

- 研究課題名 = 「Reaction mechanism analysis of recycling technology for organic wastes by anaerobic digestion」
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- 要旨 (200 語以内) = Basic fermentation experiments of lactate fermentation by *Bacillus coagulans* were performed to derive fundamental parameters of growth rate and inhibition effects. Microbial concentration was measured using both real-time polymerase chain reaction (PCR) and traditional methods. *B. coagulans* concentrations were suitably measured using real-time PCR. Three kinds of seed sludge were used for batch experiments under the same condition. When the sludge from a fermenter treating livestock and food waste was used, produced hydrogen quantity was the highest. A continuous thermophilic acid fermentation experiment was performed using kitchen garbage. Hydrogen fermentation occurred under the longer solids retention time (SRT) condition, and when SRT was set at shorter, lactate production increased. Simultaneously, microbial composition change from *Clostridium* spp. to *Bacillus coagulans* was observed. Applicability of real-time PCR quantification to monitor change in *B. coagulans* in kitchen garbage fermentation was verified. Competition between hydrogen producing bacteria and lactate producing bacteria was evaluated using batch experiments. A mathematical model including hydrogen and lactate producing bacteria and effect of inhibition was developed and it was verified with the experimental results. These results are useful for evaluating more complex acid fermentations.
- キーワード (5 語以内) = anaerobic digestion, lactate, hydrogen, real-time PCR, mathematical model