How Dangerous Are E-Cigarettes? An Analysis of Metals and Chemicals Affecting Users

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The use of e-cigarettes has skyrocketed in the past few years. With this, people have been exposed to the many dangers that come with using them. In this project, we tested for metal content and other organic materials that may be inhaled when using an e-cigarette. We hypothesized that the longer an e-liquid sits in an e-cigarette coil, the more metal content will be present in a sample. We also suspected that there might be unlisted harmful organic materials in e-liquids. We took samples with two different e-cigarettes, the JUUL and the SMOK Infinix. To conduct this, we took samples with different e-liquids, using a pump to simulate a person using an e-cigarette. Some of the samples were then heated in a digestion heater and filtered. To test the samples for metal content, we used an Atomic Absorption Spectrometer (AA) and an Inductively Coupled Plasma Spectrometer (ICP). The rest of the samples were extracted and filtered. These samples were tested for organic materials, using Gas Chromatography and Mass Spectrometry (GC-MS). The AA and ICP were used to test samples where the e-liquid sat in the coils for different lengths of time including 3 days and 1 week. The GC-MS was used to test our JUUL samples for the presence of organic materials such as nicotine and benzene. Through testing, we found there to be trace amounts of lead in our samples. Further experiments will clarify levels of other potentially harmful chemicals and metals.

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