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THE EFFECT OF TEMPERATURE CONDITIONS ON Cu, Ni, Zn AND Fe COMPLEXATION BY HUMIC SUBSTANCES DURING SEWAGE SLUDGE COMPOSTING

Dorota Kulikowska, Zygmunt Mariusz Gusiatin*

*Department of Environmental Biotechnology, University of Warmia and Mazury in Olsztyn,
Sloneczna St. 45G, 10-719 Olsztyn, Poland*

Abstract

The aim of this study was to determine how temperature conditions (max. 72 °C, 81 °C and 43.5 °C) during sewage sludge composting affect the distribution of organically bound heavy metals in humic substances (HS). To accomplish this, the content of Cu, Ni, Zn and Fe was measured in the two main fractions of HS, humic acids (HAs) and the fulvic fraction (FF). In the feedstock, the FF was mainly responsible for binding all metals except Ni. During composting in the two series with thermophilic conditions, the content of Cu and Ni in HAs increased considerably. However, in the third series this increase did not take place. Zn content in HAs nearly doubled in the first two series, but 92-94% of Zn still remained in the FF. Although Cu, Ni, and Zn content in stable-HAs increased in all three series, the increase was much greater in the two series with higher temperatures. Fe distribution was not affected by composting. These results may indicate that thermophilic conditions during composting of sewage sludge should be favored to reduce the risk of heavy metal pollution when it is used as a soil amendment.

Key words: fulvic fraction, heavy metals complexation, labile humic acids, sewage sludge compost, stable humic acids

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*Author to whom all correspondence should be addressed: e-mail: mariusz.gusiatin@uwm.edu.pl