Food processors beware: Salmonella biofilms incredibly resistant to powerful disinfectants

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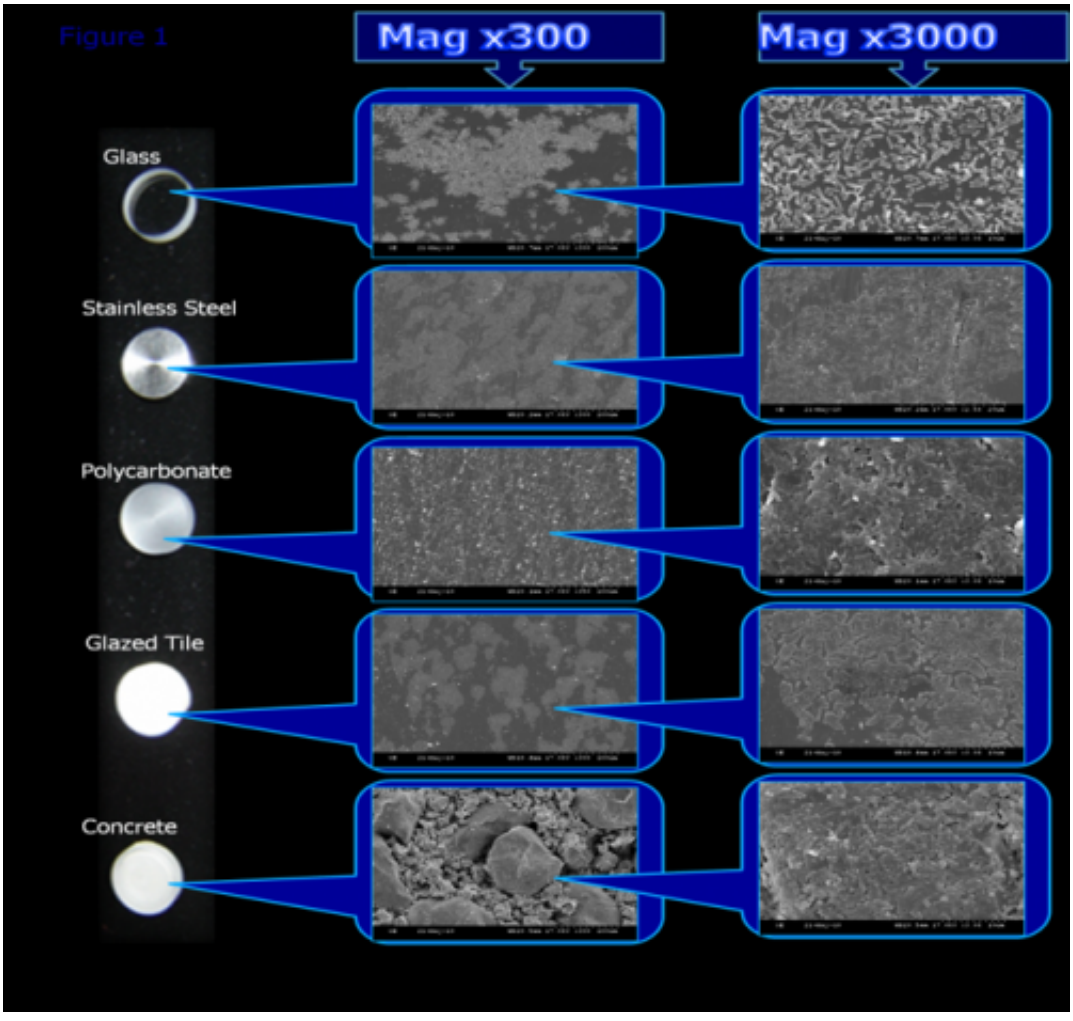

This image shows photos of biofilms on surfaces at low magnification (300) and high magnification (3000) using electron microscope. Credit: Photo courtesy of National University of Ireland, Galway

Once *Salmonella* bacteria get into a food processing facility and have an opportunity to form a biofilm on surfaces, it is likely to be extraordinarily difficult, if not impossible, to kill it, according to research published ahead of print in the journal *Applied and Environmental Microbiology*.

Researchers from National University of Ireland, Galway conducted a study in which they attempted to kill *Salmonella* biofilms on a variety of hard surfaces, using three types of disinfectant.

"We found that it was not possible to kill the *Salmonella* cells using any of the three disinfectants, if the biofilm was allowed to grow for seven days before the disinfectant was applied," says Mary Corcoran, a researcher on the study. Even soaking the biofilms in disinfectant for an hour and a half failed to kill them

The impetus for the study was a European outbreak in which 160 people in 10 countries became ill with gastroenteritis (vomiting and diarrhea) from the Agona serotype of *Salmonella*, says Corcoran. That outbreak was traced to meat from a major food-processing facility.

"It seems that *Salmonella* Agona entered into the environment in the part of the facility where meat that was already cooked was being handled, and it had survived and contaminated the cooked meat," says Corcoran. "We were interested in determining if this particular *Salmonella*, that caused the outbreak, might have something special about it that makes it better at surviving in the environment of a food processing facility. Was it better at forming a dense biofilm or was it more resistant to disinfectants than other *Salmonella*?"

The research uncovered nothing special about that specific strain.

"We found that all of the types of *Salmonella* we looked at were able to

adopt the specialized biofilm lifestyle on all of the surfaces we looked at, including glass, stainless steel, glazed tile, and plastic, and that the biofilm of *Salmonella* gets more dense over time, and becomes more firmly attached to the surface," she says.

Corcoran warns that food processing facilities must take strict care to keep *Salmonella* out of the clean areas where cooked foods get further processing and packaged

"People need to question whether disinfectants that are promoted as killing various types of bacteria are really as effective in real life situations where biofilms can form as they are claimed to be based on experiments that do not use biofilms. A lot of the time, the disinfectant may add very little, if anything, to good cleaning and appropriate food handling practices," says Corcoran. "There is a need for more research to define better methods for killing *Salmonella* biofilms."

In the US, an estimated million-plus cases of *Salmonella* occur annually, with 23,000 hospitalizations and 450 fatalities reported each year, according to the Centers for Disease Control and Prevention.

More information: www.asm.org/images/Communicati … 14/0114disinfect.pdf

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