Title Lettuce quality loss under conditions that favor the wilting phenomenon

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Abstract

While temperature management is a usual accepted practice and is the simplest and easiest way of delaying vegetable deterioration, maintenance of the recommended relative humidity (RH) during postharvest storage is not always carried out. The objectives of this work were to simulate two RH conditions: optimal (95–98%) and low (70–72%) during the storage of lettuce heads at recommended temperatures (0–2 °C), and to address how deviation of RH from optimal conditions affects lettuce quality indices. The effects of storage on quality parameters were assayed as follows: weight loss and water content as physical indices, chlorophyll content as a greenness index, native microflora (mesophilic bacteria, psychrotrophic bacteria, lactic acid bacteria, total coliforms, yeast and molds) as microbiological quality indices, ascorbic acid retention as a nutritional quality index, and overall quality as a sensory acceptability index. Additionally, these indices (with the exception of weight loss) were analyzed in three lettuce sections: external (composed by outer and older leaves), middle (composed by mid leaves) and internal (composed by inner and younger leaves). Shelf-life of lettuce was significantly affected by RH. The exposure of lettuce heads to low RH drastically reduced shelf-life by 75%. Plants exposed to low RH had considerable weight loss from the first day to the end of storage. For both RHs, the middle and internal sections did not show chlorophyll changes during storage while the external section showed pigment degradation characterized by first order kinetics. Ascorbic acid underwent first order degradation for all situations (sections and RH conditions), but with different degradation rates. The microbial population counts were slightly affected by RH. The overall quality of lettuce stored at low RH decreased rapidly. The shelf-life of material stored at this relative humidity condition was 5 days, when the overall quality scores of middle and external sections were below the acceptability limit and only the internal section had a score above the limit. In addition, overall quality of lettuce stored at optimal RH decreased slowly. At day 5 of storage the three lettuce sections had high scores and the product was satisfactory. Only at day 20 did the external section show a score just on the acceptability limit.