

Characteristics of humic substances from municipal sewage sludge: a case study

Dorota Kulikowska*, Barbara K. Klik, Zygmunt M. Gusiatin, Karolina Hajdukiewicz

Faculty of Environmental Science, Department of Environmental Biotechnology, University of Warmia and Mazury in Olsztyn, Sloneczna 45G, 10-709 Olsztyn, Poland, Tel. +48 89 5234145; emails: dorotak@uwm.edu.pl (D. Kulikowska), barbara.klik@uwm.edu.pl (B.K. Klik), mariusz.gusiatin@uwm.edu.pl (Z.M. Gusiatin), hajdukiewicz@uwm.edu.pl (K. Hajdukiewicz)

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ABSTRACT

Recycling of sewage sludge is one of the most desirable solutions in waste management strategy. Mostly, sewage sludge is composted, used for biogas production, or simply used in agriculture as fertilizer (if it does not contain heavy metals (HM)). Sewage sludge can be also used as soil amendment to immobilize HM (stabilization strategy). The new trend is using sewage sludge as a source of humic substances (HS), which, after extraction, are considered to be effective washing agents for removal of HM from polluted soils (mobilization strategy). It should be emphasized that HS for soil washing can be recovered even from sewage sludge with elevated concentrations of HM that would make the sludge unsuitable for agricultural use and composting. However, the possibility of using HS in both aforementioned strategies of soil remediation requires knowledge about their detailed characteristics. In this study, the detailed characteristics of HS from 5 different municipal wastewater treatment plants are provided. It is shown that organic matter (OM) content in sewage sludges ranged from 70.2% to 84.2% and HS content ranged from 118.7 to 227.5 mg/g OM. In all sludges, the share of humic acids (HA) in HS ranged from 35.7% to 48.2%. In HA, stable HA predominated (>92%). $\Delta \log K$ values of 0.6–0.8 showed that HA were of B-type, indicating a medium degree of humification. These results provide useful information about HS introduced into the soil.

Keywords: Sewage sludge; Resources; Organic matter; Humic substances; Humic acids

* Corresponding author.