

## **Optimization and Kinetic Analysis of the Enzymatic Hydrolysis of Oil Palm Empty Fruit Bunch To Xylose Using Crude Xylanase from *Trichoderma Viride* ITB CC L.67**

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**Abstract :** EFB are mainly composed of cellulose ( $\approx 43\%$ ), hemicellulose ( $\approx 23\%$ ) and lignin ( $\approx 20\%$ ). The palm oil empty fruit bunches (EFB) is the lignocellulosic waste from crude palm oil industries mainly composed of ( $\approx 43\%$ ), hemicellulose ( $\approx 23\%$ ) and lignin ( $\approx 20\%$ ). Xylan, a polymer made of pentose sugar xylose and the most abundant component of hemicellulose in plant cell wall. Further xylose can be used as a raw material for production of a wide variety of chemicals such as xylitol, which is extensively used in food, pharmaceutical and thin coating applications. Currently, xylose is mostly produced from xylan via chemical hydrolysis processes. However, these processes are normally conducted at a high temperature and pressure, which is costly, and the required downstream processes are relatively complex. As an alternative method, enzymatic hydrolysis of xylan to xylose offers an environmentally friendly biotechnological process, which is performed at ambient temperature and pressure with high specificity and at low cost. This process is catalysed by xylanolytic enzymes that can be produced by some fungal species such as *Aspergillus niger*, *Penicillium crysogenum*, *Trichoderma reseei*, etc. Fungal that will be used to produce crude xylanase enzyme in this study is *T. Viride* ITB CC L.67. It is the purposes of this research to study the influence of pretreatment of EFB for the enzymatic hydrolysis process, optimization of temperature and pH of the hydrolysis process, the influence of substrate and enzyme concentration to the enzymatic hydrolysis process, the dynamics of hydrolysis process and followingly to study the kinetics of this process. Xylose as the product of enzymatic hydrolysis process analyzed by HPLC. The results show that the thermal pretreatment of EFB enhance the enzymatic hydrolysis process. The enzymatic hydrolysis can be well approached by the Michaelis Menten kinetic model, and kinetic parameters are obtained from experimental data.

**Keywords :** oil palm empty fruit bunches (EFB), xylose, enzymatic hydrolysis, kinetic modelling

**Conference Title :** ICABBBE 2014 : International Conference on Agricultural, Biotechnology, Biological and Biosystems Engineering

**Conference Location :** Bangkok, Thailand

**Conference Dates :** December 24-25, 2014