**Global Challenges/Chemistry Solutions
Promoting Personal Safety & National Security: Killer silk: Making silk fibers that kill anthrax and other microbes in minutes**

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Today’s solution is a simple, inexpensive dip-and-dry treatment that can convert ordinary silk into a fabric that kills disease-causing bacteria — even the armor-coated spores of microbes like anthrax — in minutes. The study’s authors describe a range of potential uses for this new killer silk, including make-shift curtains and other protective coatings that protect homes and other buildings in the event of a terrorist attack with anthrax. Their research appears in the journal *ACS* *Applied Materials & Interfaces*.

Here’s the study’s lead author, Rajesh R. Naik, Ph.D., a scientist at the Air Force Research Laboratory at Wright-Patterson Air Force Base:

*“In adverse conditions, bacterial species, which include anthrax, become dormant and produce spores, enclosing themselves in a tough coating. The spores can survive heat, radiation, antibiotics and harsh environmental conditions, and some have sprung back to life after 250 million years.”*

Certain chemicals — most popular among which are oxidizing agents, including some chlorine compounds — can destroy bacterial spores, and they have been applied to fabrics like cotton, polyester, nylon and Kevlar. These treated fabrics are effective against many bacteria, but less so against spores. The researchers tried a similar coating on silk to see if it could perform better against these hardy microbes.

They developed a chlorinated form of silk, which involves soaking silk in a solution that includes a substance similar to household bleach and letting it dry.

*“Silk treated for just an hour essentially killed all of the bacterial cells tested within 10 minutes, and we did that similarly against spores of a close anthrax relative that was used as a surrogate.* *Given the potent bactericidal and sporicidal activity of the chlorinated silk fabrics prepared in this study, silk-chlorine materials may find use in a variety of applications, which could include water purification for humanitarian relief efforts and for use in filters or to mitigate the effects of toxic substances.”*

 **Smart Chemists/Innovative Thinking**

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