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Minimizing asynchronism to improve the performances of anaerobic co-digestion of food waste and corn stover

Qi Zhou^a, Fei Shen^{a,b}, Hairong Yuan^a, Dexun Zou^a, Yanping Liu^a, Baoning Zhu^a, Muhammad Jaffar^a, Akiber Chufo^a, Xiujin Li^{a*}

^aCentre for Resource and Environmental Research, Beijing University of Chemical Technology, No. 15 Beisanhuan East Road,

Chaoyang District, Beijing 100029, P. R. China

^bInstitute of Ecological and Environmental Sciences, Sichuan Agricultural University, Chengdu, Sichuan 611130, P. R. China

Abstract: To investigate the existence of the asynchronism during the anaerobic co-digestion of different substrates, two typical substrates of food waste and corn stover were anaerobically digested with altering organic loadings (OL). The results indicated that the biodegradability of food waste and corn stover was calculated to be 81.5% and 55.1%, respectively, which was main reason causing the asynchronism in the co-digestion. The asynchronism was minimized by NaOH-pretreatment for corn stover, which could improve the biodegradability by 36.6%. The co-digestion with pretreatment could increase the biomethane yield by 12.2%, 3.2% and 0.6% comparing with the co-digestion without pretreatment at C/N ratios of 20, 25 and 30 at OL of 35 g-VS/L, respectively. The results indicated that the digestibility synchronism of food waste and corn stover was improved through enhancing the accessibility and digestibility of corn stover. The biomethane production could be increased by minimizing the asynchronism of two substrates in co-digestion.

Keywords: Asynchronism minimization; Anaerobic co-digestion; Food waste; Corn stover

1. Introduction

Food waste mainly come from hotels, restaurants, and canteens of universities and enterprises, etc.. Food waste amount kept increasing over last decades due to the rapid growth of population in cities and fast economy development in China (Jie et al., 2012). Taking Beijing city as an example, approximately 1600 tons of food waste was collected daily in 2012. Currently, food waste either goes to animal farms as feedstock or to landfill in most cities. Serious health threat associated with food waste as animal feedstock has attracted great public attentions.

Food waste landfill has also caused serious environmental problems, such as increased leachate amount and

* Corresponding author. Addresses: No. 15 Beisanhuan East Road, Chaoyang District, Beijing, 100029, P. R. China. Tel/fax.: +86 10 64432281. E-mail addresses: xjlibuct@gmail.com or xjli@mail.buct.edu.cn.

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