IS FORENSIC SCIENCE AFFECTED BY ENVIRONMENTALLY FRIENDLY PRODUCTS?

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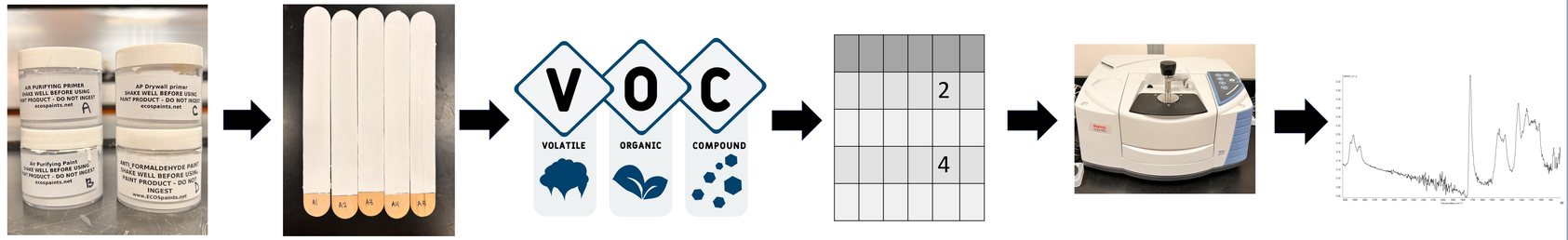
Introduction

- The study that is being conducted is examining if an “environmentally friendly” paint changes its chemical make up over time.
- The paint samples that are being tested are called “Ecos paint” which says that their paint contains “a molecular sieve which is designed to both stop harmful volatile organic compounds from being released into the air and to trap them as they float though a room” (*Air Pure Learn*).
- Meaning they will absorb potentially harmful compounds from the air in the room that they are painted in.
- Volatile organic compounds are gases that are released into the air from products and/or processes and are present everywhere

Fig 1. Chipping paint at scene.

- This is important because paint samples are a commonly used type of forensic evidence to connect people or objects to the scene of the crime.
- Paint evidence is commonly compared by looking at its chemical make-up to see if it is the same between a known source and an unknown chip.
- If the paint that is used as evidence is one of these environmentally friendly paints we want to know if it has changed over time.
- If the chemical-make up of an environmentally friendly paint changes over time from absorbing the VOC’s from the air this will affect forensic testing if the chemical fingerprint is completely different.
- The instrument, FTIR, that is being used to complete this experiment, it sends infrared radiation through the surface of the sample.
- The absorbed radiation is converted into vibrational energy by the sample’s molecules, which is the chemical fingerprint of the sample being tested.

Experimental Design



air purifying primer (A), air purifying paint (B), air purifying dry wall primer (C), anti-formaldehyde paint (D)

Applied to wooden sticks

Left to sit and collect VOC’s from atmosphere

Tested every two weeks

FTIR (Fourier Transform Infrared Spectrometer)

Chemical fingerprint

Fig 2. Experimental design

Results

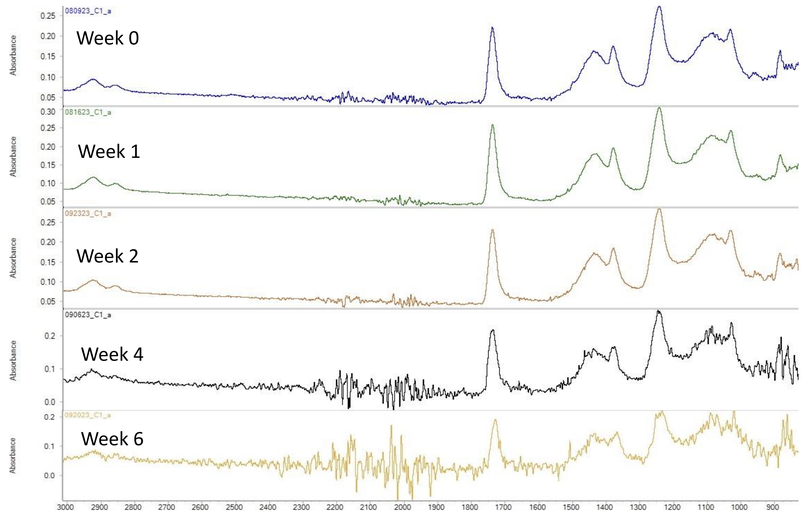


Fig 3. Air purifying dry wall primer (C) from week 0 to week 6.

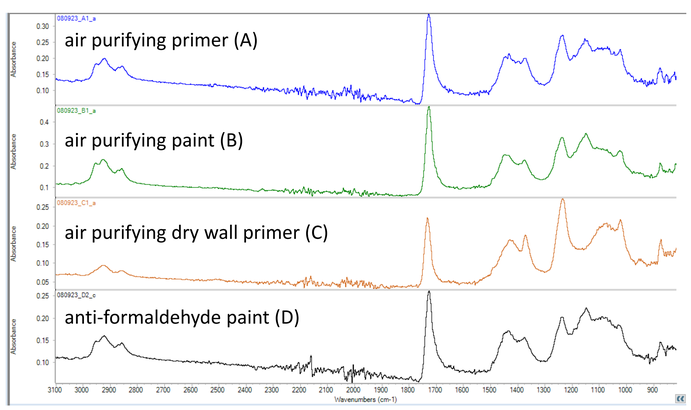


Fig 4. Chemical fingerprints of all four paints

Discussion

- Paints A-D show distinct chemical fingerprints from one another
- Paints A-D have shown no change in their chemical make up from weeks 0-6.
- The paints however have shown less intensity over the weeks that it was tested.
- Though the paint has shown no change it is still early in testing, with coming weeks there is a possibility of the chemical fingerprint changing.
- No change is also important – would show that these paints do not impact forensic paint analysis

About Me

- My name is Emily Pintilie I am a fourth-year biology student.
- I am a first generation American- Romanian in my family.
- While I was in high school, I suffered through a school shooting and a worldwide pandemic, so my beginning years of adult life were not easy to work through.
- Being a woman in science is no easy feat, we are underestimated by men and the society of our world however, I am proud to say that proving them wrong is what women in science do best and what I plan to do.

References

Air Pure Learn. ECOS Paints. (n.d.). https://ecospaints.net/air-purifying-learn

Association, A. L. (n.d.). *Volatile organic compounds*. American Lung Association. https://www.lung.org/clean-air/at-home/indoor-air-pollutants/volatile-organic-compounds#:~:text=Volatile%20organic%20compounds%2C%20or%20VOCs,they%20are%20in%20the%20air.