

Seasonal and temporal changes during storage affect quality attributes of green asparagus

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Abstract

Asparagus is a perennial crop with a short UK harvest season. Methods to extend the storage life of asparagus have proven difficult. To gain insight into the physiological (*viz.* colour, respiration rate, cutting energy, and stiffness measured using laser Doppler vibrometry), and biochemical (*viz.* sugars, ascorbic acid, and abscisic acid and its catabolites) changes throughout the UK season, two cultivars were harvested weekly and stored under shelf life conditions (7 °C). Results were compared to spears (plus one additional cultivar) cold stored (1 °C) for three weeks followed by one week of shelf life. Concentrations of sugar, abscisic acid (ABA) and catabolites at harvest were subject to seasonal variation, directly affecting storage potential. A generalised linear model with stepwise feature selection was applied to select the most important parameters for the prediction of total sugars and phaseic acid (PA). More favourable growing conditions at harvest increased sugars and lowered ABA content and catabolites, which coincided with better maintenance of spear quality during storage; including maintaining textural characteristics. Storage time had a negative impact on spear texture and sugar content, with cutting energy increasing and stiffness decreasing both during cold storage and subsequent shelf life. A partial shift in sugar biosynthesis occurred during shelf life increasing sucrose concentrations. Results suggest that the temporal flux in ABA and catabolites, and individual sugars could be used to model storage potential of asparagus spears.