New dishware sanitizers prove more effective at killing harmful bacteria

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Ohio State University researchers recently tested the merits of two new dishware sanitizers, and found them more effective at removing bacteria from restaurant dishes than traditional sanitizers.

Melvin Pascall, co-author of the study and associate professor of food science and technology at Ohio State, said that the two new sanitizers reflect the industry's recent efforts to develop more effective germ killers that are also environmentally friendly.

The two sanitizers – one carrying the name brand PROSAN® and the other called neutral electrolyzed oxidizing water – not only proved more effective, but they also contained fewer toxic chemicals.

Pascall and his colleague's research can be found in the January 2011 issue of the journal *Food Control*.

Traditional sanitizers used by restaurants contain chemicals found in bleach, which can corrode dishware, damage the environment, and irritate or burn the skin, Pascall explained. Such sanitizers also lose their effectiveness with each additional washing cycle. This means that the killing agents within the sanitizers kill fewer amounts of harmful bacteria with each rinse.

E. coli outbreaks have been on the decline since 2002, but food is still the primary means for food borne illness transmission. The Centers for Disease Control and Prevention (CDC) estimated that 28 percent of food

borne outbreaks between 1982 and 2002 originated from restaurants or other public food establishments.

Other statistics from the CDC show that approximately 5,000 people die from food borne illness each year while 325,000 are hospitalized for it.

Pascall suspects that this high incidence of illnesses could be related to the large number of patrons who eat at food service establishments in the United States.

In 2009, the National Restaurant Association reported that on a regular day more than 130 million people within the United States will eat at a public food establishment.

"Reducing the level of food borne illness within the restaurants involves serving safe, high-quality meals, but it also requires utensils and dishware to be disease-free," said Pascall.

He and his colleagues decided to compare the effectiveness of four different sanitizers by contaminating samples of milk and cream cheese with the highly infectious bacteria *E. coli*, and *Listeria innocua*. They chose four sanitizers: PROSAN®, a neutral electrolyzed oxidizing water, an ammonia compound, and sodium hypochlorite.

The neutral electrolyzed oxidizing water contained a bacteria-killing agent called hypochlorous acid, and it had an electrical potential different from that of tap water. The combined action of these two agents was responsible for the microbial reduction obtained during the study. One good point about using this water to clean dishes is that it has a neutral pH range of 6.5 to 7.5. A neutral pH means the sanitizer will not corrode dishes as much as highly acidic or alkaline sanitizers, including household bleach.

The researchers used three different types of dishware, plastic trays, ceramic plates, and glass cups. After covering the dishware with the infected milk or cream cheese, they let the food air dry for one hour before washing them.

"We wanted to simulate a restaurant atmosphere, so we allowed the food to cake onto the dishware for roughly the time it might in an actual restaurant," said Pascall.

The research team washed the dishes manually and by machine. Results indicated that the dishes washed by machine have consistently smaller amounts of the harmful bacteria on them, regardless of the sanitizers used.

"The FDA Food Code states that the amount of bacteria on a surface needs to be at least 100,000 times less after washing compared to before washing in order for it to be considered clean," explained Pascall. "This is called a 5-log reduction."

Pascall and colleagues tested multiple dirty loads with the same batch of sanitizer to see how many loads they could wash and still have a 5-log reduction of bacteria. "For both types of bacteria, the electrolyzed water and PROSAN® could wash more loads clean than the ammonia compound and the sodium hypochlorite," said Pascall. "Between the electrolyzed water and the PROSAN®, they were equally as effective except for cleaning ceramic plates, where the electrolyzed water was slightly more effective," he continued.

When the researchers were washing loads of glass dishes, the electrolyzed water and the PROSAN® sanitizers lasted 19 washing cycles, whereas the ammonia compound and the sodium hyplochlorite were only as effective over 17 washing cycles.

"Longer lasting sanitizers could be more cost effective for restaurants because they would not have to use nearly as much sanitizing solution as they currently do," said Pascall. "We cannot provide an estimate comparing the cost per volume between the four sanitizers, however."

The electrolyzed water was produced in the lab. "Following the upfront cost of the machine used to make the electrolyzed water, this method of sanitization could be extremely cost effective and convenient. The machine only requires salt water to produce the sanitizer, and we made it in the lab shortly before we used it," Pascall added.

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