**Title** Influence of pre-harvest UV-B irradiation and normal or controlled atmosphere storage on flavonoid and hydroxycinnamic acid contents of pak choi (*Brassica campestris* L. ssp. *chinensis* var. *communis*)

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**Citation** Postharvest Biology and Technology, Volume 56, Issue 3, June 2010, Pages 202-208

**Keywords** Pak choi; Polyphenols; UV-B irradiation; Low temperature; Storage; Controlled atmosphere

**Abstract**

The influence of different initial phenolic contents in pak choi (*Brassica campestris* L. ssp. *chinensis* var. *communis*) leaves, obtained by pre-harvest treatment with and without UV-B, on storage behaviour was investigated. The storage conditions were controlled (1.5–2.5% $O_2$ and 5–6% $CO_2$) or normal air atmospheres at 2 °C and 99% relative humidity. A complementary pre-harvest experiment was conducted to investigate the effect of temperature and UV-B irradiation on the level of phenolic compounds. Both UV-B treatment and temperature showed significant effects regarding polyphenolic contents determined by HPLC-DAD; total polyphenolic content increased under low temperature even without UV-B. UV-B irradiation resulted in a distinct increase in hydroxycinnamic acid derivatives at low temperature (9 °C) and of flavonoids at ambient temperature (22 °C), which might be related to the enhanced level of flavonoid precursors, i.e. hydroxycinnamic acids, which are not utilized for flavonoids in the biosynthesis pathway at low temperature. This hypothesis is supported by the strong increase in the concentration of coumaric acid derivatives under UV-B treatment and low temperature. The epidermal UV-A absorption by PAM fluorometry (pulse amplitude modulation) increased after cultivation under UV-B irradiation and this effect was more pronounced at 22 °C than at 9 °C due to the increases of flavonoid contents and their good correlation with epidermal absorption. Polyphenols are responsible for the epidermal absorption of leaves in the UV range of irradiation. The non-destructive PAM fluorometry of epidermal screening and HPLC-DAD analysis for flavonoids of leaf extracts correlated well and both methods were also applied in the postharvest storage experiment. Plants with a higher initial polyphenolic content showed an increasing effect in epidermal UV-A absorption data and a significantly increasing concentration for flavonoids over the storage period, which is assumed to be due to ongoing biosynthesis induced by the pre-harvest UV-B treatment. The level of flavonoids increased more in controlled atmospheres than in normal air, but hydroxycinnamic acids were unaffected. Fresh weight and chlorophyll content of the plants as markers of postharvest senescence changed only marginally during storage, but UV-B treated plants lost significantly more weight than plants without this treatment.