

Postharvest application of thiabendazole reduces chilling injury of citrus fruit

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Abstract

All citrus fruit exported from South Africa to USA and China undergoes a mandatory 22 day exposure to a temperature of -0.6°C in addition to a 3-day pre-cooling at the same temperature. The cold treatments are done to kill insect larvae of false codling moth (FCM), *Thaumatotibia (Cryptophlebia) leucotreta* (Meyrick) (*Lepidoptera: Tortricidae*) and the Mediterranean fruit fly *Ceratitis capitata* (*Diptera: Tephritidae*), in fruit destined for these markets. This temperature protocol is known to cause chilling injury to the rind of all cultivars. Previous studies indicate that the use of thiabendazole is effective in reducing the incidence of chilling injury in certain *Citrus* cultivars. The aim of this study was to determine the effect of different postharvest fungicides i.e., Benzimidazole, Benazid[®], Thiabendazole (Tecto[®]) and Thiabendazole (ICA-TBZ[®]), on the chilling injury susceptibility of ‘Washington Navel’ oranges (*Citrus sinensis* L. Osb.) in warm and cold baths. In addition it was also determined if the use of different dilutions of the most effective fungicide Tecto[®] in warm and cold water baths reduces the incidence of chilling injury in two ‘Navel’ orange cultivars i.e., ‘Autumn Gold’ and ‘Cambria’. Different fungicides at commercial rate, Benzimidazole (20 g/10 L), Benazid[®] (40 ml/20 L), Tecto[®] (40 ml/20 L) and ICA-TBZ[®], 80 ml/20 L) were applied to ‘Washington Navel’ oranges. The concentrations of Tecto[®] tested were the commercial rate (40 ml/20 L) as well as a half and quarter of this concentration. These treatments were applied to the fruit for two minutes in either cold water (10°C) or warm water (45°C). Thereafter the fruit were stored at a temperature of -0.5°C for 35 days, followed by a shelf life (20°C for 7 days), prior to scoring of chilling injury incidence and severity. The results indicated that the TBZ treatments were most effective in reducing the incidence and severity of chilling injury and were more effective when used in warm water than in cold water. Further research will focus on the mode of action in addition to optimizing postharvest application in the citrus packhouse.