

# You still can't drink the water, but now you can touch it

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Vishal Shah (on left) with undergraduate student Daniel Badia, both of Dowling University, hold the polymer that is critical to the water filtration system they are helping to develop. Credit: Dowling University

Engineers have developed a system that uses a simple water purification technique that can eliminate 100 percent of the microbes in New Orleans water samples left from Hurricane Katrina. The technique makes use of specialized resins, copper and hydrogen peroxide to purify tainted water.

The system--safer, cheaper and simpler to use than many other methods--breaks down a range of toxic chemicals. While the method cleans the water, it doesn't yet make the water drinkable. However, the method may eventually prove critical for limiting the spread of disease at

disaster sites around the world.

National Science Foundation-funded researchers Vishal Shah and Shreya Shah of Dowling College in Long Island, New York, collaborated with Boris Dzikovski of Cornell University and Jose Pinto of New York's Polytechnic University in Brooklyn to develop the technique. They will publish their findings in *Environmental Pollution*.

"After the disaster of Hurricane Katrina, scientists have had their backs against the wall trying to develop safeguards," said Shah. "No one knows when a similar situation may arise. We need to develop a treatment for decontaminating flood water before it either comes in contact with humans or is pumped into natural reservoirs."

The treatment system that the researchers are developing is simple: a polymer sheet of resins containing copper is immersed in the contaminated flood water. The addition of hydrogen peroxide generates free radicals on the polymer. The free radicals remain bound to the sheet, where they come in contact with bacteria and kill them.

The researchers are working to lower the amount of copper in the treated water end product and improving the system's impact on chemical toxins. Shah believes it could be ready for emergency use within five to seven years.

To develop their process, the researchers built upon a century-old chemical mechanism called the Fenton reaction - a process wherein metal catalysts cause hydrogen peroxide to produce large numbers of free radicals.

Free radicals are atoms or molecules that have an extra electron in dire need of a partner (they obtain the partner by stripping it from a nearby atom, damaging the "victim" in the process). In large quantities, the

radicals can destroy toxic chemicals and even bombard bacteria to death or irreparably damage a microorganism's cell membrane.

Applying their technique to water from the Industrial and 17th Street canals in New Orleans, the researchers were able to destroy all of the bacteria within 15 minutes. In tests with laboratory water samples containing even higher bacterial concentrations, the exact same process killed at least 99 percent of the bacteria in 90 minutes.

Source: National Science Foundation

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