University of Florida News

Researchers: Microwave oven can sterilize sponges, scrub pads

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PLEASE NOTE: To guard against the risk of fire, people who wish to sterilize their sponges at home must ensure the sponge is completely wet. Two minutes of microwaving is sufficient for most sterilization. Sponges should also have no metallic content. Last, people should be careful when removing the sponge from the microwave as it will be hot.

GAINESVILLE, Fla. – Microwave ovens may be good for more than just zapping the leftovers; they may also help protect your family.

University of Florida engineering researchers have found that microwaving kitchen sponges and plastic scrubbers – known to be common carriers of the bacteria and viruses that cause food-borne illnesses - sterilizes them rapidly and effectively.

That means that the estimated 90-plus percent of Americans with microwaves in their kitchens have a powerful weapon against E. coli, salmonella and other bugs at the root of increasing incidents of potentially deadly food poisoning and other illnesses.

"Basically what we find is that we could knock out most bacteria in two minutes," said Gabriel Bitton, a UF professor of environmental engineering. "People often put their sponges and scrubbers in the dishwasher, but if they really want to decontaminate them and not just clean them, they should use the microwave."

Bitton, an expert on wastewater microbiology, co-authored a paper about the research that appears in the December issue of the Journal of Environmental Health, the most recent issue. The other authors are Richard Melker, a UF professor of anesthesiology, and Dong Kyoo Park, a UF biomedical engineering doctoral student.

Food-borne illnesses afflict at least 6 million Americans annually, causing at least 9,000 deaths and $4 billion to $6 billion in medical costs and other expenses. Home kitchens are a common source of contamination, as pathogens from uncooked eggs, meat and vegetables find their way onto countertops, utensils and cleaning tools. Previous studies have shown that sponges and dishcloths are common carriers of the pathogens, in part because they often remain damp, which helps the bugs survive, according to the UF paper.

Bitton said the UF researchers soaked sponges and scrubbing pads in raw wastewater containing a witch's brew of fecal bacteria, viruses, protozoan parasites and bacterial spores, including Bacillus cereus spores.

Like many other bacterial spores, Bacillus cereus spores are quite resistant to radiation, heat and toxic chemicals, and they are notoriously difficult to kill. The UF researchers used the spores as surrogates for cysts and oocysts of disease-causing parasitic protozoa such as Giardia, the infectious stage of the protozoa. The researchers used bacterial viruses as a substitute for disease-causing food-borne viruses, such as noroviruses and hepatitis A virus.

The researchers used an off-the-shelf microwave oven to zap the sponges and scrub pads for varying lengths of time, wringing them out and determining the microbial load of the water for each test. They compared their findings with water from control sponges and pads not placed in the microwave.

The results were unambiguous: Two minutes of microwaving on full power mode killed or inactivated more than 99 percent of all the living pathogens in the sponges and pads, although the Bacillus cereus spores required four minutes for total inactivation.

Bitton said the heat, rather than the microwave radiation, likely is what proves fatal to the pathogens. Because the microwave works by exciting water molecules, it is better to microwave wet rather than dry sponges or scrub pads, he said.

"The microwave is a very powerful and an inexpensive tool for sterilization," Bitton said, adding that people should microwave their sponges according to how often they cook, with every other day being a good rule of thumb.

Spurred by the trend toward home health care, the researchers also examined the effects of microwaving contaminated syringes. Bitton said the goal in this research was to come up with a way to sterilize syringes and other equipment that, at home, often gets tossed in the household trash, winding up in standard rather than hazardous waste landfills.

The researchers also found that microwaves were effective in decontaminating syringes, but that it generally took far longer, up to 12 minutes for Bacillus cereus spores. The researchers also discovered they could shorten the time required for sterilization by placing the syringes in heat-trapping ceramic bowls.

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Credits

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