

TITLE: PRODUCTION OF LIGNINOLYTIC ENZYMES BY WHITE ROT FUNGI USING SUGARCANE BAGASSE AND RICE HUSK

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ABSTRACT:

Lignin is one of the components of plant cell walls and, because of its complex structure, it is one of the most recalcitrant compounds in the environment. The ability of white rot fungi to degrade ligninolytic compounds makes this group interesting for biotechnological applications. Thus, the aim of this work was to evaluate the production of ligninolytic enzymes by *Trametes* sp., *Pleurotus pulmonarius*, *Ganoderma lucidum* and *Aurantioporus pulcherrimus*. The production of crude enzymatic extracts was carried out in a nutrient medium incorporated of natural inducers of ligninolytic enzymes (rice husk and sugarcane bagasse). The cultures were incubated at 30 °C in static condition for 7 days. Laccase activity was determined by monitoring ABTS (2,2'-azino-bis (3-ethylthiazoline-6-sulfonate) oxidation; manganese peroxidase (MnP) activity was evaluated by the oxidation of MnSO₄ (manganese sulfate) and lignin peroxidase (LiP) activity was monitored by the oxidation of veratryl alcohol. The best results were obtained with *Trametes* sp: 9467.8 U/L for laccase induced by sugarcane addition and 7942.7 U/L induced by rice husk. Activities of MnP were also detected in these crude extracts, with values for sugarcane and rice husk of 28.8 U/L and 22.7 U/L, respectively. *Pleurotus pulmonarius* produced 4650.3 U/L and 5099.9 U/L of laccase with sugarcane bagasse and rice husk, respectively. *Ganoderma lucidum* laccase production was of 2826.9 U/L (cane) and 2156.5 U/L (rice) and low values of manganese peroxidase (5 U/L) were detected in the presence of both residues. Finally, in *Aurantioporus pulcherrimus* approximately 12 U/L of laccase was obtained in the presence of both lignocellulosic residues. Lignin peroxidase activities were negligible in all culture extracts evaluated. Results demonstrated that different species of white rot fungi can present a great variability in laccase (and other ligninolytic enzymes) production in the same culture conditions. Laccase activity detected with *Trametes* sp. was twice that obtained with the second best producer, *P. pulmonarius*, in the presence of sugarcane bagasse. However, rice husk induced more laccase than sugarcane bagasse in *P. pulmonarius* cultures, which also shows that the presence of different sources of lignocellulosic residues in culture media can affect laccase production of white rot fungi of same species.

Keywords: Laccase, Manganese peroxidase, Lignin peroxidase, Lignocellulosic residues.

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