The Detection for Substances in E-liquids and Secondhand Aerosol from Electronic Cigarettes

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The purpose of my project was to find out if recently reported substances found in the aerosol of e-cigarettes are present in the e-liquids and aerosol produced from a brand popular in Hawaii. The experimentation was done through gas chromatography. 3 different e-liquids (all from the same company) were tested for the experiment. 2 trials (roughly 30 min long) were done for each substance: one in the original state and another after becoming an aerosol. To get the aerosol sample, I used a cold trap vacuum pump to condense the aerosol back into liquid form. E-liquid M: High readings detected at about 7.5, 15, 17, and 24 min. E-liquid L: High readings detected at about 6, 7.5, and 9 min. E-liquid S: High readings detected at about 7, 20 and 26 min. Based on these readings, E-liquid M and L have a reading at the same time of 7.5 min. E-liquid M and C have a reading at the same time of 24 min. Other times indicate dissimilar substances were found. Aerosol M: didn't show any significant peaks besides nicotine. Aerosol L: High readings detected at about 8 and 19 min. Aerosol S: Substance was injected into the GC after 4 min of letting the GC run. Reading shows 4 peaks, in bunches of 2; detected at about 4.5 and 5.25 min. Since the substance was injected 4 min later, the actual retention time would have been 0.5 and 1.25 min. Some graphs had peaks appearing at the same time which could indicate the same substance. The readings in all e-liquids suggest they’re found in minute amounts. More substances were found in significant amounts in the e-liquids than in the aerosol. A setback in the model of GC didn't allow me to identify the unknown substances; however I can prove that there are substances in these e-liquids that are not being directly shared to the public.

Awards Won: