Safer than silver: Antibacterial material made with algae

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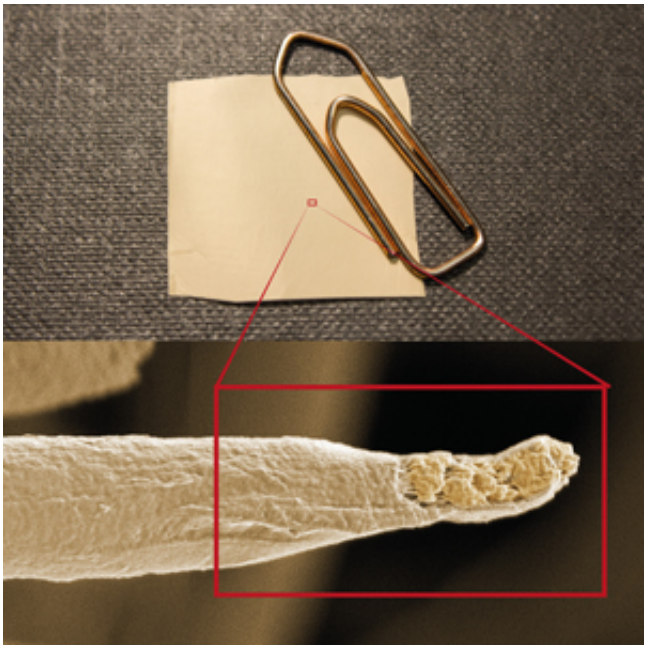

A close-up of the antibacterial fibre created by the KTH scientists. In this 2x2cm swatch of fabric are nearly 200,000 threads running in the same direction.

Consumers concerned about safety of silver ions in antibacterial and odor-free clothing will soon have a proven safe alternative thanks to ultra-thin thread and a substance found naturally in red algae.

The use of silver ions for antibacterial textiles has been a matter of hot debate worldwide. Sweden's national agency for chemical inspection is one authority which has ruled silver a health risk, citing possible damage

to human genetic material, reproduction and embryonic development.

Mikael Hedenqvist, professor of polymer materials at KTH Royal Institute of Technology, says he and his colleagues, assistant professor Richard Olsson and doctoral student Rickard Andersson, have produced new antibacterial fibres that combine bio-compatible plastics with the antimicrobial compound, lanosol, which is commonly found in seaweeds of the family Rhodophyta, or red algae.

"The substance is a good alternative to particle-based antibacterials for clothing, as well as compresses or bandages," Hedenqvist says.

Using a process called electrospinning, they have succeeded in creating an ultra-thin thread, which means fabrics can have more contact between the antibacterial fibre and the surrounding area.

"Electrospinning produces quite thin thread, with a thickness on the order of one-hundreth of a human hair," Hedenqvist says. The result is more effective clean-up of bacteria.

The thread with the integrated antimicrobial compound (lanasol) does not clump up like fibres using silver or other antibacterial particles. It can be used in random network structures, such as in non-woven materials; or in a standardized fashion, where all the strands run in the same direction.

"The active substance is completely soluble and evenly distributed inside the thread," he says. "It forms no lumps or bumps that can occur when, for example, silver-based particles are used.

"That's good because these particles affect the thread's mechanical properties negatively."

Hedenqvist says material could one day be used in air filters or to dress fittings in hospitals, since the active antiseptic substance of red algae has been shown to kill 99.99 percent of bacteria type Staphylococcus aureus – the most common cause of skin and wound infections in hospital environments.

"Hospitals are constantly striving to have as antiseptic environment as possible. But we're not there yet," he says.

Provided by KTH Royal Institute of Technology