

Title UV-B mediated changes in flavonoid composition and associated enzyme activity of white asparagus spears (*Asparagus officinalis* L.)

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Abstract

The flavonoid quercetin and its derivatives are outstanding dietary antioxidants in white asparagus spears (*Asparagus officinalis* L.) exerting health beneficial effects. UV-B radiation induces stress mediated plant defence systems and is known to cause an accumulation of antioxidant compounds in plant tissue. Several key enzymes play an important role in phenolic compound metabolism. They are therefore directly associated with the free radical scavenging properties of the phenolic compounds: phenylalanine ammonia lyase (PAL) and peroxidases (POD). The aim of the present study was to investigate the impact of UV-B irradiation on PAL and POD activity as well as mediated changes in flavonoid composition and antioxidant activity. Asparagus spears cv. 'Gynlim' were exposed to two UV-B irradiation dosages ($0.54 \text{ kJ m}^{-2} \text{ d}^{-1}$ and $1.08 \text{ kJ m}^{-2} \text{ d}^{-1}$) using an UV-B fluorescence light source (FL 20SE, 305-310 nm). Apical and basal sections of the spears were used for further analysis: PAL and POD activity estimated using photometric assays; flavonoid compound composition determined by HPLC-DAD, and antioxidant activity determined using the Trolox Equivalent Antioxidant Capacity assay, respectively. Results showed that enzyme activity (PAL and POD) and flavonoids can be induced by moderate UV-B application. Thus, UV-B might be a promising tool for enhancing health promoting properties during postharvest.