Evaluation of apricot fruit quality diversity in two countries, France and New Zealand

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Abstract

New Zealand and French stonefruit industries desire new long-storing, sweet-tasting apricot cultivars. The climacteric nature of apricots (high ethylene production that stimulates softening via cell wall degradation) shortens their storage life. Breeders in France (FR) and New Zealand (NZ) have some apricot populations producing fruit with unusually low climacteric behavior and with a range of total soluble solids (TSS).

Trials in FR and NZ shared the same research protocols, for optimal comparison and verification. Fifty genotypes representative of fruit diversity in each country were studied in June-July 2016 in FR and January-February 2017 in NZ. For each genotype, six fruit, selected according to firmness, were characterized for fruit quality traits on the day of harvest.
Measurements were: intact fruit: compression firmness, Near Infrared Spectroscopy (NIRS), ethylene production, and skin color; and fruit tissue samples: Mid Infrared Spectroscopy (MIRS), TSS, titratable acidity (TA), and individual sugar and organic acid contents.

A large diversity was observed for firmness, from 2 to 55 N in NZ and 2 to 36 N in FR. Ethylene production ranged from 0 to 996 nmol/h.kg in NZ and 0 to 3000 nmol/h.kg in FR, and discriminated between known low- and high-ethylene cultivars. Conversely, the variability was larger in NZ than in FR for biochemical content: TSS ranged from 8 to 24°Brix in NZ and 10 to 22°Brix in FR, and TA from 3 to 514 meq/kg in NZ and 22 to 350 meq/kg in FR. Acceptable prediction of TSS and TA was observed for NIRS and of TSS, TA, and individual sugar and organic acid contents for MIRS.

NIRS and MIRS have the ability for rapid fruit characterization and discrimination across countries. The fruit genetic variability opens new opportunities for the breeding programs.

Keywords:

Apricot, fruit, genetic diversity, Infrared Spectroscopy, quality traits, MIRS, NIRS, ethylene.