

Regulation of sugar metabolism by methyl jasmonate to improve the postharvest quality of tomato fruit

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Abstract

Many fruits are harvested at the early ripening stage and left to attain an edible stage during the post-ripening process or by ethylene treatment. However, the post-ripening quality of fruit is generally inferior to the quality of fruit that ripened naturally. Sugar metabolism plays critical roles in regulating fruit flavor and stress responses. Methyl Jasmonate (MeJA) treatment modulates sugar accumulations and postharvest fruit quality. However, the regulation mechanism of MeJA on sugar metabolism and its relationship with fruit post-ripening quality are unclear. The results indicated that MeJA-treated fruit possessed higher total antioxidant, lycopene and soluble solids content and lower electrical conductivity and malondialdehyde content. Besides, the post-ripening quality of fruit was strongly related to the starch and sucrose content. Compared to the control and ethephon treatments, MeJA treatment increased the activities and transcript levels of amylase, sucrose phosphate synthase (SPS) and sucrose synthase (SUS), but decreased the activities and transcript levels of acid invertase and neutral invertase. Further analysis suggested that the sucrose content had a strongly positive correlation with the activities and transcript levels of SUS and SPS, except *SISPS2*. Thus, MeJA treatment improved fruit post-ripening quality by regulating sugar metabolism.