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Factors affecting the composition and quality of broccoli juice

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Abstract

A shelf life trial using a fully balanced factorial experimental design was used to analyse the effects of acidity and light on broccoli juice made on a semi commercial scale over an eight week period in simulated retail refrigerated storage conditions. The research focused on making broccoli juice on a pilot scale, and what happens to the colour, composition and flavour during storage.

A pilot scale production of pasteurised broccoli juice was conducted and the juice satisfied microbiological safety limits for the eight week shelf life trial in retail storage conditions. The stability of the green colour of fresh broccoli through processing and storage was assessed. Neutral broccoli juice remained green for four weeks before the colour became more yellow. The acidified juice became yellow on acidification and did not change significantly during storage.

Dietary fibre and pectin levels did not change during storage. Chlorophyll and carotenoids levels decreased during storage and were directly influencing the colour changes in the juices. Ascorbic acid levels decreased significantly during processing resulting in low ascorbic acid levels (12 - 15 mg /100ml of juice) at the start of the shelf life trial and dropped further to 2-6 mg /100ml of juice after eight weeks. Acidification and storage in the dark had a protective effect on the degradation of ascorbic acid with only a 58% reduction in ascorbic acid levels compared to an 84% reduction in neutral light stored broccoli juice.

The effect of processing and storage on the flavour of the beverage was assessed using a trained sensory panel providing descriptive analysis. The sensory profiles for neutral and acidified juices were extremely different with the unbalanced acidity suppressing the perception of the basic tastes, sweet, salty and bitter. The neutral juice sensory profile only changed slightly in aroma attributes during storage for seven weeks. The astringent aftertaste of the acidified juice increased while the broccoli smell decreased during storage.

The results from this research indicate that the production of a broccoli juice with a yellow green colour and some retained nutritional components is achievable with a refrigerated (4 °C) shelf life of 30 days in light excluding glass packaging. The neutral juice is recommended as it was greener and had a broccoli flavour.

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