

Mild drought stress has potential to improve lettuce yield and quality

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Abstract

Lettuce (*Lactuca sativa* L.) is the most widespread leafy vegetable in the world, grown in several countries. However, commercially available cultivars have a low content of functional compounds, compared to several other vegetables. In addition, the postharvest period is characterized as a stressful stage, affecting the quality of this vegetable. One strategy that has been shown to be effective in increasing the content of functional compounds in plants is the application of abiotic elicitors, such as drought stress at moderate levels. In addition, there is evidence that plants submitted to these elicitors have greater tolerance to subsequent stresses, such as those arising from the postharvest storage. This study evaluated the effect of the pre-harvest application of moderate levels of drought stress on the pre and postharvest quality of lettuce. For this, lettuce plants were grown with the volume of water needed to saturate 100% of the soil (C, control), 90% of the soil (DS 90%), 80% of the soil (DS 80%), or they were subjected to a short-term acute stress by water restriction (WR) for 4 days before harvest. After harvesting, half of plants were stored at 6–8 °C and 80% humidity for postharvest analysis. The application of moderate drought stress resulted in plants with higher biomass in treatments DS 90 % and WR and did not affect the color or firmness of the plants. The DS 80 % treatment stood out in terms of quality parameters, as it resulted in plants with a higher content of carotenoids, chlorophylls, caffeic acid, monocaffeoyl tartaric acid, malercyl quercetin glucoside, quercetin-3-O-glucuronide, and greater total antioxidant activity at harvest. Plants submitted to moderate drought stress did not show changes in firmness during storage; but showed an increase in the content of flavonoids in WR, and in some phenolic compounds that have been negatively affected by storage. The results indicate that the application of moderate drought stress, especially at the 80 % level, represents an interesting strategy to improve the quality of this vegetable at harvest and after storage.