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Saturated Hydrocarbons Proxies as a Tool for Differentiation Between Anthropogenic and Natural Organic Matter Inputs to the Surface Soils of the Sava River Alluvium

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The largest heating plant in Belgrade (the capital of Serbia), is located in the residential area New Belgrade, close to the Sava River (Figure 1). Due to the potential risk of contamination, this site has been a subject of a detailed environmental monitoring for several years. The aim of our present study was to investigate the source of the organic matter input to the surface soils of the Sava River Alluvium at this location.

The surface soil samples were collected at 20 micro locations from this locality. From these samples the organic matter was extracted with dichloromethane using a Soxhlet apparatus. Saturated hydrocarbons were isolated from the extracts using a column chromatography. For that purpose, silica gel and aluminium oxide were used as adsorbents. Saturated hydrocarbons were eluted by hexane and analysed by gas chromatography - mass spectrometry. *n*-Alkanes were identified using mass ion m/z 71, hopanes using mass ion m/z 191 and steranes using mass ion m/z 217.

Saturated hydrocarbons proxies used in this research were: short to long hydrocarbon chains ratio, average weighted carbon chain lengths for long *n*-alkanes (for C_{24–33} range) [1], the terrestrial-to-aquatic ratio [2], the carbon preference index for the entire alkane range [3] the *Paq* proxy [4] and the unresolved complex mixture [5].

Distribution of hopanes and steranes in the samples was analysed to confirm the presence of petroleum-derived residues.

The results indicated that the organic matter in the samples analysed was contributed from the multiple natural allochthonous and autochthonous organic

matter sources such as: aquatic macrophytes, algal, bacterial and terrestrial plant sources, and bacterial reworking. Furthermore, presence of the petroleum-sourced hydrocarbons was confirmed as well indicating a contribution of the anthropogenic sources of hydrocarbons to the organic matter of the investigated samples.

All these results point to the complex processes of migration and mixing of the organic matter in the surface soils at the investigated location.

Considering the fact that the presence of the oil pollutants was confirmed in the samples analysed, further research is needed to reveal the environmental pollutions status of the environment at this locality.

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