

Methane Fermentation of Organic Waste with Different C/N Ratios

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There is interest in using methane fermentation to convert the non-edible parts of agricultural crops and the waste discharged from food processing into biogas. However, organic waste derived from agricultural crops is obtained seasonally and regionally, making it difficult to obtain raw materials consistently throughout the year. In addition, using the organic waste discharged from a single establishment may result in an inappropriate C/N ratio depending on the waste composition. Therefore, this study examined the methane gasification efficiency of organic waste with different C/N ratios.

For Methane fermentation of mixed organic waste with C/N ratio of 25, (1) the methane production was about 1.3 times higher than with a single organic waste with a C/N ratio of 52 and (2) the pH was stable at 6.5-7.3 throughout the experiment, which is within the optimum range of methane fermentation. Using the waste with a C/N ratio of 52, the pH fell to 5.9 and frequent pH adjustment by adding alkali was necessary to maintain continuous methane fermentation. (3) The concentration of volatile fatty acids decreased in the mixed organic waste with the C/N ratio of 25, while organic acid accumulated in the waste with a C/N ratio of 52.

Therefore, for stable, efficient methane fermentation of organic waste, it is desirable to mix organic waste and adjust the C/N ratio to 25. Instead of fermenting methane at one business site, it is better to ferment methane in a joint facility using waste from several businesses that produce different kinds of organic waste to be able to adjust the organic waste to an appropriate C/N ratio.