

Antibacterial Surface Treatment for Hardened Metals

Track Code: 2017-BAHR-67842

Categories:

- Food and Nutrition
- Materials and Manufacturing

Keywords:

- Antimicrobials
- Food and Nutrition
- Food Processing
- Food Safety
- Materials and Manufacturing
- Metals
- Surface Treatment

During food processing the transfer of bacteria from contaminated food to the processing equipment can occur. Low temperature food processing, i.e., raw food such as pre-packaged salads, cannot use high temperatures to remove harmful bacteria that may be present from the growing fields. The most common methods to prevent bacterial contamination on vegetables and fruits is washing both the food and processing equipment. There is a need for instilling antimicrobial properties into food processing equipment.

Researchers at Purdue University have developed a treatment to infuse a hardened metal surface with antimicrobial peptides. By creating an oxidized metal surface with nanometer wide and micrometer deep cracks, peptides can be infused in these microscopic cracks with a simple wet process. Preliminary testing verified that the treated surfaces provide antibacterial properties in excess of the untreated surfaces. The material stored in the cracks releases over time, leading to extended times of antimicrobial resistance. The oxidation process creates an optically colored material, which provides a simple visual indicator of wear/degradation in antimicrobial performance. This technology primarily applies to food processing, knife/chopping blades used in commercial food processing, i.e., fruit and vegetables, would be less likely to transfer bacteria during processing if they cannot grow/bind onto the surface of the blades. Another possible use to extend the "cracks as storage" approach includes lubricants. The process has been demonstrated on stainless steel and titanium and is applicable to a wide range of commercial metal alloys.

Advantages:

- Prevents spread of bacteria across metal surfaces
- Antimicrobial properties are wear resistant
- Colored wear indicators

Potential Applications:

- Commercial food processing
- Food processing equipment
- Lubricants

People:

- Bahr, David Frederick (Project leader)
- Morales Espejo, Jesus Hector

Intellectual Property:

Application Date: August 21, 2018

Type: Utility Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Application Date: August 22, 2017

Type: Provisional-Patent

Country of Filing: United States

Patent Number: (None)

Issue Date: (None)

Contact OTC:

Purdue Office of Technology Commercialization
The Convergence Center
101 Foundry Drive, Suite 2500
West Lafayette, IN 47906

Phone: (765) 588-3475

Fax: (765) 463-3486

Email: otcip@prf.org