

## INTISARI

Pabrik selulosa asetat berkapasitas 35.000 ton/tahun ini beroperasi selama 330 hari/tahun dan 24 jam/hari. Pabrik ini membutuhkan bahan baku berupa *cotton*, dan asam asetat anhidrid masing-masing sebanyak 19.687,46 ton/tahun, dan 40.906,25 ton/tahun. Kemudian, bahan pendukung yang digunakan yaitu asam asetat sebanyak 5.397,16 ton/tahun, etil asetat sebanyak 23.107,08 ton/tahun, dan natrium asetat sebanyak 3.261,3 ton/tahun. Proses yang terjadi dalam pabrik ini meliputi reaksi asetilasi selulosa dalam reaktor dengan kondisi operasi 1 atm dan 50 °C, menggunakan katalis asam sulfat, menghasilkan selulosa dari *cotton*. Lalu terjadi reaksi hidrolisis sampai pereaksi asam asetat anhidrid habis bereaksi dengan air yang kemudian dilakukan reaksi netralisasi untuk menghilangkan kadar asam sulfat. Lalu, hasil produk netralisasi diproses hingga terbentuk flakes selulosa asetat dan dikeringkan hingga diperoleh produk selulosa asetat padat.

Pabrik ini didirikan di Kabupaten Karanganyar, Jawa Tengah dengan luas area sebesar 3,6 ha dan luas bangunan sebesar 2,78 ha. Pabrik ini diharapkan mampu menyerap tenaga kerja sebanyak 322 orang. Kebutuhan air pabrik ini sebesar 239.485,87 kg/jam yang didapat dari air sungai Bengawan Solo dan diproses di unit pengolahan air sebelum digunakan. Pabrik ini juga memiliki unit pembangkit *steam*, unit penyedia udara tekan, dan unit pengolahan limbah. Kebutuhan total listrik pabrik ini sebesar 1.855,35 kW.

Pabrik selulosa ini direncanakan berdiri pada tahun 2025 dengan modal tetap \$ 45.096.986,33 + Rp. 320.556.455.855,09 dan modal kerja \$ 33.721.247,13 + Rp. 8.364.049.379,41. Keuntungan yang diperoleh pabrik ini sebelum dikenai pajak sebesar \$ 14.212.806,19 dan setelah dikenai pajak sebesar \$ 9.948.964,33. Berdasarkan evaluasi ekonomi yang telah dilakukan, maka diperoleh *Return on Investment* (ROI) sebelum pajak sebesar 21,14% dan setelah pajak 14,80%, *Pay Out Time* (POT) sebelum pajak sebesar 3,21 tahun dan setelah pajak 4,03 tahun, *Break Even Point* (BEP) sebesar 54,32%, *Shut Down Point* (SDP) sebesar 29,56%, dan *Discounted Cash Flow Rate of Return* (DCFRR) sebesar 21,91% per tahun. Berdasarkan hasil evaluasi tersebut, maka pabrik ini menarik dan layak untuk dikaji lebih lanjut.

Kata kunci : selulosa asetat, *cotton*, *flakes*, proses asetilasi.

## ABSTRACT

*The cellulose acetate plant with a capacity of 35,000 tons/year operates for 330 days/year and 24 hours/day. This factory requires raw materials in the form of cotton and acetic anhydride respectively as much as 19,687.46 tons/year and 40,906.25 tons/year. Then, the supporting materials used are acetic acid as much as 5,397.16 tons/year, ethyl acetate as much as 23,107.08 tons/year, and sodium acetate as much as 3,261.3 tons/year. The process that occurs in this factory includes the acetylation reaction of cellulose in a reactor with operating conditions of 1 atm and 50 oC, using a sulfuric acid catalyst, producing cellulose from cotton. Then, hydrolysis reaction occurs until the acetic anhydride reagent is used up and reacts with water which is then carried out a neutralization reaction to remove sulfuric acid levels. Then, the neutralization product was processed to form cellulose acetate flakes and dried to obtain a solid cellulose acetate product.*

*This factory was established in Karanganyar Regency, Central Java with an area of 3.6 ha and a building area of 2.78 ha. The factory is expected to be able to absorb a workforce of 322 people. The water requirement for this factory is 239,485.87 kg/hour which is obtained from the Bengawan Solo river water and processed in the water treatment unit before being used. This plant also has a steam generating unit, a compressed air supply unit, and a sewage treatment unit. The total electricity requirement for this factory is 1,855.35 kW.*

*This cellulose factory is planned to be established in 2025 with a fixed capital of \$45,096,986.33 + Rp. 320,556,455,855.09 and working capital \$ 33,721,247.13 + Rp. 8,364,049,379.41. The profit earned by this factory before tax was \$14,212,806.19 and after tax was \$9,948,964.33. Based on the economic evaluation that has been carried out, the Return on Investment (ROI) before tax is 21.14% and after tax is 14.80%, Pay Out Time (POT) before tax is 3.21 years and after tax is 4.03 years. , Break Even Point (BEP) of 54.32%, Shut Down Point (SDP) of 29.56%, and Discounted Cash Flow Rate of Return (DCFRR) of 21.91% per year. Based on the evaluation results, this factory is interesting and deserves further study.*

*Keywords: cellulose acetate, cotton, flakes, acetylation proc*