Genotype, ultraviolet irradiation, and harvesting time interaction effects on secondary metabolites of whole lettuce and browning of fresh-cut product

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ABSTRACT
This study evaluated the importance of three factors (genotype, ultraviolet [UV] radiation and harvest time) and their interaction on phenolics, tannins, flavonoids and antioxidant activity of ‘Paris Island’ (romaine type) and ‘Sanguine’ (red leaf type) lettuce plants as well as on the severity of browning of their fresh-cut product. Ten genotypes had significant effect on secondary metabolite accumulation and higher levels were found in ‘Sanguine’, while no interaction effect was found among all the studied factors. Therefore, a new analysis of variance was performed for each genotype separately. The results showed that in ‘Paris Island’ the time of harvest had a significant effect on all measured parameters with higher levels for plants from the night harvest, while UV radiation had little effect on the plants’ biochemistry. On the contrary, in ‘Sanguine’, UV radiation significantly affected the concentration of secondary metabolites and antioxidant capacity, with higher levels for plants grown under UV-open film. Browning evaluation of fresh-cut product derived from the above plants showed that factors affecting secondary metabolite concentration in whole plants at harvest did not have a similar effect. The findings indicate that there are appropriate treatments, for each genotype, that could achieve high production of secondary metabolites and improve their antioxidant properties.

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