# SOLID-STATE BIOCONVERSION OF PASSION FRUIT WASTE BY WHITE-ROT FUNGI FOR PRODUCTION OF OXIDATIVE AND HYDROLYTIC ENZYMES

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The food-grade white-rot fungi are able to synthesize relevant hydrolytic and oxidative extracellular enzymes. Wheat bran (WB) is the most common substrate for the cultivation of these fungi. However, the list of possibilities is very large and includes food processing wastes. Yellow passion fruit waste (YPFW) is an abundant food waste in Brazil, rich in carbohydrates, especially pectin. The aim of the present work was to evaluate the possibility of using YPFW as substrate to cultivate *Pleurotus ostreatus*, *Pleurotus pulmonarius*, *Macrocybe titans*, *Ganoderma lucidum*, and *Grifola frondosa* to obtain useful oxidative (laccases and peroxidases) and hydrolytic (polysaccharide depolymerase) enzymes. All cultures presented high laccase activity in both substrates, YPFW (ranging from 6,040±455 to 10,200±980 U/L) and WB (ranging from 5,900±560 to 10,900±815 U/L) with the exception of the *G. frondosa* cultures (1,500±25 U/L in YPFW and 1,830±90 U/L in WB). Although the Mn peroxidase activity was detected in all culture filtrates, it was significantly lower than that of laccase. The best producer of Mn peroxidase was *P. pulmonarius* (220±18 U/L) followed by *P. ostreatus* and *M. titans*. No lignin peroxidase activity was detected in cultures. Among the polysaccharide depolymerase enzymes, pectinase was the main enzyme produced by all species, especially in YPFW cultures, being *M. titans* the best producer (1,720±130 U/L). Low levels of endoxylanase and no exo- and endocellulase activities were observed while in WB cultures, the production of endoxylanase was higher, especially by *P. ostreatus*, *P. pulmonarius*, and *G. lucidum* (400 to 650 U/L). All extracts (from YPFW and WB cultures) presented high levels of aryl-glycosidases, especially β-xylosidase (ranging from 1,500 to 6,500 U/L). In conclusion, YPFW was used with success as substrate for enzyme production by white-rot fungi. YPFW cultures exhibited a good ability of colonization and good mycelial growth, comparable with those found in WB systems.

Keywords: laccase, ligninolytic enzymes, white-rot fungi, solid-state fermentation