Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

ANAEROBIC DIGESTION EVALUATION OF SOURCE-SEGREGATED DOMESTIC FOOD WASTES

Nara Paula Schmeier, Luciana Paulo Gomes *, Maurício Gammertt Röhnelt, Alessandra Wirth, Gisele Catrine Silva da Silva, Luciano Flores da Rosa, Luis Alcides Schiavo Miranda, Marcelo Oliveira Caetano

Civil Engineering Graduate Program, Unisinos University. 950 Unisinos Ave, São Leopoldo, RS, Brazil. zip code: 93022-750

Abstract

Anaerobic digestion (AD) is considered worldwide an effective technology employed for organic solid waste treatment such as source-segregated domestic food, providing environmental impacts reduction through bioenergy and biofertilizer production. In this work, it was evaluated the effects of organic load rates on the performance of an anaerobic digestor. The biodigester operated for 340 days, under fed-batch mode 1 (daily feeding) and fed-batch mode 2 (weekly feeding, three times per week) with different organic load rates (OLR): 3.28, 4.10, 5.00, 7.80, 7.98 and 9.64 kg. TVS/m³. day. The AD was loaded with organic solid waste from a university restaurant and a previously acclimated inoculum. The results revealed the OLR of 4.10 TVS/m³. day has presented the highest biogas (94.63 NL/kg.TVS) and CH_4 (45.42 NL/kg.TVS) yields. In addition, it was observed higher biogas yield through fed-batch mode 2. Lastly, it was verified that high VFA/Alkalinity ratio, high VFA and ammoniacal nitrogen concentrations, foaming generation and absence of substrate pre-treatments influenced considerably biogas and methane yields.

Key words: anaerobic digestion, biogas, organic load rates, source-segregated domestic food waste

Received: March, 2021; Revised final: November, 2021; Accepted: January, 2022

* Author to whom all correspondence should be addressed: e-mail: lugomes@unisinos.br; Phone/Fax: (+55 51) 999767772