

Banishing biofilms: loosening their grip could make food supply safer

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If you could see a piece of celery that's been magnified 10,000 times, you'd know what the scientists fighting foodborne pathogens are up against, said University of Illinois microbiologist Hans Blaschek.

"It's like looking at a moonscape, full of craters and crevices. And many of the pathogens that cause foodborne illness, such as Shigella, E. coli, and Listeria, make sticky, sugary biofilms that get down in these crevices, stick like glue, and hang on like crazy.

"Scientists and people in the food industry are intensely interested in how these biofilms form and behave. Understanding how they work could lead to targeted approaches for their prevention and removal," he said.

The sales figures for his new book *Biofilms in the Food Environment* certainly support that sense of urgency. Blaschek says the book contains the accumulated wisdom of academics who study biofilms and industry food scientists who battle them on the front lines daily.

According to Blaschek, the problem faced by produce suppliers can be a triple whammy. "If you're unlucky enough to be dealing with a pathogen--and the pathogen has the additional attribute of being able to form biofilms—and you're dealing with a food product that's minimally processed, well, you're triply unlucky," the scientist said.

"You may be able to scrub the organism off the surface, but the cells in

these biofilms are very good at aligning themselves in the subsurface areas of produce.

“Over time, the sticky cells of the biofilm form on top of each other, creating a microenvironment that behaves more like a multicelled organism. And all these little bacterial cells communicate with each other. They’re fascinating really; unfortunately, they can also be deadly,” he said.

Blaschek says the biofilms book has generated a lot of interest from the food industry. “It’s really a comprehensive reference source for industry scientists, university researchers, and regulatory agencies. In particular, food engineers who design strategies and cleaning procedures for produce need to understand how biofilms form and behave so they can develop better protocols for removing them,” he said.

“There’s an interesting discussion of the correlation between a strain’s virulence and its biofilm-forming abilities, information about cutting-edge technologies to investigate microbial compositions in biofilm ecosystems and cell-to-cell interaction, and updated findings on the molecular attributes and mechanisms involved in biofilm development,” he said.

“It’s a very applied kind of approach, connecting the research that’s being done in labs across the country with the needs of food technologists,” he added.

Source: University of Illinois at Urbana-Champaign

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