



Colorado Science and Engineering Fair

2024 Individual Project Abstract Form

Please print 2 copies of the completed form. Sign both copies, keep 1 for your notebook and submit 1 copy to your Regional Fair Director with your other paperwork.

Title of Project: Producing Biodiesel from Spent Coffee Grounds: Traditional vs. In situ Transesterification

Finalist's Name: Mariami Zhuzhunashvili

School and City: Cherry Creek High School, Greenwood Village

Sponsor's Name: Ethan Dusto


Category: Chemistry (CHEM)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

Faced with the detrimental effects of using almost exclusively nonrenewable resources, scientists must search for better, less harmful sources of energy. One such alternative is biodiesel, specifically biodiesel produced from spent coffee grounds, or SCG. This research project describes methods to extract oil from SCG and transesterify it, as well as test it to ASTM standards. Transesterification can be done in two steps (traditional transesterification), but it is also possible in one step, known as in situ transesterification. Through reflux, filtration, and distillation, biodiesel is produced, and its corrosivity and viscosity are tested. Both methods addressed in this research are a viable means to create biodiesel. However, traditional transesterification appears to be much more unreliable and lead to more experimental error, as well as producing unreliably differing amounts of biodiesel.

I hereby certify that the above statements are correct and the information provided in the Abstract is the result of one year's research. I also attest that the above properly reflects my own work.

Finalist's Signature: 

Date: 3/7/2024

In addition, all students must complete the ISEF Student Checklist (1A), Research Plan, Approval Form (1B), and Checklist for Adult Sponsor (1), and any other ISEF forms required for this type of project. See the International Rules and Guidelines for form requirements. Return COPIES of all of these forms to your Regional Fair Director with you Finalist Verification/Permission Form. A signed copy of this form must be included in your notebook.