

# Tiny water purification packet helps save lives worldwide

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Chemists have developed a powerful household water purification system that puts the cleansing power of an industrial water treatment plant into a container the size of a ketchup packet. The researchers have shown that the tiny packet, which acts as a chemical filter, can be added to highly contaminated water to dramatically reduce pathogen-induced diarrhea — the top killer of children in much of the developing world.

The packets also show promise for boosting water safety during emergencies and natural disasters, such as earthquakes, floods and hurricanes, where water purity is suddenly compromised, the researchers say. The lifesaving packets, whose use is being expanded globally, was described today at the 231st national meeting of the American Chemical Society.

Worldwide, approximately 1.5 million children under age five die each year from simple diarrhea acquired from pathogens found in drinking water, according to public health experts. That translates to about 4,000 children dying each day as a result of contaminated water.

“It’s like a 9-11 catastrophe happening everyday worldwide, but this is a tragedy that can be prevented,” says Greg Allgood, Ph.D., director of Procter & Gamble’s Children’s Safe Drinking Water program, which manufactures the packets. The company has been developing the packets since 1995 in collaboration with the U.S. Centers for Disease Control and Prevention (CDC).

In those countries that lack a modern water purification system, boiling is often the main water decontamination method, Allgood says. But boiling must be done properly to remain effective. In many parts of the world, drinking water is not cleaned at all, he adds.

“There’s clearly a need for simple, safe and effective decontamination systems for third world countries,” Allgood says. Unlike large stationary purification systems, the packets are extremely small and portable, which allows them to be easily used in remote locations and emergency situations. “This tiny system seems to fit that bill by quickly providing high water quality that can rival that of a modern treatment plant.”

In randomized, controlled trials conducted by the CDC involving a total of 25,000 people in three countries — Guatemala, Pakistan and Kenya — the chemical packets reduced the incidence of diarrhea by about 50 percent, Allgood says. The packets also were tested by researchers from Johns Hopkins University at a refugee camp in Liberia, where they produced more than a 90 percent reduction in diarrhea, the scientist says.

Called “PUR Purifier of Water,” the system consists of a packet containing a grayish powder composed of a variety of chemicals that collectively are capable of removing contaminants within minutes of being added to water. The main active ingredients of the powder are calcium hypochlorite (bleach), which can kill a wide range of deadly pathogens, and ferric sulfate, a particle binder that can remove impurities such as dirt and also disease-causing pathogens that aren’t killed by the bleach. The packets can kill water-borne pathogens that cause cholera, typhoid and dysentery; remove a variety of toxic metals, including lead, arsenic and mercury; and also remove dangerous pesticides like DDT and PCB, Allgood says.

The device is very efficient: A single packet can decontaminate 2 ½ gallons of drinking water, or enough drinking water to sustain a typical

household for about 2-3 days, Allgood says. The packet is added to a large container of impure water, stirred, filtered through a cloth to remove impurities and then allowed to sit for 20 minutes. The net result is clear, safe drinking water, the researcher says.

The price of safety comes relatively cheap, Allgood says. Each packet costs a few cents and Procter & Gamble has been providing them free to some countries hit hard by sudden water emergencies, he says. To date, more than 40 million of these packets have been distributed worldwide for both sustained water remediation and emergency relief, Allgood says.

Source: American Chemical Society

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