Physicochemical and molecular properties of tomato cultivars harvested at different stages show different patterns during post-harvest ripening

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Abstract

Tomato is the second most important non-cereal crop after potato in terms of consumption and agro-based industries worldwide. In this study, we examined fruit quality characteristics and cell wall-associated fruit softening of three different-coloured tomatoes, 'Sarikiz' with yellow, 'Moda' with orange and 'Cherry' with red colour, harvested at the mature green, breaker, and ripe stages, and stored for the following 3 weeks. Fruit firmness significantly declined in all varieties and reached the softest level in all fruits harvested at the ripe stage and stored for 21 days. The decrease in fruit firmness was related to higher water-soluble pectin, higher expression level of cell wall-related genes, but not related to the integrity of fruit flesh in post-harvest storage conditions. The expression level of *SlPSY1* was the highest in Cherry and the lowest in Sarikiz varieties. These results indicate that fruit softening in post-harvest storage conditions is directly related to harvested ripening stage, regardless of the variety.