

Tomato turf wars: Benign bug bests salmonella; tomato eaters win

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Scientists from the U.S. Food and Drug Administration (FDA) have identified a benign bacterium that shows promise in blocking *Salmonella* from colonizing raw tomatoes. Their research is published ahead of print in the journal *Applied and Environmental Microbiology*.

When applied to *Salmonella*-contaminated tomato plants in a field study, the bacterium, known as *Paenibacillus alvei*, significantly reduced the concentration of the pathogen compared to controls.

Outbreaks of *Salmonella* traced to raw tomatoes have sickened nearly 2,000 people in the US from 2000-2010, killing three. Since the millennium, this pathogen has caused 12 multistate outbreaks of food-borne illness—more than one each year. It was this carnage that provided the impetus for the study, according to corresponding author Jie Zheng, of the FDA.

"The conditions in which tomatoes thrive are also the conditions in which *Salmonella* thrives," says coauthor Eric W. Brown, also of FDA, "but we knew that if we could block *Salmonella* from infecting the tomato plant, we could reduce its risk of infecting the person who eats the tomato."

The logic behind the work is simple. Many innocuous bacterial species thrive within the tomato-growing environment.

"We hypothesized that such an organism could be found that possessed

the ability to outcompete or chemically destroy *Salmonella*," says Zheng. "After screening many hundreds of potential biocontrol strains of bacteria that were isolated from farms and natural environments in the Mid-Atlantic region, we found about 10 isolates of bacteria representing very different genera and species that could curb the growth and/or destroy *Salmonella* in our test assays."

Many of these were as pathogenic to humans as is *Salmonella*, but two isolates, belonging to the environmentally friendly species, *P. alvei*, strongly inhibited growth of *Salmonella*.

"This bacterium also has no known history of human pathology, making it a great candidate as a [biological control agent](#)," says Zheng.

"While farmers and agricultural scientists have long used microbes to prevent plant diseases, we now have the opportunity to add a naturally-occurring microbe to a crop in the field with the goal of preventing human disease," says Zheng. "Our ambitions are now to extend this microbial approach to cantaloupe, leafy greens, and other crops that have lately been responsible for outbreaks of food-borne *Salmonella* and *E. coli*."

More information: The manuscript can be found [online](#). The final version of the article is scheduled for the July 2014 issue of Applied and Environmental Microbiology.

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