

Transcriptional response of oil palm (*Elaeis guineensis* Jacq.) inoculated simultaneously with both *Ganoderma boninense* and *Trichoderma harzianum*

ABSTRACT

Application of beneficial microbes offers an environmentally friendly alternative for mitigation of basal stem rot (BSR) disease in oil palm. However, the biocontrol mechanisms of *Trichoderma* against the pathogenic *Ganoderma* spp. which cause BSR are largely unknown at the molecular level. To identify the transcripts involved during induced systemic resistance (ISR), we analyzed the root transcriptomes of oil palm seedlings inoculated simultaneously with both *G. boninense* and *T. harzianum*, and un-inoculated oil palm seedlings, as well as those that were inoculated with either pathogenic or beneficial fungi. Our analyses revealed that the biocontrol mechanisms of *T. harzianum* against *G. boninense* involve modulation of genes related to biosynthesis of phytohormones (ethylene, MeJA and MeSA), antioxidant (l-ascorbate and myo-inositol) and unique secondary metabolites such as momilactone, cell wall metabolisms, and detoxification of phytotoxic compounds; in addition to its role as a biofertilizer which improves nutritional status of host plant. The outcomes of this study have fueled our understanding on the biocontrol mechanisms involving *T. harzianum* against *G. boninense* infection in oil palm roots.

Keyword: *Ganoderma*; Global gene expression; Induced resistance; Oil palm; *Trichoderma*