ABSTRACT

White root rot disease, caused by *Rigidoporus microporus* is a significant threat to coffee production in Indonesia. This study evaluated the incidence and severity of white root rot disease in coffee plants at IP2SIP Gayo, Bener Meriah, and assessed the antagonistic potential of 13 *Trichoderma* spp. isolates against *R. microporus* in vitro condition a completely randomized design. Field observations showed that shaded and unmanaged coffee fields exhibited a higher disease incidence (73%) and severity (41.25%) compared to unshaded and unmanaged fields (incidence 57% and severity 30%), suggesting that high soil moisture and shade promote di sease development. *In vitro* dual culture assays showed that *Trichoderma* spp. significantly inhibited the my sclial growth of *R. microporus* after 7 days of incubation. Isolates G2DTLM, G2DRLM, G3DTLD, and G2DTLD achieved the highest inhibition levels of 74.93%, 73,53%, 76.66%, and 72.89%, respectively. Microscopic observations confirmed the mechanisms of mycoparasitism, as evidenced by hyphal coiling, deformation, and cell lysis. This finding indcate that, *Trichoderma* spp. isolates have the potential to be promising biocontrol agents for suppressing white root rot in coffee plantations.

Keywords: Biologi control, coffee, Mycoparasitism, *Rigidoporus microporus, Trichoderma* spp.