

OU graduate student developing solutions for water problems in Ethiopia

May 16 2011

A University of Oklahoma environmental science graduate student will travel to Ethiopia in June to test materials she has been investigating as possible solutions to fluorosis—a widespread problem in the Rift Valley, where high levels of fluoride in the drinking water result in dental and skeletal disease.

Laura Brunson, graduate student in the OU College of Civil Engineering and [Environmental Science](#), works with researchers in the OU Water Center on global water challenges, specifically fluorosis. Left untreated, fluorosis causes darkening of the teeth and bone deformities. In Ethiopia, the side effects of fluorosis are clearly health related, but have a cultural aspect as well. Novel approaches to this problem are needed to produce effective solutions—solutions not readily available in rural, impoverished areas of countries like Ethiopia.

Brunson has been investigating inexpensive, sustainable and locally available solutions, such as adsorption—a useful technology for [fluoride](#) removal from drinking water because it does not require energy input outside of gravity and, depending on the material used, can be very effective at removing fluoride to meet the World Health Organization standard. She has been investigating fluoride removal using several novel [materials](#) including aluminum coated wood and bone chars.

Bones charred at a high temperature are effective in the removal of fluoride from water, but Brunson is investigating other materials with similar properties of bone char because some communities do not like

the idea of treating water with bones. Wood char is one possibility, but it has to have a coating for it to work as well as bone char. Brunson will test these materials in Ethiopia this summer. "It's important to test the materials in the location where they will actually be used," she says.

When Brunson can determine the effectiveness of the materials, the next step is building awareness in the region. A sustainable treatment plant will be needed and this will require community support. On this aspect of the project, Brunson is working with a group of students from the OU Center for the Creation of Economic Wealth to develop and implement a business model for the bone char technology. Incorporating the model into Ethiopian communities will help to ensure the project's success.

Brunson is also working with Paul Spicer, an OU anthropologist, to conduct surveys in the area to understand the values, motivation and interests of the Ethiopian people. "We need to know what the Ethiopian people think about their water and what their treatment preferences are," says Brunson. Spicer will spend one week in the area on this crucial part of the project. According to Brunson, "A project often fails because no one takes the time to understand the concerns of the people who are affected."

On this visit, Brunson hopes to gain a better understanding of the materials she has been investigating as part of her graduate research project, but more important, she hopes to find a solution to the [water](#) problem in the Rift Valley of Ethiopia.

Provided by University of Oklahoma

Citation: OU graduate student developing solutions for water problems in Ethiopia (2011, May 16) retrieved 22 June 2024 from <https://phys.org/news/2011-05-ou-student-solutions-problems-ethiopia.html>

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