Title Effect of 1-MCP on quality and antioxidant capacity of *in vitro* digests from 'Sunrise' apples stored at different temperatures

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Abstract

The antioxidant capacities of phenolic and non-phenolic fractions for *in vitro* digestates from 'Sunrise' apple were assessed after postharvest application of 1-methylcyclopropene (1-MCP), a ripening inhibitor, and three weeks storage at 5, 13, 15, 18 and 22 °C. An *in vitro* digestion system was used to generate the soluble bioaccessable digestate which was then fractionated into phenolic and non-phenolic fractions. The two fractions were assayed for Folin-Ciocalteu Reaction (FCR) reducing capacity and peroxyl radical scavenging capacity. Quality retention of the fruit was assessed by measuring internal ethylene concentration, firmness and titratable acidity. Treatment with 1-MCP inhibited internal ethylene concentration and better maintained the firmness and titratable acidity of 'Sunrise' summer apples as compared with untreated control apples at storage temperatures of 15 °C and above. The FCR reducing capacity of the phenolic fraction of the *in vitro*, simulated gastrointestinal digestates showed similar response as did the quality measures, with significantly higher activity in the 1-MCP treated fruit at higher storage temperatures. However, no consistent differences were found between 1-MCP and control treatments for the FCR reducing capacity of the non-phenolic fraction or for the peroxyl radical scavenging capacity of either fraction. The non-phenolic fractions consistently had higher levels of both types of antioxidant capacities. Treatment and storage of 'Sunrise' apples at elevated temperatures (> 13 °C) resulted in improved fruit quality and retention of reducing capacity in simulated gastrointestinal digestates.