

EDITORIAL COMMENT

Dear reader,

The first issue for 2020 presents the results of experimental studies of national and international teams working in various fields relevant to scope of the EEEP journal. The articles are included in the headings *Environmental Biotechnology, Bioautomatics and Bioinformatics, Man and Biosphere, Renewable and Alternative Energy Sources and Biofuels, Forest Biology, Ecological and Sustainable Agriculture*.

We pay great attention and publish on first place data from intensive studies focused on development of universal biotechnologies for effective treatment of all four major classes of wastes (multi component food waste of megacities, toxic food waste filtrates, metal-containing wastewater and liquid radioactive waste) and obtain valuable products. The key point is that the authors consider described wastes classes as extreme factors in relation to microorganisms and ecosystems. On the basis of thermodynamic prognosis, theoretically permissible chemical reactions are analysed, the most effective reaction is selected, and then the optimal path, among the pathways known for microorganisms is selected. Obviously, the selected pathway of toxic compounds detoxification may carry out a number of different physiological and taxonomic groups of microorganisms providing biotechnologically promising results after microbial interaction with toxic compounds. Moreover, developed environmental biotechnologies should be effectively implemented for prevention the environment pollution by all four types of hazardous waste as well as for bioremediation of contaminated ecosystems.

In the second rubric *Bioautomatics and Bioinformatics* a new mathematical model describing the process of simultaneous H_2 and CH_4 production from organic wastes in a cascade of two continuously stirred tank bioreactors is presented. Actually, a lot of models describing separately the fermentative hydrogen production and the anaerobic digestion for methane production are known, but only few models of two-stage anaerobic digestion processes are published up to now. The proposed herewith model is developed by reducing the universal but very complicated Anaerobic Digester Model № 1 basic structure elaborated by the International Water Association. The investigated input-output static characteristics Q_{h_2} and Q_{ch_4} are important for the practical applications and will be further used in optimising the bioreactors to achieve maximal production of either hydrogen and methane. The model also allows finding the optimal ratio between the volumes of the two bioreactors subject to the same optimisation goal.

Valuable conversion data of coal ash to zeolite-based iron oxide magnetic nanocomposites are presented in the rubric *Man and Biosphere*. The main contribution of the manuscript is elucidation the possibility of producing magnetic zeolites from coal fly ash while retaining the advantages of two-step synthesis and application of magnetite from the raw material. Described alkaline treatment of the coal fly ash via modified double stage fusion-hydrothermal activation leads to synthesis of hydroxy-sodalite/cancrinite zeolite nanocomposites which would be low-cost efficient magnetic ion-exchangers and adsorbents of heavy metals for remediation of polluted waters. In next article a comparative study demonstrate the water content of mixed honey bee-collected pollen from different harvesting periods during three consecutive years. This parameter is important to evaluation the amount of protein content, lipids, sugars, minerals and other components in the pollen as a source of bioactive constituents.

A short review on the principles, experimental devices and projects of fusion-fission nuclear plants which can combine energy production, production of fuel for the conventional fission reactors and burning of the high radioactive nuclear waste is presented in the rubric *Renewable and Alternative Energy Sources and Biofuels*. Nowadays, development of the hybrid nuclear reactors can provide energy with abundant resource, safe, and clean at reasonable cost. The hybrid fusion-fission reactors, proposed in 1950s by A. Sakharov in Russia and D. Imhoff in USA, have many advantages which are well demonstrated in the presented text, figures and schemes.

A team from Indonesia present details about aviation biofuel production in two reactors and appropriate analysis of the aviation biofuels including total acid number (TAN), density at $15^\circ C$, total sulfur content, freezing point, carbon bistribution of C_{10} - C_{14} , aviation biofuel blending, etc. Based on the experimental

results the authors concluded that the Aviation Biofuel complied for TAN, density at 15 °C, and freezing point parameters. Aviation biofuel blending of 2%, 5%, and 10% were in accordance with the Aviation Biofuel Defence Standard 91-91 for all parameters.

Leaves parameters values of Oriental plane tree (*Platanus orientalis* L.) are reported in the rubric *Forest Biology* in an attempt to evaluate the anthropogenic and natural factors of the environment. Moreover, this study highlights the endogenous, population and interpopulation variability of the leaves (in total 8 morphological parameters) of this rare tree species from eight natural populations of Bulgaria and their relationship with the particular origins.

In the last rubric *Ecological and Sustainable Agriculture* is presented a comprehensive survey evaluating the land suitability classes for effective and anti-erosion land use in the Dobrich region. The existing natural and economic preconditions, the erosion factors and the actual quantities of eroded soil are analyzed and discussed. Based on integrated data analysis the optimal protective practices to limit erosion processes and increase soil productivity are recommended.

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