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Semi-continuous anaerobic digestion of extruded OFMSW: Process performance and energetics evaluation

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Abstract

Recently, extrusion press treatment shows some promising advantages for effectively separating of organic fraction of municipal solid waste (OFMSW) from the mixed MSW, which is critical for their following high-efficiency treatment. In this study, an extruded OFMSW obtained from a demonstrated MSW treatment plant was characterized, and submitted to a series of semi-continuous anaerobic experiments to examine its biodegradability and process stability. The results indicated that the extruded OFMSW was a desirable substrate with a high biochemical methane potential (BMP), balanced nutrients and reliable stability. For increasing organic loading rates (OLRs), feeding higher VS (volatile solid) contents in feedstock was much better than shortening the hydraulic retention times (HRTs), while excessively high contents caused a low biodegradability due to the mass transfer limitation. For energetics evaluation, a high electricity output of 129.19-156.37 kWh/ ton raw MSW was obtained, which was further improved by co-digestion with food waste.

Key words: Extrusion pretreatment; OFMSW; Food waste; Trace metal; Anaerobic digestion.