

KSU, EcoQuest Team to Advance Ionization for Food Safety

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Description

Ionization appears to be a better way than ozone to fight food-borne pathogens, Kansas State University researchers say.

MANHATTAN, Kan. – Ozone was good, but adding ionization appears to be better when it comes to getting rid of foodborne pathogens.

And what is ionization? Jim Marsden of a Food Safety Consortium research team at Kansas State University likens a new process using ionization to a "miniature sun" of ultraviolet energy interacting with oxygen and drawing particles out of the air, thus producing an antimicrobial effect.

"When Mount St. Helens went off, you had all these particles floating around," Marsden said. "The reason they're not still floating around is that ionization from the sun caused them to fall out of the air."

Marsden's KSU team worked with EcoQuest International, a Greeneville, Tenn.-based company, to determine the potential use of its ionization generator for food safety in processing plants. The researchers wanted to find out its effectiveness in reducing several pathogens including *E. coli*, *Listeria monocytogenes* and *Staphylococcus auerus*.

With EcoQuest phasing out its straight ozone generation system and shifting to ionization, it settled on a more advanced system that was originally developed by NASA to decontaminating spacecrafts during long missions, Marsden explained. The new technology for food safety goes beyond being merely ozone based. Its components consist of an antimicrobial part that uses oxidated gases such as peroxide and ozone and the ionized part.

"Here we're talking about oxidated gases that basically fill the room with a somewhat aggressive antimicrobial system – extremely safe and breathable," Marsden said. "The levels of ozone are very low in terms of OSHA and FDA standards."

The researchers used stainless steel surfaces to test the system's effectiveness in removing contaminating bacteria. The ionization system removed more microbial populations than ozone at shorter exposure times.

Ozone already has a good track record as a disinfectant. The FDA in 2001 approved its use as a sanitizer for food contact surfaces and for direct application to food products. It is also used extensively for purification of bottled and municipal water.

"In the meat and poultry industry there are some applications for ozone where products are being treated with aqueous ozone prior to being sliced," Marsden said. "They're looking at ozone for decontamination of poultry chillers and for direct decontamination of birds as they go down the processing line."

Marsden noted that the five years since government approval of the process is not a long time to determine how well applications are going to work, particularly in the meat and poultry industry.

The ionization system may be suited for related uses pending further research. KSU and EcoQuest personnel will examine its effectiveness in inactivating avian influenza environmentally. They may also investigate how the system could control *Listeria* in ready-to-eat meat processing environments.

The recent research results showed that ionization was effective in reducing levels of *Staphylococcus auerus*, leading researchers to consider the implications for hospitals and nursing homes.

"The ionization effect is that it eliminated odors," Marsden explained. "For odors to be present they have to be aeromatic, so if you take it out in particle form and inactivate further with peroxide and ozone, it might have some application as well in hospitals, nursing homes and the food industry."

Keywords

IONIZATION, FOOD SAFETY, OZONE, PATHOGENS