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TURKEY'S RENEWABLE ENERGY OUTLOOK AND A GENERAL ASSESSMENT OF RECENT DEVELOPMENTS

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ABSTRACT

Turkey is the world's 17th and Europe's 6th largest economy and the country has made significant advances and breakthroughs in its economy since last two decades. Turkey is a very rich country in terms of geographical location and geological structure due to renewable energy sources. The country has planning to take advantage of these resources to the maximum extent aiming both will contribute to security of energy supply and prepare the ground for the creation of new jobs. The installed power of renewable energy sources, which was 12,305 MW in 2002, has reached the value of 36,702 MW in the third quarter of 2017 with an increase of 198%, approximately. This is an indicator that the renewable energy can be a solution to achieve the country's future goals of energy. This paper presents an overview of Turkey's renewable energy appearance and a general examination of renewable energy status with the latest figures, which determined according to the recent developments. It is also aimed to contribute to all fields, businesses and the industry working on renewable energy, not only to whom seeking the newest developments and latest numbers, but also planning to produce green energy and create green jobs for the country's sustainable development.

Key words: Renewable Energy, Turkey, Energy Developments

AN EXAMINATION OF MEASURING AND CONTROL SYSTEMS IN AN INDUSTRIAL BIOGAS PLANT IN TURKEY

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ABSTRACT

As an alternative method to the classical energy productions, the concept that energy can be consumed where it is produced has been successfully applied today to minimize the increasing energy costs and use more efficient and clean energy. Even though the fossil-based energy sources are gradually decreasing, they continue to harm the environment with many negative effects such as air, water, soil pollution and global warming. Protecting the environment from these harms, and reducing these negative effects has become the most important targets of many countries in the world. The solutions can be found via renewable energy sources by producing "green power". As these types of solutions increase, the ratio of greenhouse gas emitted at the atmosphere decreases, which is an extremely environmentally friendly approach. Despite the possibility that fossil fuels will end up in a certain period, these alternative energy productions need to be spread over a wider area to achieve sustainable green energy productions. As a good alternative choice, biogas production by evaluating organic wastes in an industrial biogas plant, methane gas is produced and converted into heat and electricity energy in cogeneration systems. Measurement and control systems are needed for the biogas production and cogeneration systems. In this context, pressure, level, temperature measurements are made and biogas content is analyzed, successfully. The pump, mixer, blower and heating system are controlled according to the information obtained from the measuring systems. In this study, an examination of measuring and control systems in an industrial biogas plant in Turkey is discussed in detail.

Key words: Industrial Biogas Plant, Measuring and Control System, Sensor

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BIOMONITORING OF SO₂ SPATIAL DISTRIBUTION ON THE TERRITORY OF THE REPUBLIC OF MOLDOVA

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ABSTRACT

Based on the Air Quality Assessment Grades (GECA) and the Lichens Toxicity Scale (STL) versus SO₂, developed by us, was tested the air quality, in 2007 and 2017, from 60 and 107 forest ecosystems and stations, respectively, in order to achieve air quality monitoring at national and international level by non-instrumental methods, for honoring Republic of Moldova's obligations under the Geneva Convention (1979). It was established that the moldavian forest ecosystems do not contain reserves to critical loads of SO₂ pollution, the annual average for the vegetation season for dendrological species is 0.02 mg / m³ air, and for communities of lichens and cyanobacteria (organisms sensitive to pollution) - only 0.01 mg / m³. Lichens indication demonstrated that the current level of air pollution with SO₂ is between 0.05 and 0.5 mg/m³, what indicates long-term, adverse effects, manifested in all studied forest ecosystems. Over 10 years, air quality has improved, particularly in the northern and central areas of the country, while the southern and south-eastern areas remained practically unchanged. Of the 107 ecosystems and stations, evaluated in 2017, it was found that in 10 forest ecosystems the air quality is assessed as *clean air*, 24 - *low polluted air*, 54 - *moderate polluted air*, 15 - *polluted air*, 4 - *high polluted air* and those with *critical polluted air*, were missing.

Keywords: lichens, bioindication, air pollution, SO₂, monitoring.

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A GENERAL EVALUATION OF TURKEY'S ENERGY DIPLOMACY AND THE LATEST CLIMATE CHANGE STUDIES

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ABSTRACT

Energy imports in Turkey increased around 36.1 percent annually for the first 10 months of 2017, and this amount rose to 41.7 percent in the August-October period, which relatively high increase in oil prices was experienced as it is expected. The country aims to reduce the dependence on imported inputs, especially in energy and related matters. Also, it is targeted to continue structural reforms with stability, accelerating technology with intensive productions and reduce the ratio of current account deficit to the national income to the level of 3.9 percent by reducing this dependence on imported energy at the end of the Medium-Term Program. In this study, a general assessment of Turkey's energy diplomacy and the latest climate change studies are examined according to up to date developments and the numbers. Therefore, it is aimed to contribute to the energy diplomacy in Turkey and raise awareness on the climate change studies.

Key words: Turkey, Energy, Energy diplomacy, Climate change studies

AN ENERGY AUDIT AND OPTIMIZATION IN BAR MILL ANNEALING FURNACE

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ABSTRACT

Due to today's competitive conditions and rising energy prices, the efficient use of energy consumed by facilities is only possible with the energy savings that can be made by investing in time, updating the technology, optimizing operating conditions and constant controlling. In this direction, The Bar Rolling Mill authorities have started this work to detect possible energy losses on the site and to increase energy efficiency. Measurements and evaluation of the results were made on the surface insulation inspections in annealing furnace, annealing furnace flue gas and annealing furnace cooling water, compressors, compressed air lines, pumps and annealing furnace burning air fan and hydraulic motors in Bar Mill. In the studies of the measurements, each equipment and line were examined separately and necessary calculations were done. Some suggestions were made on determined points which cause energy losses, how much loss is realized through these points and necessary investments to compensate for these energy losses, the price information. In the light of these works carried out in the factory; It is possible to save a total of 1,767,120.04 kWh/year energy and 441,780.01 ₺/year saving of money. Total investment cost is 558,500.85 ₺. The average return on investment (ROI) for all application plans is 1.26 years. After all these improvements, CO₂ emission values will be reduced to 1,030.23 tons per year.

Key words: Bar Rolling Mill, Energy Efficiency, Energy-Saving, Annealing Furnace, Pump, Hydraulic Motor.

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BIOGEOGRAPHIC ASPECTS OF THE CHARACTERISTICS OF ZONALITY, HEIGHT BELTS AND EXTRAZONALITY IN THE STRUCTURE OF VEGETATION (LAKE BAIKAL REGION)

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ABSTRACT

The ideas concerning continuity and discreteness of vegetation cover are always in the basis of numerous classification structures. The development of biogeography and geobotanic mapping as a method allowed to accumulate a huge experience for establishing of classification systems and approaches reflecting these or those peculiarities in territories under definite physical-geographic conditions. It starts with description of communities without ranges determining regional-zonal features of vegetation and results in establishing of formations characterizing historical-genetic links in formation and development of vegetation in concrete territories. Due to this fact, the revealed arealogical (geoelemental) and belt-zonal compositions of plants species in communities are basic criteria for assessment of structural-dynamic organization of vegetation under concrete physical-geographic conditions at any territory.

Key words: vegetation, biogeographic aspects, zonality, height belts, extrazonality, arealogical and belt-zonal compositions of plant species, key sites, Lake Baikal region

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THE IMPACT OF HUMAN RESOURCES MANAGEMENT IN SMEs ON THE REPUBLIC OF KOSOVO

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ABSTRACT

In this paper we will talk about the impact of human resources management in the SMEs growth in Kosovo. Human resources management is the innovation and creativity that employees have for their organization. Human Resources play an important role nowadays in a modern and dynamic economy. The failure of an implementation of good HR strategy strongly affects society, if we consider the lost opportunities and the resources consumed. It is therefore necessary to better understand the importance of HR development for the global economy, something that we will try to highlight in this paper. For the company to succeed in the business environment and in their industry they have to be very creative and innovative. Companies have to come up with the new products, marketing strategy and new ventures etc. Unemployment rate in Kosovo is very high around 40% comparing to the young generation that enter the working market every year. So, SMEs are considered very essential in smoothing this unemployment rate and give this generation new possibilities on showing their working potential. Furthermore, finding work for this generation we also have impact on the so called brain drain, which is a concerning issue for Kosovo. So, SMEs are not having impact only in the economic growth but also in the aspect of keeping youth and their potential inside the country.

Key words: Human resources management (HRM), SMEs, innovation, creativity, society, global economy, new ventures.

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IMPACT OF INTEROPERABILITY OF INFORMATION SYSTEMS – THE CASE OF INSTITUTIONS OF THE REPUBLIC OF KOSOVO

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ABSTRACT

Interoperability of information systems as a concept within governmental institutions has been used by different governmental institutions around the World. Therefore, the main purpose of this was to identify the state and level of realization of interoperability of electronic systems by institutions of the Republic of Kosovo, with a deeper focus on creation of governmental gateway as an interface of e-services hub in a national level. Initially, academic literature was used to understand the importance of the most successful governance methods including e-Governance and rational management as well as to analyze the use of various e-services and interaction between them. Also, this paper is based on case study approach that the author has had the opportunity to directly interact during the implementation and management teams, which was used as the main research methodology and data collection.

Keywords: Information Systems, e-Government, Interoperability, Governmental Gateway

REGRESSION STUDY ON PLANT DENSITY AND WEED ON THE TRAITS OF DIFFERENT RAPESEED GENOTYPES IN DARAB REGION

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ABSTRACT

In order to study the application of mathematical models in the analysis of the effect of planting density and weed interference on agronomic traits of different rapeseed genotypes, indicators including physiological feature, morphological feature, components and compounds of components of experimental rapeseed genotypes, in the terraces, which were broken twice, in the form of pilot plan of blocks, complete randomized, with 3 replications was conducted in Fars province (Darab city, Farrag district) in 2012-2013 (two years). The results of stepwise regression of grain yield (as dependent variable) on 12 agronomic traits were presented for two years. The results confirmed that pod weight and 1000-grain weight could well predict performance changes. In order to interpret the relationships between traits and grouping them, factor analysis was used based on these relationships. Factor analysis was carried out using principal components method on the traits studied in this experiment and the factors were given to Vermax 1 for better justification. In this analysis, the three main and independent factors justify a total of 88.48% of the total variance.

Keywords: Rapeseed, Morphological feature, Density, Weed, Variety, Regression, Correlation Coefficient

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GEOBOTANIC CHARACTERISTICS OF VEGETATION IN THE BAIKAL STATE BIOSPHERE RESERVE

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ABSTRACT

The vegetation was studied along a definite itinerary and was aimed to reveal a detailed structure of the communities at the natural reserve territory. The results the geobotanic descriptions of the vegetation of the Pereyomnaya and Abiduy Rivers basins as key sites for research of the reserve vegetation for all of the reserve were showed. And we added additional information on the structure of the plant communities obtained for last time investigation of the reserve vegetation. The territory of Baikal Biosphere Reserve organized in 1969 represents a unique area of the vegetation structure in Southern Pre-Baikal region.

Key words: geobotanic characteristics of vegetation, southern Pre-Baikal, Baikal state biosphere reserve

CORRELATION BETWEEN TGA-IGA LEVELS AND HYSTOPATHOLOGIC CHANGES IN CD: A STUDY IN COELIAC CHILDREN IN ALBANIA

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ABSTRACT

Diagnosis of CD is based on a number of examinations; serologic testing and duodenal biopsies being the most important. Advances in serologic testing are raising the question if duodenal biopsy is always a necessary examination. The purpose of the study is to present the correlation between the serum level of TgA-IgA and the significant histopathologic changes in the intestinal mucosa. Also we will try to establish the cut-off value of TgA-IgA through which we can predict the presence of histological changes, Marsh 2 or more, in the intestinal mucosa. The study included 112 children diagnosed with CD in the department of pediatrics, clinic of specialties, from 2010 to 2016 with an age range from 6 months to 18 year old. Serologic testing and duodenal biopsy were performed in all patients. Histopathologic changes were interpreted according Marsh-Oberhuber criteria. To compare the diagnostic value of the tests, and to establish the cut-off values we used the ROC curve analysis. By analysing the average values of the TgA-IgA, TgA-IgG, AgA-IgA and AgA-IgG according to the stage of disease, Marsh 0 to Marsh 3 a/b/c confirmed with biopsy, we found that TgA-IgA titer increases significantly with progression of Marsh stage; whereas the increase of the other parameters (TgA-IgG, AgA-IgA and AgA-IgG) has no statistic significance, considering the correlation between increase of antibody titer and progression of Marsh stage. According to the data we found an increasing number of patients with elevated TgA-IgA ≥ 100 with higher Marsh stages confirmed with biopsy. Aproximately 14.3% of patients with biopsy stage M1 had TgA-IgA ≥ 100 . On the other hand in patients with M3 stage this percentage increases up to 61.5% (P=0.043). We classified the patients based on the TgA-IgA titer in two categories; patients with TgA-IgA <100 and patients with TgA-IgA ≥ 100 . The data show that most of the patients with TgA-IgA ≥ 100 experience gastrointestinal symptoms, abdominal distension, weight loss, failure to thrive and anemia, compared with patient with TgA-IgA <100. This suggests that higher titers of TgA-IgA are associated with severe manifestations of CD in children. For a limit value of TgA-IgA ≥ 76.85 the test has a sensibility of 70.3 % and a specificity of 85.7%. According to our analysis this is the best combination of the parameters and thus the established cut off value of TgA-IgA. In this study we found a positive correlation between seric level of TgA-IgA and the histological changes compatible with CD in the intestinal mucosa.

Key words: tissue transglutaminase antibodies – IgA(TgA-IgA), chronic enteropathy, Marsh classification.

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COMBINING ABILITY FOR YIELD OF SOME LINES OF MAIZE SYNTHETIZED IN CONDITIONS OF THE MYZEQE REGION OF ALBANIA

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ABSTRACT

According to Sprague and Tatum (1942), the estimate of combining ability (general and specific) is necessary to effectively exploit the heterozygosity and synthesis of new hybrids. Sprague and Tatum (1942) defined general combining ability (GCA) as “the average performance of a line in hybrid combinations” and defined specific combining ability (SCA) as “those cases in which certain combinations do relatively better or worse than would be expected on the basis of the average performance of the lines involved”. The methods of using these indicators were later elaborated by other authors such as Griffing, Eberhart, Hallauer, etc. This paper gives the results of the estimate of the combining ability for the yield of 15 inbred lines of the maize selected in Agroarfa Lushnja, Albania. The lines were synthesized by the self-pollination maize hybrid of the class 600, the most widespread hybrid in the Myzeqe region. One of the aims of the work was the evaluation of different hybrids cultivated so that they can be used effectively as a base material in the creation of new maize lines adapted to the conditions of this area. It is known that this region has a dry and hot climate. Selected lines are of six inbred generations which represent good agronomic indicators as well they resulted the best ones in the testcross analyzer. From the diallel analysis of the combining ability it results that from these hybrids are created four lines of interest for general combining ability and four lines with specific combining ability. Lines 9 and 11 are presented as candidates to enter in the collection of lines that can be used for producing hybrids. From this study it turns out that hybrids that fit well into production conditions can be a good source for creating suitable lines in the conditions of a given area.

Key words: Crossing, diallele, general combining ability, specific combining ability.

INVESTIGATING THE DESTRUCTIVE EFFECTS OF COLD HUMORS ON BRAIN IN TRADITIONAL MEDICINE

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ABSTRACT

From the perspective of modern medicine, brain diseases are not traceable since humors, from the viewpoint of Iranian medicine, are fluid substances that flow in proportional and balanced amounts in the body when it is in the normal state and their quantitative and qualitative balance maintains the body health and naturally regulates all of its vital mechanisms. In this study, we intend to explain the methods of detecting cold humors increased in the brain with the aid of original resources of Iranian medicine and express the solutions to prevent the formation and accumulation of these materials and extract and explain the methods for their excretion from the body, especially the brain. From the perspective of Iranian medicine, to treat these states, the type of the increased or altered humor should initially be determined based on signs and symptoms and then, we should help the body to excrete and cleanse these materials.

Key words: Cold humors, brain, traditional medicine

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LARGE CYST TREATED USING “STICKY TOOTH” OBTAINED FROM RETAINED CANINE AND MIXED WITH B-TCP

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ABSTRACT

The dental cysts are formed from different reasons and can grow in becoming huge with time. We are showing a case where cystectomy was the treatment of choice, to accelerate healing and minimize the possibilities or reformation or infection during the healing. The cystic hole left, was filled using a combination of grinded tooth and synthetic particles of β -TCP granules. The grinded tooth was obtained after extraction of a retained canine 43 and treated with Smart Dentine Grinder. The extraction was done in the same session with the cystectomy. The mixed particles was treated with the BCGF system from venous autologous blood to became in a sticky consistency and are enriched this way with growth factors and more to accelerate healing. We have called this material “Sticky Tooth” since the autologous tooth and blood derivate were used. The case has a 1 year follow up showing the symptomless clinical and CBCT result of the final healing allowing a final prosthetic treatment.

Key words: SDG, BCGF, Cyst, “Sticky Tooth”

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INVESTIGATION OF ABSORPTION OF HEAVY METALS AND POLLUTING MINERAL COMPOUNDS BY CARBON NANOPARTICLES PRODUCED FROM POMEGRANATE PEEL, AS WELL AS ELEMENTS EFFECTIVE ON IT

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ABSTRACT

Existence of chemical pollutions and heavy metals in the environment, especially in surface and ground waters is followed by enormously harmful effects on public health. For the purpose of elimination of these pollutions, several methods including implementation of CNTs and active carbons yielding from agricultural wastes have been used. Considering the industrial variability of the city of Saveh, every year a large amount of polluting chemical wastewater enters the environment. The purpose of the present study was to eliminate the Nickel heavy metal and pollutions caused by mineral compounds through making use of pomegranate peel wastes for production of active carbons. For this purpose, various parameters such as pH, contact time, absorber amount, primary density of the metal, and Freundlich and Langmuir's adsorption isotherms, as well as the overall experiment scheme were studied and investigated using the Design Expert Software. Results of the study showed that a pH of 8 is associated with the highest absorption level. In addition it was tuned out that by prolonging the contact time up to 50 minutes, more than 84.2% of the Nickel content is absorbed by the absorber. The obtained experimental data are in a roughly desirable consistence with the Freundlich and Langmuir's isotherm models. The values yielded by the optimization of factors were evaluated in order to obtain an optimum elimination efficiency solution and a high selectivity percentage. In order to obtain the selectivity of 0.691 and the optimum elimination efficiency of 91.7432, the value of pH must be equal to 8, contact time must be 50 minutes, and the primary density must be 75mgs per liter.

Key words: nickel, optimum elimination efficiency, pomegranate peel wastes

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ANALYSIS AND MODELING OF ENERGY DEMAND STRUCTURE IN IRAN'S BUILDINGS AND RELATED INDUSTRIES

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ABSTRACT

In this paper, the demand of the energy carriers in Iran is analyzed and modeled for the country's largest consumer, buildings and related industries, in the status quo and future perspective. To this end, the building sector is divided into two sections: household section (residential buildings) and services (business-office and service buildings) according to the ISIC classification, each of which is subdivided into other sub-sections. In addition, building-related industries include some non-metallic minerals and basic metals industries. Given that scenario-based energy planning helps to increase the understanding of different probabilities in the future, the future perspective of the system is modeled according to the 2035 horizon using the LEAP modeler in the "reference" scenario, which indicates continuation of the status quo of the energy system in the future. The results of the modeling indicate an increasing demand for energy as so it is expected that the demand for energy carriers in buildings and related industries to reach up to 1040.6 million barrels of oil equivalents in 2035, from 559.8 million barrels in 2014. Therefore, in order to reduce energy consumption, solutions are modeled and analyzed according to the scenarios for "Improvement of energy consumption in buildings and related industries", and then the greenhouse gas emissions and their environmental impacts are examined.

Key words: Buildings and Related Industries, Energy Demand, Energy Policy-making, Oil, Gas and Electricity, Modeling, LEAP, Scenario

USABILITY OF *TULIPA SP.* IN PHYTOREMEDIATION, AMONG IMPROVEMENT TECHNIQUES USING PLANTS, ITS ROLE IN THE MITIGATION OF ENVIRONMENTAL POLLUTION IN URBAN AREAS, THE SAMPLE OF ERZURUM CITY, TURKEY

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ABSTRACT

This study was conducted with three replicates at six different junctions facing dense motor-vehicle traffic to investigate the usability of ornamental plants in the prevention of environmental pollution in Erzurum in Turkey. *Tulipa sp.* (*Tulipa* ‘Banja Luka’, *Tulipa* ‘Golden Parade’, *Tulipa* ‘Pink Impression’, *Tulipa* ‘Margarita’, *Tulipa* ‘Antarctica’, *Tulipa* ‘Hakuun’, *Tulipa* ‘Escape’, *Tulipa* ‘Darwidesign’) plants and soil around their roots were taken on planting (pre-test) and fading (30 days after plantation, post-test) periods, and heavy metal accumulation was investigated in the soil around the roots of the plants and in their leaves and flowers. Eight types of heavy metal (Cr, Mn, Fe, Co, Cu, As, Cd, Pb) contents of the samples (soil, leaf, and flower) were analyzed through Inductively Coupled Plasma Mass Spectrometry (ICP-MS). The mean and standard deviations of the variables were determined conducting the T-test in the SPSS program and the statistical significance levels of the results obtained were determined using the ANOVA test ($p < 0.01$). Post-test levels of Co, Cr, Fe, and Cd in plant samples (all three parts) were found to be statistically significant ($p < 0.01$) at A2 (Havuzbaşı) and A1 (Gez) junction points, which receive the densest traffic. However, Fe, Cr, Cu and Mn ion levels of soil at A4 (University entrance) and Yenişehir junctions, where the traffic density is lower, were found to be not significant in post-tests. The reason for this is thought to be the addition of soil from outer sources when placing bulbs. Considering the increase rate (%) in Cr between pre- and post-tests, it was found that the largest change was seen in flower petals (436%; from 1.25 mg kg^{-1} on planting to 6.70 mg kg^{-1} 30 days later), followed by leaves (505% from 1.94 mg kg^{-1} to 11.74 mg kg^{-1}) and soil (63% from 40 mg kg^{-1} to 65 mg kg^{-1} at pre - and post-tests); these differences are statistically significant. At A1 point, the increase between the measurements of leaves for Mn was found to be 226% (from 29.25 mg kg^{-1} to 95.22 mg kg^{-1}); for Fe in flower petals at A4 point, the increase was 855% (from $866.26 \text{ mg kg}^{-1}$ to $8274.56 \text{ mg kg}^{-1}$); Co levels in leaves at A4 point increased by 863% (from 0.43 mg kg^{-1} to 4.14 mg kg^{-1}). This study is the first to be conducted on *Tulipa sp.* in Turkey. This study is important because it was determined in the study that the plant investigated provides not only aesthetical and visual contributions to landscape architecture, but it also has a possible function of being a hyper-accumulator depending on the rate of heavy metals it contains in its body parts. Usability and functionality of the plant to this aim were also discussed. Struggling with environmental pollution is a heritage to be dropped for the future. Therefore, wise solutions to preventing pollution are vitally important in the respect of economic development, rehabilitation of polluted areas and sustainable use of all the areas for the futures of countries.

Key words: Environmental pollution, phytoremediation, heavy metals, *Tulipa sp.*, Erzurum, Turkey

PREDICTION HUMUS LEVEL OF BLACK SOILS OF FOREST-STEPPE UKRAINE DEPENDING ON THE APPLICATION OF CROP ROTATION, FERTILIZATION AND TILLAGE

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ABSTRACT

In the long residential field experiments revealed the dynamics of total long-humus black soil, depending on the recruitment and placement of crop rotation, tillage, fertilizer type and its dosage. Given the forecast changes to humus content in typical black soil humus under different farming systems main components by 2050. Done age excursion into the past and look to the future in the age cycle. The level of humus accumulation during the execution of various processing systems is most significantly changed in the first years after the beginning of the experiment, then the humus content is stabilized and changes very slowly with time as a result of the transition of humus formation to a quasi-equilibrium state with degradation phenomena. The use of various methods for treating chernozem of typical low-humus for 42 years only led to a delay in the processes of dehumification and to some extent stabilized the mineralization of humus, but did not contribute to its preservation and extended reproduction to the initial level at the time of the experiment. The increase in humus content occurs with respect to plowing and a control option without fertilizers. The increase in the content of total humus for simple and extended reproduction of humus in the secular cycle is equivalent to 20-25 tons per 1 ha and 30-33 tons per 1ha, respectively. To ensure established increases in humus, it is necessary to annually introduce manure 10-12 tons per 1 ha for simple and 14-15 tons per 1 ha of extended reproduction of the total humus content annually.

Keywords: humus, black soil typical, crop rotation, cultivation methods, tillage, manure, fertilizer, forecast, stationary experiment.

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EFFECT OF CALENDULA OFFICINALIS HYDROALCOHOLIC EXTRACT ON SERUM LEVELS OF TNF-A, GLUCOSE, AND LEPTIN IN TYPE 1 DIABETIC MALE RATS

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ABSTRACT

Objectives: Diabetes is a chronic disease characterized by decreasing insulin secretion due to impairment of the function of beta cells in the pancreas or increased insulin resistance. The tendency to treat diabetes by herbal medicines, which has less side effects than chemical drugs, is spreading day by day. High blood glucose levels in chronic diabetes mellitus cause multiple complications including increased inflammatory factors such as TNF- α and a decrease in leptin levels in blood and other tissues. Therefore, it is important to reduce the destructive effects of these factors. Herbal drugs are considered to reduce complications of diabetes. In this respect, the positive effects of hydroalcoholic extract of *Calendula officinalis* in some tissues have been observed and it has been suggested that it may be effective in reversing the levels of leptin and TNF- α . Therefore, in this study, the effect of *Calendula officinalis*'s extract on blood glucose, TNF- α , and leptin was evaluated by experiments on diabetic male rats. **Materials and Methods:** Sixty male Wistar rats considering 300-250 g were separated into 6 groups in equal and random order: healthy group, diabetic group, diabetic group with normal saline gavage, and three diabetic groups receiving extract of *Calendula officinalis* with doses of 100, 150, and 250 mg / kg. Diabetes was persuaded by injection of 60 mg / kg Streptozotocin (Sigma-Germany). The duration of treatment of rats was 4 weeks. To measure the variables, after anesthetizing the animals, the blood sample was collected to define the levels of TNF- α and leptin by ELISA, and the fasting glucose levels by an enzymatic method. **Results:** The body weight of diabetic rats after 4 weeks of intervention was significantly less than that of control rats, and treatment with extract of *Calendula officinalis* had no important effect on the weight of rats. Meanwhile, persuaded diabetes significantly increased abstaining blood glucose in diabetic groups than in the control group. In diabetic groups receiving the extract of *Calendula officinalis*, fasting blood sugar decreased significantly in compression to diabetic control group. TNF- α levels increased in diabetic condition, and behavior of diabetic rats with extract of *Calendula officinalis* decreased this inflammatory factor. Serum leptin decreased by induction of diabetes than healthy control group, and the extract of *Calendula officinalis* did not significantly affect the level of this cytokine. **Conclusion:** The extract of *Calendula officinalis* showed some of the anti-diabetic properties such as decreasing blood glucose and anti-inflammatory effects, and reduces TNF- α , which is an important inflammatory marker for the pathogenesis of diabetes, with no significant effect on serum leptin levels.

Key words: Diabetes, TNF- α , leptin, *Calendula officinalis* extract

EVALUATION OF HEAVY METAL POLLUTION IN SURFACE SOILS IN ZANJAN PROVINCE, IRAN

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ABSTRACT

Increases of heavy metals in soils are harmful to the environment and human health. Heavy metals in soils originate from both natural and anthropogenic sources. Zanzan province in Iran due to industrial and mining activities is susceptible to increasing of heavy metals. This paper investigated heavy metals concentration in 296 composite soil samples in Zanzan Province. Enrichment Factor (EF) and Geoaccumulation Index (Igeo) calculated for each soil sample to determine the soil quality. EF results show low enrichment in heavy metals except Pb and Zn. Igeo calculated for each sample and results indicated that most samples have no pollution except for Pb, Zn, and Cu. For the understanding of pollution pattern in the study area, the spatial distribution of heavy metals based on EF values evaluated and location of pollutants were determined. Results showed main pollutants were located in central part and western part of this area where industrial stated and mines have activities related to heavy metal.

Key words: Soil Pollution, Heavy Metals, Enrichment Factor, Geoaccumulation Index, Zanzan

