First 'nanorust' field test slated in Mexico

May 27 2009

This image is of nanorust. Credit: CBEN/Rice University

Rice University researchers today announced that the first field tests of "nanorust," the university's revolutionary, low-cost technology for removing arsenic from drinking water, will begin later this year in Guanajuato, Mexico.

"Mexico's debating the adoption of more stringent national standards for allowable levels of arsenic in drinking water, and officials in Guanajuato are looking ahead to explore ways they might meet stricter new standards," said nanorust inventor Vicki Colvin, Rice's Pitzer-Schlumberger Professor of Chemistry and director of Rice's Center for

Biological and Environmental Nanotechnology (CBEN).

Colvin and CBEN faculty, staff and students began visiting Guanajuato last fall to prepare for the upcoming tests. Guanajuato, which has a population of 80,000, is the capital of Guanajuato state. It is about 230 miles northwest of Mexico City.

Arsenic is a colorless, odorless, tasteless element, and prolonged exposure to dangerous levels of arsenic can lead to skin discoloration, sickness and cancer. Arsenic-poisoned drinking water is a global problem, affecting tens of millions of people in communities in Asia, Africa, North America, South America and Europe.

CBEN's arsenic-removing technology is based on the unique properties of particles called "nanorust," tiny bits of iron oxide that are smaller than living cells. In 2006, Colvin and CBEN colleague Mason Tomson, professor in civil and environmental engineering, published with their students the first nanorust studies. Their initial tests indicated nanorust -- which naturally binds with arsenic -- could be used as a low-cost means of removing arsenic from water.

Qilin Li, an assistant professor of civil and environmental engineering and CBEN faculty expert in water treatment, said Rice's team plans to test nanorust-coated sand. The material will be used in sand filters to treat groundwater from wells. The water treated with nanorust will be kept separate from the water that is released for human consumption, Li said.

"Our studies of nanorust have progressed rapidly over the past three years, but in order to move this technology toward practical application there is really no substitute for this type of field test," Li said.

Pedro Alvarez, the George R. Brown Professor of Engineering and chair

of the Department of Civil and Environmental Engineering, said, "One collateral benefit of the nanorust filters is that they may also help remove water-borne viruses that are responsible for a wide variety of gastrointestinal diseases."

Source: Rice University (news : web)