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Xylanase production from *Pseudomonas putida* and *Staphylococcus aureus*

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SUMMARY

The objective of this study was to investigate the xylanase production from two bacterial species, namely *Pseudomonas putida* and *Staphylococcus aureus.* Several xylan sources, were tested for xylanase production, among which wheat bran supported maximum xylanase production in both the species. Effect of pH and temperature on xylanase production was also studied. The culture medium with pH 6.5 and temperature 40^{0}C in *Pseudomonas putida* and pH 6.0 and temperature 45^{0}C in *Staphylococcs aureus* promoted the growth and maximum xylanase production.

Key words : Liquid state fermentation, Xylan, Xylanase, *Pseudomonas putida*, *Staphylococcus aureus.*

Ligno cellulose constitutes the largest biomass source on earth and is mainly composed of lignin, cellulose and hemicellulose,of which xylan is the major compound (Douglas and Rodney, 1989).

Xylan is the major plant structural polymer, it is the major component of the hemicellulosic fraction of lignocellulosic biomass and their hydrolysis can be obtained using xylanases. They are composed of a backbone of 1,4-β- glucuronic acid. Xylans can be hydrolyzed by β-xylanase and by β-xylosidase (Peter and Fritz, 1986).

The main commercial use of xylanase is in bio bleaching of paper and pulp due to their bleach boosting properties. In addition, it finds other applications in various agroindustrial processes such as efficient conversion of hemicellulosic biomass to fuels and chemicals; digestibility enhancement of animal feedstock; processing plant fibre sources namely flax and hemp; clarification of juices; improvement of coffee processing; preparation of high fibre baked goods; for maceration of fruits and vegetables and improvement in the consistency beer (Biely, 1985; Wong *et al.,* 1988; Zeikus *et al.,* 1991and Viikari *et al.*,1994).

In the present study, an attempt has been made to study the xylanase production by two bacterial species namely, *Pseudomonas putida* and *Staphylococcus aureus*

MATERIALS AND METHODS

The microorganisms such as *Pseudomonas putida* and *Staphylococcus aureus* were obtained from P.S.G.R. Krishnammal College for Women, Coimbatore, Tamilnadu. The cultures were maintained in nutrient agar medium at 4^{0}C.The chemicals used in the present study were of analar grade. Oat spelt xylan was obtained from sigma chemical Co.,/USA.

Conical flasks was amended with 100ml of nutrient broth medium and inoculated with *Pseudomonas putida* and *Staphylococcus aureus* and incubated for 3 days in static condition.After three days the culture filtrate was extracted and centrifuged at 5,000rpm for 20 mintutes. The supernatant was used as crude enzyme. Xylanase enzyme activity was assayed by the method of Bailey *et al.* (1992).

The xylanase activity is expressed in International units. One International unit of xylanase is the amount of enzyme required to liberate 1μ mol of D-xylose min /mL.

RESULTS AND DISCUSSION

Various agricultural residues such as wheat bran, rice bran, groundnut shell, sugarcane bagasse, and *Cyanodon* grass were tested for maximum xylanase production. Among the various agricultural residues tested, wheat bran was found to enhance more xylanase production in *Pseudomonas putida* and *Staphylococcus aureus* (Fig.1, Table 1). Similar results were already noticed in *Schizophyllum radiatum* and *Aureobasidum pullulans* by (Cavazzoni *et al*., 1998; Karni *et al.*,1998) To find out optimum pH for xylanase production by *P. putida* and *S. aureus*, the pH of the basal medium was adjusted to pH 3.5 to 7.5. Each organism appears to have optimum pH for xylanase production. In the present study xylanase production was found to be maximum at pH 6.5 in *P.putida* and pH 6.0 in *S.aureus* (Fig.2, Table 2).

Temperature plays an important role in the production of xylanase. Optimum temperature for xylanase production was reported by number of workers. In the present study, xylanase production was found to be maximum at 40^{0}C in *P. putida* and at 45^{0}C in *S. aureus*

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