

Alternative Methods to Control Postharvest Diseases of Rambutan

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SUMMARY

Anthraxnose (*Colletotrichum gloeosporioides*) stem-end rot (*Botryodiplodia theobromae*) and brown spot (*Glioccephloricum microchlamydosporum*) are the major postharvest diseases of rambutan fruit (*Nephelium lappaceum* Lin) cv. Malwana special selection in Sri Lanka. The occurrence of the three diseases was significantly reduced to 37%, while retaining the overall quality of the fruits for 14 days at 13.5^o C and at 95% RH by a dip treatment with potassium metabisulphite at 250 ppm. Blotting sheets impregnated with cinnamaldehyde at 30 ppm served as an in-package fumigant to reduce the occurrence of the above mentioned three postharvest diseases in low temperature storage at 13.5^o C for 14 days while retaining the colour and overall quality.

Soil fungus *Trichoderma harzianum* (TrH 40) isolated from the soils of rambutan orchards in the Western Province had antagonistic effects against the three postharvest pathogens. TrH 40 was mycoparasitic, showed antibiosis and caused disintegration of mycelia of the postharvest pathogens. The antagonistic effect was greater on *G. microchlamydosporum*. The antagonistic activity of the TrH 40 was highest after 12 days incubation at 28^o C. The antibiosis of TrH 40 was effective up to 120^o C. Application of Ca²⁺ improved the efficacy of the biocontrol agent TrH 40.

All three postharvest pathogens secreted pectic enzymes, polygalacturonase (PG) and pectin lyase (PL) in culture, but only PL was present in infected tissues.

The *in vivo* PL activity was highest in *B. theobromae* infection. The four Generally Regarded As Safe (GRAS) compounds, potassium metabisulphite (250 ppm), cinnamaldehyde (30 ppm), acetaldehyde (70 ppm) and benzaldehyde (50ppm) reduced both *in vivo* and *in vitro* PL activity and *in vitro* PG activity. The effect of potassium metabisulphite was greater than the other three GRAS compounds tested. The effect of potassium metabisulphite was high on *G. microchlamydosporum*.

The storage life of rambutan cv. Malwana special selection was extended to 18 days by the combined application of potassium metabisulphite at 250 ppm and *T. harzianum* (TrH 40). The postharvest diseases did not occur and the overall quality of the fruits was retained. Rambutan cv. Malwana special selection 1 fruits dipped in potassium metabisulphite at 250 ppm and stored in low temperature storage as mentioned earlier under controlled atmosphere (CA) (7% CO₂ & 5 % O₂) was disease free and also retained the overall quality up to 21 days.