

Title Application of Pesticide Sprays to Fresh Produce: A Risk Assessment for Hepatitis A and *Salmonella*

Author Scott W. Stine, Inhong Song, Christopher Y. Choi and Charles P. Gerba

Citation Food and Environmental Virology, 3, Number 2, 86-91, 2011

Keywords Pesticide spray application; Produce; Hepatitis A virus; *Salmonella*; Quantitative microbial risk assessment; Lettuce; Bell pepper; Cantaloupe

Abstract

The purpose of this study was to quantify the transfer of viral and bacterial pathogens in water used to dilute pesticides sprayed onto the surfaces of cantaloupe, iceberg lettuce, and bell peppers. The average percent transfer of bacteria was estimated to range from 0.00021 to 9.4%, while average viral transfer ranged from 0.055 to 4.2%, depending on the type of produce. Based on these values the concentrations of hepatitis A virus (HAV) and *Salmonella* in water necessary to achieve a 1:10,000 annual risk of infection were calculated. Under worst case scenario assumptions, in which a pesticide is applied on the same day that the produce is harvested and when maximum transfer values are used, concentrations of 1.5×10^{-3} CFU *Salmonella* or 2.7×10^{-7} MPN HAV per 100 ml of the water used for application would result in 1:10,000 annual infection risk to anyone who consumes the fresh produce. If harvesting does not occur until at least 14 days after the application, to produce the same risk of infection, the numbers of *Salmonella* in 100 ml of water used to dilute the pesticides will be greater by up to five orders of magnitude, while the HAV numbers will have increased by up to two orders of magnitude. Based on the reported concentrations of enteric viruses in surface and ground waters in the United States, a 1:10,000 annual risk of infection could easily be exceeded with some groundwater sources used in the United States. To reduce the risks associated with the consumption of fresh produce, water used to prepare pesticides in spray applications should be evaluated for its microbiological quality.

<http://www.springerlink.com/content/e295u2710n48u584/fulltext.pdf>