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Stanimir KOSTADINOV – University of Belgrade, Faculty of Forestry, Belgrade, Serbia

Nada DRAGOVIĆ – University of Belgrade, Faculty of Forestry, Belgrade, Serbia

Editorial Office: Faculty of Forestry
Kneza Višeslava 1
11030 Belgrade
Serbia

Phone: +381 11 3053 990
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bioinformatics such as the Multiple alignments and Phylogenetic trees, and 3D modelling for proteins.
We analyzed 193 indicators Diatomae algae organisms from the V. Sladechek’s list (1973). Here we perform the results of Multiple alignments and 3D models of 56 rbcl amino acid sequences available in GenPept (NCBI). A short unique (5-35) amino acid sequences were identified for 24 proteins with 49 unique variable sites of indicators Diatomae algae organisms which normally used as bioindicators of water saprobity.
Therefore, it is allows us to use the antibodies for direct qualification and quantification of the indicator Diatomae algae species in the samples of water using the rbcl proteins and together with CO1 proteins of water indicator invertebrate species make the conclusion of ecological state of the water resources.

Key words: water resources, marker genes, marker proteins, bioindicators, 3D models.

POTENTIAL OF NATURAL ATTENUATION PROCESSES IN ENVIRONMENTAL CONTAMINATION BY PETROLEUM HYDROCARBONS

Nenad Marić¹*, Zoran Nikić¹

¹ Department of Ecological Engineering for Soil and Water Resources Protection, Faculty of Forestry, University of Belgrade, Serbia
nenad.maric@sfb.bg.ac.rs*

Once released in the environment, petroleum hydrocarbons can be long-term sources of contamination. The main advantage of bioremediation compared to conventional remediation treatments is its reduced cost. Natural attenuation is the passive bioremediation approach that relies on natural processes in the reduction of contamination. This study provides insight into the natural attenuation processes in groundwater in the alluvial deposits of the Zapadna Morava River (the site of historical contamination by kerosene in Vitanovac, Kraljevo, Serbia). Monitoring was performed in the direction of groundwater flow movement, downgradient from the source of contamination. Groundwater samples were analyzed for the following parameters: total petroleum hydrocarbons (TPH), O₂, NO₃⁻, Mn, Fe and SO₄²⁻. TPH concentrations declined in groundwater across the site, and were accompanied by increasing concentrations of electron acceptors (O₂, NO₃⁻, SO₄²⁻) and decreasing concentrations of metabolic products of biodegradation (Mn, Fe). The observed trends provide strong evidence of the activity of different biodegradation
mechanisms at this site (aerobic respiration, nitrate reduction, reduction of manganese (IV), reduction of iron (III) and sulfate reduction). The results obtained confirm the natural occurrence of aerobic and anaerobic biodegradation mechanisms in this phreatic aquifer contaminated by petroleum hydrocarbons 20 years ago. However, use of natural attenuation as a cost-effective remediation alternative depends on its capacity to ensure protection of public health, safety and the environment.

**Key words:** petroleum hydrocarbons, groundwater, natural attenuation, biodegradation

**TREND ANALYSIS OF ANNUAL WATER DISCHARGE AND SUSPENDED SEDIMENT LOAD IN THE JUŽNA MORAVA RIVER (SERBIA) 1958-2007**

Sanja Manojlović¹, Tanja Dobrosavljević¹, Milena Gocić², Predrag Manojlović¹, Marko Milošević³

¹University of Belgrade – Faculty of Geography, Belgrade, Serbia
²University of Niš – Faculty of Science and Mathematics, Department of Geography
³Geographical Institute „Jovan Cvijić“
sanjam@gef.bg.ac.rs

Global climate change and changes caused by human activity have greatly changed river systems. Many studies have looked at the causes of variability in suspended sediment load on world’s largest rivers where different trends in discharge and sediment transport were noted. This paper analyses the trend of suspended sediment load transport (Qs) on the hydrological profile Mojsinje. The data on daily values of discharge (Q) and suspended sediment concentration (SSC) for the period 1958-2007 were measured by Republič Hydrometeorological Service of Serbia. The trend of suspended sediment load transport was determined using the nonparametric Mann-Kendall test and Pettit test. The results showed that the mean annual suspended sediment load was $2.47 \times 10^6$ t (160.5 t/km²/year) and ranged from $0.04 \times 10^6$ t (2.6 t/km²/year) to $9.85 \times 10^6$ t (640.3 t/km²/year) for the period 1958-2007. The average decrease of suspended sediment was 5.15 t/km²/year which show statistical significance at the level of 0.001. The Pettit test detected 1985 as a change point in suspended sediment load, which has since dropped by about 71%.