Production and characterization of Ligninolytic enzymes by *Leucoagaricus gongylophorus* fungus

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**INTRODUCTION:** Many fungi produce enzymes that degrade lignocellulose which is composed of cellulose, hemicellulose and lignin. Degradation of these polymers have biological and biotechnological importance. *Leucoagaricus gongylophorus* (LG) lives in symbiosis with leaf-cutting ants which are agricultural pests. It is known that *L. gongylophorus* produces laccases but the function of these enzymes in the ant-fungus symbiotic relationship is not clear. The objectives of this work are to verify if LG produces ligninases as Lignin Peroxidase (LiP) and Manganese Peroxidase (MnP), to establish methodology for production of the ligninolytic enzymes from LG, to characterize a laccase produced by this fungus. **MATERIAL AND METHODS:** To produce ligninases, LG was inoculated in the presence of the veratryl alcohol as a possible inductor and this medium was monitored for 13 days. Total ligninases were detected using ABTS substrate in the presence of cofactors H₂O₂ and Mn²⁺. Presence of LiP and MnP was analyzed by exclusion of these cofactors in enzyme assay. Syringaldazine substrate was used to confirm the presence of laccase. Temperature and pH curves were performed for activity of enzymatic extract. Chromatographic techniques were used for partial purification of native laccase. **RESULTS AND DISCUSSION:** Ligninolytic peak activity occurred on the 11th day of inoculum. No ligninases beyond laccase were detected. pH 3.0 and pH 6.0 were great for enzymatic activity with ABTS and syringaldazine respectively, and optimum temperature was around 50°C for both. Partial purification on hydroxyapatite ceramic column showed a protein with about 50-70kDa which exhibited laccase activity. **CONCLUSIONS:** Results suggest that LG do not produce LiP and MnP enzymes. Methodology applied was effective for native laccase obtention. Laccase from LG apparently have typical characteristics of most laccases already characterized produced by basidiomycetes.

Keywords: Laccase, *Leucoagaricus gongylophorus*, Ligninases

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