Compound Adds Bacteria Protection

New system releases silver ions to prevent buildup

The milling industry may soon have a new long-lasting tool to protect against bacteria, mold, and fungus.

Agion Technologies LLC, Wakefield, MA, has developed Agion™ antimicrobial, a compound that coats surfaces to prevent microbial activity and buildup for long periods of time—up to several years, depending on the application.

More than 50 companies including Foss Manufacturing, Bosch Siemens, Dupont, Honeywell, and AK Steel are already using the product on fibers, fabrics, molded plastics, paper, and coated steel products.

The system places an antimicrobial compound containing silver, a natural antimicrobial agent, on a surface such as equipment, walls, or floors. The presence of the Agion microbial prevents and inhibits its microbial growth on surfaces.

"The Agion antimicrobial compound shows efficacy in as little as half an hour," says Dr. Ravi Bhatkal, vice president strategy and business development, Agion Technologies.

The compound is active on the material's surface, not on the product, so flour or wheat contamination is not a concern. It will not impart itself to any product, like flour, that comes in contact with the treated surface.

Science

Agion Technologies, founded five years ago, developed a system that uses controlled release of silver ions to block microbial activity.

The key is in controlling the silver's release, something that has until now eluded science, says Bhatkal. This is why silverware tarnishes over time.

An antimicrobial system requires three factors to prevent bacteria, mold, or fungus development: an active ingredient, a carrier to release it, and a release mechanism.

In Agion's system, the active ingredient is silver; the carrier to release it is zeolite, and the release mechanism is ion exchange.

To create the system, Agion uses zeolite, a porous, ceramic material with a molecular makeup Bhatkal likens to a block of Swiss cheese. The zeolite is loaded up with silver ions, and through ion exchange, the ions are gradually released, preventing microbial activity.

The zeolite acts as an ion pump, providing controlled release of silver ions into the environment and providing continuous antimicrobial protection.

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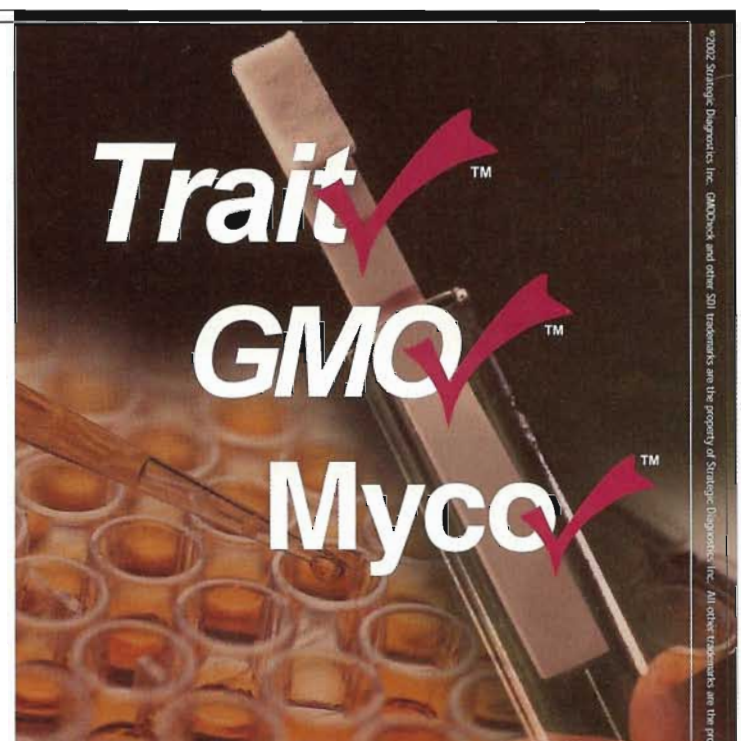

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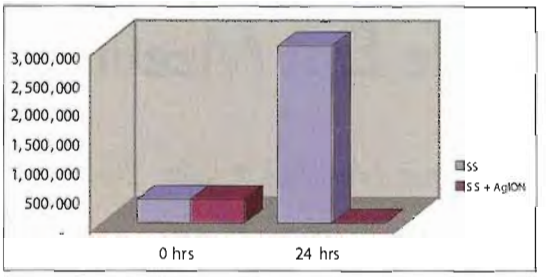
"Moisture comes in contact with the particles and releases silver ions slowly over time," he says. "The more moisture, the higher the rate of release."

The ion exchange causes silver to be released until equilibrium is reached, then no more until moisture levels increase. That is what gives the system its long life.



Bacteria buildup on bare stainless steel (gray) versus AGION-treated stainless steel (burgundy).

Applications

The system can be adapted into a wide range of processes and produced in liquid or powder coatings, says Bhatkal. It is applied late in production, so that it will be in the final product.

"For example, when the fiber is formed, our material attaches itself to it," he says. "Then, when fabric is woven of the fiber, it becomes antimicrobial."

To illustrate the product's benefits, AGION is currently helping build a concept home near Los Angeles, CA. The compound will be applied to heating, ventilation, and air conditioning systems and "high-touch" zones, such as appliances, handrails, doorknobs, faucets, and food preparation surfaces.

Though the product is not yet used in the milling industry, AGION has surveyed milling industry companies and sees great potential. Possible uses include flooring, walls, equipment, storage bins, hoppers, sieves (fiber, filament, wire), conveyor belts, cutting boards, filtration, packaging, and sifter boxes.

In addition, the product could be used in the transportation industry to coat railcar walls and roofs.

Effectiveness

AGION has evaluated the system's effectiveness using microbial measurement techniques, ash tests, electron microscopes, ion-release measurements, and other technology. The material can withstand temperatures of 1,500 F (800 C) and pH levels of 3 to 10.

In addition, after application, AGION can test to see if the product is still effective, using accelerated lifetime testing in laboratories or at the application site to detect the release of silver ions.

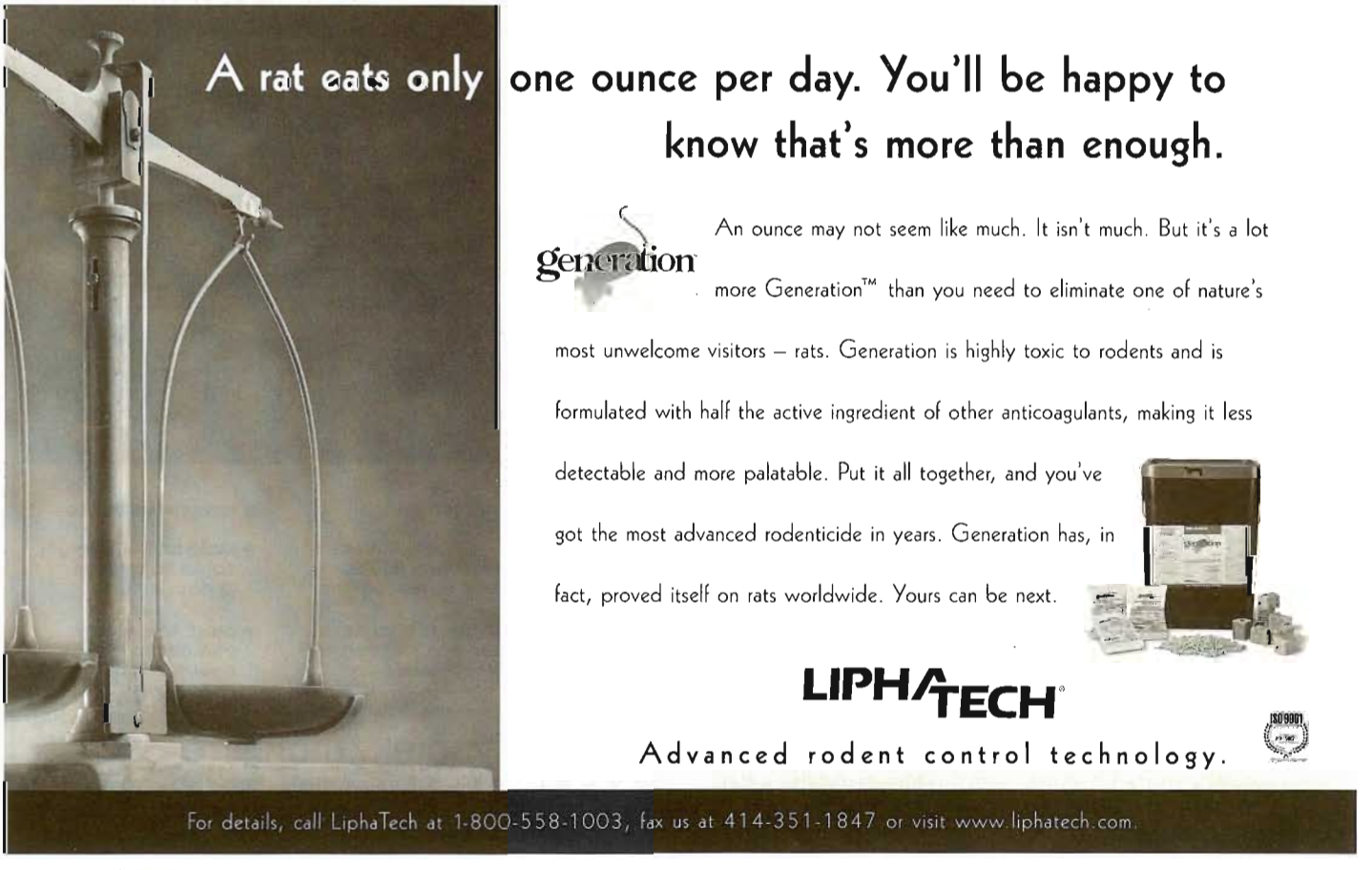
Product life depends on application. "Railcars are recoated every seven to 10 years, so the AGION antimicrobial application can be engineered to last 8 1/2 years," says Bhatkal.

While the product will not eliminate the need to disinfect and clean periodically, it will end the microbacterial cycle. "You still have to do cleaning—the AGION microbial adds an extra level of protection," he says.

Bhatkal anticipates that millers will probably purchase the system through their coating supplier or as a service through equipment suppliers.

Joli A. Shaw, editor

Editor's note: *This article is based on a presentation by Dr. Ravi M. Bhatkal, vice president strategy and business development, AGION Antimicrobial, Wakefield, MA (781-224-7125/www.agion-tech.com). Bhatkal spoke at the Association of Operative Millers Central/Wheat State/Texoma Districts' meeting Aug. 2 at Lake of the Ozarks, MO.*



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