Influence of organic fraction of municipal solid waste particle size on biogas production

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Abstrak

The performance of anaerobic digestion (AD) to process organic fraction of municipal solid waste (OFMSW) can be improved with various pre-treatments. Mechanical pre-treatments, mainly chopping, have shown to be the most economical and relatively effective method to increase contact between the substrate and microorganisms. The purpose of this research was to analyze the effect of OFMSW particle size on CH4 gas formation in a laboratory-scale Biochemical Methane Potential (BMP) assay. The research was conducted for 35 days at a temperature of 35°C with three sizes of OFMSW co-digested with cow manure. OFMSW with particle sizes of 10-13 mm, 4.76-10 mm, and 2-4.76 mm produce CH4 gas with an average of 114.7+14.7 ml, 101.7+0.5 ml, and 110.9+10.8 ml, respectively, while methane yield was 0.277 L CH4/g VS, 0.208 L CH4/g VS, and 0.229 L CH4/g VS, respectively. Particle size is more likely to have an influence on the hydrolysis and acidogenesis processes, as demonstrated by the significant difference of VFA value, but not on the biogas potential. Particle sizes of 13-15 mm produce 19.25 mg VFA/L, while the size range of 2-4.76 mm produces 118.1 mg VFA/L.