

Change in process of disinfecting spinach, salad greens could reduce illness outbreaks

August 19 2015, by Sean Nealon



Nichola M. Kinsinger, a post-doctoral researcher at UC Riverside, studies food safety related to leafy green vegetables. Credit: UC Riverside

Ever wonder what that the words triple-washed or pre-washed on a bag of baby spinach mean?

Not much according to engineers at the University of California, Riverside. They discovered that small peaks and valleys in baby spinach leaves could be a key reason why there have been numerous bacterial outbreaks involving leafy green vegetables.

Current disinfectant is put into the rinse water, and not specifically applied to the leaf surface. The researchers in the Bourns College of Engineering found that because of the varied topography of the spinach leaf nearly 15 percent of the leaf surface may reach concentrations as low as 1000 times that of the bleach disinfectant being used to rinse it.

As a result, as the leaves move through the processing facility after being rinsed the bacteria may continue to live, grow, spread, and contaminate other leaves and surfaces within the facility.

Following rinsing under the low bleach condition, upwards of 90 percent of adhered bacteria were observed to remain attached to and survive on the leaf surface.

"In a sense the leaf is protecting the bacteria and allowing it to spread," said Nichola M. Kinsinger, a post-doctoral researcher working with Sharon Walker, a professor of chemical and environmental engineering. "It was surprising to discover how the leaf surface formed micro-environments that reduce the bleach concentration and in this case the very disinfection processes intended to clean, remove, and prevent contamination was found to be the potential pathway to amplifying foodborne outbreaks."



Madeline Luth, left, and Nichola Kinsinger, conduct research related to baby spinach and food safety. Credit: UC Riverside

Kinsinger will present her research on August 19 at the 250th American Chemical Society National Meeting & Exposition. The talk is called, "Is our salad safe? Efficacy of disinfection techniques to decontaminate spinach leaves and reduce cross-contamination."

Kinsinger is also writing a paper, co-authored by Walker and Madeline Luth, an undergraduate student, about the findings. It will soon be submitted for publication.

The Center for Disease Control estimates that 1 in 6 Americans become ill and 3,000 die annually from foodborne diseases. Additionally, this

causes and an estimated over \$75 billion per year loss for the food industry.

Past research has found about 20 percent of single food commodity outbreaks from 2003 to 2008 were attributed to leafy green produce. Contamination of such minimally processed and ready-to-eat produce is of concern since it is frequently consumed uncooked or raw.

One of these outbreaks, involving spinach, occurred in California in 2006. In all, 199 people in 26 states were infected with the outbreak strain of *E. coli*. Three died.

Currently, the industry standard is to add 50 to 200 parts per million of bleach to the water used to rinse leafy green vegetables. But that is just a recommendation, not a requirement or regulation, Kinsinger said.

For the research, Kinsinger and Walker designed a parallel plate flow chamber system to evaluate in real time the attachment and detachment of pathogens to the spinach in realistic water chemistries and flow conditions.

Their work focused exclusively on baby spinach, however the issue of reduced bleach concentration across the leaf surface and other surfaces within the processing facility translates beyond the specific scenarios tested and demonstrates the limitation of bleach disinfection causing significant concern over public health.

Future research will focus on a broader range of foods, surfaces in processing facilities and pathogen types, Kinsinger said.

Despite their findings, Kinsinger notes that the United States has one of the safest food supply systems. Still, she says, "I recommend rinsing those leaves."

More information: Is our salad safe? Efficacy of disinfection techniques to decontaminate spinach leaves and reduce cross-contamination, the 250th National Meeting & Exposition of the American Chemical Society (ACS).

Provided by University of California - Riverside

Citation: Change in process of disinfecting spinach, salad greens could reduce illness outbreaks (2015, August 19) retrieved 27 April 2024 from <https://phys.org/news/2015-08-disinfecting-spinach-salad-greens-illness.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.