

Title Evaluation of chlorine dioxide treatment for *Xanthomonas axonopodis* pv. *citri* bacterium control

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Citation Program and Abstracts, 11th International Citrus Congress (ISC Congress), 26-20 October 2008, Wuhan, China. 333 pages.

Keyword citrus canker; chlorine dioxide; disinfectant

Abstract

Treatments with Chlorine dioxide (ClO₂) to control the *Xanthomonas axonopodis* pv. *citri* (Xac) bacterium, the cause of citrus canker, were studied. Citrus canker is an endemic disease in the Argentinian Litoral. In order to prevent the spread of this fruit disease, packing houses are required by current regulations to use a treatment with 200 mg/L Sodium Hypochlorite for 120 s or 2% Sodium Ortho Phenyl Phenate (SOPP) during 30 s to all asymptomatic fruit. Chlorine dioxide is a water soluble gas with 2.5 times higher oxidative power than sodium hypochlorite. It differs from the latter because it is pH stable, it does not attack ferrous metals and it does not oxidize by chlorination. Assays were performed: 1) *in vitro* in the lab; 2) on artificially inoculated fruits in the lab and 3) on infected fruit from the orchard in the packing house facility. Lab assays were performed using ClO₂ at 0.1 – 5 mg/L concentrations for 2 to 300 s exposure, at 6°C, 20°C y 38°C. Minimum lethal concentrations *in vitro* and artificially inoculated fruits assays were 0.3 mg/L and 1 mg/L respectively at the aforementioned temperatures. Packing plant facility assays were conducted by fruit immersion in dump tanks. Chlorine dioxide was generated in situ and applied at 1 to 6 mg/L concentration for 120 s exposure time at 15.6 - 21°C. Chlorine dioxide application method was controlled using the oxidation reduction potential (ORP). Control ranged from 760 to 782 mV. No viable Xac bacteria were detected in the water dump tanks, nor on asymptomatic fruit surface or in canker lesions on fruit surface from orchards.