

Title Effect of chlorine dioxide and ozone on physicochemical, microbiological and nutritional parameters of iceberg lettuce (*Lactuca sativa* var. *Capitata*) in simulated postharvest handling in the Bogota Sabana, Colombia

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Abstract

The iceberg lettuce (*Lactuca sativa* var. *capitata*) suffers fast postharvest deterioration due to the presence of microorganisms, reactions of enzymes, inappropriate handling, among others. In this context, postharvest treatments are necessary to avoid the fast deterioration of these vegetables, extend shelf life and decrease the amount of losses. In Colombia, currently there is no suitable protocol for postharvest handling of lettuce cultivar 'Batavia', which prevents producers from assuring high product quality. It is thought that postharvest losses of lettuce can reach values ranging from 20 to 30%. Lettuce is considered of value due to its freshness and its high content of water, in addition, lettuce is a low energetic food. Furthermore, lettuce has minerals, fiber and substances with antioxidant and anticarcinogenic properties. Nevertheless, lettuce can represent a potential danger for human health because it may carry clinical pathogens. This work allows to determine changes in nutritional and microbiological parameters of iceberg lettuce (*Lactuca sativa* var. *capitata*), when applying treatments of chlorine dioxide (ClO₂) and ozone (O₃), two common disinfection treatments. In this work the physico-chemical (acidity, soluble solids) and functional (phenolics and antioxidant activity) characteristics were measured, as well as native microbial population (aerobic) under simulated transportation: 67% HR, 18°C, 12 h (transport from harvest site to cold storage, treatment and packing house); 85% RH, 24 h storage at 10°C (waiting time in distribution center), 11 d at 3°C (shipping) and 6 d at 6°C (storage at retail shelf), simulating the conditions of post-harvest management at the Sabana de Bogotá. The vegetable material was subjected to various disinfection treatments including dioxide concentrations at 3 ppm, ozone at 0.34 ppm, and water (control) for 30 s. The results showed a significant reduction (1,17 log) that can be achieved, in 6 h after treatment with any of the two sanitizers. Moreover, an increase in phenolic compounds in treated lettuces was observed, subsequently increasing the antioxidant activity. It is possible to conclude that using chlorine dioxide and ozone as disinfectant treatments improves nutritional quality, while reduce microbial content in 'Batavia' lettuce grown in the Sabana of Bogota, Colombia.