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Killer Paper for Next-Generation Food Packaging

Scientists are reporting development and successful lab tests of "killer paper," a material intended for use as a new food packaging material that helps preserve foods by fighting the bacteria that cause spoilage. The paper, described in ACS' journal, Langmuir, contains a coating of silver nanoparticles, which are powerful anti-bacterial agents.

Aharon Gedanken and colleagues note that silver already finds wide use as a bacteria fighter in certain medicinal ointments, kitchen and bathroom surfaces, and even odor-resistant socks. Recently, scientists have been exploring the use of silver nanoparticles -- each 1/50,000 the width of a human hair -- as germ-fighting coatings for plastics, fabrics, and metals. Nanoparticles, which have a longer-lasting effect than larger silver particles, could help overcome the growing problem of antibiotic resistance, in which bacteria develop the ability to shrug-off existing antibiotics. Paper coated with silver nanoparticles could provide an alternative to common food preservation methods such as radiation, heat treatment, and low temperature storage, they note.

However, producing "killer paper" suitable for commercial use has proven difficult.

The scientists describe development of an effective, long-lasting method for depositing silver nanoparticles on the surface of paper that involves ultrasound, or the use of high frequency sound waves. The coated paper showed potent antibacterial activity against *E. coli* and *S. aureus*, two causes of bacterial food poisoning, killing all of the bacteria in just 3 h. This suggests its potential application as a food packaging material for promoting longer shelf life, they note.

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