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PII: S0960-8524(18)31143-X
DOI: https://doi.org/10.1016/j.biortech.2018.08.040
Reference: BITE 20323

To appear in: *Bioresource Technology*

Received Date: 4 July 2018
Revised Date: 10 August 2018
Accepted Date: 11 August 2018

Please cite this article as: Zhao, Y., Sun, F., Yu, J., Cai, Y., Luo, X., Cui, Z., Hu, Y., Wang, X., Co-digestion of oat straw and cow manure during anaerobic digestion: Stimulative and inhibitory effects on fermentation, *Bioresource Technology* (2018), doi: https://doi.org/10.1016/j.biortech.2018.08.040

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Co-digestion of oat straw and cow manure during anaerobic digestion: Stimulative and inhibitory effects on fermentation

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Abstract: Impacts of adding different amounts of cow manure (CM) on the anaerobic digestion (AD) of oat straw (OS) with total solids content (TS) values of 4%, 6%, 8% and 10% was assessed over 50 days using batch experiments. A modified Gompertz model was introduced to predict the methane yield and determine the kinetic parameters. The optimum addition was a 1:2 ratio of CM to the OS added, which resulted in a suitable C/N ratio of 27 and a higher degradation rate of lignocellulose. The best cumulative methane yield of 841.77 mL/g volatile solids added (VS_{added}) was 26.64% greater than that of digesting OS alone. In addition, the amount of CM added produced larger effects than that of changes in the TS. However, higher CM concentrations were found to be inhibitory. Clustering analysis could provide significant guidance for demonstrating project process and combining farming and animal husbandry.

Keywords: oat straw, cow manure, additives, methane yield

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