

Title Temporal changes in individual phenolics and sugars in imported nectarines subjected to simulated "Real World" supply chain conditions

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Abstract

Most previous research has not considered the effects of the 'real world supply' chain on quality attributes of ready-to-eat imported stone fruit. This work tackles this outstanding problem by simulating and assessing the effect of different storage regimes to reflect current practice in the real-world supply chain between Spain and the UK, considering ripening, transit, shelf life and home life. Late season nectarines of two different yellow-flesh, clingstone, melting cultivars (classical vs. new style variety) were used. Two different scenarios were considered: for scenario 1, fruits were not cool-stored after arrival (reflecting current practice), and for scenario 2, the storage period (2°C) was extended for 14 days. Fruits were then ripened at 18°C for 24h, and stored at 5°C for a further five days and eventually held at room temperature for a further four days reflecting retail and home life, respectively. Fruit were sampled at arrival at the Plant Science Laboratory (UK), after 14 days of cool storage, just after the ripening period and again at day 0, 2 and 4 of home life.

Individual sugars (sucrose, fructose and glucose) and individual phenolic compounds (procyanidin B1, catechin, neochlorogenic and chlorogenic acid, quercetin-3-glucoside, quercetin-3-rutinoside, cyanidin-3-glucoside and cyanidin-3-rutinoside) were identified and quantified, in both skin and flesh tissue, using HPLC equipped with RID and DAD, respectively. After 14 days of cool storage, and for both cultivars, unripe nectarines showed higher sucrose content and total sugar content than nectarines stored under scenario 1. However, as fruit passed through the 'supply chain', sugar content failed to increase sufficiently as expected (after ripening and during shelf and home life) resulting in 30% lower sugar content at day 4 of home life compared to scenario 1. For skin samples in both cultivars, two weeks of cool storage had a significantly negative effect on the level of most individual phenolics, which decreased by almost half. No significant differences, however, were found among sampling dates. The results suggest that even extended cold storage period by just two weeks (under current practices), could result in a poorer quality 'ready to eat' imported nectarines as they may be less sweet and have a lower antioxidant capacity.