

## Accepted Manuscript

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PII: S0960-8524(17)30665-X  
DOI: <http://dx.doi.org/10.1016/j.biortech.2017.05.026>  
Reference: BITE 18052

To appear in: *Bioresource Technology*

Received Date: 7 March 2017  
Revised Date: 3 May 2017  
Accepted Date: 4 May 2017

Please cite this article as: Knoop, C., Dornack, C., Raab, T., Nutrient and heavy metal accumulation in municipal organic waste from separate collection during anaerobic digestion in a two-stage laboratory biogas plant, *Bioresource Technology* (2017), doi: <http://dx.doi.org/10.1016/j.biortech.2017.05.026>

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# Nutrient and heavy metal accumulation in municipal organic waste from separate collection during anaerobic digestion in a two-stage laboratory biogas plant

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## Abstract

Municipal organic waste (MOW) is a promising feedstock for biogas plants and separate collection will increase available quantities. To close nutrient circles digestates shall be redistributed to arable land. However, less is known about digestate properties and how they are influenced during digestion. Therefore, changes in nutrient and heavy metal concentration in the solid digestate were investigated during anaerobic treatment of MOW in a two-stage laboratory biogas plant. Results show that the solid digestate is exposed to element accumulation, except for N, P and Mg. The loss of initial N, P and Mg load accounts up to 45 %, which must be redistributed elsewhere in the digester system. K load of feedstock was completely rediscovered in the solid digestate. Heavy metal concentration in the digestate increases by factor 1.6 at average. The results emphasize that element retention in the digester system has a decisive impact on nutrient content of digestates.

**Keywords:** municipal organic waste (MOW), anaerobic digestion, two-stage biogas plant, digestate properties, nutrient and heavy metal content, element retention

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