

# Researcher looks to use nanoparticles for food safety

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Byron Brehm-Stecher, assistant professor in food science and human nutrition, has some big ideas for his work with tiny particles. His latest research project will allow him to study the potential of using silver nanoparticles to improve the safety of the world's food supply.

Although the particles can't be added directly to foods, the ultimate goal of this project is to develop food-related applications such as microbe-resistant fabrics or non-biofouling surfaces. The research, he said, could have a large impact on the safety of foods.

“Through our work, we hope to gain a greater understanding of how these materials affect microbial structure or function,” Brehm-Stecher said. “This may lead to new approaches for killing foodborne pathogens and enhancing food safety. For example, silver nanoparticles are already being used in food packaging to soak up the plant-ripening hormone ethylene, extending the shelf life of fruits. The science is at a basic point right now, but we expect that it will translate into something more applied in the future. I’m looking forward to extending this as far as the questions we have will take us.”

Brehm-Stecher said they hope to learn more about how silver nanoparticles exert their antimicrobial activities by testing QSI-Nano® Silver for its ability to interact with microbial cells.

QSI-Nano® Silver is prepared from pure metallic silver that is vaporized in the presence of an inert gas, and then condensed under controlled

conditions to form discrete particles smaller than 100 nanometers in diameter. A nanometer is a billionth of a meter. You can get an idea of the size difference between a nanometer and a meter by imagining something the size of a marble sitting next to an object the size of the Earth.

“One of the things we do in my lab is to develop multi-ingredient antimicrobial mixtures. I was interested in finding antimicrobials that would be physically compatible with other compounds that we’re working with,” Brehm-Stecher said. “It looked like the nanoparticles could provide us with a good solution. I approached QuantumSphere and they were open to sending us compounds and working with us. We’re interested in many of the same things. It’s a good relationship.”

Brehm-Stecher started work on the project in January 2008. He and graduate assistant Heidi Weinkauff have had good results so far.

“It’s been very fulfilling and exciting to be able to design experiments with Heidi and see what happens,” Brehm-Stecher said. “The results so far have met and surpassed our expectations, and we’re only a couple of months into the grant. Every experiment, whether it turns out as expected or not, points us in a new direction and we are now getting some fascinating clues about how nanosilver works as an antimicrobial.”

Scientists face many challenges when working with unfamiliar materials. Because Brehm-Stecher and Weinkauff were new to nanoparticle research, they collaborated with QuantumSphere chief scientist Doug Carpenter early on to optimize their test methods and begin generating data.

Source: Iowa State University

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