

**RARE**

**INVESTIGATION OF BIOCHEMICAL AND PATHOLOGICAL CHANGES  
FOLLOWING POST HARVEST TREATMENT OF *Musa acuminata*  
(Var. EMBUL) WITH ESSENTIAL OILS**

By

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## ABSTRACT

Anthrachnose and crown rot are the most common post harvest fungal diseases of banana. *Colletotrichum musae* was isolated and identified as the causative agent responsible for anthracnose peel blemishes while three fungi namely, *Lasiodiplodia theobromae*, *Colletotrichum musae* and *Fusarium proliferatum* were identified as causative agents responsible for crown rot of 'Embul' banana. The above identified organisms were treated *in vitro* with volatile extracts of cinnamon (*Cinnamomum zeylanicum* Blume) leaf and bark and buds of clove [*Syzygium aromaticum* (L.) Merr et L.M.Perry]. These oils showed high fungistatic and fungicidal activity between the ranges of 0.30 mg/ml – 0.64 mg/ml and 0.40 mg/ml – 1.17 mg/ml respectively. Benomyl a standard fungicide was fungicidal within the range of 0.005 – 0.007 mg/ml. The antifungal constituents of the test essential oils which were separated and identified by TLC & GC, were eugenol, eugenyl acetate, cinnamaldehyde,  $\alpha$ -terpineole, camphene, 1,8 cineole, cinnamyl acetate, myrcene,  $\beta$ - caryophyllene, terpinene-4-ol, cinnamyl alcohol, acetyl eugenol and  $\alpha$ -humulene.

Mature "Embul" banana were treated with fungicidal essential oils of cinnamon bark, leaf and clove and packed under modified atmosphere (MA) and stored at 14 °C, 90% r.h. and ambient temperature (28 ± 2 °C) separately. Benomyl was sprayed as a standard fungicide. The storage life of 'Embul' banana was lengthened up to 14 and 21 days, which was stored at 28 ± 2 °C and 14 °C respectively. The physico-chemical properties of oil treated banana stored at the two temperature regimes showed no significant difference in comparison to the control. The banana stored at 28 ± 2 °C treated with

cinnamon bark (0.8 or 1.6 mg/ml) and cinnamon leaf (2.34 mg/ml) oils and banana stored at 14 °C treated with cinnamon bark (1.6 mg/ml) and cinnamon leaf (2.34 mg/ml) oils showed significantly low disease severity than that of control. The evaluation of organoleptic properties indicated that cinnamon bark (1.6 mg/ml) and cinnamon leaf (2.34 mg/ml) oil treated banana stored at 28 ± 2 °C showed significantly higher acceptability than that of control and benomyl treated banana.

Polyphenol Oxidase (PPO), which is responsible for the enzymatic browning, was isolated from 'Embul' banana. Cinnamon leaf, bark and clove oils were found to inhibit the oxidation of L-3,4 dihydroxyphenylalanine (L-DOPA) by PPO with an ID<sub>50</sub> of 0.085 mg/ml, 0.115 mg/ml and 0.078 mg/ml respectively.