

Lignocellulolytic activities among Trichoderma isolates from Lahad Datu, Sabah and Deception Island, Antarctic

Abstract

Trichoderma species have the potential for application in composting as biological control agents in controlling disease and increasing yield of production in the agricultural industry. The prevalent soil fungus of Trichoderma produces lignocellulolytic enzymes that assist the degradation of woody lignocellulose materials. The aim of the experimental work was to check the potential of lignocellulolytic Trichoderma fungi for the use of rapid composting of oil palm empty fruit bunches fibers. Fifty-two of Trichoderma isolates from Sabah and seven isolates from Antarctic were examined for in-vitro lignocellulolytic activity by assaying their ability to develop dark brown pigments, yellow halo zone, and clear white zone on tannic acid media (TAM) for lignin; Jensen Media (JM) for cellulose; and modified Melin-Nokrans media (MMNM) for starch. The best six Sabah Trichoderma isolates (5D, 10L2, 10P, 5E, 10X, and 10E2) were found to be potential lignocellulolytic agents based on their diameter of halo zone formed on amended media for further testing of in vitro bioconversion of oil palm empty fruit bunches. The diameters of halo zones were measured for the analysis of their ability in degrading lignin, cellulose, and starch. In contrast, Antarctic Trichoderma isolates consistently exhibited lower lignocellulolytic activities based on their smaller diameter of halo zone formed on TAM, JM, and MMNM. Most of the Trichoderma isolates are found to synthesize polyphenol oxidase, endoglucanases, and are able to hydrolyze starch to glucose in the three different media. Thus, the finding shows the potential of these isolates for use in large-scale composting of oil palm empty fruit bunches.