Eco-safe antibacterial fibre discovered

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(Phys.org)—Researchers at KTH Royal Institute of Technology in Stockholm have discovered an antibacterial polymer that can be used in everyday products such as sportswear, diapers and bandages, without causing resistant bacteria.

"We have managed to find an antibacterial polymer that attaches stably to cellulose and therefore cannot be released into the environment," says Josefin Illergård, a chemistry researcher at KTH.

The discovery could be an important breakthrough in the search for environmentally-friendly ways to control bacteria while preventing antibiotic resistance and resistant bacteria.

Illergård says the team's discovery is based on cellulose fibres embedded in a polymer, which kills bacteria. Cellulose is the most common organic substance in nature and the primary structural component of plant cell walls. The active polymer is so strongly bonded to the fibres of the cellulose material that it does not loosen or leak into the environment via water.

Antibacterial agents such as triclosan and silver ions are commonly used in sportswear and shoes to remove unpleasant odors from bacteria formation. But such biocides leak into the environment when the treated garments or surfaces are washed, raising the risk that bacteria will gradually become resistant to their effect.

"If someone uses a cloth to wipe a countertop treated with antibacterial

agents, and that cloth is rinsed in the sink, those substances are then spread further through the drain and into the environment where they can contaminate soil and water and give rise to bacterial resistance," Illergård says.

She says that bacteria must come in direct contact with the material for the antibacterial process to work.

Because polymer has a positive charge and bacteria a negative charge, the new material actually attracts bacteria, she says. The material does not contain large amounts of polymer; and only non-toxic nitrogen oxides remain after it is burned. Nevertheless, the team's goal for the future is to continue the research and try to replace the antibacterial polymer with an entirely renewable material.

"We know that this project is of international interest," Illergård says. "Our papers have been requested by companies abroad and we are getting a lot of feedback when we present our findings at conferences.

"In the future, I believe our material will be used in cleaning clothes, in sanitation for hospitals and in different kinds of water purification filters," she says.

Illergård says the material could be ideal for simple water treatment in the future. "What if water could be purified in an environmentally friendly manner by our material, instead of just strainers?" she asks. "Many lives would be saved, and the material could be placed directly on the fire and burned after use."

Provided by KTH Royal Institute of Technology

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