

Research finds salmonella responds differently to tomato varieties, ripeness

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University of Florida researchers have discovered that tomato variety and maturity influence the ways salmonella bacteria respond to the fruit.

The findings, published Aug. 31 by the online, open-access journal *Public Library of Science (PLoS) ONE*, suggest researchers may be able to develop tomato cultivars more resistant to salmonella contamination.

Also, by monitoring tomato ripeness, it may be possible to reduce fruit's susceptibility to contamination during and after harvest, said Max Teplitski, an associate professor in soil microbiology.

And finally, he said, the findings support the idea that salmonella contamination isn't solely due to hygiene problems on the picking or handling end—although such workers are often the first blamed.

“Sanitation, of course, contributes to produce safety. But now that we know that there's also biology behind these interactions, it's important to clearly understand that it's not always the fault of the farmers and the producers and packers,” Teplitski said. “Even though our studies have been limited in scope, these results give us a realistic expectation that we can identify or develop a tomato variety that is high yielding and also less susceptible to salmonella contamination.”

Salmonella infection is among the most common foodborne illnesses, often spread by raw or undercooked meat, poultry or eggs, but sometimes a result of eating contaminated produce. Its symptoms can

include abdominal pain, fever, nausea and vomiting.

In 2008, federal health officials erroneously blamed a [salmonella outbreak](#) on domestically grown tomatoes, but later said imported contaminated peppers were responsible. Growers in Florida and other states lost an estimated \$100 million in sales.

Teplitski, a member of UF's Institute of Food and [Agricultural Sciences](#) and UF's Genetics Institute, notes that less than 1 percent of supermarket produce contains salmonella or E. coli and the contamination becomes a problem only when this produce contaminates other food, or is consumed raw.

“The chances of encountering it are very low,” he said. “Even so, the producers are not satisfied with less than 1 percent. They want to have 0 percent.”

The study, funded by the Florida Tomato Committee and Center for Produce Safety, began after Teplitski said his research team noticed that oblong Roma tomatoes seemed more often linked to salmonella than round varieties, and wondered if this was more than coincidence.

The researchers inserted “reporter” salmonella into [tomatoes](#) of varying maturity and type so they could see how the gene would react. The reporter salmonella emit a fluorescent light as they multiply inside the tomato. That fluorescence showed researchers [salmonella](#) distinguishes between tomato varieties and among fruit of varying ripeness.

Team member and UF postdoctoral researcher Jason Noel is now screening a greenhouse full of tomato varieties to give growers information about which are most resistant to [salmonella contamination](#). They also plan to look at field irrigation and fertilization practices, to see if they affect produce safety.

The team also includes former UF undergraduate student Ali Alagely, Nabil Arrach of the Vaccine Research Institute of San Diego and Michael McClelland of the University of California, Irvine.

Provided by University of Florida

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