Mechanical pretreatment of source-collected municipal biowaste prior to energy recovery by anaerobic digestion

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Abstract

Pretreatments are usually necessary to prepare biowaste for anaerobic digestion. In this study, two wet mechanical pretreatments, namely air-compressed press (PT#1) and worm screw press (PT#2), were investigated on urban household biowaste (HBW). Two Liquid to Solid ratios were tested in each pretreatment. Anaerobic digestion of pretreated biowaste was studied by measuring their biomethane potentials (BMP) and by controlled experiments in a Continuously Stirred-Tank Reactor (CSTR) with a feed load of 3.5 gVS.L<sup>−1</sup>.d<sup>−1</sup>. It was observed that increasing Liquid/Solid ratio in the pretreatments allowed to increase the proportion of biodegradable organic matter extracted from the biowaste, up to 949 gCOD.kg<sup>−1</sup>TS from HBW. The BMPs of pretreated waste were very high (up 525 LCH<sub>4</sub>.kg<sup>−1</sup>VS) and COD (949 gCOD.kg<sup>−1</sup>TS) from HBW. The anaerobic digestion process in CSTR was able to convert a high fraction of COD load (81%) and a high methane production up to 345 LCH<sub>4</sub>.gVS<sup>−1</sup>.

Keywords: pretreatment, press, anaerobic digestion, biowaste, biomethane potential.