

Title Exposure of broccoli to different temperatures during storage: some changes in postharvest physiology and activities of ammonia-assimilating enzymes

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Abstract

The rate of quality deterioration in harvested produce is greatly influenced by storage temperature. To determine its effects in broccoli (*Brassica oleracea* L.) heads were kept at 5 and 20°C for 5 days after harvest. Important physiological traits and activities of ammonia assimilating enzymes were investigated. Almost constant hue angle values and decline in respiration rate and ethylene production were observed at 5°C storage. However keeping the heads at 20°C resulted in rapid yellowing of the florets, which could be a consequence of relatively constant C₂H₄ production. Although CO₂ production declined at 20°C, the rate of production was slightly higher than that of the heads stored at 5°C. Glutamine synthetase (GS; EC 6.3.1.2) activity in florets slightly increased at 5°C but decreased at 20°C. In the branchlet portion, the activity did not change significantly. In both storage temperatures, the amination and deamination activities of glutamate dehydrogenase (GDH; EC 1.4.1.2) in the florets gradually increased while a decrease was found in the branchlet portion as storage progressed. Ammonia content in all portions change very little at 5°C. However, an abrupt increase to about seven times the content at harvest, was observed in florets stored at 20°C at the end of the experimental period. Ammonium toxicity due to the decline in GS activity and the relatively constant ethylene production and higher respiration rate could be the major contributing factors affecting rapid quality deterioration of the commodity stored at 20°C. Ammonia content in broccoli could therefore be used as an indicator of product freshness. Changes in GDH activity may indicate its anabolic and catabolic roles when tissues undergo stress.