

## Analisis tekno-ekonomi produksi enzim lipase dari limbah agroindustri dengan metode solid state fermentation = Techno economic analysis of lipase enzyme production from waste agroindustry with solid state fermentation method

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### Abstrak

Kebutuhan akan jenis katalis yang berasal dari bahan baku hayati (biokatalis) semakin meningkat seiring dengan perkembangan produk yang berbasis ramah lingkungan. Sebagian besar produk enzim untuk industri di Indonesia masih berstatus impor sebanyak 99%. Perkiraan nilai pasar dunia khusus di industri enzim mencapai angka 4,4 miliar USD dan untuk konsumsi enzim dalam negeri telah mencapai 187,5 miliar rupiah dengan kebutuhan enzim mencapai 2.500 ton di tahun 2015. Untuk mencapai kebutuhan biokatalis (enzim) yang tidak sedikit, diperlukan produksi secara massal dengan simulasi produksi menggunakan aplikasi SuperPro Designer v9.0 untuk mendapatkan kondisi yang diinginkan dan merancang alat produksi enzim lipase berbasis medium padat (fermentasi Solid State) dengan memanfaatkan equipment berupa Tray Bioreactor, filter press, centrifuge, mixing tank 2, dan dryer. Analisis keekonomian berupa NPV, IRR, Payback Period, dan Benefit Cost Ratio yang lebih menguntungkan antara basis produk 1 kg dengan 10 kg adalah produksi enzim dengan basis 10 kg dengan NPV Rp112.796.147.423,00; IRR 54,20%; Payback Period 1,95 tahun; dan Benefit Cost Ratio 3,36.

*Needs for this kind of catalyst derived from biological raw materials (biocatalysts) has increased along with the development of products based on environmentally friendly. Most of the enzyme product for the industry in Indonesia still an import as much as 99%. Estimated value of the world market specialized in enzyme industry reached 4.4 billion USD and for the consumption of enzymes in the country has reached 187.5 billion rupiah to the needs of the enzyme reached 2,500 tons in 2015. To achieve the needs of the biocatalyst (enzyme) that is not less, is needed A mass production with production simulation using SuperPro Designer v9.0 application to get the desired conditions and equipment designing of production lipase enzyme-based solid medium (fermentation solid State) by utilizing equipment such as Tray Bioreactor, filter press, centrifuge, mixing tank 2, and dryer , Economic analysis in the form of NPV, IRR, Payback Period, and the Benefit Cost Ratio is more advantageous product base 1 kg to 10 kg is the production of an enzyme with a base of 10 kg with a NPV Rp112.796.147.423,00; IRR 54.20%; The Payback Period of 1.95 years; and Benefit Cost Ratio of 3.36.*