Pitchaya Pumiput 2006: Study on Production Process of Hydrolysate from Steam Explosion of Oil Palm Trunk for Xylitol Fermentation. Master of Science (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Sawitri Chuntranuluck, Ph.D. 105 pages.

Oil palm trunks are agriculture byproducts of lignocellulosic nature in Thailand. They are interesting biomass sources and precious substances for xylitol and ethanol production. Xylitol is a sugar-alcohol with sweetening power, anticariogenic properties and suitable for diabetic. Oil palm trunks are interesting for production of xylose as a substrate for xylitol production by fermentation of yeast.

Oil palm trunks consist of alpha-cellulose 37.14% pentosan 30.59% lignin 22.32% ethanol/benzene extractive 8.07% ash 8.56% on dry weight. The fractionation of oil palm trunk chip was studied using steam explosion as pretreatment. It was found that the optimal condition was LogRo 3.65 or the pressure at 21 kg/cm^2 (214 ^oC) for 2 minutes to gave high xylose in washing pulp solution and high yield of fiber with high glucose. The washing pulp solution from steam explosion of oil palm trunk contained xylose in xylooligosaccharide form. When studied the optimal posthydrolysis to xylose, it was found that 1%w/v H_2SO_4 at 120 ^oC for 30 minutes by autoclave gave the highest xylose to 8.15 g per steam explosion of oil palm trunk 100 g. A study on adsorption with activated carbon of toxic substances affecting microorganisms in washing pulp solution gave the optimal condition was with in 2 steps. The first step was with 5%w/v activated carbon for 30 minutes of adsorption time. The second step was with 2%w/v of activated carbon for 60 minutes. Both steps could reduce the intensity of color, phenolic compounds, furfural and 5-hydroxymethylfurfural to 99.96, 99.15, 100 and 99.94 %, respectively. Further more, the hydrolysate as substrate for fermentation with *Candida magnolia* TISTR 5664 could produce xylitol Yp/s 0.08 g of xylitol / g of xylose. Whereas, the fermentation from pure xylose gave Yp/s 0.29 g of xylitol / g of xylose. The fermentation with *Candida guilliermondii* FTI 20037 produced xylitol from the hydrolysate gave Yp/s 0.12 g of xylitol / g of xylose. While the fermentation from pure xylose gave Yp/s 0.30 g of xylitol / g of xylose.

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