

Anaerobic digestion of screenings for biogas recovery

Abstract

Screenings comprise untreatable solid materials that have found their way into the sewer. They are removed during preliminary treatment at the inlet work of any wastewater treatment process using a unit operation termed as a screen and at present are disposed of to landfill. These materials, if not removed, will damage mechanical equipment due to its heterogeneity and reduce overall treatment process, reliability and effectiveness. That is why this material is retained and prevented from entering the treatment system before finally being disposed of. The amount of biodegradable organic matter in screenings often exceeds the upper limit and emits a significant amount of greenhouse gases during biodegradation on landfill. Nutrient release can cause a serious problem of eutrophication phenomena in receiving waters and a deterioration of water quality. Disposal of screenings on landfill also can cause odour problem due to putrescible nature of some of the solid material. In view of the high organic content of screenings, anaerobic digestion method may not only offer the potential for energy recovery but also nutrient. In this study, the anaerobic digestion was performed for 30 days, at controlled pH and temperature, using different dry solids concentrations of screenings to study the potential of biogas recovery in the form of methane. It was found screenings have physical characteristics of 30% total solids and 93% volatile solids, suggesting screenings are a type of waste with high dry solids and organic contents. Consistent pH around pH 6.22 indicates anaerobic digestion of screenings needs minimum pH correction. The biomethane potential tests demonstrated screenings were amenable to anaerobic digestion with methane yield of 355 m³/kg VS, which is comparable to the previous results. This study shows that anaerobic digestion is not only beneficial for waste treatment but also to turn waste into useful resources.