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Introduction

Marine products industry discharges large amounts of fish waste in Tohoku coastal area. Incineration is the general method of treating fish waste. But there is high energy loss because of the high water content of the waste. Fish waste can be used for anaerobic digestion because of its high chemical oxygen demand (COD). In general, fish waste is protein-rich substrates, and their degradation products (ammonium) can inhibit the process. Therefore, co-digestion assays of fish waste with active sludge were undertaken. Injections of active sludge lead to reduce protein concentration of raw materials. Additionally, the influence of oyster shell and carbon carrier for anaerobic digestion of fish waste was investigated. Main component of oyster shell is CaCO_3 . Calcium ion improved methane production and counteracted ammonia inhibition.

Methods

Continuous operations of mesophilic anaerobic digestion were conducted. Reactor volume was 400 ml. HRT was shorten by gradation (HRT 70d, 40d, 20d). Substrates contained active sludge and crushed fish waste. Fish content of substrate was 10% or 20%. 25 g of oyster shell and 63 cm^3 of carbon carrier were put into reactors.

Results and Discussions

In mesophilic anaerobic co-digestion of fish waste with active sludge, it was observed that oyster shell contracted the inhibition and improved methane production. The methane production increased in anaerobic digestion of fish waste with oyster shell by carbon carrier. When fish content of the substrate was 20% and HRT was 20 days, methane yield was about 0.5 in the continuous anaerobic digestion of fish waste with oyster shell. To clarify the mechanism of anaerobic digestion with oyster shell, further studies about the microbiological characterization are required.

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