

Title Potential alternative disinfection methods for organic fresh-cut industry for minimizing water consumption and environmental impact

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Abstract

Disinfection is one of the most important processing steps affecting the quality and safety and the shelf-life of the end product in fresh-cut processing. Chlorine is the most widely used disinfectant in fresh-cut industry. However, recent outbreaks associated with pathogen contamination in fresh-cut vegetables raised the concerns about the efficacy of chlorine treatment in assuring the safety of the products. Moreover, due to the environmental and health risks posed by the use of chlorine, there is a trend in eliminating chlorine from the disinfection process. Thus, there is a need for alternative sanitizers to be used for the disinfection of fresh-cut vegetables, not only for the organic food sector but also for the conventional food processors. Another challenge for the food industry is the minimization of water consumption and wastewater discharge rates. The United Nations Environment Programme stated that Europe is one of the two global regions where more water is used for industry than for agriculture. Among the different industries, the food industry ranks third in water consumption and wastewater discharge rates coming after the chemical and refinery industries. The adoption of less water consuming systems is required for improved water management in the industry. Therefore the food industry is now seeking alternatives to chlorine which assure the safety of the products, maintain the quality and shelf-life, while also reducing the water consumption rates in processing. Chlorine dioxide, ozone, organic acids, peroxyacetic acid, electrolyzed oxidizing water and hydrogen peroxide are the main alternative sanitizing agents that gained interest in recent years. The effects of these disinfecting agents on the microbiological, nutritional and sensory quality of fresh-cut produce, and also the possible environmental impact and the potential on minimizing water consumption rates in the food industry are reviewed in this manuscript.