Harnessing the Sun to tackle period poverty

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A re-usable sanitary towel that could potentially kill up to 99.9% of bacteria when exposed to sunlight is being developed by scientists at Cardiff University.

The team is developing a special type of fabric that is infused with non-toxic metals acting as a catalyst, harnessing energy from the Sun and producing compounds capable of killing bacteria, removing stains and neutralizing odors.

The material could be used in reusable sanitary towels or discreet period pants, which would be rinsed with water and then left to dry in the sun to kickstart the bacteria-killing process.

It is believed the product, estimated to cost between $0.03 and $0.05, would be of huge benefit to people living in low- and middle-income countries, where access to single-use sanitary products is both costly and limited.

Reusable sanitary towels and period pants are an eco-friendly and low-cost alternative to single-use plastic products; however, safe use requires an elaborate disinfection and laundering regime.

Access to disinfectants and clean water is at a premium in many countries around the world, meaning existing reusable products can drastically increase the risk of infections.

"The use of unsanitary reusable products has been found to contribute to an alarmingly high incidence of vaginal infections in low- and middle-income countries. This creates chronic discomfort and doubles the risk of miscarriage, which can prove deadly in communities with poor medical provision," said project lead Dr Jennifer Edwards from Cardiff University's School of Chemistry.

"In Nepal, for example, almost half of female agricultural workers there have such an infection at any one time."

The team have already provided clear preliminary evidence showing that the non-toxic Photo Active Catalysts (PAC) can harness energy from sunlight to produce chemical energy, in the form of bacteria-killing particles called reactive oxygen species (ROS).

The ROS can be created in significant amounts using the catalysts and

have been shown to be effective at killing 99.9% of the bacterium Deinococcus radiodurans in just 15 minutes when exposed to UV light.

Importantly, the team have shown that antibacterial activity only occurs under UV light and is ineffective in the dark, meaning the materials are benign and less likely to cause possible irritation when worn under clothes.

Thanks to new funding through the Grand Challenges Explorations, an initiative of the Bill & Melinda Gates Foundation, the team are now exploring how this technology can be implemented into a suitable material inside a sanitary towel.

At the same time, they are aiming to optimize PACs so that they can be used against a broad spectrum of pathogens as well as reduce organic blood products and color.

"Our overall goal is to create a catalyst-infused self-cleaning material that can provide a cheap and easy-to-use solution for use in reusable period products to improve the health of women in communities all over the world," Dr Edwards continued.

"Our initial results show the technology is already highly effective at rapidly killing bacteria in the presence of sunlight, so it is up to us now over the next 12 months to optimize our process and create a product that is effective at reducing the likelihood of deadly infections."

Provided by Cardiff University