URP Proposal for Summer 2016

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For this summer, I have two potential projects in mind. Both projects are analytical, but one is the analysis of contaminated mushrooms, water, substrates, and sweetgum logs from Mississippi (environmental) and the second involves the analysis of tobacco alkaloids in electronic cigarette filling solutions (health). Only one student would work on both of the projects, as I anticipate down-time between each project and not enough work between either of them to fill the entire summer of with research.

Project 1: Analysis of Shiitake mushrooms, water, substrates, and sweetgum logs from Mississippi

This project is a collaboration with Dr. Frank Mrema of Alcorn State University. We are determining the concentration of elements in Shiitake mushrooms grown on sweetgum logs by inductively coupled plasma – optical emission spectroscopy (ICP-OES). Unfortunately, the logs were possibly contaminated, but the source is unknown. An initial analysis of mushrooms has not produced any results of concern. However, we have expanded the study to include water from the farms, substrate from the control samples, and possibly the sweetgum logs from the original growth. The student will be involved in acid digestion of the samples, preparation of standards, and analysis by ICP-OES.

Project 2: Further analysis of tobacco alkaloids in electronic cigarette filling solutions

Electronic cigarettes are new nicotine delivery systems that are not regulated by the Family Smoking Prevention and Tobacco Control Act (Public Law 111-31). The Food and Drug Administration Center for Tobacco Control has identified seven research priorities and electronic cigarettes fall under purview of "Understanding the Diversity of Tobacco Products". We recently received an internal grant to expand our previous research and help seed the project for external funding. We have developed a specific method for analysis of the most commonly occurring tobacco alkaloids using high performance liquid chromatography (HPLC). We have completed some performance measures and analyzed a few filling solutions, but we need to expand the study and focus on sampling statistics. The student will be involved in analyzing more samples and increasing our statistics. There will also be a collaboration with Drs. Carver and Kovach from biology.

Role of the Undergraduate Student: Exposure to the scientific method the undergraduate research is crucial in preparing our students for successful and productive careers in science. The student who performs research with me will gain an extensive hands-on experience with analytical methods and instrumentation. The student will also have the opportunity to present the research at a regional meeting and/or national meeting. The student on this project should have completed CHEM 3210 and 3010/3020 with at least a B by the end of Fall semester. Proficiency in statistics is plus, knowledge of SPSS even more helpful. The student will be expected to work 40 hours/week, May 9 – July 15, 2016 and to give two presentations over the course of the summer. The project will culminate in a student-written paper.