Engineer helps poor in developing nations purify drinking water

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The device looks deceptively simple - a porous clay pot placed in a five-gallon plastic bucket with a spigot - but Vinka Craver believes it can save millions of lives each year.

The assistant professor of civil and environmental engineering at the University of Rhode Island says that when water is poured into the ceramic pot and it passes through to the bucket, the water is purified and becomes safe to drink.

"More than one billion people in the world don't have access to safe drinking water, and about two million people die each year from diarrhea and other diseases related to unhealthy water," Craver said. "Ninety percent of those deaths are children under age five. If we can get people in developing nations to use this filter in their homes, it will save a lot of lives."

Working in collaboration with the non-profit group Potters for Peace and colleagues at the University of Virginia, Craver is testing the effectiveness of the filters and working to ensure that they are accepted in local communities.

Looking somewhat like a ceramic pot in which a houseplant is grown, the water filters are made with a mix of local clay and sawdust and impregnated with colloidal silver. When the clay is fired, the sawdust burns out, leaving a network of fine pores through which the water filters. The filters can be manufactured using local materials and labor.

"Potters for Peace began to distribute the filters in 1998, but only recently research groups are studying them to make sure they work properly," explained Craver, a resident of Wakefield. "I was the first to present in a scientific publication a mechanistic study of their effectiveness at removing bacteria."

Craver's research determined that the ceramic filters without the addition of the silver nanoparticles effectively removed 97 percent of bacteria from the water, and the filters with the silver cleaned the water of more than 99 percent of bacteria. The silver kills the bacteria while the porous clay simply filters it out.

For the last three years, Craver has been studying the use of the filters by 70 families in San Mateo Ixtatan, a Mayan community in Guatemala.

"One of our challenges is getting the filters accepted in the communities," Craver said. "Many people we talk to don't realize that their water is unhealthy, others don't like the taste of the water after it has been filtered, and others don't like having the filter and bucket in the house all the time."

Her next step is to assess the impact of the filters on the health of the residents. She will visit Guatemala this summer to determine if there have been reductions in doctor's visits and missed work days and improvements in economic well-being. She will also compare the success of the filters with other water purification technologies being tested in the region.

In addition, Craver's graduate student Sophia Narkiewicz of Coventry will launch a new program this summer in the Limpopo province of South Africa to see if the usage of the water filters extends the lives of those suffering from HIV/AIDS.

"The life expectancy of HIV patients is significantly lowered when they are faced with recurring bouts of diarrhea from drinking unhealthy water," Craver said. "It causes even more problems with their immune system. So we are going to give them water filters to see if it will improve their health and extend their lives."

The United Nations Millennium Development Goal is to halve the number of people without access to safe drinking water by 2015. Craver hopes that her work to expand the use of these water filters will help to achieve that goal on time.

Source: University of Rhode Island (news : web)

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