

Accepted Manuscript

Short Communication

Drinking water treatment sludge as an effective additive for biogas production from food waste; kinetic evaluation and biomethane potential test

Mohammadali Ebrahimi-Nik, Ava Heidari, Shamim Ramezaniazghandi, Fatemeh Asadi Mohammadi, Habibollah Younesi

PII: S0960-8524(18)30474-7
DOI: <https://doi.org/10.1016/j.biortech.2018.03.112>
Reference: BITE 19751

Received Date: 9 January 2018
Revised Date: 18 March 2018
Accepted Date: 23 March 2018

Please cite this article as: Drinking water treatment sludge as an effective additive for biogas production from food waste; kinetic evaluation and biomethane potential test, *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.03.112>

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.



Drinking water treatment sludge as an effective additive for biogas production
from food waste; kinetic evaluation and biomethane potential test

Mohammadali Ebrahimi-Nik¹, Ava Heidari^{2*}, Shamim Ramezaniazghandi², Fatemeh Asadi
Mohammadi¹, Habibollah Younesi³

¹ Department of Biosystems Engineering, Faculty of Agriculture, Ferdowsi University of
Mashhad, Mashhad, Iran,

² Department of Environmental Science, Faculty of Natural Resources and Environment ,
Ferdowsi University of Mashhad, Mashhad, Iran

³ Department of Environmental Science, Faculty of Natural Resources, Tarbiat Modares
University, Imam Reza Street, P.O. Box 46414-356, Noor, Iran

Abstract

The effect of drinking water treatment sludge (DWTS) as a mixture additive, on biogas and methane production from food waste was studied. Mesophilic anaerobic digestion of food waste with 5 concentrations of DWTS (0, 2, 6, 12, and 18 ppm) was carried out. It was found that DWTS can significantly enhance biogas and methane yield. The highest biogas (671 Nml/g VS) as well as methane yield (522 Nml/g VS) was observed when 6 mg/kg DWTS was added. This is equal to 65 and 58 percent increase in comparison with the control digester. The calculated lag time for methane was found to be in between 3.3 and 4.7 days. The DWTS also reduced the lag phase and retention time. The biogas experimental data was fitted with the modified Gompertz and the first-order kinetic models with R^2 higher than 0.994 and 0.949, respectively. The ratio of the experimental biogas production to the theoretical biogas production (ϵ) for control sample was 0.53 while for other samples containing additive were higher than 0.78.

* Corresponding author: E-mail: heidari@ferdowsi.um.ac.ir (A. Heidari); Tell: +985138805471

** Co- corresponding author: E-mail: ebrahimi.nik@ferdowsi.um.ac.ir (M. Ebrahimi.nik); Tell: +985138805849

Download English Version:

<https://daneshyari.com/en/article/7067278>

Download Persian Version:

<https://daneshyari.com/article/7067278>

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