CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0918

Project Title
Comparison of Commercial Logs: pH and Airborne Particulates

Abstract

Objectives/Goals
If different commercial fire logs all the same weight are made by different companies, then I think that the different brands of commercial logs will vary in production of airborne particulates and pH.

Methods/Materials
Materials: 4 logs of each brand of firelogs: Duraflame, Ralph's, Sunny Select, Bengal Recycled, and Pine Mountain and a modified chiminea heater with shop vac. (see display for details)
Methods: I burned twenty logs (four of each brand) for 30 minutes and collected the soot/water from the logs. I analyzed the soot water in five different ways.

Results
The solution of each burn was analyzed in five different ways: particulate measurement, filter paper inspection, and examination of the clarity of the soot water visually and microscopically, and acidity. A measurement of the depth of sediment for each test tube was taken for each burn, and the average of four burns for each brand was calculated. The average sediment of each log was used for comparison. The soot water was also inspected for clarity and color. The averages of the pH's were calculated for each brand. Each test tube was shaken and a drop of fluid from each specimen was placed onto filter paper and evaluated visually.
The results of sediment production was from least to most: Ralph's, Pine Mountain, Sunny Select, Duraflame, and Bengal Recycled. Visually, the color and clarity also varied from yellow and cloudy to amber and clear to black and opaque, with the recycled log soot water remaining black and opaque. The pH differences were a range from 4.5 -8.0, with 5 of the burns being acidic.

Conclusions/Discussion
The results of my experiment supported my hypothesis. It turned out that all of the brands of firelogs varied in particulate production. However the pH was less variable. The recycled brand produced the MOST particulates .
Overall, commercial firelogs seem to produce a lower amount of particulates that natural wood. However there is variation in the content of the commercial logs that result in the production of particulates. The commercial logs made of wax and sawdust seem to burn cleaner than the logs made of recycled wood waste. However there is a significant amount of particulates production even in the wax logs that we must be aware of if we are to consider alternative ways to improve the air quality in the Central San Joaquin Valley as well as the state of California.

Summary Statement
A comparison of the airborne particulate production and pH from different brands of commercial firelogs

Help Received
my parents watched me burn each log (for safety reasons); my father helped me attach the misters to the chiminea after my first attempt failed due to a burned up filter.