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Impact of Hormic Doses of UV-C on Postharvest Quality of Vegetable Amaranth (*Amaranthus cruentus* L.)

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Abstract

The diet of many rural and recently urban and peri-urban inhabitants is made up of largely African leafy vegetables (ALVs) whose nutritional and medicinal value is well appreciated. Currently, the magnitude of postharvest losses of ALVs in Kenya can reach up to 50%. UV-C has been used as a germicidal agent for water and surface disinfection including postharvest management of pathogens in fruits and vegetables due to its capacity to affect DNA of microorganisms. Low doses of UV-C irradiation can trigger favourable physiological reactions in biological organs such as fruits and vegetables which can lead to the improvement of shelf-life and storability as well as increase of health promoting components in fruits and vegetables. The objective of the study was to evaluate the effects of postharvest applied UV-C irradiation (254 nm) on weight loss and characteristic plant compounds such as carotenoids, chlorophyll and protein of vegetable amaranth (*Amaranthus cruentus* L.). Eight weeks after sowing, vegetable amaranth leaves were harvested and immediately subjected to UV-C at 1.7 kJm⁻² and 3.4 kJm⁻². Non treated plants served as control. Thereafter, leaves were stored at 5 °C (85% rH) for 14 days and 20 °C (85% rH) for 6 days. The experiment was laid in completely randomised design with three replications. Results obtained indicated that postharvest treatment of vegetable amaranth with UV-C contributed to significantly reduce weight loss and enhanced carotenoid, chlorophyll and protein content at hormic UV-C doses (1.7 kJm⁻²). The findings of the present study therefore indicate the use of UV-C as a postharvest treatment technology that is relatively affordable and easy to apply for improving quality of ALVs, which might be a promising step in enhancing food security.

Keywords: Carotenoids, chlorophyll, indigenous African vegetables, postharvest treatment, protein, UV-C