

Sphingolipids associated with flesh browning onset and development in ‘Cripps Pink’ apples (*Malus domestica* Borkh.)

Javier Sánchez-Contreras, David Rudell, James Mattheis and Carolina A. Torres

Postharvest Biology and Technology, Volume 180, October 2021, 111623

Abstract

Flesh browning (FB) of ‘Cripps Pink’ apples can cause significant economic losses to apple producers worldwide. FB symptoms and etiology can vary for this cultivar. Specific metabolic fingerprint has the potential for identification and understanding of different disorders leading FB postharvest. Flesh tissue from fruit collected starting 150 days after full bloom, through harvest, then, until 7 months into cold storage were sampled for non-targeted metabolic analyses using gas and liquid chromatography coupled with mass spectrometry. Radial FB development was positively associated with sphingolipids metabolism. Elevated levels of multiple glucocerebrosides and ceramides were found in apples at risk for developing the disorder and with symptoms, while the concentrations of a different group of inter-related metabolites tentatively as sphingolipids increased in healthy tissue during storage. Based on previous reports in other plant and animal species, elevated sphingolipid concentrations may be associated with membrane lipid catabolism, cell apoptosis, and fruit senescence involved in FB symptom development.