

**TITLE:** COMBINATION OF CHITOSAN AND *Mentha* ESSENTIAL OILS TO CONTROL ANTHRACNOSE CAUSED BY *Colletotrichum gloeosporioides* AND *C. brevisporum* IN PAPAYA fruit

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**ABSTRACT:**

Anthrachnose is the most important disease attacking papaya, causing important postharvest losses. *Colletotrichum gloeosporioides* has been commonly reported as the main causal agent of papaya anthracnose. However, other *Colletotrichum* species have been also associated with papaya anthracnose in different countries. The excessive and continuous use of chemical fungicides has been associated with the development of antifungal resistance in *Colletotrichum* species. This study investigated the efficacy of chitosan (Chi), *Mentha piperita* L. (MPEO) and *Mentha x villosa* Huds (MVEO) essential oil alone or in combinations to inhibit the growth of *Colletotrichum gloeosporioides* and *C. brevisporum* isolates associated with anthracnose in papaya cv papaya (*Carica papaya* L.) fruit. The efficacy of combined concentrations of Chi and MPEO or MVEO to control the development of anthracnose lesions in papaya fruit (papaya) caused by tested *Colletotrichum* isolates was also evaluated during 10 days of storage ( $25 \pm 0.5$  °C). Chi (2.5, 5, 7.5 and 10 mg/ mL), MPEO and MVEO (0.15, 0.3, 0.6 and 1.25  $\mu$ L/mL) alone effectively inhibited the mycelial growth of three testes isolates of *C. gloeosporioides* and *C. brevisporum* in laboratory media. Combinations of Chi (5 or 7.5 mg/mL) and MPEO or MVEO (0.15, 0.3, 0.6 or 1.25 mL/mL) inhibited the growth of tested *Colletotrichum* isolates and presented in most cases additive or synergistic interactions, as assessed by Abbott index. Development of anthracnose lesions induced by *C. gloeosporioides* and *C. brevisporum* isolates was reduced by coatings formed by Chi (5 mg/mL) and MPEO or MVEO (0.3, 0.6 or 1.25  $\mu$ L/mL) combinations during storage. Decreases in anthracnose lesion development in papaya coated with 5 mg/mL Chi and 0.6 or 1.25  $\mu$ L/mL MPEO or MVEO were similar or higher than those caused by a commercial fungicides formulation. The application of coatings formed by combinations of selected Chi and MPEO or MVEO concentrations could be considered an alternative strategy to control papaya anthracnose caused by *C. gloeosporioides* and *C. brevisporum*.

**Keywords:** Papaya, mold decay, *Colletotrichum* spp., edible coating

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