

Tucson Citizen

UA effort may lead to safer food, water

Field test for E. coli faster, more accurate

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A technology developed at the University of Arizona could prevent widespread illness and even death by quickly detecting microscopic pathogens in food and water.

The Innovis detection kit can produce test results for E. coli and other pathogens in 10 minutes instead of the hours or days current tests take. Also, testing can take place in the field, said Olin Feuerbacher, operations manager at Innovis Technologies.

Innovis is a business created by students in the McGuire Center for Entrepreneurship at UA's Eller College of Management.

The patented technology was developed by Indraneel Ghosh, a UA chemistry professor.

Testing methods now in use can take up to two days to produce results, and material to be tested must be sent to a lab, Feuerbacher said.

Quicker results could eliminate or minimize a repeat of situations such as last year's E. coli contamination of California spinach that resulted in three deaths and 205 confirmed illnesses.

The traditional culture-based testing, which grows the suspected pathogens in a lab using a sample, requires 24 to 48 hours for results, he said.

A second common test, the Polymerase Chain Reaction, or PCR, test takes six hours and requires lab facilities.

The Innovis kit will cost \$35 per test. The 10-minute turnaround from starting the test to getting results means contaminated food can be identified before it is sent to the public, reducing illness and death and saving money.

The Arizona Department of Health Services provides accurate lab testing, but a faster, accurate field test would be welcome, said Will Humble, assistant director for public health awareness.

"We hope this one works, because it will save time and effort. And the quicker you can make the decision, the better you can protect people," Humble said. "Anything that helps get answers quicker so we can develop public health interventions in a quicker way is welcome to all of us."

Lab-based tests now used require from six to 48 hours and typically require a large volume sample to test, he said.

Existing field tests have a problem with incorrectly detecting pathogens that are not present.

"Right now we discourage the use of field devices because there are so many false positives coming out of the ones available now," Humble said. "One of the weakest links in the chain right now is field tests. If this one will fill the gap, we will embrace it."

Feuerbacher said the Innovis test kit is more than 99 percent accurate and has shown no problems with false-positive results.

Innovis team members Rachana Gollapudi, Alicia Reeves and Feuerbacher came across the zinc-finger technology when researching business opportunities in UA's Office of Technology Transfer.

The zinc finger biomolecule binds to the DNA of a targeted pathogen so it can be detected via a color change in the test kit.

About a month after the Innovis team decided to move forward with commercializing the technology, the California spinach contamination case hit the headlines, prompting the team to push ahead and focus on testing produce, water and meat, Reeves said.

The test kit can be used on irrigation water, crops in the field, produce when it is harvested and food when it is shipped. It can even be used to test food in restaurants, Gollapudi said.

The test kit must meet U.S. Environmental Protection Agency compliance tests before it can be marketed, Reeves said. The team has spoken with potential investors, and a number of labs have expressed interest in the product, she said.

The students will reap the profits from the business while UA and the professor get a piece of the action through licensing and royalties.

The technology also has applications in detecting and identifying a specific microbe, such as one that causes a disease in humans.

ADDITIONAL INFORMATION

THE COMPETITION

The Innovis Technologies team of Olin Feuerbacher, Alicia Reeves and Rachana Gollapudi will be among six teams vying in Friday afternoon's championship round of the CB Richard Ellis/McGuire Entrepreneurship Business Plans Competition.

Other teams competing will be:

- All Abroad LLC, which designs dynamic teaching and learning opportunities worldwide for faculty and students. Team members are Shannon Kolder, Chris Leet, Greg Oates and Gabby Pavelko.
- MotionBay Sports, an indoor sports instruction facility offering video motion-analysis lessons for a range of popular sports. Team members are Matt Boltz, Austin Sams and Daniel Shlossman.
- RediRipe, a ripeness indication system using a patented, color-changing fruit sticker that tells growers when fruit is ripe. Team members are Adam Baskin, Sean Conway, Justin Guerra and Adam Little.
- ExploreIt Innovations, educational software based on the learning styles of today's young students. Team members are Dermot Carey, Ryan Ralston, Jamie Samdal, Joseph Smith and Matt Stacy.
- Vidrio Communities, which builds high-quality urban and ecologically friendly active adult communities for the gay and lesbian population. Team members are Wai-ni (Teresa) Liu, Ben McDonald, Alexandra Meyn and Rakesh Mopidevi.

The business plans competition will begin at 12:30 p.m. Friday at the Berger Auditorium in McClelland Hall, 1130 E. Helen St.

Parking is available in the Park Avenue garage, immediately west of McClelland Hall, for a fee. For more information, call 621-2211.

HOW IT WORKS

The Innovis kit uses a biomolecule known as a zinc finger to bind to the DNA of a targeted pathogen so it can be detected.

This patented technology was developed by Indraneel Ghosh, a University of Arizona chemistry professor.

When the zinc finger finds and binds to, say, E. coli DNA, it activates a protein and causes a color change in the test kit, alerting the person doing the testing that the contaminant is present. The more colored spots found, the greater the contamination.

The process begins with rinsing the item to be tested. Water from the rinse is collected and passed through a 0.22-micron membrane filter that collects bacteria.

The filter, about the size of a dime, is placed in a well containing a lysis solution that causes the bacteria to rupture.

The filter is then rinsed, and covered in detection proteins. The zinc fingers find the DNA sequence for the pathogen being sought and bind to it.

The filter is again washed and then dunked in a detection buffer solution that makes the color changes appear if pathogens are present. More color change means more pathogens present.

The entire process takes less than 10 minutes.

ON THE WEB

www.fda.gov

www.fda.gov/oc/opacom/hottopics/spinach.html

www.azdhs.gov

www.innovistechnologies.com

SUCCESS STORIES

Many successful companies have been launched from student projects at the McGuire Center for Entrepreneurship program at the University of Arizona's Eller College of Management.

Some Arizona-based ones include:

- Split Engineering, a mining software company from the class of 1997 developed by Tom BoBo and Brian Norton.
- Ugallery.com, a Web-based market for classically trained student artists from the class of 2006 developed by Stephen Tanenbaum, Alex Farkas and Greg Rosborough.
- Native American Botanics, which uses hydro-growth techniques for Native American botanics to create a culturally aligned revenue base for Native American communities. The project was from the class of 1998 and was developed by Bill Quiroga and Anita Hayden.
- Chocolate Iguana, a specialty chocolate/coffee house, from the class of 1993 developed by Eric Barnes.
- WLT Capital, which offers online software to consolidate, manage and create market/trading influence for whole loans. It is from the class of 2005 and was developed by Arsen Ovanessoff, Larry Owens and Nathan Taube.
- ShareMore Children's Productions, which educates children through literary and performing arts. It is from the class of 2005 and was developed by Sharon O'Brien and Sonia Teder-Moore.