

Title The effect of short-term high CO₂ treatment on the physiological characteristics and blackening of cut-cabbage

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Abstract

This study investigated the effect of short-term high CO₂ treatment on the physiological characteristics and blackening of cut-cabbage. Cut-cabbage was exposed to air (control) and high concentration carbon dioxide (30, 60 and 90% CO₂– balance N₂) at room temperature (about 28°C) for 6 hours, and was then stored at 13°C for 3 days. Respiration rates and ethylene production after 0-1 of days were highest for 90% CO₂ treatment and decreased in the order of 60% CO₂, 30% CO₂ and air treatment. The Hunter ‘L’ value, used as an indicator of blackening, rapidly decreased in cut cabbage leaves in air, but was delayed in the short-term high CO₂ treatment; the inhibition of blackening was more effective as the CO₂ concentrations increased. Polyphenol oxidase (PPO) activity was lower in the short-term high CO₂ treatment, particularly in 90% CO₂, than in air. Total phenol and ascorbic acid contents were greatest for 90% CO₂ treatment, but CO₂ concentrations above 60% significantly reduced total sugar contents. Weight loss increased slowly as the storage period extended, and was slightly greater in higher CO₂ concentrations. In summery, a short-term high CO₂ treatment for cut-cabbage significantly inhibited leaf blackening of cut cabbage due to a reduction of PPO activity and retention of ascorbic acid concentration with increasing CO₂ concentration.