SP24.24. College students at risk of chronic Arsenic intake for rice, pasta, and ramen: rapid assessment of this pollutant by TXRF.

Overview

Food insecurity is not a trivial issue among college students. Financial or time limitations might lead students to abuse affordable and quick meal options, such as rice, pasta, and ramen. It is well known that there is a vast region of North America, including Arizona, where anthropogenic activities or geographical conditions sometimes exacerbate uranium concentration levels in water and soil. Usually, there is a spatial relationship between uranium and arsenic in well water. Arsenic is a ubiquitous contaminant that is considered a global environmental challenge. Using water that exceeds the arsenic limits for irrigation, drinking, or cooking can potentially imply a substantial human health risk. Here, we aim to verify the potential persistence of arsenic in food prepared with water exceeding 10 ppb of arsenic (current USEPA limit) using Total Reflectance X-Ray Fluorescence (TXRF). Using this method, we should be able to perform a rapid analysis directly on the samples of meals cooked without the need for wet digestion, which potentially can lead to loss of arsenic.

What the Student will DO and Learn

The project's first stage is primarily experimental (60-70%) to analyze meals cooked with deionized water spiked with levels of arsenic exceeding the limits. In contrast, the project's second stage is equally experimental and documental (50%), consisting of data analysis and manuscript writing. The selected undergrad researcher will develop and validate a method for sample preparation suitable for TXRF, based on available literature. In doing so, the selected undergrad researcher will learn how to navigate different scientific databases, use reference management software, learn different TXRF spectrometry, and get training in the S2 Picofox.
The selected undergrad researcher will collaborate in writing scientific publications for peer-reviewed journals. In doing so, the selected undergrad researcher will learn how to ethically manage information, data, and references and communicate effectively with a defined scientific audience.

Additional Benefits

Extensive experience with a unique technique such as Total Reflectance X-ray Fluorescence that is used by local employers. In addition, the student will develop transferable skills inherent from research highly attractive for employers.

Time Commitment

6 hours/week for 30 weeks