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Xylanase from *Bacillus pumilus* by solid state fermentation using local carbon and nitrogen sources

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The aim of this work was to optimize the cultivation conditions and the media to produce xylanase by solid state fermentation of *Bacillus pumilus*, using paddy husk as the support. Solid medium was prepared by mixing 200g of paddy husk with 800mL of liquid fermentation medium, containing (gL^{-1}) xylan, 20.0; peptone,2.0; yeast extract, 2.5; K_2HPO_4, 2.5; KH_2PO_4, 1.0; NaCl, 0.1; $(NH_4)_2SO_4$, 2.0 and $CaCl_2.2H_2O$, 0.005; $MgCl_2.6H_2O$, 0.005; and $FeCl_3$, 0.005. Production of xylanase activity started on the 2nd day and the highest activity (141.96 $Ug^{-1}DM$) was obtained on the 6th day at room temperature at pH 9.0. When paddy husk to liquid fermentation medium ratio was optimized as 2:9, xylanase activity was increased by 1.04 times than the control which contained the husk to liquid medium ratio 2:8 at pH 9.0. When the culturing temperature was optimized at 40 ^oC, xylanase activity was increased by 1.10 times than the temperature non optimized condition. When commercial Birch wood xylan was replaced with different concentrations of corn cob, xylanase production was increased. Highest xylanase production (224.18 $Ug^{-1}DM$) was obtained in the medium containing 150 gL^{-1} corn cob at pH 9.0 and 40 ^oC. Xylanase production was supported by sucrose (248.23 $Ug^{-1}DM$), fructose (235.54 $Ug^{-1}DM$) and arabinose (286.42 $Ug^{-1}DM$), while the enzyme production was reduced by glucose (212.42 $Ug^{-1}DM$), galactose (195.95 $Ug^{-1}DM$), lactose (207.29 $Ug^{-1}DM$) and amylose (213.95 $Ug^{-1}DM$) than in the control which contained no sugar (222.56 $Ug^{-1}DM$). When organic nitrogen sources were replaced with locally available nitrogen sources such as ground nut powder or sesamum seed cake powder or coconut seed cake powder or soy meal powder, highest xylanase production (290.66$Ug^{-1}DM$) was obtained in the medium containing soy meal powder. When different concentrations of soya meal powder were added to the optimized medium, highest xylanase production (326.45 $Ug^{-1}DM$) was obtained in the medium containing 16 gL^{-1} of soy meal powder. Based on the optimization of the culture conditions, the xylanase production by *Bacillus pumilus* was increased by 2.29 times than that of the initial non-optimized condition.

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