

INTISARI

Industri pangan merupakan salah satu industri yang berkembang pesat di Indonesia. Salah satu produk yang selalu dibutuhkan adalah margarin. Margarin digunakan sebagai penambah cita rasa dalam memanggang kue, menumis makanan, dan sebagai olesan roti.

Pabrik Margarin dari *Palm Oil* – Minyak Sawit ini dirancang dengan kapasitas 45,000 ton/tahun dan beroperasi secara kontinyu selama 330 hari/tahun dan 24 jam/hari. Proses produksi menggunakan bahan baku utama *Refined, Bleached, Deodorized Palm Oil* (RBDPO) sebanyak 45.000 ton/tahun dan *Coconut Oil* sebanyak 5.400 ton/tahun sebagai bahan pendukung utama.

Proses yang dilakukan pada pabrik ini adalah interesterifikasi enzimatis. Tahap pertama adalah persiapan bahan baku, di mana RBDPO mengalami fraksinasi menjadi Palm Stearin (RBDPS) yang akan digunakan sebagai reaktan dan Palm Olein (RBDPOL) yang menjadi hasil samping. Kemudian tahap proses, di mana Palm Stearin, RBDPO dan *coconut oil* dengan komposisi 40:45:15 persen berat direaksikan dengan bantuan katalis enzim Lipozyme TL IM dalam *fixed bed reactor* R-01 pada 1 atm dan 70°C. Tahap terakhir adalah pengolahan produk dengan menambahkan bahan-bahan penunjang, yaitu bumbu fasa minyak (lecithin, vitamin A, beta karoten) dan fasa air (garam, natrium benzoat, susu skim, air), kemudian didinginkan dengan votator VOT-01 dan VOT-02 hingga dihasilkan margarin padat yang disimpan pada suhu 16°C.

Pabrik ini direncanakan akan didirikan di Pesawaran, Lampung di lahan seluas 12,8 ha dan memperkerjakan 181 orang karyawan. Kebutuhan utilitas untuk menjalankan pabrik ini meliputi kebutuhan listrik sebesar 1039,9719 kW/tahun, kebutuhan air *make up* sebanyak 7814,9162 kg/jam, steam jenuh sebesar 651,2796 kg/jam, bahan bakar gas alam sebesar 19,9657 kg/jam, refrigeran sebesar 1834,3266 kg/jam dan udara instrumen sebanyak 385 m³/jam.

Pabrik margarin ini memiliki modal tetap sebesar \$19.258.509,94 + Rp206.124.784.827,15 dan modal kerja sebesar \$17.481.026,85 + Rp9.928.816.822,64, dengan biaya produksi \$60.991.408,15. Berdasarkan evaluasi ekonomi, pabrik ini tergolong *high risk* dengan ROI *before tax* 47,36%, ROI *after tax* 23,68%, POT *before tax* 1,74 tahun, POT *after tax* 2,97 tahun, BEP 31,58%, SDP 12,40% dan DCFRR 21,91%. Berdasarkan uraian di atas, dapat disimpulkan bahwa pabrik ini layak dan menarik untuk dikaji lebih lanjut.

Kata kunci: Interesterifikasi, RBDPO, *Palm Stearin*, *Coconut Oil*, Margarin



ABSTRACT

Food industry is one of the fastest growing industries in Indonesia. This industry produces many kinds of food material that is always needed, one of them is margarine. Margarine is commonly used to enhance flavor in baking and cooking.

This margarine plant from palm oil is designed with production capacity of 45.000 ton/year and operates continuously for 330 days/year and 24 hours/day. The raw material used are Refined, Bleached, Deodorized Palm Oil (RBDPO) as much as 45.000 ton/year and coconut oil as much as 5.400 ton/year.

The process used in margarine production in this plant is interesterification. The first step is to prepare the RBDPO where it is fractionated to be Palm Stearin (RBDPS) as the material and Palm Olein (RBDPOL) as the side product. Second step is the production of margarine oil, where 40:45:15 %weight of Palm Stearin, RBDPO and coconut oil is reacted in a fixed bed reactor at 70°C and 1 atm with the help of Lipozyme TL IM catalyst. The last step is the finishing of margarine product, where lecithin, vitamin A, beta carotene, salt, water, natrium benzoate, and skim milk are added to margarine oil, and the mixture is cooled using votator VOT-01 and VOT-02 until solid margarine is produced and then stored in 16°C.

This plant is planned to be built in Pesawaran, Lampung on a 12,8-hectare land area with 181 employees. Utility needed consists of electricity as much as 1039,9719 kW/year, make up water as much as 7814,9162 kg/hour, saturated steam as much as 651,2796 kg/hour, natural gas as much as 19,9657 kg/hour, refrigerant as much as 1834,3266 kg/hour and instrument air as much as 385 m³/hour.

To start production, this margarine plant requires a Fixed Capital Investment of \$19.258.509,94 + Rp206.124.784.827,15 and Working Capital of \$17.481.026,85 + Rp9.928.816.822,64. This plant is classified as high risk with ROI before tax 47,36%, ROI after tax 23,68%, POT before tax 1,74 years, POT after tax 2,97 years, BEP 31,58%, SDP 12,40% and DCFRR 21,91%. Based on the economic evaluation, it can be concluded that margarine plant from palm oil with capacity of 45.000 tons/year is feasible to be further studied.

Keywords: *Intesterification, RBDPO, Palm Stearin, Coconut Oil, Margarine*