ABSTRAK

Isopropil laurat merupakan senyawa ester yang banyak dimanfaatkan sebagai bahan aditif dalam produk farmasi dan kosmetik, karena memiliki sifat emolien dan *spreadability* yang baik. Senyawa ini umumnya diperoleh melalui reaksi antara isopropil alkohol dan asam laurat. Asam laurat, yang termasuk dalam golongan asam lemak bebas, banyak terkandung dalam minyak nabati, salah satunya minyak kelapa.

Pabrik isopropil laurat menggunakan bahan baku utama minyak kelapa, yang memiliki kandungan asam laurat sebesar 45–53%. Pemilihan minyak kelapa didasarkan pada ketersediaannya yang melimpah di Indonesia, sehingga mendukung pemanfaatan potensi sumber daya lokal. Proses produksi yang digunakan terdiri dari empat tahap utama, yaitu: hidrolisis minyak kelapa untuk menghasilkan asam lemak dan gliserol, distilasi campuran asam lemak untuk memperoleh fraksi tinggi asam laurat, reaksi esterifikasi antara asam laurat dan isopropil alkohol, serta pemurnian produk isopropil laurat melalui distilasi. Seluruh reaksi, baik hidrolisis maupun esterifikasi, dilakukan secara enzimatis untuk menjaga keberlanjutan proses dan meminimalkan dampak lingkungan.

Pabrik dirancang dengan kapasitas produksi 15.000 ton isopropil laurat per tahun, menghasilkan produk dengan kemurnian 99% serta produk samping berupa gliserol dan campuran asam lemak. Kebutuhan utilitas meliputi air payau sebanyak 5.013,27 kg/jam yang diambil dari Sungai Kali Mireng, udara instrumen sebesar 1.739,58 kg/jam, bahan bakar *Low Sulfur Fuel Oil* (LSFO) sebanyak 60,24 kg/jam, dan listrik sebesar 183,97 kW yang disuplai oleh PLN. Pabrik akan dibangun di kawasan industri *Java Integrated and Industrial Port Estate* (JIIPE), Kecamatan Manyar, Kabupaten Gresik, Jawa Timur, dengan luas lahan sebesar 28.500 m² dan melibatkan 280 tenaga kerja.

Berdasarkan analisis ekonomi, pabrik ini memerlukan *fixed capital* sebesar $27.756.390,79 + Rp208.596.110.540,60 dan *working capital* sebesar $67.192.528,91 + Rp6.760.446.319,75. Total *manufacturing cost* mencapai $271.189.213,15 + Rp53.435.863.126,16. Hasil analisis profitabilitas menunjukkan *Return on Investment* (ROI) sebelum pajak sebesar 50,79%, *Pay Out Time* (POT) selama 1,65 tahun, dan *Discounted Cash Flow Rate of Return* (DCFRR) sebesar 22,97%. Nilai *Break Even Point* (BEP) sebesar 40,53% dan *Shut Down Point* (SDP) sebesar 31,62%. Berdasarkan perhitungan tersebut, dapat disimpulkan bahwa pendirian pabrik isopropil laurat dari minyak kelapa dengan kapasitas 15.000 ton/tahun layak dan menarik untuk dikaji lebih lanjut.

Kata kunci: isopropil laurat, asam laurat, minyak kelapa

ABSTRACT

Isopropyl laurate is an ester widely used as an additive in pharmaceutical and cosmetic products due to its excellent moisturizing properties and good spreadability. It is typically produced through the esterification of isopropyl alcohol and lauric acid. Lauric acid, a type of free fatty acid, is abundantly found in various vegetable oils, particularly coconut oil.

Isopropyl laurate production plant utilizes coconut oil as the primary raw material. Coconut oil is chosen due to its high lauric acid content (45–53%) and its abundant availability in Indonesia, which supports the development of locally sourced downstream products. The production process consists of four main stages: hydrolysis of coconut oil to produce fatty acids and glycerol; distillation of the fatty acid mixture to obtain a high purity lauric acid fraction; esterification of lauric acid with isopropyl alcohol; and final product purification through distillation. Both the hydrolysis and esterification reactions are carried out enzymatically to ensure environmentally friendly processing.

The plant is designed with a production capacity of 15,000 tons per year, yielding isopropyl laurate with 99% purity, along with by-products including glycerol and a mixture of fatty acids. Utility requirements include brackish water sourced from Kali Mireng River at 5.013,27 kg/h, instrument air at 1.739,58 kg/h, Low Sulfur Fuel Oil (LSFO) for boiler fuel at 60,24 kg/h, and electricity supplied by PLN at 183,97 kW. The plant will be located in the Java Integrated and Industrial Port Estate (JIIPE), Manyar District, Gresik Regency, East Java, covering a land area of 28,500 m² and employing 280 workers.

Economic analysis indicates a fixed capital investment of $27,756,390.79 + Rp208,596,110,540.60 and working capital of $67,192,528.91 + Rp6,760,446,319.75. The total manufacturing cost is $271,189,213.15 + Rp53,435,863,126.16. Profitability assessment yields a pre-tax Return on Investment (ROI) of 50.79%, a Pay Out Time (POT) of 1.65 years, and a Discounted Cash Flow Rate of Return (DCFRR) of 22.97%. Additional analyses show a Break Even Point (BEP) of 40.53% and a Shut Down Point (SDP) of 31.62%. Based on these economic indicators, the isopropyl laurate plant from coconut oil with a capacity of 15,000 tons/year is considered feasible and promising for further development.

Keyword: isopropyl laurate, lauric acid, coconut oil