

Development of Simple-To-Apply Biogas Kinetic Models for the Co-Digestion of Food Waste and Maize Husk

Authors : Owamah Hilary, O. C. Izinyon

Abstract : Many existing biogas kinetic models are difficult to apply to substrates they were not developed for, as they are substrate specific. Biodegradability kinetic (BIK) model and maximum biogas production potential and stability assessment (MBPPSA) model were therefore developed in this study for the anaerobic co-digestion of food waste and maize husk. Biodegradability constant (k) was estimated as 0.11d⁻¹ using the BIK model. The results of maximum biogas production potential (A) obtained using the MBPPSA model corresponded well with the results obtained using the popular but complex modified Gompertz model for digesters B-1, B-2, B-3, B-4, and B-5. The (If) value of MBPPSA model also showed that digesters B-3, B-4, and B-5 were stable, while B-1 and B-2 were unstable. Similar stability observation was also obtained using the modified Gompertz model. The MBPPSA model can therefore be used as alternative model for anaerobic digestion feasibility studies and plant design.

Keywords : biogas, inoculum, model development, stability assessment

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