



## Evaluation of Properties of Extracellular Antifungal Metabolites Secreted by Four Antagonistic *Burkholderia* Strains for the Control of *Colletotrichum truncatum*

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### Abstract

In the replete of biological disease management strategies, microbial antagonism is becoming a promising disease control tool used by scientists. Among various mechanisms extended by antagonists, production of extracellular antifungal substances is of greater interest. Properties of cell-free culture supernatants of four antagonistic *Burkholderia* sp. against chilli anthracnose causal agent, *Colletotrichum truncatum* was assessed in this study. These antagonists were found to produce diffusible antifungal substances for antibiosis against *C. truncatum*. Cell-free culture supernatants of six days old nutrient broth cultures, which were centrifuged twice at 12000 rpm for 20 minutes and filtered through a 0.22 µm millipore membrane were used for the study. The effect of each of the extracts on *C. truncatum* mycelial growth and spore germination was evaluated and their heat stability, durability at both 4 °C and room temperature and their minimum inhibitory concentrations were also studied. All the selected antagonists were capable of producing and accumulating extra cellular antifungal compounds inhibiting the growth of *C. truncatum* within a five-day incubation period. Cell free culture supernatants contained 11.0 mg/ml total soluble solids. Culture filtrates of *Burkholderia multivorans* and *B. gladioli* isolates showed a remarkable thermostability at 120 °C, while *B. arboris* and *B. rinojensis* culture filtrates were thermally stable up to 100 °C. Cell-free culture supernatants of the antagonists retained their antifungal properties up to a maximum of 2 months at room temperature and up to 3 months at 4 °C. Minimum inhibitory concentrations of culture filtrates of *B. multivorans*, *B. arboris*, *B. gladioli* and *B. rinojensis* were 4.85 mg/ml, 1.62 mg/ml, 7.42 mg/ml and 6.59 mg/ml respectively. Antifungal metabolites biosynthesized by *Burkholderia* sp. were mostly organic solvent soluble molecules, which could be extracted into ethyl acetate. The ethyl acetate fraction of the culture supernatant showed a minimum inhibitory concentration of 2 mg/ml on *C. truncatum* mycelial growth suppression. These properties of cell-free culture



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supernatants produced by the antagonistic *Burkholderia* strains provide an excellent opportunity for chilli anthracnose disease management.

**Key words:** Antagonists, Antifungal, Biological control, *Burkholderia* sp., Cell-free culture supernatants

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