

EDITORIAL COMMENT

Dear readers,

The Editorial Board is pleased to present the first English language issue for 2022 of your favorite journal Ecological Engineering and Environmental Protection, hopefully in the end of the Covid-19 pandemic. Within the rubrics *Man and Biosphere*, *Renewable and Alternative Energy Sources and Biofuels*, *Bioinformatics and Bioautomatics*, *Forest Ecology and Biology*, *Ecological and Sustainable Agriculture*, and *Radiation Ecology*, are published six peer reviewed experimental scientific articles and two reviews from Bulgarian, foreign and mixed teams.

In the first rubrics Man and Biosphere you will find curious information on many challenges directed to long-termed human space missions beyond the low Earth orbit (LEO) and metabolic resources management (reliable air, water and food supply for the crew). Evidently, the desired extended space exploration beyond LEO with longer human stay in space introduces a new mission element: the constrained access to consumables and resources, and waste recycling and utilization. Moreover, the logistics required to keep the crew safe and healthy during these missions beyond International Space Station (ISS) is a first-order driver in mass and volume requirements. A second review shed light on a national and global public health problem caused by the uncontrolled prescribing and use of antibiotics in human and veterinary medicine like the antimicrobial resistance (AMR). Afterwards, the resistant bacteria can be transmitted via the food chain to humans and animals. Considering that the horizontal gene transfer is one of the most important mechanisms for dissemination of AMR, after consumption of contaminated food, water, etc., genetically determined AMR in animals can easily affect resistance among people, which makes vital drugs ineffective against serious illnesses. For the possible spread of AMR in pigs and related ecological niches - pig farms, manure lagoons, wastewater and soils, large-scale studies have been conducted to clarify their ecological and health significance.

In the second rubrics Renewable and Alternative Energy Sources and Biofuels is considered a proposal for an alternative small scale renewable energy solar power system configuration having reduced cost and complexity for household applications. The combination of hydronic thermal energy storage with a minor rework of electronic appliance power supplies can produce a system that meets the criteria required for a viable solar power system of equivalent utility as current battery-inverter based systems. The elimination of batteries, especially those containing lithium, as a necessary component of the system is beneficial as the cost and scarcity of lithium may increase substantially as electric vehicle markets intensify. The serious energy and environmental problems associated with the use of fossil fuels necessitate the search for alternative energy sources. In this issue is described also a two-stages anaerobic digestion (TSAD) system with an immobilized microbial consortium which represents an innovative biotechnological approach seeking to obtain an increased energy yield and raised degree of processing of waste materials. Some additional raw materials which represent waste materials from agriculture or other industrial scale processes can be successfully applied for higher biohydrogen production. An extremum seeking based composed recursive model-free controller has been proposed for the TSAD process which can produce simultaneously both hydrogen and methane. In order to achieve maximum total gases production rates, the proposed controller comprises extremum seeking controller, recursive stabilization and time delay compensation terms and does not require any knowledge of the model parameters (rubrics Bioinformatics and Bioautomatics).

In the rubrics Forest Ecology and Biology, phytocoenological characteristics and preliminary assessment of the health status of the first Dawn redwood (*Metasequoia glyptostroboides*) artificial plantation in Bulgaria established in 1969 are carried out. The health status of the Dawn redwood plantation

is assessed as “good” and from the distance of the 50-year period, the artificial afforestation with this exotic relic of the village of Kokalyane can be considered as successful.

Field experiments with maize conducted during the year 2020 evaluate the limits of maize grain yield grown on soils with different properties and with different levels of nutrients (rubrics Ecological and Sustainable Agriculture). The multifactorial experiments include the application of mineral fertilizers - ammonium nitrate, superphosphate, potassium sulfate and diatomic earth, containing respectively – nitrogen (N), phosphorus (P), potassium (K), and diatomic earth, which represents 89-95% silica in amorphous form. Simulation is performed at medium levels of all nutrients and on concurrent levels of nutrients including the high level of two fertilizers excluding two others. The results show that the experimental and simulated maize yields on Leached smolnitsa in Bozhurishte are significantly lower than those on Alluvial-meadow soil in Tsalapitsa.

The results on a study of the tritium content in surface water from three Rila lakes – Moussala lake, Aleko lake and Ice lake, and precipitation at Moussala mount has been presented in the rubrics Radiation Ecology. The obtained new data by using high precision nuclear and radiochemical methods should be applied to assess the radiation status of the investigated water sources and for evaluation of possible future changes and trends.

On behalf of the Editorial Board I would like to express our sincere gratitude for the active publishing and editorial work of Assoc. Prof. Tonko Petkov, who have made a valuable contribution to raising the popularity and prestige of our journal. Be health and still creative in your favorite scientific topics - management and operation of air transport, regulatory framework in aviation, etc.!

Enjoy the new issue and the MELiSSA Summer University which will be held for the first time in May 17-19, Sofia, Bulgaria!

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Sofia

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