

Effect of Plant Extract, Chitosan Coating, Hot Water Treatment and their Combination on Postharvest Crown Rot Diseases of Banana cv. Kluai Hom Tong

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Abstract

Effects of plant extracts, chitosan, hot water treatment (HWT) and their combinations on crown rot diseases and quality of banana fruit cv. Kluai Hom Tong were evaluated. *In vitro* trials were conducted on potato dextrose agar (PDA) with 0, 100, 500, 1,000, 5,000 and 10,000 ppm of the extracts of cinnamon (CE), piper and garlic to compare with 750 ppm carbendazim (CBZ) at room temperature. The result revealed that the cinnamon extract (CE) completely inhibited the conidial germination and mycelial growth of all three fungi; *Colletotrichum musae*, *Fusarium* spp. and *Lasiodiplodia theobromae* at 5,000 pp with regard to control. The piper extract at 5,000 ppm totally suppressed the mycelial growth of all fungi while the conidial germination was 0.33, 33.33 and 10% for *C. musae*, *Fusarium* spp. and *L. theobromae*, respectively. However, garlic extract had not significant effect on both conidial germination and mycelial growth of all fungi. The ED₅₀ values of cinnamon extract were 588, 692 and 1,950 ppm for mycelial growth of *C. musae*, *Fusarium* spp. and *L. theobromae* and 91,758 and 50 ppm for their conidia germination. *In vitro* study, the banana fruit were treated with 5,000 ppm CE, 1% (w/v) chitosan solution, hot water treatment (HWT, 45°C for 20 min), combined CE and chitosan, combined CE and HWT and 750 ppm CBZ and kept at cold storage of 13 °C for 7 weeks and disease severity of treated fruit was investigated. The results expressed that CE was the least disease severity of crown rot 25% while 100%, 80% and 30-50% in untreated control, CBZ and other treatments after stored for 5 weeks, respectively, when inoculation was done before treatment. However, the effectiveness of CE on disease severity was reduced, when inoculation was applied after treatment. The combination of CE and HWT was not recommended to use for controlling postharvest banana crown rot disease because of heat injury. The quality of banana treated with CE, chitosan, HWT and the combined CE and chitosan was further investigated on displayed shelf life at room temperature for 7 day after one month at cold storage. The results indicated that the CE extract had no negative effect on the quality criteria; weight loss, color changes of peel, respiration rate and ethylene production rate. The chitosan coating delayed in ripening process and quality loss such as firmness of peel and pulp and total soluble solid of treated fruits. However, the effectiveness of chitosan in delaying ripening process was decreased when it was combined with cinnamon extract. These results suggested that the combination of CE and chitosan were not compatible for maintaining the quality of banana fruit.

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