ASSESSMENT OF POTENTIAL BIOGAS PRODUCTION FROM PUBLIC MARKET WASTES OF AMADEO, CAVITE

Undergraduate Thesis
Submitted to the Faculty of the
College of Engineering and Information Technology
Cavite State University
Indang, Cavite

In partial fulfillment
of the requirements for the degree
Bachelor of Science in Agricultural Engineering

MEL EHRENZ M. DELA REA
April 2016

ABSTRACT

DELA REA, MEL EHRENZ M. Assessment of Potential Biogas Production from Public Market Wastes of Amadeo, Cavite. Undergraduate Thesis. Bachelor of Science in Agricultural Engineering. Cavite State University, Indang, Cavite. April 2016. Adviser: Dr. David L. Cero.

The study was conducted from September 2015 to February 2016 to assess the potential biogas production from public market wastes of Amadeo, Cavite. Specifically, the study aimed to: quantify the amount of biodegradable wastes generated from the public market in terms of volume and weight; determine the quantity of gas produced from the public market wastes; and design a suitable biogas plant for Amadeo Public Market.

The generated wastes from the market were quantified according to type (vegetable and fruit wastes, fish entrails, condemned meat and offal) for five consecutive weeks, each week having two market days (Thursday and Sunday). After quantification, a setup for biogas production composed of four treatments with varying frequencies of agitation was made. Each treatment had three replications in which 1:1 ratio (waste – water) was used and where the proportion of the wastes in every setup depended on the results of the quantification. The daily volume of gas produced was determined using displacement method. The square type DSAC Model Biogas Plant was designed for the market.

Among the market wastes, fruit and vegetable wastes has the largest quantity with 109.05 kg percent of the total wastes in terms of weight, followed by fish entrails with 67.60 kg, and condemned meat and offal with a mean of 7.90 kg per market day. In terms of volume, fruit and vegetable wastes accounted 0.192 m^3, followed by fish entrails and condemned meat and offal with 0.066 m^3 and 0.011 m^3, respectively. The largest amount of biogas was obtained in the treatment where alternate agitation was done with a mean

total of 24,375 mL for 68 days, followed by the treatment where alternate agitation was done with 21,386.67 mL for 62 days, weekly agitation with 21,046.66 mL for 58 days, and no agitation with 18,237.50 mL of biogas produced for 59 days. The potential biogas production of the wastes was 3,931.45 mL for every kilogram of market wastes. A square type DSAC Model Biogas Plant with a volume of 7 m^3 was designed. Supplementary designs were made with a digester volume of 10 m^3 and 15 m^3 to facilitate the future fluctuations of waste generation in the public market.