A REVIEW | Asian Journal of Bio Science, Volume 7 | Issue 2 | October, 2012 | 219-222
Received : 13.07.2012; Accepted : 24.08.2012

Isolation, characterization of cellulolytic bacteria and its application in waste treatment

SIMMI GOEL

Department of Biotechnology, Mata Gujri College, SRI FATEHGARH SAHIB (PUNJAB) INDIA
Email: simmig76@yahoo.co.in

Cellulolysis is the process of hydrolysis of cellulosic material with the help of cellulose degrading enzyme i.e. cellulase. The microbial method employed for cellulose dergradation offers potentially efficient and affordable technique. The goal of this research work was to exploit the cellulolytic potential (cellulases) of bacterial isolates for the treatment of textile effluent.

Key words : Textile waste, Colour, Cellulases, Industrial effluent, Biosorption

How to cite this paper : Goel, Simmi (2012). Isolation, characterization of cellulolytic bacteria and its application in waste treatment. *Asian J. Bio. Sci.*, **7** (2) : 219-222.

INTRODUCTION

Cellulases are inducible enzymes which are synthesized by microorganisms during their growth on cellulosic materials (Lee *et al.,* 1996). Cellulase hydrolyzes the β-1, 4-glycosidic bonds in the polymer to release glucose units (Nishida *et al.,* 2007).This cellulose degrading enzyme can be used in the formulation of washing powder, extraction of fruit and vegetable juices and starch processing. Cellulases interactively promote the cellulose degradation (Wood and McCrae, 1982; Mishra and Rao, 1988), to cope with the problems of food and energy shortages expected in near future with explosive increase in human population.

Isolation of cellulolytic bacteria:

Cellulose producing bacteria were isolated from wood samples on the basis of their ability to grow on cellulose containing media *i.e.* CMC. Isolation of cellulase producing bacteria was done using CMC agar medium. Samples were incubated at 37^0 C for 24 hours. The plates were stained with Congo red solution and destained with 1M NaCl solution. Clear zone indicated the hydrolysis of CMC as a result of cellulases production. Then pure bacterial colonies were cultured in flasks containing LB-CMC broth.

Characterization of isolated bacterial strain:

The identification and characterization of the isolated cellulolytic bacterial organisms were carried out according to the methods of Cullimoore, (2000) and Cowan and Steel, (1993). Isolated bacteria were gram negative, rod-shaped and formed glistening colonies on CMC agar plates. The strains showed maximum growth after 24 hour of incubation (with highest optical density *i.e.* 0.292). This shows that at 24th hour of incubation, there occurred maximum growth rate and product formation.

Biochemical tests of isolated bacterial strain:

Biochemical characterization of the isolates revealed it to be positive for urease, indole production, methyl-red and glucose and sucrose fermentation. The isolates showed negative result for the citrate utilization, catalase activity, voges-proskauer and lactose fermentation (Table 1).

Table 1: Biochemical tests of isolated cellulolytic bacteria

Sr. No.	Characters	Observation	Results
1.	Urease test	Yellow to red/pink	+ve
2.	Indole production	Formation of red layer	+ve
3.	Methyl-red test	Remains red	+ve
4.	Voges-Proskauer test	Red to yellow	-ve
5.	Citrate utilization	Remains green	-ve
6.	Catalase activity	No bubbles released	-ve
7.	Carbohydrate fermentation		
	Glucose	Red to yellow	+ve
	Lactose	Remains red	-ve
	Sucrose	Red to yellow	+ve