

CHEMICAL INACTIVATION

EFFICACY OF GASEOUS CHLORINE DIOXIDE AS A SANITIZER AGAINST *CRYPTOSPORIDIUM PARVUM*, *CYCLOSPORA CAYETANENSIS*, AND *ENCEPHALITOOZON INTESTINALIS* ON PRODUCE

(Y.R. Ortega, A. Mann, M.P. Torres, and V. Cama)

Parasites have frequently been identified in fresh produce or vegetables and have caused several foodborne outbreaks. *Cryptosporidium parvum*, a parasite often linked to waterborne transmission, has also been reported causing disease through the consumption of unpasteurized milk or apple cider and by eating unwashed contaminated vegetables and fruits. Most cases of cyclosporiasis have been almost exclusively associated with the consumption of contaminated fresh vegetables, such as raspberries, lettuce, basil, mixed greens, and snow peas. Recently, chlorine dioxide gas has been evaluated for the killing of *Salmonella*, yeast and molds on berries as an alternative to rinse sanitizers for fruits and vegetables eaten raw.

The efficacy of gaseous chlorine dioxide to reduce parasite and bacterial burden in produce was investigated in this study. Basil and lettuce leaves were inoculated with *C. parvum* and *Cyclospora cayetanensis* oocysts, *Encephalitozoon intestinalis* spores, and a cocktail of two isolates of nalidixic acid-resistant *Escherichia coli* O157:H7 and subsequently treated for 20 minutes with gaseous chlorine dioxide at 4.1 mg/l. *Cryptosporidium*, *Encephalitozoon*, and *E. coli* loads were significantly reduced (2-4 log), although *Cyclospora* was resistant to the treatment. Our findings demonstrate that *Cyclospora* oocysts are resistant to gaseous chlorine dioxide treatment but other pathogens such as *Cryptosporidium*, *Encephalitozoon* and *E. coli* can be inactivated using gaseous chlorine dioxide, therefore providing an alternative treatment for safer vegetables.



