

Postharvest application of partitioned plant extracts from Sinaloa, Mexico for controlling papaya pathogenic fungus *Colletotrichum gloeosporioides*

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Abstract

Anthraxnose compromises papaya production and is caused by the fungus *Colletotrichum gloeosporioides*. New natural alternatives to synthetic fungicides are necessary to control anthracnose due to health and environmental concerns. In this regard, extracts of plants from Sinaloa, Mexico, have shown activity against molds and yeasts with medical and agricultural importance; however, their protective effect on papaya fruit infected with *C. gloeosporioides* is still unknown. This study aimed to assess the *in vitro* and *in vivo* antifungal activities of crude methanol extracts (ME) from nine plants from Sinaloa, Mexico, and their semi-purified fractions. *In vitro* assays showed that *C. gloeosporioides* was inhibited by 7 out of the 16 extracts assessed; *Psidium sartorianum* (pulp), *Echeveria kimnachii* (leaf), and *Vitex mollis* (VM) (pulp) had the highest antifungal activity and the lowest toxicity against *Artemia salina*. When these extracts were fractionated, the activity increased. Hexane (HF-VM) and ethyl acetate (EAF-VM) fractions of *V. mollis* were the most effective fractions (MEF), with the lowest minimum inhibitory concentration (MIC) (20 and 30 mg/mL, respectively). The *in vivo* results showed that HF-VM at 40 mg/mL (HF40) was the best to delay the apparition and development of anthracnose symptoms. Coumarins, alkaloids and terpenes were detected on this fraction by tube assays or thin layer chromatography (TLC). Moreover, this treatment decreased water loss and did not affect any of the quality parameters assessed. Therefore, HF40 is a natural alternative to thiabendazole (TBZ) in the protection of papaya fruit against anthracnose.