

Groundbreaking research helped the industry to develop science- and risk-based food safety practices

Chlorine (as sodium hypochlorite, NaOCl) has been widely used due to low cost, ease of use, and efficacy in pathogen inactivation. However, chlorine is rapidly depleted by reaction with organic exudates from cut vegetable tissues, debris, and soil that accumulate in reused and recirculated wash water. Processors traditionally have used a free-chlorine level of 1 ppm as the “Control Limit” and re-wash as the “Corrective Action” in Hazard Analysis and Critical Control Points (HACCP) programs. With advances in understanding chlorine inactivation of bacterial pathogens, questions arose concerning this produce washing practice. However, no scientific data were available to guide the industry changes. Our seminal research demonstrated that 1 ppm free chlorine is insufficient to prevent pathogen cross-contamination, and that re-wash is not an effective corrective action to rectify process failure. Our follow-up studies further demonstrated that a minimum of 10 ppm free chlorine is required to effectively prevent pathogen cross-contamination during washing. This research article was ranked the most downloaded (more than 300 times) in the first year of its publication by the publisher. Experts from academia, government (FDA, USDA, CDC, EPA), and industry (producers, equipment and chemical suppliers, consultants), including members of our team, formed a working group to address the industry need for specific information on preventing cross-contamination of fresh-cut produce during washing through control of chlorine and other sanitizers. To provide industry guidance in support of the implementation of the Food Safety Modernization Act (FSMA), a white paper entitled ‘*Validating Antimicrobial Washes as Preventive Controls for Fresh-cut Leafy Vegetables*’ is being developed by this working group and is expected to be released in 2016.