Title	Reducing browning of fresh-cut 'Maha' carambola with chemical additives and low-oxygen atmospheres
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Abstract

A study was conducted to determine the effects of post-cutting chemical treatments, atmospheric modification, and their combinations, on the shelf life of carambola (*Averrhoa carambola* cv. Maja) slices based on appearance, colour and polyphenol oxidase [catechol oxidase] (PPO) activity. Treatments comprised: (1) post-cutting chemical treatments (5-minute dip): control (distilled water), 0.5 or 1.0% ascorbic acid (AA), 1.0 or 2.0% citric acid (CiA), 0.5 or 1.0% oxalic acid, 500 or 1000 ppm EDTA-Ca; (2) low-oxygen storage (flow rate: 50 ml per minute): 20.3, 11.3, 4.7, 2.3 and 1.4% and nitrogen (effectively 0.4% O_2); and (3) combinations of chemical treatment and low-oxygen: control (distilled water + 21% O_2), distilled water + 0.4% O_2 (nitrogen), 1.0% AA + 21% O_2, and 1.0% AA + 0.4% O_2 (nitrogen). Post-cutting dips of 1% AA and 2% CiA significantly delayed the cut surface browning and maintained the best colour of Maha slices. AA dips (0.5 and 1.0%) also reduced PPO activity throughout storage at4 deg C, with 1% AA inducing the lowest PPO activity. Low-oxygen atmospheres above 0.4% O_2 did not effectively prevent either cut surface browning or PPO activity. Carambola slices treated with 1% AA and held in an atmosphere of 0.4% O_2 (nitrogen) had no significant browning or loss in visual quality for up to 12 days.