

Title Cultivar variability in the response of tomato fruit lycopene synthesis and antioxidant potential to a brief postharvest heat stress

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Abstract

The overall objective of this project is to utilize directed postharvest stress and optimization of the postharvest environment to maximize the genetic potential of the tomato fruit to produce more nutritionally important secondary compounds while maintaining or improving its appealing flavor and aroma characteristics. We hypothesized that brief, directed applications of non-injurious heat stress followed by maintenance of conducive handling temperatures can be used to redirect the secondary metabolism of tomatoes to stimulate tissue antioxidant and aroma volatile systems during ripening. Mature green fruit of seven different tomato cultivars, including one containing the crimson gene for high lycopene content, were exposed to 25, 52 or 54°C water for 2.5 or 5 minutes, then exposed to 100 ppm ethylene in air for 2 days at 20°C followed by ripening in air at 20°C. Lycopene content and antioxidant potential at the full red ripeness stage was increased by 10 to 50% in fruit exposed to 52 or 54 °C water compared to the 20°C water control treatment and varied by circa 50% among the different cultivars.