

Utilization of agro-industrial biowastes to produce xylanase using *Aspergillus niger* AUMC 14230: optimization of production parameters.

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ABSTRACT

An Agricultural and industrial wastes are available in massive amounts, and the disposal of those biowastes causes environmental and health problems. Xylanase plays an essential role in nature and has various industrial applications. The objective of the present work was to evaluate the utilization of some agro-industrial biowastes, including sugarcane bagasse, corn cob, corn stalk, rice straw, wheat straw, wheat bran, and rice bran in the cost-effective production of xylanase enzyme using *Aspergillus niger* strain AUMC 14230 by applying corn cob (1%) as the main component in fermentation media. Among the agriculture residues used, the results showed that the corn cob was the preferable optimized carbon source for xylanase production with activity (100 Uml⁻¹), followed by wheat bran (84 Uml⁻¹), while corn steep liquor (3% concentration) was the ideal nitrogen source. Furthermore, the findings revealed that the optimum levels of various parameters for the xylanase production were inoculum size 0.50% (v/mL), initial pH 4.5, incubation temperature 50 °C, aeration 1:5 (Vm:Vf), agitation speed 175 rpm, and time course 120 h. Based on the obtained findings, it could be concluded that the corn cob and wheat bran, inexpensive and abundant sources, could be applied as a carbon source for large-scale industrial xylanase production, which ultimately lowers the production cost of xylanase enzyme, besides, helps to reduce the environmental problems linked with the disposal of agro-industrial biowastes.

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