

Title Tissue sampling method and mineral attributes to predict bitter pit occurrence in apple fruit: A multivariate approach

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Abstract

Apples susceptibility to bitter pit (BP) is associated with low Ca contents and high Mg/Ca, K/Ca and N/Ca ratios in the fruit. However, the method of fruit tissue sampling to assess these mineral attributes affects the reliability to predict BP. This study was carried out to identify the best tissue sampling method and mineral attribute to discriminate apple fruit regarding the occurrence of BP. 'Fuji' and 'Catarina' apples (known by the low and high susceptibility to BP, respectively) were separated in lots without and with BP symptoms, after four months of cold storage (0 ± 0.5 °C and 95 % RH), and then analyzed for mineral content in the peel, flesh and peel+flesh of the fruit. The calyx-end of the fruit was used for peel (thickness of 0-2 mm) and flesh (thickness of 2-8 mm) sampling methods. For the peel+flesh, a wedge-shaped segment was cut longitudinally from the fruit, discarding the core tissue. Canonical discriminate analysis (a multivariate technique) was carried out to assess the best fruit tissue sampling method and mineral attribute (Ca content and the Mg/Ca, K/Ca e N/Ca ratios) to segregate fruit without and with BP, for each cultivar. The results show that mineral analysis of peel+flesh is less suitable to discriminate fruit of both cultivars for BP occurrence. Also, the choice of using peel or flesh for mineral analysis depends on cultivar. The peel in 'Fuji' and the flesh in 'Catarina' are the best sampling tissues, and in both situations the Mg/Ca ratio was the mineral attribute that provided the best discrimination between fruit without and with BP.