

Title Chlorophyll fluorescence as a nondestructive indicator of broccoli quality during storage in modified-atmosphere packaging.

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Abstract

The objective of this study was to determine if chlorophyll fluorescence could be used as an indicator of anaerobic respiration in broccoli (*Brassica oleracea* var. *italica*) during storage in modified-atmosphere packaging (MAP). Two types of packages were used, PD-941 bags, which provided optimum MAP conditions for broccoli (approx equal to 3 kPa O₂ plus 5 kPa CO₂), and PD-961EZ bags, which allowed the CO₂ to accumulate (approx equal to 11 kPa CO₂). After 28 days in MAP at 1 deg C, the broccoli heads from both types of bag had similar appearances and weight losses. However, broccoli held in the PD-961EZ bags had developed slight to moderate alcoholic off-odours and had higher ethanol, acetaldehyde, and ethyl acetate contents, as compared with broccoli in PD-941 bags. Chlorophyll fluorescence parameters (Fv/Fm, T1/2, Fmd, and phi PSII) were lower for broccoli held in the PD-961EZ bags than in PD-941 bags, and these differences increased with storage duration. These results indicate that chlorophyll fluorescence is a reliable, rapid, nondestructive indicator of broccoli quality during MAP, and that it could be used to determine if broccoli has developed off-odours without opening the bag and disrupting the package atmosphere.