

Pre-storage chitosan-thyme oil coating control anthracnose in mango fruit

Sadiq Shah, Majid S. Hashmi, Ihsan Mabood Qazi, Yasser Durrani, Ali Sarkhosh, Ibrar Hussain and Jeffrey K. Brecht

Scientia Horticulturae 284: 110139. (2021)

Abstract

Anthracnose caused by *Colletotrichum gloeosporioides* is a severe postharvest mango disease. Postharvest application of fungicides is necessary to effectively control this disease, however, many of these fungicides are not allowed in many countries. In this study we aimed to investigate the combined effect of 1% chitosan plus 400 $\mu\text{L L}^{-1}$ thyme oil to control anthracnose and improve shelf life of mango fruit (cv. White Chaunsa). We found that 400 $\mu\text{L L}^{-1}$ thyme oil can completely inhibit *in vitro* mycelial growth of the fungus *C. gloeosporioides*. However, the combined application of 1% chitosan plus 400 $\mu\text{L L}^{-1}$ thyme oil was more effective than thyme oil (400 $\mu\text{L L}^{-1}$) alone in controlling the disease in artificially inoculated mango fruit. Furthermore, this combined treatment significantly ($P \leq 0.05$) decreased naturally occurring decay. A mechanism related to promotion of fruit resistance by stimulation of phenolic metabolism is suggested by elevated phenylalanine ammonia-lyase (PAL) and peroxidase (POD) activities as compared to both the control and the synthetic fungicide Prochloraz. In addition, retention of physicochemical properties such as titratable acidity, total soluble solids, firmness, weight loss, color, and higher scores for sensory perception confirmed the efficacy of the treatment. This study demonstrated that the application of 1% chitosan plus 400 $\mu\text{L L}^{-1}$ thyme oil more effectively controlled mango anthracnose as compared to synthetic fungicide; however, the commercial efficacy of the treatment needs to be tested.