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Original Research Article

Experimental investigation and modeling of parameters affecting biogas production process from food waste by anaerobic digestion method

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ABSTRACT

Biogas production among other renewable energy sources is an economical and environmentally friendly way. Since high percentage of human food in the world is converted into food waste, one of the most suitable sources used as a feed for bio-gas production is food waste. One of the most important methods for producing biogas from organic waste is the use of anaerobic digesters. The factors affecting the production of biogas in anaerobic digestion machines are two general types of feed and its characteristics and the effect of process parameters on the amount of biogas production. In this paper, an anaerobic digestion machine was constructed and the effect of the parameters of the input feed type and operating parameters such as temperature and retention time on the operation of this process are examined by applying "Response Surface Methodology" (RSM) technique. Experimental results in this paper show that with increasing temperature and (C/N) and retention time, the amount of gas produced in anaerobic digesters increases. By increasing the temperature parameter to 45 °C and C/N to 40 in the remaining time of one month, the amount of biogas produced reaches 265 mL. RSM Model shows that (C/N) parameters has the greatest impact on the amount of biogas and T-square (T^2) term has the least impact on the amount of gas produced. In the following article, the function of the amount of gas produced based on the independent temperature and C/N parameters is expressed as a mathematical relation.

Keywords: Biogas, Anaerobic digester, Food waste, RSM model