

Enhanced Methane Yield by Codigestion of Sewage Sludge with Microalgae and Catering Waste Leachate

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ABSTRACT

The codigestion of different wastes is a promising concept to improve methane generation during anaerobic processes. However, the anaerobic codigestion of catering waste leachate with algal biomass and sewage sludge has not been studied to date. The present study investigated methane generation by the anaerobic codigestion of different mixtures of catering waste leachate, microalgal biomass, and sewage sludge. Codigestion of waste mixture containing equal ratios of three substrates had 39.31% higher methane yield than anaerobic digestion of raw sludge. This was possibly because of a proliferation of methanogens during the codigestion period, induced by multiphase digestion of different wastes with different degrees of digestibility. Therefore, codigestion of catering waste leachate, microalgal biomass, and sewage sludge appears to be an efficient technology for energy conversion from waste resources. The scientific application of this codigestion technology with these three substrates may play a role in solving important environmental issues of waste management.

Keywords: anaerobic codigestion; raw sludge; catering waste leachate; methane generation; microalgae