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## **Effects of Carrier on the Performance of a Methane Fermentation System Using Heat from a Hot Spring**

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A small-scale methane fermentation system was developed by hot spring water for warming the reactor. Materials were added directly into the first tank without grinding leftover food, including paper bags. The temperature of the fermentation tank was adjusted to ~55°C by running hot spring water through a tube coiled around the tank. To improve the methane production efficiency, methane production and volatile fatty acid (VFA) concentrations in two operations were compared by different carriers (polyurethane and carbon fiber) in the reactors.

Methane produced during the operation with carbon fiber carrier was higher than that with polyurethane carrier. Concentrations of total volatile fatty acid (T-VFA) in the operation with carbon fiber carrier were 1/10 as high as in the operation with polyurethane carrier. Propionic acid concentration decreased by the addition of carbon carriers in the reactor. Methanogenic communities attached to each carrier were analyzed by PCR-denaturing gradient gel electrophoresis (PCR-DGGE) analysis. Methanogenic communities were different between those two carriers.