THE SILVERINSTITUTE

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Silver News

Silver May be the Answer to Biting Midges;

Insect Carries Deadly Disease to Livestock in U.S. and Europe.

Biting midges are tiny flying insects that spread deadly diseases among sheep, cattle and other livestock, and prevention usually relies on draining nearby wetlands that are vital to the ecosystem or using toxic insecticides that detrimentally effect the environment.

Fortunately, there may be a safer way to get rid of these pests. Researchers at Kansas State University, University of Arkansas and the U.S. Department of Agriculture have discovered in lab tests that 250 milligrams per liter of silver nanoparticles in water can destroy about 90 percent of midge larvae.

Interestingly, the researchers chose not to deliver the nanosilver by simply spraying or similar applications but by mixing the nano silver with sorghum particles, which the larvae deemed as nourishment. This increased the likelihood that the silver would be accepted and increased its toxic effect.

While midges are common in states such as Florida, which has swampy areas, the midges also cause millions of dollars of livestock loss in England, according to the U.K. Department for Environment, Food and Rural Affairs, which notes that midges are spreading a disease known as 'blue tongue.' According to a BBC report, last year's outbreak was the first since 2007 and farmers in other parts of Europe including the Netherlands are reporting the disease as well.

Silver may destroy insect larvae that produce livestock-killing disease.

Can Silver, Apples and Copper Curtail Oil Pipeline Corrosion?

A silver alloy may protect oil pipes from corrosion.

Oil has sulfur-containing organic compounds that eventually corrode the pipes that carry the liquid. If engineers could find a substance that binds to the sulfur atoms, thus negating their corrosive tendencies, this would go a long way to making pipelines and equipment last longer.

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One such experiment is taking place at the Immanuel Kant Baltic Federal University (Kaliningrad) where researchers are synthesizing silver and copper microparticles that adhere to sulfur atoms, essentially taking sulfur out of the picture.

According to their published report, the team from East Kazakhstan Technical University (Kazakhstan) learned that silver-copper microparticles attracted the compounds in oil that cause corrosion, but they needed a substance to keep the alloy stable. They found that pectin, a soluble fiber found in fruits and most abundant in apples, worked well. Pectin is used in cooking to gel fruits, often to make jams and jelly.

In a prepared statement, Elena Van, a PhD. in Engineering, Associate Professor at the Institute of Medicine and Life Sciences of the Immanuel Kant Baltic Federal University, said: "Our experiments have shown that the proposed bimetallic microparticles can serve as an environmentally-friendly way to protect metals from corrosion. In the future, we plan to conduct experiments in real conditions: apply a layer of microparticles to the surface of the pipeline body and reproduce the conditions of oil transportation along it. We assume that the durability of such coatings will be commensurate with the service life of the transport pipes themselves. But for now, this is only a theory that requires further confirmation."

Electric Bandage Makes its Own Power With the Help of Silver

Bandages that use electricity to speed up healing are not new, but they have drawbacks. For instance, even the smallest conventional batteries can be too bulky or awkward for a patient to wear. Second, those that use a transducer-type electrical system require the patient to be near a coil that wirelessly emits electrical signals. This limits the wearer's freedom to move around.

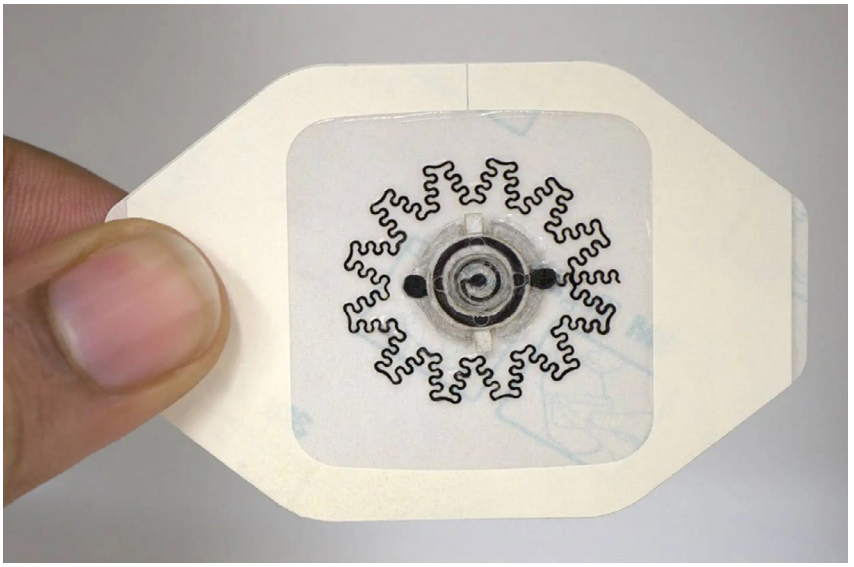
Now, a bandage that makes its own electricity, with silver as a main component, eliminates these issues.

The one-use bandage is the brainchild of a team of U.S. and Korean researchers who took an off-the-shelf bandage and added two electrodes to one side and a thin inactive battery on the other. The battery contained a magnesium anode and a silver chloride cathode separated by a layer of cellulose impregnated with sodium chloride (salt crystals). When a drop of water was applied to the cellulose layer it produced a voltage of about 1.5 volts at very low current so that a patient's tissue would not be harmed. The silver chloride cathode is crucial, because it is not only flexible but provides a low resistance conduit for electricity.

The bandage costs about US$1 and although it dries out after about seven hours it can be reactivated with another water drop and will work for a few hours more. However, the developers note that the bandage is so low cost that a new bandage should replace it, and patients could apply it themselves. One feature of the bandage is that it can have a long shelf life as the battery is not activated until it gets wet.

The battery is nicknamed WPED, or Water-Powered Electronics-free Dressing, and in laboratory tests on mice, diabetic skin ulcers healed about 30 percent faster than wounds treated with traditional bandages.

In a prepared statement, Amay Bandodkar, co-corresponding author of the work and an assistant professor of electrical and computer engineering at North Carolina State University, said: "Our goal here was to develop a far less expensive technology that accelerates healing in patients with chronic wounds. We also wanted to make sure that the technology is easy enough for people to use at home, rather than something that patients can only receive in clinical settings." She added: "Next steps for us include additional work to fine-tune our ability to reduce fluctuations in the electric field and extend the duration of the field. We are also moving forward with additional testing that will get us closer to clinical trials and – ultimately – practical use that can help people."



RAJARAM KAVETI

This wet bandage produces a healing electrical current without the use of conventional batteries.

How Silver Helps the Green Revolution

Silver is no longer simply a store of wealth or investment but also an engine that powers the Green Revolution. The Silver Institute produced this video to illustrate the white metal's importance to clean energy applications, global electrification efforts and highlight its important role in industry, society, and as an investment. The video also addresses the importance of sustainability among our member companies. **Click Image To Watch Video**

Nanosilver Can Self-Heal Breaks or Damage;

Will Your Mobile Phone Fix Itself One Day?

Some 'self-healing' materials such as certain concretes, polymers or ceramics can fix small cracks or dents when light, heat or chemicals are administered, but Chinese scientists have observed self-healing in nanoscale silver without any outside intervention.

Their studies on nanoscale silver seen under electron microscopes have shown that the metal can repair tiny damage such as nanocracks and nanopores with no external involvement. Even more remarkable is that this occurs not only at room temperature but in extremely low temperatures down to -100 degrees Celsius.

The tests involved making infinitesimally small holes in thin sheets of nanosilver with an electron beam and watching when, in a matter of several dozen minutes, the crystal matrix of atoms reordered itself into its previous atomic structure.

The team tested nanogold as well, but it did not exhibit any self-healing properties.

While the exact mechanism is not fully understood, the scientists theorize that it could be because of an atomic imbalance (positive vs. negative) that occurs when an area is left vacant by a hole and the edges of the holes attract each other and tend to close the gap.

This discovery could play an important role in designing silver nanowires that automatically fix breaks or repair damage occurring in electronic gear without human intervention.

Silver Nanowires Help Make Gold Nanowires for Nerve Experiments

Although silver nanowires have many medical uses, some researchers have found that gold nanowires may work better for connecting nerve cells directly with medical devices.

However, they had trouble making such thin gold nanowires and found that by using more easily-produced silver nanowires as support, they could not only form the gold nanowires but combine them with silicone, making the wires more flexible and stronger.

"As it's possible to make silver nanowires, we take advantage of this and use the silver nanowire as a template on which we grow gold," said Klas Tybrandt, a professor of materials science at the Laboratory of Organic Electronics at Linköping University, quoted in *The Debrief*, a website that covers science and technology. "The next step in the process is to remove the silver. Once that's done, we have a material that has over 99 percent gold in it."

Depending upon the application, gold nanowires may be better to use than silver because gold is a softer metal and will do less damage when inserted into soft tissue.

"We've succeeded in making a new, better nanomaterial from gold nanowires in combination with a very soft silicone rubber. Getting these to work together has resulted in a conductor that has high electrical conductivity, is very soft and made of biocompatible materials that function with the body," Tybrandt said.

The wires have so far been tested only on rats and future studies are to include seeing how close the wires can be placed to nerve cells without damaging the cells and seeing how well the wires pick up nerve signals and transmit electrical signals back to nerves. Such back-and-forth communication could be used for the "treatment of a variety of neural disorders and diseases, including neuropathic and chronic pain, paralysis, major depression, Parkinson's disease, and epilepsy," Tybrandt and his team noted in their article in the journal Small.

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