



Colorado Science and Engineering Fair

2025 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: Up In Smoke: The Effect of Protective Topical Ointments Against Wildfire Particle Penetration

Finalist's Name: Saahithi Kasa

School and City: Cherry Creek High School, Greenwood Village

Sponsor's Name: Ethan Dusto

Category: Biomedical & Health Sciences

Division: Senior (grades 9 - 12)

Abstract (250 words or less):

The purpose of this experiment is to determine the best active ingredient in combatting the effects of wildfire pollution on skin barrier deterioration as recent evidence suggests the skin can serve as a pathway for harmful toxins to enter the body, potentially leading to conditions such as inflammatory dermatitis, pigmentation disorders, and skin cancers. The idea was to create a plant-based topical ointment akin to sunscreen, which could be used as a preventative measure rather than a post-event treatment. Four sample ointments featuring mango oil, flaxseed oil, soybean oil, and coconut oil respectively were tested on polyurethane skin simulants mimicking an epidermis that had been exposed to a simulated wildfire. The mass of the skin simulants was measured every day for a two-week period to assess the absorption of the oils vs. penetration of toxins. The data indicated both the flaxseed and mango oils were the most successful in absorption through the skin samples and thus preventing particle penetration. This can be attributed to the rich composition of omega-3 fatty acids within the flaxseed oil and flavonoids within the mango oil, both of which are known to enhance skin barrier function. This finding suggests a plant-based protectant is possible; however, more research needs to be conducted on how the oils and toxins react at a cellular level. Eventually, clinical trials involving human subjects would be essential to validate these findings.

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:

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.**