



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: To Be or Not To Be Organic

Finalist's Name: Jocelyn Kramer

School and City: Good Shepherd, Denver

Sponsor's Name: Annette Humphery

Category: Chemistry

Division: Junior (grades 6 - 8)

Abstract (250 words or less):

From farm to table, fruits and vegetables are common foods around the world. While the USDA requires that produce labeled as organic must use natural fertilizers and eco-friendly pest control, it is difficult to know for certain whether these products contain pesticides or residue from pesticide use from nearby farms. With the possibility of pesticide residue in organic fruit, is it worth paying, for example, 40% more for organic raspberries versus conventional raspberries? The objective of this research project is to analyze organic and conventional raspberries, a thin-skin fruit most prone to absorb pesticides, using gas chromatography/mass spectrometry (GC-MS) to detect the presence of pesticides. Gas chromatography is a separation method that uses gas flow to separate compounds based on interaction with the liquid stationary phase. To prepare the samples, raspberries were soaked in 190-proof ethanol in order to extract chemicals, including pesticides, from the raspberries into the ethanol for GC-MS analysis. Using a pipette, the ethanol solution was then transferred to an 8-mm GC-MS vial and placed in the sample tray of the GC-MS machine where it was "picked up", separated, and analyzed. During the analysis run, the GC-MS machine compared results to its internal library of identified chemicals. The GC-MS machine produced a data file and chromatogram of detected chemicals, including but not limited to sugars and pesticides, from each sample that ran. Results showed the detection of one harmful pesticide, furfural, for all organic and conventional raspberry samples.

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.**