

EDITORIAL COMMENT

Dear readers,

We are pleased to present the second issue of your favorite journal Ecological Engineering and Environmental Protection in its English version. Within the topics *Environmental Biotechnologies*, *Man and Biosphere*, *Forest Ecology and Biology* are published 8 peer reviewed scientific articles from Bulgarian and foreign teams, a short presentation of two thematically related books written by our colleagues and valuable information concerning the upcoming international MELiSSA Conference.

In the first section (*Environmental Biotechnologies*) you will find an impressive experimental work the results of which should be used as a basis for the development of novel universal biotechnologies of metal-containing sewage purification with simultaneous destruction of multicomponent food waste (MFW). It is known that significant environmental pollution by metals has been observed due to the industrial and agricultural activities. A promising research area is the microbial treatment of industrial metal-containing sewage which is based on divalent copper accumulation, precipitation or reduction to insoluble monovalent copper compounds by microorganisms. In their article, the authors propose a novel combined approach for fast and effective simultaneous reductive pathway of metals-oxidizers detoxification and anaerobic destruction of MFW with hydrogen gas obtaining. Moreover, they successfully investigate the patterns of toxic copper(II) removal in the form of soluble citrate complex and simultaneously hydrogen fermentation of multicomponent food waste. The second article in the first section presents curious data that plants can be used for removal of heavy metals from water. Herbal products, like *Pinus halepensis* sawdust, corn cob, tamarind peel, groundnut shell, modified corn stalks, *Algae*, cocoa pod husk, bean pod etc. provide big advantage, as they are economical, renewable and eco-friendly. Herein, the authors established that regaining of valuable metal ions (Cr, Ni, Cu, Zn, Cd and Pb) from low concentrated leach solutions and contaminated water is possible by using the extract, obtained from *Menta piperita* plant.

In the second section *Man and Biosphere* are published three intriguing articles dedicated to different ecological topics and scientific interests. For example, natural radioactivity of drinking and mineral water is important parameter from radioecological point of view because of relatively high radiotoxicity of some of natural radionuclides and their importance for the human health. Recently national and EU regulations decrease the drinking water norms with the aim to strengthen consumers security concerning drinking water quality. In a large scale study are obtained data on the concentration levels of ^{226}Ra , ^{210}Pb and natural U in mineral waters from certain most frequently used sources in Rhodope Mountains region, Southern Bulgaria, the effective doses of natural radionuclide contents are calculated and the radiological hazards caused by ingestion of these waters are evaluated. Phenol is another highly toxic compound that has a high degree of bioaccumulation along the food chain and has a proven negative impact on living organisms and the environment. For example, its effect on aquatic organisms is manifested even at relatively low concentrations, therefore, its removal or neutralization into the environment poses a real challenge for researchers. In this regard, the results of the experimental study showed the possibility of cultivating *Pleurotus ostreatus* mushroom fungus in soil material taken from the environment containing elevated concentrations of heavy metals, as well as growth the mycelium in such an environment in order to improve the properties and purification from pollutants. Moreover, tyrosinase isolated and purified from mushroom bodies shows high phenol degradation activity – 71% at the 72 hour. Another article provides information on the depletion of phosphorus (P) as an important element for all forms of life and its pollution impact on the environment in case of intensive discharge of phosphorus compounds into water bodies. The struvite production from sewage and manure waste has evidently the great potential as a source of phosphorus and the recovered product is valuable both as it is a slow release fertilizer and with its low content of heavy metals compared to the mineral fertilizers. The sewage wastewater and sludge, and the animal manure can be regarded as an important secondary source of Phosphorus.

In the period of 2018-2020, a number of studies are conducted as a part of Phase 1 of the multifactor ecological-phytogeographic analysis of the dendroflora of in the territory of the Lozenska Mountain. In the third section *Forest Ecology and Biology* are presented data on the characterization of the edificators with respect to the reference species. It is shown some heterogeneity in the influence of the factors and the distribution of the groups of species. The most determinants identified for the convertibility of the edificators are cryoclimatic factor, edaphic regime and soil pH. In-depth analysis reveals soil types, their properties and distribution in the Botevgrad valley. It is found that soil cover is characterized by considerable diversity in the ravine valleys of the Bebresh River and its tributaries. Alluvial and Diluvial soils occur in the middle of the region in lowest parts. Gray forest soils developed in the Pre-Balkans and the northern slopes of the Balkan Mountains and Light Grey (Pseudopozolic) soil are spread there. Rendzinas and shallow soils (Lithosols) are developed over hills and slopes. The most fertile soils are Dark grey forest soils (Phaeozems) but they are distributed only in limited area. An advanced study presents the basic dependencies between some of the factors governing nutrient flows in the soil and the needs for fertilizing crops with the main nutrients nitrogen, phosphorus, and potassium – as components of precision agriculture. Having at disposal accurate and comprehensive information on the crops, their development and the external environment relevant mathematical model is developed. It provides support in making applicable, rational, and optimal decisions for management of production processes in agriculture at different hierarchical levels.

The third edition of the book “Natural hazards and ecological catastrophes – study, prevention, protection” will arouse great interest among a wide range of readers. The author - Prof. Garo Mardirosuian from the Space Research and Technology Institute of the Bulgarian Academy of Sciences, is well known expert in the fields of the natural hazards, risk perception and risk management. All previous editions of the book were met with great interest by the audience. The subject of the monograph “An introduction to the mathematical agronomy” is the theoretical and experimental foundation of a new scientific area, Mathematical Agronomy. It is defined as the theory of mathematical models of agronomical objects, processes and phenomena. The author - Prof. Alexander Sadovski discusses some elements of this theory, the experimental foundations of mathematical modeling of yield and the application of mathematical methods and models in solving practical tasks in the field of soil science and agriculture.

Dear readers, the 2020 edition of MELiSSA Conference is the European platform dedicated to closed life support system. Nevertheless, the COVID-19 pandemic, this is the place where all participants could share and exchange experience on fundamental and applied research for Space and Earth applications. The Conference will highlight and foster the collaboration between researchers, engineers, experts, private and public organisations.

Enjoy the new issue, edited books and MELiSSA Conference!

Prof. Hristo Najdenski, DVM, DSc,
Corresponding Member of BAS,
Editor-in-Chief