

Effect of feedstock carbon to nitrogen ratio and organic loading on foaming potential in mesophilic food waste anaerobic digestion

Abstract

Foaming problem which occurred occasionally during food waste (FW) anaerobic digestion (AD) was investigated with the Malaysian FW by stepwise increase in organic loading (OL) from 0.5 to 7.5 g VS/L. The FW feedstock with carbon to nitrogen (C/N) ratio of 17 was upgraded to C/N ratio of 26 and 30 by mixing with other wastes. The digestion which was carried out at 37 °C in 1-L batch reactors showed that foam formation initiated at OL of 1.5 g VS/L and was further enhanced as OL of feedstock was increased. The digestion foaming reached its maximum at OL of 5.5 g VS/L and did not increase further even when OL was increased to 7.5 g VS/Ld. Increase in the C/N ratio of feedstock significantly enhanced the microbial degradation activity, leading to better removal of foam causing intermediates and reduced foaming in the reactor by up to 60 %.

Keyword: Organic loading; Anaerobic digestion; Foaming; Carbon to nitrogen ratio; Biogas methane