ABSTRACT

The characteristic of biodiesel are liquid, yellowish, and a density of 0.887 kg/m³. This biodiesel plant uses transesterification process through foolproof method with a capacity of 34056 kg methyl ester/day. This plant located in Sumedang, West Java, is chosen based on raw material, water availability, and the ease of transportation.

Biodiesel production process consists of 3 stages, which are esterification, transesterification and purification. In the stage of esterification, the FFA in the sunan candlenut oil is reacted to the methanol as volume ratio of 1:10 by using H₂SO₄ as catalyst with batch process at 60°C and 1 atm. In the stage of transesterification, the triglycerides and the rest of FFA is reacted to methanol as volume ratio of 1:6 by using NaOH as catalyst with a batch process at 60°C and 1 atm. In the stage of purification, the methyl esters is washed by using water process at 95°C then the moisture content is evaporated to reduce water content into 0.05% volume.

This plant is projected to operate by using batch process for 24 hours/day and 330 days/year. This plant requires 102717.127 kg of sunan candlenut oil a day and methanol, sulfuric acid, NaOH as the supporting materials. The water utilities required for sanitation water, make-up boiler water, process water, make-up water, and cooling water, are 34,13 m³/day, 2573,8661 m³/day, 20,73 m³/day, 2491,071 m³/day and 293,371 m³/day respectively.

Key word: Sunan candlenut oil, esterification, and transesterification.