

Evaluation of *Trichoderma asperellum* B1902 in controlling *Fusarium* wilt of cavendish banana cultivar

ABSTRACT

Trichoderma species is one of the microorganisms with antagonistic properties as biological control agents. In the banana industry, *Fusarium* wilt disease caused by *Fusarium oxysporum* f. sp. *cubense* (Foc) has been practically managed using chemical pesticides that led to environmental disruptions, ineffective conditions and disease resistance. In preliminary study, *T. asperellum* gave better result compared to other species in inhibiting the growth of Foc in in vitro condition. Therefore, the aim of this study was to examine the effects of *T. asperellum* as a biological control of *Fusarium* wilt disease of banana. A total of 326 fungal isolates were isolated from soil samples obtained around Malaysia and identified as *Trichoderma* species based on phenotype characteristics. The species identity for the best candidates from dual culture test was confirmed based on internal transcribed spacers (ITS) and translation elongation factor 1 alpha (TEF-1 α) sequence identity. In dual culture test, findings showed that three isolates with a high percentage inhibition of radial growth (PIRG) were observed in plates of *T. asperellum* isolates B1902 (84.85%), T2007 (77.78%) and C1667 (75.76%), which successfully inhibited the growth of *F. oxysporum* f. sp. *cubense* isolate 9888. Based on in vivo test, the best candidate was *T. asperellum* B1902 with lower disease severity index (DSI) value of 0.2 compared to the inoculated control with DSI of 3.6. As a conclusion, *T. asperellum* B1902 can be used as an alternative treatment in managing *Fusarium* wilt disease. Hence, future study should be focused on applying *T. asperellum* as a biocontrol agent in the field and controlling other plant diseases in the agricultural plantation.

Keyword: Biological agent; *Fusarium oxysporum*; Malaysia; Panama disease