

Title Estimating quality and shelf life of whole and fresh-cut leafy greens with moisture units at harvest

Author Jorge M. Fonseca, Shelagh Fallon and Hyun-Jin Kim

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Abstract

A series of replicated trials has been conducted during the last few years at the Yuma Agricultural Center, Arizona, USA, to investigate the effect of moisture conditions on yield and microbial quality of leafy greens grown in arid conditions. Early trials showed that the timing of the last irrigation affects both visual and microbial quality of lettuce with extremely late irrigation termination producing the shortest shelf life in lettuce. Likewise lettuce harvested immediately after a rainfall event showed lower quality and higher microbial population. Following research with a) changing environmental factors such as salt concentration in the irrigation water and different light intensity during the week before harvest, and b) various agricultural practices including treatments with the elicitors methyl jasmonate and harpin protein and with different nitrogen fertilization rates indicated that excess turgidity and the occurrence of selected secondary metabolites significantly alter the shelf life of leafy greens. The results from our studies suggest that managing moisture conditions at harvest is key to enhance postharvest quality of whole and fresh-cut leafy greens. Despite the potential decline in weight associated with practices such as early irrigation termination, reduced nitrogen fertilization, and stress-producing factors it has been shown that these factors can be "regulated" in a way that yield and quality are simultaneously maximized. A discussion of the hypothesis behind these findings is provided, including the probable reasons for the correlation of lower water activity and higher levels of selected phenolics with longer shelf life of leafy greens.