

Title INFLUENCE OF PARTICLE SIZE AND TOTAL SOLIDS
ON BIOGAS PRODUCTION

Author Regina Kulugomba

Advisor Sahataya Thongsan, Ph.D

Co-Advisor Assistant Professor Sarayouth Viviudth, Ph.D.

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ABSTRACT

The study was conducted with the aims of assessing the influence of particle sizes and total solids of food waste on biogas production and their implications on economic evaluation. The physical and chemical compositions of food waste were analyzed. The anaerobic digestion tests on the influence of particle size and total solid on biogas production were conducted. NPV, BCR and PBP were the economic indicators used in this study. The physical composition analysis results indicated that food wastes contained high biodegradable materials such as noodle, rice, and meat hence making them suitable substrates for biogas production. Further, the analysis of chemical composition revealed that the waste had more carbon oxygen demand (COD), biological oxygen demand (BOD) and moisture content (MC) of 278,388 mg/kg, 103,889 mg/kg and 77.1% respectively. This indicates that the waste can be used for biogas production. The anaerobic test results on the influence of particle size on biogas production indicated that food wastes that were made into smaller particles produced more volume of biogas (400 mL/day) than those that were not ground (210 mL/day). The results of the influence of total solid on biogas production indicated that TS₁₅ (360 mL) produced the highest volume of biogas than TS₅ (150 mL), TS₁₀ (290 mL) and TS₂₀ (225 mL). For both tests, there was no huge variation in methane concentration. Project A that included production of biogas using ground food waste by an electric blender had the highest NPV, BCR and shortest PBP of 9,351,503 Baht, 2.09 and 8.00 yrs respectively. Producing biogas from non ground waste was found to be non economical.