Title Short postharvest storage under low relative humidity improves quality and shelf life of minimally processed baby spinach (*Spinacia oleracea* L.)

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Abstract

The maintenance of relative humidity (RH) after harvest is not always possible and can influence the quality of the raw material for minimal processing. The objective of this study was to evaluate if short-term postharvest exposure to different RH conditions such as high (99%), medium (85%) and low (72%) influenced the quality and shelf life of minimally processed baby spinach. Weight loss, water content (WC), osmotic potential, electrolyte leakage, headspace gas composition, sensory evaluation, colour, texture and microbiological populations were evaluated before and after processing, as well as during shelf life. Baby spinach exposed to low RH conditions on the one hand significantly showed lower water content and higher osmotic potential and stiffness after exposure for 36 h at 15 °C when compared to high RH conditions. After processing, samples exposed to low RH were rehydrated and no differences in dehydration were observed among samples exposed to different RH conditions. However, the percentage of damaged leaves increased significantly from 7.5% to 12.5% due to the process, this percentage particularly increasing with increasing RH. On the other hand, processed baby spinach exposed to high RH had a higher respiration rate, higher percentage of leaf damage, and increased electrolyte leakage, causing a decrease in quality resulting in a shelf life 4 d shorter than baby spinach exposed to low RH. The observed changes were mainly linked to a significant postharvest breakage, which influenced the susceptibility to microbial colonization. Psychrophilic bacteria and *Pseudomonas* counts of samples exposed to high RH were 1 log higher than those exposed to low and medium RH. To minimize the impact of leaf damage, baby spinach should be processed at medium–low hydration levels. This study shows that controlled RH after harvest is critical as it can influence the microbiological population and the maintenance of acceptable visual quality.