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XII INTERNATIONAL CONFERENCE ON SOCIAL AND TECHNOLOGICAL DEVELOPMENT

BOOK OF ABSTRACTS

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NOTE:

The authors have full responsibility for the originality and content of their own papers.

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PLENARNA PREDAVANJA

APPLICATION OF THIRD GENERATION IONIC LIQUIDS IN PHARMACY: FROM SOLVENTS TO ACTIVE COMPONENTS

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ABSTRACT

The pharmaceutical industry currently synthesizes the largest percentage of active components of drugs and dietary supplements in a solid aggregate state. The reason for this is decades of experience in the synthesis of such compounds, the method of their purification, adapted and optimized technical-technological processes of their production, as well as a defined procedure for quality control, recommended by relevant international organizations such as the Food and Drug Administration (FDA) and the European Medicines Agency (EMA).

However, synthesizing pharmacologically active substances (FAS) in solid form has several major drawbacks. One of the most significant limitations of their application is the problematic absorption of these formulations due to poor solubility in water as well as the consequently reduced bioavailability of active components, which is why even 40% of tested preparations do not pass the final stage of clinical trials. To increase solubility and bioavailability, the pharmaceutical industry applies many FAS in the form of salts or markets them as solutions (syrups), suspensions, gels, etc. Another major problem is potential polymorphism, i.e. a phenomenon in which the active substance can crystallize in multiple crystalline forms, which have different physico-chemical properties, solubility and bioavailability, and in the case of FAS, often different therapeutic effects and even toxicity.

The possibility of synthesis and application of FAS as ionic liquids has been investigated for the last few years to overcome solid-state FAS's disadvantages. Ionic liquids are a new class of compounds in the scientific world. They are defined as ionic compounds with a melting point below 100 ^{o}C, the most important being ionic liquids in a liquid aggregate state at room temperature. Due to their exceptional

properties, such as non-volatility, high thermal and chemical stability, ability to dissolve a large number of compounds, biodegradability and low toxicity, ionic liquids are increasingly used in various fields of science and industry today and represent a "green" alternative to volatile organic solvents. Synthesis of FAS in the form of ionic liquids, with a cation or anion as a pharmacologically active substance, eliminates the problem of their low solubility in water, prevents the possibility of building polymorphic forms and enables the achievement of a much higher concentration of active components compared to solid formulations. With the correct selection of cations and anions, it is possible to adjust their physical and chemical properties to improve water solubility, bioavailability, facilitated transport through cell membranes and local application. Special attention is focused on obtaining FAS with the synergistic pharmacological effect of cations and anions.

Keywords: Ionic liquids, pharmacologically active substances, polymorphism, local application.

RADIATION PROCESSING OF MODERN POLYMERIC MATERIALS AND THE PERSPECTIVE OF INDUSTRIAL AND COMMERCIAL APPLICATIONS

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ABSTRACT

In addition to numerous applications such as sterilization of medical equipment, food conservation, preservation of cultural heritage objects, deactivation of hazardous substances from water and sludge, ionizing radiation can also be used for the production and modification of modern polymer materials. There are three methods for applying ionizing radiation in the production and modification of polymeric materials:

- Cross-linking,
- Radiation-induced polymerization,
- Polymer degradation.

Research on the effects of gamma radiation on polymer materials includes:

- Improving the properties of polymers by gamma irradiation,
- Surface modification of polymers,
- Effect of gamma irradiation on the properties of rubbers.

For commercial purposes, gamma irradiation can be used to:

- Sterilization of plastic medical devices and health care products,
- Preparation of wood/polymer/composites to the cultural heritage preservation,
- Synthesis of radiation-induced hydrogel dressings.

The Radiation Unit as a part of the Vinca Institute was built in 1978. with the help of the United Nations Development Program and the International Atomic Energy Agency. The source is the radioactive isotope cobalt, Co-60. The paper describes the possibility of applying gamma radiation from the Radiation Unit of the Vinca Institute for the production and modification of polymer materials.

Keywords: Gamma, irradiation, polymer, cross-linking.

INVITED LECTURE
POZIVNO PREDAVANJE

WHY IS THE FINGERPRINT OF ILLITERATES PERSONS WHEN VERIFYING DOCUMENTS UNRELIABLE FOR EXPERTISE

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ABSTRACT

It is in practice that illiterate people, instead of signing documents, where a personal signature is required, make an impression of the index finger of their right hand. This is done with the help of persons in legally authorized services: in municipal registry offices, courts, police and notaries. The procedure for fingerprint authentication is defined by law, but the way it is performed in practice is performed in such a way that the fingerprint taken is of poor quality and is not reliable when examining its authenticity. In practice, the coloring of the finger is performed by pressing the finger/index finger on the surface of a textile pad soaked with stamp ink and after that the printing is done by pressing the paper. The resulting fingerprint, due to the high roughness of the surface of the textile cushion, the colored ink was not evenly adsorbed on the protruding papillary lines and minutiae of the finger, and a fingerprint with broken papillary lines is obtained, and the minutiae are almost not visible at all.

If the fingerprint is not made with clear papillary lines and if there are not at least twelve visible minutiae between the papillary lines, then such a fingerprint is of poor quality and unreliable for establishing its authenticity with an indisputable fingerprint in which papillary lines and present minutiae are clearly visible. The rule in the expert examination of the authenticity of a disputed fingerprint is to determine the identity of the structure of the papillary lines in the disputed and undisputed fingerprint using the graphic-comparative method of identity and non-identity, to determine the identity or non-identity of at least twelve minutiae present in the

disputed and undisputed fingerprint. If the disputed fingerprint in the document was made in poor quality and unprofessionally, then such a fingerprint is unusable for any comparison with the undisputed fingerprint of a certain person.

Keywords: document, fingerprint, textile pad with ink for stamps and stamps, papillary lines and minutiae, identity and non-identity, graphic-comparative method.

ECOLOGY, ENERGY EFFICIENCY
EKOLOGIJA, ENERGETSKA EFIKASNOST

INCREASING THE ENERGY EFFICIENCY OF BUILDINGS IN THE AREA OF THE CITY OF BANJA LUKA AS A FUNCTION OF ADAPTATION TO CLIMATE CHANGES

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ABSTRACT

The negative effects of climate change that occur because of natural cycles and anthropogenic action are reflected in all aspects of the environment and life of modern man: human health, ecosystems, economy, social issues, and the like. This is evidenced by the extreme values of climate parameters (high summer temperatures, heavy rainfall, and floods), which have become more frequent in the last few decades. Due to the threat to the health and survival of the population in certain areas, there is a need to take significant steps regard to this.

Adaptation to changed climate conditions has become one of the most important methods used by local communities in predicting the future impacts and risks of climate change. One way to combat these consequences is to increase the energy efficiency of buildings, which has many positive effects. Warming of buildings (envelope optimization) primarily affects the reduction of the need for energy consumption for heating and cooling of buildings, which in the long-term results in a reduction of CO_2 emissions, as well as economic savings.

The use of new construction technologies and the development of modern urbanism in the direction of increasing the quality of living space, and therefore the quality of life of the population of urban areas, would greatly affect energy efficiency, environmental protection, reduction of the negative effects of climate change, and thus the achievement of the goals of sustainable development.

Keywords: climate change, adaptation measures, energy efficiency, environment, sustainable development.

HOUSEHOLD PARAMETERS IN THE FUNCTION OF AGRICULTURAL WASTE MANAGEMENT

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ABSTRACT

The amount of agricultural waste generated in rural areas in the Republic of Serbia is significant and depends on the type of agricultural activity and its level of development. The list of agricultural waste is not final but in principle it includes residues from the cultivation of arable crops, residues from the cultivation of fruit crops as well as residues resulting from breeding of domestic animals. Some of these residues have economic value because farmers use them for other purposes. What is a problem is the lack of an adequate agricultural waste management model, which has a negative impact on the environment. Farmers most often burn harvest residues and fruit pruning residues, composting is insufficiently applied, and dealing with dead animals is a special problem.

The aim of this work was to investigate how household parameters affect the management of agricultural waste in the area of the Mačva region. For this purpose, a survey of the rural population was conducted in the municipalities of Šabac, Bogatić, Loznica, Ljubovija and Vladimirci. Among the parameters related to the household, the following were analyzed: number of household members, age, gender and level of education. The research results indicate that there is a connection between these parameters and the way of handling agricultural waste.

Keywords: household, parameters, agricultural waste, management.

ORGANIC LIVESTOCK BREEDING AS A FUNCTION OF ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

Conventional livestock production is still the dominant form of livestock production in the Republic of Serbia. However, there are also great opportunities for the development of organic livestock production. In order for a farm to pass the certification and receive the organic farm label, it is necessary to fulfill a number of conditions. First of all, it is necessary to harmonize all ecological and production conditions, as well as standards for animals raised in organic livestock systems in accordance with the legal regulations on organic production.

The aim of this paper is to present the possible forms of development of organic animal husbandry in accordance with the principles of environmental protection and sustainable development. For the development of organic animal husbandry, it is necessary to have the interest of consumers who will understand the importance and quality of organic products and appreciate their added value. The process of transforming a conventional farm to organic livestock production requires a certain period of time - the conversion period.

The social and ecological importance of organic animal husbandry compared to conventional farming is the production of sufficient quantities of extremely high-quality food while minimizing all forms of pollution.

Keywords: organic animal husbandry, environmental protection, sustainable development.

ENVIRONMENTAL CRIME AS A GLOBAL THREAT TO THE WORLD

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ABSTRACT

Environmental crime is a global problem and a serious threat primarily to health security. Namely, the citizens' awareness about the importance of the environment is at a rather low level. Therefore, the paper will deal with the issue of illegal dump sites in the area of the City of Doboj, their causes, consequences, as well as the measures that are to be undertaken with the aim of preventing environmental crimes. The paper will also present potential measures/solutions for the purpose of decreasing the number of illegal dump sites which considerably endanger the basic components of the environment.

Keywords: criminal act, illegal dump site, crime.

EMISSIONS AND REMOVAL OF GREENHOUSE GAS THROUGH THE DECARBONIZATION DIMENSION

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ABSTRACT

The main goal of the work is to describe the state, indicators, goals, policies and measures in the dimension of decarbonization, which refers to the subdimension - emission and removal of greenhouse gases in the Republic of Srpska (B&H), based on data from the still working document Energy and Climate Plan of the Republic of Srpska. This document provides recommendations, policies and measures related to decarbonization, energy efficiency, security of supply to the internal market, etc., in order to fulfill the international obligations of the Republic of Srpska (BiH) accepted by the Treaty on the Establishment of the Energy Community of Southeast Europe and the Sofia Declaration. After its adoption, the Energy and Climate Plan of the Republic of Srpska will replace the Energy Development Strategy of the Republic of Srpska until 2035. The Entity Energy and Climate Plan of Republic of Srpska and FBiH are integral parts of the Integrated Energy and Climate Plan of BiH. The goals set in the Energy and Climate Plan of the Republic of Srpska are very ambitious and challenging for the Republic of Srpska, especially considering the energy transformation sectors in which the reduction of greenhouse gas emissions is planned.

Keywords: decarbonization, indicators, greenhouse gases, energy and climate plan of the Republic of Srpska, energy transformation sectors.

ENVIRONMENTAL BENEFITS AND ENERGY EFFICIENCY ARISING FROM OPTIMIZATION OF VESSEL'S VOYAGE

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ABSTRACT

The number and size of vessels are increasing every day, and the maritime industry is becoming one of the leading factors of global pollution. This paper will present the basic methods and simulations which will show that significant environmental and energy efficiency benefits can be achieved by optimizing the vessel's route. A detailed description of the reduction of harmful gases emission, which is resulting from the reduction of the ship's speed, will also be presented. In addition to the presentation of the current existing results on this topic, the results obtained from the analysis carried out on the ship machine and engine simulator from the Maritime Faculty in Kotor, by the authors of the paper, will also be given. By optimization of the voyage, which comes from more effective tasks performing at all organizational levels, the vessel is able to adjust its speed in such a way to arrive at the port exactly on time for the berthing operations. This would allow the vessel to reduce its speed, which would lead to the ultimate goal of minimizing air pollution by reducing the emission of harmful gases from vessels.

Keywords: marine pollution, harmful gases emission, vessel's speed, vessel's voyage.

CASE STUDY - THE INFLUENCE OF LOCATION AND ORIENTATION ON THE ENERGY CLASS OF A FAMILY BUILDING

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ABSTRACT

The research analyzed the energy needs of a residential building, built with the usual construction system in the Republic of Serbia, at ten locations with different climatic conditions. The research is based on checking the energy class of a typical building, with a change in the orientation of the same building in relation to the sides of the world, at each of the ten analyzed locations individually. It is analyzed how the orientation of the building within the same location affects the building's energy needs. In addition, the influence of the location on the building's energy needs is analyzed.

The calculation of the energy needs for heating the building was done using the URSA Building Physics 2 software, according to the current legislation of the Republic of Serbia, with materials whose quality and thermo physical properties are controlled in accordance with the ISO 9001:2000 standard and for which there is valid certification documentation from the reference national institute IMS- a.

For the given location and position of the building in relation to orientation towards the sides of the world, the energy needs were calculated, and if it deviates from the permitted values that categorize the building into energy class C, the thermal envelope thickness is corrected. In addition to the correction of the thermal envelope, the research will also analyze the economic aspect in terms of increasing investments for additional amounts of thermal insulation material that arise due to the need for the building to reach energy class C, which is a necessary condition, for obtaining a construction permit according to the current legislation in the Republic of Serbia.

Keywords: energy class, residential building, thermal insulation.

COMPARISON OF FACADE ASSEMBLIES FROM THE ASPECTS OF ENERGY EFFICIENCY AND ECONOMIC PROFITABILITY

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ABSTRACT

The energy certification of buildings in Serbia has brought numerous changes, related to the way new buildings are designed, but also a significant need for energy rehabilitation of existing buildings. The aim of this paper is to examine the effectiveness of the most commonly used facade assemblies, considering that the facade of a building is an essential link in the chain of elements that make up an energy-efficient building. In this paper, the five most commonly used facade assemblies, which are applied during the construction of multi-family residential buildings in Serbia, are analyzed, along with the materials used in them. Their economic aspect was also analyzed, along with the mandatory comparative calculation of the energy efficiency of the residential building and the application of the URSA-Building Physics 2 softver, in accordance with the Rulebook on Energy Efficiency of Buildings. The facade assembly of the ventilated facade with natural stone cladding, as well as the contact facade with distinct facade cladding, was analyzed. In this context, the economic aspect of the application of different facade assemblies was also analyzed. It was observed that for the same energy class of the facade wall, the investment can be significantly different and be 5.86 times higher per square meter of the surface of the facade wall. This research is significant considering that the energy rehabilitation of existing buildings is considered as a necessary step towards reducing the energy needs for heating buildings in the Republic of Serbia, and that it is necessary to take measures to reduce the energy required for heating buildings.

Keywords: ventilated facade, thermal insulation, energy efficiency.

USE OF NEW ECOLOGICAL FORMS OF ENERGY IN THE COFFEE PRODUCTION FACTORY

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ABSTRACT

Large companies are aware of the increasing importance of environmental business initiatives and concern for environmental protection. The business principle of the company for the production of coffee in Serbia is based on the foundations, which in environmental protection are guided by the principles of the ISO 14001 standard. One of the company's priorities is raising awareness of the importance of sustainable business not only among employees, but also among partners and consumers. This is proof that all environmental initiatives are implemented both locally and globally.

One of the best examples is the proposal for a new purpose for the by-product from the coffee processing process, coffee chaff, which was previously waste and unused.

Coffee chaff is used as biomass for heating the entire plant and the administrative part of the factory. It was one of the company's first ecological projects, which brought a significant financial, but above all environmental benefit, since their use reduced the emission of carbon dioxide by as much as 11%, and the products of biomass combustion themselves have no harmful effect on the environment, which also solves the issue of waste disposal. The process of environmentally sustainable production methods is time-intensive, complex and requires a large financial outlay. If from the producer to the seller, a goal is set for reducing waste, water consumption, encouraging recycling, then it becomes the way of thinking of the whole community in modern times.

Keywords: ecology, biomass, ecological benefit.

THE BY-PRODUCT OF BIOETHANOL PRODUCTION - HUSK MADE OF WET CORN USED AS ECOLOGICAL ANIMAL FEED

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ABSTRACT

The production of alternative fuels from plant raw materials in the last few decades has led to significant changes in the fields of the energy industry, agriculture, and food industry. In this paper, the possibilities of using by-products from the production of bioethanol from waste corn grain are presented. The advantages of bioethanol compared to fossil fuels were also explained, the production of bioethanol from waste corn was given, but also the production of a by-product of bioethanol production - a husk made of wet corn. The quantities of husk made of wet corn obtained are relatively large, because it is a bulky material that contains a large percentage of water in it and as such is difficult and expensive to manipulate, but in terms of the content of nutrients it is a very valuable food. Application in feed mixtures for domestic animals, in concentrations higher than those practiced so far, has a positive effect on the economic profitability of bioethanol production from waste corn grain. The paper analyzes the possibilities of using husks made of wet corn in the diet on farms, with experiences from Canada and the USA. An analysis was done on the farm as part of the bioethanol production plant, as well as the possibility of drying husks made of wet corn with a justification analysis.

Keywords: bioethanol, husk made of wet corn, drying, nutrition.

FULFILLING INTERNAL NEEDS FOR ELECTRIC ENERGY USING SOLAR PANELS ON PUBLIC BUILDINGS

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ABSTRACT

The use of solar panels for the production of electric energy for one's own needs is at the beginning in Serbia. The adoption of the Law on Renewable Energy Sources and by-laws on the status of buyer-producer has initiated a greater interest of both households and business entities in greater use of energy produced in this way. In addition to simplified procedures, the increase in the price of electricity is another reason why citizens, the public and business sectors decide to build solar power plants on their roofs.

The paper shows how much it costs to cover one's own needs for electricity from a solar power plant installed on the roof of a public building. The financial and economic profitability of the investment was also analyzed, as well as the problems that exist in the procedure of construction and connecting solar power plants in the buyer-producer mode.

Keywords: solar energy; energy production from RES; buyer-producer mode.

LOW-CARBON URBAN DEVELOPMENT INTEGRATION - DECARBONIZATION OF CITIES - A REVIEW

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ABSTRACT

The world is faced with issues in the energy market for many years now, the availability of fossil fuels is running out and cannot keep up with the growing demands, whereas the prices remain unstable and at high level. The consumption of fossil fuels leaves a large impact on the environment, by intensively increasing the concentration of carbon dioxide and other greenhouse gases to the atmosphere, which intensifies this effect leading to the warming of our planet and climate change. Climate changes impose a big task on modern society from which arises a series of actions and commitments that must be undertaken in order to adequately respond to all challenges during the reduction of greenhouse gases, especially CO_2 emissions. Following the Paris Agreement, the state governments are dealing intensively on defining decarbonization strategies and implementation of the same with the aspiration to reduce greenhouse gases by 55% until 2030, whereas the key objective is to set net zero carbon emissions by 2050. To accomplish this, the countries should define long-term decarbonization strategies backed up by short - and medium-term actions in order to determine their ideal forthcoming scenario, while maximizing socio-economic benefits. Previous researches established that cities are held accountable for more than 70% of CO_2 and other greenhouse gas emissions and as such are suitable for the implementation of decarbonization measures. This paper provides an overview of the research with the aim of presenting the most effective systems and policies, which leads to zero carbon emissions, then the classification and analysis of the various methods used in the construction, industry and transport

sectors, as well as the criteria by which the authors observed the path of decarbonization worldwide while achieving climate neutrality through the use of renewable energy sources.

Keywords: climate change; greenhouse gas emissions; RES; energy policy; decarburization.

ECONOMY AND MANAGEMENT
EKONOMIJA I MENADŽMENT

SOCIAL CAPITAL IN MONTENEGRO AS A FUNCTION OF THE NEW DEVELOPMENT PARADIGM

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ABSTRACT

Social capital significantly affects the level of competitive abilities of organizations, as well as the national economy as a whole. Normal functioning of developed economies is not possible without active institutional pluralism as a combination of state and market regulation (at the economic level), i.e. the rule of law, political democracy, sociocultural capital and all other social subsystems (at the social level). The subject of research in this paper is the analysis of social capital as potentially the least used development resource of Montenegro. The goal of the research is to prove that countries with a high level of social capital development have better opportunities for increasing the productivity and competitiveness of the overall national economy, than those with a lower level of social capital development.

Keywords: social capital, institutional pluralism, state regulation, market regulation, competitiveness.

THE WESTERN BALKANS IN THE ERA OF TRANSNATIONALISM AND INDIVIDUALISM

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ABSTRACT

In the paper, the authors problematize the process of approaching the Western Balkan countries to membership in the European Union through the analysis of the process of stabilization and association from the aspect of fulfilling the criteria for membership in the European Union. In fact, the main goal of the paper is to determine whether this transnational community leads the same process of approaching membership in the European Union for all Western Balkans countries, given that some countries in the region are in different stages of development and require an individual approach when fulfilling the criteria for membership in the European Union. The research focus is primarily on the interests of the Western Balkan countries (Albania, Bosnia and Herzegovina, Montenegro, Kosovo, North Macedonia, Serbia) for joining the EU, that is, on the challenges to which the mentioned countries are exposed on the path of integration, as well as on the potential consequences of such accession processes by respective countries. The second goal is to analyze the common foreign policies of the European Union towards the Western Balkans in order to find out what the interest of the Western Balkans countries for joining the European Union (and vice versa) and how quickly we can expect the expansion of membership in the European Union and these areas of the Balkans.

Keywords: Western Balkans, EU, EU foreign policy.

CONCEPT OF COMPETITIVENESS OF THE CITY'S ECONOMY

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ABSTRACT

The paper presents the concept of competitiveness of the city's economy. Its growing importance in the theory and policy of the competitiveness of certain urban areas is highlighted. The concept of city competitiveness means a kind of theoretical and methodological unification of the general and local dimensions of the multi-level category of competitiveness. This multiplies the possibilities of viewing relations between economic actors in a certain area. The authors note the growing interest of researchers of various vocations in studying the concept of city competitiveness. For economic analysts of the concept of competitiveness of the city, particularly significant drivers of the improvement of the city's competitiveness are related to dynamic changes in the structure of the economy, movements in the labor markets, the emergence of new social needs, and recently an increasing number of factors related to security issues (infrastructural, energy, food, etc.). An increasing number of cities recognize the need to strengthen their competitive position by applying an entrepreneurial and marketing approach. In addition to the so-called "hard" drivers of the city's competitiveness (job opportunities, ease of doing business, tourist attractiveness), "soft" factors such as the perception of the quality of life, the image of the city, the availability of specific offers, and the like are gaining importance. Reducing the category of city economy competitiveness in the Republic of Serbia to an economic aggregate indicator, the paper presents, based on its own calculations, a

comparative overview of the economic competitiveness indicators of the cities of Belgrade, Novi Sad, Niš and Kragujevac in the period 2005-2021.

Keywords: competitiveness of the city, drivers of improving the competitiveness of the city, economic aggregate.

EXTERNAL SOLVENCY MANAGEMENT OF SELECTED BALKAN COUNTRIES

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ABSTRACT

The authors investigate the external solvency of three Balkan countries, two of which are so-called late transition countries (Bosnia and Herzegovina and Serbia), while Bulgaria is a country that has completed the transition and become a member of the European Union since 2007. Two indicators of external solvency are analysed: *External debt/gross national income (GNI)* and *External debt/export of goods and services* in the period 1997-2021. Moderate external indebtedness of these countries at the end of 2021 was established. Specifically, the external debt/GNI ratio for Bosnia and Herzegovina was 58.08%, for Serbia, 67.83%, and for Bulgaria, 57.52%. At the end of 2021, the second indicator of external solvency was within the permissible limits, i.e., it was well below 220%, which the World Bank marked as the upper limit of indebtedness. The value of this parameter was quite high for BiH (131%) and Serbia (122%), while for Bulgaria was incomparably lower (87%). An important factor of a country's external solvency is the *Net inflow of foreign direct investments (FDI)*. The available data indicate that since 2010, Serbia has been much more successful in attracting FDI compared to the other two Balkan countries. Also, research on the correlation between GDP growth rate and FDI (as a share of GDP) for Serbia shows a statistically more significant positive relationship compared to Bosnia and Herzegovina and Bulgaria.

Keywords: external debt, external solvency, export of goods and services, foreign direct investments.

SOME RESULTS IN THE APPLICATION OF THE PRINCIPLES OF CIRCULAR ECONOMY IN THE PRODUCTION OF CARDBOARD PACKAGING

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ABSTRACT

The dominant model of the economy, in the world and in our country, is still a linear model, that is, a linear economy based on the assumptions that natural resources are available in abundance, easy to obtain and cheap to dispose of. In contrast to the aforementioned, the circular economy represents a regenerative economic system within which production resources, waste, waste emissions and energy outflow are significantly reduced by slowing down, rounding off and extending energy and material cycles (life cycles) in production.

The paper will present the basic principles of the circular economy and the results of their application on the example of a company for the production of cardboard packaging in the Republic of Serbia. Through responsible business operations, the company managed to achieve a significant shift in the optimization of production processes and thus reduce the negative impact on the environment by minimizing the emission of harmful gases, reducing energy and water consumption. The company also cultivates a B2B2C model, according to which it collects information on how users use packaging and thus proactively participates in the eco-design of packaging, which consists mostly of recycled and ecological materials, paints and varnishes.

Keywords: circular economy, sustainable development, cardboard packaging, eco-design

OBJECTIVES OF FINANCIAL REPORTING IN THE PUBLIC SECTOR

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ABSTRACT

Current public sector reforms, aimed at improving its efficiency and effectiveness, require financial information that reflects the effects of business activities no only on engaged financial but on total economic resources. There is always a dilemma which of accounting models can be applied in the public sector to best meet the requirements information needs of all interested users. Financial reporting in the public sector is based on the cash model of accountants, which for the sake of information in a number of cases needs to be supplemented by the accounting model.

Keywords: reform, public sector, accounting, financial reporting.

IMPACT OF GOLD PRICE MOVEMENT ON THE RATE OF THE RETURNS FROM INVESTMENT ACTIVITY ON FINANCIAL MARKETS

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ABSTRACT

Due to the consequences caused by the crisis of the COVID-19 virus pandemic (interrupted supply chains), energy crisis, geopolitical crisis (war conflicts between Russia and Ukraine) resulting in high inflation, the working paper analyzes, tests and quantifies the impact of gold price movements on daily rates of return from investment activities on the observed financial markets of America, Europe and China. The aim of the working paper is to arrive at concrete, practically tested and quantified results through the application of multivariate GARCH models in the function of quantifying the impact of the gold price on the yield rates of the observed financial markets. Investing in gold represents an alternative to investing in currencies (currency pairs) and financial instruments on the financial markets. The time period of the research is from 2012 to 2023, where the effectiveness of the application of the multivariate GARCH methodology is tested in the period before the COVID-19 crisis, during and after the crisis. The research methodology includes the use of SIC (Schwarz) information criteria for selecting optimal models. The results of the working paper confirm the significance of the application of econometric multivariate GARCH models in terms of quantifying the impact of the gold price on the daily rates of return from investment activities on the observed financial markets. The obtained research results will be useful both to the academic community for further research in the field, and to the professional in terms of making optimal investment decisions.

Keywords: gold price, returns on financial markets, GARCH models, risk, investing.

CAUSES AND CONSEQUENCES OF THE GLOBAL CRISIS ON THE FINANCIAL SECTOR - WILL A FINANCIAL CRISIS FOLLOW

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ABSTRACT

For the last fifteen years, the world has been shaken by multiple financial crisis, beginning with the global economic crisis in 2008, which began in the American market and spread throughout global markets. Recovery from that crisis was slow. The global economy improved steadily over the next decade, only to face a further global crisis caused by the coronavirus pandemic. Despite international "lockdowns" and other restrictions, business, stock markets and the financial sector were maintained. The banking sector especially seemed to show resilience during the crisis caused by government interventions during the coronavirus pandemic, mostly due to the capital positions built up after the 2008 financial crisis.

The opinion of many analysts' reporting indicates that the real consequences on the economic sector will only be felt in the coming period. Today, we are experiencing high inflation, a slowdown in economic activity and problems in the global banking sector, which resulted in the March 2023 failure of three US banks, as well as Credit Suisse. Other American banks are also at risk of failure.

The forecasts from the World Bank are not optimistic at the global level, indicating an unfavorable climate for economic activity in general, and specifically for the financial sector as a whole. A healthy banking sector is necessary to stop the crisis, and must play a crucial role in helping the global economy to return to growth.

The United States Federal Reserve (FED) at the May 2023 meeting of the Federal Open Market Committee (FOMC) raised the reference interest rate by 0.25 percent, i.e. 25 basis points. This was the third time in 2023, and the tenth consecutive increase in the interest rate since March 2022. The European Central

Bank (ECB) also increased reference interest rates in 2022 and 2023. Due to inflationary pressure, all three key interest rates were increased by 50 basis points in March of this year, despite panic in the markets. Despite over a year's worth of interest rate hikes, forecasts indicate that regulators do not expect a significant decrease in inflation until 2025.

Although some have tried to find parallels in today's economic crises to that of 2008, this financial crisis is in no way similar due to significant differences in the causes. Instead, this crisis has more in common with the commodity crisis of the 1970's. Is continued contagion of the financial system and banking collapse possible, with a major financial crisis to follow? A financial crisis of some sort seems a certainty, but it is quite unclear whether it will happen soon and what will be its final trigger.

Keywords: financial crisis, banking sector, inflation, interest rates, regulator.

INVESTMENT IN GOLD RESERVES UNDER CONDITIONS OF GLOBAL UNCERTAINTY - ECONOMIC STRENGTH OR NOT

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ABSTRACT

In recent years, many countries in the world are returning to buying and storing gold as the most traditional form of protection against inflation, under conditions of global uncertainty. Gold has always represented security, and since the establishment of the international financial system, it has been the main currency, not only for trading, but also for keeping the monetary reserves of central banks. The US dollar, released as a floating currency in the 1970's, became known as the "petrodollar" and offered stability for the world's economy for half a century. But the US deficit spending over the last decade has created inflationary pressures that make the dollar increasingly less attractive. Since the beginning of the world economic crisis in 2008, gold has become attractive again.

Buying gold is just one form of asset in which central banks hold their reserves. Opinions are divided, as to whether the gold of central banks is an assessment of future market trends, and not an indicator of financial power. Others are of the opinion that this precious metal represents the economic strength of the country, which has a certain percentage of reserves in its portfolio. Therefore, one of today's primary roles of gold is the diversification of reserves.

The price of gold in recent years has reached a historical maximum; in March of this year gold traded at a price of almost 2,000 USD per ounce. The price continues to increase after the US Federal Reserve's decision in March 2023 to raise interest rates.

According to data from the World Gold Council, which keeps records by country, the United States has the most gold reserves, almost 67 percent of the

country's total foreign exchange reserves. Germany, the International Monetary Fund, Italy and France follow with more than 2,000 tons of gold.

Significant amounts of gold in the last decade have been bought by Russia and China, which occupy the sixth and seventh ranks respectively for world gold holdings (as shown later in this paper).

Is gold really an indicator of economic strength and power of a country? Given that economically strong countries have a high proportion of gold reserves in their portfolio, this is likely the case.

According to the World Gold Council, of the countries in the South Eastern European region, Serbia has the strongest gold position, having the most reserves as compared to neighboring countries of the region. Positioned behind Serbia is North Macedonia, followed by Slovenia, and Bosnia and Herzegovina. Montenegro's gold reserves of 1.09 tons have been pledged as collateral for an international loan, while Croatia sold its reserves after 2001.

Keywords: foreign exchange reserves, central bank, financial crisis, gold reserves, financial markets.

THE INFLUENCE OF DIGITAL MEDIA ON MODERN BUSINESS

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The modern era is shaped by intense competition and demanding consumers, which is why companies abandon traditional communication methods and focus on digital media imposed by the development of information technologies. The presence of the company on the Internet is not a goal, but something that is taken for granted. The attention of the management of a successful company is focused on interactive content, which is created by the wider social community, not just the company. In this way, the company quickly and easily obtains information about the market in which it operates, the behaviour of consumers who use or want to use their products and services, creates campaigns that spread virally, blogs, communicates two-way with consumers, promotes its values and way of doing business . The research goal of this paper is an analysis of how digital media influence modern business.

The results of empirical research have shown that the effective use of digital media in modern business directly contributes to better positioning and differentiation of the company on the market and leads to a greater degree of consumer loyalty and achieving a competitive advantage.

Keywords: digital media, management, communication, business

EUROPEAN COMMON AGRICULTURAL POLICY AND SUSTAINABLE NUTRITION TRENDS

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ABSTRACT

The common agricultural policy of the European Union for the period 2023-2027 aims to stop environmental degradation and reverse it in favour of climate change mitigation, efficient use of limited natural resources and biodiversity conservation. Agriculture in the European Union (EU) is strongly influenced by the Common Agricultural Policy (CAP). However, aligning agricultural policy with nutrition is complex, primarily because the objectives of agricultural policy are predominantly economic, which poses a challenge for developing coherence between agricultural, trade and health policies. Today, the European food system is characterized by unhealthy dietary trends, ecologically unsustainable production and dependence on an aging agricultural population. Agricultural systems and food diets should be sustainable from an environmental and health point of view, so increasing their sustainability must be a major objective of farm and food policies. Unfortunately, climate, environmental and health shocks are likely to increase in the coming years. Therefore, it is extremely important to favor a healthier and environmentally friendly diet through changing consumer behavior through dietary recommendations and nutritional labels. The ongoing reform of the Common Agricultural Policy (CAP) represents an opportunity to address these issues. Recognizing the urgency of transitioning to sustainable food systems, European civil society and other public interest organizations have shown consistent support and constructive engagement in the Farm to Fork Strategy Plan. The aim of the paper is to point out the importance of incorporating sustainable nutritional issues within the Common Agricultural Policy of the European Union.

Keywords: Common Agricultural Policy, food security, sustainable food system, nutrition, European union.

TOWARDS A COMMON AGRICULTURAL AND FOOD POLICY: SUSTAINABIILITY CHALLENGES

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ABSTRACT

The Common Agricultural Policy of the European Union has been widely known for more than 60 years. The aim of this joint policy is to ensure an adequate supply of food, given that after the war and years of hunger, people could not adequately enjoy the presence of a variety of foods. Current food systems are characterized by the overproduction of processed foods with low nutrient content. This has contributed to unhealthy and unbalanced diets across the EU, leading to a range of health risks, especially for poorer population groups. The EU's food and agricultural systems require a fundamental change of direction in light of the serious, interconnected and systemic economic, environmental and health challenges they face. Today, Common Agricultural Policy supports the European Union single market for agricultural food products, ensures affordable prices, keeps rural communities vital and high environmental standards. Unfortunately, climate change, the emission of harmful gases, wars, and epidemics have a negative impact on agricultural production, which calls into question the quality and safety of food as well as people's health. In order to meet new global expectations, new CAP should be transformed into a CAFP (Common Agricultural and Food Policy) that aims to strengthen the resilience of the entire food chain, recognizing the changed power relations in the chain and the interaction between consumption and production. The aim of this work is to point out the efforts that the Common Agricultural Policy to make quality and healthy food available to everyone. Therefore, this paper will cover topics related to the quality and safety of agricultural food products, their impact on human health, towards a Common Agricultural and Food Policy.

Keywords: Common Agricultural and Food Policy, Common Agricultural Policy, food security, health, sustainability.

DECISION SUPPORT SYSTEMS IN MANUFACTURING: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The digital transformation of businesses is currently experiencing significant improvements, supported by the use of artificial intelligence. The manufacturing sector is being substantially transformed using emerging technologies. Consequently, the manufacturing environment has become more dynamic and complex, causing more interdependencies, uncertainties, and large amounts of data that should be processed and analyzed. In this sense, artificial intelligence plays a crucial role in supporting data-driven decision-making, which is beneficial for the digitalization of manufacturing processes. The aim of this paper is to present a bibliometric analysis that comprehensively describes who the main contributors are and what the main streams of research are in the field of developing and implementing decision support systems based on artificial intelligence in manufacturing. The research findings should be a valuable resource for other academics interested in learning more about the most recent developments in the field. Furthermore, it opens possibilities for further research related to the development of intelligent decision support systems in manufacturing.

Keywords: Manufacturing, Industry 4.0, Decision support systems, Artificial intelligence, Bibliometric Analysis.

E-BUSINESS IN FUNCTION OF SUPPLY CHAIN MANAGEMENT IMPROVEMENT

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ABSTRACT

The subject of this research paper is the possibility of improving supply chain management using electronic business. In order to be competitive, a company needs to develop in line with market trends. The impact of electronic business on SCM has led to the development of e-SCM, which creates new business opportunities in the market. This paper reviews the adventaged of implementing electronic business and information technologies in SCM.

To ensure the successful implementation of e-SCM and the potential benefits of electronic business on SCM, it is essential to consider factors such as suitable infrastructure, education, and legal regulation. This paper discuss these prerequisites and presents a symbiosis of theoretical reviews and statistical research results on the application and possibilities of e-SCM in the Republic of Serbia.

Keywords: e-business, supply chain management, information technologies, contemporary business.

OPTIMIZATION HOUSEHOLD ENERGY MANAGEMENT SYSTEM USING GWO ALGORITHM: A REVIEW

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ABSTRACT

The paper provides an overview of the application of the Gray Wolf Optimization (GWO) algorithm in the Energy Management System (EMS). Modern society cannot function without the use of electricity. In every household, there are various appliances that consume electricity, some of which are larger while others are smaller consumers. The main goal is the rational use of these appliances and their operation during periods of lower energy prices. People's habits in homes or residential buildings vary, leading to fluctuating electricity consumption. It is necessary to create a schedule for the use of appliance in order to reduce electricity bills. However, energy consumption is increasing, and energy sources are becoming insufficient, so it is essential to optimize consumption.

There are numerous nature-inspired algorithms used for the optimization of complex problems, one of which is the GWO algorithm. It has significant applications in solving various management problems. The mathematical model of the GWO algorithm and its functioning method are described in the paper. Additionally, the paper presents an overview of the application of the GWO algorithm in scientific research to reduce electricity bills, optimize the use of heating/cooling appliances, and implement alternative energy sources (solar, thermal, wind energy, etc.).

By implementing smart technologies, nature-inspired algorithms, and renewable energy sources, we can effectively manage our energy consumption while maintaining a comfortable and sustainable living environment.

Keywords: GWO algorithm, EMS, optimization, electricity, appliances

THE ROLE OF TOURISM MANAGEMENT IN ACCESSIBLE TOURISM

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ABSTRACT

Accessible tourism has been a previously under-researched area in domestic tourism research. To a considerable extent, the authors of this study have been making efforts to increase the attention paid to this issue. Based on the results of a questionnaire survey, the authors present some important aspects of the travel demand of people with disabilities that need to be taken into account by tourism destination management when developing tourist attractions and products, as well as in the design of modern visitor management. The issue of accessible tourism concerns more than 10% of the European population, i.e., beyond its social and societal importance, it is not a negligible number from a market point of view. Understanding the expectations and specific consumer habits of the stakeholders is essential to develop an appropriate offer and to ensure equal access to services. The authors, in their capacity as experts in the Erasmus Peer Act project, report on the Hungarian survey and on the results of small sample surveys in 4 other countries (Germany, Italy, Spain and Croatia).

Keywords: accessible tourism, travel habits and frequency, motivation.

BUSINESS COMMUNICATION AND MANAGEMENT

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ABSTRACT

The man is a piece which is in the environment of others where it can directly provide the important information that are necessary for the wise direction of its own and their activities. Many important facts are located outside of place and time or remain hidden within them. For example, the "true" or "real" attitudes, beliefs and emotions of a person can only be understood indirectly, either through its confessions, or through what it appears to be unconscious expressive behavior. The man plays his role, possesses the qualities, do the actions that will have the results which he wants. In accordance with this, there is a belief that man offers his performance and sets his life show "for the benefit of others". Successful business communication is a very important function of management. This paper points out the importance of business communication of human resources in modern business conditions.

Keywords: simedonia, eudaimonia, altruism, empathy, management, communication.

GENERIC COMPETITIVE STRATEGIES

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ABSTRACT

One of the main issues in competitive strategy is the company's relative position in the economic segment. Positioning determines whether a company's profitability will be above or below below the average of the corresponding economic segment. A company that is capable of doing well positions can achieve high rates of return even if the structure of the economic segment is unfavorable, and the average profitability in it is modest.

The most important condition for long-term above-average results is sustainable competitiveness an advantage. Although compared to its competitors, the company may have countless advantages and disadvantages, there are two basic types of competitive advantage it can have: low costs and differentiation. The significance of any strengths or weaknesses of the company is ultimately a consequence of their impact on relative costs or differentiation.

Cost advantage and differentiation, on the other hand, arise from the structure of the economy segment.

The subject of research in this paper is the impact of a defined strategic commitment on implementation of the company's set goals, as well as the reflection of the chosen strategy on the further future of the business. The goal of the research is to find the basic prerequisites for successful application in generics competitive strategies, as well as parameters for qualitative and quantitative measures of performance.

Also, the goal is to examine whether the companies operating in the field of railway transport in BiH used generic competitive strategies and explored the key prerequisites for a successful one strategy implementation. The choice of the rail

transport market stems from the fact that there is potential to gain a competitive advantage over other transport markets in BiH.

Keywords: strategy, competitive advantage, differentiation.

NEW OCCUPATIONS AND COMPETENCES OF THE FUTURE

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ABSTRACT

The ever-evolving landscape of technology, automation, and globalization is reshaping the global workforce, necessitating a paradigm shift in our understanding of occupations and competences. This paper delves into the concept of "New Occupations and Competences of the Future" and explores the emerging trends that are poised to shape the job market in the years ahead.

The primary objective of this paper is to address three pivotal questions pertaining to the future of work. Firstly, we anticipate the emergence of new occupations, analysing the driving factors behind their development. By scrutinizing current trends and technological advancements, we aim to shed light on the potential job opportunities that will arise. Secondly, we delve into the evolving competences required for workers to thrive in the rapidly changing work environment. We examine the skills, knowledge, and attributes that individuals will need to adapt to evolving job requirements and remain competitive in the workforce. Thirdly, we explore the complex interplay between humans and robots in the workplace. Through an examination of various industries and sectors, we investigate the extent to which robots can replace human workers, the specific tasks and roles susceptible to automation, and the potential implications for employment dynamics.

This paper relies on a comprehensive literature review conducted using reputable academic databases such as Google Scholar and SSRN. The search terms utilized include "future competences," "future occupation," and "robots vs. human." Only articles published between 2018 and 2023 were selected for inclusion in this review.

Through rigorous research and analysis, this paper aims to provide valuable insights into the future landscape of occupations, the evolving competences necessary

for success, and the implications of automation on the workforce. Furthermore, it explores the competences and skills that will be in high demand as a result of these changes, emphasizing the importance of adaptability, creativity, critical thinking, and digital literacy.

Keywords: future competences, new occupation, human, employee.

DO DIFFERENCES IN THE MARITAL STATUS OF WOMEN AFFECT THEIR BEHAVIOR AT THE WORKPLACE?

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ABSTRACT

Our personal lives and our work commitments should be in balance. Many female employees face the double burden of their careers and families. Previous studies have established that there are differences in women's work behavior by marital status, but these results are still largely unclear and sometimes questionable. The aim of this research is to prove that the differences in behavior between married women and those who are not (unmarried, divorced, widowed) are not only reflected in family relationships and roles, but also in workplaces. The research was carried out using an online model at the beginning of 2023. on a quota, representative sample (n=140). Five hypotheses were set, four of which were confirmed in the research. A 5-point Likert scale was used as a research instrument. The correlation partial analysis method was applied. All women were observed through three statistical characteristics: (1) women without children; (2) women with small children; (3) women with adult, independent children. The statements in the scale reflected the following eight forms of organizational behavior: job satisfaction, creativity and innovation, taking responsibility, absenteeism, stress, conflicts, work engagement and loyalty to the organization. The research results indicate that the differences in the behavior of women according to their marital status are more significant and are reflected in most of the observed forms of organizational behavior. As such, they should be useful knowledge in human resource management, especially in the motivation and management of employees.

Keywords: marital status, behavior at work, women.

PERCEPTION OF STRATEGIC CORPORATE GOALS AND EMPLOYEES' MOTIVATION

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ABSTRACT

The majority of authors in previous researches agree that strategic corporate goals should be clear, timely, transparent and accessible to all stakeholders. What is not yet completely clear and sufficiently researched is how much the perception of these goals by employees as stakeholders affects their motivation? The goal of this research is aimed at finding an answer to that question. The research was conducted on a representative quota sample of 120 respondents. In order to determine the perceptual processes of strategic goals and motivation of employees, a five-point Likert scale with 12 defined statements was constructed and used. The method of partial correlation was used. The determined coefficients point to three key conclusions. (1) The perception of goals by employees reflects positively on employee identification (r = 0.6611). (2) The perception of goals by employees is not significantly reflected in employee motivation (r = 0.3171). (3) Identification of employees with a strategic organizational goal has a positive effect on employee motivation (r = 0.8358). This segment of human resource management is still insufficiently known and researched, and therefore represented in practice. This should be a clear guide for researchers, but also for entrepreneurs and managers to make a turnaround in the creation and realization of organizational goals. More effective creation of perceptual flows and identification processes should be given its respectable place in the motivation of employees.

Keywords: goals, human resources, motivation.

TEAMWORK IN THE CLUB AS A SUPPORT FOR THE SOCIALIZATION OF YOUNG ATHLETES

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ABSTRACT

In order to appropriately approach the socialization process, which is extremely important for young athletes, it is desirable that coaches, as well as all members of a sports club, be familiar with the basic knowledge regarding this process. It is important to distinguish between sources and agents of socialization, where the main source is culture and the main agents are families, educational institutions, peers and, in the modern age, increasingly present media, especially virtual ones. The multiplication of various models and the exponential growth of information that "burdens" us every day represent a growing problem in the process of education in general, including in the work of sports clubs. Within small groups, such as those in sports clubs, intensive social interaction of peers connected by common sports interests takes place. If that group is well managed in the environment of a positive club atmosphere, it is possible to satisfy and develop the social needs and skills of the students through social facilitation, which will serve as an incentive for the overall development of the personality. With the help of the model learning process, if emotional closeness and respect for the group leader (coach) is developed, it is possible to internalize appropriate norms, rules of behavior and values at the level of identification, which then becomes a permanent part of the pupil's personality.

Keywords: socialization, teamwork, sport, youth.

THE ROLE AND SIGNIFICANCE OF BRANDING OF SERBIAN BASKETBALL

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ABSTRACT

Nowdays, when the world is changing really fast, it is necessary to be ready to react and adapt to all the changes, both within the organization and in the external environment. Proper managment of branding of an individual, organization, company all the way up to the level of one country is very important and it leads us to successfull response to unexpected situations, which thus gives a competitive adventage in the market. Serbia, know as „basketball nation“ and with awards coming year after year, has a huge potential related to the branding of basketball and it’s sport in general. We could say that that potential have been neglected, because how little attention has been paid to it and how much it hasn’t been used. Therefore, more attention must be paid to that segment and an initiative must be launched to improve the branding of Serbian basketball and sports in general.

Keywords: branding, brand, basketball, Serbia, sport, marketing.

IMPULSE BUYING OF FASHION PRODUCTS

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ABSTRACT

Vendors utilize various sales strategies to secure the greatest possible return and the most favorable customer experience. One of the most commonly used sales promotion method refers to discounts that can be highlighted in a variety of ways with the aim of encouraging customers to buy products. The subject of the paper is the analysis of the impulse buying of fashion products, prompted by a certain amount of discounts. The aim of this research is to examine how a certain amount of discount affects the frequency of impulse purchases of fashion products online and in physical stores, by taking into account the following independent variables: gender, generation and level of income. The survey method was used, with the application of an online questionnaire in a sample of 1,002 respondents in the Republic of Serbia. The results revealed that fashion products were more likely to be purchased on impulse when discounts exceeded 30%. It is concluded that this information may be useful to the product suppliers, because they can increase the price of the fashion products to pay off the discounts of over 30%, which can result in a more frequent impulse buying, thereby ensuring the desired results in financial terms.

Keywords: impulse buying, fashion products, amount of discount, online shopping.

FACTORS AFFECTING CONSUMER ETHNOCENTRISM, WITH FOCUS ON SERBIA

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ABSTRACT

The introduction provides a review of the context that favors ethnocentrism and leads to this phenomenon. The paper explains the meaning of the very term and provides the general characteristics of consumer ethnocentrism, connecting the emergence of this phenomenon with ethnocentrism itself. The subject of the paper is consumer ethnocentrism as an important category that affects the purchase of products, and therefore the overall market. In-depth consideration is given to the research of multiple works by authors who studied various factors that can influence consumer ethnocentrism to a greater or lesser extent, such as socio-psychological, demographic, economic, political and situational ones. The aim of the paper is to review literature that deals primarily with consumer ethnocentrism as a derivative of ethnocentrism, so as to gain a better insight into consumer behavior and needs, as well as the interests of manufacturers, for the purpose of formulating a successful marketing strategy.

Keywords: ethnocentrism, consumer ethnocentrism, consumer behavior, marketing strategy.

CONSUMER BEHAVIOR AND LOYALTY TO THE SALES FACILITY

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ABSTRACT

Loyalty of customers towards the point of sale as a brand is an important concept that defines the relationship between the seller on the one hand and the buyer, that is, the consumer on the other. Nowadays, it is of particular importance for every seller to have the largest and most content base of his loyal customers, that is, consumers. Footwear represents one of the most suitable product segments that enables the development of consumer loyalty towards a particular brand of sales facilities. This research served us with the aim of analyzing the profile of footwear buyers and their loyalty towards a particular brand of sales facilities in the Republic of Srpska. In order to reach the set goal, we conducted a survey that included 90 participants between the ages of 20 and 65, and the socio-demographic characteristics of consumers throughout the Republic of Srpska were investigated. Our results revealed that more than half of those surveyed identified themselves as brand loyal customers who spend up to 10% of their total income on footwear.

Keywords: consumer, loyalty, brand, sales facility.

REASONS FOR THE GROWING POPULARITY OF LOCAL FOOD - RESULTS OF A REPRESENTATIVE CONSUMER MOTIVATION STUDY

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ABSTRACT

There is growing interest in local food products. In addition to the impact of their consumption on the local economy, and on rural development, their environmental benefits and their actual or potential role in the development of rural tourism are also highlighted. A detailed knowledge of consumer choices and habits is a prerequisite for effective marketing work, thus strengthening the products' market position. The present study presents partial results of a representative survey on the motivations for consuming local food products. The creation and widespread promotion of local products can be a driving force for rural tourism, gastronomy, and rural development. Therefore, it is paramount to understand the motivations and considerations that lead potential consumers to choose locally-produced food occasionally or regularly.

Keywords: local products, food, motivation, consumer habits, rural development.

ANALYSIS OF THE INFLUENCE OF ADVERTISING COSTS ON COMPANY INCOME

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ABSTRACT

The creation of business activities based on the concept of marketing represents the construction of an appropriate relationship between the effort invested and the achieved result. This means that the ability to achieve positive business activities is related to the management system of the company, the response of the target public and the achieved results. For this reason managers are constantly faced with the need to compare the achieved business results and the contribution of marketing activities.

By obtaining and processing primary and secondary data, the impact of marketing itself is determined, that is, the justification of the marketing concept is checked. The importance and contribution of the marketing concept or individual marketing activities can be determined by analyzing the relationship between realized costs and key business performances. The research of marketing costs and effects expressed in selected parameters is a reliable basis for evaluating the level of acceptability of the marketing concept in the company's operations.

The subject of research in this paper is the statistical-financial analysis of the impact of advertising costs on the total revenue of the company. Advertising costs represent costs incurred on the basis of a strategic plan in order to promote a company, that is, a specific product. How marketing costs affects total revenue is shown through the interdependence of costs and total revenue.

Keywords: advertising, costs, marketing, income.

THE IMPACT OF MOBILE MARKETING ON THE BRAND VALUE DIMENSIONS

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ABSTRACT

Marketing communication tools play a significant role in the development of brands. In other words, they help consumers understand what a brand represents and what its value is. Mobile marketing activities are a basic form of communication between consumers and companies. The use of "smartphones" has led to many changes in the patterns of behavior of consumers and companies, as well as the development of applications for "smartphones" by many companies, indicating the importance of applying this medium in advertising. Also, the constant increase in smartphone users is causing more intensive advertising through mobile applications, which allows companies to communicate with their existing and potential consumers efficiently and interactively. The main objective of this paper is to determine the impact of mobile marketing activities on building brand value in the fashion brand market through four dimensions of a brand based on consumer perception, namely brand awareness, brand associations, perceived quality, and brand loyalty. The empirical survey included 405 questionnaires that consumers of fashion brands completed. Research hypotheses have been tested by applying confirmatory factor analysis and structural equation (SEM) models. Regarding mobile marketing activities, the results indicate that this modern medium has a negative and statistically significant impact on all brand value dimensions.

Keywords: mobile marketing, brand value, consumer.

ANALYSIS OF THE IMPACT OF INFLUENCERS AND FRIENDS ON MAKING A PURCHASE DECISION

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ABSTRACT

The expansion of the Internet has dramatically changed media preferences and consumer behavior. According to official statistics, there is an increasing proportion of Internet, social media, and mobile phone users worldwide. In this way, a new digital reality has been established that functions parallel to the material. Thus, in addition to the traditional influence of reference groups such as family, groups of friends, working groups, etc., influencers as kind of opinion leaders in the digital environment, are also exercising a more substantial influence on consumers. Following the above, this paper sought to analyze the impact of influencers and friends on purchasing decisions. In addition, differences regarding the influence of influencers and friends on the decision-making of the purchase of different categories of products and services were analyzed. For this purpose, a t-test of paired samples was conducted. By examining primary data collected from 340 respondents, it was concluded that influencers have a more significant influence on purchasing decisions than friends, especially when buying cosmetic and food products. The theoretical implications of the paper relate to improving current knowledge about the effects of influencers on consumer behavior. The obtained scientific results are also helpful guidelines for managers when formulating appropriate marketing strategies.

Keywords: influencers, friends, making a purchase decision.

EXTERNAL AND INTERNAL DIGITAL MARKETING ACTIVITIES IN THE SHIPPING INDUSTRY: THE ANALYSIS OF SOCIAL MEDIA ADVERTISEMENT

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ABSTRACT

The transformation from traditional to digital marketing is happening in different industries, including the maritime industry as well. The primary characteristic of the shipping business is that it has been conceived on traditional stakeholders relations for a long time, which starts to change with the application of new technologies. In this paper, an analysis of the intensity and content of the marketing activities of shipping companies through social media is carried out. The companies' marketing is perceived based on the number of followers, posts, likes, comments, and shares on social networks on the following social networks: Facebook, Instagram, and Twitter.

In contemporary literature, it has been confirmed that container companies have more effective advertisements than others, so this paper's primary research question is: What is the difference between container and multipurpose shipping companies' external and internal digital marketing activities?

As a method, a case study is used, which analyses typical examples of shipping companies that have leading positions on the market.

The paper found that social media advertising has external marketing effects on customer satisfaction, value, intention to buy and sell, customer relationships, brand awareness, knowledge creation, corporate credibility, acquiring new customers, personnel performance, employee brand management, and sustainability. The results indicate a more significant representation of the Facebook network than Instagram and Twitter.

Regarding internal marketing, it has been discovered that in the shipping industry, special attention is paid to employees (primarily seafarers) and the increasingly growing trend of implementing the concept of Corporate Social Responsibility.

The paper contributes to the intensification of the application of marketing in shipping as a modern scientific and practical discipline by which shipping companies are increasingly becoming visible and positioned on the global market.

Keywords: digital marketing, social media, shipping industry.

DIGITAL MARKETING AND FEMALE ENTREPRENEURSHIP: BETWEEN TRADITIONAL RECOMMENDATION AND MODERN ADVERTISING

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ABSTRACT

The work follows the analysis of the problems of business presentation and marketing of women entrepreneurs from marginalized social strata (Roma population), based on the results of several months of research. The theoretical perspective shows that female entrepreneurship is burdened with numerous problems, and the challenges faced by members of marginalized social strata are particularly sensitive. Using the focus group method, the research was conducted in the territory of Novi Sad, and the respondents who live and work in the territory of Juznobačka district of AP Vojvoda (Republic of Serbia) participated in it. The results undoubtedly point to the fact that successful self-employment and female entrepreneurship today are largely linked to the basics of digital marketing. However, even though we live in the digital age, the classic, personal "word of mouth" recommendation is not out of place or surpassed. On the contrary, there is a clear pattern indicating that this method of communication with clients is still functional/sustainable, even though the vast majority of modern communication channels rely on digital forms of presentation.

Keywords: digital marketing, female entrepreneurship, Roma women, focus groups, personal recommendation.

ARTIFICIAL INTELLIGENCE IN DIGITAL MARKETING

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ABSTRACT

The aim of this paper is to investigate the impact of artificial intelligence on consumers, the familiarity of consumers with artificial intelligence, as well as the interaction of consumers with tools that use artificial intelligence in their work. The main conclusions of the research indicate that marketing is increasingly changing and adapting to new trends, and that artificial intelligence with its methods will become an indispensable part of marketing. Modern consumers like to check product information, take a good look at all the offers and finally decide to buy. In this process, artificial intelligence can create an excellent personalized environment for the user to feel invited to make a purchase. Modern marketing incorporates artificial intelligence methods to more easily profile customers and create personalized content. In addition to the use of artificial intelligence for profiling and easier selection of relevant information, modern marketing introduces modern advertising methods so that brands can get closer to their consumers. Therefore, lately, more attention has been paid to marketing on social networks, mobile marketing, as well as e-mail marketing. In the end, it can be concluded that artificial intelligence has an impact on the buying habits of consumers. The survey was divided into three parts, each of which represented one hypothesis. All hypotheses were partially or fully confirmed.

Keywords: artificial intelligence, mobile marketing, digital marketing, modern advertising.

LAW AND SECURITY SECTION
PRAVO I BEZBJEDNOST

THE ABUSE OF POSITION AND AUTHORITY IN THE BANKING SECTOR THROUGH A CRIMINAL LEGAL CONSTRUCT

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ABSTRACT

It is almost unavoidable not to find cases of abuse of position and authority perpetrated by bank clerks in the banking sector. Through the research itself, different types of misuses will be elaborated in this paper, such as creating loan documentation with false documents and subsequently approving the monetary loan or credit until the moment of payment. In addition to the above mentioned, in this paper we will analyse the general parameters of the internal work directives of bank clerks and their effect, as well as the legal legislation which refers to the whole banking system in B&H, in regards to the mentioned segment of misuse. From that standpoint, it should be emphasized that for abuse of position to be the subject of a criminal investigation, in addition to other characteristics, the conduct of the perpetrator through the institution of intent (lat. dolus) as a subjective element of the commission of a criminal offense must also be determined.

Keywords: Abuse of position and authority, credit documentation, false documents, legal legislation, institution of intent.

DEEPFAKE AS A NEW FORM OF CRIMINALITY

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ABSTRACT

Lies are not unknown to humanity, they are as old as humanity itself, but the dimensions of the consequences that lies can reach today, with the use of modern technologies, have greatly increased. Recently, the use of modern technologies has created another means on the basis of which it is possible to create and distribute false content faster and easier, which can be used to undermine basic human rights. This tool is known as Deepfake and is used to tag photos, audio and video recordings that contain content that never happened in reality. In the continuation of the work, the authors explain the appearance of deepfakes. Certain international organizations, such as the European Union and the World Intellectual Property Organization, have recognized the necessity of reactions to this phenomenon. After analyzing the legal documents of international organizations, the authors turn to the presentation of normative solutions regarding the incrimination of deepfake in certain countries. The last part of the paper is dedicated to whether, according to the existing legislation of the Republic of Serbia, deepfake can be classified as a criminal offense.

Keywords: deepfake, criminality, Republic of Serbia.

SECURITY CHALLENGES AND THREATS IN THE LOCAL COMMUNITY - CASE STUDY OF THE MUNICIPALITY OF FOCA

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ABSTRACT

People's interest has always been to be safe and that the place where they live and work has a high level of security. A safe local community is a prerequisite for development and survival, especially in today's time, which is characterized by a large number of different security challenges and threats. People's priority is to be able to satisfy their needs and realize their rights and interests in the local community where they live. Any form of threat to security in the local community arouses the interest of citizens, which is a kind of alarm for the local self-government, but also for the security authorities. Local self-government bodies in the local community are obliged to deal with issues that are of importance to their citizens and to initiate issues that are the responsibility of other bodies and services so that they are resolved in a timely manner. The issue of security in the local community is the responsibility of the local police, which also aims to ensure that the personal and property security of citizens is at the highest possible level. There are various security challenges and threats that endanger citizens in the local community and they primarily differ in relation to the specifics of the local community itself, primarily geographic, demographic, cultural, ethical, ethnic, industrial, social, etc. The aim of this paper is not only to indicate the conceptual definition of the local community and security challenges and threats, but also to indicate the very importance of a safe environment in which people live. Also, the paper will present the perception of various security

threats, as well as their ranking by degree of danger by citizens in the municipality of Foča.

Keywords: security, security challenge, security threat, local community, local self-government.

THE IMPACT OF LACK OF REGULATION IN THE FIELD OF DIGITAL ASSETS - CRYPTOCURRENCIES ON CRIMINAL ACTIVITIES AND MISUSE

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ABSTRACT

This scientific paper examines the lack of regulation in the field of digital assets, specifically cryptocurrencies, and its connection to possibilities for manipulation and fraud, as well as its link to criminal activities. Focusing on the Southeast Europe region, the paper particularly highlights that Bosnia and Herzegovina is the only country in that environment without a regulatory framework for digital assets, while Serbia and the European Union have already established regulations for this field.

By analyzing the existing regulatory frameworks in Serbia and the European Union, insights are provided into the measures taken to mitigate risks associated with cryptocurrencies, including manipulation, fraud, and the commission of criminal offenses. Real-life examples that have occurred in Bosnia and Herzegovina due to the lack of regulations are also examined, demonstrating the potential consequences on the market in Bosnia and Herzegovina.

By comparing the current situation in Bosnia and Herzegovina with regulations in other countries, the paper points out the shortcomings and the need for establishing a regulatory framework for digital assets. The absence of regulation in Bosnia and Herzegovina creates a legal vacuum that allows room for manipulation and fraud in the cryptocurrency field.

The aim of this paper is to emphasize the importance of establishing a regulatory framework for digital assets in Bosnia and Herzegovina to ensure investor protection, mitigate risks, and stimulate the sustainable development of the cryptocurrency

sector. This paper provides a basis for further discussions on the necessity and advantages of regulatory intervention in the field of digital assets in Bosnia and Herzegovina.

Keywords: Digital assets, cryptocurrencies, MiCA regulation, EU, Serbia, commission of criminal offenses, misuse, cryptocurrency frauds, ICO.

THE INSTITUTE OF DIVORCE WITH SPECIAL EMPHASIS ON CONSENSUAL DIVORCE AS MEANS OF ENDING A MARIAGE IN FAMILY LAW LEGISLATION OF THE FEDERATION OF BOSNIA AND HERZEGOVINA

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ABSTRACT

Divorce is one of the means of ending a marriage which is performed by a decision of the court during the life of the marital partners. Today divorce is a frequent occurrence in society and is known by almost all cultures around the world. The influence of the Catholic Church is the reason why the possibility of divorce has been introduced in to the legal systems of catholic states such as Italy, Spain, Portugal and Ireland relatively late. This is also the reason why it still does not exist in the Philippines. This paper will examine the legal ordering of the divorce in the legal system of Bosnia and Herzegovina with a brief examination of the way this legal institute is ordered in some countries of the European Union. In the first part of this paper the historical development of divorce through roman and canon law will be examined as well as divorce causes in our and comparative law. In the second, main part of this paper, the focus will be placed on the very institute of divorce and on the procedure for divorce according to the Family law of FB&H with special emphasis on consensual divorce a means of ending a marriage. The paper should demonstrate that consensual divorce is an easier and quicker process, because it is based on the free and consensual will of the marriage partners aimed at dissolving their marriage. Likewise, numerous advantages and reliefs of the procedure of consensual divorce for the marital partners as opposed to the divorce by means of filing a lawsuit will be indicated.

Keywords: divorce, consensual divorce, divorce causes, process for divorce.

EXTRAMARITAL UNION IN B&H FAMILY LAW WITH SPECIAL REFERENCE TO THE INHERITANCE POSITION OF THE SURVIVING EXTRAMARITAL UNION PARTNER

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ABSTRACT

The institute of the extramarital union in family law of Bosnia and Herzegovina will be examined in detail in the paper, with special emphasis to the position of the extramarital union partner as inheritor in the inheritance proceedings. The extramarital union is a union of a man and a woman of which neither is married, that has lasted for at least three years, or less if it produced a child by the participants. This is how the extramarital union is defined and determined in the Family law of the Federation and of Brčko District. In Family law of Republic Srpska the extramarital union is defined as being a union of a man and a woman (extramarital union partners) between which there are no marital obstacles and which has lasted at least two years or less if it had produced a child. Given this fact, the inheritance position of the extramarital union partner is differently regulated in B&H. The inheritance position of the extramarital union partners is significantly made more difficult by the need to prove the existence of the extramarital union.

In the results of the paper possible solution to this problem will be indicated in the form of the need to register the extramarital unions. Likewise, a thought will be given to the possibility of introducing certain rebuttable legal presumptions to benefit the extramarital union partners. In this way the position of the extramarital union partner in inheritance proceedings would be enhanced and the shifting of the burden of proof from the extramarital union partners to the inheritors disputing the existence of the extramarital union would be achieved.

Keywords: extramarital union, extramarital union partner, inheritance proceedings, inheritance by extramarital union partners.

THE RIGHT OF THE THIRD GENERATION - THE RIGHT TO A HEALTHY ENVIRONMENT

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ABSTRACT

Most modern constitutions contain provisions on the protection of the environment, so the Constitution of the Republic of Srpska in its Article 35 proclaims that man has the right to a healthy environment, and that everyone, in accordance with the law, is obliged to protect and improve it within his capabilities. Actors in the realization of this right are both public authorities and all citizens, all with the aim of ensuring the healthiest living conditions and constant improvement of its quality.

In this sense, we are all equally responsible for the quality of the environment in which we live, and therefore we must be equally aware of the consequences of our activities that are reflected on the environment, and persevere in our efforts to minimize our negative actions in terms of environmental pollution as much as possible.

That is why there is a need for greater engagement of the public authorities, raising the environmental awareness of citizens, as well as the allocation of larger budget funds for this purpose, in order to avoid the emergence of environmental problems.

In this way, we will ensure and enable a dignified life and health, both for the present and future generations.

Keywords: law, constitution, environment, ecology.

INVALID CONTRACTS IN THE LAW OF OBLIGATIONS OF THE REPUBLIC OF SRPSKA

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ABSTRACT

In order for an obligation contract to produce a legal effect, it is necessary to fulfill the conditions stipulated by the law for its creation and validity. The absence of any of these conditions renders the contract legally invalid. The Law on Obligations of the Republika Srpska mostly accepted the dual division of invalid legal transactions, and thus contracts, dividing them into void and relatively void, although one part of our legal theory adds to this division the category of the so-called non existent contracts. Long-standing judicial practice have not been sufficient to determine the precise difference between the conditions that must be met for a contract to be void or voidable.

The paper discusses the theoretical and practical aspects of the distinction between void and voidable contracts as well as their legal effects, the consequences arising from these differences as well as the assumptions for the conversion and convalidation of invalid contracts.

Keywords: contract invalidity, non-existent contracts, conversion, convalidation.

INFORMATION TECHNOLOGY AND MEDIA
INFORMACIONE TEHNOLOGIJE I MEDIJI

DEFENSE-IN-DEPTH OF MODERN RADIO SYSTEMS

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ABSTRACT

A purpose of this paper is to present the Defense-in-depth strategy for the protection of the information system, in this case of modern radio systems. It will explain the basic terms and systems of modern radio systems and how to implement them. Also, this paper will explain the basic concepts of radio communication systems, concepts of mobile radio and mobile GSM communication.

Keywords: Defense-in-depth, TETRA system, DMR, Private LTE and 5G.

MODELS OF SOFTWARE SYSTEMS DEVELOPMENT AND DESIGN

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ABSTRACT

The software development model involves the use of one or more traditional approaches to software development, agile methodologies, or a combination of both approaches to obtain the most efficient and effective software. The differences between these approaches are very significant and the paper will show when and which approach is best to use. Improperly used approaches to software development can greatly affect the quality of software. This paper aims to present the situation in the field of Software Systems Development Model and Software Design Model and better understanding of given areas. Modeling is the only way to visualize the design and check the requirements before starting the implementation. The most important thing is that the final product- software best meets the requirements and ideas of the customer. This is exactly what software development models and approaches allow. The second goal of the paper is to understand the importance of using software design models. The paper concludes with a conclusion that combines everything written and provides a better understanding of the importance of approaches and models for software development.

Keywords: Agile software development, Traditional software development, Use Case model, UML.

INFORMATION SECURITY IN THE FUNCTION OF CORPORATE MANAGEMENT OF INFORMATION TECHNOLOGIES

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ABSTRACT

It is known that the three basic elements of information security are protection against confidentiality, integrity and availability of information. The ISO/IEC 27001 standard helps companies protect information in any form. The new version of the ISO/IEC 27001:2022 standard follows new trends in IT and introduces new security controls. Information security is not the same in 2022 as it was in 2013, as many companies have embraced remote work and are using virtual applications.The standards of the ISI/IEC 27000 series represent answers to the increasing challenges of implementing information security measures in the company. The paper researched, analyzed and proposed the conceptual framework of information security in the function of corporate management of information resources, services and business values. The goal is to show that there is a strong connection between information security and company operations. The recommendations and guidelines of the COBIT 2019 management framework were used for information technology management. An important feature of the development and application of the COBIT framework is its flexibility and alignment with many relevant standards.

Keyword: international standard 27000 series, COBIT, corporate management of information technologies.

ARTIFICIAL INTELLIGENCE IN GRAPHIC DESIGN AND ART - SOME ETHICAL ASPECTS

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ABSTRACT

AI has undoubtedly already entered everyday human lives. It is present in the form of simple household appliances such as robotic vacuum cleaners, in car industry, computer games, in the manufacturing industry, film industry, education, and science. On websites, online stores and in various software and applications, AI has long been used in the form of chat bots. The effect of AI on human life and the idea that AI will completely replace the human is an increasingly common topic among scientists, as is the topic of this article.

In this article we will discuss the ethical issues that accompany AI and its use in various fields of human activity with an emphasis on design and art. We will prove that the application of artificial intelligence in graphic design and art can speed up the design process, improve the quality of the product, and reduce the cost of making final products. However, the article will advocate the position that artificial intelligence still serves only as an auxiliary tool for achieving better and faster results, but not as a substitute for the author's creativity.

Keywords: artificial intelligence, graphic design, art, ethics.

THE INTERNET OF THINGS IN HEALTHCARE INDUSTRY

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ABSTRACT

The Internet of Things (IoT) is continuously changing our lives, the way we live, work and communicate with other people and devices. The constant increasing the number of connected devices has resulted in the emergence of IoT technology in the health industry (health tourism, development of biotechnology, pharmaceuticals, medical equipment, virtual medicine, educational processes, telemedicine...) and in health institutions, health insurance funds, universities, tourist boards, transporters. .. The application of IoT in healthcare, also known as the Internet of Medical Things (IoMT), will improve the way healthcare is provided, making it more efficient, accessible and economical.

This paper presents various aspects of the development of mobile/smart applications that are used by patients themselves and their families, doctors in hospitals and insurance companies based on a set of previously collected data. However, in order to realize all the advantages of IoT technology in healthcare, it is necessary to keep in mind the challenges in achieving privacy, security and compatibility of data from different sources and between different devices.

Keywords: Internet of Things (IoT) devices, Internet of Medical Things (IoMT), smart aplications.

MAPPING THE RISK OF FOREST FIRES AT THE TERRITORY OF THE REPUBLIC OF SRPSKA PRESENTED THROUGH GIS

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ABSTRACT

The result of this work is a forest fire risk map on the territory of the Republic of Srpska. In this paper, a risk map was created using a geographic information system and the spatial distribution of risks on the territory of the Republic of Srpska was shown. All data used were digitized in raster and vector format and as such were used for further analysis using GIS. The paper describes the methodology by which the risk map was created and by which criteria the degree of risk was assigned. Forest fire risk maps are created for the purpose of planning the protection of forests and forest land from fire. In addition to the map, guidelines are also given on how to influence fire risk reduction, as well as how the map can be upgraded.

Keywords: wildfire, analysis, risk map, Republic of Srpska.

ENGINEERING, TECHNOLOGY AND MATERIALS
INŽENJERSTVO, TEHNOLOGIJE I MATERIJALI

EARLY DETECTION OF *PHYTOPHTHORA PLURIVORA* PATHOGEN INFECTION IN SWEET CHESTNUT LEAVES USING NONDESTRUCTIVE OPTICAL METHOD

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ABSTRACT

This study introduces a novel nondestructive optical method for detecting infections of the invasive *Phytophthora plurivora* pathogen in sweet chestnut (*Castanea sativa*) leaves, as well as monitoring plant health and stress. The proposed method utilizes spectrophotometric measurements to continuously monitor the optical transmission coefficients of plant leaves in real-time. To test the method, one group of plants was infected with the pathogen while another group was kept healthy in prolonged period. The infected group exhibited modified circadian rhythms of the optical transmission, which were indicative of the plants' stress. These findings demonstrate the ability of the proposed optical method to detect early stress in plants and to improve plant health assessment and management by providing an early indicator of plant stress and disease, thereby allowing for prompt intervention and treatment.

Keywords: Nondestructive optical method, leaf transmittance, plant health assessment, Phytophthora plurivora, sweet chestnut leaves.

MICROBIAL SURVIVAL ON DIFFERENT WOODEN SURFACES

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ABSTRACT

Wood has a long tradition as a natural material used by humans in the preparation, packaging and transport of food products. However, microbial adhesion and subsequent biofilm formation on wooden surfaces can be a source of contaminations that may seriously affect the safety and quality of foods. Hence this study aimed to assess the adhesion of bacteria *Escherichia coli* ATCC 35218, *Pseudomonas aeruginosa* ATCC 27853, *Staphylococcus aureus* ATCC 25923 and yeast *Pichia membranifaciens* ZIM 2417 on different types of wooden surfaces such as poplar (*Populus* sp.), Norway spruce (*Picea abies*), European beech (*Fagus sylvatica*), and to evaluate whether Belinka oil food contact and disinfectant P3-oxonia active 150 can interfere with adhesion to beech surfaces. The adhesion was determined by the number of colony-forming units per mm^2 of sample (CFU/mm^2). The results showed that bacteria cells noticeably had a higher ability to adhere to wood in comparison with yeast. Evaluation of adhesion revealed that the gram-negative bacteria *E. coli* ATCC 35218 and *P. aeruginosa* ATCC 27853 exhibited a much better ability for adherence to wooden surfaces than gram-positive bacteria *S. aureus* ATCC 25923. In addition, it should be pointed out that wood species like Norway spruce had antimicrobial effect against *S. aureus* ATCC 25923 and *P. membranifaciens* ZIM 2417 compared to poplar and European beech. Agents used in the food industry to maintain food contact surfaces such as the Belinka oil food

contact and disinfectant P3-oxonia active 150 also showed antimicrobial properties and consequently lower adhesion of microbes to beech surfaces.

Keywords: adhesion, bacteria, yeast, wooden surfaces.

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AMINO ACID PROFILES OF CEREALS

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ABSTRACT

Cereals play a key role to satisfy the global food demand of a growing population, especially in developing countries where cereal-based food production is the only predominant source of protein and energy. The quality of protein of cereals is based on their amino acid composition, especially on the content and availability of essential amino acids. The aim of this study was to analyze the chemical composition and amino acid profiles of different cereals, such as barley, maize, oat, rice, rye and wheat, that are important for nutritional purposes in human diet. The content of protein, moisture and crude fat in cereals varied significantly from 7.83 to 13.22 %, 11.45 to 13.80 %, and from 1.67 to 6.35 %, respectively. The obtained results showed that oat had the highest contents of crude protein (13.22 %), crude fat (6.35 %) and crude cellulose (9.42 %) compared to other cereals. Significant ($p < 0.05$) variation existed in the content of essential and nonessential amino acids among samples with the highest level in oat and wheat. Essential amino acids accounted for one-third of the total amino acids in the tested cereals. Glutamic acid was found to be the most abundant amino acid. Although lysine is the limiting amino acid for all cereals, the amount varies among species, being highest in oat and lowest in maize and rice. It could be concluded that the amino acid composition of oat is the most favorable among cereals due to its high protein content and the content of lysine which can be found in limited amounts in most of the cereals.

Keywords: cereals, amino acid profiles, chemical composition.

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CHEMICAL COMPOSITION AND ANTIFUNGAL ACTIVITY OF ROSEMARY ESSENTIAL OIL

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ABSTRACT

Essential oils are one of interesting natural products group that are used in different aspects of life due to their various biological activities. The aim of this study was to determine antifungal activity of *Rosmarinus officinalis* essential oil on selected isolates of mold. Eleven laboratory origin isolates of mold were selected for antifungal researches, such as: *Alternaria alternata, Aspegillus flavus, A. fumigatus, A. niger, A. versicolor, Cladosporium cladosporioides, Fusarium proliferatum, F. sporotrichioides, Penicillium aurantiogriseum, P. expansum* and *P. oxalicum*. Mold species are isolated from wheat, corn and buckwheat and flour of these cereals. The antifungal activity was determined using broth microdilution method.

By the application of GC/MS analysis of essential rosemary oil, 25 components was identified. The major components of the rosemary essential oil were 1,8- cineol (44.73%), camphor (11.90%), α-pinene (10.78%), β-pinene (7.07%), camphene (4.57%), trans-caryophyllene (4.56%), borneol (3.40%), α-terpineol (1.99%), p-cymene (1.89%), bornyl acetate (1.33%) and mircen (1.30%). Essential oil of *Rosmarinus officinalis* showed antifungal activity on all tested isolates in the MIC range of 0.8-14.2 µl/ml and MFC range of 3.5-454.5 µl/ml. The lowest MFC value was obtained for *C. cladosporioides* (3.5 µl/ml). The highest MFC value was obtained for *P. oxalicum* (454.5 µl/ml). Obtained results of the rosemary essential oil antifungal activities could be of significant value in the improvement of antifungal

protection–the damage reduction caused by molds activities in food and in the replacement of synthetic preservatives and fungicides with products of natural origin.

Keywords: essential oil, rosemary, antifungal activity, molds.

Acknowledgment

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COMPARATIVE ANALYSIS OF THE FAT AND FATTY ACID PROFILE OF DONKEY, MARE AND HUMAN MILK

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ABSTRACT

In recent years, the use of donkey milk (DM) and mare milk (MM) in human nutrition attracts more attention in the scientific community due to their similarities to human milk (HM) and specific nutritional properties. Raw DM and MM are traditionally used to treat various respiratory problems in the Balkan region. The aim of this work was to determine the fat content and fatty acid (FA) profile of DM and MM compare to those in HM. The total fat content was determined by the Gerber method, while the separation, identification and quantification of methyl esters of FA was performed by gas chromatography with a flame ionization detector (GC-FID). The results showed that DM and MM contained lower fat content (0.68% and 1.02%, respectively) than HM (3.42%). The DM had higher amounted of saturated fatty acids (46.72% of the total FA) compared to HM (37.40%) but similar to MM (49.30%). The share of polyunsaturated fatty acids was higher in DM (22.36%) and MM (21.54%) compared to HM (18.48%). The content of linoleic acid was similar in MM (13.15%) and HM (13.23%) but higher than that in DM (10.25%). DM and MM were characterized by higher content of α-linolenic acid (6.47% and 5.25%, respectively) than HM (1.94%). The favourable profile FA in DM and MM and their similarity to HM may contribute to increasing market demand for these types of milk.

Keywords: fat, fatty acids, donkey milk, mare milk, human milk.

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SENSORY ANALYSIS IN CULINARY APPROACHES TO SPINY-CHEEK CRAYFISH MEAT DISHES

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ABSTRACT

Encouraging scientists to collaborate with professional chefs paves the way for optimized food offerings as well as innovative products and services. The goal of the present study was to prepare different dishes from meat from freshwater invasive spiny-cheek crayfish (*Faxonius limosus*) and to test quality by sensory analysis. The sensory analysis of the crayfish meat was conducted by a sensory panel consisting of thirty professional chefs selected for their expertise in the sensory profiling of food. The meat samples were heat-treated in three different ways: by sautéing on butter (sample 1), poaching (sample 2) and frying in shallow fat (sample 3). The professional chefs were asked to suggest the use of each meat sample to prepare different types of dishes and the type of wine that would best match that type of meal. Answers were grouped into categories: salad, pasta, risotto, starter, soup, main course, white wine and red wine. According to the results, sample 1 would be appropriate for the preparation of risotto, and could be served equally with white and red wine. Sample 2 would be good for appetizers, salads and soups, while sample 3 would be excellent for preparation of pasta dishes. The results obtained in this study can be used for the development of new types of dishes using freshwater crayfish meat for gastronomic purposes.

Keywords: invasive spiny-cheek crayfish, sensory analysis, meat dishes, gastronomy.

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TRADITIONAL FOOD PRODUCTS WITH CERTIFICATION MARK – CONSUMER OPINION

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ABSTRACT

Traditional food is a significant element of the European cultural heritage, which quality and special characteristics could be guaranteed by some certification marks. As a result of Interreg-IPA CBC project Traditional and Standard Quality - TASQ (HUSRB/1602/41/0146),

Quality assurance system TASQ was developed and the certification mark Q was registered by Intellectual Property Office (IPO). In this study, consumer opinion regarding traditional food products with certification mark was explored through an online survey on a sample of 542 respondents in the Republic of Serbia. According to the obtain results 44.2% of the respondents prefer to purchase products with some quality marks, 39% purchase this kind of products from time to time, while 10.5% of respondents are not sure and only 6.3% do not care about products with certification marks. 68.1% of the respondents consider that certain kind of certification can improve placement on the market, 25.7% are not sure and only 6.1% of the respondents think that certification mark do not improve position of the products on the market. Another question, related to the quality system developed within implemented IPA project, was whether the participants are informed about TASQ. Toward obtained results, 77.8 of the respondents are not informed about TASQ and

22.2% of them know what TASQ represents, which means that further steps in TASQ promotion are required and necessary.

Keywords: traditional food products, certification marks, consumer survey.

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FATTY ACID COMPOSITION OF KRANJSKA SAUSAGE WITH CASINGS TREATED WITH PLANT EXTRACTS (*PRINUS SPINOSA* L.)

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ABSTRACT

This study aimed to evaluate the effectiveness of natural casing treatment with aqueous or ethanol extract of the blackthorn fruits (*Prunus spinosa L.*) on fatty acids content of vacuum-packed Kranjska sausages. Three experimental groups of sausages were produced: CS - a conventional sausage filled in a natural casing; WS - a sausage filled in a natural casing previously submerged in an aqueous blackthorn extract, and; ES - a sausage filled in a natural casing previously submerged in ethanol blackthorn extract. The sausages were produced in industrial conditions, vacuum packaged, and stored at 4°C for 60 days. The GC-FID analytical technique determined the qualitative and quantitative composition of fatty acids in the tested samples.

The predominant saturated fatty acids (SFA) were palmitic (C16:0) and stearic (C18:0), whose amounts ranged from 24.32% to 25.68% and 15.49% to 15.99%, respectively. The most represented monounsaturated fatty acid (MUFA) was oleic acid (C18:1), which ranged from 42.37% to 43.57%. Linoleic acid (C18:2c+t) was the dominating polyunsaturated fatty acid (PUFA), with 7.40% to 7.97%. Based on the obtained results, it can be concluded that treated casings had a statistically significant effect ($p<0.05$) on the content of the identified fatty acids in analyzed samples.

Keywords: Kranjska sausage, fatty acids, blackthorn fruits extract, natural casing.

PHYSICOCHEMICAL PROPERTIES OF CREAM CHEESE WITH THE ADDITION OF SELECTED SPICES

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ABSTRACT

The aim of this study was to examine the influence of the addition of selected spices on the physicochemical properties of fresh cream cheese. Six different samples of fresh cream cheese were produced in the milk processing plant (mini cheese factory). The first sample was marked as a control, without the addition of spices, and the other five were produced with the addition of different spices (oregano, basil, parsley, rosemary, and chives), in the amount of 1%. To define the quality of produced cheeses, the following analyzes were performed: determination of moisture, ash, protein, fat, chloride content, determination of acidity, pH measurement, water activity measurement. Based on the obtained results, it was determined that the addition of spices had a statistically significant ($p<0.05$) effect on the physicochemical properties of fresh cream cheese. Analyzing the results of physicochemical tests of produced samples of cream cheese, it was established that the values of all tested parameters were in accordance with the relevant legal regulations. Produced cheeses with the addition of selected spices meet the quality requirements and represent acceptable products for different groups of consumers.

Keywords: fresh cream cheese, spices, physicochemical properties.

Acknowledgment

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CHEMICAL PROPERTIES OF SHELLED AND UNSHELLED APRICOT SEEDS, PHYSICO-CHEMICAL AND ANTIOXIDATIVE CHARACTERIZATION OF OILS OBTAINED FROM THESE SEEDS

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ABSTRACT

Apricot (*Prunus armeniaca*) is a continental stone fruit that belongs to the *Rosaceae* family. The aim of this work was to determine the chemical properties of shelled and unshelled apricot seeds, as well as the physico-chemical and antioxidant characteristics of the oils obtained from these seeds. The content of moisture, crude ash, crude protein and crude fat in unshelled apricot seeds amounted 4.79%; 2.60%; 21.31% and 47.72%, respectively, and the values for these parameters were not significantly different in relation to shelled apricot seeds where the following values were obtained: 5.02%; 2.53%; 22.06%; 51.79%, respectively. The content of potassium, magnesium, phosphorus and calcium, expressed in mg/100g, in unshelled and shelled apricot seeds were 618.86 and 567.04; 259.83 and 248.06; 144.28 and 136.26; 118.04 and 117.10, respectively. Unshelled apricot seeds contained more different fatty acids compared to shelled apricot seeds. The content of the two plentiful fatty acids, oleic and linoleic, was approximately equal. The density, refractive index at 20˚C, iodine number and saponification number of the unshelled apricot seed oil amounted 0.91 g/mL, 1.4701, 98.92 g I_2/100g and 199.14 mg KOH/g, and were almost identical to the values obtained for the shelled seed oil. The acid level of unshelled apricot seed oil was 0.96 cm^3/100g, and it differed from that of unshelled apricot seed oil (1.47 cm^3/100g). Similar to the seed samples, the two most abundant fatty acids in oils were oleic (66.05% in unshelled seed oil and 68.37% in shelled seed oil) and linoleic (23.41% in unshelled seed oil and 23.65% in shelled seed oil). Both types of oils showed weak antioxidant activity with regard to DPPH

and ABTS radicals, with the fact that the oil of shelled apricot seeds (IC_{50}= 5757.58 µg/mL) showed slightly better antioxidant activity with regard to ABTS radical compared to unshelled apricot seed oil (IC_{50}=6793.61 µg/mL), while with regard to the DPPH radical, unshelled apricot seed oil (IC_{50}=43504.44 µg/mL) showed better antioxidant activity compared to shelled apricot seed oil (IC_{50}=45637.5 µg/mL).

Keywords: apricot, seed oil, physico-chemical characteristics, antioxidative activity.

HOW DOES AN IONIC LIQUID BASED ON SALICYLATE INFLUENCE THE SOLUBILITY AND INTERACTIONS OF CAFFEINE IN WATER SOLUTIONS?

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ABSTRACT

Caffeine is a naturally occurring stimulant found in drinks, supplements, pharmaceuticals, and cosmetic products. The solubility of caffeine plays a crucial role in their effectiveness and safety, as it affects their absorption and distribution in the body. To enhance solubility and prevent aggregation, biocompatible additives can be added. Additives based on salicylate ions are known to improve caffeine's solubility in water and reduce its bitter taste.

This study was conducted to analyze experimental data obtained from solubility, volumetric, viscosimetric measurements and computational simulations. The aim was to understand the hydration and aggregation properties of caffeine in a 0.1 mol·kg^{-1} 1-butyl-3-methylimidazolium salicylate aqueous solution. The results of the volumetric and viscosimetric measurements, and computational simulations suggest that 1-butyl-3-methylimidazolium salicylate also promotes the self-aggregation of caffeine in water, with increasing caffeine solubility in examined solutions.

Keywords: caffeine, salicylate, solubility, self-aggregation.

Acknowledgements

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INVESTIGATING THE ELECTROCHEMICAL PERFORMANCE AND CHANGES OF ANATASE TiO_2 NANOTUBE ARRAYS ELECTRODE IN IONIC LIQUID ELECTROLYTE

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ABSTRACT

The large-scale application of lithium-ion batteries (LIBs) is hindered by severe safety concerns when the cells are exposed to mechanical, thermal, or electrical abuse conditions. These safety issues are intrinsically related to their superior energy density, combined with the (present) utilization of highly volatile and flammable organic-solvent-based electrolytes. Improving the thermal stability of electrolytes and the safety of LIBs is one of the imperatives of our investigations.

Ionic liquids are investigated as potential optimal electrolytes for LIBs that can combine low flammability, good thermal stability and high electrical conductivity. That approach provides a great chance of developing highly functionalized, new electrolyte systems, which may overcome the afore-mentioned safety concerns related to conventional electrolytes, also offering enhanced mechanical, superior thermal performance, electrochemical performance and safety tolerance to both overcharge and thermal abuse.

In this work the 0.5 M solution of LiTFSI salt in ionic liquid 1,3-diethylimidazolium bis(trifluoromethylsulfonyl)imide, (C_2C_2imTFSI), was tested as electrolyte for LIBs by using robust anatase TiO_2 nanotube arrays (NTAs) electrode and in parallel the same electrolyte with functionalized additive 1-butylsulfonate-3-methylimidazole, (C_2C_2imSO_3). Mentioned additive is sulfonate-containing zwitterion, which both prevents decomposition of electrolyte and contributes to the

less voltage decrease with the number of cycles. The galvanostatic (GS) testing was performed at room temperature, at current rate 3C. Capacity of TiO_2 NTAs significantly increases with addition of sulfonate-containing zwitterion (additive).

Keywords: lithium-ion battery, electrolyte, flammability, thermal stability.

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EFFECT OF CHEMICAL COMPOSITION ON THE MICROSTRUCTURE, HARDNESS, AND ELECTRICAL CONDUCTIVITY PROFILES OF THE BI-GA-GE AND BI-GE-ZN ALLOYS

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ABSTRACT

The microstructure, hardness, and electrical conductivity of the alloys from ternary systems based on Bi and Ge have not been studied so far. This paper presents the results of experimental and analytical investigation of Bi-Ga-Ge and Bi-Ge-Zn ternary systems. Following experimental techniques were applied: optical microscopy (LOM), scanning electron microscopy (SEM) with energy dispersive spectrometry (EDS), X-ray diffractometric analysis (XRD), Brinell hardness measurements and electrical conductivity measurements. Among the analytical methods, the Calphad method and the software Pandat ver. 8.1 were used. In all investigated ternary systems an isothermal section at 25 °C was selected for experimental testing. Based on the optimized thermodynamic parameters for the constitutive binary systems, the calculation was performed. The experimentally obtained results were compared with the results of thermodynamic calculations and good agreement was noticed. Also, in two tested systems hardness and electrical conductivity were measured and using appropriate mathematical models these properties were guided in the entire range of the composition. The obtained results include determination of isothermal sections, identification of co-existing phases, electrical conductivity and hardness measurements and development of mathematical models for prediction of electrical conductivity and hardness.

Keywords: Bi-Ga-Ge; Bi-Ge-Zn; mechanical and electrical properties; mathematical model.

MECHANICAL AND ELECTRICAL PROPERTIES OF THE TERNARY BI-CU-GE ALLOYS

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ABSTRACT

In this study presents the results of experimental and analytical testing microstructure, hardness and electrical properties of the selected ternary Bi-Cu-Ge system. In the experimental part of the study, alloys of selected compositions were prepared and then examined using scanning electron microscopy (SEM) and energy dispersive spectrometry (EDS), X-ray powder diffraction (XRD), hardness measurements by Brinell method and electrical conductivity measurements. The equilibrium phase diagram of the Bi-Cu-Ge ternary system is calculated using the Calphad method and the corresponding thermodynamic program (Pandat ver. 8.1). The results include calculated characteristic isothermal sections structural characteristics, phase composition, mechanical properties and electrical conductivity for ternary Bi-Cu-Ge system. Isothermal section of the ternary Bi-Cu-Ge system at 25 °C have been extrapolated using optimized thermodynamic parameters from literature. Experimentally obtained results were compared with the results of thermodynamic calculation of phase diagrams. Good overall agreement between experimental and calculated values was obtained. Hardness and electrical conductivity of selected alloys were measured and by using appropriated mathematical model these properties were predicted in the whole composition range.

Keywords: Bi-Cu-Ge system; experimental test; isothermal sections; hardness measurement, electrical conductivity measurement.

INVESTIGATION OF MECHANICAL AND MICROSTRUCTURES OF EUTECTIC WELDED AND BRAZE WELDING APPLICATION IN AL-CU PIPE JOINTS

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ABSTRACT

One of the most important factors in cooling systems is ensuring tightness. For this, it is necessary to form strong aluminium copper pipe connections. These connections working under vibration should not leak during long-term use. In this study, aluminium and copper pipes joined by eutectic welding and brazing method were investigated. Tensile test, impermeability and bursting tests were applied to all samples. Microstructures at the junction interfaces were investigated under scanning electron microscopy (SEM). As a result of the experimental studies, eutectic welding and brazing connections were compared. Although the eutectic weld joint length is 50% shorter than the brazed joint, the tensile test gave approximately the same value of 22 N/mm2. In the blast tests, on the other hand, the eutectic source showed 16.67% higher pressure resistance.

Keywords: Aluminum tube, Copper tube, Cooling system, Brazing, Eutectic bond, Sealing.

INVESTIGATION OF STATIC AND DYNAMIC STRENGTH OF AIR SUSPENSION BELLOWS IN HEAVY VEHICLES

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ABSTRACT

Air suspension bellows is a rubber-based polymer material that needs to be used in heavy-duty vehicles. The service life of the rubber and court fabric used as the bellows material changes due to the process. While premature damage to the bellows increases the risk of accidents, frequent replacements cause an increase in costs. In this study, improvement studies based on the court fabric and the process were carried out. At the end of the study, two types of air bellows materials passed static tests. These tests are; TGA, DSC, DMA, FTIR tests for pre-cooking rubber mixture; for court cloth, elongation, z and s twist, adhesion strength, court thickness. Tensile test, hardness and impermeability tests were applied to the samples after the vulcanization process. With the improvements made, the mechanical tests have been confirmed. Blasting and fatigue tests were carried out for the life of the bellows. The mold firing temperature was reduced from 185°C to 180°C, the time was reduced from 415 seconds to 385 seconds, and it was determined that the product life of the bellows increased by 15% at 12 bar constant pressure.

Keywords: Air suspension bellows, Rubber, Court cloth, Bellows bursting test, Fatigue test.

QUALITY TESTING OF SODIUM BICARBONATE

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ABSTRACT

Sodium bicarbonate ($NaHCO_3$), also known as baking soda, is widely used in different branches of industry (chemical, food, pharmaceutical, cosmetic, etc.), but also in the household. When talking about the use of baking soda in the household, one of the frequent questions is whether it contains aluminium? Therefore, the aim of this work is to examine the quality of commercially available baking soda products.

Samples used for analysing the quality of products are different commercial products found in marketplaces and pharmacies in Banja Luka, and one sample obtained directly from the soda ash factory. In this paper the products were tested for the concentration of $NaHCO_3$, chlorides, ammonium ion and aluminium, in accordance with standard methods.

The results show that the mass fraction of $NaHCO_3$ for all tested samples is very high (99.30%–99.99%). The tested concentrations of chloride and ammonium ions also show slight deviations in the tested samples, and the obtained values range from 0.00%–0.05%. The presence of aluminium was found in all tested samples in traces, and the obtained values range from 0.0025%-0.0050%.

Based on the obtained results, it can be concluded that all tested samples of baking soda from the domestic market are of extremely high purity, while impurities are present in very low concentrations.

Keywords: sodium bicarbonate, commercial product, quality, impurities.

MULTILAYER PERCEPTRON CLASSIFICATION MODEL FOR DETECTING EMOTIONAL DISTRESS IN BREAST CANCER PATIENTS

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ABSTRACT

Breast cancer is one of the most common malignancy, and one of the leading cause of cancer-related death among women. This research aimed to explain emotional distress based on self-empowerment skills and interpersonal interactions in breast cancer patients using the explainable multilayer perceptron classification model. The participants in this research were a sample of 735 patients age ranged from 19-80 with breast cancer from Tajrish Hospital in Tehran in 2022 who were selected by convenience sampling through online platforms. The survey assessments included demographic characteristics (age and job, marital status and educational level), emotional distress, self-empowerment skills, interpersonal interactions, and family care.

The data were analyzed using the Multilayer Perceptron Classification Model. The input layer includes age and job, marital status and educational level, self-empowerment skills, interpersonal interactions, and family care) and the output layer (target feature) includes emotional distress divided into low and high groups using a mean split. The results indicated that the accuracy of the classification in the training and test samples was 75.6% and 73.5% respectively. The AUC of 0.812 in the models was near to 1 indicating an excellent fit. Interpersonal interactions, self-empowerment, family care, age, having job, educational level and marital status were the most important effects in explaining the classification of emotional distress.

Keywords: breast cancer, emotional distress, multilayer perceptron, self-empowerment skills, interpersonal interactions.

VANILLIN-BASED PYRIDO-DIPYRIMIDINES: SYNTHESIS AND ANTIOXIDANT ACTIVITY

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ABSTRACT

Introduction: The synthesis of pyrido-dipyrimidines by one-pot heterocyclization of thiobarbituric acid, vanillic aldehydes, and amines has been performed in water. Our synthetic method displays several benefits such as the use of a green medium and various substrates and yields up to 99%. Pyridopyrimidine molecule is a notable pharmacophore in drug design due to its various pharmacological actions including anticancer, antioxidant, analgesic, anti-inflammatory, and antimicrobial activity. In the light of the studies, we synthesized vanillin-based pyrido-dipyrimidines and investigated their antioxidant activity.

Methods The antioxidant activity of investigated compounds was determined by the ABTS radical-scavenging assay. In addition to ABTS assay, DPPH test was performed to study antioxidant activity of most potent compounds.

Results The antioxidant activity of selected compounds was further evaluated by determination of the IC_{50} values. All investigated compounds exhibited remarkable antioxidant potential. Namely, analysed compounds exhibited excellent antioxidant activity (the inhibition was up to 99%), three molecules expressed good ability to scavenge the $ABTS^{\bullet+}$ radical cation while all tested compounds showed very good antioxidant properties in comparison with DPPH radical.

Conclusions Newly synthesized pyrido-dipyrimidines showed very good radical-scavenging potential that leads to the fact that they can be further investigated for *in vivo* antioxidant activity.

Keywords: pyrido-dipyrimidines, synthesis, radical-scavenging.

REDUCTION OF FORMALDEHYDE EMISSION IN MODIFIED UF RESINS BASED ON BENTONITE AND OMMT

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ABSTRACT

Urea-formaldehyde resins (UF) are adhesives that can cause pollution in apartments and other indoor spaces due to the emission of free formaldehyde (FA) from wooden panels. This problem can be solved in several ways. One way is to add a "catcher" free FA. For the purposes of this work, two resins with "catchers" of free FA from the smectite group were synthesized, under the same conditions. The first UF resin was modified with bentonite (UFB), while montmorillonite K10 modified with hexadecyltrimethylammonium bromide (OMMT) was added to the second UF resin (UFOMMT). The specific surface (SP) was determined using the Sears method (SP bentonite = 19.9 m^2/g, SP OMMT = 13.5 m^2/g). Cation exchange capacity (CEC) was also determined for bentonite in the amount of 0.68 mol/kg, while for OMMT it was 0.02 mol/kg. The results show that the content of free FA in the UFB resin is 0.18%, and the released FA is 4.8% (determined by the bisulfite method) and is higher than that of the UFOMMT resin (free FA is 0.12%, and released FA is 0, 96%). The aim of this paper is to compare two FA "catchers" that belong to the same group of clay-smectites, one of which, K10, is organically modified. The obtained results show that organic modification of K10 results in a more efficient "catcher" of free and released FA from UF resin.

Keywords: urea-formaldehyde resin, bentonite, montmorillonite K10, free and released formaldehyde.

CA-BIOCHAR AS METHYLENE BLUE BIOSORBENT

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ABSTRACT

In this research, Ca-biochar derived from spent mushroom substrate was prepared using hydrothermal carbonization and pyrolysis at 180 °C and 500 °C, respectively. The structural characteristics and surface analysis of the synthesis materials were characterized by Fourier transform infrared (FTIR) and scanning electron microscope (SEM). Its adsorption performance was investigated through the removal of methylene blue using batch adsorption experiments. The obtained results suggested that Ca-biochar are highly effective adsorbent of methylene blue with reached maximum capacities of 4.121 mg g^{-1} and 4.196 mg g^{-1} at temperatures 295.15 and 300.15, respectively. The kinetic study demonstrates the removal process using Ca-biochar pseudo-second-order kinetics. Overall, the spent mushroom substrate has the potential as an efficient sorbent of methylene blue, hence contributing to a circular economy and waste minimization in the mushroom industry.

Keywords: waste biomass, hydrothermal carbonization, pyrolysis, biochar, methylene blue.

FABRICATION OF BIORESOURCE - DERIVED FUNCTIONAL NANOMATERIALS

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ABSTRACT

The actual price fluctuation of petroleum combined with ecological and environmental issues led the industrial attention to develop and design more sustainable alternatives. The use of biodegradable polymers from renewable resources in polymer manufacturing, food packaging and for medical application is becoming a favorable option over petroleum-based plastics. Among all biopolymers, biopolyesters Poly Lactic Acid (PLA) and Polyhidroxyalkanoates (PHAs) are considered as the most commercially promising bioplastics. PLA is a biopolyester produced by polymerization of D-, L- lactic acids originated through fermentation of simple sugars from agricultural sources (corn, potato, sugar cane, sugar beet, etc.). PHA is a generic designation for biopolyesters produced by controlled microbial fermentation in the presence of an abundant source of sugars or lipids. The main objective of this work is to develop flexible PLA/PHB thin nanomaterials for sustainable food packaging applications by means of electrospinning technique. Since PHAs posses low resistance to thermal degradation with melting temperatures close to degradation narrowing the processing window thus electrospinning technique reduce energy consumption and avoid thermal degradation during processing. A complete morphological, structural and thermal characterization of the developed materials was conducted at the same time.

Keywords: nanofibers, food packaging, electrospinning, biopolymers.

CHARACTERISTICS OF EDIBLE FILMS BASED ON SUGAR BEET POLYSACCHARIDES

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ABSTRACT

In order to achieve eco-efficiency, great attention is paid for finding alternatives to conventional petrochemical materials and their replacement with raw materials from renewable sources, where polysaccharides, thanks to their chemical structure and functional properties, are recognized as materials of exceptional potential. The use of these materials reduces the problem of generating large amount of packaging waste, with biomass and agro-industrial waste being favored as raw materials for production. The main objective of our research is the use of biopolymers (pectin) from industrial waste to develop edible films. The films are prepared through solution casting method from water solutions and their potential as biobased, biodegradable packaging material is evaluated along with their structural, thermal and barrier characterization.

Keywords: edible films, food packaging, polysaccharides.

RELATIONSHIPS BETWEEN THE STRUCTURE AND MECHANICAL PROPERTIES OF POLYETHYLENE BLOWN FILMS

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ABSTRACT

The production of polyethylene blown films, which are used for the production of packaging, such as different types of bags and pouches, is a very complex process. With this procedure, the molten plastic mass is extruded through a ring tool and forms a thick-walled cylinder. The still heated and softened cylinder expands by blowing air into a hollow cylinder of a certain diameter and wall thickness.

The quality of the film is affected by adjusting and matching the height of the cooling line, the blowing ratio, the working speed and the capacity of the extruder. The quality of the film can also be affected by add of additives in the extrusion process. In this way, the material gets the desired color, firmness, elasticity, static electricity is eliminated, and it is possible to influence other properties as well.

Commercially available PELD, PEHD, recycled PE material that was not used for original purposes (Post Industrial Recycled Materials) and additives were used for the production of films. By mixing fresh polyethylene, additives and recycled polyethylene in different ratios, products with different mechanical characteristics are obtained.

Keywords: blown film extrusion, mechanical properties, polyethylene.

PCM APPLICATION IN LIGHT CONSTRUCTION BUILDINGS IN VARIOUS CLIMATES

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ABSTRACT

Incorporating phase change materials (PCM) into building structures as passive latent heat thermal energy storage technologies offers a potential solution for reducing energy demand and regulating thermal comfort in occupied buildings. Integrating PCM into lightweight walls can improve their thermal performance by increasing building heat capacity and decreasing energy consumption. The effects of phase change materials (PCMs) added to the thermal envelope of lightweight residential containers on building thermal comfort are investigated in this study. The simulations were run for the summer period because it is difficult to achieve thermal comfort without using a lot of energy at that time. Thermal comfort is highly dependent on both, climatic conditions and the materials used to construct the building's thermal envelope, and the simulation was performed for weather conditions in three different geographic locations using TRNSYS simulation software. The paper examines the effects of PCM on indoor air temperature, specifically on reduction of maximum air temperature and temperature fluctuations.

Keywords: Building, PCM, Phase-change material, Thermal comfort, TRNSYS.

THE POSSIBILITY OF USING POLYMER-BASED PHASE CHANGE MATERIALS FOR THERMAL ENERGY STORAGE

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ABSTRACT

Phase change materials (PCM) are attractive energy storage technologies due to their high energy storage density and the ability to reversible absorb and release thermal energy at a nearly constant temperature. Polymers and polymer-based eutectic mixtures are promising PCMs. This study aims to investigate heat properties (melting, Tm, freezing, Tf, temperature, melting enthalpy and thermal conductivity) of potential PCMs based on polyethylene glycol polymer (PEG2000). We prepared following two and three components materials: PEG2000 : ethylene glycol (5:6): PEG2000 : PPG 400 (1:5); PEG2000 : PPG400: Choline chloride (2:2:15); PEG2000 : Choline chloride : ethylene glycol (4:3.6:3); PEG2000 : Glyoxal (5:2). The prepared three components material belong to deep eutectic solvents. Tm of the prepared materials are lower compared to pure PEG2000 (Tm = 57 ºC) e.g. Tm of PEG2000 : PPG400: Choline chloride is 43 ºC. The determined melting enthalpies are also lower for prepared materials compared to PEG2000. This decrease is lower for eutectic mixture such as PEG2000: Choline chloride: ethylene glycol. We can conclude based on the obtained result that eutectic mixtures based on polymers are promising PCMs.

Keywords: deep eutectic solvents, phase change materials, polymers, melting temperature, enthalpy.

DISTRIBUTION OF MINIMUM MAIN NORMAL STRESS IN UNIAXIAL TENSION OF PLATE WITH CIRCULAR OPENING

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ABSTRACT

The growth of production is largely related to the increase in the volume of scientific and technical information used in the process of constructing. The collection, processing, transmission and analysis of technical information can greatly affect the process of constructing. By having such information, constructors come up with ideas more easily and carry out processes of constructing more easily. In the process of constructing, constructors perform various calculations and analyses. Analysis of the state of stress is one of the main analyzes in the process of constructing of machine parts. Therefore, the aim of this paper was to analyze the distribution of the minimum main normal stress during axial tension of isotropic rectangular plates with a central circular opening. For this analysis, the finite element method (FEM) and the ANSYS software package were used, and steel as one of the most well-known isotropic materials was used for the plate material.

Keywords: circular opening, minimum main normal stress, rectangular plate, ANSYS software package.

STRESS ANALYSIS OF GEAR SHIFT FORK WITH MASS OPTIMIZATION

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ABSTRACT

This study focuses on stress analysis and optimization of a gear shift fork. The main function of the gear shift fork is to enable proper engagement and disengagement of the required gear to achieve a specific transmission ratio. The aim of this study is to create a new optimized design of the fork and perform an analysis. Using Autodesk Inventor 2023 software, a 3D model of the fork is created, a finite element mesh is generated, and a static analysis of the old and new model is performed under identical constraints and loads. Using the Shape Generator option within Autodesk Inventor software, optimization which lead to a reduction in the mass of the part by 23% is performed. However, the analysis results show that the maximum Von Mises stress increases in the optimized model.

Keywords: analysis, stress, gear shift fork, optimization, Autodesk Inventor

PHYSICAL AND CHEMICAL OF WASTE VEHICLE TIRES, HOT ASPHALT EFFECT ON PROPERTIES

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ABSTRACT

In today's world, with the increasing population density, consumption habits are also changing and increasing rapidly in proportion to the population. The development of the industry, the transportation of products produced together, the increase in the rate of individual vehicle ownership have also increased the rate of vehicle tire usage significantly.

This situation has led to the development of new environmental problems. Developing environmental problems have pushed countries to seek disposal of waste tires. In this study, it was used as an additive to hot asphalt as a disposal method of waste tires. The effect of waste tire on the physical and chemical properties of hot asphalt was investigated. Waste vehicle tires were granulated based on powder metallurgy principles with the help of water jet and a homogeneous mixture was provided with hot asphalt at 160 °C. Asphalt samples mixed with 2%, 4%, 6% and 8% rubber powder were prepared and subjected to Marshall test. The Marshall test results of the control sample obtained from hot asphalt without additives were compared. The waste tire ratio of the sample that provides the optimum value improvement was determined as 8%. Then, Indirect Tensile Strength Test, Bitumen Filled-Void Ratio Test, Breaking Energy Test, Loading Test, Tire Track Tests were applied to this sample. As a result, it was concluded that 8% waste tire additive had a positive effect on the physical and chemical properties of hot asphalt.

Keywords: hot asphalt, waste tire, disposal, waste management.

THE USE OF EGG SHELL, CHICKEN FEATHERS, MARBLE POWDER AS CONCRETE ADMIXTURE AND INVESTIGATION EFFECTS

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ABSTRACT

Food industry waste has a great potential for use in terms of prevalence, accessibility and quantity. In this research, the effects of eggshells on concrete by substitution of cement were investigated. In addition, the results of using chicken feathers together with egg shells as fiber reinforcement material were also examined. For the comprehensive evaluation of the effects of eggshell, marble dust, which is a waste of limestone and marble industry widely used in the cement industry, was also used as an additive. In this context, an additive-free cement was prepared under laboratory conditions and 12 cement samples with additives were prepared by substituting all additives to this cement in different proportions. Physical, chemical and mechanical tests of these samples were carried out. According to the test results, conformity assessment of all samples according to the cement standard was carried out separately. It has also been determined that CEM I 42.5 R Portland cement can be produced and used at higher rates by substituting up to 10% of ground eggshell. Cement produced with eggshell has been found to increase the early strength of concrete. In addition, it was determined that the setting time of the concrete was shortened if chicken feathers were added to the cement together with the egg shell.

Keywords: cement, concrete, eggshell, chicken feather, marble powder, limestone additive.

REDUCTIVE REMOVAL OF HEXAVALENT CHROMIUM IN AQUEOUS SOLUTION BY MAGNETIC AMINO-FUNCTIONALIZED POLYMER NANOCOMPOSITE

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ABSTRACT

The contamination of water with chromium is a global issue that is especially severe in developing countries with intensive mining and heavy industry (South Africa, Pakistan, and India) [1,2]. Trivalent Cr(III) and hexavalent Cr(VI) are the most common forms found in effluent water. Whereas trivalent chromium is a micronutrient (25–35 g/day) involved in the metabolism of lipids and carbohydrates [3,4], hexavalent chromium is exceedingly toxic, teratogenic, and mutagenic. Particularly concerning are its high solubility in water, mobility in detritus, and potential for bioaccumulation in living tissues. Due to these factors, hexavalent chromium has been the subject of numerous studies, especially its removal from effluent [5,6]. These studies have demonstrated that sorption is a highly effective and relatively simple technique for chromium removal from wastewater. In terms of this, magnetic heavy metals nanosorbents derived from inorganic compounds and polymers [7-9] are incredibly intriguing, because they could have been readily extracted from the mixture using an external magnetic field. The sorption investigation of hexavalent chromium in aqueous solutions on the magnetic amino-functionalized polymer nanocomposite based on glycidyl methacrylate, m-PGMA revealed its highly selectivity and efficiency. [10,11]. The binding mechanism of

hexavalent chromium ions onto m-PGMA was investigated using kinetic, equilibrium, and thermodynamic experiments as well as molecular modeling techniques (theoretical quantum-chemical calculations) [12-15]. It was observed that the process occurs in two phases. In the first phase, electrostatic interactions attract hexavalent chromium ions to the surface of the sorbent via the active sites (amino and APTMS groups). Cr(VI) is then converted to Cr(III) ions, which can coordinate with amino or hydroxyl groups on the surface of the sorbent [16]. The trivalent chromium ions that persist in the solution or on the surface of the sorbent are less hazardous than the initial hexavalent form. The application of m-PGMA sorbent enables the transformation of the toxic form of chromium into a less hazardous form, which is significant due to the possibility of sorbent regeneration and the subsequent processing of the solution following sorption.

Keywords: hexavalent chromium, sorption, magnetic polymer nanocomposite.

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THE POSSIBILITY OF PRODUCING THE 3D PRINTING FILAMENT FROM WASTE POLYMER MATERIALS

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ABSTRACT

Polymers are the most commonly used materials for 3D printing, mainly produced in the shape of filament, or as a powder and liquid resin as well. The 3D printing market is a well growing sector, which causes waste, such as failed 3D printed objects and support structures. Also, many 3D print objects are used as disposable prototypes. This waste can be recycled, by shredding and extruding in order to virgin produce 3D filaments. But multiple extrusion of polymer materials can have a huge influence on molecular weight, viscosity, and their mechanical properties. The filaments can be also produced by reuse of waste materials not necessarily originally used for 3D printing. There are still many challenges for reusing and recycling the plastic waste into a new material with desirable properties. The properties of produced filament are essential to generate any 3D part, which needs to be durable and resistant. Critical points in extruding filaments are diameter consistency which is essential to ensure printability and uniformity in the 3D printing. Morphological, thermal, rheological and mechanical properties of the filaments can be changed in different ways, such as combining recycled and virgin materials in appropriate ration, adding other polymers, additives that can increase the homogeneity of the composite or producing coextruded filaments. Reprocessing and recyclability of filaments for 3D printers can show economic and environmental

benefits. With the appropriate structuring of the 3D printing filament, there is the possibility to develop innovative green filament produced from virgin or recycled materials.

Keywords: 3D printing, polymer filament, properties, circular economy, waste valorization.

1D TEMPERATURE TOMOGRAPHY OF A FLAME, BASED ON VIS-NIR SPECTROMETRY

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ABSTRACT

This study presents a novel method for the reconstruction of the temperature distribution inside firebox of a coal power plant. A set of experimental measurements was performed on the premises of a large commercial coal power plant. The distribution of the temperature has been reconstructed using the spectrometry measurements. Radiative heat transfer model was used to solve inverse problem by damped least-squares (Levenberg-Marquardt) method. This research offers experimental and measurement set up in power plant based on two spectrometers. Two probes were coupled to the two identical spectrometers via optical fiber cables. The temperature field distribution was measured in one dimension, along the line of sight between two horizontally opposed optical probes. The advantage of this method is in its simplicity and in addition, it enables the faster determination of temperature profile. The new method avoids the need for an insertion of cooled probes deep into the firebox. It also enables calculating of the average attenuation coefficient which is related to the concentration of particles in the flame. This method gives opportunity to be modified for determination of 2D and 3D temperature distributions.

Keywords: temperature measurement, temperature profile, spectrometry.

SCAVENGING DRAIN ANALYSIS (SDA) FROM TWO-STROKE DIESEL ENGINE - MOST USEFUL ANALYSIS

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ABSTRACT

One of major vessel operating expenses, where the prime mover is two-stroke engine, is related to cylinder oil consumption. In addition to mentioned ones, there are frequently generated expenses related to excessive wear which leads to damage and breakdown of engine pistons, rings and cylinder liners. Those are additionally increased as commercial lost time, purchasing of spare parts and repairs expenses.

It is very important to frequently monitor the wear trend inside the engine cylinder. Monitoring is possible with SDA analysis (scavenging drain analysis) of waste oil from the engine cylinder. If a sudden large amount of metal particles is detected during the analysis, it can be concluded that abnormal wear is present. It is important to react promptly, in order to mitigate the undesirable consequences that can lead to problems escalation, and even to stop marine diesel engine. In this paper will be demonstrated SDA analysis from a low-speed two stroke marine diesel engine (MAN B&W 6S42MC7).

What sets the analyzed method apart from others is that it provides the most useful information to marine engineers who are in charge of proper engine operation and maintenance.

Keywords: sda, drain analysis, maintenance, diesel engine.

CREATION OF INFORMATION SYSTEM MODULE FOR MOTOR VEHICLE MAINTENANCE

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ABSTRACT

The information system for motor vehicle maintenance is very complex and contains a large number of processes, data flows, data stores and external objects. At the same time, a clear and detailed specification of the system requires that the method of abstraction be applied to the presentation of the system using DTP. This is achieved on the one hand by the hierarchical decomposition of the process, and on the other hand by a specific way of displaying the structure and content of data flows and storage in the data dictionary of the structural analysis system, with possible hierarchical display of the structure of external objects, by creating modules.

Keywords: Process analysis. Maintenance of motor vehicles. Complex technical systems. Modules.

INFLUENCE OF PERSONAL VEHICLE DIAGNOSTICS ON RELIABILITY AND ENVIRONMENTAL PROTECTION

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ABSTRACT

Modern vehicles are equipped with systems that enable greater safety and comfort. Diagnostics in the vehicle enables the system to monitor itself and all peripheral components. It also detects and stores disturbances and interferences that are detected throughout the system. The requirements it should fulfill is continuous monitoring of all system characteristics, such as: physical inputs/outputs, functional behavior of the system and network configuration. Diagnostics, as an integral part of condition maintenance, should determine the technical condition of the constituent components with a certain accuracy at a certain moment in time. Determining the working condition of the constituent components is achieved by applying appropriate modern instruments with the aim of increasing the safety and reliability of vehicle users, as well as environmental protection.

Keywords: Diagnostics, Reliability, Security, Longevity.

PSYHOLOGY
PSIHOLOGIJA

THE RELATIONSHIP OF AUTHORITARIANITY AND VIRTUAL BEHAVIOR ON SOCIAL NETWORKS

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ABSTRACT

The main goal of this research was to check whether there is a statistically significant correlation between authoritarianism and virtual behavior on social networks, as well as whether there are differences in virtual behavior on social networks with regard to sociodemographic characteristics. A total of 242 respondents, 65 male and 177 female respondents participated in this study. The age of the respondents ranged between 16 and 66 years and the average age was 33 years. The instruments used in the research are: a questionnaire for collecting data on sociodemographic characteristics of respondents designed for this research, Autoritarnost- questionnaire (for testing authoritarianism) i VPDM-questionnaire (a questionnaire for testing virtual behavior on social networks). The research results showed that there is a statistically significant connection between authoritarianism and two forms of virtual behavior on social networks, namely virtual alienation and negative attitude towards social networks. Also, significant differences were found in virtual behavior on social networks with regard to gender, age and education.

Keywords: authoritarianism, virtual behavior, social networks, correlation, differences.

EMOTIONAL INTELLIGENCE IN THE CONTEXT OF JOB SATISFACTION

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ABSTRACT

Emotional intelligence is significant for all spheres of human life. Therefore, it has also found its practical application in the company's business operations. In recent times, the importance of emotional intelligence in organizations has been recognized as a key factor of successful work of the organization in the sense that it influences the individual to initiate and continue with activities despite obstacles, to cope with dissatisfaction successfully, manages his way of thinking, empathizes with others and contributes to reducing the ambiguity of social interaction.

On the other hand, one of the most important tasks of any organization is to increase the efficiency of employees because this is how the organization achieves its goals. In order to achieve efficiency and attain organizational goals, it is not enough to have only highly motivated employees, but also their job satisfaction must be at a higher level. Numerous factors influence job satisfaction; both organizational such as job satisfaction itself, pleasant working conditions, coworkers, reward system, organizational structure and personal factors such as an employee characteristics and personality traits, the compatibility of personal traits and work, overall life satisfaction, the status in the organization, age and seniority.

The aim of this work is to examine whether there is a connection between the level of emotional intelligence of employees and job satisfaction, whether individuals with a higher level of emotional intelligence also have higher job satisfaction because both areas are of great importance for the successful functioning of the organization. The aim is also to determine whether there is a statistically significant difference in job satisfaction between employees of different age and years of employment. Employees in business entities from different activities from the Republic of Srpska

participated in the research. The data was collected using an emotional intelligence test as well as a job satisfaction questionnaire designed for the purpose of this research.

Keywords: emotional intelligence, job satisfaction, organizational behaviour.

REY–OSTERRIETH COMPLEX FIGURE TEST (ROCF): COMPARATIVE ANALYSIS OF APPLICATION ON RESPONDENT WITH AND WITHOUT A DIAGNOSIS

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ABSTRACT

Rey–Osterrieth complex figure test (ROCF) is used for research purposes to examine the development of visuo-perceptual organization, visual short-term and long-term memory, as well as executive functions. The aim of this paper is to present the results of research on the application of the ROCF test, and to interpret and compare two cases of application of the ROCF: on subjects from a healthy and psychopathological population. Respondents were selected to be of the same age and gender. From the psychopathological population, a subject with a diagnosis of autistic spectrum was selected. The results confirmed the results of previous research. The healthy subject used a drawing strategy characteristic of people without neuropsychological difficulties, there were no deviations in drawing and sketching. The subject with autism, although functional, on the ROCF test had a severe decline in the ability to plan and organize, as well as the ability to remember relevant visual information, with the use of an inferior drawing strategy.

Keywords: Ray-Osterit complex figure test, research, autism.

CASE REPORT OF COGNITIVE-BEHAVIORAL THERAPY OF PANIC DISORDER IN COMORBIDITY WITH HYPOCHONDRIA

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ABSTRACT

Cognitive-behavioral therapy is a science-based principle that research shows is effective for a wide range of problems. The therapist and client work together to identify and understand the problem in terms of the relationship between thoughts, feelings and behavior. The approach is usually focused on the „here and now“ difficulties. The problem to be approached must be precisely defined, as well as the goal to be worked on during the therapy. The development of this approach went through three waves: the first represented behavioral therapies based on classical and operant conditioning, the second were cognitive therapies based on changing cognitions and social learning, and the third were "mindfulness" therapies based on acceptance and full awareness.

This paper presents a case of panic disorder in a 22-year-old girl, with the use of cognitive-behavioral therapy (CBT), especially the third wave (ACT). The paper describes the plan and course of treatment, with appropriate techniques. An essential characteristic of panic disorder is repeated attacks of severe anxiety that are not limited to a particular situation or set of circumstances and are therefore unpredictable. Panic anxiety refers to situations where there is no objective danger. Comorbidity refers to the psychiatric disorders in the same person, regardless of the time and relationship between the occurrence of these disorders.The treatment lasted three and a half months, divided into thirteen sessions. All set goals were achieved, and the client reports on subjective improvement.

The assessment of the effect of the implemented cognitive-behavioral treatment was done on the basis of clinical evaluation, as well as standard questionnaires for psychological assessment, namely: AAQII, SGSE, CORE, YSQ, SCL-90 and UPH.

Keywords: cognitive-behavioral psychotherapy (CBT), panic disorder, case report, comorbidity, hypochondria.

COGNITIVE-BEHAVIORAL TREATMENT OF SOCIAL ANXIETY: A CASE STUDY

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ABSTRACT

Cognitive-behavioral theory claims that an individual creates social anxiety to a certain extent by exaggerating the consequences of his failure and public performance in front of the audience (Labaš, 2021; according to Konig, Peulić, Matijević, 2018). Social anxiety or fear of public speaking is a form of anxiety and denotes a normal reaction, state of alertness and stimulation of awareness to danger (Labaš, 2021). This reaction to danger can cause vigilance, combativeness, withdrawal or flight, which on the one hand helps in overcoming difficulties, but on the other hand can be an extremely uncomfortable state. In this regard, it is most beneficial to change the perception and attitude towards social anxiety.

This paper presents cognitive-behavioral therapy in the treatment of social anxiety in a 19-year-old girl. The treatment lasted a month and a half, more precisely, five sessions were conducted. The therapy consisted of the following cognitive-behavioral techniques: alleviating the fear of public speaking through a change in perception and psychoeducation, practicing presentation skills, shifting focus, and the like. It is important to note that this is a client with extremely developed personal capacities and resources, therefore the treatment was completed relatively quickly, and the set initial goals were met.

The evaluation of the effect of the implemented cognitive-behavioral treatment was done on the basis of clinical evaluation, subjective reporting of the client as well as standard questionnaires for psychological assessment. The following questionnaires were used in this work: AAQII, SGSE, CORE, YSQ and SCL-90.

Keywords: cognitive-behavioral psychotherapy (CBT), social anxiety, public speaking, case study.

INTEGRAL CAUSAL PSYCHOTHERAPY

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ABSTRACT

Introduction: Modern psychotherapy faces a serious challenge: to treat patients in ever shorter periods and at the same time manage to eliminate the cause of the disease so that the symptom does not return. This article presents a short-term deep psychotherapeutic approach Integral Causal Psychotherapy (ICT) that offers a solution to this problem. The article presents the model of personality formation and functioning, the theory of psychotherapeutic changes, the methodology of work used in ICT.

Methods: We have used ICT since 2018 for 66 patients in individual therapy, as well as in work with groups. ICT diagnostics is based on the analysis of the influence of sociocultural factors on the formation and functioning of the personality. The therapy tools are represented by the complex application of psychodynamic psychotherapy, neuromodeling techniques and katathym imaginative psychotherapy.

Results: ICT makes it possible in a short-term mode to detect and eliminate the centers of problems rooted in mentally unprocessed experience and personality structure, and to harmonize personal structures in accordance with the nature of the Self. Therapeutic changes are permanent and sustainable.

Conclusion: ICT can be a good choice to treat depression, anxiety disorders, fears, burnout, chronic fatigue, low and unstable self-esteem, existential and identity crises, problems in interpersonal relationships and sexual sphere, and other psychological and psychosomatic problems.

Keywords: integral causal psychotherapy, personality, self.

ADOLESCENT SELF-HANDICAPPING AND DEPRESSION

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ABSTRACT

Self-handicapping is a significant problem today, and refers to the strategy that people use in situations where they are confronted with real or potentially threatening information to self-understanding. The threat to self-esteem, the expectation of failure in some activity, encourages the person to actively seek factors that may interfere with that activity and justify a potential failure. The negative ways of structuring and interpreting experiences, the events we find in self-handicapping strategies, are very often traits/characteristics of depression. Such student behaviors are evident in school, so the main research problem was to investigate the relationship between adolescents' self-handicapping and depression. The aim was to determine the manifestation of self-handicapping in relation to gender and age, as well as the possible relationship with adolescent depression, all in order to find strategies that would help adolescents to self-regulate behavior and improve their mental health. The study was conducted among 215 adolescents, ages 16 to 19 in Tuzla Canton. The study included 117 male (54.42%) and 98 (45.58%) female respondents. Self-handicapping and depression questionnaires were used. The results presented that adolescents use below-average self-handicapping strategies, no significant statistical difference was found regarding gender, while there was a significant difference regarding age in self-handicapping. A significant but low correlation between adolescent self-handicapping and depression was found. The results indicate that it is necessary to educate young people about the consequences of self-handicapping and point to strategies that could help them achieve their goals more effectively.

Keywords: self-handicapping, depression, adolescents.

PSYCHEDELIC DRUGS AND PSYCHOLOGY

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ABSTRACT

Scientific interest in psychedelic drugs has increased exponentially over the past decade. Just in the last few years, small controlled clinical trials examining the potential therapeutic utility of psilocybin-assisted therapy in patients suffering from anxiety, depression, and substance abuse have reported extremely positive outcomes. Hallucinogen has perhaps been most widely used in scientific literature and is the legal designation used to classify these substances in many countries. Unfortunately, it also is a misnomer because these compounds rarely evoke true hallucinations and do not normally impair reality testing. Furthermore, a wide range of psychoactive substances, including cannabinoids, dissociative anesthetics, anticholinergics, and entactogens such as MDMA, can produce “hallucinogenic” effects. Hence, LSD-like drugs are often referred to as classical hallucinogens or serotonergic hallucinogens in order to distinguish them from other drug classes.

Keywords: psychedelic drugs, LSD, MDMA, hallucinogen.

STRESS AND AUTOIMMUNE DISEASES

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ABSTRACT

The continuation of life depends on the ability of an organism to maintain a state of dynamic equilibrium or homeostasis. Homeostasis is constantly disturbed by entropic forces, the stressors: the state of threatened homeostasis is called stress. A complex set of behavioral and physical reactions the adaptive response is employed by the organism to reestablish balanced physiological conditions. In antiquity, Hippocrates regarded health as harmonious balance of the four key elements of life – water, fire, air, and earth – and defined states of imbalance among these elements as disease. He also described the adaptive response as the "healing power of nature." (Chrouses et al.)

The actual term stress was originally adopted from physics by Hans Selye. In physics, it describes the resistance of a body to applied pressure, following Hook's law of elasticity. An acting force may distort a body elastically in linear fashion or, if applied excessively in quality, quantity, or time, may produce nonlinear deformations. Similarly, stress may be a transient and time – limited responses of the organisms, whereas the physiological and behavioral defense mechanisms, rendering them inefficient or deleterious.

Unraveling the mechanisms and pathways that the immune system uses for communication between its various parts has proven to be fascinating and complicated endeavor that is far from completion. Studies of the structure and function of the immune system have produced information that can provide investigators with important lessons in psychoneuroimmunology. Indeed, education is an integral component of the function of the immune system; once the immune system has encountered an antigen, instructions are given so that the experience will be remembered.

Stress plays an important role in individual and species survival, but it also participates in the development and aging of every individual. The quality, intensity, and duration of stress are important in determining the positive or negative effects on the organism. There are two main condition of the stress system that led to pathology: an excessive and prolonged or a defective adaptive response to a stressor. In both cases, the dose – response relation between the potency of a stressor and the adaptive response of the organism is shifted to the left or right respectfully. There are pathological conditions of the stress system leading to disease and, vice versa, disease that alter the activity of the stress system in pathological fashion.

Keywords: stress, autoimmune diseases, pathology.

MEDICAL AND BIOMEDICAL SCIENCES
MEDICINSKE I BIOMEDICINSKE NAUKE

THE INFLUENCE OF METEOROLOGICAL FACTORS ON THE DEVELOPMENT OF SEVERE ACUTE EXACERATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A TIME-SERIES FROM NOVI SAD, SERBIA

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ABSTRACT

Introduction: Variable values of meteorological factors may influence the development of acute exacerbations of chronic obstructive pulmonary disease (AECOPD), but there are few studies available on this subject. This study's objective was to determine whether such effects are existent in patients residing in Novi Sad, Serbia.

Methods: In this time-series, the medical histories of 552 patients hospitalized at the Institute for Pulmonary Diseases of Vojvodina between 2017 and 2022 for severe AECOPD of non-infectious etiology were analyzed. For the entire period, data on the average daily values of air temperature, relative humidity, atmospheric pressure, and wind speed on the territory of Novi Sad were collected. For statistical analysis, a quasi-Poisson generalized linear model along with DLNM models were utilized.

Results: For each increase in atmospheric pressure of 5 mBar, the relative risk (RR) for the occurrence of AEHOBP hospitalization was 0.80 (95% CI 0.44–1.46); for an increase in temperature of 5°C, the RR was 1.09 (95% CI 0.94–1.27); for an increase in relative air humidity of 10%, the RR was 0.97 (95% CI 0.58–1.62); and for an increase in wind speed of 1 m/s, the RR was 1.06 (95% CI 0.51–2.21).

Individual and cumulative lag models, along with multi-predictor models, produced no statistically significant results as well.

Conclusions: In our sample, there was no correlation between meteorological factors and severe AECOPD. There is a need for additional research involving a greater number of respondents from various geographic regions.

Keywords: air temperature, relative humidity, atmospheric pressure, wind speed, acute exacerbations of chronic obstructive pulmonary disease.

DRUGS AND FATTY ACIDS COMPETITION FOR THE BINDING SITES IN HUMAN SERUM ALBUMIN

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ABSTRACT

Human serum albumin (HSA) is a highly abundant and extensively studied transport protein in human blood. It binds and transports a wide range of compounds, including fatty acids, heavy metal ions, metabolites, and nutrients. Binding with a double bond ligand enhances electron transport and electrical conductivity. HSA also displays catalytic activity and regulates osmotic pressure. Its unique structure allows interactions with diverse chemical and biochemical substances. HSA is utilized in medicine, pharmaceuticals, and environmental protection, and shows promise as a biosensor. In this study, molecular docking calculations were performed to investigate the competition between fatty acids and some drugs for the nine binding sites in HSA. A special interest was given to the influence of fatty acids on the number and positions of drug binding sites on HSA. Attention was focused on the binding energy of a ligand to HSA, as well as the interaction between ligand molecules and aminoacides in the binding site. The ability to transport drugs to specific receptors, enabling their unimpeded passage through membranes and biological barriers, has garnered increasing attention. HSA binds and transports medicinal substances, facilitating their storage and metabolism. This reduces the active concentration of drugs in the blood, improves their distribution, and extends their therapeutic effect.

Keywords: HSA, fatty acids, molecular docking, orthosteric binding.

ISOPROTERENOL STRUCTURE, ANTIOXIDATIVE PROPERTIES, AND INTERACTIONS WITH PROTEINS

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ABSTRACT

Isoprenaline (isoproterenol) is a non-selective β-adrenoreceptor agonist known for its therapeutic effects, which include increased heart rate and cardiac output, bronchodilation, and improved peripheral circulation. Apart from its primary functions in the nervous system and physiological regulation, isoproterenol exhibits antioxidant properties. This study employed a combination of experimental techniques (UV–vis, FTIR, and Raman spectroscopy) and theoretical calculation methods (molecular docking and DFT) to investigate the structural and functional properties of isoproterenol. The appropriate level of theory (M05-2X/6-311++G(d,p)) was determined by comparing experimental and theoretical bond lengths and angles.

The antioxidative activity of isoproterenol towards DPPH• was assessed using UV-VIS spectroscopy and further analyzed by DFT methods to elucidate the most probable antiradical mechanism. Compared to its natural analogs (epinephrine and norepinephrine), isoproterenol demonstrates energetically more stable orthosteric binding to the β-adrenergic receptor. Molecular analysis revealed that π-π contacts with amino acids and hydrogen bonding involving hydroxyl and amino groups play an important role in its binding.

This study enhances our understanding of the antioxidant properties of isoproterenol, providing insights into its potential relevance in oxidative stress-related conditions. Moreover, the structural findings contribute to the future development of novel therapeutic agents with enhanced antioxidant activity and pharmacological profiles.

Keywords: isoproterenol, spectroscopic techniques, molecular docking, antioxidant activity, orthosteric binding.

SYNERGY BETWEEN EXPERIMENTAL AND MOLECULAR DOCKING FOR IDENTIFYING NATURAL THERAPEUTIC COMPOUNDS AGAINST ALZHEIMER'S DISEASE

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ABSTRACT

Excessive hydrolysis of acetylcholine, a signaling molecule between neurons, by acetylcholinesterase (AChE) is crucial in the development of Alzheimer's disease. Modulation of AChE activity in the presence of the indigenous plant species from Montenegro extract leads to the inhibition of acetylcholine binding to AChE. The investigated plant extract contains several potential AChE inhibitors. To avoid lengthy and expensive experimental testing for each constituent of the extract, molecular docking calculations were performed. The total binding energies were monitored, and the interactions of individual compounds with AChE were analyzed. Compared to the acetylcholine, all active substances from the extract formed more stable adducts with both closed and open forms of AChE. Therefore, all investigated substances have the potential for competitive inhibition of acetylcholine binding to the active site in AChE. Considering their concentrations in the extract, catechin and gallic acid were selected for separate experimental docking, confirming the results of molecular docking calculations. Combining experimental and molecular docking techniques, experimental research volume and time were significantly reduced, as well as the quantity of chemicals used. Besides, the costs and time required to discover potential natural remedies for treating Alzheimer's disease were also decreased.

Keywords: acetylcholine esterase, molecular docking, competitive inhibition, Alzheimer's disease, natural remedies.

COMPETENCIES IN PUBLIC HEALTH

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ABSTRACT

The public health response to the COVID-19 pandemic, with the aim of reducing the consequences of the disease, required an urgent change of model and teaching content in the education of health professionals. Traditional models based on time-defined exposure to educational content have not shown appropriate outcomes. According to the World Health Organization (WHO), competency-based education is essential to the professional development of leaders in public health. The concept of competence defines the desired outcomes of education in the form of knowledge, skills, and attitudes, and competences are most often presented as a dynamic framework of these elements that are realized through the practice of a health professional. The application of specially created instruments for the assessment and development of competencies in public health, which include professional knowledge, professional skills, and attitudes for decision-making, crisis communication, and leadership, ensures the effective professional development of public health employees in accordance with the needs of the community.

Keywords: competences, competence frameworks, public health.

EDUCATION
OBRAZOVANJE

THE MODEL CHANGE IN THE UNIVERSITY EDUCATION PROGRAMS IN EASTERN HUNGARY

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ABSTRACT

As of 2021, a significant portion of Hungarian universities have been maintained and supervised by foundations, following the previous stage of state maintenance. The University of Debrecen, Hungary's second largest university also participated in the process dubbed "the model change." By introducing innovations into their model of operation, which had been unchanged for decades, these institutions are expected to be able to meet new challenges more successfully. One of the top priority areas of the current higher education strategy is to operate in the form of a public trust foundation performing a public service mission that provides a more competitive and flexible operating model. Among the universities that have undergone the model changing process, it is the UD that has the most sizable framework for funding provided for the performance of its public tasks, the use of which is overseen by the university and the foundation making strategic decisions. In my presentation, I will give an overview of the most important lessons we have learned at the University of Debrecen concerning our institution's participation in this recent model change.

Keywords: higher education, model change, education strategy, priority areas.

DIFFERENCES IN SELF-ASSESSMENTS OF TEACHER'S SPECIFIC COMPETENCIES ACCORDING TO TEACHER'S PROFESSIONAL EDUCATION AND WORK EXPERIENCE

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ABSTRACT

In theory, specific competencies are most often defined as systems of knowledge, skills, abilities and motivational dispositions, which ensure the successful realization of professional activities. Competencies for inclusive educational work are specific, because they represent an integrated construct of specific groups of teachers' abilities to: support the development of students' personalities and values of social inclusion; inclusive teaching and learning; creating an inclusive learning environment; communication and cooperation in inclusive working conditions and others. The quality of inclusive educational work is largely determined by the degree of development of the aforementioned abilities.

This article presents the results of empirical-non-experimental research, which was conducted on a sample of 761 teachers from 19 elementary schools in the Republic of Srpska, with the application of appropriate descriptive method instrumentation. In accordance with the set goal of the research "Identification of differences in self-assessments of teachers' specific competences according to professional education and work experience of teachers" it was identified that among the categories of professional education: higher, higher and (specialist, master's or doctor of science) there are statistically significant differences at the level of $p< 0.05$; while there are no statistically significant differences in the categories of teacher's work experience $p>0.05$.

Thus, teachers who had a higher professional degree self-assessed their specific competencies somewhat lower than teachers with a higher professional degree and

teachers who are specialists, masters or doctors of science. The teachers' work experience did not affect the differences in the self-assessment of competences.

Keywords: specific competences of teachers, self-assessment, differences.

AMBIENT TEACHING ENVIRONMENT FOR THE GIFTED STUDENTS IN CHEMISTY

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ABSTRACT

Establishing a learning environment for gifted students is of great importance since it should encompass the development of their interpersonal skills, social responsibility and enable effective delivery of teaching instructions (Miedijensky, 2018). Contrary to traditional school learning through the adoption of final products of scientific research, ambient teaching is offering high degree of adoption of a scientific way of thinking and engagement of students, starting from observational procedures, to extracting and collection of materials (Lehrer and Schauble, 2006). Our study aimed to explore the gifted students' perceptions regarding the ambient teaching as a model for learning environment. 24 gifted students from elementary schools in Kragujevac attended at the workshop in the laboratory at the Faculty of Science. The workshop was dedicated to the basic principles and laboratory operations and equipment, while problems were carefully designed to meet the cognitive needs of gifted students. Interview was used as instrument for delineation of the gifted students' perceptions regarding the ambient teaching. According to the results, majority of the students confirmed the significance and suitability of the ambient teaching for the learning chemistry as school subject, as well as they considered this way of learning more interesting than traditional method used in schools.

Keywords: gifted students; chemistry, ambient teaching; workshop.

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GIFTED STUDENTS IN A REGULAR PRIMARY-SCHOOL CHEMISTRY CLASSROOM IN ŠUMADIJA DISTRICT (SERBIA) – OPPORTUNITIES AND MEETING THE NEEDS FOR FURTHER DEVELOPMENT

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ABSTRACT

Gifted students have a range of unique abilities interwoven with the higher levels of creativity and motivation that differentiates them from the most peers in their distinctive learning and understanding abilities. In order for gifted students to fully develop their abilities, the teaching environment must be tailored to meet their special needs by implementing higher-order cognitive tasks in learning activities, so that the lack of challenge and boredom doesn't trigger some negative outcomes in the terms of disinterest, becoming disengaged and unmotivated, which ultimately leads to unfulfillment of student's potentials and underachieving (Taber, 2015). In Šumadija district gifted children have the opportunity to enroll in regular schools or be grouped in specialized classrooms by abilities (chemistry/biology; physics; mathematics; informatics). Also, gifted students can participate in a various afterschool activities intended for high-achieving and gifted students, such as Regional Centre for Talented – Kragujevac, workshops organized by Faculty of Science – Kragujevac and Petnica Science Centre – Valjevo. The main goal of this paper is to examine the position of gifted students in chemistry in our district and to evaluate real circumstances and opportunities that are presented to students through our educational system.

Keywords: Gifted students, chemistry, development of gifted students.

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PSYCHOLOGICAL ASPECTS OF SPATIALITY

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ABSTRACT

The design of space and its evaluation can be examined from the way space is perceived and from its memory production potential. Such psychological notions of spatiality, which primarily concern the perceived and experienced aspect, are most often drawn from the first children's spatial conceptualizations.

Analyzing preverbal and precultural spatial representations of children on the one hand, and contemporary architectural practice on the other, this paper sets as its theme groups of qualitative values that are psychologically established through interaction between users and the space they inhabit. In this way, concepts such as place, sensory experience, and subconscious experience are directly associated with qualitative values such as domestic, sensory, and affective comfort.

The aim of this paper is to form a methodological pattern of architectonic structure of comfort, within which values of lower order of associated parameters are established, explained by concepts such as integrity, temporality, grounding, sensory potential, haptic qualities, immediacy, and identification, as well as spatial indicators and architectural elements that incite and produce complex psychological connections with space.

As a result, the presented techniques and operational tools for evaluating the psychological aspect of spatiality can serve as a methodology for evaluation and improvement of existing spaces, but also as a method for designing new higher quality spaces, that would build more complex psychological connections between user and environment.

Keywords: architecture, sensory, place, comfort, experience.

THE ROLE OF A DIAGRAM IN THE METHODOLOGY OF ARCHITECTURAL EDUCATION

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ABSTRACT

The main goal of this paper is to examine the role of a diagram within the design studio as a significant methodology in contemporary architectural education. Our starting point is the fact that in mastering the skill of architectural design, the most important thing is to understand the process itself, and that the architectural diagram is one of the modern instruments that enables and improves that process. In practice, generations of architects who promote the diagram and use it as a basic design tool, thereby introducing innovations into the architectural discourse. According to our current understanding, the diagram is a representation of the complex structure of architectural thinking and a means of visualizing the creative process.

The methodological approach in this paper is based on theoretical and empirical research. In the first part of the paper, the theoretical framework of the diagram phenomenon in architecture is set, while the second part is conceived as an empirical research conducted through the teaching process within the design studio of the Architectural Studies at the Faculty of Architecture, Civil Engineering and Geodesy of the University of Banja Luka.

The expected result of the discussion of this paper is a better understanding of the role and practical application of a diagram and diagrammatic thinking in order to improve and advance the methodology of the educational process in the field of architectural design.

Keywords: architecture, diagrammatic thinking, design process, design studio.

ANALYSIS OF MATHEMATICAL METHODS FOR ASSESSING THE DEGREE OF ELIGIBILITY OF INVESTMENT PROJECTS

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ABSTRACT

This paper considers some of the problems that occur in the rankings of the investment projects and ways of resolving conflicts between the methods. If there is a limitation regarding capital, it is necessary to assess cash flows on additional capital investment in a larger project and resolve the conflict between the methods. If there is adiscrepancy in time and dynamics of funds influx in use of modified net present value and modified internal rate of return, it will not come to conflict, i.e both methods will give the same results on the acceptance or rejection of projects. When ranking mutually exclusive investment projects between methods of net present value, internal rate of return and profitability index, there may be a discrepancy between the methods while comparing the investment projects that differ it the size of cash flows or have different dynamics of cash flows influx.The reason of conflict is that the internal rate of return implies that the net cash flows can be invested at a rate equal to the internal rate of return, while the method of net present value and profitability index imply that the net cash flows can be invested at a rate equal to the cost of capital.In the event that the cost of capital is lower than the discount rate that corresponds to intersection point of the net present values lines, depending on the cost of capital - it may result in a conflict of methods of the net present value and internal rate of return.The conflict may occur between the method of net present value and profitability index in the event of significant differences in the cash flows volume, and between the method of profitability index and internal rate of return, if the rankings based on net present value and profitability index match.

Keywords: investment, projects, methods, modified, ranking.

ADDITIONAL PAPERS
DODATNI RADOVI

ADVERTISING ON SOCIAL NETWORKS THROUGH THE PRISM OF ETHICS

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ABSTRACT

In recent years, advertising on social networks has become one of the most important factors for the survival of companies on the market. It seems that there is more and more advertising and less and less ethics. Precisely because of this, the paper pointed out the importance of ethics when advertising on social networks. The results of the research is also conducted with the aim of determining the views of respondents who use social networks on the ethics of advertising and with the aim of identifying the key gaps and challenges they face during advertising. The data used were collected using a survey questionnaire, which was conducted online and processed using the statistical program IBM SPSS Statistics. 350 respondents participated in the research in the period from July 1st. until September 30th 2022 in the territory of the Republic of Srpska who use social networks privately, professionally or combined (privately and professionally). The authors point the importance of developing ethical guidelines and regulations for advertising on social networks, in order to ensure a fair and transparent practice, which protects the interests of users and improves the integrity of advertisers.

Keywords: social networks, advertising, ethics, information and communication technologies.

STUDENT EVALUATION OF THE QUALITY OF HIGHER EDUCATION IN BOSNIA AND HERZEGOVINA

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ABSTRACT

The paper analyzes the student evaluation of the quality of higher education in Bosnia and Herzegovina, with an emphasis on the implementation of standards for quality improvement introduced in 2012. The goal of the research is to assess the effectiveness of these measures in improving the quality of higher education in the country. The main research question is whether there is a difference in the quality of teaching before and after the introduction of quality assurance standards. To arrive at the results, an independent t-test was conducted with the calculation of the mean and standard deviation. The data used were collected using survey questionnaires, and they refer to the period of before the introduction of the standard (from 2008 to 2012) and after the introduction of the standard (from 2013 to 2022). The data processed using the statistical program IBM SPSS Statistics. The obtained results show that student evaluation is a valuable tool for quality improvement, and that the introduction of standards and accreditation of higher education institutions are steps in the right direction. However, since it is about quality, as an applicable category, the authors point to future improvements in the level of quality of higher education in Bosnia and Herzegovina.

Keywords: quality, ENQA, higher education, standards, teaching process.

INTERNET ADDICTION: DETECTION, POSSIBLE CAUSES AND CONSEQUENCES

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ABSTRACT

Internet addiction is not formally defined as a mental disorder or a disease. However, many descriptive terms are used to bring about the phenomenon of inappropriate usage of internet services. What makes internet addiction unique in the world of addiction disorders is the fact that internet addiction, as an impulse-control disorder, does not include intoxicants ingested by the victim. Many researchers tried to detect the causes of the disorder, and this study aims to contribute to this research. We have reached a group of students from the Belgrade area studying at two institutions of higher learning: a) one private university offering undergraduate, graduate, and doctoral levels of studies within three areas of study: economics and management, law, and information technology (IT); and b) one private college offering undergraduate program in IT. Machine-learning was applied to analyse collected data, and further efforts were invested to detect possible causes of the disorder.

Keywords: Internet addiction, inference, human behavior, machine learning.

BAYESIAN STATISTICS, MACHINE LEARNING AND FORENSIC EVIDENCE

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ABSTRACT

This paper deals with the application of Bayesian statistics to hypothesis testing. Contrary to the classical approach, historical data and subjective judgment play a great deal in finding valid hypotheses, but Bayesian statistics is superior in judging the validity of a hypothesis having a known outcome. It is essential to point out the impact of Bayesian statistics on machine learning. Since the emergence of the need to analyse vast volumes of data, new analytic algorithms have been developed and applied to different research areas. Moreover, the Bayesian approach provides a solid ground for statistical inference regarding cause-and-effect relationships within the studied phenomenon. In this paper, we concentrate on those statistical properties that show the cause of a phenomenon, which makes judgments about the manner of occurrence of a consequence, and the operating concepts of causality, providing judgments about a process.

Keywords: Bayesian statistics, inference, forensic evidence, machine learning.