



Project Overview

The Toxicity of Wood Smoke from Prescribed Fire



Project Context & Background

The goal of this project is to examine the toxicity of fine particulate matter generated during prescribed burns of the Coconino National Forest in northern Arizona.

Like cigarette smoke, particles in wood smoke contain compounds such as polycyclic aromatic hydrocarbons (PAHs), many of which are known carcinogens and mutagens.

To date, most studies have focused on the toxicity of cigarette smoke or of urban particulate. To our knowledge, this work represents the first effort to examine the toxicity of fine particulate generated during prescribed fire.

Who is This Project For?

This is an excellent project for students interested in environmental chemistry, atmospheric chemistry, toxicology, biochemistry, or pharmacology.

What Will I Do?

You will use Chinese hamster ovary (CHO) cells to examine the cytotoxicity and mutagenicity of extracts taken from particulate generated during prescribed fire.



Before (above) and after (below) prescribed fire



Canned Research Project

What Will I Learn About?

- Clonogenics (cell culture tests)
- *HPRT* forward assay
- Use of positive and negative controls
- Use of dose-response curves

Note: Some familiarity with Excel is required

To Learn More

- *Hannigan M.P.; Cass G.R.; Lafleur A.L.; Longwell, J.P.; Thilly W.G. Bacterial mutagenicity of urban organic aerosol sources in comparison to atmospheric samples. *Environ. Sci. Technol.* **1994**, *28*, 2014-2024.
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- Oanh, N.T.K.; Nghiem, J.H.; Phyu, Y.L. Emission of polycyclic aromatic hydrocarbons, toxicity, and mutagenicity from domestic cooking using sawdust briquettes, wood, and kerosene. *Environ. Sci. Technol.* **2002**, *36*, 833-839.
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- Dellinger, B.; Pryor, W.A.; Cueto, R.; Squadrito, G.L.; Hegde, V.; Deutsch, W.A. Role of free radicals in the toxicity of airborne fine particulate matter. *Chem. Res. Toxicol.* **2001**, *14*, 1371-1377.
- Hannigan M.P.; Cass G.R.; Penman B.W.; Crespi C.L.; Lafleur A.L.; Busby W.F. Jr.; Thilly W.G.; Simoneit B.R.T. Bioassay-directed chemical analysis of Los Angeles airborne particulate matter using a human cell mutagenicity assay. *Environ. Sci. Technol.* **1998**, *32*, 3502-3514.

*strongly recommended for comparison to this work