

# Antimicrobial effect of rhizome and medicinal herb extract in controlling postharvest anthracnose of dragon fruit and their possible phytotoxicity

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## Abstract

A study was conducted to evaluate the antifungal effect of ginger, turmeric rhizome and “dukung anak” (medicinal herb) crude extract against *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. at minimal concentrations 2.5 g L<sup>-1</sup>, 5.0 g L<sup>-1</sup>, 7.5 g L<sup>-1</sup> and 10.0 g L<sup>-1</sup> (*in vitro*). Additionally, the possibility of using these extracts as an edible coating to control postharvest anthracnose in dragon fruits at maximum concentrations of 5.0 g L<sup>-1</sup>, 10.0 g L<sup>-1</sup> and 15.0 g L<sup>-1</sup> (*in vivo*) were elucidated. The results showed that all plant extracts possessed significant antifungal activity against *C. gloeosporioides* by inhibiting mycelial growth and conidial germination, and caused distortion, shrinking and swelling of fungal hyphae. Ginger crude extracts at 10.0 g L<sup>-1</sup> showed the best effect *in vitro* by suppressing mycelial growth (88.48 %) and conidial germination (87.50%) which was comparable to commercial fungicide (Mancozeb) at 2.0 g L<sup>-1</sup> (80.45%). *In vivo* study showed that all plant crude extract at 15.0 g L<sup>-1</sup> compounded disease incidence (DI) and disease severity (DS) due to phytotoxicity. However, using “dukung anak” at 5.0 g L<sup>-1</sup> or 10.0 g L<sup>-1</sup> significantly controlled anthracnose and this was not different in turmeric-treated fruits at 10.0 g L<sup>-1</sup> after 28 days of cold storage at 11 ± 2 °C, 80% RH. On the contrary, dragon fruits treated with ginger at 5.0 g L<sup>-1</sup> and above experienced severe disease incidence due to phytotoxicity. In conclusion, crude extract of dukung anak or turmeric can be used as bio-fungicide to control anthracnose in dragon fruits at 10.0 g L<sup>-1</sup>, while concentration at 15.0 g L<sup>-1</sup> and above may exacerbate diseases in dragon fruits due to phytotoxicity.