Kinerja proses pilot scale anaerobic digestion sampah makanan pada variasi intensitas pengadukan = Process performance pilot scale anaerobic digestion of food waste under various mixing intensities

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Abstrak

Pengadukan dalam Anaerobic Digestion AD dapat dikontrol untuk meningkatkan kinerja proses AD. Penelitian ini bertujuan untuk mengetahui pengaruh intensitas pengadukan terhadap kinerja proses AD, transfer panas di dalam digester dan untuk menganalisis kesetimbangan energi. Penelitian dilakukan menggunakan Continuous Stirred Tank Reactor CSTR dengan volume terisi 400 L yang beroperasi pada suhu rata-rata 27,8 1,07oC. Penelitian operasi skenario pertama dilakukan dengan input substrat sampah makanan dengan Organic Loading Rate OLR 10 kg VS/m3 selama 43 hari dan diaduk menggunakan variasi intensitas pengadukan 30 rpm dan 60 rpm selama 4 jam/hari untuk melihat kinerja proses AD. Operasi skenario kedua dilakukan menggunakan substrat sampah makanan dan kotoran sapi banding limbah Fat Oil and Grease FOG sebesar 10:1 dengan OLR 10 kg VS/m?3 dan dilakukan variasi pengadukan berkala 30 rpm, 15 menit/1,5 jam dan kontinu 30 rpm, 4 jam/hari untuk melihat tansfer panas dalam digester. Hasil penelitian operasi skenario pertama menunjukkan terdapat perbedaan yang signifikan pada kedua intensitas pengadukan.

<hr>Mixing in Anaerobic Digestion AD can be controlled to improve the performance of the AD process. This study aims to determine the effect of mixing intensity on the performance of the AD process, heat transfer in the digester and to analyze the energy balance. The study was conducted using a Continuous Stirred Tank Reactor CSTR with 400 L working volume which operates at an average temperature of 27,8 1,07 C. In the first scenario operation study, reactor was fed with food waste with Organic Loading Rate OLR 10 kg VS m3 for 43 days and mixed using variation of mixing intensity 30 rpm and 60 rpm for 4 hours day to see AD process performance. The second operation was carried out using food and cow dung with Fat Oil and Grease FOG waste ratio 10 1 and mixed intermittent 30 rpm, 15 min 1.5 hour and continuous 30 rpm, 4 hour day to see heat transfer in the digester. The results of the first scenario operation study showed that there was a significant difference in both mixing intensity p.