

## **Production of ligninolytic enzymes by *Coptotermes curvignathus* gut bacteria**

### **ABSTRACT**

Maximum utilization of lignocellulosic biomass is contingent upon degrading the recalcitrant lignin polymer. Conventional methods employed in delignification require high inputs of energy and chemicals, resulting in the release of highly toxic effluents. The ability of gut flora of *Coptotermes curvignathus* in lignin degradation was investigated in this study. Production of ligninolytic enzymes was done in an aerated submerged fermentation system with kraft lignin as sole carbon source. The degradation experiment was carried out for 7 days at 30 °C, pH 7. Three potential lignin degraders identified as *Bacillus* sp., *Lysinibacillus* sp. and *Acinetobacter* sp. were successfully isolated. The bacterial growth and secretion of extracellular ligninolytic enzymes confirmed metabolism of kraft lignin by the identified strains. *Lysinibacillus* sp., a novel lignin degrader showed highest manganese peroxidase ( $76.36 \pm 15.74$  U/L) and laccase activity ( $70.67 \pm 16.82$  U/L) after 7 and 6 days of incubation respectively, while maximal activity of lignin peroxidase ( $262.49 \pm 0.92$  U/L) was recorded after 7 days in culture supernatants of *Bacillus* sp. With respect to the activity of the secreted enzymes, the lignin degrading potential of these bacterial strains can be explored in the valorisations of lignocellulosic biomass in industrial processes such as pulping, bioethanol production, fine chemicals and materials synthesis.

**Keyword:** Enzymes; Kraft lignin; Laccase; Peroxidases; Termites