

Volatile Fatty Acids Production from Different Composition of Food Waste and Its Effect on Phosphorus Recovery

ABSTRACT

Food waste is reported to be high in phosphorus content that can be solubilised during anaerobic digestion, hence enhancing phosphate release in the digested liquor. One of the important intermediate products during anaerobic digestion is volatile fatty acid that may influence the phosphorus release. There are limited studies were found in investigating the effect of volatile fatty acids on phosphorus recovery. Therefore, this study aims to study the effect of volatile fatty acids, specifically acetic acids on phosphorus recovery from different composition of food waste. In this study, food waste which segregated into three different composition, namely, protein-rich food waste, fibre-rich food waste and carbohydrate-rich food waste were used as substrates in anaerobic digestion to allow phosphorus to be solubilised for 15 days, in controlled temperature (37oC) and pH (6.8-7.2). The volatile fatty acids, pH and total phosphorus concentration of each composition were analysed once in every three days. The results show that phosphorus recovery was significantly affected by the volatile fatty acids concentration. The highest phosphorus recovery was achieved from protein-rich food waste, followed by fibre-rich food waste and carbohydrate-rich food waste, with phosphorus concentrations of 614 mg/L, 466 mg/L and 478 mg/L, when the volatile fatty acids were 21090 mg/L, 8550 mg/L and 9690 mg/L, respectively. It was also found the optimum time to recover phosphorus was differ for each food waste composition. For high solid content of carbohydrate rich food waste, the time needed to digest was longer compared to protein rich and fibre richfood waste