

Scientists pitch in to help keep salad mixes safe to eat

June 14 2011

It's no wonder that packaged salad mixes are a produce section favorite. They offer convenience, selection, and quality, and perhaps best of all, they free us from the chore of washing and chopping, slicing, or shredding salad greens.

But outbreaks of foodborne illness have, from time to time, been associated with bagged salad greens. The outbreaks have led the freshcut produce industry to voluntarily adopt stringent quality-control standards.

U.S. <u>Department of Agriculture</u> (USDA) food safety researchers are pitching in to help keep salad mixes safe to eat. Innovative studies led by Agricultural Research Service (ARS) <u>microbiologist</u> Maria T. Brandl are providing new information about the impressive array of genes that a major foodborne pathogen, *Escherichia coli* O157:H7, calls into action when attempting to colonize leaves of fresh-cut lettuce.

ARS is USDA's principal intramural scientific research agency. This research supports the USDA priority of ensuring food safety

Mechanical cutting of lettuce leaves into large pieces or shredding of leaves into narrow strips, like those in taco filling, breaks lettuce cells, explains Brandl. The broken cells exude carbohydrates, which the microbe can use as a source of energy. But injured cells can also leak natural compounds such as antimicrobials that are problematic for the pathogen.



A study with romaine lettuce that Brandl and her coinvestigators published in <u>Applied and Environmental Microbiology</u> in 2010 showed that *E. coli*, when exposed in lab tests to the contents of broken lettuce leaf cells, can adapt quickly. Using an approach known as microarraybased whole genome transcriptional profiling, the researchers determined that the pathogen uses its genetic arsenal to protect itself against not only the <u>antimicrobial compounds</u>, but also against oxidative stress, osmotic stress, damage to its DNA and other threats to its ability to survive and multiply.

The investigation--the first to provide extensive details about the biology of *E. coli* O157:H7 in fresh-cut lettuce--has paved the way for followup experiments that Brandl and coworkers hope will lead to new technologies to overcome the pathogen's defenses.

Provided by United States Department of Agriculture

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