Decontamination of Fresh Produce: What Are the Challenges to Achieving Success?

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Abstract: Documented outbreaks of foodborne diseases associated with consumption of fresh fruits and vegetables have occurred with increased frequency on an international level in recent years. These outbreaks have been attributed not only to bacterial pathogens, but also to viruses and parasites. Among the types of produce implicated in more than one outbreak in the United States are lettuce, herbs, tomatoes, seed sprouts, green onions, cantaloupes, berries, and mangoes. Changes in agronomic, processing, and distribution practices, together with enhanced epidemiologic, surveillance, and microbiological detection techniques, have undoubtedly contributed to increase awareness and confirmation of these outbreaks. A myriad of sanitizers in both liquid and gaseous forms have been evaluated for their efficacy in killing foodborne pathogens on produce. For various reasons, however, many of these sanitizers have been minimally effective. The challenge is to deliver the lethal form of chemicals in sanitizers to sites on the surface and in subsurface tissues of produce where pathogens may be present. Factors such as the diversity in surface morphology, hydrophobicity of the cuticle, infiltration of pathogens into naturally occurring plant structures and cut tissues, and potential internalization of pathogens through the vascular system are among the hurdles that must be overcome to achieve success in decontaminating produce by sanitizer treatment. What works in reducing pathogens on one type of produce may be considerably less effective on another type. Layered on these challenges is the need to not cause adverse sensorial changes in produce as a result of treatment with sanitizers. Regulatory limits concerning the use of produce sanitizers vary from country to country and must also be considered when selecting sanitizers. While progress is being made to improve the efficacy of produce sanitizers, still much work is needed before strategies can be developed and applied to more effectively reduce the risk of illness associated with consumption of fresh produce.

Key words: Decontamination, fresh produce, challenges and achieving success.