



RESEARCH PAPER

Regulatory influence of sugars on amylase production by *Aspergillus fumigatus* using agricultural waste as fermentation substrate

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Abstract : Amylases are one of the most important microbial enzymes and are used in many industrial applications. *Aspergillus fumigatus* NTCC1222 has been found to successfully use cheap lignocellulosic residues to produce amylases with potential applications in textile desizing (Singh *et al.*, 2014). In current times with urgent need of adopting sustainable industrial practices, lignocellulosic biomass offer a precious resource to generate valuable products of economic value while aligning well with the Sustainable Development Goals (SDGs). The current study evaluates the influence of additional sugars on amylase production, under solid state fermentation using wheat bran, a cheap and readily available agro-industrial residue, as the substrate. 12 different sugars (Monosaccharides, Disaccharides and Polysaccharides) were added to the wheat bran-based fermentation medium to see the potential effect of the given simple and complex sugars. Amongst monosaccharides, galactose exhibited the best positive effect with about 46% higher enzyme activity than control. Cellobiose was the best enhancer of amylase activity as a disaccharide, when evaluated against sucrose, lactose, maltose, melibiose. Glycogen best supported amylase production amongst the polysaccharides tested. The highest increase and decrease in amylase production was observed for galactose (+45.53% at 0.50% concentration) and soluble starch (-94.22% at 1.25% concentration), respectively, amongst all the sugars evaluated. Interestingly, fungal growth decreased at all concentrations for soluble starch. The given investigation helps us to understand the effect of different sugars as metabolic regulators, while assisting in improving amylase production using wheat bran as substrate.

Key Words : Amylase, Sugars, Metabolic regulators, Wheat bran, Sustainability, Solid state fermentation

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