

Terpinen-4-ol treatment maintains quality of strawberry fruit during storage by regulating sucrose-induced anthocyanin accumulation

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Abstract

Terpinen-4-ol, the main component of tea tree oil, controls postharvest decay of strawberry fruit. In this study, nuclear magnetic resonance (NMR)-based metabolomics was used to investigate global metabolic profiles in strawberries treated with terpinen-4-ol and stored at 20 °C for 3 d. Measurements showed higher levels of sucrose and fructose, and lower levels of α -d-glucose, β -d-glucose, and citric acid in terpinen-4-ol-treated fruit. Treatment also increased expression of *FaSS* and *FaSPS* mRNAs and decreased expression of *FaAI*. Terpinen-4-ol treatment maintained higher anthocyanin levels accompanied by increasing the expression of genes in the pentose phosphate, phenylpropanoid, and flavonoid pathways, and transcription factor MYB10. In addition, expression of *FaSnRK1* was also increased in terpinen-4-ol-treated fruit. We conclude that terpinen-4-ol maintains strawberry fruit quality by regulating sucrose metabolism and anthocyanin biosynthesis, and that *FaSnRK1* perceives the higher sucrose levels to induce anthocyanin accumulation in treated fruit.