

Evaluation of calcium hydroxide, calcium hypochlorite, peracetic acid, and potassium bicarbonate as citrus fruit sanitizers

Guilherme Dilarri, Caio Felipe Cavicchia Zamuner, Mauricio Bacci Jr. and Henrique Ferreira

Journal of Food Science and Technology 59: 1739–1747. (2022)

Abstract

Xanthomonas citri (*X. citri*) is a quarantine plant pathogen and the causal agent of the citrus canker. *X. citri* forms biofilms and remains fixed on the surface of plant tissues, especially on leaves and fruits. Considering this, all the citrus fruits have to be sanitized before they can be commercialized. NaOCl is the main sanitizer used to decontaminate fruits in the world. Due to its toxicity, treatment with NaOCl is no longer accepted by some Europe Union countries. Therefore, the aim of this work was to evaluate potassium bicarbonate (KHCO_3), calcium hydroxide (Ca(OH)_2), calcium hypochlorite (Ca(OCl)_2) and peracetic acid ($\text{CH}_3\text{CO}_3\text{H}$) as alternatives to NaOCl for the sanitization of citrus fruit. By monitoring cell respiration and bacterial growth, we determined that peracetic acid and calcium hypochlorite exhibit bactericidal action against *X. citri*. Time-response growth curves and membrane integrity analyses showed that peracetic acid and calcium hypochlorite target the bacterial cytoplasmatic membrane, which is probably responsible for cell death in the first minutes of contact. The simulation of the sanitization process of citrus fruit in packinghouses showed that only peracetic acid exhibited a performance comparable to NaOCl. Among the tested compounds, peracetic acid constitutes an efficient and safer alternative to NaOCl.