



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: Comparison of Canola, Sunflower, Soybean, and Used Fryer Biodiesels on Their Engine and Emission Properties

Finalist's Name: Miles Rutledge

School and City: Yuma High School, Yuma

Sponsor's Name: Amy Melby

Category: Earth & Environmental Sciences (EAEV)

Division: Senior (9th - 12th grades)

Abstract (250 words or less):

Biofuel is a form of fuel created from living organisms. Biodiesel, produced from seed crops, undergoes a transesterification process to allow them to be used as fuel in common diesel engines. It was hypothesized that used fryer, canola, soybean, and sunflower oil would have similar efficiencies when compared to standard diesel. Before the biodiesels can be used in a standard diesel engine, it has to undergo a transesterification process. Each oil produces a different amount of biodiesel after this step. It was hypothesized that canola oil would have the highest transesterification efficiency. It was also hypothesized that they would also have similar carbon emissions. A small, one-cylinder 4-stroke diesel engine was used to turn a hydraulic pump to test the biodiesels. A measured amount of fuel was put into the engine, and then the engine was run for 5 minutes. The excess fuel was drained off and measured to determine how much fuel was burned per minute. During this time a carbon monoxide reader was used to measure the amount of carbon in the exhaust. It was found that the oils tested produced similar amounts of biodiesels, with soybean producing the most. The difference between the fuel's engine efficiencies was not statistically significant. Canola produced the least amount of carbon of the oils tested, but it wasn't statistically significant when compared to soybean oil.

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:

3/1/24

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.