

The efficacy of the period of saccharification on oil palm (*elaeis guineensis*) trunk sap hydrolysis

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Abstrak

This study investigates the enzymatic hydrolysis rate of Oil Palm (*Elaeis guineensis*) Trunk (OPT) sap in terms of the length of saccharification process with the aim to elevate sugar production. Emphasis was placed on the reaction time and addition of supplements such epsom salt ($MgSO_4$) and alanine amino acid ($C_3H_7NO_2$) to accelerate the efficiency of *Saccharomyces cerevisiae* containing the enzyme invertase. A whole oil palm trunk was divided into four different sections, upper, middle-1, middle-2 and bottom with separate experiments over 10 days enzymatic reaction period. The highest saccharification rate was shown as 13.47% on the tenth day. This result indicates that the increase in the saccharification rate was positively correlated with the length of hydrolysis. Moreover, the sample with nutrients achieved the highest sugar output, 17.91% on the fourth day of hydrolysis which was 4.44% higher than the hydrolysis rate of the sample without nutrients. In the presence of complex OPT sugars, together with other essential elements, epsom salt and alanine amino acid, *S.cerevisiae* achieved a higher hydrolysis metabolism to simple sugars as the cells strived to produce energy and regenerated the invertase. Moreover, the upper part of the OPT rendered the highest potential for sugar production with levels of 21.2% with supplements and 15.6% without. From this experimental analysis, a conventional saccharification method was optimized through the addition of nutrients and a prolonged (10 days) hydrolysis process which yielded an increase in sugar production.