

Research Paper :

Deterioration of timber quality of *Dalbergia sissoo* by a die-back pathogen *Lasiodiplodia theobromae*

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SUMMARY

Sissoo (*Dalbergia sissoo* Roxb.) is an important timber tree planted in different regions of our country for its highly valuable wood. Die-back caused by *Lasiodiplodia theobromae* leads to deterioration of timber quality of infected plant. The present investigation was carried out to determine the activities of cellulases, xylanase and lignin peroxidase in degradation of chemical constituents of infected wood. The studies indicated that the pathogen is efficient producer of all these enzymes. Different cellulolytic enzymes showed highest activities from 30th to 40th days after incubation whereas xylanase and lignin peroxidase activities reached a peak on 20th and 30th days after incubation, respectively. The increased activities of these enzymes resulted ultimate decay of the *sissoo* wood.

Key words :

Cellulases, *Dalbergia sissoo*, Die-back, *Lasiodiplodia theobromae*, Lignin peroxidase, Xylanase.

Dalbergia sissoo Roxb. belonging to the family Papilionaceae is a medium to large deciduous tree with a light crown. The tree is planted for its good quality timber and also valued for decorative and often fragrant wood. Die-back of *D. sissoo*, incited by *Lasiodiplodia theobromae* (Pat.) Griffiths and Maubl. (Syn. *Botryodiplodia theobromae* Pat.), is a dreadful sporadic disease causing deterioration of the quality of timber. The disease is characterized by its symptoms expression as dyeing back from tip to downwards, drying and shedding of leaves and twigs all over the plant, loosening of fibres and dusty appearance of the wood. Cellulose is the major constituent of plant cell wall particularly in the secondary wall and it is a linear polymer of D-glucose units with β -1,4 glycosidic linkages. Fungus producing cellulolytic enzymes and having the capacity to cause degradation of hardened tissues have been reported by a number of workers (Wood *et al.*, 1988; Barkai *et al.*, 1991; Mehrotra, 1995). Most studies relating to enzymatic degradation of hemicellulose have focussed on xylans with the virtual exclusion of galactoglucomannans and glucomannans. Xylans are the major hemicellulose in angiospermic wood. The removal of cellulose and hemicellulose creates a channel wide enough to allow access of the

enzymes to the sites of the lignin degradation (Reid, 1995). In this study the activities of different cellulolytic enzymes, xylanase and lignin peroxidase responsible for degradation of chemical constituents of *sissoo* wood infected by *L. theobromae* was assayed.

MATERIALS AND METHODS

The infected wood was collected from different places of Burdwan district of West Bengal. After being chopped up, the blocks were dried in hot air oven and the substrates were finally prepared from the blocks separately by grinding and sieving through a nylon net (40 mesh). The pathogen, *L. theobromae* was also isolated from infected plant.

Flasks containing the wood blocks were incubated individually with agar discs (7mm in diameter) cut from the margin of 7 days old actively growing colonies of the test fungus on PDA medium and incubated at $25^{\circ} \pm 1^{\circ}\text{C}$ under gyratory shaking at 70 rpm.

The cultures were harvested at 10 days intervals and filtered through an ice-cold G₄ sintered glass filter. The filtrates so obtained served as the enzyme sources to assay the enzyme activity.

Exoglucanase activity was determined by incubating 0.25 ml of culture filtrate with 0.75

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