

Accepted Manuscript

Fate of nutrients and heavy metals during two-stage digestion and aerobic post-treatment of municipal organic waste

Christine Knoop, Michael Tietze, Christina Dornack, Thomas Raab

PII: S0960-8524(17)32152-1
DOI: <https://doi.org/10.1016/j.biortech.2017.12.019>
Reference: BITE 19274

To appear in: *Bioresource Technology*

Received Date: 17 September 2017
Revised Date: 5 December 2017
Accepted Date: 7 December 2017

Please cite this article as: Knoop, C., Tietze, M., Dornack, C., Raab, T., Fate of nutrients and heavy metals during two-stage digestion and aerobic post-treatment of municipal organic waste, *Bioresource Technology* (2017), doi: <https://doi.org/10.1016/j.biortech.2017.12.019>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Fate of nutrients and heavy metals during two-stage digestion and aerobic post-treatment of municipal organic waste

Christine Knoop ^{a*}, Michael Tietze ^b, Christina Dornack ^c, Thomas Raab ^a

^aBrandenburg University of Technology, Chair of Geopedology and Landscape Development, Siemens-Halske-Ring 8, 03046 Cottbus, Germany

^bGICON - Großmann Ingenieur Consult GmbH, Tiergartenstr. 48, 01219 Dresden, Germany

^cTechnische Universität Dresden, Chair of Waste Management, Pratzschwitzer Str. 15, 01796 Pirna, Germany

*Corresponding author: christine.knoop@b-tu.de, tel. 0049 355 694537

Abstract

The biogas technology is a promising approach for the recovery of energy and fertilizer from municipal organic waste (MOW). However, only scarce information on the development of initial nutrient and heavy metal loads during processing is available. Therefore, this study investigates properties of source-separated MOW during treatment in a semi-industrial scale two-stage biogas plant and subsequent digestate composting including impurities removal. Data from 15 batch experiments was investigated by material and substance flow analysis. Results of this study have shown that about 40% of nutrients contained in the MOW inflow are mineralized during anaerobic and subsequent aerobic treatment. A higher nutrient release was observed during the anaerobic treatment step. Additionally, impurities removal causes a significant reduction of final nutrient content. Heavy metal analysis confirmed a high heterogeneity of contamination levels. However, digestion and composting do not seem to significantly impact on total heavy metal loads in the substrate flow.

Keywords: MOW, digestate treatment, composting, substance flow analysis, nutrient transfer, heavy metals

Download English Version:

<https://daneshyari.com/en/article/7068479>

Download Persian Version:

<https://daneshyari.com/article/7068479>

[Daneshyari.com](https://daneshyari.com)