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In Vitro Efficacy of *Trichoderma asperellum* and *Trichoderma Virens* in the Suppression of Avocado Stem-End Rot and Pineapple Black Rot

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Background: Postharvest diseases pose a substantial limitation for global food security, generating loss of 10-50% of the total fruit and vegetable output. Avocado (*Persea americana*) and pineapple (*Ananas comosus*) are two valuable fruit types with substantial global production and consumption. Stem end rot in avocados, induced by *Botryodiplodia theobromae*, and black rot in pineapples, caused by *Thielaviopsis paradoxa*, are widespread postharvest diseases that significantly diminish fruit quality and economic value. Due to the criticality of environmental and health hazards posed by synthetic fungicides, there is a necessity of sustainable alternatives. *Trichoderma* spp. has been shown to be effective as biocontrol agents against several pathogenic fungi.

Objective: This study assessed the in vitro antagonistic efficacy of two *Trichoderma* spp. (*T. virens* and *T. asperellum*) against the specified postharvest pathogens.

Methods: Following isolation and confirmation of each causal organism, dual culture assays were conducted on PDA plates with respective biocontrol agents (*Trichoderma virens* and *T. asperellum*), and percentage radial growth inhibition was calculated.

Results: After seven days of incubation, *T. asperellum* demonstrated greater radial fungal growth inhibition against *B. theobromae* (40.55%) compared to *T. virens* (34.66%). Conversely, *T. virens* displayed stronger antagonistic activity against *T. paradoxa* (56.44%) compared to *T. asperellum* (38.22%). Further, a Statistical analysis revealed no significant difference between the two *Trichoderma* species against each pathogen ($p > 0.05$), suggesting the potential use of both *Trichoderma* species as biocontrol alternatives to substitute synthetic fungicides in management of post-harvest diseases in avocado and pineapple. Nonetheless, validation via field experiments and evaluation of commercial feasibility are crucial for practical use.

Keywords: Biocontrol, *Botryodiplodia theobromae*, *Thielaviopsis paradoxa*, inhibition, radial growth