Regional Blood Donation and Transfusion Center in Wrocław were divided into two parts: filtered (F) (Teruflex Imugard III) and non-filtered (NF). F and NF were stored in the same conditions simultaneously. Samples were separated from main concentrate (F and NF) in the day of preparation (0 h), after 24, 48, 72 and 144 hours of storage. In every sample adenosine diphosphate (ADP)-induced, collagen (COL)-induced, arachidonic acid (AA)-induced and epinephrine (EPI)-induced platelet aggregation were measured. Friedman's rank test and paired samples Wilcoxon test were performed (Statistica 12 EN).

Decreased platelet aggregation was observed during storage in F and NF with each agonist used. In ADP-induced aggregation continuous decrease in platelet aggregation was observed. In AA-induced platelet aggregation difference between F and NF was observed after 48h ($p=0.028$), 72 h ($p=0.028$) and 144 h ($p=0.046$) of storage and aggregation in F was higher.

Platelets lose aggregation potential during storage. Platelets after filtration aggregate at different level than platelets derived from non-filtered PCs.

Keywords:

platelets, aggregation, platelet storage lesions, platelet concentrates



MICROALGAE – THE PRODUCERS OF SOME IMPORTANT COMPOUNDS FOR SEVERAL INDUSTRIAL SECTORS

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A few words about the authors:

Our group is working on a project “Algal cell usability to produce natural pigments for the cosmetic industry“. The team members are DSc Dr Eng. T. Kobiela, Dr M. Milner-Krawczyk, MSc. Eng. A. Sobiepanek and A. Zalewska (BSc. student).

Abstract:

Microalgae are a very diverse group of organisms. They may be found individually or in group chains in freshwater and marine systems. Nowadays, microalgae are one of the most famous living objects for research due to their original chemical composition, which gives great opportunities for the several industries. The usability of microalgae is constantly growing, and new aspects of their utilization are invented within days. Some of the unique products created by microalgae are natural colorants, fatty acids, enzymes, polymers and peptides.

In this research, we have examined two different species: *Dunaliella tertioleca* and *Cylindrotheca closterium* for their production of natural pigments. The performed research included diverse light and fluorescent microscopic observations as well as UV/Vis spectroscopic analysis of the pigment composition in microalgae. *Dunaliella t.* is a green alga, which produces chlorophyll. On the other hand, *Cylindrotheca c.* can be yellow or brown in color, which may be due to the production of several carotenoids. Literature data indicates a constant desire of natural raw ingredients received for cosmetic industry. Microalgae extracts can be mainly found in face and skin care products, which is why much research is done in this area.

Keywords:

microalgae, natural pigments, cosmetics, *Dunaliella*, *Cylindrotheca*

PLENARY SESSION



THE USE OF MASS SPECTROMETRY IN MEDICINE

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Abstract:

Mass spectrometry is an analytical technique which, in organic chemistry as well as in sciences derived from it, is used to study or confirm the structure of organic compounds as well as qualitative and quantitative determination of specific compounds present in a mixture. It can detect substances found in complex chemical mixtures even in minimal amounts of the order of pentograms. It is used by chemists, physicists, biologists, biochemists in medicine as well as in environmental protection and many other fields of science: identification of substances in space, identification of the structure of molecules, testing of protein and polysaccharide sequences, monitoring of environmental pollution, anti-doping tests, monitoring of industrial processes.

The basis for the operation of each spectrometer, regardless of the design, is the ionization of the particles of the test substance, which allows it to accelerate in the electric field in a vacuum. Sample ionization can be carried out using several methods. The heterogeneous stream of ions (positive or negative) is divided into a number of components, depending on the mass / charge ratio (m / z). From the mass to charge ion ratio, one can usually conclude what the molecular weight of the chemical compound or its fragment was.

Keywords:

diagnostics, laboratory, chemistry



THE ROLE OF VITAMINS. QUANTIFICATION OF VITAMIN C

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Abstract:

Vitamins are low-molecular organic compounds widespread in the plant and animal world. The chemical structure of vitamins is very diverse and therefore it is difficult to include them in a specific group of compounds. Most vitamins have a ring structure or contain ring structures (with the exception of ascorbic acid and pantheonic acid). Using the criteria for classification of organic compounds, the above-mentioned acids belong to aliphatic compounds, while vitamins A and D to alicyclic compounds, vitamin K to aromatics, and other vitamins to heterocyclic compounds. Vitamins are catalysts for biochemical reactions, they are part of enzymes and coenzymes, they are necessary for the growth and maintenance of vital functions of organisms. Vitamins are generally exogenous compounds (for many organisms) and must be supplied with food. Some of them also turned out to be exogenous growth factors for various microorganisms, and two necessary biocatalysts, provided by soil bacteria to higher plants (vitamin B12) and lower vitamin B1. To distinguish them from other essential nutrients, vitamins are considered as substances that act very small quantities. The daily total demand for vitamins, with the exception of ascorbic acid is small, does not exceed 20 mg.

Keywords:

vitamins, demand, quantitative



NEUROMOTOR IMMATURITY IN EARLY SCHOOL CHILDREN – ISSUE ANALYSIS

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PhD student at Akademy of Special Pedagogy Maria Grzegorzewska in Warsaw/Hand Therapist/Graphic motor trainer.

Abstract:

The problem of coordination, balance and general mobility of the child is a common phenomenon in the school environment. More and more children are experiencing difficulties in the field of motor and perceptual functions. Cycling, crossing a narrow balance beam, or catching a ball is a real challenge for a young man. Disorders of lateralization, somatognosia and dysfunctions within the crossing of the midline of the body, occurring in children, are considered to be a developmental norm. They become a precursor to students' learning difficulties. There are many sources of the above mentioned problems. They take both an external and internal form. The author is interested in linking the discussed issue with the specificity of neuromotor immaturity. The aim of the paper is to analyze the issue of neuromotor maturity, discuss basic primary reflexes and their impact on the child's learning and behavior, as well as presentation of neurodevelopmental studies being conducted among children attending public schools in Poland and abroad.

Keywords:

neuromotor immaturity, neuromotor maturity, primary reflexes, perceptual motor functions, research



RENAL INVOLVEMENT IN SJOGREN'S SYNDROME- CASE REPORT

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A few words about the author:

The author is a fifth year medical student at the Faculty of Medicine, University of Rzeszów, involved in the research projects concerning immunology and autoimmune diseases.

Abstract:

Sjogren's syndrome is a chronic autoimmune disease, associated with a lymphocytic and plasmacytic infiltrate, concerning mainly exocrine glands and leading to "sicca syndrome". This immune process may affect not only salivary, parotid and lacrimal glands, but also disrupt function of nonexocrine organs, including kidneys. In this case study, we present a female patient with severe decrease of GFR, metabolic acidosis, polydipsia and polyuria in the course of Sjogren's Syndrome. Problematic and multi- faced medical history of the patient highlights the importance of proper diagnosis and therapy as well as awareness of possible multiorgan manifestation of Sjogren's Syndrome.

Keywords:

Sjogren's Syndrome, interstitial nephritis, renal manifestation, autoimmune disorder



SPIROMETRA SPP. AS THE CAUSAL AGENT OF HUMAN PARASITOSIS

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The authors are fourth-year students of medical analytics at the Faculty of Pharmacy with Medical Analytics Division at Medical University of Lublin. They are interested in parasites and their influence on human life.

Abstract:

Spirometra spp. is a tapeworm genus known mainly in Asia as the causal agent of a disease called sparganosis. Plerocercoid larvae of *Spirometra* spp. (sparganum) can infect human organism primarily after ingestion of reptile or amphibian meat. Copepods infected with proceroid larvae can also be a source of invasion in humans. In Poland, plerocercoids were described in the meat of mammals in Białowieża Primeval Forest. Parasites cause various, nonspecific symptoms depending on the location, such as: subcutaneous nodules, pain, itching of the skin, oedema, fever, paresthesia and other symptoms. The disease entails diagnostic and therapeutic difficulties. Surgical extraction of the worm is the simple curative treatment. Therefore, the detection of plerocercoids is a relevant issue, due to its presence in the meat of hunted wild boar.

Keywords:

Spirometra spp., sparganum, sparganosis



VITAMIN D - DEFICIENCY AND OVERDOSE

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Mirosław Malec - pharmacist, traveler, blogger. Currently Ph.D. student at the Department of Clinical Pharmacy and Biopharmacy and the Department of Anaesthesiology and Intensive Pediatric Care at Poznan University of Medical Sciences.

Abstract:

Vitamin D is significant for maintaining good health. Like hormones, it plays several important roles in keeping the body's cells healthy and enables them to function correctly. Most people do not provide enough vitamin D, so its supplements are very popular and widely available. The results of research conducted in recent years indicate many benefits associated with the supply of vitamin D. Currently, this vitamin is not associated only with the regulation of calcium and phosphate metabolism. Increasing opportunities for its use in the prevention and even treatment of certain diseases are increasingly pointed out. Possible, although extremely rare, is the situation where the level of this vitamin will be too high, and thus - toxic. The risk of unwanted side effects after absorption of vitamin D from food or exposure to the sun is shallow. It may appear if you take supplements in excessive doses for too long. Therefore, vitamin D dietary supplements should be used under control and as prescribed by a doctor or pharmacist.

Keywords:

vitamin D, overdose, side effects, supplementation



IMPACT OF EXERCISE IN SENIOR PHYSICAL ACTIVITY

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A few words about the author:

I want to become a doctor of health sciences.

Abstract:

One of the most important mitigating factors and enabling successful aging is regular physical activity. Movement training is a type of physical activity performed for medical reasons, the goal is to achieve physical and mental effects that counteract anxiety and increase the body's adaptability. Specialists from the World Health Organization (WHO) state that older people engage in physical activity five days a week for 30 minutes. Based on the selected literature, I present the pros and cons of physical activity which is most preferred in this age group. Nordic walking is one of the types of healthy forms of recreation. Initially, this discipline was intended for running skiers as one of the forms of recreation. Initially, this discipline was intended for running skiers as one of the forms of year-round training in order to maintain fitness during the break from competition. A walk is a very pleasant way of spending free time, low-intensity aerobic exercise can provide a moment of peace, it is the joy of being in the fresh air and improving physical fitness. Analyzing carefully the physical activity of walking, it turns out that we have to do with a mixture of walking and fitness that increases oxygen intake, allows you to burn more calories with less effort. The walk allows movement in a natural setting that is satisfying. Summary: Outdoor movement for older people is a pleasant oxygenation of the body, it can improve relationships with loved ones and a sense of security.

Keywords:

physical activity, moment, physical fitness, walking and fitness



THE INFLUENCE OF NITROGEN STRESS ON THE SYNTHESIS AND FLOCCULATING ACTIVITY OF EXOPOLYSACCHARIDES FROM EUSTIGMATOS MAGNUS

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Abstract:

Eustigmatos magnus is a unicellular microalga able to synthesize exopolysaccharides (EPS) which consists mostly of sugar, often modified by non-sugar residues, but also proteins, aminoacids, fatty acids, nucleic acids, humic acids and other molecules. Algae requires specific conditions for EPS synthesis. To intensify this process, it is necessary to apply stress condition for example light or nutrient stress.

EPS show a wide diversity in structure and composition, which contributes to numerous physiochemical and biological properties for example: antimicrobial functions, flocculating, thickening, emulsifying, metal binding and adhesion abilities. This enable for variety application including wastewater treatment, agriculture, and food, pharmaceutic or cosmetic industry.

In this study the influence of nitrogen concentration on the exopolysaccharides synthesis by *E. magnus* were examined. Purified and lyophilized EPS was used for measuring sugar and protein concentration and flocculating activity using spectrophotometric methods. The results show that EPS yield as well as flocculating activity was higher at nitrogen (NaNO_3) concentration 0.75 g/L and 1.5 g/L.

Acknowledgements:

This research was partly supported by the Polish National Science Centre, project No. 2016/23/D/NZ9/02670 (2017-2020) to I.K.

Keywords:

exopolysaccharides, flocculation, algae, *Eustigmatos magnus*



THE EFFECT OF CINNAMIC ACID AND ITS DERIVATIVES ON CHANGES IN THE STRUCTURE OF GLUTEN PROTEINS

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Abstract:

At present, people awareness of proper nutrition increases significantly. Therefore, there is a need to improve and enrich the food consumed with ingredients of healthy properties. Bread, which is still widely consumed, can be a convenient way to provide valuable substances to the body. Phenolic acids, as these "health-promoting" ingredients, can be a suitable additive to bread and enrich it. However, the introduction of additional substances to the wheat dough disrupts the structure of the gluten network. The aim of the research was to examine the effect of selected phenolic acids (cinnamic, ferulic, coumaric, caffeic, chlorogenic) on the structure and properties of a model wheat dough. These compounds were added in concentrations of 0.05%, 0.1% and 0.2% to the model flour consisting of wheat starch and wheat gluten in a proportion 80:15 (w/w). The samples obtained as a result of kneading, washing out and lyophilization were tested using two complementary methods: FTIR and FT-Raman spectroscopy. FTIR spectroscopy provides an insight into the secondary structure of proteins by analyzing the amide I and amide III bands and observing changes in water populations (2800-4000 cm⁻¹). Raman spectroscopy allows to study the tertiary structure of proteins by analyzing the band associated with disulfide bridges. In addition, Raman spectroscopy allows the study of the environment of two aromatic amino acids - tyrosine and tryptophan.

Keywords:

gluten, phenolic acid, Raman spectroscopy, FTIR spectroscopy



HABITAT SELECTION OF THE CRESTED LARK GALERIDA CRISTATA IN AGRICULTURAL LANDSCAPE OF WESTERN POLAND

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A few words about the authors:

Scientists and a student from Poznań University work in environmental biology specialized in knowledge about birds. Barbara Kistowska, as a specialist, helped with gathering land cover data by using Sentinel.

Abstract:

Progressive agricultural intensification is decreasing number and size of the animal populations inhabiting farmland. However, some species can withstand this process or live almost only in it. Crested lark *Galerida cristata* (GC) is an example of species inhabiting intensively managed agricultural lands. It is declining in most of the area of Poland, but in some places its population is stable. While protecting crested lark, it is essential to know its habitat preferences. To specify that, in 2017, we conducted a field survey on 30 randomly chosen study plots (1km²) in western Poland to detect breeding pair of GC. We discovered 106 pairs of the crested lark, set their habitat as a circle with 50 m radius. We used collected data about land cover based on Corine Land Cover, Sentinel, and our direct observations in the field. Then we used Generalized Linear Models to test what type of environment they choose and Generalized Linear Mixed Models to explain which particular elements of the landscape are important for a crested lark to inhabit. We detected that crested lark selected farmlands and chose places near buildings and silages. Silages often lie next to houses and probably are an additional source of food.

Keywords:

agricultural intensification, land-use, sentinel, Corine Land Cover, farmland birds



EFFECT OF DIFFERENT OIL POMACES ADDITION ON THE GLUTEN PROTEINS STRUCTURE STUDIED BY SPECTROSCOPIC METHODS

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A few words about the author:

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Abstract:

The aim of the research was to determine the influence of the pomaces addition on the structure of gluten proteins. The selected pomaces after oil production were obtained from: primrose, black seed, pumpkin, milk thistle and hemp and were added to model flour in the amount of 3%, 6%, and 9%. The pomaces are a source of not only valuable unsaturated fatty acids, but also dietary fiber, antioxidants and macro- and microelements. Interactions between pomaces preparations and gluten proteins are very important in the baking industry.

The gluten samples were washed out from unmodified and modified by fibre dough samples and analysed. Structural changes in gluten proteins were studied using spectroscopic techniques such as and Fourier transform infrared spectroscopy (FT-IR) and Fourier transform Raman spectroscopy (FT-Raman).

Changes in the gluten structure were determined by analysis of the amide I band ($1570-1720\text{ cm}^{-1}$) using FT-IR spectroscopy and conformation of disulphide bridges using FT-Raman spectroscopy. Based on the analysis of the spectra, it can be concluded that the pomaces interact with the gluten proteins. The analysis of difference spectra indicated aggregation of gluten proteins into hydrogen bonded β -sheets. These β -sheets can be formed by other β -sheets, β -turns, antiparallel- β -sheets and/ or α - helices. Changes in conformation of disulphide bridges can depend on the pomaces chemical composition.

Keywords:

oil pomaces, gluten, Raman spectroscopy



MAGNETIC PROPERTIES OF BIFEO₃ THIN FILMS

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A few words about the author:

Wojciech Salamon is a Master Student of Materials Science in AGH University of Science and Technology in Cracow. His research concerns multiferroic materials, magnetism and laser ablation techniques.

Abstract:

Authors investigated the room and low temperature magnetic properties of thin films of multiferroic material - BiFeO₃. Thin films of this material were obtained by Pulsed Laser Deposition, using SrTiO₃ as a substrate. For this purpose single-phase Bi-rich BFO target was synthesized via solid state reaction. Morphology of obtained nanostructures was characterized by advanced surface investigation methods.

Keywords:

multiferroics, magnetism, laser ablation, thin films



MOBILE DEVICE FOR BIOMECHANIC AND KINEMATIC ASSESSMENT OF HUMAN BODY

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We are an interdisciplinary team. It consists of specialists in the field of electronics, automation and computer science. We conduct research in the field of use of IT systems to support human rehabilitation.

Abstract:

The article describes the implementation of a measurement system for remote orthopedic diagnostics and plans for the development of a final version - a commercial one without many disadvantages in relation to existing solutions. As a result of research experiments and construction works, a prototype set capable of remote human orthopedic diagnostics was created. The article presents the course and results of experimental tests of the measuring system, whose task is to calculate the orientation and send to a mobile device. Data processing algorithms will ensure effective monitoring of performed exercises with accurate mapping of performed movements on a computer or mobile device in the form of a human avatar. Developed, specialized algorithms for proper data processing will ensure the minimization of energy consumption by system. The final effect of the construction, research and experimental works carried out will be a commercial version of the extended mobile device for remote orthopedic diagnostics and motor skills of the human body. The device being developed will be characterized by high accuracy and stability of operation.

The work was financed by the National Center for Research and Development under the Intelligent Development 2014-2020 program.

Keywords:

Inertial Measurement Unit (IMU), motion, mobile diagnostics system, biomechanics



INBRED - A PROBLEM OF MODERN ANIMAL HUSBANDRY

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PhD student on Institute of Animal Sciences.

Abstract:

Having the best phenotypic animals has become a trend for both companion and farm animals around the world. Striving for this, the desired feature is established by choosing the right pair of parents. This choice is quite simple especially in the modern world where the development of reproductive biotechnics is at such a high level, but most often such a pair is created by siblings, or either one of the parents and a descendant, or half siblings. This mating model increases the chance of units homozygous in terms of the characteristics expected by breeders, unfortunately, in addition to the positive effects of such breeding, negative ones may also appear. They are related with an increase in kin and inbreeding, which can also lead to inbreeding depression, which results in a decrease in the value of the feature. The homozygous system is also often related with the expression of lethal or semi-lethal genes which has a negative impact on the breeding of a given population. So, striving for perfection, we can achieve the opposite effect especially for low-inherited traits.

Keywords:

inbred, semi-lethal, breeding



EVALUATION OF THE EFFECTIVENESS OF THE CATTLE GENETIC RESOURCES CONSERVATION PROGRAM IN POLAND

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Abstract:

Since the domestication of animals, meaning over the course of 12,000 years, man has created over 7,000 breeds of domesticated animals in the world that perform key functions in agrosystems. Native breeds are perfectly adapted to local climatic conditions, and most importantly their presence is important for maintaining biodiversity. In Poland, four native cattle breeds with two-way meat and dairy utility type are breed, on which milk production was based for many years: Polish red, white-backed cattle, Polish red-white, and black-and-white cattle. However, the widespread use of high-yield breeds in cattle breeding resulted in the so-called "Holsteinisation", which led to a decrease in the population of native breeds to values that threaten their existence, which is why the Genetic Resources Conservation Program has been developed.

The material for analysis consisted in data made available by the Institute of Animal Production and the Polish Federation of Cattle Breeders and Milk Producers regarding the number and Evaluation of Cattle Use Value.

The Genetic Resources Conservation Program did not start at the same time for all breeds of cattle, however, for each of them has been conducted for at least 14 years. During the implementation of the program, the number of cows increased, which is especially noticeable in the case of the white-backed and Polish red breeds.

Keywords:

Genetic Resources Conservation Program, native cattle breeds



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