Food scientist develops 'rechargeable' anti-microbial surfaces to improve food-handling safety

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(PhysOrg.com) -- Using nano-scale materials, a University of Massachusetts Amherst food scientist is developing a way to improve food safety by adding a thin anti-microbial layer to food-handling surfaces. Only tens of nanometers thick, it chemically "re-charges" its germ-killing powers every time it's rinsed with common household bleach.

Food scientist Julie Goddard recently received a four-year, $488,000 grant from the United States Department of Agriculture's Agriculture and Food Research Initiative to lead the development of the new method for modifying polymer and stainless steel processing surfaces by adding a nano-scale layer of antimicrobial compound to gaskets, conveyor belts and work tables, for example.

As she explains, "This layer replenishes its anti-microbial qualities with each repeated bleach rinse. So at the end of the day in a meat-packing plant, for example, when employees clean their equipment, the regular bleach rinse will re-charge the surface's anti-microbial activity. They will not need to add any more steps." The chemical action comes from a halamine structure that holds chlorine in an applied layer only nanometers thick. The treatment does not affect the strength of tables or trays.

Food production is increasingly automated and as the number of surfaces

contacted by food increases, there is greater potential for contamination. Goddard and colleagues' new method will cost industry less than incorporating anti-microbials into an entire conveyor belt construction, for example. The technique is effective at the square-inch scale in the laboratory now, the food scientist adds, and a major goal will be to show that it can be effective at larger scales in commercial food processing.

Goddard, who did the preliminary work to show that this nanotech method is effective against organisms relevant to food safety and others relevant to food spoilage, such as *E. coli* and *Listeria*, says the technology is already being applied in hospital textiles whose anti-microbial properties are replenished each time they're laundered in bleach.

"It's not meant to replace thorough cleaning, which should always be in place, but it's meant to add power to the process and a further layer of low-cost protection against contamination." Goddard's collaborators on this project include UMass Amherst food scientist Lynne McLandsborough and Joe Hotchkiss, director of the Michigan State University School of Packaging.

Provided by University of Massachusetts Amherst