

INTISARI

Asam salisilat sintesis dibuat menggunakan proses Kolbe-Schmitt. Bahan baku utama pembuatan asam salisilat adalah fenol sebanyak 4.596,7 ton/tahun dan karbon dioksida sebanyak 3.859,8 ton/tahun dan bahan baku pendukung adalah NaOH 50% sebanyak 1.917 ton/tahun, dan asam sulfat 60% sebanyak 2.927,5 ton/tahun. Larutan NaOH direaksikan dengan fenol di dalam reaktor (R-01) menghasilkan *sodium phenolate*, fenol, dan air. Gas CO₂ dengan suhu 190°C dan tekanan 5 bar direaksikan dengan sodium fenolat dalam reaktor *fluidized bed* (R-02). *Sodium salicylate* keluaran R-02 direaksikan dengan asam sulfat 60% di dalam reaktor (R-03). Tahap selanjutnya adalah pemurnian sehingga diperoleh asam salisilat dengan kemurnian 99,5% (basis kering) sebanyak 5.000 ton/tahun.

Pabrik ini akan dibangun di Kota Cilegon, Provinsi Banten, Jawa dengan luas area 10.000 m². Total karyawan yang dibutuhkan adalah 182 orang. Kebutuhan energi meliputi kebutuhan listrik sebanyak 2.405.500,75 kWh/tahun dipenuhi menggunakan listrik dari PLN dan sebagai cadangan menggunakan generator dengan bahan bakar berupa *spindle oil* sebanyak 107,11 kg/jam. Sedangkan kebutuhan air untuk utilitas adalah sebanyak 36.441,48 kg/jam dan udara instrumen 150 m³/jam.

Pabrik ini membutuhkan modal tetap sebanyak US\$ 5.832.287,52 + Rp 40.529.231.664,14 dan modal kerja sebanyak US\$ 16.404.396,41 + Rp 1.823.357.245,45. Pabrik dirancang untuk setiap tahunnya memperoleh *sales* sebanyak US\$ 66.326.532,44 dengan *manufacturing cost* sebesar US\$ 51.875.313,04 + Rp 10.744.783.767,83 dan *general expenses* sebesar US\$ 7.974.524,67 + Rp 5.082.310.669,15. Keuntungan sebelum pajak sebesar Rp 70.708.023.939,03 dan keuntungan sesudah pajak Rp 35.354.011.969,51. Nilai BEP = 42,00%, SDP = 30,47%, ROI sebelum pajak = 59,69% dan ROI setelah pajak = 29,85%. POT sebelum pajak = 1,46 tahun dan POT setelah pajak = 2,58 tahun. DCFRR = 24,56%. Dari hasil evaluasi yang dilakukan, pabrik ini secara teknis dan ekonomi menarik untuk dibangun.

Kata kunci: asam salisilat, Kolbe-Schmitt, fenol.

ABSTRACT

Salicylic acid synthesized through Kolbe-Schmitt process. The main raw materials are phenol as much as 4,596,7 tons/ year and carbon dioxide as much as 3,859,8 tons/year and supporting materials are 50% NaOH as much as 1,917 tons/ year and 60% sulfuric acid as much as 2,927,5 tons/ year. Phenol is reacted with NaOH solution in reactor (R-01) to produce sodium phenolate, phenol, and water. Carbon dioxide (190°C and 5 bar) is reacted with sodium phenolate in a fluidized bed reactor (R-02). Sodium salicylate R-02 is reacted with 60% sulfuric acid in the reactor (R-03). Purification is needed to obtain salicylic acid with a purity of 99.5% (dry base) of 5,000 tons / year.

This plant will be built in Cilegon, Banten, Java with estimated area of 10,000 m². The total required employees are 182 employees. Energy requirement covers electricity need as much as 2,405,500.75 kWh/yr filled with electricity from PLN and a generator as back up power supply with spindle oil as much as 107.11 kg/hour. While the water requirement for utility is as much as 36.441,48 kg/hour and air instrument that requires as much as 150 m³/hour.

The factory requires fixed capital as much as US\$ 5,832,287.52 + Rp 40,529,231,664.14 and working capital as much as US\$ 16,404,396.41 + Rp 1,823,357,245.45. The factory is designed to annually earn as much as US\$ 66,326,532.44 with manufacturing cost as much as US\$ 51,875,313.04 + Rp 10,744,783,767.83 and general expenses as much as US\$ 7,974,524.67 + Rp 5,082,310,669.15. Profit before tax as much as Rp 70,708,023,939.03 and profit after tax as much as Rp 35,354,011,969.51. The value of BEP = 42,00%, SDP = 30.47%, ROI before tax = 59.69%, ROI after tax = 19.85%, POT before tax = 1.46 years and POT after tax = 2.58 years. DCFRR = 24.56%. From the results of the evaluation, the factory is technically and economically attractive to be built.

Keywords: salicylic acid, Kolbe-Schmitt, phenol.