

The Effect of Microwave Radiation on Biogas Production Efficiency Using Different Plant Substrates

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Abstract : The purpose of the present work was to assess the impact of using electromagnetic microwave radiation as a means of stimulating the thermal conditions in anaerobic reactors on biomethanation efficiency of different plant substrates, as measured by the quantity and quality of the resultant biogas. Using electromagnetic microwave radiation to maintain optimal thermal conditions during biomethanation allows for achievement of much higher technological effects in comparison with a conventional heating system. After subjecting different plant substrates to fermentation in the model fermentation chambers, the largest improvements in regard to biogas production efficiency and biogas quality were recorded in the series with corn silage and grass silage. In the first case, the quantity of methane produced in the microwave-stimulated technological system exceeded by 15.26% the quantities produced in reactors heated conventionally. When grass silage was utilized as the organic substrate in the process of biomethanation, anaerobic reactors treated with microwave radiation produced 12.62% more methane.

Keywords : microwave radiation, biogas, methane fermentation, biomass

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