

Cigarette litter and soil contamination. URP Proposal for Summer 2012

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Pollution and its effects on the environment have been studied increasingly over the past decade as public awareness and government mandates demand solutions to the problems created by human industries.¹ The anthropogenic release of metal contaminants into the environment is a persistent problem in Tennessee. As the 4th largest industrial center in the state, Chattanooga area pollution sources include manufacturing, fertilization, electricity generation, waste water treatment and mining operations. Several point sources of pollution are located throughout the Tennessee River Valley. One point source that people may not consider is cigarette litter.

Cigarette litter, including butts and filters, is among the most common forms of litter discarded worldwide.² It is estimated that several trillions of cigarette butts and filters are improperly disposed of each year.³

The past few summers, we have analyzed leachates from cigarette litter for metals and organic compounds.⁴ This past summer, we expanded the project to study how contaminants leached from cigarette litter affect biota by exploring the bioaccumulation of metals in pea plants by growing the plants in butt-littered soil. The soil in which the plants were grown will also be analyzed for metal content. This summer, soil will be acid digested and analyzed for metal content by inductively coupled plasma – optical emission spectroscopy.

Role of the Undergraduate Student: As a researcher, I strongly feel that undergraduate research and exposure to the scientific method are 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 must have completed Chem 3210 and 3010/3020 with at least a B. The student will be expected to work 40 hours/week, May 7 – July 13, 2012. The project will culminate in a student written paper at the end of the summer.

¹ Alloway, B.J.; Ayres, D.C. *Chemical Principles of Environmental Pollution*. Oxford: Alden, 1993.

² Micevka, T, Warne, M., Pablo, F., Patra, R., *Arch, Environ. Contam. Toxicol.* **2006**, 50, 205-212.

³ Novotny, T. E., Zhao, F. *Tobacco Control*, **1999**, 8, 75-80.

⁴ Moerman, J. W.; Potts, G.E. *Tobacco Control*, **2011**, 20 (suppl 1), i30 – i35.