

Effect of paper fraction on the mesophilic anaerobic digestion of OFMSW. Biogas and digestate evaluation.

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The effect of the percentage of paper fraction on the anaerobic digestion of Organic Fraction of Municipal Solid Waste (OFMSW) was evaluated in terms of biogas production and digestate stability. To reach this objective, the municipal waste from an anaerobic digestion plant was manually divided into 3 fractions: organic, paper and inert fraction. Two lab-scale semi-continuous anaerobic digesters were tested under mesophilic conditions and maintaining an HRT of 15 days: one reactor was fed only with organic fraction as a reference reactor (R1) and the other one (R2) was operated with 15 and 30% of paper in a wet weight basis. The feedstock of each reactor was grinded and mixed with the liquid fraction from the effluent of the anaerobic digestion plant to achieve a concentration of 5% TS. The digestate stability was evaluated with two different methods: The 5-day biochemical oxygen demand (BOD₅), done following the 5210D standard method procedure, and a batch anaerobic activity test.

The results showed that the behavior of both digesters was the same with the addition of paper except when the feedstock had a 30% of paper on it. In that case the specific methane production decreased a 15%, in comparison with the reference reactor. However, the digestate stability was better because the R1 digestate kept having more biodegradability potential than R2 digestate. The BOD₅ were 2.0 and 1.5 g O₂ · L⁻¹ and the production during the batch anaerobic activity tests were 196 and 163 ml CH₄ · g⁻¹ VS_{fed} for R1 and R2 respectively.