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A comparitive xylanase production by two *Aspergillus* species

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SUMMARY

The present investigation was undertaken with the objective to find out the suitable micro organism for the maximum xylanase production using two *Aspergillus* species namely *Aspergilus fumigatus* and *Aspergillus terreus* using Czapek's dox wheat bran xylan medium. The effect of pH, temperature, agitation, incubation period, nitrogen sources, bivalent ions, substrate concentration, stability, inhibitors on xylanase production was studied. It was inferred that *Aspergillus fumigatus* enhanced the maximum production of xylanase than *Aspergillus terreus in* all the parameters studied.

Key words : Xylanase, *Aspergilus fumigatus* and *Aspergillus terreus*

Xylan is the main hemicellulose's present in plant cell walls. It is a linear polysaccharide consists of D-xylose residues linked by β-1, 4 bonds with a variety of substituents in carbon 2 and 3 of the xylose units. Due to its complex structure, the biodegradation of xylan requires the synergistic action of several hydrolytic enzymes for efficient and complete breakdown (Biely, 1985) .The enzyme that degrade the complex polysaccharide xylan into its monomers are constitutively known as xylanases. The xylanases are of two types - extracellular xylanase and intra cellular xylanases. Various micro organisms like bacteria, fungi possess the ability to secrete these enzymes.

The products of hemicellulose hydrolysis *i.e.* xylose and arabinose can be used as substrates in the production of different antibiotics, alcohol, feeds, chemicals and fuels (Thompson, 1983).Hence these enzymes which are of commercial interest should ideally be produced quickly and in high quantities from simple and inexpensive substrates.

The production of enzymes is highly dependable on the cultural conditions that favour fermentation. Thus the present study aims in selecting a suitable pH, temperature and other cultural conditions which favours the enzyme production by two *Aspergillus* species namely *Aspergilus fumigatus* and *Aspergillus terreus*

MATERIALS AND METHODS

Glasswares :

All the glassware's used are of Borosil brand.

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Chemicals:

All the chemicals used were of analytical grade. Oats spelt xylan from Sigma Chemicals. Co. / USA were used as a substrate for xylanase assay.

Micro organism:

The fungi used for the study namely *Aspergillus terreus and Aspergillus fumigatus* are obtained from the laboratory of PSGR Krishnammal college for Women, Coimbatore. The cultures were maintained at 4^0 C on Potato Dextrose Agar (PDA) slants.

Media used:

Czapek's dox medium was used with sucrose replaced by 3% wheat bran xylan.

The media and the distilled water used were sterilized in an autoclave at 15 lbs p.s.i. for 15 minutes.

Xylan extraction:

Xylan was extracted from wheat bran by the method of Panbangred *et al*., 1983

Preparation of inoculum and cultivation conditions:

The culture broth consists of 50 ml of czapek-dox medium with wheat bran xylan as carbon source in a 250 ml conical flask. Each flask was inoculated by an actively sporulating mycelial disc. Cultures were incubated for 5 days at 40° C.Fungal mat grown in the liquid medium was filtered through Whatmann No. 41 filter paper and the filtrate were centrifuged at 3000rpm for 20 minutes. The supernatant was collected and used as a crude enzyme.

Substrate preparation:

1gm of oat spelt xylan was homogenized in 50 ml of 0.05 m phosphate buffer of pH 7.0. It was heated to boiling