

EFFECT OF LCFA CONTENT IN THE CO- DIGESTION OF MANURE AND FOOD WASTE

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ABSTRACT

The influence of the lipid content in the mesophilic co-digestion of food waste with cow manure was evaluated. An oily waste was used to simulate the lipid content of food waste. Four reactors with four different concentrations of fat were run in parallel. An oily effluent was added in pulses to simulate different fat contents. The control reactor R1 received no additional fat and R2, R3 and R4 received an increasing input of oil on days 49, 56 and 84 which corresponded to 6, 25 and 36% of Fat COD/total COD in R2, 9, 38 and 46% Fat COD/total COD in R3 and 13, 51 and 55% Fat COD/total COD in R4.

The performance was evaluated through the measurement of methane production, effluent soluble chemical oxygen demand (COD), effluent volatile fatty acids, long chain fatty acids (LCFA), total and volatile solids removal.

Using single factor analysis of variances (ANOVA) no statistical differences were detected in the reactors performance, in terms of pulse response. The exception was the LCFA adsorbed onto the solid matrix. Hence, R1 only presents palmitic acid (C16:0) adsorbed onto the solid matrix and R2, R3 and R4 presents C16:0 along with stearic (C18:0). The values detected of these two acids were always lower than 25 gCOD/kgTS and no other significant differences were found between the four reactors performance. The added fat was in this case, apparently retained in the reactor in the form of floating yellowish aggregates. The results indicate that cow manure presents a good buffer capacity to overcome the different lipids input of the FW.

Keywords: Cow manure, anaerobic digestion, food waste, long chain fatty acids, biogas.

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