



“EFFECT OF PARTICLE SIZE AND AERATION IN THE ENZYME ACTIVITY OF *Trametes sp 44* DURING THE DEGRADATION OF CORN STOVER”

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Introduction. Vegetable waste like wood, consist primarily hemicellulose, cellulose, and lignin. Basidiomycetes fungi through nonspecific and oxidative enzymes carry out the enzymatic degradation of lignin using lignin peroxidase (LiP), laccase (Lcc) and manganese peroxidase (MnP) [1] enzymes. It is known that these enzymes may or may not have a synergistic action. This degradation allows them to have access to the cellulose and hemicellulose as the main source of carbon and energy through the synthesis of xylanases and cellulases enzymes [2]. It is reported that there are various factors that affect the synthesis of enzymes involved in the degradation of lignocellulosic waste. In solid state fermentation allows the use of waste such as corn straw. This study evaluated the effect of the particle size as well as the absence and presence of aeration in the synthesis of hidrolitic present and ligninolytic enzymes in *Trametes sp. 44*.

Methods. *Trametes sp. 44* was grown on PDA plates for 5 days. Per 100 mL of water was added a PDA agar plate with the fungus grown which were put in shaking for 24 hours at 150 rpm. Corn stover was washed, sieved and sterilized. The preinoculum was added until moisture of 75%. Solid-state fermentation took place following the protocol of Raimbault [3] and using two particle sizes (PZ-8 = 0.937 and PZ-12 = 0.661 in). The first fermentation was carried out in the absence of aeration in the second condition provided 200 mL of air/minute. Kinetics of 15 days ligninolytic activity (LiP, MnP, Lcc) [4] and hydrolytic (xilanase and cellulase) [5] was determined in *Trametes sp. 44*. Each assay was performed in triplicate.

Results. Throughout the fermentation activity xylanolytic and cellulolytic was detected from the third day gradually increasing with the growth of the fungus with a maximum on day 13 of 3.5 AU/mL, there was significant difference in units of activity for the four culture conditions. In contrast in terms of the ligninolytic activity as shown in Fig 1 and Fig 2 air supply favors the synthesis of these enzymes (LiP, Lcc, MnP), duplicating units of

activity. This behavior was observed in two sizes of particle tested, in addition to the 12 particle size units of activity were minor in comparison with the one obtained in 8 particle size.

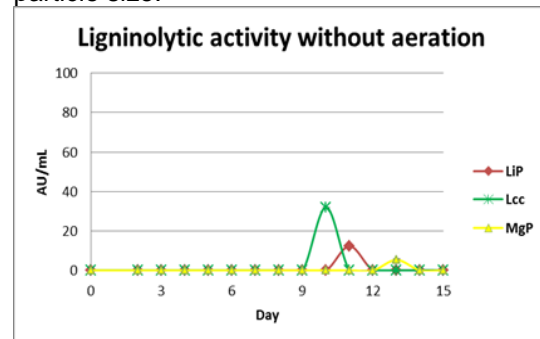


Fig.1 Ligninolytic activity without aeration particle size 8.

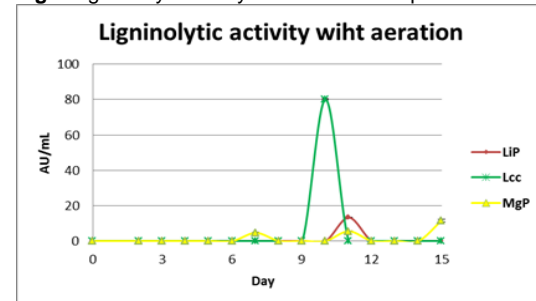


Fig 2. Ligninolytic activity with aeration (200 mL/min) particle size 8.

Conclusions. The size of particle and as well as the absence or presence of air have a marked effect on the enzymatic profile of *Trametes sp. 44*

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