SEVENTH INTERNATIONAL SCIENTIFIC CONFERENCE

JUNE 5 th – WORLD ENVIRONMENT DAY

THE BOOK OF ABSTRACTS

09 - 10 June, 2022, Bihać, Bosnia and Herzegovina

University of Bihać

Biotechnical Faculty

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L E T T E R O F A P P R E C I A T I O N

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Bihać, June 2022. Organization committee

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ECOSYSTEM PROTECTION

ANALYSIS OF LEGISLATION ON THE MANAGEMENT OF THE INTRODUCTION AND SPREAD OF INVASIVE ALIEN SPECIES IN THE WESTERN BALKANS

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ABSTRACT:

The introduction of non-native (NN) species is widely recognized as one of the main threats to aquatic biodiversity and impact to human well-being. The first large piece of European legislation on NNS addressing IAS, come into a force in 2014 by the EU Regulation 1143/2014 on the "Prevention and management of the introduction and spread of invasive alien species". Based on Regulation, Member States (MS) should take action on pathways of unintentional introduction, measures for the early detection and rapid eradication of these species, and to manage species that are already widely spread in their territory. However, still it is not known if this regulation affected further actions in non-EU Balkan countries although the regulation on IAS, MSs are obliged to foster cooperation with third countries. Based on the questionnaire, the role and impact of European legislation on alien species on the formation of laws and regulations on the prevention and management of the introduction and spread of invasive alien species in the Western Balkans were investigated.

KEYWORDS*: invasive alien species, legislation, Balkan*

Type of presentation: Oral

BENEFITS OF INTRODUCTION AND IMPLEMENTATION OF ISO 14001 STANDARD IN THE MEAT INDUSTRY

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ABSTRACT:

The international standard ISO 14001 is the best known standard of the ISO 14000 series and specifies the requirements for all organizations, of any type or size, to implement an environmental management system.
The number of ISO 14001 certificates is growing every day all over the world, although somewhat weaker in BiH, it is increasingly being introduced and implemented by companies in BiH. The Environmental Management System (EMS) is a practical tool for environmental initiatives that can ultimately generate financial benefits through competition or improving organizations: reducing costs and increasing revenue. These benefits have prompted companies to adopt the ISO 14001 standard, which is today the most popular environmental management standard, with more than 300,000 certified companies worldwide. The implementation of ISO 14001 brings benefits to companies that adopt it that can be classified into external and internal benefits. These benefits are visible, among other things, through measures to improve environmental protection, profitability, efficiency, improve image, improve customer satisfaction and improve employee satisfaction.
According to most literature, benefits and advantages are classified into three groups that can be manifested through different effects: internal effects such as cost reduction, environmental improvement, increased productivity, increased profit margin, improved internal procedures, improved employee morale, and external marketing effects such as improving corporate image, increased market share, increased customer satisfaction, increased time and delivery to customers. In addition, there are environmental benefits such as improved relations with communities, improved relations with the authorities.

This paper analyzes the benefits of introducing ISO 14001 in the food industry with an emphasis on the meat industry, and presents key quantitatively measurable indicators of improving internal and external effects.

KEYWORDS: *ISO 14001, environmental management system, benefits, internal effects, external effects*

Type of presentation: Oral

ECOSYSTEM SERVICES ASSESSMENT AS A TOOL FOR EFFECTIVE NATURAL RESOURCES MANAGEMENT

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ABSTRACT:

Human activities have a great impact on the natural environment resulting in ecosystem degradation and biodiversity loss. These changes have heavily influenced nature's functioning and in turn the benefits that it provides to people – the ecosystem services (ES). Recognising that these changes ultimately affect us, there is a growing interest among stakeholders from different sectors (nature protection, agriculture, forestry, fishery, water management, economy) in ES concept. As the importance of ES is gaining wider recognition, there has been a need for tools that could potentially provide information to decision makers on ES supply under current and future anthropogenic pressure. Therefore, the explicit ES assessment methods are considered as main requirements for the implementation of the ES concept into natural resources management planning and related decision making.

The purpose of this paper is to present customised TESSA methodology for ecosystem services assessment applied in 6 pilot sites in the Croatia-Serbia cross border region. The methodology emphasises the importance of comparing estimates for alternative states of a protected site (for example, before and after application on management measures) so that decision-makers can understand the importance of such measures, and hence the benefits for human well-being that may be lost through the degradation or gained by conservation.

KEYWORDS: *ecosystem services, ES, natural resources, management, TESSA methodology*

Type of presentation: Oral

ICHTHYOFAUNA DIVERSITY IN A PROTECTED AREA LABUDOVO OKNO – RAMSAR SITE IN SERBIA

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ABSTRACT:

Labudovo okno (3,733 ha) stretches along the left bank of the Danube river in the furthest south-eastern part of Vojvodina. Within the borders of the Ramsar site there are several river islands, whose dimensions have altered during the construction of Đerdap Lake downstream from the area.

Fifty-two species of fish from 21 families were recorded in the aquatic ecosystems of Labudovo okno. In comparison with the previous composition, the fish fauna is to a certain degree changed and impoverished. Anthropogenic factors greatly influence the structure of the fish fauna and the abundance of populations, among others inadequate stocking of open waters. Lack of effectiveness was attributed to many anthropogenic factors, including fishing, often with a lack of law enforcement, water management (abstraction, dams, and flow regulation), habitat degradation, and invasive non-native species.

Labudovo okno is also endangered due to the visitors' negligence and high level of poaching of wetland birds and illegal fishing.

KEYWORDS: *Ramsar site, fish diversity, nature protection*

Type of presentation: Poster

BIODEGRADATION OF SYNTHETIC WASTEWATER CONTAMINATED BY HEAVY METALS IN THE LABORATORY BIOREACTOR

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ABSTRACT:

Contamination of water with heavy metals has a serious impact on the environment and human health. Increased concentrations of heavy metals are mainly associated with industrial discharges, but insignificant amounts of heavy metals can also be found in municipal wastewater.

In this research, synthetic wastewater was prepared with the addition of heavy metals of different concentrations (Fe, Pb, Cd, Zn and Co), so that the concentration of heavy metals in wastewater is 4-5 times higher than the maximum allowable concentration of heavy metals in water prescribed by the Decree on Conditions for Discharge of Wastewater into the Environment and Public Sewerage Systems (Official Gazette of the Federation of BiH, No. 26/20).

Biodegradation was performed in a laboratory bioreactor with a volume of 2 L, under the aerobic conditions. For the biodegradation of synthetic wastewater, activated sludge from wastewater treatment plants was used, in which mixed bacterial cultures were prepared by the technique of accumulation of nitrificants and denitrificants. Biodegradation was monitored for 7 days. In synthetic wastewater, an increased initial concentration of organic matter expressed as COD was measured, and it was 286 m /L, as well as an increased concentration of ammonia - 108 mg / L, and phosphorus – 34.4 mg / L.

KEYWORDS: *biodegradation, synthetic wastewater, heavy metals, activated sludge*

Type of presentation: Poster

OBSERVANCE OF ADSORPTION OF ACID AZO DYE ON NH_4BETA ZEOLITE AND ITS DEGRADATION UNDER INFLUENCE OF UV RADIATION FROM AQUEOUS ENVIRONMENT

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ABSTRACT:

Waste waters of many industries that use dyes in the process of production represent a big problem for the environment, unless they get treated in an appropriate manner before being released into the recipient. Because of the simple and economical process of work, adsorption is still one of the most frequently used methods for purification of waste waters. Advanced oxidation processes have also lately been more often used in the treatment of polluted waters, because they bring about mineralization of a big number of harmful matters into non-toxic compounds. As it is well-known, zeolites are nanoporous materials which are applied in different technologies as adsorbents and catalysts thanks to their unique structure, which consists of cavities and channels of different dimensions. This study has observed the efficiency of removal of textile azo dye Bemacid Red (product of the company CHT, Switzerland) from the aqueous environment by adsorption on NH_4BETA zeolite and degradation under the influence of UV radiation. Experiments were performed at 283 K, and the concentration of dyes was determined spectrophotometrically at 503 nm (Perkin Elmer UV/VIS Spectrometer Lambda 25 and T80+UV-Vis Spectrometer). Characterization of NH_4BETA zeolite (product of the company Zeolyst International, USA) was performed by the scanning electron microscope (SEM) and Fourier Transform Infrared Spectroscopy (FTIR). Degradation of the dye under the influence of UV radiation was performed in the photochemistry cell in the presence of zeolite, and the source of UV radiation was the high-pressure mercury lamp (Philips, HPL-N, 125 W, with the emission maximum at 366 nm). Obtained results indicate that NH_4BETA zeolite possesses active centers on its surface which suit this adsorbate, considering that UV radiation did not contribute to a more efficient removal of this dye.

KEYWORDS: *azo dye, BETA zeolites, adsorption, UV degradation, waste water*
Type of presentation: Poster

PROGRAM OF MEASURES FOR PRESERVATION AND IMPROVEMENT OF THE ENVIRONMENT OF RURAL SETTLEMENTS

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ABSTRACT:

The outflow of population from the countryside to the city is a general trend in Serbia, and the reasons are above all we can find it in the decline of the rural economy, poor infrastructure equipment and lack of conditions for basic living standards.
Analyzing the communal problems of the rural area, a shortcoming is noticed rural water supply management system, lack wastewater collection and treatment infrastructures and non-coverage municipal waste removal service. All these communal problems result negative impact on the quality of life of the inhabitants of rural settlements and negative environmental impact.
Measures that would contribute to the preservation and improvement of the environmental condition of rural areas must be created in accordance with sustainable development. By defining the real situation in rural areas, mechanisms of action could be identified through environmental models of sustainability that would reduce weaknesses and shortcomings.
At the same time, defining the real situation and relations in the Serbian rural area is a contribution to the development of methodological research in this area.

KEYWORDS: *environmental protection, rural development, sustainability*

Type of presentation: Oral

THE DARK SIDE OF ARTIFICIAL LIGHT

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ABSTRACT:

In the recent past, Earth inhabitants had a completely dark night and sky full of stars at night, while in the last twenty years, only the inhabitants of less-developed countries could enjoy the starry sky, who had no possibility to install sources that would threaten the night sky by overuse of artificial lighting.

Specifically, today we are faced with light pollution, which is primarily the result of the scattered light of cities and other light emissions from artificial sources, mainly from urban areas and areas where economic operators (factories, warehouses, etc.) are concentrated. Much of the light flux from these sources, and therefore energy, is scattered and lost in the sky, which makes the night sky brighter and the celestial objects in its background become invisible. Light pollution is now considered a complex problem that has a detrimental effect on the environment with a very wide range of consequences.

The harmful effects on the environment are primarily reflected in disturbances in astronomical observations, inducing hormonal disorders in humans working at night, in plants disturbing vegetation cycles in plants, disorienting birds in space, sea turtles cubs and some other animal species, which all together directly affects at their survival, often causing changes in the habitat of endangered animal species.

Given that there is a need to protect the environment as a whole, and human health as well, from light pollution, it is necessary to take appropriate measures to educate the public about the potential adverse effects of light pollution while at the same time improving legislation in this area of environmental protection, because only through valid legal framework for the adoption of regulations on protection against light pollution, it is possible to reduce, if not completely eliminate, the harmful effects of light pollution in the environment.

KEYWORDS: *light pollution, sustainable lighting, environment*

Type of presentation: Oral

THE INFLUENCE OF TYPE OF SOIL ON THE LEVEL OF MINERAL SUBSTANCES IN HERZEGOVINA TOBACCOS

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ABSTRACT:

Mineral substances have an important part in the chemistry of tobacco and their share in the composition of entire dry substance is approximately 11 – 30%. They are visible through the ashes content that is left after the burning process. The level of mineral substances is particularly important factor in regulating the burning process of tobacco and the quality of tobacco is inversely proportional with the quantity of ashes. The highest content of mineral components have tobaccos dried in shades, then tobaccos dried in sun and the lowest level have tobaccos dried with hot air. Type of tobacco, soil, climate, the position of the leaf on the stem, way of drying tobacco etc, are influencing the level of mineral substances In order to examine the influence of the soil type on the ashes content in Herzegovina tobacco, the research was carried out on two localities: Pocitelj hill (medium deep red soil, Tera rossa) and Pocitelj valley (deep alluvial soil) near the Neretva River in the town of Čapljina in BiH.Tobacco was dried traditionally in the sun. The content of total mineral substances was analyzed in the samples of three tobacco varieties (Ravnjak, VH i VH-32) per harvest.The results showed that the content of total mineral substances in all three varieties and in all harvests was in the accordance with the literature data and that the influence of soil type and variety has different levels of significancy.

KEYWORDS: *mineral substances, tobacco, varieties, red soil, alluvial soil, influence*

Type of presentation: Online

ECO-ETHICS IN CONTEMPORARY LITERATURE FOR CHILDREN

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ABSTRACT:

The danger of ecosystem damage and efforts to promote nature conservation have contributed to the growing popularization of eco - ethics. Eco or ecological ethics as a framework of different ethical orientations is part of the movement for the protection of nature and the diversity of its life forms. This is a specific area of philosophical research and teaching on the establishment of ethical norms as a criterion of moral behavior towards the living world and ecosystems in nature. Man today is in imbalance with nature and it is necessary to restore a harmonious relationship in order to improve the quality of human life.

In contemporary children's literature in Bosnia and Herzegovina, the topics of ecosystem preservation and environmental protection are increasingly present. As knowledge is mostly learned and acquired in childhood through all forms of social action, so children's literature seems to be a suitable medium for the transfer of knowledge. The paper examines the strategies of contemporary authors for children in promoting environmental protection and the ways in which the authors integrate environmental protection messages into the text.

KEYWORDS: *children's literature, eco-ethics, ecosystem, nature protection*

Type of presentation: Oral

INDEPENDENT ELECTRICITY SUPPLY SYSTEMS FOR TOURIST ATTRACTIONS IN HARD-ACCESSIBLE AREAS

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ABSTRACT:

Ecotourism is becoming dominant, especially after global disturbances such as the pandemic. In addition to the health segment, it must include the cognitive and educational segment, so attractions are an important element in creating eco-products in tourism. Whether they are natural or artificial attractions, they are often located in hard-to-reach areas and their function cannot be maximally valorized without basic infrastructure. The development and implementation of a system for the production of electricity from unlimited solar energy are important for the development of sustainable tourism. Hybrid power systems are especially important in order to rationalize costs. Fully autonomous power systems in inaccessible areas where access to the public network is difficult or completely disabled are crucial. The system of remote lighting control of radio frequency and LED technology, with the aim of completely independent management of local distribution networks, enables the development of isolated tourist attractions.

KEYWORDS: *independent supply systems, attractions, ecological aspects, ecotourism*

Type of presentation: Online

ENVIRONMENT, NUTRITION AND HEALTH

ANTIMICROBIAL ACTIVITY OF FERMENTED WASTE OF DIFFERENT TYPES OF FRUIT

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ABSTRACT:

Fruit waste is organic in nature and contributes greatly to soil and water pollution, which presents a concern for the environment. The use of biological preparations that use fruit waste (bio enzyme) can of invaluable importance. By applying these preparations, we do not harm or disturb, but we support and contribute to the environment and all living organisms because they are completely natural and harmless.Organic waste,or healthy and fresh fruit waste, was collected for the production of bio enzymes. The peels of apple, banana, pineapple and orange were collected, because the obtained waste bio enzyme from such waste has a more pleasant and refreshing smell. The waste bio enzyme was prepared by mixing 1 part brown sugar, 3 parts fruit waste and 10 parts water. A 5 l plastic container with a good closure was used to make the waste bioenzyme. Such a mixture of sugar, fruit waste and water was left to stand in a well-closed container for 45 days.

The aim of this study was to evaluate the antimicrobial activity of fermented organic waste (bio enzymes), to find a dilution that can control the population of Escherechia coli. To find the best concentration to reduce the population of Escherechia coli the enzyme was diluted 1:10; 1:20; 1:30 and 1:50. Antimicrobial activity was performed by disk diffusion method on MaCconkey agar and discs with different concentrations of bioenzymes were placed, and an antibiotic was used for comparison. The results showed that the enzyme diluted 1:50 had the largest zone of inhibition. Bio enzyme has shown good antimicrobial activity which indicates its power as a promising source of natural antimicrobial agents.

KEYWORDS: *Bio enzyme, Escherichia coli, disk diffusion method,antimicrobal activity*

Type of presentation: Poster

PHYSICO-CHEMICAL AND MICROBIOLOGICAL CONTROL OF DRINKING WATER OF KLJUČ MUNICIPALITY

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ABSTRACT:

This paper presents the results of testing the hygienic correctness of the municipal water supply in Ključ in 2017 and 2018. Samples were taken from the city water supply network.
The following physico – chemical indicators were examined: humidity, pH value, consumption of $KMnO_4$, ammonia, nitrates, nitrites, chlorides, iron and microbiological indicators: Escherichia coli, Colifom bacteria, Enterococci and Clostridium prefrigens. The results of the study showed that water from the city watercourse mainly meets the conditions prescribed by the Regulation.

KEYWORDS: *physico – chemical indicators, microbiological indicators, water supply*

Type of presentation: Poster

ASSESSMENT OF IRON INTAKE AND RISK OF IRON PRESENT IN THYME HERBAL TEA INFUSIONS CONSUMED BY PRESCHOOL CHILDREN

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ABSTRACT:

Iron is an essential element for the human body and plays a key role in the functioning of all cells. Its main role is to carry oxygen through the blood from the lungs to all cells. Iron deficiency causes anemia, which is a major public health problem. One of the most vulnerable groups in the population are children in development. On the other hand, excess iron taken up in the body accumulates in vital organs, mostly in the liver, so excessive accumulation can cause serious health consequences. Providing the population with a sufficient amount of nutritious and hygienically healthy food is the foundation of public health protection. According to the current Law on Food of BiH, the main goal is to ensure a high level of human health protection, and the measures applied should be based on risk assessment, which is based on the assessment of the intake of harmful substances. An anonymous survey on 200 preschool children from the municipality of Travnik collected data on body weight, age, frequency and amount of consumption of thyme herbal tea infusions. Analysis of infusions of 20 samples of mint herbal tea for Fe content by atomic absorption spectrophotometry (AAS) showed that the average iron concentration was 0.01775 mg/kg. The values of average daily intake of Fe (IFe) decreased with the age of the surveyed children and were lower than the values of the oral reference dose of iron, therefore the values of hazard coefficients of iron (HQFe) in relation to age decreased and were <1. By consuming the analyzed infusions of herbal thyme tea, children consume iron necessary for the functioning of their body in quantities that do not have a harmful effect on their health.

KEYWORDS: *risk assessment, hazard coefficient, herbal tea, heavy metals*

Type of presentation: Oral

CARING FOR THE ENVIRONMENT IN AN INCLUSIVE SCHOOL

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ABSTRACT:

This research explores the development of environmental caring character through the IPA Cross-Border Cooperation Program Bosnia and Herzegovina - Montenegro, with special reference to the inclusive practice of the Centers as institutions that educate students with disabilities. This study used the CIPP (context, input, process, product) evaluation model, including semi-structured interviews, observations and document analyses for data collection. The results illustrate that the program succeeded in disseminating motivation and environmental care to both students with special needs and regular students, providing a foundation for sustainable development. This study contributes to the expansion of theoretical discourse and the practice of character development in environmental care by considering the needs of students.

KEYWORDS: *environment, inclusion, students with special needs, regular students*

Type of presentation: Oral

CHEMICAL COMPOSITION OF TRADITIONAL TRAHANA FROM THE UNA - SANA CANTON

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ABSTRACT:

Trahana is a traditional fermented product made from wheat flour. After fermentation, the dough is cut into smaller pieces and rubbed by hand through a sieve until a specific granular shape is obtained which is then dried in the sun and then at room temperature. It is usually consumed as a soup. In this paper, chemical analysis of nine trahana samples from the Una-Sana Canton was performed. Next values were obtained: water content ranging from 8.77% (sample A8) to 12.08% (sample A2); pH value of 4.24 (with A4); degree of acidity °SH from 0.47 (sample A8) to 0.93 (sample A1); ash expressed on dry matter from 0.52% (sample A8) to 0.92% (sample A1). The following values were determined by colorimetric color measurement: the lowest L value was recorded for sample A2 (66.82), and the highest for A5 (81.44); the lowest a* value was determined for sample A8 (1.25), and the highest for sample A2 (3.59). The lowest b* value was recorded for sample A9 (13.61), and the highest for A2 (24.32).*

KEYWORDS: *trahana, chemical composition, Una - Sana Canton*

Type of presentation: Poster

CHEMICAL MIGRATIONS FROM POLYETHYLENE TEREPHTLATATE BOTTLES INTO DRINKING WATER

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ABSTRACT:

Packaged drinking water is mostly sold on the market in PET bottles. PET is a very inert polymer. However, under certain conditions, chemicals such as monomers, antimony, 2-aminobenzamide and NIAS can migrate from PET bottles to water. The amount of migrants in the water depends on the quality of the PET bottle (raw materials and technology of PET bottle production), the bottling process and the conditions of storage and distribution. Studies depending on the factor and the intensity of the influence of factors show variability in the results, and in the case of the influence of the color of PET bottles contradictions. Variability can be attributed to a variety of analytical methods and exposure conditions. Although studies of migration of proven migrants under standard conditions do not show exceeding the prescribed limits, the safety of PET bottles for drinking water should still be under question, because in some cases, the origin of some chemicals found in water packaged in PET bottles is not clearly determined.
The paper presents an overview of migrating chemicals, influencing factors and toxic effects on the consumer.

KEYWORDS: *chemical migration, PET, water, NIAS*

Type of presentation: Oral

CHEMICAL PROFILE OF DIFFERENT ESSENTIAL OILS ISOLATED FROM PLANT SPECIES OF THE GENUS ARTEMISIA

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ABSTRACT:

Artemisia plants are aromatic plants that are often used in traditional medicine because of their medicinal properties. The genus Artemisia belongs to the plant family Asteraceae. There are 480 species within the genus, 57 in Europe and 16 in Croatia. Artemisia essential oil contains a large number of bioactive compounds that are widely used not only in the chemical industry but also in medicine and the food industry. Its components have various bioactive properties, such as antifungal, antibacterial, antiparasitic. It also stimulates the appetite, improves digestion and stimulates bile secretion and liver function, and quickly eliminates indigestion and bloating. Artemisia plants are used to make teas, brandies, extracts, and flower buds also serve as an aromatic spice after being ground into a powder. The aim of this study was to isolate and analyze the chemical composition of essential oils of six plant species of the genus Artemisia (A. absinthium, A. abrotanum, A. annua, A. arborescens, A. verlotiorum, A. vulgaris) collected in the time immediately after full flowering. Isolation of the oil was carried out by the method of hydrodistillation in a Clavenger apparatus. GC-MS analysis of A. absinthium essential oil showed that the dominant compounds of this oil are cis-sabinyl acetate and cis-epoxy ocimene. The dominant essential oil compound of A. abrotanum is borneol; in Artemisia annua oil these are artemisia ketone, camphor and 1,8-cineole; in Artemisia arborescens oil these are camphor and chamazulene; in Artemisia verlotiorum oil these are cis-thujone (46.3%), 1,8-cineole (10.9%) and trans-thujone (9.0%); in A. vulgaris oil trans-thujone and trans-epoxy ocimene. Comparing the chemical compositions of essential oils of the already studied plant species of the genus Artemisia, it can be concluded that these are oils dominated by monoterpenoid components: 1,8-cineole, artemisia ketone, cis-thujone, trans-thujone, cis-epoxy ocimene, camphor, borneol, cis-sabinyl acetate. In A. arborescens, chamazulene also appears as a dominant component.

KEYWORDS: *genus Artemisia, essential oil, chemical composition, biological activity*
Type of presentation: Poster

COMPARATIVE CADMIUM CORRELATED GENE EXPRESSION IN DOMESTIC VS. HYBRID KALE VARIETIES FROM BOSNIA AND HERZEGOVINA

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ABSTRACT:

Kales (Brassica oleracea L. var. acephala D.C), are ancient Mediterranean vegetables, known for their nutritional values, and very popular cultivars in the Herzegovina region, the southern part of Bosnia and Herzegovina. Kales are known as heavy metal accumulators, but some are very tolerant to heavy metals as well. To evaluate and confirm the expression levels of several cadmium heavy metal correlated genes (HMA2/4, YSL3, FP3/6, and ATX1), Real-Time PCR was used. The results showed linear gene expression with increasing cadmium concentration. The lowest gene expression was observed in domestics kales, whereas in hybrid kales, the gene expression was significantly higher.
These results indicate a better ability of domestic kale varieties to tolerate $CdCl_2$ than hybrid kales. Based on the obtained data, we can conclude that domestic Herzegovina kales are better candidates for human consumption, whereas the hybrids show exceptional cadmium absorption abilities, indicating their possible role in phytoremediation processes.

KEYWORDS: *Gene expression, heavy metals, kales, phytoremediation, RT-PCR*

Type of presentation: Oral

DETERMINATION AND COMPARISON OF THE EFFECT OF TEA COOKING TIME ON THE CONTENT OF TOTAL PHENOLS, FLAVONOIDS AND ANTHOCYANINS

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ABSTRACT:

Tea and its ingredients are one of the important components for maintaining health and reducing the risk of various diseases. In addition to water, it is the most commonly consumed drink. It has significant antioxidant, anti-inflammatory, antimicrobial, anticancer, antihypertensive properties. The method of preparation of tea drinks affects the content of biologically active substances and their stability, so it is important to investigate the influence of parameters of preparation of tea solutions on the content of biologically active substances, anthocyanins, flavonoids. Two types of tea (nettle and mint) were taken from two domestic producers. The teas were treated at intervals of 5, 10, 15 and 30 minutes at a temperature of 80°C. The obtained results indicate that the concentration of phenol and flavonoids increases with increasing cooking time up to 15 minutes, after which the value decreases. Anthocyanin content was found only in some treatments. It was also found, based on the results obtained by the Mann-Whitney U test, that for most treatments there is a statistically significant difference in terms of phenolic and flavonoid content between two producers for the same type of tea.

KEYWORDS: *tea, phenols, flavonoids, anthocyanins, statistically significant difference*

Type of presentation: Poster

DETERMINATION OF METALS IN DIFFERENT KIND OF MILK BY ATOMIC ABSORPTION SPECTROMETRY

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ABSTRACT:

Milk is an excellent source of many essential nutrients, including Ca, proteins and vitamin D. Nine metals (Ca, Mg, Mn, Fe, Cu, Zn, Cd, Ni and Pb) in raw and pasteurized cow, sheep and goat milks were determined by atomic absorption spectrometry. The content of Mn, Fe, Cd, Ni and Pb was below the detection limit of the method used. The concentration ranges for Ca, Mg, Zn and Cu, in all milk samples, were as follows: 4.598-9.928, 0.595-2.068, < LD-0.0837 and < LD-0.0323 mg/L, respectively. The order of the metal levels was Ca>Mg>Zn>Cu. The highest content of Ca and Mg was found in goat milk. In the case of cow's milk, the content of Ca, Mg and Zn increased with increasing milk fat. Matrix correlation analysis showed that there is a very strong correlation between Ca and Mg in milk samples (Pearson correlation factor, r = 0.830).

KEYWORDS: *Milk, Metal Content, Atomic Absorption Spectrometry*

Type of presentation: Poster

DISEASES AND PROTECTION OF HAZELNUTS (*CORYLUS AVELLANA*)

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ABSTRACT:

We have been picking hazelnuts for millennia and then crunching delicious kernels. In its natural form it is widespread on the edges of forests, and in bushes, on the banks of streams but today it is common in parks and gardens. Today, the common hazel Corylus avellana is produced in Europe as a source of income. Most growers opt for organic farming of this plant. Hazel is not difficult to raise, but due to its high prevalence today we find different types of diseases that are present. Sometimes they are not a problem because they are found in smaller quantities. Diseases can be observed on the fruits of Monilinia fructigena, Botrytis cinerea, and Nematospora coryli, on the leaves of Phyllactinia guttata and on the roots of Armillaria mellea. Diseases and protection options are presented.

KEYWORDS: *Corylus avellana, diseases, protection*

Type of presentation: Poster

FIVE-YEAR EVALUATION OF PATIENTS WHO UNDERWENT THYROID SURGERY BASED ON PHD FINDINGS

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ABSTRACT:

Diagnosis of nodal changes in thyroid gland is based on hormonal evaluation, ultrasonic diagnostics, thyroid scintigraphy and cytologic puncture. Based on volume or localization, relation with surrounding organs and how nodes are scintigraphically displayed, cytological punctuation is indicated. Aim: Evaluate all operated patients with changes in thyroid gland during the period from 2013 to 2018 at the Cantonal Hospital "Dr. Irfan Ljubijankić "Bihać and get information on the number and type of tumors operated based on pathohistological findings (PHD). Materials and methods: The conducted study was a retrospective, descriptive clinical study which included 208 patients who underwent surgery of the thyroid gland from 2013 to 2018. Patients are divided according to PHD diagnosis, age, gender and geographical affiliation. Results: Our research included 208 patients, 84% women and 16% men. 15.5% of patients had thyroid cancer and 176 patients or 84.5% had benign thyroid changes. No significant difference was found in the representation of individual forms of thyroid cancer based on gender distribution. An exception is colloidal struma, which has been shown to be significantly more common in women than in men. Women in our population are significantly more likely to suffer from all thyroid diseases. This article is also a sort of evaluation of the current state of health care in the field of thyroid diseases.

KEYWORDS: *thyroid gland, thyroid cancer, PHD finding, operative tretman*

Type of presentation: Oral

EFFECTS OF MELATONIN ON MORPHOLOGICAL CHARACTERISTICS IN *MELISSA OFFICINALIS L.* AND *VALERIANA OFFICINALIS L.* UNDER HEAVY METAL INDUCED STRESS

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ABSTRACT:

Heavy metals, due to the impossibility of their decomposition, represent a serious environmental and nutritional problem. The accumulation of essential and non-essential heavy metals in living organisms reduces normal growth and development, causing acute poisoning, disease, and even death of organisms. Melatonin, a hormone, has recently been shown to be a very important multifunctional molecule in protecting plants from oxidative stress because of its ability to directly neutralize reactive oxygen species.

The response of lemon balm and valerian (germinated in water or 0,1 mM melatonin) to increased concentrations of Zn and Cd, as well as the changes in the chloroplast pigments of plants during abiotic stress were determined.

In contrast to lemon balm, significantly higher concentrations of chlorophyll a, b and carotenoids were obtained in valerian leaves treated with exogenous melatonin (1.73, 0.59, and 1.12 mg/g FW) compared to control leaves (1.14, 0.35 and 0.72 mg/g FW). Cadmium treatment had a negative effect on all morphometric characteristics of both plant species. This negative effect is reduced in plants treated with melatonin, which confirms a positive effect of melatonin in the growth and development of plant species, especially under the influence of chemical stressors.

KEYWORDS: *melatonin, heavy metals, lemon balm, valerian*

Type of presentation: Poster

EFFECTS OF MUNICIPAL SEWAGE SLUDGE ON SOIL PROPERTIES AND MISCANTHUS X GIGANTEUS BIOMASS YIELD

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ABSTRACT:

The application of municipal sewage sludge as source of nutrients in energy crops growing is a promising sustainable patway of management. However, an adequat application of municipal sewage sludge in agriculture, can potentially be a source of heavy metals and pollutants accumulation in soils. This problem can be solved by growing fitoremediators such as Miscanthus x Gitanteus as an energy crop. On this way waste material can be used as slow released fertiliser to supply energy crop growth and soil fertility improvement. Produced biomass is an good raw material for energy production as well as soil heavy metal remediation. In same time the end product does not enter the food chain and there is nio hazard for humans or animals health. The aim of the study was to test impact of different rates of sewage sludge on soil fertility and quality properties and biomass production. Sewage sludge was applied at regular rate of 1.66 t DM ha-1 as well as two times (3.22) and three times (6.44) higher rate than was allowed bay national regulation. Soil propertis was not significantly changed in chemical fertility indicators and changes in heavy metalls was not statistically significant respectively to control treatment withouth sewage sludge application. Likeways to soil changes, the Miscanthus biomass yield was almost simmilar on treated and non-treated variants. The heavy metal content of Miscanthus crops differed but not consisently to applied sewage sludge rate. The results shows that Miscanthus can be right choice for reciclyng of sewage sludge withouth environmental hazards.

KEYWORDS: *sewage sludge; Miscanthus; heavy metals; biomass; energy production*

Type of presentation: Oral

FIRST NOTE OF PRESENCE OF LERNAEOCERA LUSCI (*PENELLIDAE: COPEPODA*) IN FROZEN FISH IN SERBIAN SUPERMARKETS

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ABSTRACT:

In frozen hake, imported from Spain to Serbia and distributed to stores, we have found some examples of Lernaeocera lusci. Although is known that parasites can be destroyed by sub-zero freezing temperatures, their presence could indicate low quality of fish health. From a nutritional standpoint, some findings revealed that L. lusci is able to cause severe deterioration in the nutritional quality of its host oil. Heavy infection levels make the parasitized fish inadequate sources of fish oil and unsuitable for consumers with special dietary needs.
The copepod Lernaeocera lusci is a common ectoparasite of the hake Merluccius merluccius, which constitutes its definitive host. This parasite could couse seriuos pathogenic effects by anchoring of the branchiae and deriving nutrition from the blood of its host and could have major effects on the aquaculture industry and with fish farming expanding, there is considerable potential for this parasite to become a serious problem for commercial mariculture.

KEYWORDS: *marine fish parasite, Copepoda, frozen hake*

Type of presentation: Oral

GERMAN WORDS IN THE CONCEPTUAL FIELD: FOOD AND HEALTH - LINGUISTIC ANALYSIS

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ABSTRACT:

Ecolinguistics, or the ecology of language, emerged as a new paradigm of linguistic research in the 1990s within sociolinguistics.
Just as ecology studies the interaction of living organisms with each other, so the ecology of language studies the influence and interaction between languages and between languages and their environment and the society in which they are located.
This paper deals with the influence of the German language on the Bosnian language and analyzes the semantic adaptation of words of German origin in the Bosnian language system and focuses on the conceptual field related to: environment, food and health.
The task of analyzing adaptation processes is to describe what changes a foreign German word has undergone from the moment of "borrowing" to the formation of the basic form - which in linguistics is called a replica - and what changes occur in a replica from the moment of integration onwards. Bosnian language.
The paper also presents the representation of German words, ie. Germanisms in the field of "food and health" and their frequency in the Bosnian language.

KEYWORDS: *language ecology, German language, Bosnian language, semantic adaptation*

Type of presentation: Oral

HEALTH CONTROL OF FOODSTUFFS IN THE CONTROL OF SALMONELOSIS (*SALMONELLA SPP.*)

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ABSTRACT:

The control of the health safety of food is performed in accordance with the Law on the health safety of foodstuffs and articles of general use (SL RBIH 2/92 and 13/94). Food can be primarily and secondarily contaminated. Primary contamination means contamination at the time of cultivation and production, and thus contaminated comes on sale. We have a good example in the extensive rearing of chickens fed salmonella-contaminated food. Foods can be secondarily contaminated through dirty hands and utensils during the process of production, processing, transport, storage, sale and the preparation process, and they can also be contaminated by vectors.

The aim of this epidemiological research is to determine the positive effect of monitoring the health of food by showing how the number of salmonellosis patients in Una-Sana Canton and the number of microbiological analyzes in Una-Sana Canton with insight into the positive results of the analysis, in two time intervals. The first time interval is from 1998 to 2006 as a sample in which no monitoring was performed by the Veterinary Institute and the Institute of Public Health of the USK, and from 2006 to 2020 as a sample in which the health safety of food was monitored. In the first time interval we will see that the curve loses linear flow with oscillations and in 2005 we have a sudden jump in the curve of 118 patients in one year. In the second period, the curve maintains a linear flow without large oscillations in the newly infected. Statistics were also processed by age structure, distribution of diseases by municipalities and by gender structure.

KEYWORDS: *health control, foodstuffs, salmonelosis*

Type of presentation: Oral

IMPACT OF JABLANICA MUNICIPAL WASTEWATER ON NERETVA RIVER WATER QUALITY IN THE HIGH WATER LEVEL SEASON

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ABSTRACT:

Aim of this article is to determine impact of Jablanica municipal wastewater on Neretva river water quality. Samples was collected in period of 4 years in high water level season at upstream and downstream points. Quantitative estimation implied determination of important chemical and microbiological parameters. It has been studied and compared water quality indexes (WQI) as well as bacteriological load. It was found that there is no statisticaly significant chemical and bacteriological impact on the water quality of the Neretva River.

KEYWORDS: *Water quality index, wastewater, bacteriological load, Neretva river*

Type of presentation: Poster

MEASUREMENT OF MICROCLIMATIC PARAMETERS AND THE CONCENTRATION OF PARTICULATE MATTER IN PRESCHOOL INSTITUTIONS IN UNA - SANA CANTON

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ABSTRACT:

Clean air and appropriate microclimatic parameters are an important prerequisite for the health of preschool children. The stay of a large number of people indoors worsens the microclimatic parameters, and affects the concentration of particulate matter, which can adversely affect attention, respiration, heart rate, motor skills and the process of thermoregulation of the organism. This significantly increases the possibility of the occurrence and spread of respiratory diseases, especially in the younger population. The Hygiene and Health Ecology Service has introduced regular measurements of microclimatic parameters and particulate matter in preschool institutions in the Una - Sana Canton area since January 2020. The analysis of the obtained results showed that the air temperature in the rooms where children stay is mostly within the comfort zone, while the humidity, as well as the concentration of carbon dioxide and particulate matter, size PM10, often deviate from the allowable values. Given that any deviation from the recommended values impairs the feeling of comfort and creates a predisposition for the appearance of certain diseases, mainly respiratory organs, institutions where the same has been recorded, an expert opinion was sent, as well as a recommendation for further action.

KEYWORDS: *microclimatic measurements, particulate matter, air quality, health impact*

Type of presentation: Poster

MEDICINAL PROPERTIES AND PRESENCE OF WILD CHESTNUT IN ALTERNATIVE MEDICINE OF THE POPULATION OF UNA-SANA CANTON

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ABSTRACT:

Unlike the sweet chestnut, wild chestnut fruit is not edible, but is harvested in the fall for its medicinal properties. Due to its medicinal properties, the most commonly often used in alternative medicine is the seed, but the whole plant is medicinal: buds, flowers, leaves, bark, and even the root. Wild chestnut saponins prevent the accumulation of fluid in the body, and have a positive effect on veins. The primary active ingredient found in wild chestnut extract is escin, which is used as an aid in the therapy of veins and capillaries because it reduces damage to capillaries, strengthens their walls and protects against edema. Wild chestnut is represented in the alternative medicine of the population of Una-Sana Canton with over 65.5% of the total number of respondents, in the form of various preparations and for the treatment of various health problems, varicose veins, blood clots, cuts, wounds, skin and wrinkles

KEYWORDS: *wild chestnut, saponini, escin, healing*

Type of presentation: Poster

SYNTHESIS OF BIO-COMPOSITE SUSTAINABLE MATERIALS AND THEIR APPLICATIONS IN ENVIRONMENTAL TECHNOLOGY

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ABSTRACT:

Organic wastes such as wood, hair, feathers, exoskeletons of crustaceans and molluscs or even water melon rind represent some examples of valuable and abundant sources of natural polymers such as cellulose, keratin and chitin, which were already extensively exploited for preparation of novel bio-composite materials. Application of green chemistry approaches for their synthesis makes such bio-composites really sustainable materials with several interesting properties for different applications, including those in environmental technology. In this review, synthesis of novel bio-composites based on cellulose (CEL), chitosan (CS - chemically modified chitin) or keratin (KER) and their potential for application in environmental technology will be presented.

The synthesis is based on dissolution of bio-polymers in ionic liquids. This is the crucial step in the synthesis of such materials, which at the same time makes the process completely recyclable with regard to the solvents. The tensile strength is regulated by the proportion of CEL in the material, while higher proportions of CS were shown to add to the adsorptive and antimicrobial activity of the material [1]. Antimicrobial activity was also observed for CEL:KER materials and was further improved by decorating the bio-composites with silver or gold nanoparticles [2].

Our research has shown high potential for application of synthesised bio-composites in environmental technologies including removal of toxins or killing of pathogens in water. It was demonstrated that CEL:CS composites can remove up to 96 mg of microcystin per gram of composite, which is almost 5 times higher than best known adsorbent for microcystin [1]. On the other hand CEL:KER composites with incorporated Ag0 nanoparticles have shown up to 6 logs of reduction in the number of bacteria (99.9999% growth reduction) of bacteria such as E. coli which is a frequently encountered pathogen in wastewaters [2].

[1] TRAN, C. D., DURI, S., DELNERI, A., FRANKO, M. (2013), Journal of hazardous materials. 252/253, p 355-366
[2] TRAN, C. D., PROSENC, F., FRANKO, M., BENZI, G. (2016), ACS applied materials & interfaces. 8, p 34791-34801

KEYWORDS: *Bio-composites, organic wastes, sustainable materials, green chemistry, environmental technology*

Type of presentation: Oral

NUTRITIONAL STATUS OF ELDERLY PEOPLE FROM THE UNA-SANA CANTON

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ABSTRACT:

Nutritional status is the degree to which metabolic needs for nutrients are met. The aging of the population is constantly increasing, and thus malnutrition is on the rise, a phenomenon characteristic of the elderly. One of the indicators of proper nutrition is the nutritional status, which can be determined using various methods. The aim of the study was to assess the nutritional status of elderly people in the Una-Sana Canton, who live in their own home and to determine the factors that affect the nutritional status. The Mini Nutritional Assessment (MNA) questionnaire was used for this study. The research included people over the age of 65 who live in their own home. This research includes a smaller number of respondents, it is necessary to conduct larger research in order to determine in more detail the assessment of the nutritional status of the elderly in Una-Sana Canton. However, the results of this research already indicate that the problem of malnutrition is present among the elderly.

KEYWORDS: *Elderly, Nutritional status, Mini Nutritional Assessment, malnutrition*

Type of presentation: Poster

OPTIMAL SOLUTION FOR REDUCING SO_2 EMISSIONS IN ORDER TO REDUCE THE IMPACT OF THE OPERATION OF THERMAL POWER PLANTS ON THE ENVIRONMENT

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ABSTRACT:

Awareness of the need to limit the release of pollutants into the air began to grow after it was realized that certain human activities have a negative impact on the environment. In order to protect the environment as efficiently as possible, in addition to restrictions, mechanisms such as additional taxes, emission permits, etc. are introduced. There are a number of developed technologies, as well as those that are still in development, that can reduce emissions into the environment of various pollutants to an acceptable level. However, when adopting restrictions in the field of environmental protection, it should be borne in mind that any tightening of rules and regulations creates additive costs for their implementation. Consequently, the adoption of stricter regulations and rules for thermal power plants results in the need to install more efficient and, consequently, more expensive technologies, based on which it can be concluded that electricity production will have additional costs and thus higher electricity prices, which may not exist in a competitive market. Pollutants that pollute the environment cause great damage to humans and other living beings, and pollution due to the burning of fossil fuels to human health, occupies one of the leading positions in a series of pollutants. As in many countries of the world, strict regulations regarding CO_2 emissions are in force, they are removed from flue gases by various methods, and the way of choosing the optimal solution for the purpose of SO_2 reduction will be presented in this pape.r

KEYWORDS: *pollutant, reduction, pollution, human health*

Type of presentation: Oral

POTENTIAL IMPACT OF TRAFFIC NOISE ON THE ENVIRONMENT AND HUMAN HEALTH

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ABSTRACT:

It is known that traffic noise is a significant environmental problem of all urban ecosystems, and which is also one of the most widespread sources of such ecosystems. In addition to the potential impact on the environment, traffic noise also has a significant impact on humans and their health.

The paper presents individual measurements of noise intensity in the narrower area of the city of Bihać at two measuring locations with the highest frequency of traffic flow. Control measurements were performed in the inner part of the city at two traffic intersections on Bedem - intersection 1 (mark: R1) and at the intersection of Irfana Ljubijankica Street and city bypass - intersection 2 (mark: R2). For individual measurements, a mobile dB meter was used - Sound Level Meter - Datalogger PRO 318 type II IEC 651. At both locations, a total of 60 individual measurements were performed that did not exceed values greater than 90 dB or ranged from 60 to 90 dB .

The measured noise values were statistically processed (t - test) and indicate that there is a statistically significant difference in noise intensity between these two locations.

KEYWORDS: *traffic noise, noise impact, human health*

Type of presentation: Poster

PREVENTION AND INTERVENTION MEASURES OF OBESITY IN ADOLESCENTS

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ABSTRACT:

Obesity means increase in total fat mass, not total body weight as a result of an imbalance between energy intake and energy consumption. Weight gain does occur at the expense of body fat mass, but with the application of modern procedures for determining body composition, certain deviations have been observed. Weight gain does not have to be due to fat, but muscle mass, and people with increased muscle mass can not be classified as obese, and it is similar in people who have increased body weight at the expense of body water in the presence of generalized edema and ascites. People with optimal body weight can have a higher normal weight than the reference one, and this form of obesity is called sarcopenic obesity. Obesity in adolescents can lead to various health problems, the most common of which are depression, asthma, gene varum, and non-alcoholic steatohepatitis. If preventive measures and interventions are not taken in time, obesity will eventually lead to much more serious health problems such as diseases of the cardiovascular and endocrine systems. Factors contributing to the development of obesity are low socioeconomic status, sedentary lifestyle and reduced physical activity.

KEYWORDS: *obesity, body weight, prevention and intervention measures*

Type of presentation: Poster

QUALITY AND ACCEPTABILITY OF TRADITIONAL COOKED CHEESES FROM THE AREA OF UNA-SANA CANTON

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ABSTRACT:

Cheese is an extremely valued food all around the world, including in our areas. Bosnia and Herzegovina has a long tradition in a family production of dairy products. With the development of technology, various types of cheese have also developed. So cheese smoking has become widespread in cheese production. It is known that this method of canning also improves sensory properties such as taste, smell, texture, consistency. Traditionally, boiled chees is made from cow's milk, and recently producers have also produced it from goat's milk and a mixture of goat's and cow's milk. The aim of this work was to examine the quality and properties of cooked cheeses based on the chemical compositions and sensory properties of cheese samples from the USK area. Sensory and chemical quality was tested on 8 samples of cheese (4 non-smoked and 4 smoked). The proportion of dry matter, water, fat, protein, salt, acidity (pH value), sensory analysis, and cheese color were analyzed in the samples. The results of the analysis show that according to the share of water, cheeses are classified in the category of semi-hard cheeses. Based on the obtained data, it can be concluded that there is no large deviation in the chemical composition of cheese produced in different rural households from the Una-Sana Canton area. During the sensory analysis, all domestic traditional cooked cheeses belong to the good quality category, while the sample from the market belongs to the middle-quality category. Based on the results of acceptability, we can conclude that consumers are more inclined to consume domestic cheese.

KEYWORDS: *cooked cheese, chemical composition, sensory analysis, color*

Type of presentation: Poster

REMOVAL OF HEAVY METALS FROM WASTEWATER USING NATURAL AND MODIFIED BENTONITE AND PYROPHYLITE

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ABSTRACT:

In this paper, the adsorption capacity of crude, thermally and acid - activated bentonite and pyrophylit in the removal of heavy metals (Pb, Cd, Cr, Cu, Co and Ni) from a multi - component solution at different initial concentrations was investigated. The chemical composition of the adsorbents was determined by the WDXRF method, the content of SiO_2 oxide in bentonite is 48.28% in pyrophyllite 65.71%. Also, before activation, the natural content of the tested heavy metals was determined. Thermal activation was performed at 350 oC and acidic 0.4 M, 0.5 M and 0.6 M HCl and H_2SO_4. The zero charge point for bentonite is 8.27 and for pyrophyllite 9.03. Research has shown that bentonite has in most cases better adsorption properties compared to pyrophyllite. The adsorption of heavy metals is greatly influenced by the pH of the solution, the contact time, the amount of adsorbent and the initial concentration of metal ions. Pyrophyllite showed better adsorption properties for: Cu (91.86%) 0.4 M HCl, Cu (95.93%) 0.5 M HCl, Ni (74.63%) 0.6 M H_2SO_4, Cu (85, 47%) crude and Co (76.5%) thermally activated. Based on the obtained results, it can be concluded that the highest degree of adsorption was recorded for bentonite activated with 0.6 M H_2SO_4, where the adsorption efficiency of Pb was 99.8%. The difference in the adsorption behavior of the tested adsorbents can be explained by their different crystal structures and different response to activation. The results of the research included in this paper confirmed the null hypothesis that by applying natural, thermally and acid-activated bentonite and pyrophyllite it is possible to remove heavy metals from a multi-component solution with a satisfactory degree of adsorption while adjusting the pH value.

KEYWORDS: *wastewater, adsorption, bentonite, pyrophyllite, heavy metals*

Type of presentation: Oral

RISK FACTORS THAT INCREASE SYSTOLIC BLOOD PRESSURE

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ABSTRACT:

Systolic blood pressure values greater than 140 mmHg are considered to be elevated blood pressure, which can result in multiple damage to various parts of the human body. The aim of this paper is to show how risk factors such as increased blood fats, elevated blood sugar, cigarette smoking, myocardial infarction and stroke lead to increased systolic blood pressure and the consequences of high systolic blood pressure. The research will determine the relationship between the age of patients, gender, body weight of patients with the occurrence of increased systolic pressure, and seek to determine which risk factors contribute most to the occurrence of elevated systolic blood pressure. Respondents are patients of the family medicine clinic, Banja Luka Health Center (100 patients) who have elevated systolic blood pressure. The research was done in a period of 6 months during 2021. An equal number of male and female patients were included, and the average age of the patients was 65 years. Based on the results of the research, we came to the conclusion that patients older than 35 have high systolic blood pressure, we obtained an equal number of male and female patients with elevated systolic blood pressure, and that there is a significant difference in systolic blood pressure, gender and age.

KEYWORDS: *systolic blood pressure, risk factors, consequences*

Type of presentation: Poster

THE EFFECT OF THE BIOSTIMULATING FERTILIZER VERAMIN ON THE RASP QUALITY OF THE RASBERRY PLANT (*RUBUS IDAEUS*)

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ABSTRACT:

This paper analyzes the influence of foliar application of the biostimulative fertilizer Veramin on some of the quality elements of the raspberry variety Polka. The research was conducted on the site of Ribić Island in the area of the city of Bihać, and according to the system of control and treatment, a total of 12 quantitative and qualitative properties were analyzed depending on the influencing factors, namely: the total of sugar content, reducing sugars, invert sugars, sucrose, water content, dry matter, total acidity, vitamin C, total phenols, total flavonoids and antioxidant capacity and fruit mass.

After the analysis, it can be concluded that raspberry plants treated with Veramin are characterized by lower content of total acidity (1.39%), dry matter (12.71%) and vitamin C content (20.60 mg/100 g fresh weight). Based on the obtained results, it was shown that Veramin did not have a positive effect on the weight of the raspberry fruit and certain chemical and antioxidant properties of the fruit, compared to the control treatment.

KEYWORDS: *Polka, fertilizers, biostimulators, Veramin, control*

Type of presentation: Poster

THE INFLUENCE OF HEALTHY DIET ON THE PREVENTION AND CONTROL OF TYPE 2 DIABETES

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ABSTRACT:

Diabetes mellitus is a chronic non-communicable disease that occurs as a result of a number of factors, of which lifestyle or bad lifestyle habits are the leading cause of type 2 diabetes. Type 2 diabetes occurs in middle age, so it is very important to take care of what is consumed and in what quantities. With a quality and balanced diet, type 2 diabetes can be prevented and later controlled. In this paper, I will analyze people with diabetes who are overweight (BMI greater than or equal to 25) and their diet until the onset of type 2 diabetes. 2 as well as whether they follow a diabetic diet. Due to poor or no preventive examinations, a very common example in practice is that people in addition to overweight have a genetic predisposition and a lot of stress. Through my work, I will try to point out the importance of a proper diet as well as the importance of a healthy lifestyle.

KEYWORDS: *diabetes, prevention measures, healthy diet, risk factors*

Type of presentation: Poster

TREATMENT OF SYNTHETIC WASTEWATER CONTAINING AN AZO DYE BY ELECTRO-FENTON PROCESS

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ABSTRACT:

This research focused on treatment of synthetic wastewater from textile industry containing azo dye BEMACID RED E-TL by electro-Fenton process. The study was performed in a batch laboratory electrochemical reactor. As anode material it was used boron-doped diamond (BDD) and mixed-metal oxide (MMO) and stainless steel was used as cathode. It was examined the impact of different process parameters: current density (2,5; 5; 10 mA/cm^2), initial dye concentration (50; 100; 150 mg/L), pH (3.65, 7, 10), catalyst concentration (0.05, 0.1, 0.2 mM) and supporting electrolyte (NaCl, Na_2SO_4). The concentration of dye before and after the treatment was measured spectrophotometrically and the results are shown trough dye removal efficiency. It has been shown that the process is very efficient and that the efficiency increases with decreasing pH. For 30 minutes of treatment it was achieved 95.3 % removal of dye with BDD anode at current density of 5 mA/cm^2 and 0.1 mM of $Fe2^+$ as catalyst. NaCl has been shown to be a significantly more efficient supporting electrolyte compared to Na_2SO_4.

KEYWORDS: *BEMACID RED E-TL, advanced oxidation process, boron-doped diamond*

Type of presentation: Poster

AFLATOXIN WITH AN ASPECT TO ANIMAL FEED

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ABSTRACT:

Molds of the genus Aspergillus are among the most common causes of spoilage of food and feed, and in adverse conditions can produce mycotoxins as toxic secondary metabolites. Aflatoxins are a group of mycotoxins that often contaminate various cereals, most often corn, and by entering the food chain due to animal feed contaminated with animal feed, they can also be present in food of animal origin. Aflatoxin contamination can affect all processes from cultivation and harvesting, through storage to processing, although only storage in high humidity conditions is generally mentioned. The appearance of aflatoxins is conditioned by climatic conditions, geographical position, agricultural processes and raw material processing processes. In order to prevent the formation of aflatoxins, it is necessary to first prevent the growth of mold at all stages of production, collection, transport, processing, storage and sale of foods on which mold can develop. Constant monitoring of aflatoxin levels in food and animal feed is also required. Methods for the determination of aflatoxins are: ELISA method, gas chromatography, liquid chromatography, high performance liquid chromatography and mass spectrometry. The aim of this study was to examine the presence of aflatoxin B1 in animal feed in the area of USC. The obtained results will show us whether the measures are observed before the harvest, during the harvest and after the harvest, and whether we are sure of this biological danger when consuming meat, eggs and dairy products.

KEYWORDS: mycotoxins, aflatoxins, feed, ELISA

Type of presentation: Poster

THE IMPORTANCE OF REVITALIZATION OF INDIGENOUS FRUIT SPECIES AND VARIETIES IN THE AREA OF TUZLA CANTON

Sead Noćajević[1], Besim Salkić[1], Emir Imširović[1], Emina Salihović[2], Jasmina Ovčina[3], Mensur Noćajević[4]

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ABSTRACT:

Old orchards with indigenous fruit species and varieties in Bosnia and Herzegovina, and thus in the Tuzla Canton, are largely neglected and slowly dying out. Having adapted to local agro-ecological conditions over the years, they could serve as a basis for organic fruit growing.
Renewing orchards with indigenous fruit species and varieties means preserving the centuries-old tradition of using fruits in the diet, both fresh and processed. Takisha pear and Samoniklica apple jam has long been used as food and medicine.
The reason for the renewal of orchards is the high quality of the genetic potential of our old fruit trees in Bosnia and Herzegovina in terms of fruit growing. The aim of this paper is to present agro and auxiliary technical measures in the revitalization of old trees, to present the use values of individual varieties and their medicinal properties.

KEYWORDS: *autochthonous fruit species and varieties, revitalization, grafting, pomological characteristics*

Type of presentation: Oral

CHANGES IN PHYSICO-CHEMICAL PARAMETERS AND COMPOSITION OF FATTY ACIDS OF OILS AND FATS AFTER THERMAL TREATMENT

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ABSTRACT:

Fats and oils (lipids) are substances of plant or animal origin, which are dominated by triglycerides - esters of glycerol and fatty acids. In practice, fats that are solid at room temperature are usually called fats, and fats that are liquid at that temperature are called oils. Solid fats contain more saturated fatty acids, and oils contain more unsaturated fatty acids. In our area, oils obtained from oilseeds and lard are dominant in the diet. The fat is mainly used for frying, while the oils can be used for various purposes, as an addition to salads, for frying or in dressings. In addition to these traditional fats and oils, palm oil can be used in many restaurants or the food industry. Since fats are exposed to high temperatures during frying, we were interested in the changes that occur in fats after heat treatment. In the experiment, we determined some of the physicochemical parameters of fat quality (density, refractive index, iodine number, acid number, saponification number, peroxide number and malonyl dialdehyde (MDA) content). Changes in fatty acid composition after thermal treatment of fats and oils were determined by gas chromatography with FID detector. From the obtained test results it was concluded that some of the parameters did not change significantly before and after heat treatment (density, refractive index, iodine number, saponification number) while for some oils and fats peroxide number, acid number, MDA content had significant differences. Changes in fatty acid content vary considerably from sample to sample and in most cases are not statistically significant.

KEYWORDS: *fatty acids, oil, fat, thermal treatment*

Type of presentation: Poster

ECO-CRITICAL APPROACH TO ORAL LITERATURE

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ABSTRACT:

Nature is reflected in various ways in the oral literature of Bosniaks. It is not only the reason for the creation of songs and stories, but, through motives and themes, it is an integral part of it. Examining the connection between the world of nature and oral literature is not new in literary criticism, however, based on insights into literary criticism, it can be concluded that little has been written about nature in oral tradition recorded in the Bosniakculture. Therefore, the aims of the paper are the analysis and interpretation of examples of oral literature in which the elements of flora and fauna are recognized, i.e. the meanings they carry. The starting assumption is that the selected oral traditions reflect love and respect for the natural world. This paper aims to contribute to a better understanding of the relationship between oral literature and nature. Eco-critical approach to oral literature.

KEYWORDS: *ecocriticism, oral literature, nature, tradition*

Type of presentation: Oral

SUSTAINABLE ANIMAL AND PLANT PRODUCTION

BARLEY AND WILD BARLEY DISEASES FROM THE FERTILE CRESCENT

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ABSTRACT:

In April 2021, a survey was conducted in Şanlıurfa province of Turkey located in the Fertile Crescent region, and diseases occurring on barley (Hordeum vulgare) and wild barley species (Hordeum spontaneum and Hordeum bulbosum) were determined. A total of 77 barley fields, 31 Hordeum spontaneum populations, and 2 Hordeum bulbosum populations were investigated in Şanlıurfa. Among the barley fields and Hordeum spontaneum populations, spot and net forms of net blotch caused by Pyrenophora teres f. maculata and Pyrenophora teres f. teres, scald caused by Rhynchosporium commune, and leaf stripe caused by Pyrenophora graminea were found. The net form of net blotch was found in 2 Hordeum bulbosum populations investigated. The net form of net blotch was found to be the most common disease in barley fields, followed by the spot form of net blotch, scald, and leaf stripe. Two barley fields were disease-free. The most common disease in Hordeum spontaneum populations was found to be the net form of net blotch, followed by scald, spot form of net blotch, and leaf stripe. No disease was observed in the 1 Hordeum spontaneum population.

KEYWORDS: *Barley diseases, Turkey, Fertile Crescent, Hordeum vulgare, Hordeum spontaneum, Hordeum bulbosum*

Type of presentation: Oral

COMPARATIVE ANATOMY AND PHYSIOLOGY OF THE PANCREAS OF MAN AND CATTLE

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ABSTRACT:

It has been 100 years since insulin was isolated from the pancreatic tissue of a calf fetus (1921), while today insulin is obtained from the pancreas of adult mammals, and insulin is used to treat diabetes. As animal insulin was first used, with this paper we want to compare the structure and function of the human and bovine pancreas. The pancreas is a gland located in the retroperitoneal space - the anatomical space behind the abdominal cavity. It got its name because it looks like a lizard, and consists of a head, trunk and tail, and is also called the pancreas. It extends from the duodenum all the way to the spleen. There are many important roles that can be divided into endocrine and exocrine. The exocrine part of the pancreas consists of glandular acinuses that secrete secretion-pancreatic juice with a large number of enzymes important for the processes of digestion. This secretion is secreted into the duodenum by the pancreatic excretory duct system. The hormonal function of the pancreas is related to special glandular cells, grouped into small islets (Langerhans islets), whose diameter is 0.3 mm. These cells release their products directly into the blood. There are two types of cells in the islets of Langerhans: insulin-secreting β-cells and glucagon-secreting α-cells. In addition to these hormones, the pancreas also secretes somatostatin, pancreatit polypepitide.

KEYWORDS: *pancreas, anatomy, physiology, hormones*

Type of presentation: Oral

CURRENT SITUATION OF STEM RUST IN THE CWANA REGION

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ABSTRACT:

Wheat is one of the most cultivated cereal crops in the world, including the CWANA region which includes Central-West Asia and North Africa. Abiotic and biotic factors reduce wheat yields considerably. Due to the global climate changes and sharply increasing world population, food security is becoming a major problem. Therefore, the protection of wheat from diseases and pests has become an even more important issue. Stem rust of wheat caused by Puccinia graminis f. sp. tritici, also known as wheat black rust, is one of the most important biotic factors with negative effects on wheat yield. Factors like weather conditions, mutation, production of large amounts of uredospores, and sexual recombinations on Berberis spp. have important roles in the occurrence of stem rust epidemics. Berberis species are present extensively in the CWANA region and Southern Europe, especially in Turkey and Georgia. This pathogen forms numerous races which render wheat plants susceptible to stem rust. In particular, the Ug99 stem rust race and its variants spread rapidly in the CWANA region and caused serious devastation to the wheat plants.

KEYWORDS: *Berberis spp., CWANA, Puccinia graminis f. sp. tritici, stem rust races, Ug99*

Type of presentation: Oral

EXAMINATION OF THE DIVERSITY OF NATURAL SOIL CONDITIONS ON THE GROWTH OF WILD GARLIC (*Allium ursinum*)

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ABSTRACT:

Allium ursinum, popularly known as wild garlic, forest or bear onion is a wild medicinal plant that is present in natural populations and is to some extent conditioned by soil properties. This plant species shows numerous positive properties on human health, which indicates its potential and the need for its detailed research.

Therefore, the aim of this study was to determine the diversity of natural conditions on wild garlic grows and soil sampling was performed from three localities in the municipality of Srebrenik. Soil sampling was performed in well-known localities, i.e. in areas where the presence of wild garlic (Allium ursinum) in its natural populations was determined. After proper sampling, processing and preparation of soil samples, the analysis of basic physical and chemical properties of soil was performed. In the soil samples taken, the texture and structure, the content of hygroscopic moisture, pH value, electrical conductivity and the degree of salinity of the soil, and the humus content were determined.

Soil analysis showed that the plant species Allium ursinum is most favored by lighter, moist soils, rich in humus and nutrients, i.e. soils in which the reaction of the soil in the area is weakly acidic to weakly basic. Analysis of pH values as well as EC and TDS showed that increasing the anthropogenic impact increases the pH value as well as the specific conductivity and the degree of salinity of the soil. All the obtained results are in accordance with the literature data, where it can be concluded that the presence of wild garlic (Alllium ursinum) is primarily determined in combination with environmental factors (climate, relief, topography, hydrology, etc.).

KEYWORDS: *wild garlic, soil, natural conditions.*

Type of presentation: Poster

INFLUENCE OF MULCH ON MORPHOLOGICAL, BIOCHEMICAL AND ANTIOXIDANT PROPERTIES OF ARONIA (*ARONIA MELANOCARPA ELLIOT*)

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ABSTRACT:

Black chokeberry fruits are rich sources of bioactive substances, including polyphenols and anthocyanins, and suitable raw material for production of functional foods. The aim of this research was to determine how mulching and the types of mulch can affect the most important morphometric, chemical and antioxidant properties of the fruit of black aronia. In this study, Nero cultivar was used. The bushes were planted on experimental field of the Biotechnical Faculty, University of Bihać. Laboratory analysis of fruits were carried out in the chemical laboratory of the Biotechnical Faculty in Bihać.Covering the soil with straw has influenced the double increase in iron content, and the coverage of black plastic foil has contributed to the multiple increase in sugar in the fruit, compared to the classic growing of the aronia without mulch. This research has a practical significance because it can serve farmers as a guideline in the implementation of agrotechnical measures in the cultivation of aronia.

KEYWORDS: *Chokeberry; Mulch; Antioxidant properties*

Type of presentation: Oral

INVENTARISATION AND CHARACTERIZATION OF FIVE GENOTYPES OF WALNUT (*JUGLANS REGIA L.*) IN THE AREA OF BUGOJNO

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ABSTRACT:

The common walnut (Juglans regia L.) originates from areas stretching from the Caucasus Mountains in Iran to the east, through Turkmenistan and the Himalayan Mountains to Central Asia. Common walnut or domestic walnut is also known by the names: Persian, Greek, Carpathian, Royal (Mrva, 1995). The aim of this study was to select superior walnut genotypes in the area of Bugojno based on agronomically significant traits. Five walnut genotypes marked as G1, G2, G3, G4 and G5 were found, marked and tracked in the field and their coordinates were determined. For morphological analysis of the fruit, a sample of thirty fruits for each genotype was used. Phenotypic studies included monitoring and measurement of agronomically significant traits based on the IPGRI descriptor of Juglans species. A total of seven phenotypic traits were monitored: fruit width (mm), fruit thickness (mm), fruit length (mm), fruit weight (g), core weight (g), shell weight (g) and bulkhead weight (g). According to its morphological characteristics, the G2 genotype was distinguished, which was characterized by the best characteristics and the following values were recorded: fruit width (31.6 mm), fruit thickness (29.13 mm), fruit length (41.26 mm), fruit weight (13.29 g), stone weight (5.35 g), shell weight (7.52 g), as well as bulkhead weight (0.354). The lowest values of these parameters were recorded for genotypes G4 and G5. Genotypes with high values of production-significant traits (fruit weight, core weight) confirmed the hypothesis that not enough effort has been made so far to identify those genotypes that can become a commercially significant resource in the area of Bosnia and Herzegovina. Those desirable traits can still be found on individual walnut trees throughout Bosnia and Herzegovina.

KEYWORDS: *walnut, Juglans regia L., genotypes, morphological traits*

Type of presentation: Poster

OCCURRENCE OF CURCULIO ELEPHAS GYLLEHAL (*CHESTNUT WEEVIL*) COLEOPTERA (*CURCULIONIDAE*) ON CHESTNUT FRUITS

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ABSTRACT:

Una-Sana Canton (USC) has a large forest areas where chestnut Castanea sativa Mill. grows as a self-sprout tree (about 7.000 ha) The fruits of the chestnut are rich in nutrients, which favors the development of the insect chestnut weevil, Curculio elephas (Coleoptera: Curculionidae).This insect reduces the quality of the chestnut fruit and restores the chestnut forest. The aim of this study was to investigate the prevalence of harmful insect on chestnut fruits of Una-Sana Canton. It was taken for research 10 chestnut fruits samples, with ten locations (Municipality of Cazin, Velika Kladuša, Bužim and Bosanska Krupa).The weight of the chestnut fruits samples was 1000 g, and the number of fruits in the sample was from 160-185. The harmful organism is determined on the basis of the apperance of larvae and damage to fruits.Larvae were collected and counted for each sample in the laboratory. The number was of larvae per sample ranged from 0 to 35. The largest number of larvae was registered on samples of chestnuts from the area of the municipality of Cazin and Velika Kladuša, and the smallest from the area of the municipality of Bosanska Krupa.There are many reasons that cause the prevalence of C. elephas and fruit damage, these are: specific structure of the fruit, disorder of chestnut forests in the Una-Sana Canton for use in fruit production.

KEYWORDS: *chestnut weevil, Curculio elephas, chestnut (Castanea sativa Mill.), fruits*

Type of presentation: Online

IN SEARCH OF RESISTANCE TO BARLEY STRIPE DISEASE

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ABSTRACT:

Barley stripe disease caused by Pyrenophora graminea could be a problem in areas where no clean seed is used or no seed treatment is practiced. Genetic resistance is the preferred control method. In this study, 10 barley cultivars, 10 barley landraces, and 10 wild barley (Hordeum spontaneum) genotypes were tested for their resistance using 3 Pyrenophora graminea isolates under greenhouse conditions. The virulence level of the isolates showed differences. Isolate Dg80 was the most virulent isolate followed by isolates Dg26 and Dg8. Barley cultivars Misket, Sabribey, and Çumra 2001 showed resistant reactions to the 3 isolates used. Cultivar Martı showed an intermediate reaction to isolate Dg80 and resistant reactions to isolates Dg26 and Dg8. Landrace #167 showed resistant reactions to the 3 isolates used. Landrace #153 showed resistant reactions to isolates Dg80 and Dg8 and an intermediate reaction to isolate Dg26. Landrace #98 showed intermediate reactions to isolates Dg80 and Dg26 and a resistant reaction to isolate Dg8. Hordeum spontaneum genotype #41 showed resistant reactions to the 3 isolates used. Genotypes showing resistant or intermediate reactions could be planted in the field or could be used in breeding studies.

KEYWORDS: *Barley stripe, Pyrenophora graminea, Barley landraces, Hordeum spontaneum, Disease resistance*

Type of presentation: Oral

QUALITY OF MILK OF PRAMENKA SHEEP BREEDS FROM BIHAC AND TRAVNIK

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ABSTRACT:

One of the main agricultural activities in Bosnia and Herzegovina, and especially in the area of Una-Sana Canton and Central Bosnia Canton, is the production of milk, both beef and sheep. According to the Agency for Statistics of Bosnia and Herzegovina for 2011, the number of sheep in Bosnia and Herzegovina ranged around 1,021,000 heads and milk production amounted to about 17,610,000 liters. Sheep and goat milk production in the world is estimated at 20.6 million tonnes, of which sheep's milk accounts for 8.3 million tonnes. The structure and function of the mammary gland is crucial for milk production. The development of the mammary gland is influenced by a number of factors. One of the most significant is the action of hormones. In this paper, we analyzed milk from two sheep farms, from two areas, with respect to the chemical composition and hygiene of the milk. Studies have shown that there are no significant differences in the quality of milk on both farms, both in terms of chemical composition and hygiene of milk.

KEYWORDS: *sheep, milk, chemical composition, hygienic correctness*

Type of presentation: Poster

SENSORY QUALITY AND ACCEPTABILITY OF ECOLOGICALLY PRODUCED APPLE JUICE

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ABSTRACT:

Organic agriculture is a unique system of sustainable management in agriculture with the aim of producing healthy food, ie meeting the appropriate social needs while preserving the natural ecosystem. A very suitable raw material for juice production is apple, due to its high dry matter content and good yield, as well as its relatively low price. For the production of quality apple juice, the apple variety is of great importance due to its specific sensory properties. Nowadays, there is an increasing trend of demand and consumption of domestic products produced in an ecological way, and this primarily refers to the production of juices, jams…. In the Una-Sana Canton, apples are, among others, the most important and widespread fruit species. The aim of this study was to evaluate the sensory quality and acceptability of apple juice produced in two ways, ecologically and conventionally, based on sensory analyzes. Sensory evaluation of samples included evaluation of color, odor, taste, clarity and homogeneity of all samples of apple juice. The results of sensory properties of the tested samples showed that organically produced apple juice has lower ratings compared to technologically produced apple juice. The acceptability test showed satisfactory and good acceptability of organically produced samples of apple juice compared to conventional ones, which were rated very well by potential consumers. The conclusion of this paper is that regular sensory evaluation of apple juice and standardization of technological production processes would significantly improve the quality of organically produced apple juice.

KEYWORDS: *apple juice, sensory quality, ecologically produced*

Type of presentation: Poster

THE IMPORTANCE OF BEES FOR ACHIEVING SUSTAINABLE DEVELOPMENT

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ABSTRACT:

The contribution of bee pollination to the promotion of sustainable development goals through food, security and biodiversity is widely recognized. However, the extent to which bees contribute to other benefits has yet to be fully recognized. Existing research has highlighted the importance of insects in achieving multiple sustainable development goals through the regulation of natural cycles, biological pest control, pollination, and even as bio-inspiration. Beekeeping is an agricultural activity that requires very little investment and can take place almost anywhere in rural or suburban areas. It is one of the agricultural productions for which no land is needed. Bees play an important role in achieving the United Nations Sustainable Development Goals (UN 2015) which have devised 17 goals to achieve synergies between human well-being and environmental resources through interconnections between bees as a critical group of insects with diverse economic, social, cultural and environmental values of people in the context of sustainable development goals. Beekeeping is an activity that can affect all 17 goals of sustainable development, among other things, it offers opportunities to fight poverty and create new job opportunities for people who do not own land. Also, investments in beekeeping can be negligible and bee products have great potential in the local market. In our area, the use of bee products for apitherapy has a long tradition and gives promising results. Bees not only produce honey and other products such as beeswax and pollen, but also help produce nearly three-quarters of the plants that produce 90% of the world's food. We must strive to restore balance and reverse the paths of bee decline if we are to meet a future in which bees continue to contribute to the sustainable development of society.

KEYWORDS: *bees, beekeeping, sustainable development*

Type of presentation: Poster

EFFECT OF LIGHT ON GROWTH AND SPORULATION OF ISOLATES STUDIED

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ABSTRACT:

Six selected isolates of Alternaria spp. were used in these studies, as follows: A: 1) FM-15; 2) BM-2; 3) CLA-108 monitoring A. dauci isolates; B: 4) Mr-114; 5) IM-14, and 6) Aa-82 monitoring A. alternata isolate.Testing of the effect of light on the growth and sporulation of selected Alternaria spp isolates was performed by sowing on PDA and exposure to the following lighting conditions: constant light, constant darkness, natural light/dark shift, UV lighting. The growth rate was determined after sowing by measuring the diameter of the colony after 3, 5, 7 and 10 days in five replications, while the intensity of sporulation was expressed through the number of conidia per 1 cm2 of colony. The largest radial growth of colonies of all three isolates from group A studied was achieved when exposed to constant light, while the isolates from group B studied achieved a slightly higher increase under UV lighting. The effect of nutrient media on the intensity of sporulation in the isolates from group B studied was abundant, while sporulation in isolates from group A was absent except in UV lighting where it was very weak.

KEYWORDS: *A.dauci isolates, A.alternata isolates, light, growth, sporulation*

Type of presentation: Oral

THE MOLECULAR TOOLBOX OF ECTOMYCORRHIZAL-DRIVEN PHOSPHATE MINERAL WEATHERING

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ABSTRACT:

Ectomycorrhizal fungi form symbiotic partnerships with tree roots and are able to biochemically weather inorganic phosphorus (Pi)-rich minerals such as apatites and provide Pi to their host in return for photosynthates. Fungal-driven nutrient cycling based on mineral weathering plays a critical role in ecosystem and crop productivity and geochemical cycling. However, the transcriptional responses to symbiosis and weathering of mineral phosphates in ectomycorrhizal fungal hyphae are largely unknown. An artificial system was developed to study the solubilisation of hydroxyapatite by P. involutus. This was confirmed by EDX spectroscopy data, which showed depletion of Pi from the HAP crystals along with the formation of secondary minerals. RNA-seq analysis revealed that ectomycorrhizal symbiosis induced a different set of genes in the hyphae of P. involutus than in the non-symbiotically growing fungus, including specific expression of organic acid metabolism genes. Metabolomic analysis using UPLC-Q-TOF-MS led to the identification of several secreted metabolites enriched in the presence of hydroxyapatite in P. involutus systems growing non-symbiotically or in symbiosis with P. sylvestris seedlings. The analysis also led to the identification of novel metabolic compounds secreted during the weathering process. The results of the transcriptome and metabolome analyses were combined to create a mechanistic model of HAP weathering by P. involutus at the molecular level.

KEYWORDS: *Paxillus involutus; Pinus sylvestris; ectomycorrhizal symbiosis; hydroxyapatite; SEM-EDX; fungal mineral weathering; fungal weathering metabolites; RNA-seq; UPLC-Q-TOF-MS*

Type of presentation: Poster

RESISTANCE BREEDING THROUGH GENETIC RESERVOIRS OF AEGILOPS SPELTOIDES

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ABSTRACT:

Tetraploid durum wheat (2n = 28, AABB) and hexaploid common wheat (2n = 42, AABBDD) are major crops used as food and forage. Diseases cause significant yield losses in wheat. Developing disease-resistant varieties by using resistance genes is a more economic and environmentally friendly solution than applying fungicides against disease-causing agents. Wild relatives of wheat are important genetic reservoirs for use in wheat (Triticum spp.) breeding strategies. Aegilops speltoides Tausch is one of the most exploited ancestral relatives of wheat. However, the recipient chromosome region cannot always be fully substituted by alien chromatin, or the alien loci of the donor may carry genetic material with adverse effects besides the introgressed target. Complicated immunity mechanisms of plants have provided a better comprehension following the recent advances in molecular biology. Recently, mapping technologies have been improved due to the invention of next-generation sequencing (NGS). Moreover, advances in molecular marker technology have elucidated key regulators of resistance in big-sized and complex genomes. Various QTLs/genes responsible for resistance to stem rust, leaf rust, and powdery mildew diseases have previously been identified in Aegilops speltoides. Improvements in genomic technologies, and gene editing technologies have much to offer in terms of targeting resistance loci more precisely, which will undoubtedly facilitate the introgression of alien genetic material.

KEYWORDS: *Wheat, Triticum spp. Aegilops speltoides, disease resistance*

Type of presentation: Online

OCCURRENCE PSEUDOPERONOSPORA CUBENSIS (BERK. & M.A. CURTIS) ROSTOVZEV (CUCUMBER DOWNY MILDEW) IN THE MUNICIPALITY OF CAZIN ON GHERKIN CUCUMBER HYBRIDS

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ABSTRACT:

Berkeley and Curtis first reported cucumber downy mildew in 1968 from Cuba.The gherkin cucumber downy mildew, caused by pseudo fungus Pseudoperonospora cubensis (Berk&M.A.Curtis) Rostovzev is one of the economically most significant diseases. Symptoms on cucumber are angular lesions that are limited by the leaf veins. During periods of leaf wetnwss from dew, irrigation or rainfall, incipient lesions can become conspicuously water-soaked. In our area, the disease appeared in the early eighties of the last century and has been occurring regularly every year since then. During 2021, the occurrence of P.cubensis in the area of the municipality of Cazin was monitored at 4 locations with 4 hybrids-Regal F1, Passamonte F1, Harmonie F1 and Kybria F1.The disease was determined by the microscopic method.A scale from 0-5 was used for determination of infection intensity on leaves of the examined hybrids.The intensity of infection (Index of illness) of the pathogen was analyzed using Townsend Heuberger method.High index of illness were determined for hybrid Passamonte F1(I=55), medium height Index of illness was for a hybrid Regal F1(I=32).Good resistance was registered on the hybrids Harmonie F1(I=10) and Kybria F1(I=5). Of the protection measures of gherkin cucumber, in addition to the application of fungicides , good results are achieved by growing resistant hybrids. The results of this work show that it is best to grow hybrids for this area Kybria F1 and Harmonie F1, because they are the most resistant to P.cubensis.

KEYWORDS: *cucumber gherkin, Pseudoperonospora cubensis, hybrids*

Type of presentation: Online

WHEAT PRODUCTIVITY ON DEGRADED LAND

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ABSTRACT:

The growing demand for food products made of flour has led to an increase in the area under wheat. The research was conducted during 2020 in Ilandža, and the subject of the study were two populations of Khorasan wheat, with a dark and a light axis. The following morphological and productive traits were studied: spike length, number of spikelets per spike, absolute mass and grain mass per spike. The results showed that both populations have high genetic fertility potential. The analysis of the examined indicators determined that in the examined year, the population of light ears had higher values for all tested parameters in relation to the population of dark ears. As the demand for alternative cereals is constantly growing on the world market, there is a great chance to introduction and improve the production of wheat in rural areas especially on degraded land.

KEYWORDS: *Alternative cereals, food products, wheat, populations, productive traits*

Type of presentation: Online

FOREST MANAGEMENT

ANALYSIS OF THE GEOSTATISTICAL APPROACH TO OLS MODELING TECHNIQUE FOR GROWING STOCK ESTIMATES OF ONE FOREST MANAGEMENT UNIT

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ABSTRACT:

Sustainable forest management requires collecting and processing a large amount of interactive qualitative and quantitative data, which became more manageable with the emergence of geoinformation technologies. The geostatistical approach to data analysis enables more effective forest management planning by combining different data types and making them suitable for both spatial and statistical analysis.
This paper analyzes the ordinary least square (OLS) regression modeling technique conducted in ArcGIS 10.8 for growing stock estimates of one management unit. The dependent variable for OLS was growing stock collected by the PPS (Probability Proportional to Size) method. In contrast, the independent variables represented environmental and spectral data extracted from Digital Elevation Model and Landsat 8.
Obtained results indicate an insignificant difference between GIS-supported OLS analysis in relation to the analysis carried out in XLSTAT software. Considering that it is usual and verified to perform OLS analysis in XLSTAT, the results indicate credibility to perform the same one supported by GIS.
Future research on the potential operational application of geostatistical approaches to analyzing the forest attribute estimates is recommended and can provide an opportunity to optimize forest management processes.

KEYWORDS: *forest management, geostatistics, OLS, growing stock*

Type of presentation: Oral

COMPARATIVE ANALYSIS OF THE AVAILABILITY OF FOREST WOOD PRODUCTS FOR THE NEEDS OF THE WOOD INDUSTRY IN THE AREA OF ZENICA - DOBOJ CANTON IN THE PERIOD 2017. – 2021. OPPORTUNITIES AND USE

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ABSTRACT:

The paper analyzes the availability of forest wood products for the needs of the wood industry in Zenica - Doboj Canton. This study seeks to examine the potential development of wood industry in the Zenica - Doboj Canton on the basis of the availability of forest resources, and it was analyzed the production of forest wood assortments of the only producer, the company JP ŠPD ZDK d.o.o. Zavidovići (forest user). The most important species of forest trees in this area are fir, spruce, white and black pine, beech, oak, and other deciduous trees. The largest amount of coniferous wood was produced in 2018 and amounted to 193,273 m3, and the smallest in 2020 when it amounted to 156,027 m^3. The percentage share of coniferous logs (assortments for the wood industry) was the lowest in 2017 when it was 59%, and the highest in 2021 with a percentage share of 64%. The largest amount of deciduous wood was produced in 2017 and amounted to 170,841 m3, and the smallest in 2020 when it amounted to 126,259 m^3. The percentage share of hardwood logs (assortments for the wood industry) was the lowest in 2017 when it was 35%, and the highest in 2018 with a percentage share of 40%. The largest amount of total wood mass was produced in 2017 when it amounted to 344,253 m^3, and the lowest in 2020 when it amounted to 282,286 m^3. The percentage of logs varied from 47-53%, technical roundwood from 6-8%, and pulp / firewood from 39-47%. The average demand for coniferous logs by the wood industry in the ZDK area varied from 46-57%, and deciduous from 45-61% (installed primary wood processing capacities are about 618,000 m^3). Due to the significant amount of cellulose wood and firewood produced, opportunities are opened for the use of forest biomass and the production of pellets, briquettes and other wood products.

KEYWORDS: *Wood industry, wood products, coniferous and deciduous wood, logs, roundwood, pulp / firewood, Bosnia and Herzegovina, Zenica - Doboj Canton.*

Type of presentation: Online

FOREST MANAGEMENT IN REDUCING CARBON DIOXIDE EMISSIONS

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ABSTRACT:

Climate change, as a consequence of (un)rational anthropogenic activities, has started a war against the whole world without a shot being fired. The inevitable growing trend of CO_2 concentrations in the atmosphere, taking into account the fact that forest ecosystems are a natural storehouse of large amounts of carbon dioxide both above and under ground, with the possibility of increased storage capacity, led to emphasizing the importance of forests in the context of rescuers. Aim of this paper is to describe the role of global forests in reducing atmospheric carbon volumes, with emphasis on forest management practices in order to preserve current carbon stocks within forest ecosystems, encourage greater storage than current, as well as carbon incorporation in the built environment, with a slight look at the concept of carbon neutrality.

KEYWORDS: *Global warming, forest management, carbon storage, carbon conservation, carbon neutrality.*

Type of presentation: Oral

WASTE MANAGEMENT

CHARACTERISATION OF CELLULOSE-CHITOSAN BIOCOMPOSITES AS SUSTAINABLE MATERIALS FOR ENVIRONMENTAL TECHNOLOGIES

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ABSTRACT:

Biocomposites based on cellulose (CEL, chitosan (CS) or keratin (KER) represent novel sustainable materials, which have potential for environmental applications such as removal of toxins (such as microcystin) or pathogens (such as bacteria and viruses) from polluted and wastewaters [1, 2]. The effectiveness and applicability of such materials is in turn determined also by their structural characteristics such as porosity and surface roughness, which increase the specific surface of the material. Thus, the goal of this study was to determine the porosity and surface roughness of CS:CEL based biocomposites by the use of photothermal beam deflection spectrometry [3]. It was found that the examined materials exhibit rather low porosity (below 0.1 %), that can be increased to 0.44 % with increase in CEL content. The increase in CEL content from 25 % to 75 % results in 50 % increase in total porosity (from 0.4 to 0.6 %), which is a favourable observation since higher CEL content also improves the tensile strength, which is desired in such materials. Furthermore, the biocomposites have rather flat surface with the amplitude of roughness at the level nm and periodicity at the level of mm. The surface roughness also increases with the increase in CEL content. Changes of roughness amplitude from 2 to 5 nm and periodicity from 3.3 to 1.2 mm were observed in CEL:CS composites for increase of CEL content from 25 % to 75 %.

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KEYWORDS: *natural polymers, chitosan:cellulose composites, photothermal beam deflection spectrometry, sustainable materials*

Type of presentation: Online

ENERGY EFFICIENCY AND RENEWABLE ENERGY SOURCES

ENERGY EFFICIENCY IN PUBLIC BUILDINGS

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ABSTRACT:

Considering the critical amount of power consumption in public buildings, sustainable energy use can present an opportunity to tackle the climate change and air pollution problems in B&H. This paper provides a brief overview of the existing studies, the legal framework and the major donor programs for EE in B&H. Moreover, it analyses the potential financial markets in the public sector and provides an estimation of potential energy savings and benefits. Finally, the paper describes the implementation process of the EE projects and summarizes the major barriers to public sector EE implementation.

KEYWORDS: *Energy Efficiency, public buildings*

Type of presentation: Oral

TECHNICAL-TECHNOLOGICAL INDICATORS OF USING SOLAR ENERGY AND WIND ENERGY WITH REFERENCE TO U-S CANTON

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ABSTRACT:

Bosnia and Herzegovina and thus Una-Sana Canton, is recognizable as a country with significant energy resources, both conventional and renewable. Today, the production of primary energy is dominated by hydroelectric and thermal power plants, while the greatest potential for increasing the share renewable sources of energy exists in the production of electricity from hydro potential, as well as wind and solar energy potential.
The biggest problem in the use of renewable energy sources is the oscillating nature of these energy sources, ie the inability to guarantee the installed power. The purpose of this paper is to highlight the potential opportunities for the use of renewable energy sources with special emphasis on solar and wind energy as well as innovative technical and technological ways of its use.
Solar energy potentials will be presented through modern ways of using solar energy through solar collectors, photovoltaic cells and focusing solar energy, while wind energy potentials will be presented through elements of design sizes of wind farms.

KEYWORDS: *Indicators, Solar Energy, Wind Energy*

Type of presentation: Oral

OPTIMISATION OF WASTEWATER TREATMENT PLANTS – CASE STUDY: BIHAĆ

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ABSTRACT:

By optimising the overall process of wastewater treatment in plants, both economic and environmental goals can be achieved. Several evaluation criteria are to be set during the analysis phase of the current state. After the primary analysis, comprehensive decision that takes in consideration inputs and required outputs, as well as operation and maintenance costs, should be made. Reduction of energy consumption, or even electric energy production for the requirements of the plants, could be achieved by the process optimisation. This paper aimed to research about current strategies and solutions in the field of Wastewater treatment plants (WWTP) optimisation, and to analyse their potential use in the case study of Bihać (WWTP) in Bosnia and Herzegovina. Qualitative research method, based on comparative case study analysis, is used to achieve the goals of this paper. As the Activated Sludge is a part of the process in the WWTP Bihać, and due to its enormous potentials, several potential recommendations regarding its potential use in order to achieve better financial and environmental benefits. The daily production of the activated sludge is 13.8 cubic meter. Other recommendations were related to the optimisation of the electrical energy usage in the WWTP by considering the sustainable ways of removing the nitrogen, and by producing the Biogas and using it as energy source for the WWTP electrical energy requirements. It has been concluded that, due the lack of technological advances in the field of Wastewater treatment technology, and due to the increasing of the wastewater production followed by poor operational and maintenance process, several actions can be made to optimize the process of WWTP in Bihać.

KEYWORDS: *Wastewater, Treatment Plants, Optimisation, Energy Efficiency, Wastewater Treatment Plants*

Type of presentation: Online

REDUCTION OF LOSSES IN WATER DISTRIBUTION NETWORKS USING ZONAL WATER METERS

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ABSTRACT:

Water losses are inevitable and are conditionally acceptable up to 15% in water supply systems, 5-8% in the case of newly build water supply networks, and 1-3% for main water supply pipeline. However, most public water companies have problems with uneconomical and irrational water losses. One of the biggest challenges in public water systems is to reduce water losses to an economically acceptable minimum. Zonal measurement instruments of water flow in combination with a memory-communication system have proven to be a very successful method of detecting water losses and initial water leaks from the system. This paper aims to discuss whether the use of such measuring instruments represents an economically optimal and technically flexible solution in the maintenance of public water companies. Qualitative research method, based on comparative case study analysis, is used to achieve the goals of this paper. Results proved that monitoring water losses by the method of night measurement results in the detection of faults, which are manifested by water losses. After detecting the increased flow on the diagram, which is formed by the data sent from the zonal flow meters, the places of water leakage in the field are detected and the fault is repaired. This paper concludes that using the zonal water meters in Water Distribution Networks is an efficient and economically acceptable method for detecting the unaccountable waters and water losses due leakage in the water supply systems.

KEYWORDS: *Water Losses, Water Distribution Networks, Zonal Water Meters, Losses Reduction, Water Supply Enterprise*

Type of presentation: Poster

LEGAL AND ECONOMIC REGULATIONS IN ENVIRONMENTAL PROTECTION

AN ACTIVITY OF BUSINESS ENTITIES AS A RISK FACTOR FOR ENVIRONMENTAL PROTECTION

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ABSTRACT:

The activity of business entities can be one of many risk factors for the protection of the environment, human health, but also the safety of citizens and their property. Seemingly legally permitted business activities of business entities, duly registered in the competent registers, can lead to undesirable consequences for the goods above. Mechanisms for protection against unwanted but evident impacts are prescribed by positive regulations in Bosnia and Herzegovina, respecting modern standards of adequacy of protection in these areas. Injured persons, natural and legal persons (business entities, public institutions, local self-government units, cantons, entities and the state) can use their active legitimacy to achieve the highest levels of civil protection, with criminal liability in each case.

KEYWORDS: *activity of business entities, protection of the environment, protection of human health, civil protection, criminal protection*

Type of presentation: Oral

ASSESSMENT OF KRUŠNICA RIVER WATER QUALITY IN THE SPRING-SUMMER SEASON BASED ON PHYSICAL AND CHEMICAL CHARACTERISTICS OF WATER

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ABSTRACT:

Monitoring the aquatic ecosystem is critical since it allows us to obtain a set of data that indicates the ecosystem's state. The analysis of physico-chemical parameters, which are decisive factors, is part of the water quality assessment process. The aim of this study was to determine the state of water quality from the Krušnica River in the spring-summer season based on the analysis of physico-chemical parameters. For the needs of the analysis of physical and chemical parameters, water samples were taken from the upper, middle and lower course of the river Krušnica. Temperature, pH, oxygen concentration, oxygen saturation, chemical oxygen demand, electrolytic conductivity, biological oxygen demand, suspended solids, total hardness, total alkalinity, chlorides, sulfates, calcium, magnesium, ammonia, and nitrites were among the physico-chemical parameters analyzed.Based on the results of physical and chemical parameters in all three analyzed water samples and according to the Decree on water classification and categorization of watercourses (Official Gazette of RS, 2/2001), the analyzed parameters meet water quality class I, except for the oxygen saturation parameter, whose value in the upper course is slightly below the allowable limit, while the middle and lower course reaches a significantly lower oxygen saturation level.

KEYWORDS: *Krušnica river, physico-chemical parameters, water quality*

Type of presentation: Oral

GREEN ACCOUNTING AND ENVIRONMENTAL AUDIT

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ABSTRACT:

The end of the 20th and the beginning of the 21st century were marked by climate changes, which warned that natural resources are not inexhaustible as they seemed and that it is necessary to act globally to monitor the use of natural resources and to develop mechanisms for the service of environmental protection. Based on these facts, rapid economic growth is accompanied by more frequent and advanced technological changes. Therefore, the question asked is what do individuals and society as a whole unity can do to prevent or minimize everything that inevitably comes to us. Traditionally, the focus of the enterprise has been exclusively on making a profit with the least possible costs and risks, and social responsibilities, which include also environmental protection, have often been ignored. The use of the traditional accounting system becomes insufficient to cover the social benefits and social costs arising from the activities of business entities in both the private and public sectors. Nowadays companies are abandoning such a concept and for this purpose, they accept a completely new concept of accounting, known as "green accounting", while in parallel with it there are developments of special forms of audit whose primary task is to assess the implementation of sustainable development policy from the social, economic, environmental and technological aspects as well. The policy of improvement and protection of the environment as well as adequate environmental management is an economic necessity for the successful operation of business systems in a modern environment, and the audit is expected to adjust its tools to the degree of compliance of activities and processes with specific requirements arising from eco-regulations and standards of business policy.

In this paper, by using the method of analysis and synthesis, as well as the method of description, all the features of accounting and environmental auditing are represented with the most important conclusions reached by the analysis of secondary literature and experiences of countries in the region in conducting the observed type of audit.

KEYWORDS: *social responsibility, environmental protection, sustainable development, green accounting and environmental audit*

Type of presentation: Oral

MENAGMENT RESPONSIBILITY

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ABSTRACT:

Product quality is the standard by which a product is measured against products of a similar kind, ie the level of quality of something. To satisfy the customer, the customer's reception of the product directly affects how the quality of the product or service is determined.

The introduction of a quality management system is a strategic decision of the organization, which is why the implemented quality management system should contribute to improving the characteristics of the organization's management system. In order to ensure product quality, it is important to pay special attention to projects in ensuring socially responsible operation of modern business systems, whose role of project management has changed radically over the past two decades due to the undeniable number of projects and their more complex business strategies.

Project management organizations highlight seven key themes in ISO 26000 on social responsibility, which are strongly related to project management. Projects have an important impact on the establishment of ongoing operations and are important tools for ensuring the strategic development of business systems.

Four different links and interdependencies between project management and systems theory highlighted by ISO 26000 are highlighted: (1) systematic treatment of project management, (2) systematic treatment of projects as complete works, (3) systematic treatment of projects as part of strategy, (4) systematic treatment of projects throughout the life cycle.

This is where the responsibility of the management arises, both in terms of the product being of satisfactory quality, and in terms of the conditions of the workers and their work, and to be ready to take on the consequences of working in the company.

It is tied to legal regulations and moral legality, and is an important part of business relationships. Business responsibility is an indispensable part of business, and its components are the responsibilities and types of managers, responsible communication, and social responsibility in general.

By simply following the ethically imposed rules of social and business responsibility in all business segments, it ensures satisfactory results, making it an imperative of every successful company.

KEYWORDS: *ISO 9001, ISO 2600, business responsibility, societal responsibility, product quality*

Type of presentation: Oral

NORMATIVE ASPECTS OF IMPROVING THE ENVIRONMENTAL SYSTEM IN THE REPUBLIC OF SERBIA

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ABSTRACT:

Environmental protection is one of the most important issues, but also the challenge of humanity. The issue of the environment is inextricably linked to economic and social development. In the European Union, there is a shared competence in the field of environmental protection, which is manifested through the regulation of this matter by the joint bodies of the Union, and at the same time, this area is regulated by national legislation, provided that the provisions are harmonized with general EU regulations. In accordance with the status of a candidate country for EU membership, the Republic of Serbia is developing its legislation in the field of environmental protection. In accordance with the Constitution of the Republic of Serbia, the system of environmental protection is regulated by the Law on Environmental Protection, as well as special laws and bylaws. New legal solutions from 2018 have codified and systematized the fees for the use of public goods, which include fees for the use of natural resources. This law regulates the fee for the use of public goods, namely, the payer for the use of both public goods and natural resources as natural capital. A special feature of the legislation in the Republic of Serbia refers to the rights of exploration and exploitation of mineral resources, which is regulated by the Law on Mining. Certain provisions of this law, which refer to the expropriation of land for the purpose of exploitation of ore resources, have opened numerous controversies, especially from the point of view of repealing the key provisions of the general legal regulations related to expropriation. According to the general legal regulations, expropriation can be carried out only in cases when it is a matter of general or public interest. The mining law de facto annulled the principle of public interest and favored the position of private profit interests.

KEYWORDS: *environment, protection, use, law, public goods, fees, public interest.*

Type of presentation: Oral

POSSIBILITIES FOR THE MICE SEGMENT DEVELOPMENT IN THE TOURISM SECTOR OF THE UNA-SANA CANTON

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ABSTRACT:

From year to year tourism represents a bigger role in our lives and as such represents one of the world's largest economic activities in which more and more money is invested as well as it is also looking for new creative, competitive and sustainable ideas for the development of this type of economic activity. Thus, the tourism sector in Bosnia and Herzegovina is becoming a part of the economy which allows development, employment, earnings and social security, especially if we accept that the most of the economic service activities participate in the tourist offer and that there is almost every place in the country with the possibility for tourism development.

Different ideas and projects in this field connect people among themselves into joint creative and effective cooperation which is confirmed by positive statistical indicators year after year. Thereby, tourism in the city and in rural areas throughout Bosnia and Herzegovina is one of the complementary activities, which corresponds to a newer approach for the development of different types of tourism.

It is the tourism development that contributes to the coordinated development of the Una-Sana Canton (USC) and therefore it is opening up opportunities and eliminating differences in the regions development.

Every form of introduction of new types of tourism creates new opportunities for the development of the Canton as well as individual cities or municipalities.

In this paper authors want to point out the possibility for development of MICE segment in the tourism sector of the USC which would, for a potential result, have the application of sustainable development of tourism because it is the sustainable form of tourism that is becoming a necessary route for further development, since tourism only which is based on the economic performance of the business and at the same time is contributing to the nature, culture and social environment, as well as competitiveness will be an opportunity for the development and progress of the region in the future.

The MICE segment is a part of business tourism that would allow extension of the season in the Una-Sana Canton, and thus would achieve a significant increase in the visibility of the USC and

cultural and natural resources. It would also achieve a potential opportunity for higher added value and would inform the public about other tourist products of the USC.

KEYWORDS: *tourism, MICE segment, possibilities, sustainable development of tourism*

Type of presentation: Oral

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