

Title Disinfection byproducts formation in aqueous chlorine dioxide during immersion cleaning of some leafy vegetables

Author Kee-Jai Park, Jae-Hee Jang, Jeong-Ho Lim, Seongweon Jeong, Jin-Ho Jo and Jin-Woong Jeong

Citation Abstracts, 14th World Congress of Food Science & Technology, October 19-23 2008, Shanghai, China. 721 pages.

Keyword chlorine dioxide; disinfection; leafy vegetable

Abstract

Chlorine dioxide is a strong oxidizing and disinfecting agent which may have a practical application for non-thermal disinfection of foods especially fresh fruits and vegetables, and food contact surfaces such as food processing facilities in food industry. Despite of numerous advantages, chlorine dioxide has potential sources of risk for human health due to the inorganic byproducts such as chlorite and chlorate. Therefore, it is important to investigate disinfection byproducts formation in practical application of food processing. In the present work, changes of chlorine dioxide, chlorite, and chlorate concentration during immersion cleaning of leafy vegetables such as leafy lettuce, kale, chicon, and sesame leaf with 10-100 ppm of ACD were investigated. ACD was generated by gaseous chlorine-chlorite type generator, and chlorite and chlorate, and trihalomethane were analyzed by ion chromatographic method and gas chromatographic method respectively. In case of whole lettuce, 0.2-2 ppm for chlorite and 2-5 ppm for chlorate increased with immersion time. When it comes to cut leafy lettuce, 0.3-6.3 ppm for chlorite and 0.6-9.1 ppm for chlorate increased. However, although there were few changes in chlorite for whole kale, chlorate concentration increased about 0.4-1.5 ppm. In case of cut kale, 0.9-5.1 ppm for chlorite and 0.1-2.9 ppm for chlorate increased. Also, in the case of chicon and sesame leaf, detected amounts of chlorite and chlorate were similar to those of leafy lettuce and kale. Although concentration of ClO_2 , free Cl, oxi-Cl decreased, there were few changes in monochloroamine, dichloroamine and chloride with ACD concentration and immersion time. THMs (trihalomethanes), such as chloroform, dichlorobromomethane and dibromochloromethane etc., were detected, which was thought to be derived from water used to generate ACD.