



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: A Novel Plant based topical drug "Curcaza+" to help treat diabetic foot ulcers/infections and help reduce antimicrobial resistance

Finalist's Name: Vedanth Raju

School and City: Aurora Quest K-8, Aurora

Sponsor's Name: CoorsTek Denver Metro (DMRSEF)

Category: Biomedical & Health Sciences

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

I have created a novel plant based topical drug, "Curcaza +" that will help treat diabetic foot ulcers (DFU) and prevent diabetic foot infections (DFI). It'll help reduce antibiotic use and in turn reduce antimicrobial resistance (AMR) resulting from excessive antibiotic use.

There are approximately 537 million patients with diabetes. About a third of those (100-182 million) get DFUs in their lifetime. Serious consequences of DFU include infection (60%), hospitalization, amputation (20%) and death within a year of DFU diagnosis (10%). Financial burden of DFU is huge (\$60B). Main cause of DFU include neuropathy, vasculopathy and bacterial overgrowth. Currently we don't have any multipurpose drug that addresses all these issues. My multipurpose drug Curcaza + with its antibiotic, vasodilatory and anti-inflammatory/antioxidative properties will help fill this gap.

WHO has listed antimicrobial resistance and resulting superbug infections as a top global health threat, estimating 10 million deaths annually. Curcaza + will help reduce both antibiotic use and resulting AMR. I created a novel plant based multifaceted drug Curcaza +, in three formulations: Nanoparticle gel, oil formulation and paste using turmeric/Curcuma longa, neem/azadirachtin, Daruharidra /Berberis aristata and malkangani/Celastrus paniculatus.

I tested Curcaza against several bacteria (common gram negative and positive bacteria in DFI) and a fungus in a BSL2 microbiology lab using kirby-bauer disk diffusion method. Nanoparticles were most effective followed by oil formulation. Paste and control had no activity against the organisms.

Curcaza+ will help treat DFU, prevent DFI, and reduce AMR thus reducing associated morbidity/mortality and economic impact.

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.**