INTISARI

Asam suksinat atau disebut juga asam *butanedioic* (1,2-asam etana dikarboksilat) dengan rumus kimia $(CH2)_2(COOH)_2$ yang sangat memiliki potensi sebagai suatu industri kimia. Senyawa ini berwarna putih, dan berupa padatan tidak berbau. Asam suksinat biasa digunakan pada industri makanan, industri farmasi, obat-obatan, dan polimer. Asam suksinat juga digunakan sebagai bahan baku pembuatan 1,4 *Butanediol* (BDO), asam adipat, *tetrahydrofuran*, yang memiliki potensi tinggi untuk pembuatan *solven* dan *fiber*.

Pabrik asam suksinat yang akan dibangun di Gresik, Jawa Timur, direncanakan memiliki kapasitas produksi sebesar 45.000 ton per tahun. Bahan baku asam maleat di Indonesia bisa didapatkan dari beberapa Perusahaan seperti PT. Justus Kimiaraya dan PT. Petrowidada. Akan tetapi sebagian besar asam maleat akan di impor dari negara lain karena kapasitas produksi di Indonesia masih relatif kecil. Kebutuhan bahan pokok lainnya yaitu gas hidrogen yang didapatkan dari PT. Aneka Gas Industri, PT. Petrokimia Gresik, dan PT. PI Energi yang berada di sekitar Gresik.

Asam maleat dicairkan pada *mixer* bersama dengan katalis *raney nickel* menggunakan air. Larutan asam maleat akan dialirkan menuju reaktor *bubble slurry* yang beroperasi pada suhu 160-190^oC. Bagian bawah reaktor akan dialirkan gas hidrogen yang digelembungkan. Gas hidrogen akan di *recycle* bersama *purging* reaktor, sedangkan campuran asam suksinat dan asam maleat pada keluaran bagian bawah reaktor akan dialirkan ke *hydrocyclone* untuk pemisahan katalis. Hasil *overflow* dialirkan ke *evaporator* untuk memekatkan larutan campuran.

Larutan pekat akan dialirkan ke *crystallizer* untuk membentuk kristal asam suksinat dan larutan *supersaturated.* Kristal asam suksinat akan dipisahkan dari larutannya dengan *decanter*. Padatan asam suksinat yang keluar dari *decanter* dalam keadaan basah sehingga harus dikeringkan pada *rotary dryer*. Hasil keluar *rotary dryer* berupa asam suksinat yang memiliki kadar air hanya 2-3% saja sehingga kemurnian padatan asam suksinat dapat mencapai 99,5%. Padatan kristal asam suksinat akan diteruskan ke *ball mill* dan *screener* untuk penyamaan ukuran kristal.

Berdasarkan hasil perhitungan evaluasi ekonomi, didapatkan *fix capital, working capital,* dan *manufacturing cost* secara berturut-turut sebesar $57782140, $141010399, dan $47861905. Sementara *general expenses* dan sales masing-masing sebesar $23221163 dan $173760474. Pabrik asam suksinat termasuk dalam kategori pabrik *low risk chemical industry*. Nilai ROI *before tax* sebesar 16,49%, ROI *after tax* sebesar 8,25%, *Pay Out Time (POT) before tax* sebesar 3,77 tahun, *POT after tax* sebesar 5,48 tahun. Berdasarkan analisis parameter kelayakan ekonomi diatas, maka dapat disimpulkan bahwa Pabrik Asam dari Asam Maleat dan Hidrogen ini layak dan menarik secara ekonomi untuk dikaji lebih lanjut.

Kata kunci: asam suksinat, asam maleat, raney nickel

ABSTRAK

Succinic acid, also known as butanedioic acid (1,2-ethanedicarboxylic acid) with the chemical formula (CH2)2(COOH)2, has great potential as a chemical industry. This compound is white and odorless. Succinic acid is commonly used in the food industry, pharmaceutical industry, pharmaceuticals, and polymers. Succinic acid is also used as a raw material for the production of 1,4-butanediol (BDO), adipic acid, tetrahydrofuran, which has high potential for the production of solvents and fibers.

The succinic acid plant to be built in Gresik, East Java, is planned to have a production capacity of 45.000 tons per year. Maleic acid raw materials in Indonesia can be obtained from several companies such as PT. Justus Kimiaraya and PT. Petrowidada. However, most of the maleic acid will be imported from other countries because the production capacity in Indonesia is still relatively small. The other basic needs are hydrogen gas, which is obtained from PT. Aneka Gas Industri, PT. Petrokimia Gresik, and PT. PI Energi, which are located around Gresik.

Maleic acid is liquefied in a mixer with a Raney nickel catalyst using water. The maleic acid solution is then fed to a bubble slurry reactor operating at a temperature of 160-190oC. Hydrogen gas is bubbled into the bottom of the reactor. The hydrogen gas is recycled and purged from the reactor, while the mixture of succinic acid and maleic acid at the bottom outlet of the reactor is fed to a hydrocyclone for catalyst separation. The overflow is then fed to an evaporator to concentrate the mixture.

The concentrated solution is fed to the crystallizer to form succinic acid crystals and a supersaturated solution. The succinic acid crystals are separated from the solution by a decanter. The wet succinic acid solids exiting the decanter must be dried in a rotary dryer. The output of the rotary dryer is succinic acid with a water content of only 2-3%, so the purity of the succinic acid solids can reach 99.5%. The succinic acid crystal solids are then passed to a ball mill and screener for size uniformity.

Based on the results of economic evaluation calculations, the fix capital, working capital, and manufacturing costs are $57,782,140, $141,010,399, and $47,861,905, respectively. General expenses and sales are $23,221,163 and $173,760,474, respectively. Succinic acid plants are classified as low-risk chemical industry plants. The ROI before tax is 16.49%, the ROI after tax is 8.25%, the Pay Out Time (POT) before tax is 3.77 years, and the POT after tax is 5.48 years. Based on the analysis of the above economic feasibility parameters, it can be concluded that the Succinic Acid Plant from Maleic Acid and Hydrogen is economically feasible and attractive for further study.

Keywords: succinic acid, maleic acid, raney nickel