Title Phenolic content and antioxidant capacity of carrots as affected by storage and different preservation methods

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Abstract

Epidemiological studies suggest that consumption of high levels of antioxidant vitamins and phytochemicals in fruits and vegetables may reduce the risk of cancer, cardiovascular disease, and stroke. Carrots contain phenolic compounds and carotenoid that can act as dietary antioxidants. Due to the variety of preservations methods available for carrots, it is important to quantify the compounds after processing and storage. Our objectives were to quantify hydroxycinnamic acid (HCA) and *parp*-hydroxybenzoic acid (*p*HBA) content in fresh, fresh-cut, frozen and canned carrots during storage and to determine the relationship between phenolics and antioxidant (AOX) capacity. Carrots were prepared as fresh-cut, frozen, and canned for comparison to fresh unprocessed carrots. Fresh-cut carrots were sampled at 0, 3, 7, 14 and 21 d. Fresh, frozen, and canned carrots were sampled at 2 wk and then once a month for 6 months. *p*HBA and HCA were quantified by HPLC at 265 and 320 nm, with results expressed as hydroxybenzoic acid and chlorogenic acid equivalents, respectively. Hydrophilic AOX capacity was measured using a Photochem antioxidant analyzer. In fresh-cut carrots, HCA content increased 6-fold over 21 d storage, while *p*HBA content increased 2-fold between d 0 and d 7 through 21. The HCA and *p*HBA content of fresh carrots remained stable during storage, and was significantly higher than that of canned and frozen carrots. The HCA and *p*HBA content of canned and frozen carrots were also stable during storage. The AOX capacity of all fresh and processed carrot samples correlated well with the levels of HCA and *p*HBA (R^2=0.96 and 0.76, respectively). The results indicate that processing significantly decreased phenolic levels, but the compounds were stable during storage. Due to the linear relationship observed between HCA levels and AOX capacity there appears to be potential health benefits associated with consumption of fresh-cut carrots after storage.