Title Assessment of fruit quality attributes of tomato hybrids involving ripening mutants under high temperature conditions

Author Naveen Garg and Devinder Singh Cheema

Citation Scientia Horticulturae, Volume 131, 22 November 2011, Pages 29-38

Keywords Heterosis; High temperature; *nor*; Quality; *rin*; Tomato

Abstract

Tomato (*Solanum lycopersicum* L.) is the most important horticultural crop worldwide. High temperature causes significant losses in tomato production due to reduced fruit set and lower quality fruits. A few pleiotropic, single gene ripening mutants such as slow-ripening alcobaca (*alc*), ripening inhibitor (*rin*), and non-ripening (*nor*) have been reported in tomato. The F_1 hybrids involving these mutants have in the past been shown to extend shelf life, fruit availability period, increase yield under ideal and high temperature stress conditions but there was no report regarding their quality attributes under high temperature conditions. Therefore in the present study, 60 F_1 hybrids were developed by crossing 15 normally ripening lines with four mutant homozygotes. These hybrids along with their 19 parents were evaluated under high temperature conditions for 10 quality parameters, *viz.*, fruit firmness, number of locules, pericarp thickness, alcohol insoluble solids (AIS), lycopene, dry matter, total soluble solids (TSS), titratable acidity, TSS/acid ratio, and ascorbic acid. The mutant homozygotes showed comparatively higher fruit firmness, pericarp thickness and AIS and lower lycopene content than normal ripening lines. The mid-parent heterosis varied from −19.60 to 87.18% for fruit firmness index, −34.12 to 33.95% for number of locules, −33.60 to 32.93% for pericarp thickness, −39.52 to 36.33% for AIS, 20.74–134.69% for lycopene, −31.21 to 31.65% for dry matter, −30.43 to 76.62% for TSS, −48.21 to 82.86% for titratable acidity, −48.39 to 64.98% for TSS/Acid ratio and −36.96 to 79.83% for ascorbic acid. All the 60 hybrids had significantly higher lycopene content than their respective mid-parental values whereas for other traits hybrids exhibited average heterosis in both the directions. Overall the fruits of F_1 hybrids incorporating *rin*, *nor* and *alc* alleles had very good quality attributes, *viz.*, colour, texture, taste and nutritional quality under high temperature conditions. The utilization of these ripening mutants open up new avenues for the development of potential hybrids capable of producing economic yield of good quality even under high temperature conditions.