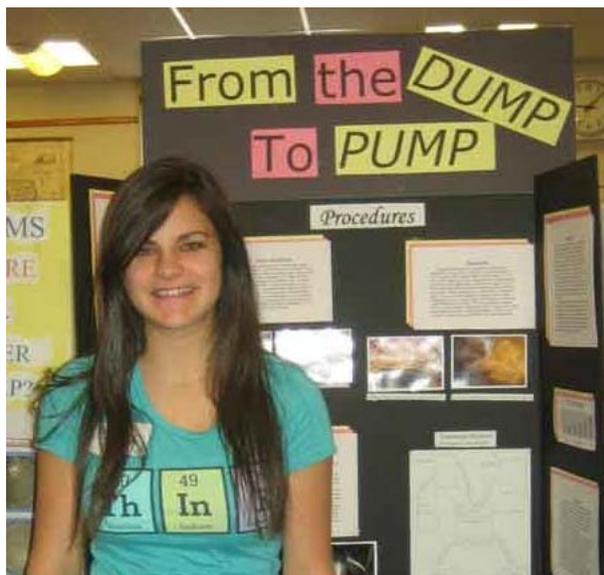




2010

MASSACHUSETTS CLEAN TECHNOLOGY AWARDS

A Program from The Foresight Project Inc; www.theforesightproject.org



Region I: Western Massachusetts

Rosalind Lytle-Rich: Mohawk High School, Shelburne Falls

*Honorable Mention, Clean Tech:
"Dump to Pump"*

About Me:

I am from a family of five. I have two sisters, both of whom have attended the State Science Fair as freshmen. I have three cats, and one dog. My greatest interest is tennis. I play second singles for our varsity team, and it is my third year on the team. Although tennis is my passion, I am also a member of the soccer and ski teams. I am an avid Harry Potter reader.

My family owns a coffee business, and through internet research, I found that it is possible to create biofuel from spent coffee grounds. So this idea interested me on a personal level. I am especially interested in the environmental, economical, and political benefits of the use of this waste material.

My Project:

Researchers have been able to extract oil from spent coffee grounds using chemicals including hexane, ether, and dichloromethane. Local farmers are obtaining oil derived from feedstock such as sunflower and canola seeds without having to use these complicated and potentially toxic chemical processes.

I investigated whether such methods could work to obtain oil from coffee grounds. One possible method of "green" extraction would be pressing, a process of pulverizing a substance until the desired separation of elements occurs. Another means of "green" extraction could be maceration, where a material is softened or broken down, often with liquid. Distillation is yet another way of extraction; it is the process of separating the components of a compound when the components have different boiling points; the substance with the lower boiling point will evaporate first, leaving the other materials behind. My project was to attempt to extract oil from spent coffee grounds using these three methods.

In my project I attempted to extract oil from used coffee grounds in a mechanical, non-chemical manner similar to that already employed by local farmers to extract oil from their feedstock. Distillation and maceration yielded insignificant amounts of oil. However, pressing produced 2mL of oil per 850 grams of undried, spent coffee grounds. Another way to look at this is that the effluent from the pressing process contained 8% oil (2 mL oil per 25mL effluent).