

Prospects for inhibition of lignin degrading enzymes to control ganoderma white rot of oil palm

ABSTRACT

Oil palm (OP) is prone to a rot by the fungus *Ganoderma* which may be capable of being controlled by enzyme inhibitors. Palm oil is used in the production of vegetable oil for foods, cosmetics, pharmaceuticals and, most recently, biodiesel. However, the fundamental process of the disease as “white rot” has been ignored by researchers. White rot fungi are capable of degrading lignin ultimately to carbon dioxide and water: Celluloses become available as nutrients for the fungus. One potential control method is to inhibit the ligninolytic enzymes. There are few data on the lignin of OP and none on how it is degraded by OP *Ganoderma* and so specific examples on how to inhibit the enzymes of the fungus is impossible. Fortunately, there is more information on lignin and lignin model compounds degraded by other fungi. The taxonomy of *Ganoderma* is confused; hence drawing direct comparisons between other taxa within the genus in terms of ligninolysis is of limited utility. In general, ligninolytic enzymes can be inhibited by (a) temperature, pH and aeration, (b) high carbon and high nitrogen and (c) halides, metal chelators, heavy metals, and reducing agents. These factors require to be tested against the enzymes from *Ganoderma* from OPs in vitro with a view to developing control methods in the field, and this is how the area requires to be progressed. Furthermore, the procedures may be useful to control other rots of trees and wood products. In the case of OP, such compounds could be (a) injected into (b) sprayed onto and/or (c) added to the soil of the OP. In conclusion, the control of *Ganoderma* of OP would benefit from investigating the effect of inhibitors on the lignin degrading enzymes in vitro to enable this to be applied in plantations.

Keyword: Oil palm; Palm oil; *Ganoderma*; White rot; Lignin; Laccase; Manganese peroxidase