

EDITORIAL COMMENT

Dear Reader,

In the second English language issue of the journal for 2019 you will be immersed and will enjoy the thematic richness of published articles. The recent issue includes nine articles within the scope of six thematic directions – *Microorganisms and Environment*, *Bioautomatics and Bioinformatics*, *Man and Biosphere*, *Space Technology and Environmental Monitoring*, *Ecological and Sustainable Agriculture*, and *Forest Biology*.

It is well known and phenomenal that living systems had developed efficient strategies for optimal growth and fitness under nutrient deficiency. In large scale yeast growth experiments with *Saccharomyces cerevisiae* (baker's yeast) as a model were identified population dynamics estimators of the metabolic shifts from respiration to mixed respiro-fermentative metabolism using various glucose and oxygen conditions. Average intrinsic dynamic parameters using exponential and logistic models have been determined using auto-regressive statistical approach. The capacity of the exponential and logistic models to elucidate these quantitative bio-indicators of Crabtree/Warburg effect is also presented and discussed in the final section of the only article of the topic *Microorganisms and Environment*. General cell growth model estimating metabolic shift has been constructed based on an Auto Regressive approach.

In the rubric *Bioautomatics and Bioinformatics* is illustrated how the use of mathematical modeling can help investigations of important points for optimization of biological processes such as transgressive overyielding. The author demonstrates that the classical competition model in the chemostat cannot exhibit overyielding and it is necessary to include other processes for the ecosystem to be able to exhibit this effect. For low complexity ecosystem the proposed combinatorial approach is shown to be quite robust with respect to both experimental uncertainty and to the number of data available.

Nowadays, the process of anaerobic digestion is regarded as a quit perspective to ensure resource-saving and environment protection. In order to obtain maximum biogas and biofuels production, a range of control methods are dedicated to anaerobic digestion process in which Extremum Seeking Control (ESC) does not require any knowledge of the model while most optimization controllers need complete model information of the controlled system. An international team has developed and propose a control method which only need the optimization target of the system and contains an Extend Kalman Filter (EKF) and a variable amplitude perturbation signal. The EKF is used to obtain more accurate estimated gradient instead of a series of high- and low-pass filters in perturbation based ESC. In addition, the proposed ESC can eliminate the shortcoming of steady-state oscillation in perturbation based ESC.

Control is important strategy also for achieving a better process stability and higher conversion efficiencies in anaerobic digesters or bioreactors where the organic matter is transformed by microorganisms in biogas – methane and carbon dioxide, and compost in the absence of oxygen. To derive the control output of a five-order nonlinear dynamic system, a synergetic design procedure is employed. It can achieve a high robustness, fast convergence, low steady state error, and globally uniformly asymptotic stability. In addition, the proposed algorithm is cheaper and provides a good performance by simulation and without focusing on the uncertainty issues of modeling.

From a descriptive study in the rubric *Man and Biosphere* the reader becomes acquainted with the garbage management and handling in Kota Kupang (Indonesia). The results indicated that fundamental changes of garbage management must be carried out considering the household

behavior, sustainability of education, changes in conventional methods for garbage handling, and a revolutionary perspective on garbage utilization with economy value.

Various activities related with the CABARET (Capacity Building in Asia for Resilience EducaTion) project are presented by authors from Mining and Geology University (Sofia, Bulgaria) and Maldives National University (Male, Maldives). Supported by FP 7 of the EC, the project strengthen the bilateral partnership and cooperation, developed educational platform, online open courses on Disaster preparedness, Science and technology for disaster risk reduction, and Community based disaster risk management, technical manuals, etc.

The mapping and monitoring of the wetlands as the most biologically productive ecosystems in the world are highly important activities. In the rubric *Space Technology and Environmental Monitoring* are reported satellite multispectral images for assessment and monitoring of the actual state of the Durankulak lake (Bulgaria). They allow not only preparation of the wetland index classification but analysis of the processes related to the dynamics of changes affecting the main components of the earth's surface – soil, water, and vegetation.

Curious data on bees preferred plant species are presented in the rubric *Ecological and Sustainable Agriculture*. Experimental data clearly show the variability in the behavior of honey bee in the selection of flora, which in turn is determined by the disturbed natural balance in nature as a result of human activities, season, or even the ratio of plant species flowering in a certain period and the genetic potential of honey bee colonies and their needs.

A lot of plant species require specific soil conditions and specific physicochemical soil characteristics for their optimal growth. The natural populations of *T. cinerariifolium* (a species of great economic importance related with production of natural insecticides like Pyrethrins) grow on well-drained skeletal soil with CaCO_3 content, but are also found on hard limestone substrate. In a large-scale study of the rubric *Forest Biology* is demonstrated that seeds from *T. cinerariifolium* planted in Rendzik Leptosol have shown the highest germination percentage, and the ones planted in Sceletic Fluvisols have shown the lowest germination percentage.

Finally, but not last the readers should find valuable information about the Sixth International Conference with Youth Session carried out in Burgas, Bulgaria. The participants enjoyed the conference and preserved unforgettable professional and personal impressions from the excellent and fruitful conference organized on the beautiful Black See coast.

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Sofia

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