

ABSTRAK

Telah dirancang pabrik biodiesel dengan kapasitas 100.000 ton/tahun dengan bahan baku minyak nyamplung. Pabrik direncanakan didirikan di Cilacap, Jawa Tengah karena telah tersedia sarana penunjang yang baik. Pabrik direncanakan menempati tanah seluas 8.525 m² dengan jumlah 205 karyawan. Reaktor yang digunakan adalah reaktor alir tangka berpengaduk, dengan kondisi operasi : temperatur 60°C dan tekanan 1 atm. Reaksi berlangsung pada fase cair, bersifat endotermis dan irrevesible. Proses pembuatan biodiesel berlangsung pada 3 tahap, yaitu : tahap penyiapan bahan baku, tahap reaksi dan tahap pemurnian produk. Kebutuhan utilitas adalah sebagai berikut : air secara kontinu sebanyak 31.195 kg/jam dan kebutuhan listrik sebanyak 436 kW. Bahan bakar solar yang dibutuhkan sebanyak 1.200 kg/jam. Pabrik dengan total penjualan Rp 870.469.484.479 dengan biaya tetap Rp 420.018.830.462. Dari analisis ekonomi diperoleh keuntungan sebelum pajak Rp 148.590.663.600 dan keuntungan setelah pajak Rp 74.295.331.800. Berdasarkan analisa kelayakan diperoleh Break Event Point (BEP) 45,19%, Shut Down Point (SDP) 25.04%, dan Discounted Cash Flow Rate (DCFR) 13.78%. Sementara itu,, Return on Investment sebelum pajak (ROIb) sebesar 35.38% dan Return on Investment sesudah pajak (ROIa) sebesar 17.69%. Pay Out Time sebelum pajak (POTb) sebesar 2,2 tahun dan Pay Out Time setelah pajak (POTa) sebesar 3,61 tahun. Berdasarkan hasil evaluasi ekonomi dapat disimpulkan bahwa perancangan pabrik biodiesel dari minyak nyamplung dengan kapasitas 100.000 ton/tahun ini layak untuk didirikan.

Kata-kata kunci : Biodiesel, Minyak Nyamplung, Reaktor Alir Tangki Berpengaduk.

ABSTRACT

Biodiesel plant has been designed with a capacity of 1000,000 tons/year with raw material of nyamplung oil. The plant is planned to be set up in Cilacap, Central Java with an area of 8,525 m² with the total of 205 employees and due to the availability of good supporting facilities. Continuous Stirred Tank Reactor is the reactor that will be used, with operating conditions: 60°C and 1 atm. The process of making biodiesel takes in 3 stages, namely: the stage of preparing raw materials, the reaction stage and the product purification stage. Utility requirements are as follows: 31,195 kg/hour of continuous water and for electricity is 436 kWh. The fuel needed is 1,200 kg/hour of diesel fuel. The plant with total sales of Rp 870.469.484.479 with a fixed cost of Rp 420.018.830.462. Profit before tax are Rp 148.590.663.600 and profit after tax are Rp 74.295.331.800. Based on the feasibility analysis obtained 45,19% of (BEP) Break Event Point, 25,04% of Shut Down Point (SDP) and 13,78% of Discounted Cash Flow Rate. Meanwhile, Return on Investment before tax (ROI_b) are 35,38% and Return on Investment after tax (ROI_a) are 17,69%, Pay Out Time before tax (POT_b) are 2,2 years, and Pay Out Time after tax (POT_a) are 3,61 years Based on the results of the economic evaluation can be concluded that the design of the plant of Acetid Acid from N-Butane with a capacity 100,000 tons/year is feasible to be established.

Keywords :Biodiesel, Nyamplung Oil, Continuous Stirred Tank Reactor