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PLENARY LECTURERS
PLENARNA PREDAVANJA

VALUE BASED APPROACH AS A DRIVER OF MODERN HEALTHCARE

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ABSTRACT

Modern healthcare is characterized by a clear trend towards a value-based approach first presented by M. Porter in 2004 as a competitive strategy for US healthcare system. The concept expands the focus from operating solely with clinical data by including a patient's values. The goal of the study is to present a personal experience of implementing value-based approach in various field of clinical practice and summarize the key findings and metrics. The experience of implementing a methodology in several sites of the public healthcare is analyzed and summarized. The following tools were used: processes standardization, "patient's pathway" analysis, cost estimation, patients' values evaluation, shared decision-making, patients' adherence, satisfaction with the quality of medical services, assessment of quality of life. Through the implementation of the Matrix tool, a structured roadmap was developed to orient efforts and resources towards transformation. This transition moves beyond measuring processes only, to measuring outcomes that matter to patients. Adding measurable subjective values is the essence of a value-based approach that improves an effectiveness of medical care. Healthcare needs applied research aimed at forming an evidence base of quality improvement projects. Current research provides further guidance of dissemination the value-based approach in practice.

Keywords: value-based healthcare; healthcare management; public health; patient centricity; trends.

OPTIMISATION OF THE APPLICATIVE PROPERTIES OF BIODEGRADABLE CELLULOSE ACETATE-BASED FILMS USING THE PRINCIPLES OF *GREEN* CHEMISTRY

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ABSTRACT

There is a growing interest in the use of biopolymers for obtaining biodegradable packaging with the addition of *green* components. The aim of this paper is to develop films based on cellulose acetate and polycaprolactone-diol intended for active packaging by adding biocompatible plasticizers. The films were obtained by solution casting method, and essential oils were used as active components, which showed antimicrobial activity in a low percentage. Biocompatible plasticizers synthesized by esterification and polyesterification reactions were used to improve the flexibility of prepared films. The obtained plasticizers also showed the effect of compatibilizer, improving the miscibility of polymers in the blend. The optical properties of the obtained blends were successfully improved by the addition of a low concentration of newly synthesized azo dye, with the ability to absorb electromagnetic radiation of a certain part of the spectrum.

Keywords: Cellulose acetate, active packaging, azo dye, *green* chemistry.

INTERNATIONAL ISO STANDARDS AND SMART CITIES COMMUNITIES

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ABSTRACT

By 2050, even more than 70 % of the European population is expected to live in urban centers. The world needs smart cities and communities that will play a leading role in meeting the most significant global challenges of our time (for example, from climate change to growing inequality). ISO standards represent an international consensus on best practices in many areas. ISO 19120 defines within 19 regions as many as 46 key / mandatory and 54 supporting / recommended indicators that help cities and communities to systematically define relevant, sustainable development goals and establish strategies to achieve them. It provides performance indicators for providing services in cities and raising the quality of life of their inhabitants, which is also the basis for defining goals and indicators for the development of smart cities and communities recognized by ISO 37122. These are global standards for collecting, evaluating, and comparing data from different cities. These standards offer effective and successful governance methods, the latest technologies, and practices that help cities improve the quality of life of their citizens and achieve environmental goals while encouraging innovation and growth, and development to strengthen smart cities and communities. We must be aware that today's smart city concept coincides with the so-called 4.0 society and the fourth industrial revolution. Still, today's approaches are no longer entirely relevant for the 5.0 society concept, which is unstoppably coming to the fore.

Keywords: ISO Standards, Smart Cities, Smart Communities.

KNOWLEDGE ASSESSMENT THROUGH THE APPLICATION OF COMPUTER ADAPTIVE TESTING IN RESPONSE TO MODERN TENDENCIES IN EDUCATION

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ABSTRACT

Education, at all levels, has undergone certain changes due to the Covid-19 pandemic. In the time of the pandemic, classes were held exclusively through online platforms or with a possible combination of traditional, frontal classes. Some institutions also conducted partial knowledge tests through online platforms with the possible inclusion of a video call meeting. The changes adopted at that time have largely remained even after the end of the pandemic.

Online tests for self-assessment and assessment of knowledge are mainly based on a random question and answer generator. Such tests are not adapted to the current knowledge of the respondents themselves and thus negatively affect their motivation. Computer adaptive testing enables the test, ie the generated questions to be asked depending on the respondent's answer to the previously asked question (simulation of oral examination). This way of assessing knowledge has two positive effects, it gives the impression that the test has been created "just for him", while on the other hand it increases the effectiveness of testing because it reduces the number of questions to be answered to objectively assess the knowledge.

This paper will describe the concept of an original, authorial CAT test model. The results of tests in the higher and secondary education system conducted using the above CAT model will also be presented.

Keywords: education, online test, CAT model, students, pupils.

***ECOLOGY, ENERGY EFFICIENCY AND GREEN
ENERGY
EKOLOGIJA, ENERGETSKA EFIKASNOST I ZELENA
ENERGIJA***

ANALYSIS OF ENERGY AND ECONOMIC INDICATORS OF ENERGY REHABILITATION - CASE STUDY OF THE RESIDENTIAL BUILDING IN PETROVAC NA MLAVI

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ABSTRACT

The conducted research analyses the energy and economic aspect of the applied measures on the energy rehabilitation of an individual residential building in Petrovac na Mlavi and the sizing of the elements of the thermal membrane. using the methodology prescribed by the Rulebook on energy efficiency of buildings (Official Gazette of RS No. 61/2011) software package URSA building physics 2. in order to improve the procedure for selecting materials for warming the thermal membrane of the building. The economic analysis of the proposed measures is based on two elements, the first is the price for individual positions of works, materials and labor, and the second aspect is the payback period of the investment used in energy rehabilitation. The research shows that in the phase of preparing energy efficiency studies for the project of energy rehabilitation of buildings, significant savings can be made in financial costs by transferring existing buildings from energy class E, after rehabilitation to energy class C. The research shows that combining energy and economic analysis identify which variant of energy rehabilitation gives the best economic effects, in terms of current price but also the fastest return on investment. In this sense, it is possible to make savings of 3.30% to 14.69% in investment in the proposed works, through the selection of materials planned within the thermal membrane. The increase of the investment used in energy rehabilitation can be realized in 11 years and 3 months. Energy rehabilitation has reduced the need for energy used in heating the building on an annual level by 31.60%.

Keywords: energy efficiency, thermal insulation materials, economic analysis, environmental impacts.

EVALUATION OF THERMAL INSULATION MATERIALS FROM THE ASPECT OF GREENHOUSE GAS EMISSIONS

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ABSTRACT

The conducted research analyzes the possibility of applying the methodology for assessing the environmental impacts that certain thermal insulation materials have on the environment. Ecosystem approach and improvement of the design phase in the direction of evaluating the environmental characteristics of the proposed materials for thermal insulation. The research uses the methodology of Life Cycle Analysis (LCA) to see at what stage of the life cycle of the proposed thermal insulation material there are hotspots and quantify the impacts. The research shows that in the phase of preparing the energy efficiency study for the project of energy rehabilitation of buildings, the impact that the applied materials have on the living environment and human health should be considered. In addition to evaluating the reduction of energy consumption for heating the building, the impact of the applied materials should also be considered. The research indicates the need for the formation of software for the calculation of environmental impacts. National software would assist in efforts to improve construction, design and environmental quality in the Republic of Serbia.

Keywords: energy efficiency, thermal insulation materials, life cycle analysis, environmental impacts.

USING PASSIVE SOLAR SYSTEMS AND GREEN ROOFS IN BUILDINGS IN THE FUNCTION OF REDUCING ENERGY CONSUMPTION

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ABSTRACT

The building sector with the highest energy consumption is also a priority area in which the possibilities of solving environmental and economic problems are great. Achieving benefits from the energy, environmental and economic aspects, can be achieved by using renewable energy sources whose implementation does not require large and expensive interventions on facilities. One such possibility is the passive use of solar energy to achieve a higher level of energy efficiency. The paper will present the basic concepts necessary for understanding the topics and research related to solar energy, energy consumption of residential buildings, the use of the Trombe wall as a heating system and extensive green roofs as a natural insulator of buildings. Accordingly, the paper describes and comparatively analyses three possible solutions to achieve a higher level of energy efficiency of a residential building, through the implementation of 3 scenarios: thermomechanical measures, Trombe wall and extensive green roof. The positive impact of this type of using the alternative solutions, has other advantages: reducing greenhouse gas emissions, achieving more favorable microclimatic conditions of built environment (preventing heat island) and the preservation of the environment and the health of modern man.

Keywords: Solar energy, passive solar system, Trombe wall, green roofs, energy efficiency.

USING GREEN SYSTEMS AS PASSIVE MEASURES FOR ENERGY OPTIMIZATION OF BUILDING ENVELOPES

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ABSTRACT

Previous research and statistical data have shown that buildings in Europe consume about 40% of total energy, and most of it is spent on heating. Due to the use of fossil fuels, many harmful gases are emitted into the atmosphere, especially greenhouse gases. Therefore, the study of new technologies and solutions in the field of construction of housing and other facilities is a priority task that is inevitably set before experts in this field. In addition to the need to optimize the envelope of buildings to reduce energy consumption, there is also a need to preserve the environment, in terms of reducing emissions, preventing the formation of heat islands and air purification. For these purposes, specific green systems are used, in the form of vertical greenery systems (green walls and facades), as well as green roofs. The biggest role in achieving the energy efficiency of a building is its envelope. This paper deals with the study of innovative technologies for materialization of building envelopes that contribute not only to the achievement of energy optimization, but also to environmental protection. Because of this concept of urban development and design, the possibility of reducing the consumption of fossil fuels has been analyzed, which would greatly reduce the negative effects of climate change, as one of the aspects of achieving sustainable cities and communities.

Keywords: Vertical greenery system, green roof, building envelope, energy efficiency, passive techniques

PESTICIDE RESIDUES AND THEIR METABOLITES IN THE LAKES OF FRUSKA GORA

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ABSTRACT

Water samples were taken from the lake Kraljevac, which belongs to the Special Nature Reserve "Kraljevac". It is located near village Deliblato. The lake was formed after the embankment that was built. The lake is filled from the surrounding watercourses. As the raising of the water level in the lake caused flooding of the surrounding agricultural areas, pesticide residues can be found in the water of the lake. During July 2021, a three water samples were taken from three locations on the lake. The presence of pesticides was tested by solid-phase disk extraction (C-18), and the obtained extracts were tested on a Thermo HPLC-MS-MS system. A total of 273 pesticides were tested. A total of 42 pesticides were found in all three water samples, two of which were from the group of acaricides, 1 bactericide, 15 fungicides, 14 herbicides and 10 insecticides. Of these detected pesticides, 24 are approved for use, and 18 active substances are not approved for use due to various negative effects on the environment. The following fungicides were detected: propamocarb, metconazole, flutolanil, difenoconazole, fenhexamide, azoxystrobin, tebuconazole, metalaxyl, amethoctradin, flusilazole, propiconazole, bitertanol, dichlofluoanide, etaconazole and fenarimole. Found fungicide concentrations range from 0.0116 µg/L to 2.718µg/L. The average found concentrations for fungicides are 0.369021µg / L, median 0.232494µg / L. The average standard deviation of three repeated measurements for all found fungicides is 0.161331µg / L, while the average

coefficient of variation for three repeated measurements for all found fungicides is 46%. The highest concentration was found for fenarimol and that was 2.72 $\mu\text{g} / \text{L}$ (s.d. 0.93). Fenarimol is the active substance in the Rubigan formulation, which was used in apple orchards to control the cause of powdery mildew and was recently banned.

Keywords: pesticides, fungicides, lake, water.

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INFLUENCE OF SLUDGE EXTRACTION ON HYDROMORPHOLOGICAL PARAMETERS OF THE JEGRICKA RIVER

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ABSTRACT

Data about hydro-morphological characteristics of the Jegrička river (Vojvodina, Serbia), before and after sludge extraction, were gathered according to standard European method River Habitat Survey (RHS) during the period between May and July of 2018 and 2019. RHS method that is in accordance with WFD (Water Framework Directive, 2000/60/EC) and has various uses: Impact on environment (EIA), goal setting and statistics related to catchment, monitoring and post-project estimates, national and regional reporting and estimates of spreading of specific aquatic species based on their habitat. RHS is conducted on 500 m long sections of river, while observations are conducted on 10 equally distanced subsections. The report requires two indexes that were developed in order to describe diversity of river habitats (Habitat quality assessment - HQA) and the presence and significance of artificial changes in the riverbed (HMS). Compared date before and after the sludge extraction, it is noticeable that the habitat change class, ie HMS score changed to worse on all sections after sludge extraction except on the last section (RHS 5). The most drastic change, for one class lower, occurred on the first (RHS 1) and the second section (RHS 2). A smaller number of vegetation groups is noticeable in the very bed of the Jegrička watercourse. Sludge extraction has reduced the presence of tall grass (reeds, rushes and sedges) in the rioarial zone, as well as increased the cover of invasive species on the coast, especially *Acacia (Amorpha fruticosa)*. Greater coverage of floating rooted species was also observed, which is a

feature of slower watercourses. The habitat quality class, HQA score, remained approximately the same for all surveyed sites.

Keywords: the Jegrička river, sludge extraction, hydromorphology, RHS.

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FUNGICIDES IN THE WATER OF THE KRALJEVAC LAKE SPECIAL NATURE RESERVE

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ABSTRACT

Water samples were taken from the lake Kraljevac, which belongs to the Special Nature Reserve "Kraljevac". It is located near village Deliblato. The lake was formed after the embankment that was built. The lake is filled from the surrounding watercourses. As the raising of the water level in the lake caused flooding of the surrounding agricultural areas, pesticide residues can be found in the water of the lake. During July 2021, a three water samples were taken from three locations on the lake. The presence of pesticides was tested by solid-phase disk extraction (C-18), and the obtained extracts were tested on a Thermo HPLC-MS-MS system. A total of 273 pesticides were tested. A total of 42 pesticides were found in all three water samples, two of which were from the group of acaricides, 1 bactericide, 15 fungicides, 14 herbicides and 10 insecticides. Of these detected pesticides, 24 are approved for use, and 18 active substances are not approved for use due to various negative effects on the environment. The following fungicides were detected: propamocarb, metconazole, flutolanil, difenoconazole, fenhexamide, azoxystrobin, tebuconazole, metalaxyl, amethoctradin, flusilazole, propiconazole, bitertanol, dichlofluamide, etaconazole and fenarimole. Found fungicide concentrations range from 0.0116 µg/L to 2.718µg/L. The average found concentrations for fungicides are 0.369021µg / L, median 0.232494µg / L. The average standard deviation of three repeated measurements for all found fungicides is 0.161331µg / L, while the average coefficient of variation for three repeated measurements for all found fungicides is

46%. The highest concentration was found for fenarimol and that was 2.72 $\mu\text{g} / \text{L}$ (s.d. 0.93). Fenarimol is the active substance in the Rubigan formulation, which was used in apple orchards to control the cause of powdery mildew and was recently banned.

Keywords: pesticides, fungicides, lake, water.

Acknowledgment

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IMPROVEMENT OF THE URBAN GREEN MATRIX THROUGH URBAN REGULATION AND ARRANGEMENT OF UNDEVELOPED SPACES: CASE STUDY OF THE PARK ALONGSIDE THE SERBIAN ARMY BOULEVARD IN BANJA LUKA

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ABSTRACT

The aim of this paper is to investigate the possibility of improving the state of undeveloped spaces in urban areas. The first part of this paper focuses on the state of the undeveloped spaces of the urban landscape. To recognize their character and quality, the Narrative Spatial Analytics (NSA) method was proposed. It integrates three design research techniques which enable landscape designers to expand the scope of their research practice. The second part of the paper discusses a case study of neglected green space, once intended for military infrastructure. The space is located in the area of the Vrbas coast and the alongside the Serbian Army Boulevard in Banja Luka. It could be incorporated into the urban green matrix as a park. The phases of urban regulation and the solution concept for the arrangement of a new park, as well as the elaboration details were analyzed, which completed the process of improving the Banjaluka green matrix.

Keywords: undeveloped city spaces, narrative spatial analytics (NSA), urban green spaces, urban design, Banjaluka.

IMPROVING THE VISUAL ATTRACTIVENESS OF SPACE BY APPLYING THE VERTICAL GREENERY SYSTEMS

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ABSTRACT

This paper's aim is to explore the possibilities of improving the visual attractiveness of space by applying the vertical greenery system (VGS). The first part of the paper focuses on the analysis of the VGS as a unique element of urban design with emphasized visual characteristics formed from the color and structure of plants, which along with their diversity form attractive and user-friendly places. The VGS has exceptional visual attractiveness, which is a basic component in the process of creating a place. The character of the VGS visual attractiveness was defined through a comparative analysis of examples from the literature.

The process of creating a place is defined as a tool for improving the quality of existing urban spaces, made up of physical, social and psychological dimensions as integral parts of the city's identity. All of that is confirmed by the process of urban regeneration of the Krajina Square in Banja Luka, presented in the second part of the paper. The conceptual solution transforms the existing urban structure of the Krajina Square into a visually attractive and functionally improved area of the city center. The success of the planned project was confirmed by the citizens of Banja Luka in an applied questionnaire. The design of the city center is based on the physical characteristics of the urban space and the users' subjective perception of the space, where the visual attractiveness of the VGS in the process of creating an image of the city is of high importance.

Keywords: open urban spaces, the vertical greenery system (VGS), placemaking, urban regeneration, Banja Luka.

APPLICATION OF MACROPHYTES IN WASTEWATER TREATMENT

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ABSTRACT

The progress of urbanization and technologies led to the rise of anthropogenic activities, which consequently have high production of pollutants, affecting ecosystems, including aquatic biomes. Phytoremediation, a plant based green technology, has received increasing attention after the discovery of hyperaccumulating plants which are able to accumulate, translocate, and concentrate high amount of certain toxic elements in their above-ground - harvestable parts. Important practical considerations for implementing aquatic phytoremediation include the use of invasive species, the optimal harvesting time and frequency for pollutant removal with macrophyte biomass. In this review, a synopsis is presented about how plants, especially macrophytes, respond to heavy metal stress and others pollutants and way how they able to reduce all tested water quality indicators in wastewater to a level that allows the use of purified water for irrigation.

Keywords: macrophytes, phytoremediation, wastewater.

THE IMPORTANCE OF HYDROLOGICAL INFORMATION SYSTEM FOR WATER MANAGEMENT OF THE TREBIŠNJICA REGIONAL RIVER BASIN

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ABSTRACT

The Trebišnjica River Basin District is one of the most hydrologically complex areas in the Balkans, with very unfavorable natural characteristics of the water regime. Uneven distribution of precipitation during the year, combined with specific conditions of water runoff in the karst, leads to abundance of water in autumn and winter and complete scarcity in the growing season. Therefore, special attention is paid to the monitoring of the basic water regime of natural watercourses and karst fields, especially since the period of construction of the Hydroelectric Power Plant in Trebišnjica. The paper shows how the development and application of the hydro-information system of Trebišnjica through its three units, the network of automatic and observation stations, the data transmission system, and the database, provided better and more efficient planning and management decisions and improved the overall business and management of reservoirs and hydropower plants of the Trebišnjica system, both in terms of electricity production and in terms of social responsibility.

Keywords: Trebišnjica basin, hydrological information system, water monitoring.

ECO-DESIGN AND USAGE OF ECO-LABELS ON PACKAGING FOR DIFFERENT TYPES OF MILK

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ABSTRACT

Eco-design and usage of eco-labels on milk packaging, have a great influence on consumers when choosing and buying this product. Milk is usually packed in carton packs, plastic bottles or bags, and glass bottles. There is a worldwide trend of using innovative technologies for packing milk in aseptic packaging made of biodegradable materials. When designing the packaging, we keep in mind its ergonomics, colors, product name, and everything else that is attractive to the potential buyer. Special emphasis is placed on the possibility of reusing and recycling packaging while respecting the principles of sustainable development. These innovations in the design and selection of materials for milk packaging are also present in leading manufacturers in Serbia, which is presented in this study.

Keywords: milk, packaging, eco-design, eco-labels.

PRESENTATION OF WILDFIRE OCCURRENCE RECORDED BY USING MODIS AT THE TERRITORY OF THE REPUBLIC OF SRPSKA - PRESENTED THROUGH GIS

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ABSTRACT

This research paper shows the analysis of wildfires at the territory of the Republic of Srpska which was performed using the data collected using MODIS satellite imagery while the map presentation was created through Geographic Information System (GIS). For the purpose of this research paper, the period between the years 2001 to 2021 was analyzed. The purpose of this analysis is to show the spatial distribution of the wildfires, their frequency, and its comparison with statistical data kept by Republic of Srpska Institute of Statistics. All the above data are presented cartographically and in tables clearly presenting the situation regarding wildfires at the territory of Republic of Srpska, as well as comparative analysis of the number of wildfires recorded by MODIS satellite imagery and the number of wildfires recorded by Republic of Srpska Institute of Statistics.

Keywords: wildfire, analysis, MODIS, Republic of Srpska.

ECONOMY AND MANAGEMENT
EKONOMIJA I MENADŽMENT

EFFICIENCY OF GOVERNMENT AND CORRUPTION CONTROL AS DETERMINANTS OF INFLUENCE OF FOREIGN DIRECT INVESTMENTS

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ABSTRACT

The paper examines the impact of government efficiency and corruption control as two of a total of six partial indicators of the World Bank's perception of the quality of public governance (World Governance Indicators) on foreign direct investment (FDI) inflows from the Western Balkans (WB) from 2010 to 2019. years. It was concluded that the WB countries slightly improved the efficiency of the government in 2019 compared to 2010. This is a shift that is absolutely insufficient in terms of the imperative to improve the quality of institutions in these countries over a period of ten years. This statement is especially important given the fact that these are countries that are on the way to joining the European union (EU). The situation is even more unfavorable when considering the change of indicators related to the expected control of corruption in these countries. Namely, during the period under review, the perception of the success of corruption control in the WB countries has hardly changed. Moreover, the perceived corruption rate in BiH increased from -0.3 in 2010 to -0.6 in 2019, in Northern Macedonia from - in 2010 to -0.4 in 2019, in Serbia from -0.3 to -0.4. Overall, it can be said that the indicators of the expected efficiency of the government and the expected control of corruption did not have a positive impact on the size of the inflow of foreign direct investments in the WB countries in the observed period of time.

Keywords: FDI, FDI inflows, government efficiency, corruption control, WB countries.

IMPLICATIONS OF THE UKRAINIAN CRISIS ON THE ECONOMY AND BUDGET OF THE REPUBLIC OF SRPSKA

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ABSTRACT

The paper investigates the impact of the Ukrainian crisis on the economy and budget policy in the Republic of Srpska. In the absence of statistical series and due to the variability of key parameters, in circumstances when it seems that the established models of international economic flows are growing, for analysis we have in mind the comparison with historical experience, as the most appropriate descriptive, and methods of deduction and synthesis. There are two main channels through which the crisis spills over into the Serbian economy; rising prices and / or shortages of energy and food and a slowdown in the euro area. Energy and food security are endangered, especially due to the fact that domestic production covers only 60% of total food needs, and that the oil and gas sectors, which account for about 1/3 of energy consumption, are completely tied to Russia.

Such circumstances have made the very assumptions of budget planning for 2022 questionable, primarily projected economic growth, employment and inflation rates. At the same time, the slowdown in the economy and the growth of energy and food prices without pursuing an active economic policy are leading to stagflation.

The created budget is focused on debt repayment and social stability, but in the new circumstances and with indebtedness over 40% of GDP, it is inevitable that there must be a change in budget priorities, but also a waiver of budget spending wherever acceptable.

Keywords: Republic of Srpska, Ukrainian crisis, budget, stagflation.

STABILITY OF THE CURRENCY BOARD SYSTEM OF BOSNIA AND HERZEGOVINA

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ABSTRACT

This paper deals with the topic of definition, structure, goal and stability of the currency board system in Bosnia and Herzegovina with the main focus on the eventual stability of the system itself. The currency board system is an alternative to traditional central banking, in which the monetary authority or central bank issues a domestic currency that is fully backed by foreign asset reserves and is willing to exchange its currency for an anchor foreign currency at a fixed rate. With regard to Bosnia and Herzegovina, from an economic, political and institutional perspective, there are strong pros and cons to using the currency board system. One of these reasons is macroeconomic stability, which is the main focus of the paper.

Keywords: Currency Board System, Central Bank of Bosnia and Herzegovina, macroeconomic stability, currency.

COMPOSITE INDICATORS OF INSTITUTIONAL QUALITY AND INSTITUTIONAL CHANGES

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ABSTRACT

The paper examines the impact of government efficiency and corruption control as two of a total of six partial indicators of the World Bank's perception of the quality of public governance (World Governance Indicators) on foreign direct investment (FDI) inflows from the Western Balkans (WB) from 2010 to 2019. It was concluded that the WB countries slightly improved the efficiency of the government in 2019 compared to 2010. This is a shift that is absolutely insufficient in terms of the imperative to improve the quality of institutions in these countries over a period of ten years. This statement is especially important given the fact that these are countries that are on the way to joining the European union (EU). The situation is even more unfavorable when considering the change of indicators related to the expected control of corruption in these countries. Namely, during the period under review, the perception of the success of corruption control in the WB countries has hardly changed. Moreover, the perceived corruption rate in BiH increased from -0.3 in 2010 to -0.6 in 2019, in Northern Macedonia from - in 2010 to -0.4 in 2019, in Serbia from -0.3 to -0.4. Overall, it can be said that the indicators of the expected efficiency of the government and the expected control of corruption did not have a positive impact on the size of the inflow of foreign direct investments in the WB countries in the observed period of time.

Keywords: FDI, FDI inflows, government efficiency, corruption control, WB countries.

BUSINESS INCUBATORS AS INFRASTRUCTURE SUPPORT TO LOCAL BUSINESS (CASE STUDY OF TIVAT BUSINESS INCUBATOR)

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ABSTRACT

The intention of authors is to further shed light on and investigate the purpose of establishing business incubators, which gained additional importance during the transition period when it comes to strengthening and restructuring less developed, former socialist economies. To that regard, we have started from the fact that the basic goal of starting business incubators can be infrastructure support in the process of founding and developing new small and medium enterprises, based on innovative or entrepreneurial ideas and projects of individuals (tenants), both locally and nationally. In addition, which will be further discussed in the paper, guided by the experiences of developed countries, business incubators in the last decade of the last century in transition countries established themselves as a reliable means of supporting development and growth of small and medium enterprise, as well as the inclusion of their economies in European integration processes. The subject of research in this paper is the analysis of the feasibility, ie. organizing a business incubator on the site of the former ZOPT in the old building of the Municipality of Tivat in the city center in terms of technical, commercial, economic and other parameters needed to test the sustainability of the project in the long run, to its full effect, in which the only possible is complete effect of engaged resources. The aim of the research is to examine the validation of the feasibility of the proposed development variant of the future business incubator, which should be an

infrastructural instrument to support the development of new and entrepreneurial ventures in the Municipality of Tivat in the early stages of their development. Considering that the launch of the future business incubator is initiated by the Municipality of Tivat, the mentioned elaboration and research is significantly wider because the project, in addition to economic validation, has an emphasized social character.

Keywords: business incubator, small and medium enterprises, entrepreneurship, innovation.

ECONOMIC MEASURES OF THE INTERNATIONAL BUSINESS ENVIRONMENT DURING KOVID -19

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ABSTRACT

The pandemic has had a major impact on the international business environment. Business between countries has changed a lot in terms of imports, exports and the border crossing of certain goods from country to country. The economic dimension of the international environment refers to the overall economic situation in a given environment and the structure of a national economy. Economic indicators determine the business conditions in a national economy. If we look at the size of the market in the analysis we can get information about the potential and size of that market. Economic measures have taken place in most countries with many restrictions. Our state, BiH, had additional problems in business, although there were some smaller companies that had positive business. Not all measures were important, but they had to be followed. International business has been kept to a minimum, which is certainly not desirable in terms of advancement. The aim of the paper is to overcome obstacles in doing business during the pandemic, as well as the task of examining the consequences of these economic measures, which we will present in the paper itself, if we will list what these economic measures were. International business is of great importance for every country and society in general, in order to survive and be successful in work and progress.

Keywords: economic measures, international business, Kovid-19, international environment.

BUSINESS OPERATIONS IN EXTRAORDINARY CIRCUMSTANCES

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ABSTRACT

In order for a company to operate successfully, a number of conditions need to be met. The first step of a company in entering the market is the analysis of the environment. In strategic management, the analysis of the environment is focused on all the factors to which the company is sensitive and to which it must respond in order to operate successfully. In such complex conditions, the biggest problem for any company is to provide a sufficient amount of accurate information for making decisions related to international business. A company that only operates within its own country finds it easier to obtain the information needed for business decisions or already knows this information based on previous business practice. It is also necessary to enable workers to do their job smoothly and to avoid stressful situations. However, this is not always possible, especially today when we face many problems and challenges. Care should be taken not to violate the rights of workers, as well as the reputation of the company. The pandemic, Kovid-19, had a very negative impact on the affairs of everyone in society, including the companies themselves, and left consequences, although there are companies whose business did not change during the pandemic, and we even have companies that profited far more during the pandemic. . The aim of this paper is to provide guidelines on how to do business in emergency situations, what needs to be applied in order to reduce such business with negative consequences to an extremely positive result, which is certainly one of the tasks of this paper, ie. which we will talk about in the paper itself.

Keywords: business, enterprise, extraordinary business.

THE ROLE OF CORPORATE SOCIAL RESPONSIBILITY IN MODERN-DAY BUSINESS

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ABSTRACT

There are different ways in which a company can show sensitivity to social processes in the environment in which it operates. However, it is not enough to sporadically undertake activities that, in addition to their own economic goals, achieve some social goals, but it is necessary to start from the principles of ethics and social responsibility in making everyday decisions, including those related to defining appropriate marketing strategies, policies and program. Special attention in this paper will be paid to the need to harmonize the social engagement of companies with their corporate mission and strategy, and social responsibility as a potentially significant source of competitive advantage, all in order to choose appropriate lens through which to evaluate best business practices. Regardless of different approaches to interpreting the role of companies in achieving common social goals, we still justify the claim of some authors that best business practice should be viewed through the lens of contributing to meeting relevant common social goals, only if contributing to their realization, at the same time, means acquiring and maintaining the company's earning capacity to a greater extent than the competition, thus eliminating business behavior that prevents us from serving the target group of consumers to gain a mass of profits critical to sustainable growth and development of the company, faster than the competition.

Key words: corporate ethics, social responsibility, reputation, competitive advantage.

OPTIMIZATION OF BUSINESS PROCESSES USING AGILE METHODS

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ABSTRACT

Agile is a software development framework based on existing development principles (such as waterfall and spiral models), and encourages continuous planning and development. The Agile approach starts with short development cycles in which programs are developed in a flexible way. There is constant team interaction and joint decision making, which means that the development team is self-governing while the development priorities are adaptable. As the Agile Approach has decisively influenced the productivity of software development, the Agile Approach methods have increasingly started to be used in other industries where the organization of work is reduced to project tasks. Scrum is a widely used, agile strategy for product development and process setup, a set of values, team roles and processes used in combination to create products.

The aim of this paper is to explain agile methods and contribute to greater application of agile methods in industries other than IT. The authors believe that this approach or its concept should have a much wider application. In our area, it all started in April 2015, when the first application of the practice from Scrum was held in EPBiH (Electric Power Industry of Bosnia and Herzegovina). Namely, then Scrum as a term for the first time enters the official documents of EPBiH in the process of defining recommendations for the application of Scrum methodology in the segment of system maintenance in order to speed up the resolution of user requirements.

Keywords: agile, scrum information technology, software, business processes.

PROVIDING EMPLOYMENT THROUGH ENTREPRENEURSHIP

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ABSTRACT

The paper shows the results of the survey which was conducted in 193 enterprises in six towns in the Republic of Serbia with 256 employees as respondents. The goal of the survey was to find out the reasons for or against the starting of an entrepreneurial venture through a self-employment process. The questionnaire consisted of 17 questions which respondents were supposed to answer selecting YES, NO or MAYBE, and, in addition, to opt for one of the following intensifiers of the answer YES: crucial, very significant and significant.

The survey was conducted within the subject Entrepreneurship, which is an obligatory subject for the students who, in this case, were in the role of surveyors.

The obtained results indicate that there are numerous ways in which state institutions can help, such as tax incentives, state support, easier availability to the entrepreneurial capital, etc.

Keywords: entrepreneurship, employment.

THE EFFICACY OF COUNSELLING, TRAINING AND DEVELOPMENT ON ENTREPRENEURIAL CAPABILITY

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ABSTRACT

This study assessed the effect of counseling, training and development on entrepreneurial capabilities of Small and Medium Enterprises Development Agency of Nigeria (SMEDAN). The objectives of the study were to examine whether training organized by SMEDAN affects entrepreneurial capabilities and also to determine the effect of counseling on entrepreneurial performance. Series of questions were asked using the questionnaire adopted by the researcher. The sample size comprised of one hundred and forty two (142) SMEs out of the two hundred and twenty (220) SMEs population of the selected SME that are registered with SMEDAN in Lagos, Nigeria. The ex-post facto and Yamane formula was adopted. The test re-test reliability approach was used. The data was analyzed using manual and electronic based methods through the data preparation grid and statistical package for the social sciences, (SPSS) statistical package version 21.0. The study made use of statistical tools which include: analysis of variance (ANOVA), correlation efficient and regression analysis in testing hypotheses where applicable. The findings of the research showed that the impact of training organized by SMEDAN affects entrepreneurial capabilities and counseling affect entrepreneurial performance. The study recommends that training and development programme should focus on developing creative or innovative individuals who can help to move the nation forward. A Self-reliant person is a creative individual.

Keywords: Training and development, Counseling, Entrepreneurial Performance, Capabilities, SMEDAN.

COST MANAGEMENT USING ERP SOFTWARE FOR MORE EFFICIENT BUSINESS IN THE INDUSTRIAL SECTOR OF SERBIA

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ABSTRACT

Reindustrialization is of particular importance for securing the conditions for growth and development of the economies of Southeast European countries, including Serbia, which have undergone a difficult period of transition and privatization. The rapid effects of accelerated re-industrialization are evident not only in the form of job creation and increase in population employment, but also in raising living standards and strengthening the competitiveness of the country's economy. Keeping pace in the field of industry with developed companies in the world today implies that the management and leaders of companies put the main emphasis in business on the introduction of continuous change and innovative development projects through cost rationalization for: research, development, production, marketing and quality assurance. The aim of the authors is to point out the importance of market-oriented behavior in the planned preparation of production, with an emphasis on the efficient use of factors of production and management of depreciation of labor resources, knowing that they base affect the business profitability. In addition, the paper highlights the importance of systematically monitoring the depreciation costs of labor resources and their timely replacement with the advantages of application of the Calculus 12 ERP program, which is used to manage the fixed asset costs in order to operate more efficiently in the industrial sector of Serbia.

Keywords: cost management, reindustrialization, ERP software program.

INTELLECTUAL CAPITAL AS A STRATEGIC RESOURCE OF FAMILY ENTERPRISES

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ABSTRACT

The paper focuses on understanding the central issues related to intellectual capital with a focus on family businesses. Intellectual capital is becoming a resource of primordial importance for the creation of economic wealth. It is indisputable that tangible assets continue to be an important factor in the production of both goods and services, noting that their relative importance decreases over time, while the importance of intangible assets based on knowledge increases. The ability of a company to use intellectual capital is perhaps a greater key to profitability than the very existence of a "stock" of knowledge.

Keywords: family businesses, intellectual capital, specifics, competitive advantages max.

DROPSHIPPING AS A NEW MODEL OF E-COMMERCE

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ABSTRACT

Internet sales grows more and more every day and it becomes one of the more popular kinds of the trade in the World but in our region as well. Especially since it enables trade without time and location boundaries, fast and simple payment and delivery to home address. Internet trade from business entities to end users (B2C-Business to Consumer) is overall present in our lives. However, in value terms, huge part of internet trade goes to trade between trade subjects (B2B-Business to Business).

If this topic is considered more thoroughly, then internet trade can be analyzed through 8 different models. Lately, there is one more model on the rise, which is called dropshipping. It considers internet web-based store which doesn't contain products on its own stock but rather promote them and after receiving an order, places the order to the supplier, which is mostly often producer, which send products directly to the shopper. So, dropshipper promotes products which sells, quite often through social medias. Shoppers could be from any part of the World, but they are mostly from one specific area which is targeted by dropshipper. When shopper orders product from dropshipper, dropshipper forwards the order to the supplier and supplier send the product directly to the shopper. In this model dropshipper never sees product that sells.

This model becomes more and more accepted within entrepreneurial population of all ages, who wants its own business and at the same time does not have enough financial resources and are not willing to take big business risks.

Keywords: internet trade, models of internet trade, dropshipping, dropshipper.

DEVELOPMENT OF FINANCIAL REPORTING IN THE FUNCTION OF PUBLIC SECTOR MANAGEMENT

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APSTRACT

The current trend of change at the global level in the political, social, economic and institutional spheres could not remain without influence on nation states and thus on the public sector. All these new conditions, phenomena and events define the new environment in which the state or the public sector operates. There is no possibility for the public sector to avoid trends and not react to changes in the environment. Any change in the environment, to a greater or lesser extent, requires public sector management to find a socially, economically and politically adequate and sustainable way to adapt. Public sector accounting plays a key role in the adaptability of the public sector to the environment.

Keywords: public sector, environment, accounting, reporting.

INNOVATION MANAGEMENT IN THE CIRCULAR ECONOMY - REPUBLIC OF SERBIA AND EU

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ABSTRACT

Sustainable development requires the application of innovations and radical changes in the concept of functioning of most countries, where it is of special importance to achieve environmental sustainability. The environment is not only the environment in which people live, but also the resource base and the place where economic activities are carried out. To ensure environmental sustainability, it is necessary to reduce the consumption of renewable resources, find alternatives to non-renewable resources and reduce waste generation and the level of ecosystem pollution. In order to achieve integration between sustainability and economic development, the concept of circular economy emerged as one of the basic concepts of the 2030 Agenda for Sustainable Development of the United Nations (2030 Agenda for Sustainable Development, UN). The circular economy represents a new approach in dealing with global problems, with a special focus on reducing resource consumption, reuse and recycling. Having in mind the importance of the concept of circular economy, the aim of this paper is to present the development and innovations in the field of this concept with special reference to the situation in the Republic of Serbia and comparison with EU member states.

Keywords: sustainable development, circular economy, innovation management, Republic of Serbia, EU.

SIX SIGMA – AN EXAMPLE OF A MODERN METHODOLOGY FOR ACHIEVING BUSINESS EXCELLENCE IN QUALITY MANAGEMENT

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ABSTRACT

In order to improve the business management process, first of all, you need to improve the quality of your products and / or services. Many organizations, in terms of quality improvement, mean meeting the requirements of ISO standards. But other methodologies of quality improvement have appeared in the world and therefore this paper will deal with quality improvement not only by meeting the requirements of ISO standards, but also by introducing new models of quality improvement, such as Lean, especially Six Sigma, all with satisfying customer requirements and wishes and continuous improvement of products and services. Quality is defined by the customer, so organizations are forced to think about quality improvement on a daily basis and to introduce quality improvement tools. Six Sigma methodology offers a mix of different methods and techniques for monitoring the quality of the work process in order to identify and eliminate errors and the causes of errors in the process. The Six Sigma methodology implementation cycle includes five phases, known as the DMAIC cycle, namely definition, measurement, analysis, improvement, and control. In the definition phase, the goals and framework of the introduction are defined, along with the identification of the problems that need to be solved. In the measurement phase, data and information on the current situation are collected. In the analysis phase, the causes of the problem are identified, using data analysis tools. In the fourth phase, solutions are introduced in order to eliminate the problem. Finally, in the fifth phase, the results of quality improvement are controlled.

Keywords: Six Sigma, quality improvement, error elimination, process, consumer, business excellence.

CAPACITY BUILDING IN THE FUNCTION OF INCREASING COMPETITIVENESS OF FOOD PRODUCERS

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ABSTRACT

This paper explains the importance of capacity building to improve the competitiveness of food producers. We first consider a more precise definition of the concept of industry competitiveness, especially with the aim of describing the most important pillars on which the growth and development of companies in the food industry is based. It is pointed out that the development of information technologies in the last thirty years on a global scale has significantly changed and modified the environment in which companies operate in the food industry, which has, among other things, motivated the emergence of models for managing production and distribution activities in the food industry. Under the influence of information technologies, but also of many processes related to comparative prices of production factors on the world market, on the one hand, as well as numerous mergers and acquisitions of industrial enterprises, on the other hand, this century has seen the transformation of a global industrial sector dominated by large conglomerates. The attention of the management of industrial companies in this period has grown increasingly focused on the development of capabilities, as a form of improving the competitiveness of not only these businesses, but also of small food producers. The focus of management on capacity building is primarily aimed at increasing added value. However, it should be noted that the production phase of the global value chain is becoming relatively standardized and is therefore characterized by ever lower yields. At the same time, in the global value chain of industrial production,

activities that precede direct production (research and development, design) and follow the process of direct production (marketing, logistics) are gaining in importance.

Keywords: food industry, food producer management, capacity building, competitiveness, value chain.

DISCOUNT RATE AS THE KEY MICROECONOMIC TECHNIQUE IN THE NATURAL RESOURCES MANAGEMENT

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ABSTRACT

As part of strategic environmental management, the need for sustainable management of natural resources is of primary importance. The essence of natural resource management is to enable the unhindered development of society, without reducing natural capital. Management of renewable and non-renewable natural resources is based on a systematic approach to understanding the long-term dynamics of complex interactions of social, economic and natural systems. The analysis of renewable resources should focus on researching certain types of resources. It is vital to take into account the ecological balance and interdependence of species. Consequently, the issue of optimal use of a specific renewable resource can be very complex because the optimal use of a number of interdependent species needs to be explored. In natural resource management, the key microeconomic technique in determining an efficient allocation is to determine the discount rate. In short, it is the annual rate at which future benefits or costs are discounted to current benefits or costs. For the management of renewable natural resources, the basic rule of optimal utilization is a discount rate equal to the sum of the biological growth rate and the growth rate of the value of capital, which ensures that exploitation is limited to a sustainable level. There is a rule for non-renewable natural resources: the discount rate is equal to the growth of the value of capital, which means that the growth rate of resource utilization prices should be equal to the discount rate.

Keywords: environmental management, renewable natural resources, non-renewable natural resources, discount rate.

BUSINESS COMMUNICATION AS FACTOR OF HUMAN RESOURCES MANAGEMENT

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ABSTRACT

In modern business aspect, it is impossible to imagine a successful business without appropriate business culture. Human resources management represents a very complex process. Business implementation is a quite complex procedure too. Development of human resources and business development depend on successful business communication. The connection between human resources management, within one organization, and development of communication skills are displayed through the level of business culture and requires constant refinement. Successfully executing the function of management comes as result of productive business communication. This paper points to the significance of business communication in development and guiding human resources in modern human resources management.

Keywords: management, communication, human resources.

SPECIFICS OF HUMAN RESOURCES MANAGEMENT IN SPORTS ORGANIZATIONS

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Human resource management in sports organizations is a relatively new management discipline, and the topic of the paper is current from the aspect of examining the way of functioning and innovation in this field. Namely, human resource management is perhaps the most important segment in running a sports organization, since its basic resources are people, athletes, on whom the success, sports achievements and profits of the organization itself depend. The paper presents the specifics of this system, with an emphasis on the most important aspects. Also, research was conducted on how human resource management works on a specific example of the sports organization FC Napredak from "Kruševac". The aim of this paper is to show on a selected example of a sports organization how to improve the functioning of human resource management, if we keep in mind their importance for the development, advancement and achievement of top sports results. The results of the research indicate that in the selected sports organization FC "Napredak", as in many others throughout our country, there is no well-organized human resources management, but current things are done on the fly, which can result in omissions and dissatisfaction of employees.

Keywords: management, human resource management, sports organization.

PERCEPTIONS OF HEALTHCARE WORKERS ON JOB DESIGN IN HEALTHCARE ORGANIZATIONS IN THE PUBLIC SECTOR

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ABSTRACT

The job design of health organizations is one of the ways to provide motivation and job satisfaction, which are key determinants of the quality of health care. In this context, the research of social, motivational and contextual factors of job design is most often performed. However, results often show that there are differences in the perception of these elements of job design, which depend on some socio-demographic characteristics of employees. Therefore, the aim of the paper is to determine which group of elements of job satisfaction stands out as the most important for health differences and which are the factors that affect the perception of job design of health workers. Empirical research and methods of t test and ANOVA test found that there are some statistically significant differences in the perception of the design elements of health organizations of employees of different genders. In addition, the results of the analysis showed that there are differences in the perception of employees of different ages, education and length of service. The obtained results may help human resource managers to define job design that will have a positive effect on the satisfaction and motivation of employees, and thus enable higher quality health care.

Keywords: job design, human resource management, health organizations.

JOB CHARACTERISTICS AND INTRINSIC MOTIVATION OF EMPLOYEES IN HEALTH ORGANIZATIONS

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ABSTRACT

Intrinsic motivation is the initiation and direction of certain employee behaviour through intangible and non-financial rewards. In health organizations, intrinsic motivation stands out as a key factor in achieving efficiency, which is why human resource managers strive to stimulate employees to provide high quality health care by applying intrinsic rewards. Job design can be used as one of the ways to improve the level of intrinsic motivation, by involving the integration of motivational, social and contextual factors of job design. The aim of this paper is to determine the impact that the business design of health organizations has on the intrinsic motivation of health workers. The results of the research showed that there is a high correlation between motivational, social and contextual factors of job design to intrinsic motivation of employees.

Keywords: intrinsic motivation, job design, human resources, health sector

RELATIONSHIP BETWEEN LEADERSHIP BEHAVIOR AND EMPLOYEE SATISFACTION: A CASE STUDY OF SERBIAN HEALTHCARE SYSTEM

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ABSTRACT

Leadership, as a process of engaging and directing employees towards the realization of a certain goal, is a social process that has a significant impact on job satisfaction. In healthcare organizations, job satisfaction is an antecedent of performances, so a leadership style must be created to provide a positive impact on both intrinsic and extrinsic satisfaction. Mostly, such effects are provided by transformational leadership, so the aim of this paper is to examine the impact that leadership behaviour can have on the intrinsic and extrinsic satisfaction of employees in health care organizations in the Republic of Serbia. Over a sample of 362 respondents employed in the health sector of the Republic of Serbia, correlation analysis showed that there is a statistically significant impact of leadership behaviour, ie leadership style, on intrinsic and extrinsic satisfaction of employees.

Keywords: leadership, transformational leadership, job satisfaction, intrinsic satisfaction, extrinsic satisfaction.

MARKETING ACTIVITIES OF SMALL FAMILY HOTELS

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ABSTRACT

The future of receptive tourism in this area relies on the potential of numerous small, family hotels. They encourage the regional development of underdeveloped areas and easily fit into the destination they belong to. Their most distinctive feature is the direct relationship with hotel guests. A small family hotel business is able to fully achieve its business and economic goals, if it consistently applies the marketing concept in its activity. The demand for these services in the world is constantly growing, because small family hotel industry is expanding in comparison to stagnant mass tourism. Marketing activities in the business dealings of small family hotels are among the most significant factors that will contribute to the development and balance of the tourist offer. The current situation in the receptive capacities is marked by still insufficient offer of accommodation in small family hotels and guest houses. Small family hotels, within the overall offer of hotel capacities, can be a significant feature of the local recognizability. All the relevant prerequisites for the further development of receptive tourism with a strong offer of small family hotels exist in this region. This form of hospitality will get stronger worldwide, thanks to the flexibility and competitiveness which are primarily based on the quality of the offer. Family-type hotels can be one of the main assets of our tourism in the coming years.

Keywords: family hotels, regional development, marketing concept, tourist offer.

CONVERSATIONAL MARKETING - NEW ROLES OF CONSUMERS

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ABSTRACT

Consumer behavior has changed. Everything is gravitating towards customization. The key driving forces without a doubt are technological growth that is developing in a rapid rhythm. Historically, the companies had a one-way communication with the consumers, where the goal was to push broadcast marketing whereas today consumers are becoming producers at the same time. In the new age of consumers, they are more knowledgeable, demanding and they expect unwavering and experiences tailored to the extreme. Emergence of conversational agents is a technology in development that is bringing the topic of conversational marketing to the broader audience through its applicability in various fields thus including the inevitable - e-commerce. A prominent feature of every conversational agent is to engage in personalized one-to-one real-time communication with a consumer and offer availability for 24 hours a day, every day. This paper aims to discuss the opportunities and challenges of conversational marketing and strives to draw the practical ramifications from it. Research method is done through the literature review. The findings clearly indicate that nowadays companies need to align with conversational marketing or they will lag behind. Three main things are the key to consumers: what they are buying i.e. product, from whom they are buying i.e. the brand and the path they take to get there i.e. service.

Keywords: customer, engagement, conversation, marketing, e-commerce.

JEL classification: M21, M31, M37.

THE USE OF ORGANIC AND PAID ADVERTISING IN ORDER TO INCREASE REACH AND ENGAGEMENT ON INSTAGRAM PROFILE

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ABSTRACT

In order to determine the most effective method of advertising on Instagram and attract users of the application to become permanent followers of the site, for the purposes of this paper, we used primarily collected data through weekly testing of seven selected methods. Five organic (increasing the number of followers and interactions - removing inactive followers, tracking posting time, changing the number of "tags", "liking" other users' content and a combination of 4 "likes" and 1 comment) and two paid directly from the Instagram application (foreign advertising and advertising for the domestic market). The results of the research were processed by descriptive statistics. The paper represents the synergy of theoretical and empirical work. The first part will theoretically describe facts related to the second, empirical, part of the paper and the case study, which was designed and researched. The idea stemmed from the need to select the most successful methods from the large number of the ones used to organically increase the number of followers and the number of interactions on the site. There was also a need to check whether these methods were as good for advertising as they were paid for. Also, it was necessary to determine whether they bring results in relation to the invested engagement. Comparing the achieved results of organic and paid advertising methods, it was found that certain organic advertising methods give better results in some parameters than paid ones, while paid ones give better results in other parameters.

Keywords: Instagram, organic advertising methods, internet marketing.

JEL classification: M31, M37.

THE INFLUENCE OF DIGITAL MARKETING ON CONSUMER BEHAVIOR

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ABSTRACT

The advent of digital marketing and its application has triggered a digital revolution in consumer behavior. Its appearance has completely changed the pattern of consumer behavior in the shopping process. Digital marketing in a completely new way without any effort in an efficient, economical and effective way connects potential customers anywhere in the world where they have access to the Internet. In a very short time in both the Republic of Srpska and Bosnia and Herzegovina, digital marketing has become a successful and irreplaceable business model that organizations and their management apply extensively in their daily business. The focus of this research is on consumer preference in shopping and use of digital networks, and their impact on shopping decisions in a relatively small market, such as the Republic of Srpska market with potential slightly less than a million consumers.

Keywords: digital marketing, consumer behavior, internet, website, organization.

THE IMPACT OF DIGITAL TWIN TECHNOLOGY ON MARKETING

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ABSTRACT

By creating digital representations of items, the digital twin concept bridges the gap between the physical and virtual worlds. Digital twin is an emerging technology that has recently received a lot of attention. With advancements in data acquisition, processing, simulation, visualization and many other associated technologies, the concept of digital twin becomes more mature and applicable in numerous application domains where it has proven to be advantageous. In the marketing domain, the digital twin is a step towards implementing a customer-centric marketing approach. Marketing tactics can be modified and targeted based on collected data on customer activities, behavior, thoughts, and feelings, hence resulting in the increased marketing effectiveness. This paper attempts to summarize the impact of digital twin in the marketing domain, outlining all related benefits and challenges.

Keywords: digital twin, marketing, IoT, AI.

THE ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN PREDICTING CONSUMERS' BEHAVIOUR

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ABSTRACT

Understanding the factors that influence consumers when making purchasing decisions, the phases that consumers go through to make decisions, as well as how to evaluate the company after the purchase are just some of the elements that require research into consumer behavior to gain a competitive advantage in the market. Digital transformation is a process that, by implementing novel Information and Communication Technologies (ICTs), has influenced not only the formation of new business models but also consumer behavior. Novel technologies have changed the way companies communicate with consumers, whether they are final or business consumers, the way they meet their needs, and the use of certain products and services, but they have also altered how consumers' needs and requirements are researched. Technologies that support the process of digital transformation such as Artificial Intelligence (AI), Augmented Reality (AR), Internet of Things (IoT), Blockchain, Virtual Reality (VR), Robotics, and 3D printing have influenced the transformation of business models and consumer expectations, consumer experience, as well as research and prediction of consumer behavior. Taking into account the importance of predicting consumer behavior for achieving business success and gaining competitive advantages in the market, this paper will examine the role of AI in the predictive activities of companies.

Keywords: digital transformation, AI, consumer behavior.

FINANCIAL COMPETITIVENESS OF BREWERY IN BIH

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ABSTRACT

By analyzing the financial statements and calculating the financial ratios, it is possible to establish the financial condition and performance of the company. This paper compares the success of breweries in Bosnia and Herzegovina for a period of 3 years. Two types of financial ratios were used; balance sheet ratios, which can be used to determine the financial position of a company, and income statement ratios, which represent the performance of a company over a period of time. As it is not possible to make a completely objective assessment of the company by comparing data from the balance sheet with data from the income statement, so it is not possible to obtain a sufficient coefficient to obtain sufficient reliable information on which to assess the financial condition and performance of the company. Only when the analysis of the group of coefficients and their mutual comparison was performed, it was possible to obtain an objective assessment and establish the financial condition and performance of the brewery in BiH.

The aim of this paper was to determine which brewery in BiH is the most financially competitive and in which of them it is worth investing financial resources.

Keywords: financial statements, balance sheet, income statement, financial ratios, competitiveness, brewery.

INFLATION RATE IMPACT ON THE RATE OF THE RETURNS OF FINANCIAL MARKETS OF SERBIA AND REPUBLIC OF SRPSKA

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ABSTRACT

Taking into account the current trends in the financial markets and the crisis caused by the COVID-19 virus, the paper analyzes, tests and quantifies the impact of inflation rates on daily rates of return-on-investment activities in the financial markets of Serbia and Republic of Srpska. The aim of the research is a concrete, practically tested and quantified knowledge about the possibilities and efficiency of the ARCH and GARCH models' application to quantify the inflation rate impact on the share returns of the observed financial markets. The period covered by the survey is from 2017 to 2021, where it is possible to test the success of the application of ARCH and GARCH methodology in the period before the COVID-19 crisis, as well as during the crisis. The research methodology includes the use of AIC and SIC (Akaike and Schwarz) criteria for selecting optimal models, as well as certain tests that are adapted to the specifics of financial markets in developing countries. The research results confirm the role and significance of the application of econometric models in order to quantify inflation rates to returns return on investment activities in 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 investors in the context of making decisions on investment activities.

Keywords: inflation rate, returns on financial markets, ARCH and GARCH models, COVID-19 crisis, risk, investment.

TAXATION AND COMMON TAX POLICY IN EU COUNTRIES

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ABSTRACT

Today's modern states cover most of their expenditures with fiscal revenues, which are undoubtedly the most important group of revenues, and the most prominent item of these revenues should be taxes that cover 80% of public expenditures in the budgets of modern states. Through the introduction to the types and goals of taxation, the scope of taxes in the EU and their impact on work, consumption, energy, environment in four members of different levels of social and economic development was further clarified and defined. It was concluded that the harmonization of the system has not yet been fully implemented and that the tax policies in the member states still differ significantly in their impact on the set goals. Significant action is achieved not only through direct but also indirect taxes depending on the member. Developed members have the greatest impact on the work and preservation of the environment through taxes, with the growing importance of energy taxes. Less developed members are paying more and more attention to property taxation, environmental protection and increasing energy levies with a standard impact on household consumption.

Keywords: taxes, taxation, European Union, common policy, members.

THE IMPACT OF THE UKRAINIAN WAR ON THE MOSCOW STOCK EXCHANGE

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ABSTRACT

The history of the Russian Stock Exchange is very rich. The first stock exchange was founded in St. Petersburg in 1703, it was a trade in goods. In Moscow, the trading platform was opened more than a century later, in 1839, and trading on Russian stock exchanges began in the 1860. Russia's invasion in Ukraine has roiled global markets. Inflation and the prospect of higher interest rates were already contributing to market volatility. Now, global sanctions and the day-to-day events in Ukraine have made navigating volatile markets even more difficult.

The Russian shares were last traded on the Moscow Stock Exchange on February 25th, when central bank then decided to halt stock trading to protect Russian investors from the impact of Western sanctions imposed as a result of what Russia calls a "special military operation" in Ukraine. The Moscow Stock Exchange resumed trading with shares on 24th of March, after a month in which it was closed due to the volatility generated by the Russia-Ukraine war, which broke out on February 24th.

The economic effects of the Ukrainian war will be felt beyond its borders, and those of Russia, and will complicate the overall equation of exiting the crisis and maintaining a sustainable recovery in the short and medium term.

Keywords: Moscow Stock Exchange, Rubble, MICEX, MOEX.

CHALLENGES FOR CRYPTOCURRENCY AUDIT, ATTITUDES OF PRACTITIONERS IN THE AUDIT IN THE REPUBLIC OF SERBIA

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ABSTRACT

Cryptocurrencies are a challenge for auditors worldwide because entities required to audit financial statements can do business with cryptocurrencies. The auditor needs to gain a preliminary understanding of the cryptocurrencies within the entity's operations to the extent sufficient to decide whether to accept the audit engagement or refuse to conduct the audit in the cryptocurrency entity. If it agrees to the meeting, the auditor will need to obtain reasonable assurance about the correctness of the accounting coverage, the established IT controls and the degree of security risk, and the potential impacts on business continuity. The research subject is auditors' attitudes in the Republic of Serbia on the challenges for cryptocurrency auditing and the level of awareness and knowledge about cryptocurrencies and related activities that may affect the planning and implementation of audits. The main conclusion is that the persons engaged in auditing in the Republic of Serbia, in most cases, have only a basic knowledge of cryptocurrencies and believe that they need additional training to increase their level of knowledge and expertise.

Keywords: audit, accounting, cryptocurrencies, blockchain.

LAW AND SECURITY SECTION
PRAVO I BEZBJEDNOST

A MINOR AS A TRANSPLANT ORGAN DONOR

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ABSTRACT

Human organ donation is an act of humanity and mercy, an expression of solidarity with the person in need of an organ and his family and, therefore, represents socially desirable and notably acceptable individual action. A living donor transplant is based on the principle of voluntarism and the protection of the individual person's autonomy, his right to physical and mental integrity, dignity and health are the imperatives that have to be respected in a transplant procedure. Hence, in case when an organ donor is a minor, who, by rule, lacks legal capacity to give an informed consent, there is a question who will on his behalf perform this humane act and allow the removal of an organ from the minor's body for transplantation purposes – particularly when knowing that this procedure is not medically indicated and is not aimed at the improvement or maintenance of the organ donor's health, but rather may cause him long term risks and problems, while all the benefits will go in favor of the organ recipient. The subject of this paper is to analyze how European national and supranational legislations regulate the matter of a minor living organ donor and, where this practice is permitted, to review the conditions for its performance. The goal of the paper is to analyze the transplant conditions as the measures for the special protection of a minor donor and determine whether there is a balance between the protection of the rights and interests of children and the protection of public interest and social solidarity, as a manifestation of the public interest. This analysis should provide an answer to the question whether it is acceptable from legal and ethical aspects to have a minor person for an organ donor and how this matter should be further regulated and developed.

Keywords: organ transplantation, a minor organ donor, informed consent, legal protection of minor's rights and interests.

PROTECTION OF PREGNANT WORKERS – COMPARASION BETWEEN EU STANDARDS, SERBIAN AND US LEGISLATION AND PRACTICE

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ABSTRACT

This paper is based on the examination of the issue of protection of pregnant women at work, with particular reference to their labour rights during pregnancy and the prohibition of discrimination against them on the basis of their sex, pregnancy and family duties.

In the first part of the paper, the author deals with relevant legal regulations that protect the rights of female workers during pregnancy, starting with the Constitution of the Republic of Serbia, as the highest legal act, through international regulation to domestic regulations. The second part of the paper refers to the law of the European Union that protects pregnant women from discrimination and other forms of abuse at work. Further, in order to show the protection of pregnant women from a completely different perspective, author deals with the protection of pregnant workers in the common law system.

At the very end, the author gives a presentation of consideration of pregnancy of workers from the employer's angle, citing problems that the employer encounters, in connection with the implementation of relevant guarantees in practice.

Keywords: pregnant workers, protection of workers, EU law, ILO standards, Serbian law.

THE ROLE OF THE GUARDIANSHIP AUTHORITY IN THE PROCEDURES OF ENFORCEMENT OF DECISIONS IN THE FIELD OF FAMILY LAW

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ABSTRACT

In this paper, we will deal with guardianship authorities that participate in the enforcement of decisions in the field of Family Law. The Law on Enforcement Procedure prescribes basic procedural rules of importance for the execution of court decisions in the field of family relations - family law, which refer to the surrender and confiscation of a minor child. The provision of Article 222 prescribes the local jurisdiction of the court in the procedures of execution of decisions on surrender and confiscation of a minor child, so that for deciding on the proposal for execution of the court decision ordering the surrender of the child, the competent court which is generally territorially competent for the party requesting enforcement, as well as the court in whose territory the child is located. According to Article 223 of the same law, an active identification card for submitting a motion for enforcement may be submitted by a parent or other person to whom the child is entrusted for custody and upbringing, as well as a guardianship authority. The manner of conducting the execution is prescribed by Article 224 of the same law. In the execution procedure, the court pays special attention to the need to protect the best interests of the child. With this provision, the legislator foresaw a kind of gradualness in coercive measures, so he prescribed that the court will leave the enforcement debtor a period of three days from the date of delivery of the decision to hand over the child to a parent or other person or organization entrusted with custody. education, under the threat of a fine.

Keywords: Authorities, guardianship, law, children, court.

LAWSUIT - INITIATOR OF CIVIL PROCEDURE (WITH REFERENCE TO DIVORCE LITIGATIONS)

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ABSTRACT

Since the exercise of civil rights is based on a fundamental and conceptual approach that is indispensable with the human desire to exercise them, or in some situations and defense (when they are subject to any challenge, restriction or violation), it is evident that the lawsuit is the initiator of their preservation. Just as in criminal proceedings the indictment by the prosecutor (which in this case is the state) is the initiator of the criminal proceedings, so the filing of a civil lawsuit (through a lawyer) is the basis for preserving the individual right that the plaintiff injured party) in litigation.

This professional paper deals with the significance of the lawsuit with reference to family law, its part- marriage law. Although it is generally known that in divorce litigation the law left two possibilities to the parties, the possibility of divorce through a request for amicable divorce, and the possibility of divorce through a lawsuit, in this paper the claim is placed on the lawsuit (in situations where the other party is not interested in amicable divorce). Therefore, the aim of this paper is to point out the importance of a lawsuit that is undisputed in litigation, but also the concept of a lawsuit, ie a claim in divorce lawsuits. The method of theoretical analysis is a method that will be used in the work and which permeates through it, since a systematic and concise approach will provide insight into the realization of the human right to divorce when it is not in the interest of the other party, but also in what way and the claim must be aimed at satisfaction with the outcome of both parties, but the highest preservation of the best interests of the child.

Keywords: lawsuit, divorce lawsuit, parties, claim.

DOMESTIC OR FAMILY VIOLENCE

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ABSTRACT

Domestic violence represents a criminal act which seriously endangers a family as a basic unit of society. In the paper, the authors analyze the elements of the criminal act of domestic or family violence in the Republic of Srpska law, with a parallel review of the legal solutions in the countries in the region, which are accompanied by the positions of relevant judicial practice and the personal views of the authors.

Keywords: violence, family, criminal act.

POSSIBILITIES OF APPLICATION OF RESTORATIVE JUSTICE TO VIOLENCE IN SPORT

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ABSTRACT

At the beginning of the paper, the authors point out that sport, in addition to having positive effects, can in some cases generate violence that is unacceptable. In this regard, violence in sports is immanent to all social epochs. As the existing concept of retributive justice embodied in criminal law (does not) give appropriate results, it is necessary to consider the possibility of applying the concept of restorative justice in the fight against violence in sports. In addition to the conceptual definition of restorative justice, the authors emphasize the existence of two models of restorative justice - diversionary and therapeutic, and after analyzing the normative framework of violence in sports in the Republic of Serbia discusses the application of these models in combating this form of violence.

Keywords: restorative justice, violence, sports.

DIRECTIONS OF ADMINISTRATIVE DISPUTE REFORM IN THE REPUBLIC OF SRPSKA

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ABSTRACT

As part of the study of administrative disputes, it is necessary to consider whether our country needs institutional reform of the administrative-judicial system. In order to give an answer to this question, it is necessary to generally problematize the importance of judicial supervision over the legality of the work of the administration and administrative dispute, and to analyze the state of the institutional system of administrative dispute in our country today. To successfully solve this problem, it is necessary to consider different models of organization of administrative disputes in individual European countries and try to answer the question of whether there is a single European model of institutional organization of administrative justice. We will present possible reform alternatives if we decide to reform, analyze possible problems and offer models of their possible overcoming.

Keywords: reforms, administrative dispute, administrative court proceedings, protection of rights.

ESTABLISHING AN EMPLOYMENT RELATIONSHIP OF THE REPUBLIC OF SRPSKA AND IN COMPARATIVE LAW

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ABSTRACT

The paper analyzes and studies the establishment of employment, primarily in the labor legislation of the Republika Srpska. The conceptual definition of employment is determined, then the conclusion of employment contracts as the legal basis for employment, the difference between employment contracts and employment contracts, conditions for concluding employment contracts and employment relationships between employees and employers, as well as employment contracts with a stranger. At the end of the paper, the appropriate conclusion was given, in accordance with the previous research.

In studying this topic, the normative method was used, which is reflected in the analysis of relevant legislation in the field of labor law. The comparative law method was especially used, so that some legislative solutions were critically presented, such as in the Republic of Serbia, the Republic of Croatia and the Republic of Montenegro, compared with the solutions in the Republic of Srpska.

Keywords: employment relationship, employment contract, employees, employer.

CONSTITUTIONAL RIGHT TO LIFE IN THE CONTEXT OF THE COVID- 19 PANDEMIC

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ABSTRACT

The right to life is a fundamental and universally accepted human right. We can find it in numerous constitutional and international legal documents. The right to life has become more pronounced in the last few years since the whole world was facing with a pandemic of the SARS-CoV-2 coronavirus disease (the COVID- 19 pandemic). In this paper, we will use a comparative method to analyze safety measures in several different countries aimed to prevent the transmission of SARS-CoV-2 virus. In particular, we will analyze the correlation between these safety measures and the constitutional right to life. An analysis of these measures shows that the safeguarding constitutional right to life was their main goal. However some of these safety measures sometime have led to restrictions of other rights and freedoms guaranteed by the constitution.

Keywords: right to life, constitutional rights, pandemic, covid- 19.

LEGAL - ECOLOGICAL ASPECTS OF THE NATIONAL PARK "UNA", ON THE BORDER OF BOSNIA AND HERZEGOVINA AND CROATIA

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ABSTRACT

Una National Park occupies a picturesque area on the state border between Bosnia and Herzegovina and Croatia. Una National Park, with its ecological and tourist capacities, is established and operates in accordance with the Law on the National Park. However, the overall perspective functionality of tourist and ecological capacities in the national park zone largely depends on the current legislation of Bosnia and Herzegovina and Croatia, which regulates certain issues within the activities of the national park. Since there is a common interest in the development of tourist and environmental capacities, while the international position of the state still determines certain conditions, directions of development.

This paper examines the current situation in this area, focusing on some practical and concrete current legal issues and problems, which prevent the faster development and functionality of the Una National Park. The entire activity is aimed at increasing the real possibilities of improving the overall ecological and tourist potentials of the National Park "Una", and thus the ecological, tourist economy of Bosnia and Herzegovina.

Keywords: Una National Park, National Park Act, ecology, tourism, cooperation, economic capacity, development.

THE CONSTITUTION OF BOSNIA AND HERZEGOVINA

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ABSTRACT

The Constitution of Bosnia and Herzegovina, i.e., Annex 4 of the General Framework Agreement for Peace in Bosnia and Herzegovina is in many ways specific in relation to the general notion of the constitution, as the highest legal document, which is its basic characteristic. The Constitution of BiH, by its very nature, is only one of the eleven Annexes to that Agreement. That is the reason why such a Constitution is not really a Constitution from the point of view of constitutional and international law, but it is an imposed, obtruded and octroized Constitution, or rather a multilateral international agreement. Such a Constitution was not created as a result of the political will of the people in BiH, but as a product of the will of the international community. Since the signing of the General Framework Agreement for Peace in Bosnia and Herzegovina, on December 14, 1995, also known as the Dayton Agreement and the Dayton Constitution, to this day, the Constitution of Bosnia and Herzegovina is the subject of analysis in BiH itself, as well as in neighboring and other countries in the world. The Constitution of BiH is, both formally and materially, an incomplete and specific legal act, which established one of the most complex forms of state organization in the world, which is also one of the characteristics of that Constitution. The Dayton Constitution of BiH has other characteristics-shortcomings: it was not created according to the usual formal-legal model, i.e. dogmatic-legal method, many terms are inadequate in the constitutional text, some legal norms are vague, and there are many other unresolved issues and legal emptiness, which all opened numerous dilemmas and different interpretations of certain provisions of the Constitution by political entities and even legal theorists in

BiH and beyond. Certain legal norms that could not be explained by "the letter of Dayton", some theorists and representatives of the international community, explained by "the spirit of Dayton". Amendments to the Constitution of Bosnia and Herzegovina were imposed mainly through the Office of the High Representative (OHR) in BiH, which also affected changes in its state polity (transfer of competencies from the entities to BiH institutions). Although a lot of time has passed since the signing of the Dayton Agreement and the adoption of the Constitution of BiH, it is still a very current topic in BiH and beyond. Regardless of all the shortcomings and weaknesses, the Constitution of BiH has its positive sides, which will be discussed in more detail in the paper. In addition to these introductory considerations, the paper will address the following issues: characteristics of the constitutional order of Bosnia and Herzegovina, administrative division of Bosnia and Herzegovina, competencies of Bosnia and Herzegovina, specifics of the political and economic system of BiH, limitation of BiH sovereignty. The paper will provide answers to very current questions, both in the past and today, whether the Constitution of BiH should be changed, whether the transfer of competencies from the entities to the BiH institutions has been stopped, whether it is possible to return the transferred competencies from the institutions to the entities, as well as other issues specific to the BiH Constitution.

Keywords: The General Framework Agreement for Peace in Bosnia and Herzegovina, constitution, constitutional order, sovereignty, sovereignty of BiH, international community.

APPLICATION OF ALTERNATIVE CRIMINAL SANCTIONS IN THE SYSTEM OF ENFORCEMENT OF CRIMINAL SANCTIONS OF THE REPUBLIC OF SERBIA

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ABSTRACT

Alternative criminal sanctions enable the punishment of offenders and the execution of a sentence of liberty in the social environment in which the perpetrator lives and works, and their content constitutes special obligations, restrictions and prohibitions. Alternative criminal sanctions include penalties in the public interest, a home prison, and a court order banning the abandonment of an apartment as a house arrest, an electronic bracelet, a suspended sentence with protective control. The aim of this paper is to point out from a scientific and practical point of view the positive effects of the introduction of alternative criminal sanctions in the legislative system, as well as their possible shortcomings. The introduction of an alternative enforcement of a sentence of offenders greatly reduces the costs of executing a criminal sanction because the convicted person is serving the sentence at the address where he / she is staying in the family circle. Execution of a criminal sanction under such conditions eliminates the daily expenses that the institution would have if the person resides in it, where it primarily falls on the convict's diet, his treatment, the costs of transport from the institution on various grounds, the use of hot water, bedding and linen that the convicted person must have, the work of civil servants in the process of security and resocialization, and all other daily activities when serving the sentence in penal conditions. This type of execution of sentences creates great economic savings in the state budget. The application of alternative criminal sanctions separates primary offenders from penological and criminological returnees, which prevents "criminal infection" and recurrence.

Keywords: offenders, punishment, criminal sanctions, alternative sanctions, execution.

INFORMATION TECHNOLOGY AND MEDIA
INFORMACIONE TEHNOLOGIJE I MEDIJI

INFORMATION SECURITY AS A SEGMENT OF SOCIAL NETWORK ACCOUNT AUDIT

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ABSTRACT

Information security is an essential and unavoidable aspect of any audit of accounts on social networks, which is carried out in natural conditions by applying methodological guidelines on a specific statement on a particular social network. A social network account audit is an independent review of an external person on the status of social media accounts, account activities and accounts information security. Nowadays, social networks are an essential factor in many people's daily lives, which suggests that they contain a large amount of information about users that can be confidential and sensitive and include photos, videos, payment card information, location, activities, and more. The subject of research in this paper is the theoretical presentation of the importance of information security in the context of social network account audit by describing the challenges, risks and recommendations that conduct tests and draw conclusions about information security accounts on social networks. The main finding in the paper is that persons engaged in the social network account audit in each audit engagement should pay special attention to the information security of demands as an essential segment of the audit of rankings on social networks.

Keywords: information security, auditors, social network account audit, social networks.

ESTABLISHING SECURE COMMUNICATION USING SSL VPN

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ABSTRACT

A following text represents a real life sample and as such it has a large possibility for use and everyday life. By setting up SSL-VPN connection, users can have access to local resources (LAN). SSL-VPN uses safe connections and creates a “safe tunnel” for clients to communicate from outside of local network to the local user network.

Application of this solution does not necessarily have to be for a business needs, it is also applicable to the everyday needs of private users (for example: chess club, gaming club, etc.).

Keywords: virtual network, firewall, SSL-VPN connection.

CREATING CLOUD BASED WEBRTC VOICE OVER IP APPLICATIONS FOR WIRED AND WIRELESS USERS

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ABSTRACT

This document presents a sample of building a Web application which is used for „Voice over IP – VoIP,, calls, internal and external to the company. The application enables wired and wireless users to access “live” voice and video communications based on the webRTC technology. Containers (micro services) were used as a development and production platform based on Docker implemented on Microsoft Azure Cloud.

Keywords: Docker, container, webRTC, Microsoft Azure.

DIGITAL TECHNOLOGIES IN A REAL KINDERGARTEN PROGRAM

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ABSTRACT

Digital technology is a comprehensive term that includes digital devices such as computers, mobile phones, tablets, etc., as well as activities that arise from using digital devices. Ways of integrating digital technologies into the preschool education program should result from the conceptual starting points of the program. In programs based on a relationship-oriented approach, such as Fundamentals of Preschool Education Program "Years of Rise", learning is understood as the co-construction of knowledge with peers and adults in situations that have personal meaning and significance for a child (Fundamentals of the Program, 2018) which implies that digital technologies in such programs cannot be used as a means of teaching or as a substitute for a preschool teacher, but in their integration the following principles should be respected: the use of digital technologies is not isolated, it is not a special area of work within the program or an independent activity but its use is already meaningfully integrated into what children and a preschool teacher are doing, what they are playing and researching; technologies are used as tools for accessing information, solving problems, creative ways of expressing one's own experience and knowledge, documenting one's activities and communication; the use of digital technologies is a social activity of joint participation and exchange; digital technologies are flexibly and meaningfully arranged and moved within the whole space or within individual spatial wholes (Pavlović, Breneselović, 2021).

The aim of the research is to see the harmonization of the use of digital technologies in the development of a real program in the kindergarten using the concept of Basics of the Program "Years of Rise". Using the method of qualitative content analysis, twelve stories on different topics, the project of educators employed in the kindergarten "Pčelica" from Sremska Mitrovica, were analyzed. The research findings were discussed from the standpoint of the above principles. It is crucial for practitioners to have a system that supports and enables their permanent professional development in the field of meaningful use of digital technologies in a real program, in accordance with the concept of Basics of the Program "Years of Rise".

Keywords: digital technologies, basics of the program, real program.

DIGITIZATION AS A TOOL FOR SUBJECTIVE ASSESSMENT OF LIGHTING IN PRODUCTION HALLS

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ABSTRACT

This paper is devoted to the issue of the possibility of lighting subjective assessment in production halls using digital tools. Production systems and processes are subject to mass digitization in synergy with the Industry 4.0 concept. It is necessary to extend the digitization process to all available processes and issues, to ensure the sustainability of digitization and its constant growth. The field of digitization is primarily focused on the collection of quantitative data in production, but the main idea of this paper is to point out the possibility of data collection in the field of subjective assessment, focusing on the assessment of working conditions and visual workload of workers. The article provides an overview of the possibilities of digitization in the subject area, while in the end, it provides an insight into the practical possibilities of interpretation of this issue.

Keywords: lighting, manufacturing, digitization, ergonomics.

Acknowledgement

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PREDICTION OF TIME-SERIES USING TIME-DELAY NEURAL NETWORKS ON THE EXAMPLE OF TOTAL ENERGY LOAD

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ABSTRACT

Energy is the spiritus movens of humanity. In the current energy crisis, this is even more pronounced. Hence, predicting the total energy load is extremely important for all elements of the energy system for a number of reasons. This paper examines the ability of the Time-Delay Neural Network model to predict total energy load, on an hourly basis, using real-world data from Spain. The neural network was created, trained and tested in Neurosolutions 5.0 software. The dataset was obtained from Kaggle database and consists of 35,000 real-world hourly total energy load records from Spain. Although the results showed a high degree of linear correlation between the observed and predicted values, max. abs. error, mean-absolute-error, and root-mean-square error values were not satisfactory. The results imply that it is necessary to introduce additional predictors such as weather conditions, and possibly economic, geopolitical, and other parameters for achieving a greater reliability of predicted values.

Keywords: TDNN, time-series, prediction, total energy load, Spain, machine learning.

WEB DEVELOPMENT

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ABSTRACT

In the last fifteen years, the Internet has experienced rapid and dynamic development, which has contributed to IT becoming one of the most popular media for exchanging information. To modern society the web is an important medium for both accessing and sharing information. The first era (approximately since 1993) of the web was characterized as a collection of static pages created exclusively by experts, which ruled out the possibility of creating your own web pages or content on the web. The second generation (1999) enables easier use and provides the possibility of publishing various multimedia content, apropos interaction between users. The Semantic Web, as the third generation of the Web (approximately since 2006), requires structing information so that computers can read and understand it as well as humans. Web development is a complete integration into everyday life that provides the possibility of interaction between people, people and computers and between computers.

Keywords: web, web development, semantic web, interaction, communication.

NETWORK AND PORT SCANNER - A TOOL FOR GOOD OR BAD

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ABSTRACT

In this paper we examine and compare several custom-made implementations of a network and port scanner that are written in Python programming language as a part of a Information systems security course teaching material. Network scanning tools play an important role in network information gathering, which is the first step in penetration testing. First version of network and port scanner comes in two sub versions: for Windows and Linux operating systems, and a slightly modified version to address specifics of Android devices. Both varieties of first version use ping command to see if a device with a certain IP address will respond to them and then uses TCP sockets to scan range of ports on a device that responded. Second version of network and port scanner uses ARP Protocol to scan a network for connected devices and then uses TCP sockets to scan range of ports on a device that responded to broadcasted package. In the late section of this paper, we emphasize advantages, disadvantages, performances and ease of usage of previously mentioned implementations. We also discuss ethical dilemmas of using such tools from the aspect of security professionals, programmers, common computer users and IT students.

Keywords: network scanner, ports, TCP sockets, ARP, information gathering.

DATA PROCESSING IN ORIGIN – ANALYSIS OF TEXTILE FABRIC AND STITCHES STRENGTH

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ABSTRACT

This paper describes how we automated data processing for over 2000 fabric samples that were ripped using MESDAN-LAB tensile Strength Tester in order to determine their respective yielding points. Yield point is defined as a point where a sample start to tear and is presented as an ordered pair of two values. First value represents force that was applied to a sample in order for it to start tearing, while the second tracked value represents elongation in which sample started to tear under the previously mentioned applied force. Several tools and development environments where used in order to automate required data processing that consists of three major parts: preprocessing, processing and postprocessing. One C# console application was written for pre and post data processing, and one Python script was written in order to send preprocessed data to Origin 2021 software for batch processing. Processed data can be further analyzed by hand or trough some data analysis and correlation software such as RapidMiner. This paper does not present results and conclusions of the conducted textile samples analysis and focuses solely on the created data processing workflow. Presented workflow can be used as a template for various similar research in textile sciences.

Keywords: Origin, data processing, tensile strength testing, Python, C#.

ARTS, COMMUNICATIONS AND DIGITAL TECHNOLOGIES

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ABSTRACT

Paul Watzlawick, an Austrian sociologist and psychotherapist, set out a famous axiom about the necessity of communication. He said “One cannot not communicate”. From this point of view on culture and digital technologies, when we use social networks, various communication applications, computers, smartphones and watches on a large scale, and when we have smart buildings and cities, we could set another axiom: “One cannot not to use digital technologies” (whether for communication, work, art or some other purposes). With so much technology in our hands, on our skin, on our bodies, in our bodies and in our minds, haven't we become cyborgs - half people, half machines? People usually refuse to admit it.

Keywords: culture, technology, cyborg, identity, art.

Acknowledgment

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ENGINEERING, TECHNOLOGY AND MATERIALS
INŽENJERSTVO, TEHNOLOGIJE I MATERIJALI

REMOVAL OF Pb^{2+} FROM AQUEOUS SOLUTION USING ALKALLY ACTIVATED HYDROCHAR OF THE SPENT MUSHROOM SUBSTRATE

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ABSTRACT

In this study, the adsorption capacity of Pb^{2+} removal from aqueous solution was examined by hydrochar of the spent mushroom substrate. In order to improve the adsorption capacity, hydrochar was previously activated with 2M KOH. The obtained results demonstrated that alkally activation increased the sorption capacity from 36 mg g⁻¹ to 74 mg g⁻¹. Structural characterization of activated and inactivated hydrochars were performed by FTIR analysis. Toward to obtained results of FTIR analysis, the increased of the oxygen functional groups (OFG) in activated hydrochars was perceived, which is contributed to the increase in the adsorption capacity of this carbonized material. Results indicated that spent mushroom substrate can be converted into hydrochar as a perspective sorbent for removal of Pb^{2+} .

Keywords: Hydrochar, Pb^{2+} , Alkally activation.

APPLICATION OF FeAl-LDH@SiO₂ FOR PHOSPHATE REMOVAL FROM WATER

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ABSTRACT

In present study FEAL-LDH@SIO₂ were Used for removing phosphate from aqueous solutions. FeAl-LDH with molar ratio Fe/Al = 3/1 was synthesized by co-precipitation from aqueous solutions in the present of SIO₂ PARTICLES. Silica obtained from rice husks were used as a substrate for the deposition of LDH particles. The prepared material was characterized by scanning electron microscope (FE-SEM), X-ray diffraction (XRD), N₂ adsorption/desorption isotherms (BET method) and Fourier transform infrared spectroscopy (FTIR). XRD analysis showed that Fe-Al had formed LDH structure. SEM analysis revealed deposition of LDH particles on SIO₂ SUBSTRATE. The adsorption characteristics for phosphate uptake of the obtained material were performed. Adsorption experiments were carried out as a function of LDHs dosage with three different mass ratios of LDH/silica = 1/1, 2/1, and 3/1 and different phosphate concentration AT INITIAL PH 4. Phosphate concentrations were determined using spectrophotometer. The results showed that the maximum sorption capacities of phosphates calculated based on Langmuir equation was 52.68 mg g⁻¹.

Keywords: FeAl-LDH, silica, adsorpcion, phosphate.

CARBON CRYOGEL MAGNETITE COMPOSITES-EFFECTIVE ADSORBENTS FOR THE PHOSPHATE AND PHENOL REMOVAL FROM WATER

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ABSTRACT

Carbon cryogel (CC) was impregnated with magnetite to produce a multifunctional magnetic adsorbent capable of removing phenoles and phosphates from water. Adsorbents were prepared via co-precipitation of Fe^{2+} and Fe^{3+} ions in aqueous solution in the presence of CC. Non-treated or acid-activated CC was used. The CC: Fe_3O_4 ratios of 1:1 and 3:1 were applied. The addition of HCl in the synthesis process was also investigated. XRD confirmed the formation of nanocrystalline magnetite. BET analysis showed that the pre-treatment diminished the CC porous structure, reducing also specific surface area (S_p). Formation of magnetite decreases S_p and total volume of micro and meso pores, but their distribution remained unchanged. FTIR spectra revealed that magnetite was attached to the surface of the acid activated CC via C=O bond. DTA-TGA and SEM indicated that acid treatment and presence of HCl were beneficial for homogeneous nucleation and distribution of magnetite, increasing adsorption properties of composite. Batch adsorption proved that the maximum adsorption capacity for phenoles was accomplished with 3:1 ratio with non-treated CC. Samples synthesized with pre-treated CC, under 1:1 ratio, gave the best results for phosphate removal. The CC/magnetite composite was found as promising adsorbent for the simultaneous removal of both pollutants.

Keywords: carbon cryogel, magnetite, synthesis, adsorption, pollutants.

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INFLUENCE OF PHOTOCATALYTIC PRETREATMENT OF CORNMEAL ON BIOETHANOL PRODUCTION

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ABSTRACT

Bioethanol can be obtained from a variety of biodegradable raw materials, and one of the cheaper raw materials is cornmeals (*Zea mays*). The most important, and at the same time the longest operations during the production of bioethanol from corn grits are enzymatic hydrolysis and fermentation, and the duration of these operations can be influenced by the application of various pretreatments. The aim of this study was to investigate the effect of photocatalytic pretreatment of corn grits, with or without the addition of TiO_2 , on the fermentation of bioethanol, using SHF and SSF fermentation procedures. Fermentation was monitored 7 days and better results were obtained with SHF process, and the addition of TiO_2 had a positive effect in both SSF and SHF procedures (for samples treated for 180 and 240 minutes).

Keywords: photocatalytic pretreatment, cornmeal, fermentation, bioethanol.

POSSIBILITY OF USING DIFFERENT TYPES OF POTATOES AND YEASTS FOR BIOETHANOL PRODUCTION

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ABSTRACT

Bioethanol belongs to the category of renewable biofuels and is mainly obtained from starchy or lignocellulosic raw materials. One of the starchy raw material that can be successfully used to obtain bioethanol is potato (*Solanum tuberosum* L.). To produce ethanol from starchy raw materials, starch needs to be hydrolyzed to glucose, maltose and other digestible carbohydrates so that it can be easily absorbed during metabolism by microorganisms such as *Saccharomyces cerevisiae*. The aim of this work is to investigate the influence of 3 different types of potatoes (Desiree, Arizona and Kennebec) and 3 different commercial yeasts (baker's yeast, distiller's yeast and wine yeast) on the SHF bioethanol fermentation process. The intensity of fermentation was monitored for 7 days by measuring the change in mass of fermentation bottles, and the highest amount of ethanol was achieved in the combinations Kennebec-wine yeast and Kennebec-baker's yeast (3.37% vol), and the lowest alcohol content was obtained by combining Arizona potatoes with distiller's yeast (1.97% vol). The largest change in the dry matter content during fermentation was achieved in potatoes of the Kennebec variety, fermented with baker's yeast, in the amount of 4.30%. All varieties of potatoes proved to be suitable for obtaining bioethanol, and the combination of Kennebec potatoes with baker's yeast proved to be the best.

Keywords: potato, bioethanol, yeast, SHF.

WET-WASHING TECHNOLOGIES FOR PURIFICATION OF CRUDE BIODIESEL OBTAINED BY ALKALI-CATALYZED TRANSESTERIFICATION

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ABSTRACT

Water and dry-washing are generally applied to purify crude biodiesel, while membrane separation and simultaneous reaction and purification procedures are under development. This work dealt with purifying the crude biodiesel obtained by the KOH-catalyzed methanolysis of waste lard with distilled water at room temperature. After completion of the methanolysis, the reaction mixture was separated into the upper ester (crude biodiesel) and the lower alcohol layer. First, the ester layer was acidified with a 1 M HCl solution to neutralize the residual catalyst and then centrifuged (3,500 rpm, 10 min) to separate the ester layer from the aqueous phase. Next, the neutralized ester layer was mixed with distilled water (20% by weight of the ester) in a separatory funnel. The mixture was first shaken vigorously and then left to stand at room temperature to separate the ester layer from the water. This wash removes salts and traces of glycerol and methanol, while acylglycerols and free fatty acids remain in biodiesel. After only one wash, the potassium level was reduced below the prescribed limit (5 ppm). The biodiesel product had physicochemical properties fulfilling the quality standard EN 14214 for biodiesel.

Keywords: biodiesel, purification, wastewater, wet washing.

OPTIMIZATION OF BIODIESEL PRODUCTION FROM RAPESEED OIL OVER CALCINED WASTE FILTER CAKE FROM SUGAR PRODUCTION

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ABSTRACT

Biodiesel is a renewable, clean-burning substitute for conventional petroleum diesel fuel obtained by transesterification of oily feedstocks. Heterogeneous catalysts have numerous advantages over homogeneous (easy separation, reusability, high-purity products), but they are usually difficult to prepare or expensive. This drawback of solid catalysts can be overcome using waste materials as sources for their preparation. This work deals with using a catalyst prepared by calcination of waste filter cake from an industrial sugar production from sugar beets in biodiesel production by the transesterification between rapeseed oil and methanol. The reaction conditions of the rapeseed oil transesterification over calcined filter cake were optimized using the response surface methodology. The waste filter cake consists mainly of CaCO_3 and the precipitated organics. A reduced cubic equation was developed to describe the effects of the reaction time, the catalyst loading, and the reaction temperature on fatty acid methyl esters. The statistical significance of the process factors and their interactions were assessed by the analysis of variance with a confidence level of 95%. The optimum reaction conditions were: the catalyst loading of 9.1% (based on the oil weight), the reaction temperature of 59.2 °C, and the reaction time of 47 min.

Keywords: biodiesel; catalyst; optimization; waste filter cake.

CAO-CATALYZED METHANOLYSIS OF INEDIBLE OILS BLENDS

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ABSTRACT

Biodiesel, a mixture of fatty acid methyl esters (FAMES), is used as an alternative, environmentally friendly fuel to fossil diesel in engines with internal combustion. The use of cheap feedstocks like inedible oil blends can significantly reduce the cost of biodiesel production. Therefore, the synthesis of FAMES from the blends of castor, camelina and used cooking sunflower oils using commercial CaO as a catalyst at the reaction temperature of 60 °C in a batch stirred reactor was studied. The aim was to examine the influence of different operating conditions, such as catalyst amount (1-3% based on oil weight), the molar ratio of methanol and oil blend (8:1-16:1), and the mass ratio of individual oils in the initial blend on FAME yield. A higher proportion of castor oil in the oil blend and a smaller catalyst amount positively affect the FAME synthesis. For example, with the blend of castor (30%), camelina (30%), and used cooking sunflower (40%) oils, the increase of the catalyst amount from 1% to 3% and the methanol-to-blend molar ratio from 12:1 to 16:1 affect the FAME yield positively.

Keywords: biodiesel, castor oil, camelina oil, used cooking sunflower oil, methanolysis.

Acknowledgment

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OPTIMIZATION OF BIODIESEL PRODUCTION FROM CHERRY (*PRUNUS CERASUSS L.*) KERNEL OIL BY CAO- CATALYZED METHANOLYSIS

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ABSTRACT

Biodiesel, an alternative for petroleum-based diesel, is commonly produced by the alcoholysis of oily feedstocks rich in triacylglycerols. The price of oily feedstocks primarily influences the overall biodiesel production cost, so the researchers are directed towards using low-cost waste oily feedstocks. Fruit waste kernels and seeds from food production, such as cherry kernels, are promising oil sources for biodiesel production. The present paper deals with using oil obtained from waste cherry kernels for biodiesel synthesis by using CaO as a catalyst. The paper's goal was to evaluate the influence of the alcoholysis reaction conditions, namely the reaction temperature, catalyst loading, and the methanol/oil molar ratio, on fatty acid methyl esters (FAME) content and to determine the optimal conditions for achieving the highest FAME content. The methanolysis reaction analysis was performed according to full factorial design 3^3 with five central points. The significant influence on FAME content has the reaction temperature and CaO loading and their quadratic terms, while the impact of process factors interactions was insignificant. The optimal reaction conditions were: the temperature of 60 °C, catalyst loading of 5% (based on the oil weight), and the methanol/oil molar ratio of 6/1.

Keywords: alcoholysis; biodiesel; cherry kernels oil; optimization.

SIMULATION OF THE COGENERATION PLANT ON RDF/SRF FUEL FOR THE DISTRICT HEATING

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ABSTRACT

The world is facing high demographic growth, rapid urbanization, and scarcity of natural resources. We are witnessing an enormous increase in the prices of fossil fuels. As a result, humanity has started the process of decarbonization and the fight against climate change. More than ever, it is necessary to transform existing and apply new technological processes that use fuels from alternative energy sources. One of the "win-win" scenarios is the use of renewable energy from waste (Waste to Energy - WtE).

Research is based on the simulation of a cogeneration plant that will use potentially obtained fuel from waste (RDF/SRF) available in Novi Sad. The process simulation shows that it is possible to treat 70 000 t of RDF/SRF per year for the production of electricity and heat energy. Electricity can be sold at feed-in tariffs to the Electric Power Industry of Serbia, while thermal energy can be used for district heating in the Novi Sad heating plant.

The contribution of the proposed cogeneration plant is in the reduction of harmful gas emissions and the fulfillment of new European regulations based on the circular economy. In addition, the use of RDF/SRF as an energy source extends the life of the landfill.

Keywords: Cogeneration, Refuse derived fuel, Energy from Waste, District heating, Simulation.

Acknowledgement

This research was funded by the City Administration for Environmental Protection, Novi Sad, Republic of Serbia through project 501-2/2021-19B-II.

IMPROVING ETHYLENE GLYCOL-BASED HEAT TRANSFER FLUIDS BY IONIC LIQUIDS AND BIOCOMPATIBLE MOLECULES

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ABSTRACT

In this paper, the influence of the additives - eight ionic liquids (ILs): 1-methylimidazolium chloride ($[\text{C}_0\text{mim}][\text{Cl}]$), 1,3-dimethylimidazolium chloride ($[[\text{C}_1\text{mim}][\text{Cl}]$), 1-ethyl-3-methylimidazolium chloride ($[[\text{C}_2\text{mim}][\text{Cl}]$), 1-butyl-3-methylimidazolium chloride ($[[\text{C}_4\text{mim}][\text{Cl}]$), 1-hexyl-3-methylimidazolium chloride ($[[\text{C}_6\text{mim}][\text{Cl}]$), 1-ethyl-3-methylimidazolium *bis*(trifluoromethylsulfonyl)imide ($[[\text{C}_2\text{mim}][\text{NTf}_2]$), 1-butyl-3-methylimidazolium *bis*(trifluoromethylsulfonyl)imide ($[[\text{C}_4\text{mim}][\text{NTf}_2]$) and 1-hexyl-3-methylimidazolium *bis*(trifluoromethylsulfonyl)imide ($[[\text{C}_6\text{mim}][\text{NTf}_2]$), as well as caffeine on the transport properties ethylene glycol (EG) was studied. Based on the measurement of density, viscosity, electrical conductivity, and thermal analysis of EG mixtures with ionic liquid or caffeine in the temperature range (278.15 - 313.15) K, the values of apparent molar volume, standard partial molar volumes, apparent molar volume at infinite dilution, Masson's interaction coefficient, thermal expansion coefficient, limiting apparent molar expansibilities, Heppler's coefficient, thermodynamic parameters were calculated. Molecular dynamic simulations supported experimental results. The obtained results were used to evaluate the influence of ionic liquids' alkyl side-chain length and anion on the possibility of improving EG as a heat

transport fluid. The influence of self-aggregation of caffeine molecules on the reduction of EG viscosity was also investigated.

Keywords: transport properties, heat transfer, ionic liquids, caffeine, ethylene glycol.

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DESIGN AND THERMOPHYSICAL PROPERTIES OF PHARMACOLOGICALLY APPLICABLE IONIC LIQUIDS BASED ON TETRACAINE AND ANTI-INFLAMMATORY DRUGS

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ABSTRACT

Here, a novel active pharmaceutical ingredient ionic liquid (API-IL) concept is presented, suggesting using traditional drugs in the form of ionic liquid. The field of ionic liquids covers salts that melt below 100 °C and are usually composed of large asymmetric cations and organic/inorganic anions. They possess a unique and convenient advantage through their tunability. ILs synthesis based on APIs preserves their biological function. Appropriate combination of cations and anions leads to better active components solubility in water, thus improving bioavailability and their potential synergistic effect.

Firstly, tetracainium salicylate and tetracainium ibuprofenate were synthesized as API-ILs. These ILs represent a combination of a drug for local anaesthesia (tetracaine) and nonsteroidal anti-inflammatory drugs (salicylic acid and ibuprofen). After ILs synthesis, spectroscopic investigations were performed using infrared and nuclear magnetic resonance spectroscopy to confirm their structures. Differential scanning calorimetry and thermogravimetric analysis determined the obtained ionic liquids' thermal behaviour. Experimental measurements of density, viscosity, and electrical conductivity were performed in the temperature range (293.15 - 353.15) K to understand the interactions occurring in the obtained

pharmaceutically active ionic liquids. The obtained results indicate stronger interactions between tetracaine with salicylate than with ibuprofenate.

Keywords: ionic liquid, active pharmaceutical ingredient, tetracaine, salicylic acid, ibuprofen.

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STRUCTURE OF BENTONITE POWDER ACTIVATED BY HYDROCHLORIC ACID

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ABSTRACT

Domestic bentonite clay (location Šipovo, Republika Srpska, BiH) is characterized by good structural, textural and morphological characteristics, and has the possibility of wide industrial application. Literature research has shown that the characteristics of this clay can be improved by various methods of modification, and then used for commercial purposes.

The aim of this work was to analyze the changes in the surface characteristics of bentonite powder caused by activation with 8% w/w hydrochloric acid (HCl) solution at a temperature of 95 °C. The bentonite was dominantly composed of montmorillonite mineral (92% w/w), and its BET area is 82.04 m²/g.

The following test methods were used to determine the effects of bentonite powder activation: X-ray powder diffraction (XRPD), low-temperature nitrogen adsorption (BET method), scanning electron microscopy with energy-dispersive X-ray spectroscopy (SEM/EDS) and infrared spectroscopy (FTIR) method. Crystal phases of montmorillonite, nontronite and quartz were detected by XRPD in bentonite powder before and after activation, SEM/EDS methods showed that activation reduced particle dimensions, slightly increased SiO₂ content, and decreased Al₂O₃ and Fe₂O content. Bands indicating the presence of a smectite group of clays were observed on the recorded FTIR spectra, which were also identified by the XRPD

method. The results of the BET method showed that the activation of bentonite powder resulted in a significant increase in specific surface area (316.25 m²/g).

Keywords: bentonite powder, hydrochloric acid activation, structural composition, textural characteristics, morphological characteristics, specific surface area.

INFLUENCE OF RAW PELLET MATERIAL ON ECOLOGICAL CHARACTERISTICS OF LOW POWER HOUSEHOLD BOILERS

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ABSTRACT

The use of biomass for energetic purposes is actual issue from different aspect of views, such as economy, used technologies, combustion specifications, environmental issues, etc. Different types of biomass are available on the market today. During the combustion process in furnaces, these types of biomass behave differently due to their specific physicochemical properties. In this research, used biomass types were wood biomass, soybean straw and chamomile waste from medicinal herbs processing. Pellet combustion was performed in a commercial furnace that was designed to heat the living space by burning wood pellets. Furnace was installed with measurement system for emissions of combustion products. The current law regulation of the Republic of Srpska in the field of environmental protection does not include testing of emissions of combustion products for plants with power less than 100 kW. In this research, the influence of pellet type on concentrations of carbon monoxide and nitrogen oxides was investigated, as well as the volume content of oxygen in the waste gas for plants with power less than 100 kW. Also, it was investigated whether the addition of additives (clay, kaolin, bentonite), used to improve the melting characteristics of ash, has an effect on reducing the emission of combustion products. The results obtained by measuring the gas emissions are compared with the standard EN 14785 which is related to the emission of carbon monoxide and nitrogen oxides.

During this research, composition of ash left after combustion of tested pellets was examined. According to these examinations, it can be pointed out that potential problems can occur when burning these types of pellets in small household heating furnaces.

Keywords: biomass combustion, pellet, gas emission, ash melting.

MECHANICAL PROPERTIES OF COMPOSITE MATERIAL REINFORCED WITH SILICA PARTICLES OBTAINED FROM BIOMASS MODIFIED WITH DOUBLE-LAYERED HYDROXIDES

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ABSTRACT

Silica particles were produced from rice husk and used as reinforcement in the polymer matrix. The obtained silica particles' surfaces were modified with layered double hydroxides, which enabled better reinforcement in the PMMA matrix. Coprecipitation was used to synthesize Fe Al layered double hydroxides (LDH) with a Fe:Al cation content of 3:1 and an FeAl-LDH: silica ratio of 1:1. X-ray diffraction, Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy with EDS were used to characterize the synthesized particles. The prepared particle amounts in the PMMA matrix were 1, 3, and 5 wt. %. The purpose of this study was to see if the obtained SiO₂ particles, as well as their modification with FeAl-LDH, had any effect on the mechanical properties of polymer composite materials. The mechanical characterization of obtained composites was done using Vickers microindentation tests and impact testing. The Vickers micro-hardness test showed that the addition of reinforcement increases the hardness of the composite. When compared to the matrix, the toughness of the composite material with a higher content of particles (5 wt. %) in the energy absorbed in this impact test was three times higher.

Keywords: Silica, layered double hydroxides, composites, mechanical properties.

SYNTHESIS AND FUNCTIONALIZATION OF ACTIVE CARBON MATERIALS

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ABSTRACT

Active carbon materials can be made with a wide range of structures, compositions and properties, depending on the nature of the organic precursor, applied synthesis process and process parameters. The wide range of their properties provides attractive opportunities for various applications especially in environment protection as well as application in energy-storage. Due to their biocompatibility there are various applications in medicine and pharmaceutical industry. Common synthesis procedures for carbon materials production involve pyrolysis of organic precursor under inert conditions (carbonization process). The resulting porous structure further develops and increases during the activation process. Activation can be performed chemically or physically. During chemical activation, the starting material is impregnated with certain chemical agents, before the carbonization process. Oxygen-containing functional groups have the greatest impact on the surface characteristics of active carbon materials. Various nanostructured elements can be incorporated on the surface of the activated carbon, such as e.g. silver and iron, which achieves additional functionality of the material.

Active carbon material have been prepared by hydrothermal carbonization of saccharides or biomass or by carbonization of hollow fibers. Chemical activation by metal (Ag or Fe) salts were applied to functionalized active carbon material. The obtained carbon materials were characterized by: X ray diffraction, scanning electron microscopy, Fourier transform infrared spectroscopy, nitrogen adsorption/desorption isotherms measurements. As a result of applied chemical activation process the active

carbon materials functionalized with nanostructured silver or iron have been obtained.

Keywords: active carbon material, functionalization, functional groups, silver, iron.

APPLICATIONS OF CONDUCTIVE POLYMERS IN MODERN TECHNOLOGIES

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ABSTRACT

Polymers are the subject of intensive research and development, not only in science but also in industry. In the last few years, many studies have been conducted on conjugated polymers, and this study of polymers has revealed their morphological characteristics and their unique electrochemical properties, which has attracted many researchers from different fields to use their versatility as a tool for technological progress. The intensive field of research is covered by the synthesis, characterization and application of the most well-known conductive polymers, such as polyaniline (PANI), polypyrrole (PPy), poly(3,4-ethylenedioxythiophene) (PEDOT), polythiophene (PTh), poly(3-hexylthiophene) (P3HT), diamionaphthalene (DAN) and their derivatives. The field of application of conductive polymers is expanding its boundaries, so research continues towards very interesting applications, such as: sensors, supercapacitors, mechanically strong but very light fibers for wearable electronic devices (electronic devices that can be worn on the body as implants or details), electrodes for touch screens, optoelectronic devices, photocells, Li-ion batteries, lasers, organic light emitting diodes (OLEDs), etc. Continuous progress in the application domain of conductive polymers continues to this day.

Keywords: conductive polymers, optoelectronic devices, sensors.

SELECTED TETRAHYDROPYRIMIDINES AS TEMPLATE FOR ORGANOGELE FORMATION

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ABSTRACT

Organogels are semi-solid structures in which an organic liquid phase is trapped by a three-dimensional matrix of self-assembled, interlinked gelator fibers. Although their most liquid composition, these systems possess the rheological behavior of solids. There has been a substantial increase in studying these systems within the last few years, predominantly due to the enormous potential for drug delivery and application in the pharmaceutical industry.

Selected tetrahydropyrimidines were synthesized employing the Biginelli reaction.^{1,2} In the first step vanilline is alkylated with different alkyl dihalides. Prepared bridged vanillic aldehydes, thiourea, and 2-(acetoacetoxy) ethyl methacrylate (AEMA) were used to synthesize the Biginelli monomer. Gelating properties were tested utilizing different monomer concentrations in sulfolane as an organogelator. The organogels were characterized by IR spectroscopy, SEM, and rheology.

The synthesis and characterization of the Biginelli-based monomers and their application in organogel formation are described. We believe that our starting point and results achieved in this study significantly affect future development in such essential areas as organogels.

Keywords: Biginelli monomer, self-assembly, tetrahydropyrimidine.

THE APPLICATION OF HYDROGELS IN MODERN AGRICULTURE

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ABSTRACT

More and more modern agricultural crops require an increasing amount of agrochemicals, however, as modern agricultural mechanization cannot meet the targeted delivery of conventional agrochemicals, over time, soil saturation occurs. After a number of years, agrochemicals become poison for the land on which they were used, and when the land is already contaminated, it is difficult to clean it. For that reason, modern agriculture is turning to the controlled use of agrochemicals. In this work, biodegradable carboxymethylcellulose - based biodegradable hydrogels were synthesized, and MWCNT carbon nanotubes were added to the gels to achieve conductivity. The purpose of these gels is to release a certain amount of agrochemicals into the soil depending on the composition of the soil, temperature, and pH value. Prepared hydrogels with and without the addition of MWCNT were added to the soil in an amount of 1% by weight of soil. Two types of fertilizers were used in the samples: microbiological and mineral fertilizers. The content of phosphorus, potassium, and nitrogen were measured in the samples; phosphorus and potassium in the samples were determined by the UV-VIS method, and nitrogen by the Kjeldahl method. During the measurement, the pH of the samples was determined using a sensor over the samples with MWCNT inside and the temperature of the samples was measured. In this way, the dependence of the released amount of chemicals on the pH and temperature of the soil was monitored. The measurement results showed that there is a controlled release of fertilizers from hydrogels, while in

the case of microbiological fertilizers there is a release at the beginning, but this process stops in the end, much faster than in the case of mineral fertilizers.

Keywords: Hydrogel, agriculture, carboxymethylcellulose, fertilizers.

INVESTIGATION OF THE INFLUENCE OF POLYOLS ON THE THERMAL PROPERTIES OF POLYURETHANE HYDROGELS

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ABSTRACT

Polyurethane is a material that is known for its stable structure and good mechanical properties, but also its hydrophobicity and insolubility in water. However, the properties of polyurethanes can be modified by incorporating hydrophilic soft segments (such as poly (ethylene oxide) (PEO)) into the structure of polyurethanes to increase their hydrophilicity, e. i. to obtain a hydrogel. In this work, polyurethane hydrogels of 2.7 functional isocyanates, poly (ethylene oxide) of molecular weight 2000, 4000, and 6000 g / mol were synthesized, with the appropriate amount of catalyst, dibutyltin dilaurate, polymerization was carried out in tetrahydrofuran as a solvent. Samples were also synthesized with varying the amount of polyol component in regard to the isocyanate component (0.5: 1; 1: 1; 1: 2). As these polyurethane hydrogels have several applications, their very important property is thermal stability. Since thermal stability depends on the content and type of polyols and isocyanates in polyurethane, the influence of the content and type of polyol component on the final thermal properties of polyurethane hydrogels was investigated in this paper. The structure of the samples was examined by infrared spectroscopy with Fourier transform, thermal properties were examined by differential scanning calorimetry and thermogravimetry. The FTIR results show that the NCO group reaction is complete and a quantitative reaction is achieved, the DSC results show that the melting temperature varies depending on the molecular weight of the PEO used and the amount of PEO. The results of the TGA analysis show that the PU degradation temperature increases with the change of the polyol component.

Keywords: Polyurethane, hydrogel, polyols, thermal properties.

BIOPOLYMERS – BASED CHEMICAL GARDENS

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ABSTRACT

Classical chemical gardens are hollow structures obtained by dissolving metal crystal salts in an aqueous solution containing appropriate anions such as silicates, phosphates, carbonates, oxalates, or sulphides. They represent the process of self-organized formation of semipermeable membranes or the growth of tubular structures. However, the formation of chemical gardens based on biopolymer hydrogels is only at the beginning of the research. The mechanisms that explain these processes have not yet been studied in detail. Extending chemical gardens to organic and inorganic-organic systems is a challenge, the realization and interpretation of which creates an opportunity to obtain nanostructures based on biomaterials, which have high biocompatibility. Chemical gardens may also be important in studying the adsorption, and desorption processes in controlled drug delivery systems.

Keywords: chemical gardens, biopolymers, hydrogels.

QUALITY TESTING OF DIFFERENT STRAWBERRY RANGE

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ABSTRACT

For successful strawberry production, it is important to follow the progress in cultivation technology, but the choice of varieties according to the field of cultivation is very important. One of the important factors of high-intensity and high-quality strawberry production is the application of new, promising varieties. The assortment of strawberries in orchards in Serbia is quite heterogeneous, with significant dynamics observed in the group of table (consumer) varieties during the last decade. In the strawberry orchards in Pocerina, the most common varieties are Alba, Licia, Aprika, Clery, and Jolie. This paper aims to examine the properties that are important for the market, namely: total acids, percentage of sweetness, phenological properties, and physical and chemical properties of strawberry fruit. The research was performed on fruit in a strawberry plantation in Pocerina on plots in the village of Gornja Vranjska. All plantations are early greenhouse production.

Keywords: Strawberry, new varieties, greenhouse production.

COMPARATIVE STATISTICAL ANALYSIS OF CORROSION LAYERS OF TWO NI-TI ALLOYS FORMED UNDER DIFFERENT MARINE ENVIRONMENTS INFLUENCES

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ABSTRACT

This paper studies the corrosive processes caused by the influence of three different seawater environments on two Ni-Ti alloys produced by different technological processes. Statistical analysis is focused on monitoring changes in the base material as well as in the formed corrosive layer. 6 samples of each Ni-Ti alloy were exposed to three different seawater environments for 6 and 12 months, after which the depth of corrosion was determined by the Focus Ion Beam method. In addition, the percentages of oxygen in the corrosive product that appeared on the surface of the alloys were determined on the same samples using semi-quantitative energy dispersive X-ray analysis. Statistical regression analysis was performed on the empirical databases formed in this way, which provided insight into the speed of development of Ni-Ti alloy corrosion processes. Different behaviours of alloys in marine environments were detected from the point of view of corrosion depth, corrosion rate, and percentage of formed oxygen, as well as the effects of the environments on the process of slowing down the corrosive degradation of the Ni-Ti alloys.

Keywords: linear regression, corrosion product, oxygen, shape memory alloy.

QUALITY CHARACTERISTICS AND CONSUMER ACCEPTABILITY OF BREAD WITH REDUCED SALT

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ABSTRACT

The aim of this research was to evaluate the technological and sensory effects of salt reduction in bread from conventional 2% to 1.34%. Four bread formulations with 1.34% of NaCl, 2% of KCl, 1.34% of NaCl and 5% of sourdough powder, and 1.34% of NaCl and 2% of sourdough starter, were prepared. The bread samples were compared with control (containing 2% NaCl) in terms of crust color, specific volume, structural and textural properties of bread crumbs. Empirical rheological properties of dough during mechanical handling and fermentation were measured. Acceptability of breads was considered by consumer panel (n=66). Empirical rheological experiments showed that salt reduction resulted in dough with higher extensibility and lower resistance to extension, being less machinable than dough with the standard amount of salt. Control dough formulation was characterized by the slowest fermentation rate and highest retention of CO₂. The examined breads were characterized by lower crumb hardness and higher specific volume in comparison to control. Bread with 2% NaCl and 2% KCl were rated as over-salted, while bread with 1.34% NaCl was rated as insufficiently salty by the consumers. Bread formulated with taste enhancers was rated as insufficiently salty, but with smaller deviation from the most desirable level of saltiness.

Keywords: bread, salt-reduction, salt replacer, taste enhance, consumer acceptability.

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PENALTY AND MEAN DROP ANALYSIS FOR SOURDOUGH BREAD

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ABSTRACT

Spontaneous fermentation of flour and water by naturally occurring lactic acid bacteria and yeasts gives sourdough. Bread produced with sourdough is characterized by numerous nutritional and functional benefits, as well as specific sensory characteristics that differ greatly from bread obtained with the use of baker's yeast. The acceptability of some product can be tested by applying the liking test. On the other hand, in order to obtain the information regarding the deviation of the product from the "ideal" according to consumers, the mean drop and penalty analysis can be applied. For this purpose, 84 consumers were regroued. They were asked to evaluate the overall liking of two bread samples: sourdough bread with the addition of spontaneously fermented spelled flour starter and classic white bread with the addition of baker's yeast. After this phase, the consumers were asked to assess the suitability of the sour taste intensity by using the scale "just about right - JAR" with 9 points (1 = too little, 5 = JAR, 9 = too much). The results indicate that over 60% of respondents believe that the analysed sourdough bread is too sour, which reduced the overall liking score by over 2.5 points. On the other hand, for the control sample, consumers reduced the rating by almost 1.0 point because they felt that the product was not sour enough.

Keywords: sourdough bread, sour taste, sensory properties, product liking.

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EFFECT OF RICE PROTEIN CONCENTRATE ADDITION ON THE PROPERTIES OF GLUTEN-FREE SPONGE CAKE

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ABSTRACT

Considering the commercially available gluten-free products, it can be established that rice and corn flour, as well as starches of different origins are the most common ingredients of gluten-free products. As a consequence of the dominance of carbohydrate components, this type of product is most often characterized by inferior nutritional and sensory quality. The aim of this study was to incorporate different concentrations of rice protein concentrate into rice-based sponge cakes. The physicochemical and sensorial properties of sponge cakes made from rice flour and rice protein concentrate (RPC) were evaluated by varying RPC at the levels of 0, 10, 20 and 30% (w/w). The incorporation of RPC from 0 to 30% (w/w) decreased the specific volume of sponge cake samples and consequently values of hardness were significantly higher. In addition to the undeniable improvement in nutritional quality, protein incorporation has contributed to the much denser and more uniform structure. Addition of proteins caused the loss of bitter taste, flavour and odour on eggs while the crumbliness and degree of dissolving were deteriorated with pronounced sensation of rough particles during consumption. Overall, the results showed that RPC could be a promising ingredient for improving the nutritional and sensory quality of gluten-free rice-based sponge cakes.

Keywords: gluten-free sponge cakes, rice protein concentrate, textural properties, sensory properties.

Acknowledgement

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ANTIPROLIFERATIVE PROPERTIES OF HONEY FROM SERBIA, KOSOVO AND BOSNIA AND HERZEGOVINA

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ABSTRACT

Honey is a natural sweetener produced by honeybees using nectar. The type of honey is determined by the type of pollen, i.e. nectar, insect secretions, as well as climatic conditions and soil composition. The health benefits of honey, used for centuries for therapeutic purposes, derive from its antioxidant nature, antimicrobial and antiproliferative activity. With the aim to assess the antiproliferative activity of different types of honey characteristic for the region, nineteen samples (acacia, linden, heather, sunflower, phacelia, basil, anise, sage, chestnut, hawthorn, buckwheat, lavender and meadow) were collected from different locations in the Republic of Serbia, Kosovo and Bosnia and Herzegovina and examined. Honey samples were also tested for physicochemical parameters (moisture, pH value, electrical conductivity, free acidity and HMF) to ensure that they meet the requirements for honey quality. Based on the obtained results of honey physicochemical profile, it was concluded that all tested samples were in accordance with the regulations of national and EU regulations. The antiproliferative potential of honey samples was assessed by in vitro tests using tumor cell lines: HeLa (cervical carcinoma), MCF7 (breast epithelial adenocarcinoma), HT-29 (colon adenocarcinoma) and MRC-5 (normal fetal lung fibroblasts).

The highest antiproliferative activity was obtained by linden honey sample 1 ($IC_{50}^{MCF7} = 7.46 \pm 1.18$ mg/mL and $IC_{50}^{HeLa} = 12.4 \pm 2.00$ mg/mL) and meadow sample 2 ($IC_{50}^{MCF7} = 12.0 \pm 0.57$ mg/mL, $IC_{50}^{HeLa} = 16.9 \pm 1.54$ mg/mL and $IC_{50}^{HT-29} = 23.7 \pm 1.33$ mg/mL) towards breast (MCF7), cervix (HeLa) and colon (HT-29)

cancer cells. Active components other than sugars contributed to cell growth activity. Probably, antiproliferative activity was achieved by polyphenols.

Keywords: honey, antiproliferative activity.

Acknowledgement

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INFLUENCE OF ADDITION OF SELECTED SPICES ON MINERAL COMPOSITION OF FRESH CREAM CHEESE

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ABSTRACT

Milk and dairy products, especially cheeses, are a good source of minerals that play an important role in maintaining health. Minerals in the diet are necessary for biological processes in metabolic functions, for normal growth and development of the organism. Various spices have been used for centuries to improve the taste of food, and they also have many medicinal properties. The aim of this study was to examine the influence of the addition of selected spices on the mineral composition 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%. The content of total ash in the tested cheese samples was determined by mineralization of the samples at 550 °C. The ICP-OES Optima 8000 instrument, manufactured by Perkin Elmer, was used to determine the content of macroelements and microelements in the tested samples. Based on the obtained results, it was determined that the addition of spices had a statistically significant ($p < 0.05$) effect on the mineral composition of the produced cheeses. The following element concentrations (in mg/100g) were determined: calcium 64.38-112.72; sodium 272.34-363.30; potassium 71.67-117.34; magnesium 8.35-14.51; phosphorus 33.35-119.40. Other identified minerals were found in smaller quantities in the produced cheeses.

Keywords: cheese, spices, minerals.

PRODUCTION OF FRESH CHEESE BY THE PROCESS OF HEAT-ACID COAGULATION OF MILK

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ABSTRACT

Cheese is one of the oldest foodstuff. Cheese consumption is constantly increasing. There are a large number of different cheeses on the market and they represent the cultural and traditional mirror of the country in which they are produced. They can be produced in industrial plants as well as in households. The aim of this work was to produce quality cheese by the process of heat-acid coagulation of milk, to monitor all parameters of the technological process of production and to examine the physico-chemical characteristics and sensory quality of the finished product. The cheese was produced in a milk processing plant, and in order to define the quality, the following analyzes were performed: determination of moisture, ash, protein, fat, chloride content, acidity, pH measurement, water activity measurement, instrumental color measurement and sensory analysis. The yield of produced cheese was 18.41%. By analyzing the physico-chemical properties of raw milk used for cheese production, it was found that the milk satisfies the requirements prescribed by the relevant regulations. Based on the obtained results of the analysis of the sample of produced cheese, it can be concluded that heat-acid coagulation of milk yielded quality cheese which, according to its chemical composition, belongs to the group of fresh cheeses. It has been established that the product satisfies all quality requirements, prescribed by the relevant regulations. Based on the performed analyzes and in accordance with the valid regulations, the layout of the declaration and the text of the specification for the produced cheese have been proposed within this paper.

Keywords: production, milk, cheese.

SMALL SCALE BEEF JERKY PRODUCTION - DEVELOPMENT OF DRYING PROCESS

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ABSTRACT

Beef jerky is a shelf-stable ready-to-eat dried meat product. In order to obtain desired product characteristics, it is necessary to apply the appropriate drying process in combination with adequate heat treatment, i.e. desired lethality time-temperature combination sufficient for destruction of pathogenic microorganisms (“cooking time”). In this study, the drying process with heat treatment was developed in laboratory conditions using constant climate chamber, Model KBF 115 (BINDER GmbH, Germany). The drying program was divided in two phases, lasting in total 6h and 30min. During the first so-called cooking phase, the temperature in chamber was 70°C during the 2h and 15min. long period, while relative humidity ranged from 80% to 93.4%, being $\geq 90\%$ for at least 1h. Throughout the second phase, drying temperature ranged from 60°C to 65°C, while the relative humidity was gradually reduced from 70% to 35% in 4h and 15min. Efficiency of developed drying and cooking process was verified by microbial analyses and determination of water activity (a_w), moisture-protein-ratio (MPR) as well as product yield. Pathogenic bacteria such as *Salmonella spp.*, *Escherichia coli* and *Enterobacteriaceae* were not detected in any sample, as well as yeasts and molds. Water activity (a_w) in final products ranged from 0.786 to 0.814, being lower then recommended value (0.85) for obtaining safe and stable jerky products (FSIS Compliance Guideline, 2014).

Additionally, MPR was below recommended value (0.75:1), ranging from 0.61 to 0.66, and product yield was approx. 40.4%.

Keywords: beef jerky, dried meat product, drying process, water activity.

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FAT AND FATTY ACID PROFILES IN THE MEAT OF FRESHWATER CRAYFISH *FAXONIUS LIMOSUS* FROM THE DANUBE RIVER DURING THE SUMMER SEASON

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ABSTRACT

In recent decades, *Faxonius limosus* from the Danube has been one of the most invasive species of freshwater ecosystem crayfish in Europe, but there is insufficient data on defining and characterizing crayfish meat quality. In this study, we analysed the dry matter, fat, fatty acids profile (FA) and nutritional quality (atherogenic (AI), thrombogenic indices (TI) and n6/n3 ratio). The individual samples of crayfish meat were collected in June (n=15), July (n=15) and August (n=15) from the same location in the Danube. The results showed that *Faxonius limosus* is lean crayfish meat with 0.20% of total fats with a favourable FA profile. Statistically significant differences ($P < 0.05$) in the proportions of fat were not observed during the summer season. Palmitic, stearic and oleic acids were the predominant saturated (SFA) and monosaturated FA (MUFA) found in the samples. The meat was characterized by the high content of polyunsaturated FA (PUFA) of which the most abundant were eicosapentaenoic, arachidonic, linoleic acid, docosahexaenoic and α -linolenic acid. The high level of n-3 PUFA, and the low AI, TI and n-6/n-3 ratio were in the range of recommended levels by fish meat researchers, suggesting the use of crayfish meat in human nutrition due to its positive gastronomic potential. These results may be a reference for further studies, primarily

as a source of information for solving the problem of *Faxonius limosus* through the development of projects of aquaculture and biodiversity protection.

Keywords: *Faxonius limosus*, meat, fat, fatty acid profile.

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TEXTURAL PROPERTIES OF PASTA SUPPLEMENTED WITH WILD GARLIC

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ABSTRACT

Pasta is a widely consumed cereal-based product all over the world. Pasta products are very popular due to their nutritional compositions, long shelf life, and availability in the market, low cost, simplicity of preparation, and transportation. In line with sustainable production and food strategies for the future, it is recommended that produce enrich pasta with nutritionally valuable compounds based on economically affordable raw materials. Recently, wild edible plants have been used significantly due to high content of bioactive compounds that are beneficial to health. One of such plants is wild garlic (*Allium ursinum L.*) that is a wild edible, spicy plant, very similar to garlic, ideal for removing toxic substances that are stored in the body, and for antiseptic and antimicrobial action. The results present textural characteristics of pasta supplemented with wild garlic powder (5, 7, 9% on d.w.), extract (20, 30, 40% on d.w.) and encapsulate (3, 5 and 7% on d.w.). In comparison to the control (95.45N), significant increase of hardness was reached in case of supplementation with moderate (125.50N) and high levels of wild garlic powder (119.08N) and high levels of extract (117.08N). In contrast, lower and mid levels of encapsulated garlic decreased pasta hardness (78.43N and 81.66N respectively), which may be due to the presence of maltodextrin as a carrier in encapsulate matrix. It was observed significant increase of adhesiveness in pasta supplemented with powdered wild garlic at all levels as well as for high supplementation levels of encapsulated and extracted wild garlic.

Keywords: pasta, wild garlic, hardness, adhesiveness.

THE NUTRITIONAL VALUE AND MINERAL COMPOSITION OF THE RED GRAPE, BLACKBERRY AND RASPBERRY COLD-PRESSED SEED OIL CAKES

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ABSTRACT

Oilseed cakes obtained after oil extraction by cold pressing is free of toxic solvents and rich in nutrients (dietary fibers, antioxidants, vitamins, minerals, etc). Blackberry, raspberry and red grape flours were separated as flours with high fibre content (62.09–74.61 % dw) and relatively low content of protein (10.55-13.20 % dw). Pressing residues of red grape and berry seeds have been shown to exhibit high levels DPPH, ABTS and reducing power capacity. The chemical composition of raspberry pressed seed oil cakes showed highest contain of 69.53% neutral detergent fiber (NDF): cellulose, hemicellulose and lignin, while acid detergent fiber (ADF) was amount of 62.77%. The results showed the content of nutrient elements with the predominance of grape seed in Ca (481.55 mg/kg) and K (473.64 mg/kg). The Zn content of was in the range of 1.32 mg/kg to 1.61 mg/kg, whereas the Fe content ranged from 10.34 mg/kg to 12.35 mg/kg. Results indicate that oil cakes of red grape and berry seed proved to be a good source of micro- and macroelements. Due to high contents of dietary fiber and other bioactive compounds, oil cake residual can be used for valorization of functional ingredients or bioactive phytochemicals and potentially used in various food/feed applications.

Keywords: cold-pressed seed oil cakes, antioxidant capacity, dietary fibers, minerals.

PHYSICAL AND CHEMICAL CHARACTERISTICS OF PUMPKIN SEEDS AND OIL FROM PUMPKIN SEEDS

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ABSTRACT

During the last decades, consumers have become aware of the fact that vegetable oils are important ingredient in quality nutrition. Oil from pumpkin seeds has a special place between cold pressed oils in this region, given that the production of this kind of oil has very long tradition in this area. Pumpkin seed has been the first seed oil-plant, that is, the first raw material in oil industry in our region. The aim of this study was to determine chemical composition of two kinds of pumpkin seeds (with the husk and without it) and production of oil from that pumpkin seeds, and then determination of physical and chemical characteristics of these oils. In this study, cleaned pumpkin seeds (cleaned husk) and seeds of special kind of pumpkin without husk (“golica”), from the area of Lijevče polje, were analyzed.

In case of cleaned pumpkin seeds, moisture content was 5,90%, total ash content 4,37%, raw cellulose content was 14,12%, raw fat content was 48,43% and raw protein content was 34,88%. In case of seeds of “golica” pumpkin, moisture content was 5,35%, total ash content was 4,47%, raw cellulose content was 10,12%, raw fat content 45,45% and raw protein content was 35,49%. Also, content of individual elements has been determined, and in case of cleaned pumpkin seeds composition has been as follows: 826,88 mg/100g of potassium, 43,03 mg/100g of calcium, 455,15 mg/100g of magnesium, 1460,76 mg/100g of phosphorus, 8,13 mg/100g of iron and 5,52 mg/100g of zinc. In case of “golica” seeds, that composition has been as follows: 1279,18 mg/100g of potassium, 75,75 mg/100g of calcium, 421,84 mg/100g of magnesium, 1414,18 mg/100g of phosphorus, 7,61 mg/100g of iron and 7,58 mg/100g of zinc.

Cold pressed oil has been produced from these seeds, and physical and chemical characteristics of these oils was determined. Exploitation in producing the oil from cleaned pumpkin seeds was 28,56%, and for “golica” seeds was 25,44%. Physical and chemical characteristics of oil from cleaned pumpkin seeds were: density 0,9174 g/cm³, refractive index on 20°C 1,4716, iodine value according to Hanus 98,23 gJ₂/100g of oil and saponification value 197,45 mg KOH/g of oil. Physical and chemical characteristics of oil from “golica” pumpkin seeds were: density 0,9181 g/cm³, refractive index on 20°C 1,4700, iodine value according to Hanus 98,23 gJ₂/100g of oil and saponification value 195,98 mg KOH/g of oil. Also, participation of individual fatty acids in oil has been detected. In oil from cleaned pumpkin seeds, fatty acid with the largest participation are: erucic acid 11,50% and palmitoleic acid 10,27%. In case of oil from “golica” pumpkin seeds, fatty acid with the largest participation are: oleic acid 21,79%, linoleic acid 16,44% and stearic acid 11,01%. Observed from the nutritional and biological aspects, oil produced from pumpkin seeds with cold pressing process belongs to category of high quality oils.

Keywords: pumpkin seeds, oil, chemical composition.

PHYSICOCHEMICAL AND NUTRITIONAL PROPERTIES OF CHOKEBERRY POMACE

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ABSTRACT

Chokeberry (*Aronia melanocarpa*) pomace is a valuable by-product obtained during juice manufacturing. This by-product is very poorly utilized despite its high nutritional value. To facilitate application in foods, a detailed knowledge of its composition and physicochemical properties is essential. Chokeberry fruit and products have great antioxidant and health-promoting potential as they reduce the occurrence of free radicals. Chokeberry pomace was sampled from SME juice producer, after the extraction operation. Domestic juice producers still do not have solution of pomace utilization, so its characterization is needed in order to achieve better by-product valorisation. Chokeberry pomace after pressing contains 37.38 g/100g of dry matter. Nutrition compounds makes up 10.39%, 5.56%, and 0.46% for carbohydrates, proteins and fat, respectively. Pomace contains 8.37% of total sugars. Application of chokeberry pomace in other food products supports claiming as ‘source’ of fiber or ‘high fiber’, given that chokeberry pomace contains 19.34 g/100g of dietary fiber. Vitamin A and vitamin D₃ were not detected in the chokeberry pomace sample, while the vitamin E content was 4.65 mg/100g, which represent about 30% of RDA for adults. The results obtained in the present study provide an overview of the properties of chokeberry pomace and allow conclusions to be made regarding their applicability for use in complex food systems.

Keywords: chokeberry pomace, by-product, nutrition, valorization.

EFFECT OF FREEZE-DRYING ON LONG-TERM STORAGE AND NUTRITIONAL CHARACTERISTICS OF SUGAR BEET MOLASSES

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ABSTRACT

Sugar beet molasses (SBM) as nutritionally valuable product can easily be transformed from byproduct to bioproduct. SBM represents rich source of minerals (Na, K, Ca, Mg) and bioactive compounds (betaine). Although, molasses consists of high amount of sugar (≤ 50.0 °S), a_w value is still high (≤ 0.600). Freeze-drying technique represents one step where biological material was treated before finalization of the product. SBM was lyophilized at 1 Pa, corresponding temperature -60°C until dry. Mineral composition of SBM molasses before and after applied freeze-drying process were determined according to ISO 6869:2008. Quantitative HPLC method revealed presence of betaine. Influence of freeze-drying on molasses was expressed in relation to changes of the dry matter, a_w value, mineral composition (Na, K, Ca, Mg, Fe, Zn) and betaine content. Lyophilized SBM with very high content of dry matter (97.5%) and reduced a_w value (from 0.587 to 0.287) implicated material long-term storage, reduced packaging cost, easier handling and transport instead of high viscous molasses. All analysed minerals were more concentrated in the lyophilized molasses expressed on dry matter content, from 4.4% for K to 23.1% for Mg. Dehydrated molasses concentrated in minerals and betaine represents nutritive favourable compound for further manipulation and enriching of food products.

Keywords: sugar beet molasses, freeze-drying, long-term storage, mineral composition.

PSYCHOLOGY
PSIHOLOGIJA

MACHOVER TECHNIQUE IN FORENSIC ASSESSMENT

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ABSTRACT

Consideration of homicide behaviour of psychotic people implies, except of examination of dominant psychopathology in a scope of current psychosis, even assessment of prepsychotic structure of personality and their available aggressive potential. The aim of this work is to consolidate if psychotic offenders and psychotic non-offenders of blood crimes distinguish in markedness of psychopathological expressions on Machover technique.

The survey was carried out on a sample of 118 male examinees, who were divided in two groups: a group of psychotic offenders of blood crimes (N= 59) and a group of psychotic psychiatric patients who did not commit crimes (N=59). The group of offenders of blood crimes is divided into two subgroups (offenders of murder and offenders of attempted murders). Information about the age of examinees, their residence, family, education, marital status, family hereditary and psychiatric diagnosis were collected with structured questionnaire for general data and social anamnesis, which was made for the necessity of this examination. The differences between groups and subgroups, with focus on possible consolidation of pathological marks, in the other words characteristic which would be of importance in the prediction of the future homicide behaviour were tested by Machover technique. Statistically important differences were not found between these two important groups in relation to the presence of pathological characteristics ($F=0,787$; $p=0,377$), while the subgroups are statistically rather different only in relation to aggressiveness variables ($t(57)=2,668$; $p= 0,01$): higher basic aggressiveness is specific for the examinees who committed murder comparing to the examinees who attempted a murder.

Keywords: blood crimes, Machover technique, aggressiveness, paranoiaity.

THE INFLUENCE OF SOCIAL SUPPORT ON CHRONIC PAIN

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ABSTRACT

The prevalence of chronic pain in the general population is estimated at 10% to 30%. Pain is an unpleasant sensory and emotional experience with actual or potential tissue damage or described in terms of such damage. In modern days there is a broad consent about chronic pain as a multidimensional construct which is influenced by physical and psychological factors and also by social parameters. The aim of this paper is the investigation of the influence of social support on chronic pain. The sample comprises 40 probands with 20 persons who suffer from chronic pain and 20 „healthy“ persons. The „Fragebogen zur Sozialen Unterstützung“ of Fydrich, Sommer and Brähler, 2007 was chosen as the sampling method. In addition, specific information on single probands with chronic pain was used. The measurement of social support was taken with four scales: „emotional support“, „practical support“, „social integration“ and „satisfaction with support“. Another analyzed variable was the number of supporting persons. The results show a significant difference between persons with chronic pain and „healthy“ persons in perceived social support and the satisfaction with support. Additional tests show differences in the number of persons who are experienced as supportive. Persons with chronic pain name less supporting persons than persons without relevant diagnostic. No gender differences in social support were explicitly proven. The assumption of a positive influence of the referent group on the pain during rehabilitation could not be confirmed as well. These results of this study provide the foundation for further research on the influence of social support on chronic pain.

Keywords: Chronic pain, social support, influence.

GENDER DIFFERENCES OF SOCIOSEXUAL ORIENTATION IN THE CONTEXT OF PERSONALITY TRAITS

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ABSTRACT

Sociosexuality is a term that explains differences in individuals' willingness to engage in sexual intercourse without intimacy, fidelity, and other determinants of emotional connection. The aim of this study was to examine how the dimensions of personality traits are related to sociosexual orientation in women and men in Bosnia and Herzegovina. The research was conducted on a sample of 430 respondents, aged 18 to 71 from BiH. Data were collected using three instruments: the Socio-Demographic Questionnaire, the Big Five Plus Two Personality Trait Questionnaire (VP + 2) and the Sociosexual Orientation (SOI) Questionnaire. Adequate statistical methods were used to estimate the difference between the group and the computational correlation. The results partially confirmed the hypotheses. Men are less restrictive than women and their liberality contributes to aggression, negative and positive valence. Women are noticeably restrictive, the personality dimensions associated with it are conscientiousness and negative valence.

Keywords: sociosexuality, personality dimensions, gender differences.

SPECIFICS OF SOCIAL DEVELOPMENT IN ASPERGER'S SYNDROME: A CASE REPORT

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ABSTRACT

Asperger's disorder belongs to the spectrum of autistic disorders and is considered highly functional autism. The main features of the syndrome are motor awkwardness, difficulties in social communication, stereotypical actions, hypersensitivity and specific interests. The aim of this research was to gain insight into the life circumstances of people diagnosed with Asperger's syndrome. The paper presents the case of a sixteen-year-old boy J.K. from Banja Luka who was diagnosed with Asperger's syndrome at the age of nine (F.84 - Pervasive developmental disorder). All behaviors specific to Asperger syndrome are significant, except for characteristic interests that were not observed. Social development went smoothly in the periods of kindergarten and primary education, there are certain problems of social adjustment to new life circumstances after finishing primary school. The significance of this paper is reflected in raising awareness of the problems of life of people with this diagnosis.

Keywords: Asperger syndrome, social development, specifics, case report.

APPLICATION OF COGNITIVE-BEHAVIORAL THERAPY TECHNIQUES IN THE TREATMENT OF SPECIFIC BLOOD PHOBIA AND INJECTIONS

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ABSTRACT

This paper presents group psychotherapy in specific phobias, using some cognitive-behavioral therapy (CBT) techniques. In the treatment of specific phobias, cognitive-behavioral therapy is the method of choice. This therapy (CBT) is a form of psychotherapy that emphasizes the importance of the role of thought in what we feel and how we behave. The development of this approach went through three waves: the first were behavioral therapies based on classical and operant conditioning, the second were cognitive therapies based on cognition change and social learning, and the third were "mindfulness" therapies based on acceptance and full awareness.

The paper describes the plan and course of treatment with appropriate techniques, with emphasis on systematic desensitization, all in order to alleviate phobic stimuli. First of all, the group underwent psychoeducation, in order to get better acquainted with the nature of their problem, as well as the importance of the techniques that will be implemented. The group dynamics between the members is also presented, but also the "mirror phenomenon" which is specific exclusively for group therapy. The assessment of the effect of the conducted cognitive-behavioral treatment was done on the basis of clinical evaluation, as well as standard questionnaires for psychological assessment.

Keywords: cognitive-behavioral psychotherapy (CBT), group therapy, specific phobias.

PERSONALITY CHARACTERISTICS AND ATTITUDES ABOUT COVID 19 OF CITIZENS OF BOSNIA AND HERZEGOVINA

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ABSTRACT

COVID 19, an infectious disease caused by the SARS - CoV-2 virus that appeared in the Chinese city of Wuhan in late 2019 as a serious pneumonia, by mid-2020 affected the European region, including Bosnia and Herzegovina and grew into a pandemic. The appearance of the virus has led to significant changes in human daily life. Due to the fact that people differ from each other, the individual's responses to the pandemic as well as to the recommended protection measures are very different.

The research aimed to examine whether there is a connection between personality traits and attitudes about the COVID-19 pandemic among the citizens of Bosnia and Herzegovina in terms of respect for protection measures (wearing a protective mask, social distance, increased hygiene measures), attitudes towards vaccination, attitudes towards conspiracy theories, trust in information placed by relevant authorities and institutions.

273 respondents from the territory of Bosnia and Herzegovina of different sex, age and educational structure participated in the research. Data were collected in December 2021 and January 2022 through a questionnaire to examine attitudes about COVID-19. The VP + 2 test was used to examine the personality traits of the respondents.

Keywords: COVID -19, pandemic, personality traits, attitudes about the pandemic.

OPTIMISM, SELF – RESPECT AND SATISFACTION WITH LIFE OF YOUTH

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ABSTRACT

Optimism and self-respect, as indicators of mental health and life satisfaction as a significant factor that contributes to the mental health level, are in a significant interrelation. The aim of this research was to perceive levels of optimism, self-respect and life satisfaction among the youth population who are in their final years of the adolescence, and to perceive the interrelation among these indicators. The sample consists of 239 students (female students 122, 51% and male students 117-49% who are in final classes in high school). In this research were used three scales for optimism questioning, Life orientation test Revised, for self respect Rosenbergs scale of self-respect and for life satisfaction, Satisfaction with life Scale. The reliability of the used scales, that is gained in this research is satisfactorily, Krombah α is between ,075 and ,802. The results show the image about the level of the observed variables among the examinees and indicates the difference in the level of the satisfaction with life between male and female students. All the variables stands in statistically significant correlation of the middle and high intensity. The promotion and preservation of mental health, as a tendency and as a scientific discipline, has its aim to raise the awareness of the importance of mental health in a life of a modern man. Achieving optimal well-being is possible through influencing those determinants that can be changed. In this case that is the life satisfaction, which stands in significant correlation with optimism and youth self-respect. The increase in life satisfaction level and some of its aspects correlate positively with the indicators of mental health and youth mental health in general.

Keywords: self –respect, optimism, satisfaction with life, youth.

BUSINESS COMMUNICATION SKILLS OF STUDENTS – FUTURE PRESCHOOL TEACHERS

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ABSTRACT

The modern business environment increasingly requires that employees, in addition to specific professional competences, develop business communication skills. A study was conducted at Preschool Teacher Training and Business Informatics College of Applied Studies- Sirmium in Sremska Mitrovica, which aimed to determine the opinion of students on: 1) the level of development of business communication skills 2) ways to improve skills in initial education. The quantitative part of the research was conducted with a 5-point Likert scale on a sample of N = 60 second-year students, and the qualitative part with an interview in two focus groups, N = 12 students each. The results showed that most students estimate that their presentation and public speaking skills are poorly developed, their business correspondence skills are averagely developed, and that they do not have the skills they need for future job applications - writing a CV, motivational letter and cover letter. as well as participation in the interview. The participants suggest that subjects from this field be introduced in the curricula of initial and master studies. Furthermore, they suggest that additional work should be done on the development of business communication skills within Lifelong Learning Centre, as well as through projects.

Keywords: business communication, students future preschool teachers, initial education, Lifelong Learning Centre.

MEDICAL AND BIOMEDICAL SCIENCES
MEDICINSKE I BIOMEDICINSKE NAUKE

MENTAL AND PSYCHOSOMATIC CONSEQUENCES OF JOB BURNOUT IN CRITICAL CARE NURSING PROFESSION: A CROSS-SECTIONAL STUDY

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ABSTRACT

Critical care nursing is considered as one of the most stressful professions in the modern healthcare systems, making it suitable for the development of job burnout. Considering this, we conducted a cross-sectional study to determine the frequency and level of chronic anxiety, as well as the frequency of psychosomatic manifestations of job burnout in the population of nurses employed in intensive care units at the University Hospital in Belgrade.

The study included 71 respondents. We implemented several specific questionnaires in the test battery to determine the prevalence of chronic anxiety and the most common psychosomatic manifestation of burnout in the population of affected respondents (experimental group), and we compared the results to those found in a population of subjects who had no evidence of burnout symptoms at the time of the study (control group).

Anxiety symptoms were nearly three times more prevalent in the experimental group, with high levels of anxiety registered in 88% of respondents. At the same time, psychosomatic manifestations were five times more common in the experimental group, affecting 97% subjects in total. The most common complaints were: headache (92% of respondents), sleep disorders (87.5% of respondents),

gastrointestinal disorders (79% of respondents), and emotional/behavioural abreactions (67% of respondents).

The results of our study indicate the necessity of developing national burnout prevention programs in critical care nursing and similar healthcare professions with high levels of stress exposure.

Keywords: critical care nursing, job burnout, anxiety, psychosomatic manifestations.

ANALYSIS OF TEST ANXIETY AMONG STUDENTS OF MEDICAL SCIENCES: A CROSS-SECTIONAL STUDY

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ABSTRACT

Test anxiety is a pathological fear that occurs before and during testing. It can be manifested with both somatic and cognitive symptoms. The purpose of this cross-sectional study was to analyse test anxiety among students at the Faculty of Medicine in Novi Sad.

A total of 375 respondents completed the Test Anxiety Inventory – TAI, a widely used inventory for assessing test anxiety that is most commonly used in school and student populations. Sociodemographic and educational characteristics of the respondents were collected as well.

In this sample, 15.5% of participants experienced no anxiety, 42.2% mild anxiety, 36.5% moderate anxiety, while 5.8% demonstrated severe anxiety. The average overall TAI score was 48.25 points. Females, those who finance studies on their own, those who renewed a previous year of studies and those with a lower grade point average experienced the highest levels of test anxiety. There was no statistically significant difference in the intensity of test anxiety between students from different study programs (medicine, dentistry, pharmacy, and nursing science) and different years of studies at this faculty.

This study discovered a significant number of students suffering from test anxiety, which can be a factor affecting their academic performance. We identified the vulnerable population of students who should be given priority access to professional counseling.

Keywords: test anxiety, medical students, academic performance, test anxiety inventory

PREDICTING THE IDEAL WEIGHT IN THE PROCESS OF DIALYSIS OF CHILDREN USING REGRESSION' ALGORITHMS

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ABSTRACT

This study shows the use of regression algorithms in predicting ideal weight in the process of hemodialysis in children. Data are collected at the University Clinic of Tirsova in Belgrade and include height and weight are measured to calculate the BMI (Body Mass Index). In addition to the above, bioimpedance, hematocrit and blood pressure are measured. The collected data are pre-processed and transformed before the application of regression algorithms. The application of regression algorithms predicts the ideal weight of the patient, which in practice is determined by the attending doctor. Two types of error were used for evaluation: mean absolute error (MAE) and root mean squared error (RMSE). The results indicate satisfactory accuracy, while future work refers to the implementation of algorithms through a smartwatch and timely receipt of useful information.

Keywords: hemodialysis, regression, ideal weight.

THE CONCEPT OF "ONE HEALTH" AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

Sustainable development is an integral economic, technological, social and cultural development, harmonized with the needs of protection and improvement of the environment, which enables present and future generations to meet their needs and improve the quality of life. Sustainable development requires understanding and actively maintaining connections between people, animals and the environment. Biomedical and related professions and sciences have provided an answer to the need to achieve sustainable development through the development of the concept of "One Health". One health involves an approach to the implementation of programs, policies, legislation and research in which several sectors communicate and work together to achieve public health well-being and improve the environment. The One Health concept is an integrated, unified approach that aims to balance human, animal and ecosystem health in a sustainable way. Areas of special importance that connect the biomedical sciences are: prevention and control of infectious diseases, especially zoonoses; animal welfare; antimicrobial resistance and responsible use of antimicrobial and antiparasitic drugs; food safety of animal origin; international trade and certification; basic biomedical research; genetic research; biodiversity. The paper describes how the veterinary profession, through its activities, implements the concept of One Health while achieving sustainable development. Based on the above, we conclude that the implementation of the One Health concept is a quality way to achieve the goals of sustainable development, primarily in the field of health care, biodiversity protection and prevention of climate change.

Keywords: One health, sustainable development, biomedical sciences.

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THE EFFECT OF YOGA ON REDUCING STRESS LEVELS

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ABSTRACT

The challenging time in which we live as a generation that for the first time encounters various situations that primarily concern our health and well-being, stopped us all in moment. The stress that has been ubiquitous so far has intensified as it has been further fueled by fear. Between business commitments, caring for a family and struggling with an uncertain economic situation, stress has unfortunately become a “normal” part of life for most people. Yoga as a technology of well-being, the science of body, mind, spirit and soul, is older than all religions and has absolutely nothing to do with them. This work of theoretical-empirical character will explain how the state of our mind manifests itself in the state of our body, that is, how we use yoga through the correction of the body (upright posture and breathing) to correct our mind and our behavior. This ancient system connects the mind and body through a series of postures, breathing exercises and meditation. When we practice yoga, we stretch the spine, stretch and strengthen the muscles and direct our mind inwards, thus relieving stress. All of this has benefits for our health as a whole, as stress at least partially plays a role in many diseases, and yoga as a method for living a better life offers tools to combat stress.

Keywords: well-being, yoga, stress, health.

WORK ENGAGEMENT OF HEALTHCARE WORKERS: DO THE WORK ROLE AND SOCIO-DEMOGRAPHIC CHARACTERISTICS MAKE A DIFFERENCE?

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ABSTRACT

Work engagement refers to a positive, fulfilling, and work-related state of mind characterized by vigour, dedication and absorption. This study aimed to examine whether there are differences in the work engagement of healthcare workers depending on their work role (doctor/nurse) and socio-demographic characteristics (gender, age, duration of service, work in shifts, income, marital status). The sample consisted of 255 healthcare workers (74.7% female), mean age of 40.75 ($SD=11.71$). We used Work Engagement Scale (Schaufeli, Bakker & Salanova, 2006). The results of ANOVA and post-hoc tests showed a statistically significant difference in dedication, taking into account duration of service ($F(3,247)=2.970$, $p=.033$, $\eta_p^2=.036$) and working in shifts ($F(1,249)=5.758$, $p=.017$, $\eta_p^2=.023$). Healthcare workers who have more than 26 years of service, and work in one shift, are the most prone to dedication. Besides, statistically significant difference has been determined in vigour ($F(4,246)=10.374$, $p=.000$, $\eta_p^2=.143$), dedication ($F(4,246)=10.639$, $p=.000$, $\eta_p^2=.015$) and absorption ($F(4,246)=7.542$, $p=.000$, $\eta_p^2=.109$) considering income, and in vigour ($F(1,249)=5.804$, $p=.017$, $\eta_p^2=.023$), dedication ($F(1,249)=5.904$, $p=.016$, $\eta_p^2=.023$) and absorption ($F(1,249)=5.113$, $p=.025$, $\eta_p^2=.020$) considering marital status. Healthcare workers who are married and completely satisfied with income are the most prone to vigour, dedication and absorption. This study's findings indicate that some socio-demographic characteristics significantly determine healthcare workers' work engagement.

Keywords: work engagement, work role, socio-demographic characteristics, healthcare workers.

REEVALUATION OF BIOLOGICAL EVIDENCE FO GENDER (IN)EQUALITY

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ABSTRACT

Seminal contributions in the field of biology like darwinian theory of evolution or the discovery of sexual hormones have contributed to the legitimization of gender inequality for many decades. However, what if this systematic accumulation of evidence supporting gender inequality is a consequence of scientific research being subject to social and political biases rather than there being a real biological dimension justifying it?

The reevaluation of the biological evidence with a gender-aware perspective by a growing number of darwinian feminists indicates that both physiological and psychological features as well as evolutionary purposes of females and males in humans and other species do not correspond to the extreme binarism and power inequality suggested by traditional studies.

The message I intend to convey in this presentation is that, while biological evidence strongly indicates that there are differences between sexes, it does not justify gender binarism nor gender inequality. To do so, I will (1) exemplify how sociopolitical stigmas condition the traditional evidence underlying our understanding of gender in fields like neuroscience, physiology and evolutionary biology, (2) discuss a revised view on the biology of sex and gender based on more recent studies that re-draws the traditional picture and (3) stress the need to incorporate gender perspective in scientific research, to generate bias-free evidence that allows for a more objective interpretation of the world and contributes to the struggle against inequality.

Keywords: sex, gender, (in)equality, women, men.

EDUCATION
OBRAZOVANJE

CHEMICAL ESCAPE ROOM AS EDUCATIONAL TOOL

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ABSTRACT

Escape room can be an excellent educational tool for the establishment of teamwork, peer learning and communication competences within school environment. It also provides opportunity for making connection between real life concepts and the knowledge acquired in the traditional school system. An escape room including lab activities related to the acid-base concepts and identification of presence of natural products in common foodstuffs has been designed for the high school students aged 17-18, selected on the base of their high trimester grades in chemistry. The students were assigned to 4 working groups. The activities were conducted at the chemical laboratories of Faculty of Science in Kragujevac. To examine student's reflections regarding their experience in escape room, an evaluation questionnaire was developed. The obtained results have indicated that implementation of the escape room in the learning of chemical concepts is increasing students' motivation, feeling of self-efficacy, teamwork competences, as well as better understanding of the application of chemistry knowledge in everyday life.

Keywords: Escape room, chemistry, lab activities.

PRIMARY SCHOOL TEACHERS' PERCEPTIONS AND ATTITUDES TOWARDS THE APPLICATION OF STEM ACTIVITIES IN REGULAR CLASSROOM

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ABSTRACT

STEM education is an educational approach focused on the integration of science, technology, engineering, and mathematics in the creation of student-centered learning environment for the examination of real-life phenomena [1,2]. The benefits of the STEM implementation within school environment are reflected in the increasement of students' creativity, problem-solving skills, communicational skills, and the fostering of knowledge application. In this study we have examined the teachers' attitudes and perceptions towards the application of STEM hands-on activities for the teaching natural science concepts to the students aged 7-10, in the framework of courses named *Nature and society* and *The world around us*. To train teachers for the implementation of STEM activities one workshop with carefully designed examples of STEM activities was organized, while the questionnaire was conducted after the teachers have implemented suggested activities in their regular classroom. The obtained data have suggested that teachers showed generally positive attitude toward STEM and high valuation of the skills and competences obtained during workshop training. In addition, the results from questionnaire have indicated that they increased knowledge base for the teaching science concepts, while the students have positively rated learning of natural concepts in this way.

Keywords: STEM, hands-on activities, teachers.

HEURISTIC AND PROGRAMMED LEARNING IN TEACHING METHODOLOGY

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ABSTRACT

Teaching methodology is a special discipline that requires a special approach and way of working with children, through theoretical and practical aspects of teaching, where students would be practically ready to pursue their profession. We reject memorization altogether, we are not saying that everything was not good before, but we are strongly in favor of regular classes and physical contact, with some changes and the introduction of new methods of work in combination with traditional teaching, because no innovation can replace the living word. Teachers and professors must be ready for new challenges, retraining, effort and work in order to enable better and more efficient teaching. For a long time now, attempts have been made to modernize teaching in various ways. We also have some successful solutions. We decided on heuristic and programmed learning because it is very important and suitable for use in working with children, and students with such a way of working lower successes and achieve better results, as well as upgrading the competencies of each student individually. Children are constantly progressing through discovering something new with the help of heuristic teaching, as well as by solving certain problems, and with programmed teaching, they are provided with constant feedback. Teachers help them in their work with mutual respect and esteem. In particular, these ways of working can be applied to gifted and talented students as an additional incentive to learn, but also to the average student who can also learn in a different way. The aim of the paper is to improve teaching and the teaching process, enabling students a different and useful way of working, where in fact we come to

the research problem related to the transformation and combination of traditional and new schools, with some new methods and ways of working. This methodology enables students to participate equally in the teaching process and work, as well as to achieve the best possible success. It is necessary to prepare students for all future challenges in society and life in general.

Keywords: Heuristic teaching, programmed teaching, teaching methodology.

NETWORKING AND COOPERATION OF DIFFERENT INSTITUTIONS AND ACTORS AS A KEY FACTOR FOR IMPLEMENTING OF INCLUSIVE EDUCATION

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ABSTRACT

Although the legislative framework is considered as appropriate, the results of numerous studies indicate that there are still various dilemmas and challenges in the process of implementation of inclusive education in the Republic of Serbia. The research was presented in the paper aimed to determine teachers (N=130) and preschool teachers (N=135) opinion about importance and gains of networking and cooperation of different institutions and actors in inclusive education implementation process. The research findings suggest that teachers and preschool teachers recognize the following as the greatest professional gain from networking and cooperation: providing and obtaining assistance from colleagues, problem perception from different perspectives, improved self-esteem for job performance, reconsidering, developing and upgrading existing competencies needed for job performance in inclusive environment. In order to improve the implementation process there is a need for the organization of professional development programs within the framework that focuses on development of competence from the area of cooperation development and learning community, as well as further networking of institutions, professionals, parents and the local community, in order to build supporting social and inspiring physical learning environment.

Keywords: inclusive education, cooperation, networking.

LEARNING AND PSYCHOLOGICAL DEVELOPMENT OF CHILDREN DURING ONLINE TEACHING

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ABSTRACT

Learning is a continuous process. If the usual way of work and teaching is interrupted, especially with first-graders, various problems, shortcomings and gaps occur, especially when there is no physical contact with the teacher, and when regular classes are deviated from. Research, as well as practice, have shown certain shortcomings in this way of working, as well as the psychological process and development of the child, which also indicates some of the shortcomings. Children are in constant contact with learning, from birth and the adoption of certain skills and habits. It is a well-known fact that a child develops psychologically from birth to adulthood through various stages. This should certainly be approached with caution, because there are a number of factors that affect this development, in our case we are talking about the impact of online teaching, as we stated at the beginning. First of all, everything starts from family upbringing, through preschool institutions, primary and secondary schools, peers, universities and society in general. Teaching and its process greatly affect the development of each individual. Today we have some of the consequences of online teaching. The students state that they are confused, they do not have clear information, everything is accelerated, they lack physical contact with the teacher, school and peers. Primary school students are particularly damaged, although the situation is similar with older students. Students are more independent, but they are still committed to regular classes. They often forget what they have learned, because they are only asked to satisfy their form. There is a big problem, which refers to the loss of permanent knowledge and its application in the future in practice, which is certainly not our goal. The goal is to create stable and capable

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generations in the future, who will be ready for all challenges and successes. The aim of this paper is to point out the shortcomings of online teaching, and the main problem of the research we mentioned at the beginning, which certainly refers to the large gaps in online teaching, as well as excessive expectations that students need to meet, which we will explain in more detail. and explain further in the paper.

Keywords: Learning, students, psychological development, online teaching.

STRATEGIES AND METHODS OF WORK IN TEACHING METHODOLOGY

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ABSTRACT

Teaching methods differ from teacher to teacher, as well as for other reasons that directly affect the teaching process itself. Teachers are the ones who can and should influence the choice of teaching strategies and methods of work. Teaching strategies and methods certainly need to be updated and used in accordance with the possibilities, needs and individual differences and interests of students. The school must also be equipped with the necessary materials and technical means, so that the choice of teaching strategies and working methods can be approached. The teaching methodology itself is complex, and therefore requires a special approach when choosing teaching equipment for direct work with students. In addition to general methods of work such as the method of oral presentation, the method of teaching conversation, work on the text, etc., it is necessary to apply collaborative learning - cooperative work, group learning, teaching workshops as new methods of work, etc. Regarding teaching strategies, it is necessary to introduce new ones, such as new learning strategies, problem-based learning, heuristic teaching, learning by discovery, etc. The aim of the paper is primarily to replace old ways of working with new, innovative ones with better results, where we come to the research problem which primarily refers to the transformation of old ways of learning into new ones through new teaching strategies and methods of work and learning. through the work itself. Modern teaching methodology as a scientific discipline also implies a modern approach to work, and it is necessary to use these opportunities and recommendations. To conclude, the teaching process should certainly be modernized with new ways of working, but with physical contact and the living word of the

teacher, and through cooperation and joint work of teachers and students. Then we will get the best results.

Keywords: Strategies, methods, teaching, teaching methodology.

WAYS AND POSSIBILITIES OF WORK IN TEAM TEACHING

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ABSTRACT

Team teaching is a new teaching system of work and learning, and of course it has a number of advantages in the teaching process itself. The ways and possibilities of work are multiple and it is necessary to prepare, of course, to work according to this teaching model. It is also necessary to plan and choose in detail the teaching content that is possible for processing, as well as the age of the students with whom team teaching can be realized. This teaching is certainly more suitable for slightly older students, because it certainly requires basic prior knowledge about some teaching contents. It is very important to point out that the time of conducting these classes should be well planned, as well as that a flexible schedule should be made. It is also necessary to plan well the groups with the optimal number of members, so that everyone can equally participate in the work, which we will talk about in more detail in the paper itself. Like any other teaching, this one has a number of advantages, as we have already mentioned, but it also has several disadvantages, which we can freely say are negligible in relation to the many advantages and possibilities of working and advancing in this way and mode of operation. Students show interest in this type of teaching, and in this way encourage cooperation, friendship, responsibility, conclusion, presenting new ideas and the like. The goal of the work is related to faster progress through these classes, and the problem is related to the change of the current way of learning into a new one through teamwork and faster progress, and more independent learning. We can also state that several classes can be included in the work of this class, for example in the school amphitheater, where they will work at this pace, learn, cooperate, but also develop a competitive spirit.

Keywords: Teaching, team teaching, teaching system.

SELF-ASSESSMENT OF TEACHERS 'COMPETENCES FOR COMMUNICATION AND COOPERATION IN INCLUSIVE WORKING CONDITIONS

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ABSTRACT

In the inclusive educational process, there is a constant need of teachers to acquire new knowledge, skills and abilities, is specific competencies that shape the communication and cooperation of teachers in inclusive working conditions.

Aim of the research: Identification of teachers' attitudes about the level of their ability to communicate and cooperate in inclusive working conditions. Empirical non-experimental research Survey was conducted on a sample of 761 teachers from 19 primary schools in Republic of Srpska - research method with the use of appropriate instruments (five-point Likert-type scale, F-test, t-test). Descriptive statistical indicators for specific competencies were analyzed, and their significance and role in the context of inclusive educational work of teachers were interpreted. Teachers' attitudes towards competencies for communication and cooperation in inclusive working conditions were identified through five indicators: knowledge of the principles of assertive communication, ability to work with children with autism spectrum, cooperation with parents of students with disabilities, cooperation with student support teams, constructive communication skills with members of national minorities and other marginalized groups.

In the assessments of specific competencies, there are no statistically significant differences in a certain level of risk with regard to the socio-status characteristics of teachers: gender, education and work experience, and there are at the level of $p < 0.01$ with regard to the workplace.

The result of the research indicates the need for continuous professional development of teachers through various types of professional support and training.

Keywords: teacher competencies, inclusion, education, upbringing.

IMPROVING THE QUALITY OF ONLINE TEACHING IN THE INITIAL EDUCATION OF PRESCHOOL TEACHERS

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ABSTRACT

Rapid development and necessity of implementation of information technologies in all domains of modern life, especially in the field of education due to the circumstances caused by the pandemic, pointed to the need to improve the quality of online teaching in the study program Vocational Preschool Teacher - Distance Learning at Preschool Teacher Training and Business Informatics College of Applied Studies - Sirmium in Sremska Mitrovica. In order to examine the interactivity of teaching and technical possibilities of the existing distance learning platform, a comparative analysis of the characteristics of the latest version of Moodle 3.11 and alternative distance learning systems was performed. Results of the analysis of the questionnaire for teachers (N=18 teachers) within four areas: realization of the teaching process; technical organization and support; interactivity of the teaching process; evaluation of student work, as well as focus group interview with students of the distance learning program (N=13 students), pointed to the need for training for teachers and students. Upon completion of the training, a database with resources for online teaching and examples of good practice has been formed and a manual for their use has been published, with the aim to further improve the quality of online teaching and strengthen students to meaningfully use the various possibilities of interactive interface in the learning process, as well as to develop teachers' competences to apply resources that allow greater interactivity.

Keywords: information technologies, distance learning, digital competencies, interactivity.

PROFESSIONAL TRAINING IN THE FUNCTION OF DEVELOPING PROFESSIONAL COMPETENCIES OF EDUCATORS

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ABSTRACT

In international documents as a part of educational policy the competence of educators is recognized as one of the key dimensions of the quality of education. The professional competence of educators is based on the creative application and re-examination of professional knowledge, skills and values in a changing educational context. The aim of the research is to review the assessments of educators on the contribution of professional development to the development of competencies needed for vocational education. Starting from the specifics of the problem in accordance with the aim of the research, in the research is used a scaling technique and an assessment instrument that contains 30 items. The competence of educators is determined through three areas: direct work with children, develop of cooperation and learning communities and develop of professional practice. Data were processed by descriptive statistics methods. The research was conducted on a sample of 117 educators employed in preschool institutions in the Republic of Serbia. The results of the research also indicate that educators apply the contents of professional development in direct work with children. Educators believe and confirm that professional development has an impact on the development of competence for professional action. Going through this process, the educator becomes a practitioner who thinks and sets goals for his professional development in accordance with his needs and the needs of the preschool institution.

Keywords: competencies, professional training, preschool teachers.

EDUCATIONAL SOFTWARE ON WINDOWS AND LINUX PLATFORMS FOR ACQUIRING DIGITAL COMPETENCE

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ABSTRACT

One of the priorities of modern teaching is for students to acquire digital skills, which is also recognized as a key prerequisite for the digital transformation of society as a whole. This is the reason why the issue of digital competency is addressed by various strategic documents of the Republic of Serbia, among which the "Strategy for the Development of Digital Skills in the Republic of Serbia for the period from 2020 to 2024" stands out. This document is in line with the European Digital Competence Framework, the definition of which was accompanied by the adoption and upgrade of the Lisbon Strategy starting in 2010, which announced the digital transformation of society. In accordance with this commitment, the development and use of educational software in teaching seems to be a necessary step, which allows students, by the implementation of various teaching contents, to gain better knowledge and develop digital competencies working in an interactive, multimedia environment that will allow them to use the potential of information and communication technologies in order to increase work efficiency and the economic development of society.

Keywords: Windows, Linux, digital competencies, educational software.

TEACHERS AND PARENTS EXPERIENCES DURING THE COVID-19 PANDEMIC IN THE REPUBLIC OF SERBIA

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ABSTRACT

The COVID-19 pandemic is a global health issue and has a major impact on education in different ways. Soon after the Republic of Serbia had confirmed the first case of the novel coronavirus pandemic in March 2020, all educational institutions were enforced to rapidly convert all their courses to emergency remote teaching and learning as a mitigation strategy against the risk caused by COVID-19. Such protection measures posed a unique challenge for all the participants, students and their parents, teachers, and institutions in general. The research analyses of parents' and teachers' perceptions of the applied educational measures aim to explore the transition from regular to online teaching in Serbian schools. Data were collected through surveys with 365 parents and 289 class teachers in primary and secondary schools. The main conclusion indicates that the implementation of online learning during the pandemic has been especially problematic and challenging for families. Various problems occurred regarding both teachers' and pupils'/parents' points of view. Some of them include: 1) internet usage, 2) pupils' inadequate organization, 3) unnecessary parents' engagement and 4) planning, implementation, and evaluation of learning.

Keywords: COVID-19, pandemic, education, online.

COMPETENCIES OF TEACHER AS FACTOR OF ENCOURAGEMENT OF DRAMA ACTIVITIES AND MAKING STAGE PUPPETS IN KINDERGARTEN

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ABSTRACT

This article analyzes role of kindergarten teacher and his methodical approaches in creativity development process in preschool children. It was analyzed drama activities in kindergarten as a way for integrated personal development of children. Research problem is focused on identifying factors that affect the encouragement of dramatic expression for preschool children. Goal of this research is consideration of the effects and actions of teacher related to dramatic activities and making stage puppets in the practice. The result showed that teachers believe that puppets are not only important for children's imagination but also, they have therapeutic effect, but in spite of that, they are not used as much as they can be. This led us to thinking about more frequent using of puppets as important component of children's benefits and children's development in general.

Keywords: child, drama activities, stage puppet.

OTHER TOPICS
OSTALE TEME

THE INFLUENCE OF BIOCLIMATE CONDITIONS ON THE DEVELOPMENT OF TOURISM ON THE ZLATIBOR MOUNTAINS

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ABSTRACT

Zlatibor is a mountain in Serbia where a significant development of the tourist economy has been recorded with a constant increase in the number of visitors. This paper presents the bioclimatic and climatic conditions on this mountain that can have a significant impact on tourism development. The required information was obtained based on physiologically equivalent temperature (PET) and universal thermal index (UTCI). The presentation of climate and bioclimate information for tourism purposes was done using the Climate Tourism Transfer Information Scheme (CTIS). Weather facilities for recreational and tourist activities were calculated using the weather facilities index (WSI). The ultimate goal is a biometeorological informant with the help of which tourists will choose the most suitable moment for the realization of their post on the mountain Zlatibor. This information is also important for the tourism industry, which can direct its business planning based on this study.

Keywords: tourism, Zlatibor, economy.

POSSIBILITIES OF APPLICATION OF AGRICULTURAL MECHANIZATION IN ECOLOGICAL AGRICULTURAL PRODUCTION

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ABSTRACT

The paper analyses the possibility of applying modern agricultural machinery in organic agricultural production. The use of appropriate agricultural machinery affects the productivity, profitability and efficiency of agricultural production and the quality of work, and ensures the proper execution of work processes to operators of machinery. The complexity of research subjects, ecological agricultural production, agricultural mechanization, legislation and responsibilities, imposes the use of different research methods. The descriptive method describes the condition and structure of the research subject, while the explicative analysis correlates modern agricultural mechanization with organic agricultural production. The normative method, in a dogmatic way, provides an overview of existing laws and bylaws that regulate the activities of organic agricultural production. The subject of concretization are legal provisions and bylaws, which regulate the field of ecological agricultural production and the use of agricultural machinery, in order to draw conclusions and define the course of action. The application of modern agricultural machinery should ensure efficiency within agro-technical deadlines, competitiveness, achieving the desired level of production and income, and make agricultural production attractive to young families, while maintaining product quality and preserving the environment.

Keywords: ecological agricultural production, modern technologies, mechanization.

SOME ECONOMIC INDICATORS OF WINTER WHEAT PRODUCTION DEPENDING ON THE SOIL TILLAGE SYSTEM

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ABSTRACT

Tillage systems can affect soil compaction, water content, soil temperature, and yield of cultivated plants. This study aimed to examine the impact of tillage systems on yield and some economic indicators of winter wheat productivity. The experiment was performed in the vicinity of Požega (Western Serbia), in the years 2014/15, 2015/16, and 2016/17. 4 tillage systems (CT-Conventional tillage, RT-Reduced tillage, RT1-Reduced tillage, and NT-No tillage) were included in the experiment. Tillage systems have significantly affected the grain yield of winter wheat. The highest average wheat yield was achieved in the CT tillage system (4837 kg ha⁻¹) and it was significantly higher than the yields achieved in other tillage systems. The average wheat yield was in a direct positive correlation with the average moisture content in the soil, and a strong negative correlation with the compaction of the soil. To achieve satisfactory wheat yields on vertisol soil type, full tillage is necessary, which includes plowing and adequate pre-sowing soil preparation. The highest value of production, as well as the highest profit, were recorded in the CT-tillage system, and the lowest in the NT tillage system. Also, the highest variable costs were recorded in the CT processing system. The lowest energy consumption, seen through the number of operations and passages of mechanization, is achieved in the NT tillage system. The economic status of wheat production depends on the yield and selling price, as well as on the number of inputs used in production. Due to the higher yield and net profit, it is recommended to produce wheat in a conventional tillage system.

Keywords: wheat, tillage systems, yield, productivity, economy, profitability.

IMPACT OF ARCHITECTURAL VISUALIZATION OF DIFFERENT TYPES OF FURNITURE IN INTERIOR DESIGN ON THE SELECTION OF OFFERED RENDERS

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ABSTRACT

Architectural visualization is the process of creating digital models using computer, which allows us a very detailed and accurate view of the future interior and exterior design. Using renders, is possible to display different levels of brightness, types of shadows and variety of materials, therefore, it is possible to obtain realistic renderings that look almost like photographs, with the appropriate settings. When displaying the render, the designer functionally solves the space and displays it in 3D with the help of 2D plans and drawings to provide clients with more detailed picture of the future appearance of the space. For interior visualization, specifically living rooms, 3Ds Max and Vray render software are most often used to visualize certain space. The subject of this paper is the analysis of the obtained data that indicate how much the choice of furniture style in render can affect potential buyers in choosing the offered apartment. Necessity of making rendering is primarily indicated because it contains details that are important to customers such as materialization, type and intensity of lighting, type of furniture, wall and floor coverings. The aim of this paper is to obtain information on the basis of surveys of potential buyers, whether the appearance of furniture and to what extent substantially affects the perception of potential buyers when choosing an apartment.. The main results of the study shows that the variability of the furniture is important segment when it comes to choosing an apartment.

Keywords: architectural visualization, render, software, space, furniture style.

ADDITIONAL PAPERS
DODATNI RADOVI

INNOVATIVE MANAGEMENT AS A PARADIGM FOR ACHIEVING COMPETITIVE ADVANTAGE

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ABSTRACT

The changing environment challenges the managers of modern organizations how to achieve stability and the ability to create change, overcoming the instability that prevails in the market and ensuring success in chaos. New ideas, applied and exploited in a way that causes an increase in profitability, directly or indirectly lead to an increase in value. This qualifies them as innovation activities that make business better (more competitive). Increased value can be reflected through higher profits, better positioning in the minds of customers, but also through more efficient business processes. The aim of this paper is to determine the impact of innovative management on the process of creating, achieving and maintaining competitive advantage. The scientific-research character of this paper is based on the analysis of relevant scientific literature and modern sources using research methods, analysis methods, comparison methods, description methods and deduction methods. The results of empirical research have shown that achieving competitive advantage is directly dependent on innovative management, because it is one of the most important areas of quality business system management.

Keywords: innovative management, competitive advantage, innovative capacity.

DIGITAL TRANSFORMATION OF THE BUSINESS AND TECHNOLOGICAL ASPECTS OF INTERNATIONAL ECONOMY

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ABSTRACT

Digital revolution and globalization have drastically been changing the way people think, behave and communicate with one another, as well as their way of functioning and performing business. The new way of creation of knowledge, education and information distribution has changed the economic and business practice on a global level. Interdependence of the market business and technological progress represents the most prominent driving force with practically inexhaustible potential. Although still at the very beginning, information and communication technologies represent the base, infrastructure of the digital revolution. An effective integration of the existing business and information solutions by the application of the standardized basic information technologies (XML-exXtensible Markup Language, Web services) notably reduces the investment risks and increase company competitiveness, fulfilling the growing demands of customers. Yet, the already proclaimed need for adjustment of information and communication technologies with business cannot adequately answer to all the challenges of global economy. One of the goals of this paper is a perception and systematic analysis of the challenges, characteristics and principles of the digital transformation in global economy. The digital transformation of business nowadays is not an option, but the only alternative of a long-term survival and improvement of companies.

Keywords: digitalization, international economy, information and communication technologies