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Name : NORAZLINA BINTI IDRIS

Title : PRODUCTION OF XYLANASE BY ASPERGILLUS NIGER ATCC 16404 USING OIL PALM LEAF AS SUBSTRATE

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Malaysia generates agricultural wastes (agro-wastes) with the volume nearly 5 million tonnes yearly. At present, oil palm fronds are the major composition of agricultural waste materials that are exported to European countries for the industrial needs. Automatically, there is also a lot of oil palm leaf that was thrown away without being utilized. Oil palm leaf (OPL) was exploited as substrates for the cultivation of *Aspergillus niger* ATCC 16404 for the production of xylanase via solid state fermentation (SSF). SSF is generally defined as the growth of the microorganisms on solid material in the absence or near absence of free water. Five fermentation parameters were investigated in determining the most influential factors in maximizing the xylanase activity and via the five-factor two-level factorial design (statistical experiment design), only ratio of carbon and nitrogen, fermentation temperature and fermentation time were significant. These three significant parameters were optimized in Response Surface Methodology (RSM) using Central Composite Design (CCD) and it shows the optimized values for ratio of carbon and nitrogen is 0.3443, fermentation temperature is 31.2°C and fermentation time is at 6.7645

days (162.35 hours) with 53 U/ml of xylanase activity. By using the optimized OPL crude xylanase for the enzyme kinetic determination, it shows Lineweaver Burk plot with R^2 equal to 0.9374, V_{max} was 156.25 U/ml and K_m was 2.078 is the most suitable model in which these results were comparable with the commercial xylanase where R^2 0.967, V_{max} 270.27 and K_m was 1.757 respectively. Furthermore, the optimized crude xylanase also utilized in the sugarcane bagasse delignification and juice clarification. In comparison with commercial xylanase, OPL crude xylanase showed positive capability results as it was successfully remove the lignin and clarified the juice.