

Title Influence of uv-c on color development and free amino acid profile in broccoli florets during postharvest storage

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Citation ISHS ActaHorticulturae 945:97-103. 2012.

Keyword UV-C light; broccoli; amino acids; phytochemicals

Abstract

Broccoli (*Brassica oleraceae*) is one of the most consumed produce among *Brassica* crops due to its bioactive compounds, glucosinolates and flavonoids. Much attention is paid to these aminoacid-derived secondary metabolites due to their potential health effect in cancer prevention. There is interest in enhancing the levels of health-promoting phytochemicals in vegetables by application of hormetic doses of abiotic stresses such as UV radiation during the postharvest phase. The objective of this work was to determine the hormetic dose of UV-C for broccoli and the effect of UV-C on the color (Hue angle). Amino acid content of the tissue was determined (GC-MS) during 12, 24, 48 and 96 h following UV-C treatment. The color change of broccoli florets was dose-dependent with minimal changes with UV-C doses between 0.9 and 1.2 kJ m⁻². However, at the dose of 1.2 kJ m⁻² the rate of color change was the lowest and therefore was considered hormetic for broccoli. Doses either below or higher than the 0.9-1.2 kJ m⁻² range, color change was more rapid. The amino acids with high titers (>100 μmol g⁻¹) were serine, aspartic acid and glutamic acid. Amino acid pools decreased with UV-C dose, either reaching maximum depletion above 1.2 kJ m⁻² (considered as a hormetic dose from color retention of broccoli florets) or all amino acids except those of branched chain amino acids, which recorded a minimum at that dose but increased above that dose. Leucine appears to be a marker of yellowing of broccoli florets and its time-average titer increased with UV-C dose and storage time. Results suggest that hormetic dose has biochemical significance from the standpoint of secondary metabolites in broccoli and that the changes in the free amino acid profile in response to UV-C can provide some insight into UV-C induced modifications in the secondary metabolites derived from those amino acids.