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The Feasibility Study on Biodrying for Solid Refuse Fuel (SRF) of Municipal Sewage Sludge

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Extended Abstract

In Korea, the landfilling of sewage sludge directly was prohibited and London agreement which forbid ocean dumping was conducted at 2012. Thus, adequate treatment method about sewage sludge is required [1]. Meanwhile, waste treatment policy paradigm is changing quickly organic waste to recycling and fueling because of Activation of Clean Development Mechanism (CDM) Project under International Climate Change Convention. However, it spends higher operating costs and longer time to drying for recycling and fueling that organic waste which contains high moisture as sewage sludge [2]. In this study, aerobic microorganisms were applied as a pre-treatment to produce sewage sludge into a solid fuel, and the possibility of moisture contents reduction by exothermic reaction was evaluated [3]. 35L cylindrical acrylic reactor (Figure 1) was applied for aerobic pre-treatment test. Digested sewage sludge was collected at the Waste Water Treatment Plant (WWTP) located in Gangnam-gu, Seoul. For the aerobic reaction, 100 ml/min·kg air was injected by blower, at lower and middle part of the reactor and stirred by motor at the top of the reactor. The aerobic pre-treatment test were conducted for 14days in total, and the moisture contents were gradually decreased which was 79% at the initial operation. At the end of the operation, moisture contents were investigated 63% that was decreased amount of 16% than primary value. Especially, temperature of reactor was much higher at 6~9 days than other days, as a result moisture contents were decreased significantly. So that maintaining high temperature is a major objective in this research. Especially, the decrease of moisture content was observed to be significant over 6 ~ 8 days when the temperature in the reactor was relatively high, and it was confirmed that maintenance of the high temperature section was the most important purpose of the study. The initial lower heat values (LHV) of sewage sludge is 3,210 kcal/kg, at the end of the process, LHV was decreased to 2,833 kcal/kg. It because aerobic microorganisms degrade organic matter in sewage sludge (Figure 2). In this study, additional test were conducted by varying the amount of air injection which flow rate was 200 ml / min · kg, progressed at 400 ml / min · kg with 2 times and 4 times the initial test, as a result the moisture content which reactor with air injected 200 ml / min · kg was most dramatically reduced (Figure 3). Through this study, we confirmed effect of moisture content reduction in sewage sludge using aerobic pre-treatment.

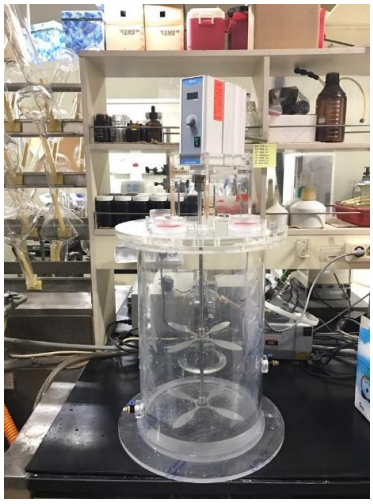

Fig. 1: 35L cylindrical acrylic reactor.

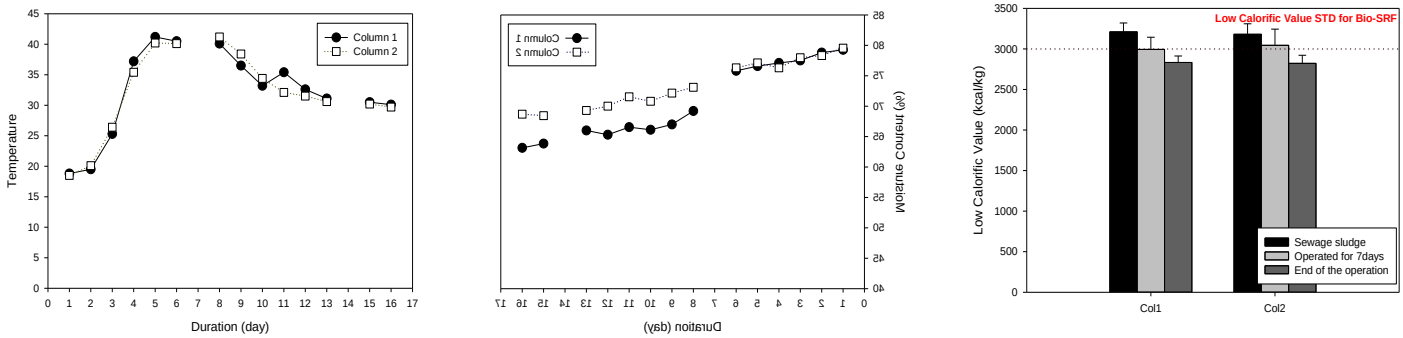

Fig. 2: Changes of temperature and moisture content during Bio-drying test.

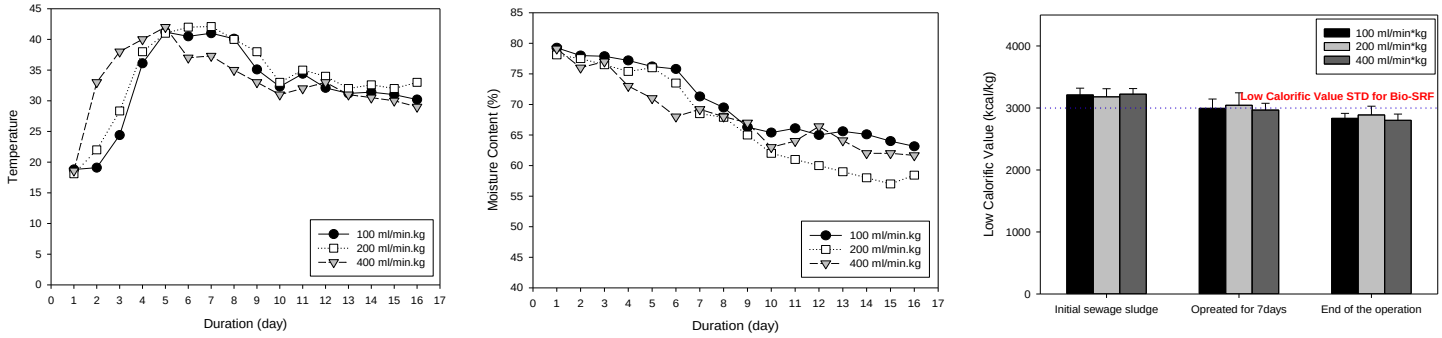

Fig. 3: Changes of temperature and moisture content related to aeration rate on Bio-drying test.

Acknowledgements

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