

**Title** A simple instrument-free gaseous chlorine dioxide method for microbial decontamination of potatoes during storage

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#### **Abstract**

An instrument-free gaseous chlorine dioxide (ClO<sub>2</sub>) method to control microorganisms on potatoes during storage was developed. Gaseous ClO<sub>2</sub> was generated by combining an equal amount of impregnated sodium chlorite and activating acids in a sachet without using any solution or equipment. After activation by mixing, the sachet was placed in the application area. The decontamination efficiency of ClO<sub>2</sub> on natural microbiota including total microorganisms, yeasts and molds, and inoculated *Pseudomonas aeruginosa* on potatoes was investigated. Different treatments using 2, 3, and 4 g of materials and various time intervals (2.5 and 5 h) to generate 16, 20, 24, 30, 32, and 40 mg/L of ClO<sub>2</sub> were evaluated. The results were effective for natural microbiota, showing over a 5 log CFU/potato reduction with a 4 g treatment after 5 h. For *P. aeruginosa*, there was almost a 6 log CFU/potato reduction after 5 h of the 4 g treatment. The lowest treatment tested (2 g at 2.5 h) showed reductions of 1.7, 1.9, and 2.3 log CFU/potato for total microorganisms, yeasts and molds, and *P. aeruginosa*, respectively. Gaseous ClO<sub>2</sub> did not affect the overall visual quality of the potato. The residue of ClO<sub>2</sub> decreased to <1 mg/L after 14 days for each treatment, indicating ClO<sub>2</sub> dissipates naturally over time.