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ORGANIC ACID PRODUCTION FROM THE ORGANIC FRACTION OF MUNICIPAL SOLID WASTE AND COW MANURE IN LEACHING BED REACTORS

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Abstract

This study was carried out to (1) investigate the potential of in-vessel solid-state anaerobic acidogenic co-digestion of high solids containing substrates, namely organic fraction of municipal solid waste (OFMSW) and cow manure and (2) examine the feasibility of using leaching bed reactors (LBR) for hydrolysis/liquefaction and acidification of OFMSW and cow manure mixtures for maximum total volatile fatty acid (VFA) and alcohol production. Results indicated that hydrolysis efficiency of 20-25% of was achieved in the LBR containing 100 % OFMSW and 75 % OFMSW and 25% manure. The hydrolysis was mainly realized in the initial 20 days and the acid production was observed in the initial 25-30 day period. The maximum total VFA concentration (in terms of acetic acid) achieved was around 6500 mg/L. The main VFA were found as acetic acid and butyric acid, whereas the main alcohol produced was found as ethanol. The LBR were found as efficient reactors in terms of rapid hydrolysis and acidification of the feedstocks investigated. The produced VFA can be used as a raw material in many industrial sectors after concentration or as a feedstock for bioenergy (mainly biogas and biohydrogen) production.

Key words: anaerobic digestion, cow manure, leaching bed reactor (LBR), organic fraction of municipal solid waste (OFMSW), volatile fatty acids (VFA)

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