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Humic Substances in Ecosystems
(HSE11)
Wrocław – Kudowa Zdrój, Poland
29th May – 1st June 2017

BOOK OF ABSTRACTS
AND
FIELD SESSION GUIDE

Polish Chapter of the IHSS
(Polskie Towarzystwo Substanacji Humusowych)
University of Wrocław, Faculty of Chemistry
and
Wrocław University of Environmental and Life Sciences
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Dissolved Organic Matter, Nutrients and Bacteria in Antarctic Soil Core from Schirmacher Oasis

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Key words: HPLC; Dissolved organic matter; Nutrients; Antarctic soil; Heterotrophic bacteria

A chromatographic method based on high-performance liquid chromatography (HPLC) has been used to investigate changes in dissolved organic matter (DOM) from soil core collected from Schirmacher Oasis, Antarctica. DOM was separated and fractionated by size by high-performance size exclusion chromatography with diode-array detection. The qualitative and semi-quantitative analysis of DOM was accomplished based on chromatographic fingerprints. The specific aims were: (1) to investigate changes in DOM components’ characteristics and in nutrients by exploring Antarctic 1.9 m deep soil core from ground active layer and upper permafrost, records; (2) to find the similarities and differences in chromatograms of DOM and relate them to active heterotrophic bacteria (HB) data after applying statistical data treatment methods; (3) to explore the potential impact of environment on DOM and bacteria records in investigated soil core.

The detectable chromophoric DOM pool was comprised of a very small low molecular mass fraction which increased down the core in permafrost soil layers. The vertical changes in nutrients (total N and P), the ratios C:N and C:P, followed total organic carbon profile suggesting similar sources. Microbiological analyses showed decreasing vertical concentrations of active HB. Statistical data treatment methods enabled clustering of soil core into 3 zones according to depth. The upper 0-20 cm had statistically relevant differences in comparison to other zones as revealed by the absence of DOM in soil water and high number of HB. Middle 0.26-1.15 m zone had distinctly low HB number and relatively low DOM concentration. The deepest zone at 1.3-1.9 m had relatively high DOM content and the lack of colony forming HB. The study demonstrated that combining HPLC with multi-wavelength detection and microbial analyses with statistical data treatment is potentially a promising tool of investigating changes in Antarctic soil DOM and in soil waters generally.

Release of ions in compost: A study of soils in industrial compost production

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Key words: compost; soil; heavy metals; moisture

This study investigated the solubility of heavy metals in compost from the same production line at two compost plants. The samples were obtained from the composting process at 10% moisture, which was a "reference" moisture content involved in the study. The samples were tested after a 3-week, 2-month, and 6-month period. The results showed that the highest moisture content in compost was found with Macropoulos method (determined by TGA) and the lowest with C/T method. The contents of Pb and Cr were found to be significantly higher in the 6-month samples than in the 3-month ones.

These results indicate the need for further research on the release of heavy metals from compost and the potential risks they pose to the environment.

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