The Effect of Mechanical Pretreatment of Municipal Solid Waste on its Potential in Gas Production – Andrzej Białowiec, Katarzyna Bernat, Irena Wojnowska-Baryła, Marek Agopsowicz

Summary

The impact of mechanical pre-treatment of municipal solid waste (MSW) on its biogas production potential was examined. Mechanical separation allowed the following size-fractions to be obtained: fine fraction – mineral fraction of municipal solid waste (MFMSW) (Φ < 20 mm), middle fraction – organic fraction of municipal solid waste (OFMSW) (20 mm < Φ < 80 mm), and coarse fraction (Φ > 80 mm). The most suitable fraction for biological treatment was OFMSW, containing about 76% of high rate biodegradable organic fraction (HRBOF). The rate constant of degradation for organic compounds in OFMSW was 0.23 d^{-1}. It was shown that total gas production (TGP) during 10 years may achieve 550 m^3/Mg OFMSW. Mechanical pre-treatment may allow an 45% decrease of the amount of landfilled MSW resulting in a reduction of greenhouse gas emissions of up to 70 m^3/Mg over 10 years of landfilling (in contrast to MSW landfilling – 213 m^3/Mg). The experimental results revealed that gas production potential should be determined on the basis of HRBOF content and measurements of the biogas production.