

2022-2023 PROPOSAL

STATEMENT OF PURPOSE

Atrazine is a chemical that is used in the United States as a pesticide. Atrazine reacts with nitrite to form *N*-nitrosoatrazine (NNAT). NNAT is most easily formed in solutions that have a pH level between 2 and 4, much like the normal pH range of stomach acid. Previous studies found that nitrates in groundwater are common in areas west of the Missouri River where irrigation is commonly used, and atrazine is found in 32% of bodies of water in the United States. Nitrosamines have been found to cause birth defects after exposure in pregnant mothers.

High performance liquid chromatography (HPLC) is used to detect and identify chemicals. It is used along with mass spectrometry (MS). HPLC and MS have been used in previous studies to identify and detect levels of NNAT. This study will examine the accuracy and efficiency of HPLC and MS in detecting NNAT. It will provide information for a larger research study being done to determine the effect of NNAT on pregnant female rats.

RESEARCH QUESTION

Are the methods of high performance liquid chromatography and mass spectrometry suitable to detect NNAT in blood and tissue samples?

SIGNIFICANCE OF RESEARCH

This research is important because it will validate the methods used in a larger research study being done. The larger research study is of great significance because it will be used as a beginning study for research in the toxicity of NNAT. This research is important for the Water Sciences Laboratory and Drs. Kim, Peeples, Rhoades, and Snow in their larger study. It is also important to any scientists that will be using HPLC and MS in their own research. This research will contribute to the community by providing an accurate and reliable method of testing for NNAT to be used by others.

METHODS OF DATA COLLECTION

Data collection will be from samples that are as close as possible to the samples that will be used in the larger research project. Data collection will come from samples of mouse placenta and fetal tissue, along with rat blood samples that are provided to me by Drs. Rhoades and Snow. Approximately eight samples will be spiked and extracted near the detection limit. The estimated detection limit will be found by running standards on the HPLC. After running the eight samples through the HPLC, accuracy and precision will be determined.

ANALYSIS OF DATA

BENCHMARKS

Stage 1: January – May 2022

In this first stage, I will be familiarizing myself with Dr. Snow's lab and completing the NRES 439 course through UNL. I will complete the EHS safety training and the in-lab training that is required by the Water Science Laboratory at UNL. I will complete a proficiency test and written exam. During this time, I will also continue to research HPLC and MS methods.

Stage 2: June 2022 – May 2023

During this second stage, I will be working with Dr. Snow and Dr. Rhoades to determine the accuracy of and validate the HPLC and MS methods for future research. This stage will include data collection and analysis. I will research the methods continually and use my research and results to write my senior thesis for the Honors and CASNR programs.