BIODIESEL PLANT FROM ALGAE NANNOCHLOROPsis SP.OIL THROUGH A TRANSESTERIFICATION PROCESS USING ALKALINE CATALYSTS

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ABSTRACT

Biodiesel is an alternative fuel made from algae Nannochloropsis sp.oil through a transesterification process using alkaline catalysts. Biodiesel plant is located in Probolinggo, East Java and operate semi-continue for 24 hours/day and 330 operating days/ year. The resulting production capacity of 20,000 tons/year or 62,500 kg/day.

The process of making biodiesel involves three stages. The first is the neutralization of algae oil with 4N NaOH to remove the FFA, and then put in a centrifuge to remove the glycerin and soap. Furthermore, oil is separated from water using a vacuum dryer. The second stage is the process of transesterification of algae oil in the reactor at a temperature of 65 °C, a pressure of 1 atm for the reaction of TGS and methanol with a ratio of 6:1 to produces methyl ester (biodiesel) and glycerol. Then the methyl ester is washed in wash coloumn, then refined to biodiesel content of 99.5%. Finally, biodiesel is stored in the storage tank.

To achieve the required production capacity of algae oil feedstock as much as 15,625 kg/day. Materials used are methanol: 8729.632 kg/day; NaOH: 270.52 kg/day; NaOCH₃ catalyst: 3634.25 kg/day. Water needs on a biodiesel plant sanitation include water, boiler feed water, process water, cooling water and amounted to 26.11 m³/day; 4886.93 m³/day; 10.48 m³/day, and 108.56 m³/day.

Key words : algae nannochloropsis sp., Biodiesel, transesterification