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Anaerobic digestion of organic fraction combinations from food waste, for an optimal dynamic release of biogas, using H2 as an indicator

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Abstract-

The objective of this study is to assess the effects of mixing the three elemental organic waste fractions (fruit and vegetable, meat, and fish) during anaerobic digestion. Batch experiments were carried out with fraction mixtures of different proportions. The results were compared, concerning the single digestion of each fraction, the gas generation, and the process performance, using H2 as an indicator. It was determined that the optimal mixture was the one with the fractions in equal proportion. This mixture achieved a balanced composition, a faster process by 58 %, and a 12 % increase in methane production. It was also determined that, as a rule, mixtures increase the hydrolysis speed and that the meat fraction mixtures manage to make this substrate suitable for anaerobic treatment by increasing the rate of hydrolysis by 148 % and buffering the acidification inhibition that suffers in its single digestion.

Index Terms- Food waste; Anaerobic co-digestion; Organic fraction; Organic composition; Methane; Hydrogen

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