

ID 120

Evaluation of volatile antifungal properties of cinnamon leaf and bark oils for managing banana anthracnose disease caused by *Colletotrichum musae* at post-harvest stage

S.D.M.K. Wimalasena¹, N.P. Ranathunge^{1*} and P.A.B.N. Perumpuli²

¹Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka.

²Department of Food Science and Technology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka.

Abstract

High postharvest losses occur in bananas due to the banana anthracnose disease. Application of cinnamon oil against the banana anthracnose pathogen is an effective solution for the postharvest losses. The volatile antifungal properties of cinnamon oil were evaluated against *Colletotrichum musae*, the causal agent of banana anthracnose disease under *in vitro* and *in vivo* conditions. The pathogen was isolated from infected banana fruits and cultured on potato dextrose agar (PDA). The antifungal efficacy of cinnamon oils on *C. musae* was evaluated *in vitro* using a series of volumes of the oils (0.1 – 4.4 µl/cm³), using a culture chamber method. The *in vitro* test revealed that 0.1 µl/cm³ level was sufficient to suppress the mycelia growth and spore germination of *C. musae*. For the *in vivo* evaluation, artificially inoculated banana fruits at the ripening stage were exposed to 25%, 50% and 100% concentrations of cinnamon leaf oil and bark oil (0.1 µl/cm³) at room temperature (27 °C) under ambient light to evaluate the anthracnose lesion development on the fruit surfaces. Average diameters of the lesions were recorded in 12 and 14 days after treatments. The minimum level to achieve significant lesion inhibition ($p < 0.005$) without damaging the fruit peel was the 50% concentration of cinnamon bark oil. Physical, chemical properties and organoleptic properties of the treated banana were evaluated along with the untreated fruits to assess their eating quality. The oil treatments did not significantly change the organoleptic properties of Cavendish banana except the taste, in which the leaf oil treated sample received less score. Fruit firmness of cinnamon bark oil and leaf oil treated banana samples were 3.44 N and 1.46 N, respectively compared to the control (3.2 N) ($p < 0.005$). The pH and titratable acidity of bark oil and leaf oil were 6.08, 5.72 and 1.50%, 0.99%, respectively ($p < 0.005$). The total soluble solid content of leaf oil treated sample was 22.90 % of Brix while that of bark oil was 26.40% of Brix. It was concluded that, among the treatments used Cavendish banana exposed to 50% cinnamon bark oil is the most effective for the control of banana disease without compromising fruit quality parameters under the tested conditions.

Keywords: Banana, Cinnamon leaf and bark oil, *Colletotrichum musae*

***Corresponding Author:** nalika@agbio.ruh.ac.lk