

Antifungal activity and phytochemical screening of *Vernonia amygdalina* extract against *Botrytis cinerea* causing gray mold disease on tomato fruits

ABSTRACT

Gray mold disease caused by *Botrytis cinerea* is a damaging postharvest disease in tomato plants, and it is known to be a limiting factor in tomato production. This study aimed to evaluate antifungal activities of *Vernonia amygdalina* leaf extracts against *B. cinerea* and to screen the phytochemical compound in the crude extract that had the highest antifungal activity. In this study, crude extracts of hexane, dichloromethane, methanol, and water extracts with concentration levels at 100, 200, 300, 400, and 500 mg/mL were shown to significantly affect the inhibition of *B. cinerea*. Among the crude extracts, dichloromethane extract was shown to be the most potent in terms of antifungal activities. The SEM observation proved that the treatment altered the fungal morphology, which leads to fungal growth inhibition. For the *in vivo* bioassay, the fruits treated with dichloromethane extract at 400 and 500 mg/mL showed the lowest disease incidence with mild severity of infection. There were 23 chemical compounds identified in *V. amygdalina* dichloromethane extract using GCMS analysis. The top five major compounds were dominated by squalene (16.92%), phytol (15.05%), triacontane (11.31%), heptacosane (7.14%), and neophytadiene (6.28%). Some of these significant compounds possess high antifungal activities. This study proved that *V. amygdalina* from dichloromethane extract could be useful for inhibiting gray mold disease on tomato fruit and has potential as a natural antifungal agent.

Keyword: *Vernonia amygdalina*; Antifungal activity; *Botrytis cinerea*; Phytochemical; Tomato; Gray mold disease