



2024 RAD CONFERENCE

ORIGIN OF LIPID TRACERS IN THE SURFACE SOILS USING DIAGNOSTIC INDICES AND HIERARCHICAL CLUSTER ANALYSIS

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Petroleum hydrocarbon-related soil contamination is a serious environmental issue. The different causes of this pollution, which include industrial emissions and the unintentional spilling of petroleum and its derivatives, can have detrimental effects on entire ecosystems. To ascertain the anthropogenic input of hydrocarbons in the examined soil samples, a variety of assessment indices were produced. In this investigation, soil samples were taken from surface layers near the heating plant in New Belgrade, Serbia.

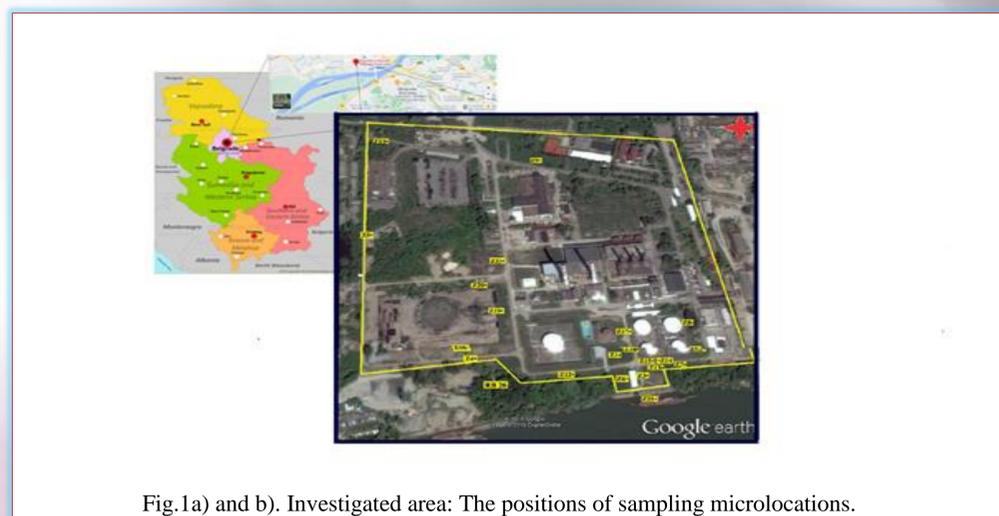
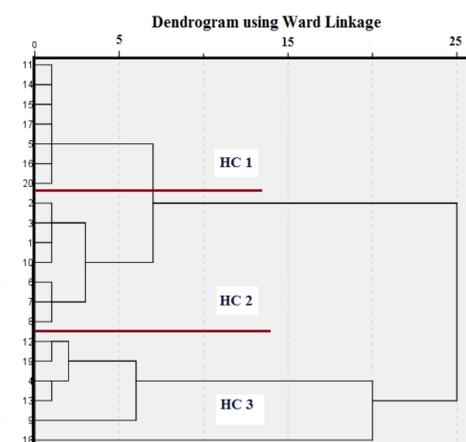


Fig.1a) and b). Investigated area: The positions of sampling microlocations.



The dendrogram was obtained by applying the Q mode hierarchical cluster analysis in urban soils of New Belgrade near the alluvial area of the Sava River

The initial exploratory approach involved the use of Hierarchical Cluster Analysis (HCA) on the log-transformed data set of 20 sampling sites. Spatial HCA identified similar monitoring sites, and in this case, produced a dendrogram grouping all the samples into individual groups (Fig. 2). Based on the level of grouping, three separate clusters of soil samples have been found from the output of the Q-mode hierarchical cluster analysis. Differences in photosynthetic pathways of plants as well as anthropogenic input had an impact on soil organic matter composition. Since the biogenic contribution tends to be reduced at all sites, the group of HC1 clusters can be predominantly attributed to native organic matter. C4 plants that were present in soil organic matter transmitted a stronger signal. In certain sampling sites, in the HC1 cluster the contributions from aquatic organic matter were higher. These findings might be linked to an occasional rise in the water table. The fluctuation of isoprenoids in this alluvial area indicated the variation in redox potential during sedimentation. The n-alkanes which represented hydrocarbons dominated by higher plants and traffic activity are defined by the second cluster, HC 2. This group has a higher concentration of C3 plant compounds than the rest of the groups. Sedimentary alkane assemblages like in some soil samples (position sites which are located in the outskirts of the urban areas (residential block and near a motorway with a medium traffic density) may result from the intake of hydrocarbons

Acknowledgement: The authors would like to thank the Ministry of Education, Science and Technological Development (Grant No: 451-03-66/2024-03/200026)

Reference

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