

Effect of a photosensitive filter on the yield and postharvest quality of 'Viroflay' baby spinach (*Spinacia oleracea* L.) leaves cultivated in a hydroponic system

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Abstract

Consumers are demanding foods with high sensory and nutritional quality including a higher content of compounds that help maintain good health. Given this scenario, new technologies are emerging to produce fresh salads that have the characteristics currently in demand. Shade nettings or photosensitive filters on fruit and vegetable crops are a technology that provides protection, modifies the light spectrum resulting in a higher accumulation of antioxidant compounds, making them more desirable to consumers. The objective of this study was to compare the effect of shade netting on the fresh quality parameters of baby leaf spinach grown in a hydroponic system at harvest and after a period of 10 days at 4 °C. By using different shade netting colors, the average photosynthetic photon flux density (PPFD) that reaches the plants was modified during the growing period of baby leaf spinach (red: 118.35 $\mu\text{mol m}^{-2} \text{s}^{-1}$; blue: 117.96 $\mu\text{mol m}^{-2} \text{s}^{-1}$; gray: 63.18 $\mu\text{mol m}^{-2} \text{s}^{-1}$ and control without shade nettings: 278.12 $\mu\text{mol m}^{-2} \text{s}^{-1}$). At harvest, baby leaf spinach grown under the red shade netting reached the highest yield. However, with the blue filter, leaves showed a value of 9.3% dry weight, significantly higher than the values from red and gray filters with values of 7.3 and 6.3%, respectively. The phenolic compound contents reached significantly higher values of 485.5 mg gallic acid equivalent (GAE) per 100 g^{-1} FW for the baby leaf spinach grown under the red filter compared to the blue, gray and control filters with values of 472.5; 387.6 and 316.5 mg GAE per 100 g^{-1} FW, respectively. The antioxidant capacity was significantly higher under the red filter. The sensory quality parameters indicated that spinach grown under color filters did not show off-flavors and maintained its turgidity and appearance at harvest. In the postharvest period, baby leaf spinach grown under red filter maintained the highest total phenol content and antioxidant activity after 10 days at 4 °C with similar appearance and turgidity as the control.