

## ABSTRAK

Aluminium Sulfat atau  $Al_2(SO_4)_3$  merupakan senyawa kimia anorganik yang larut dalam air dan biasanya digunakan sebagai bahan flokulasi dalam industri pemurnian air minum, pabrik pengolahan air limbah serta di pabrik kertas. Dalam pemurnian air, Aluminium Sulfat menyebabkan kotoran menggumpal, sehingga dapat disingkirkan sebagai partikel yang mengendap di dasar wadah atau tangki dan mudah disaring. Proses ini disebut koagulasi atau flokulasi.

Pabrik Aluminium Sulfat dirancang dengan kapasitas 40.000 ton/tahun dengan menggunakan bahan baku Bauksit sebanyak 2.541,9317 kg/jam dan Asam Sulfat 80% sebanyak 5.084,8499 kg/jam. Reaksi beroperasi pada suhu  $110^{\circ}C$  dan tekanan 1 atm dengan konversi reaksi 92%. Reaksi berlangsung pada fasa padat - cair, eksotermis dan bersifat *irreversibel*. Bauksit dipilih sebagai bahan baku utama karena ketersediaan Bauksit yang melimpah di Kalimantan Barat, Indonesia merupakan bahan yang paling dibutuhkan dalam proses pembuatan Aluminium Sulfat. Utilitas yang diperlukan antara lain 139.919,1829 kg/jam air, 1.632,4108 kW listrik yang disediakan oleh PLN, dan 7,4719 kg/jam bahan bakar. Lokasi pabrik akan didirikan di Kabupaten Mandor, Kalimantan Barat. Pabrik ini direncanakan berbentuk Perseroan Terbatas (PT) dengan total 107 karyawan. Luas tanah keseluruhan 14.150 m<sup>2</sup> dengan luas bangunan 10.250 m<sup>2</sup>.

Kelayakan pendirian pabrik kimia di Indonesia memiliki beberapa parameter yang telah diperhitungkan dan mendapatkan nilai *Return of Investment* (ROI) setelah pajak 19%, hasil perhitungan *Payment Out Time* (POT) setelah pajak diperoleh selama 3,4 tahun, nilai *Break Even Point* (BEP) sebesar 42,02% dan angka *Shut Down Point* (SDP) sebesar 14,60%. Dibutuhkannya analisa keuntungan sebelum mendirikan sebuah pabrik yaitu dengan menghitung total penjualan sebesar Rp 235.956.000.000,- dengan *total production cost* sebesar Rp 168.507.304.259,- dan mendapat keuntungan sebesar Rp 50.586.521.806,- setelah dipotong pajak 25%.

Berdasarkan hasil evaluasi ekonomi diatas, dapat disimpulkan bahwa pendirian pabrik Aluminium Sulfat dari Bauksit dan Asam Sulfat dengan kapasitas 40.000 ton/tahun ini layak untuk didirikan.

Kata - kata kunci : Aluminium Sulfat; Bauksit; Asam Sulfat; Padat - Cair

## ABSTRACT

*Aluminium Sulphate or also known as  $Al_2(SO_4)_3$  is an anorganic chemical compound which is soluble in water and widely used as a coagulating agent in water purification industry, waste water treatment plant and also in paper manufacturing. For example, in water purification industry, Aluminium Sulphate can be used to precipitate the impurities, so they can be eliminated as particles which precipitate on the bottom of container or tank, and it's easier to be filtered. Then, this process usually called as coagulation or flocculation.*

*Aluminium Sulphate plant is planned to be established with production capacity of 40.000 ton/year, by reacting 2.541,9317 kgs/hour of Bauxite and 5.084,8499 kgs/hour Sulfuric Acid (80 % purity) as raw materials. Reaction is operated at temperature of  $110^{\circ}C$  and pressure of 1 atm with 92% of reaction conversion. The reaction also occurs at solid – liquid phase, exoterm and irreversible. Bauxite is choosen as main raw material in this process since the availability of Bauxite in West Kalimantan, Indonesia is very much. Utilities required are 139.919,1829 kgs/hour of water, 1.638,4324 kW of elecricity which is served by the State Electricity Enterprise, and 7,4719 kgs/hour of fuel. Plant will be established in Mandor, West Kalimantan, Indonesia and will be ran of Limited Liability Company (Ltd) with 107 employees. The plant construction also will be established on total area of 14.150 m<sup>2</sup>.*

*The feasibility of establishing chemical plant in Indonesia has several parameters that have been calculated and get a Return on Investment (ROI) after tax 19%, the calculation of Payment Out Time (POT) after tax is obtained for 3,4 years, the Break Even Point (BEP) value is 42,02% and the Shut Down Point (SDP) rate is 14,60%. Profit analysis is needed before setting up a factory that is by calculating total sales of IDR 235.956.000.000,- with a total production cost of IDR 168.507.304.259,- and earning a profit of IDR 50.586.521.806,- after tax deduction of 25%. Based on the calculation of economic analysis above, the conclusion is Aluminium Sulphate plant from Bauxite and Sulphuric Acid with capacity of 40.000 ton/year is feasible to be established.*

*Keywords : Aluminium Sulphate; Bauxite; Sulphuric Acid; Solid – Liquid Phase*