

# Role of contaminated organic particles in cross-contamination of fresh produce during washing and sanitation

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## Abstract

Outbreaks of foodborne illnesses from fresh produce in recent years have prompted industrial community to consider new practices aimed at reducing the risks of pathogenic microbial contamination on the produce. The presence of organic matter in wash water not only decreases the efficacy of sanitizers to inactivate microorganisms, but also has the potential to transfer microbial contamination to fresh produce. This study aims to comprehensively evaluate the transfer of pathogens from inoculated organic matter to uninoculated fresh produce leaves during washing, as well as determination of the adequate active free chlorine concentration needed to prevent the potential risk of cross-contamination during produce washing process. In addition, the study also characterized the role of particles in increasing the mechanical shear at the leaf surface using numerical simulation. The results showed that cross-contamination of fresh produce occurred significantly in a short time (< 2 min) if the wash water was contaminated. The presence of contaminated organic matter (COD = 0.05 g/L) in wash water enhanced the transfer of bacteria to the fresh produce surface by approximately 1 log unit when compared to planktonic bacterial cells in the wash water. In addition, the presence of organic matter also significantly increased the shear stress at the leaf surface. The adequate active free chlorine (0.005 g/L) in wash water was able to prevent the cross-contamination of fresh produce and inactivate bacteria inoculated on organic contaminants in wash water during washing process. In summary, this study will contribute to guidelines for the design of fresh produce washing process.