

**Title** Postharvest changes in pigment concentrations in 'Fuji' apples with 'Fuji' stain  
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### **Abstract**

'Fuji' apples (*Malus domestica* Borkh cv. 'Fuji') sometimes develop a discolouration in the peel during cold storage, typically in the periphery of sunburned peel. We refer to this particular postharvest disorder as 'Fuji' stain as we have not observed it in any cultivar other than 'Fuji' and the discolouration looks like a stain on the peel. Because peel discolouration occurs, peel pigments are thought to be involved. Hence the concentrations of anthocyanins, epicatechin, quercetin glycosides, chlorogenic acid, chlorophylls, and carotenoids in peel disks taken from areas exhibiting 'Fuji' stain were compared to concentrations observed in peel disks not exhibiting 'Fuji' stain. In 2005, peel from sunburned apples exhibiting 'Fuji' stain was compared to peel from three areas of sunburned apples not exhibiting stain [i.e. sunburned peel, the area around the sunburned peel (halo), and the area around the halo (OH)]. Additionally, stained peel was compared to the sun-exposed side of non-stained non-sunburned apples (NSNB). The second year, 2006, we compared stained peel to NSNB peel and the area outside the stained area (OS) on those fruit with stain. The concentrations of idaein, epicatechin, and quercetin glycosides were consistently low in the stained peel both years. This is in contrast to our earlier studies in which sunburned 'Fuji' apples had high concentrations of quercetin glycosides and epicatechin and low concentrations of idaein, and non-sunburned apples had low concentrations of quercetin glycosides and epicatechin and high concentrations of idaein. The consistent and unique characteristic of stained peel reported here indicates an association of these compounds with the incidence of stain. In 2005, chlorogenic acid concentrations in the stain peel were lower than other peel types, but in 2006 they were higher. Differences in chlorophyll and carotenoid concentrations were observed among many of the peel types. However, there is not a clear association between stain development and changes in chlorophyll and carotenoid concentrations due to significant differences not being observed in both years. While our research provides insight into pigment changes associated with 'Fuji' stain formation, more work is needed to help clarify the inconsistencies observed between the 2 years.