

## App Will Assess Risk in Making Water Sampling Recommendations

If it has rained within the past 24 hours, should fruit or vegetable growers sample their irrigation water for *E. coli* or postpone irrigating their crop? What about sampling or irrigating if the local irrigation district has performed canal maintenance within the past 24 hours? There will soon be an app to help growers make such educated decisions about the relative risks of transferring pathogens to their crop via irrigation water based on real-time local environmental and physical activity. But as Channah Rock, Ph.D., and a University of Arizona water quality specialist in Maricopa, AZ pointed out, the computer application is just one tool to assist growers and should be used as part of an integrated food safety program.

Expected to be completed by year's end, the app will be available for download, for use on a personal computer and for use on a smart phone. It is part of a larger research project led by Rock, also an associate professor in UA's Department of Soil, Water and Environmental Science. Charles Gerba, Ph.D. and a UA microbiology professor, is co-investigator responsible for the quantitative microbial risk-assessment portion of the research.

The app would tap into agricultural weather data from local networks, such as the Arizona Meteorological Network or AZMET, in Arizona. Rock said she's starting with her home state but sees no reason why the program couldn't eventually be expanded to draw from other state's agricultural weather networks.

Users also input their water source (surface or groundwater), irrigation method, crop and a few other pieces of data, including recent *E. coli* data and available historical information about the water source. The program factors in all these variables as well as the transfer rate of *E. coli* to the crop and *E. coli* survival post-irrigation. The result is a relative risk based on environmental data and assesses risk to advise users to collect additional water samples or have confidence in their established water quality profile. "We're being careful in how we provide that recommendation," Rock said of the results. "Growers can use this information to make informed decisions about their water source."

This project builds on her previous research that examined water quality and how it related to food safety risks with produce. "In previous years, we looked at the risk of produce becoming contaminated with polluted water and how that impacts the consumer," Rock said. The current project looked at the relationship of physical and environmental factors to the presence of pathogens or indicators, and particularly *E. coli*, in irrigation water.

"We found different environmental triggers in a field where we were conducting our analysis; things like rainfall, duration of rain and the change in humidity led to greater risk in that water source," she said. "These have been proven in other studies. If there was rain within a 24-hour period, then that should be a trigger to do more intense monitoring." Physical activity, such as canal maintenance, also possesses the potential to increase *E. coli* levels, Rock said. "Most irrigation districts aren't doing canal maintenance during leafy green season," she said. "But we found maintenance (i.e. dredging sediments) to be a very big trigger. If there was maintenance being done, research suggests waiting at least 24 hours after the

maintenance event [to irrigate] and I'd collect samples" to confirm water quality. Even the physical make-up of the canal--lined versus unlined--influenced the risk of contamination.

Although Rock's project focused on *E. coli*, she said they also compared results to potential contamination risks associated with *Salmonella*. At least in her study, only four percent of water samples tested positive for *Salmonella*. Those all came during the summer and the incidence was significantly correlated to water temperature. Lined canals also showed little or no *Salmonella* incidence.

#### Key Industry Take-Aways

- App will help growers make more informed decisions about irrigation and water sampling.
- Environmental and physical factors influence the potential risk of transferring pathogens to produce via irrigation water.

To view the complete research proposal, "[Evaluation of Risk-based Water Quality Sampling Strategies for the Fresh Produce Industry](#)" [click link here](#) to additional resource.

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