

Accepted Manuscript

Short Communication

Cocoa residues as viable biomass for renewable energy production through anaerobic digestion.

Nayaret Acosta, Jo De Vrieze, Verónica Sandoval, Danny Sinche, Isabella Wierinck, Korneel Rabaey

PII: S0960-8524(18)30768-5
DOI: <https://doi.org/10.1016/j.biortech.2018.05.100>
Reference: BITE 20006

To appear in: *Bioresource Technology*

Received Date: 21 March 2018
Revised Date: 29 May 2018
Accepted Date: 30 May 2018

Please cite this article as: Acosta, N., De Vrieze, J., Sandoval, V., Sinche, D., Wierinck, I., Rabaey, K., Cocoa residues as viable biomass for renewable energy production through anaerobic digestion., *Bioresource Technology* (2018), doi: <https://doi.org/10.1016/j.biortech.2018.05.100>

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.



Title: Cocoa residues as viable biomass for renewable energy production through anaerobic digestion.

Nayaret Acosta¹, Jo De Vrieze¹, Verónica Sandoval², Danny Sinche³, Isabella Wierinck⁴, Korneel Rabaey^{1*}

¹Center for Microbial Ecology and Technology (CMET), Ghent University, Coupure Links 653, B-9000 Gent, Belgium

²Universidad de las Fuerzas Armadas ESPE, Av. Gral. Rumiñahui s/n, Sangolquí, Ecuador

³Instituto de Eficiencia Energética y Energías Renovables, Iñaquito N35-37, Quito, Ecuador

⁴Organic Waste Systems (OWS), Dok Noord 5, B-9000 Gent, Belgium

Manuscript submitted to Bioresource Technology

Abstract

The aim of this work was to evaluate the bioenergy potential of cocoa residue via anaerobic digestion. Batch and fed-batch lab-scale reactors were operated under low and high solids conditions. In the batch tests, $59 \pm 4\%$ of Chemical Oxygen Demand (COD) was recovered as methane. This corresponded with an average methane yield of 174 (wet) and 193 (dry) L kg⁻¹ volatile solids fed, whereas a series of fed-batch reactors produced 70 ± 24 (wet) and 107 ± 39 (dry) L CH₄ kg⁻¹ volatile solids fed during stable conditions. A case study was developed for canton Balao (Ecuador) based on our experimental data, operational estimates and available cocoa waste in the area. Annually, 8341 MWh could be produced, meeting 88% of the current electricity demand in Balao. This case study proves the potential for cocoa waste as a source of renewable energy in rural areas.

Keywords: biogas, cocoa waste, bio-energy, methane, agricultural residues

* Correspondence to: Korneel Rabaey, Ghent University; Faculty of Bioscience Engineering; Center for Microbial Ecology and Technology (CMET); Coupure Links 653; B-9000 Gent, Belgium; phone: +32 (0)9 264 59 76; fax: +32 (0)9 264 62 48; E-mail: Korneel.Rabaey@UGent.be; Webpage: www.cmet.UGent.be.

Download English Version:

<https://daneshyari.com/en/article/7066294>

Download Persian Version:

<https://daneshyari.com/article/7066294>

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