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Solid State Fermentation (SSF) of Lignocellulosic Agricultural Waste by *Marasmius* sp. for Laccase Production

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Abstract: Laccases are extracellular enzymes, making the purification procedures easy and able to exhibit a considerable level of stability in the extracellular environment. It is suitable for application in biopulping, biobleaching and the treatment of dyed industrial wastewater. In pulp and paper industry, laccase was used as lignin degrading enzyme in separation and degradation of lignin in wood pulp. Two types of fermentation were used in the production of laccase which are solid state bioprocessing (SSB) and submerged bioprocessing (SmB). SSB is a fermentation that involved solid in the absence or near absence of water while SmB is a fermentation process that uses liquid during the process of fermentation. Different types of lignocellulotic agricultural wastes, such as sago *hampas,* rice straw, oil palm empty fruit bunch (EFB), sago bark and rice husk were used as the substrate in this bioprocess experiments. The objective of the research is to perform solid state bioprocessing (SSB) using different types of lignocellulosic agricultural waste for the production laccase. From the result obtained, it is shown that the fermentation of rice straw using SSB had the highest production recorded as 1.009 U/g of substrate based on its laccase enzyme activity. To the best of our knowledge, this is the first report on the induction of laccase production by *Marasmius* sp. under SSB using rice straw waste as the substrate.

Keywords: Laccase; Lignocellulosic; Rice straw; *Marasmius* sp.; Agroindustrial waste