Student's Name

Professor's Name

Course

Date

Stereochemistry Lab Report

Part 1: Determination of Absolute Stereochemistry and Sample Concentration by Optical Rotation

Introduction

The purpose of the experiment was to help in the isolation of organic compounds using gas chromatography techniques in a static environment. Both the liquids and solids could be examined using the same technique in a laboratory. The procedure aimed at detecting the volatile organic compounds that might be present in a sample. On a specific note, this experiment carried out the analysis process by utilizing the headspace analysis through a series of five dilution criteria in the entire system of events in the lab (Ma, Yongpeng et al. 388). In the process of carrying out the experiment in a dynamic manner, the inert gas would then flush out the volatile components into the GCMS instrument in a direct manner over a particular period of time.

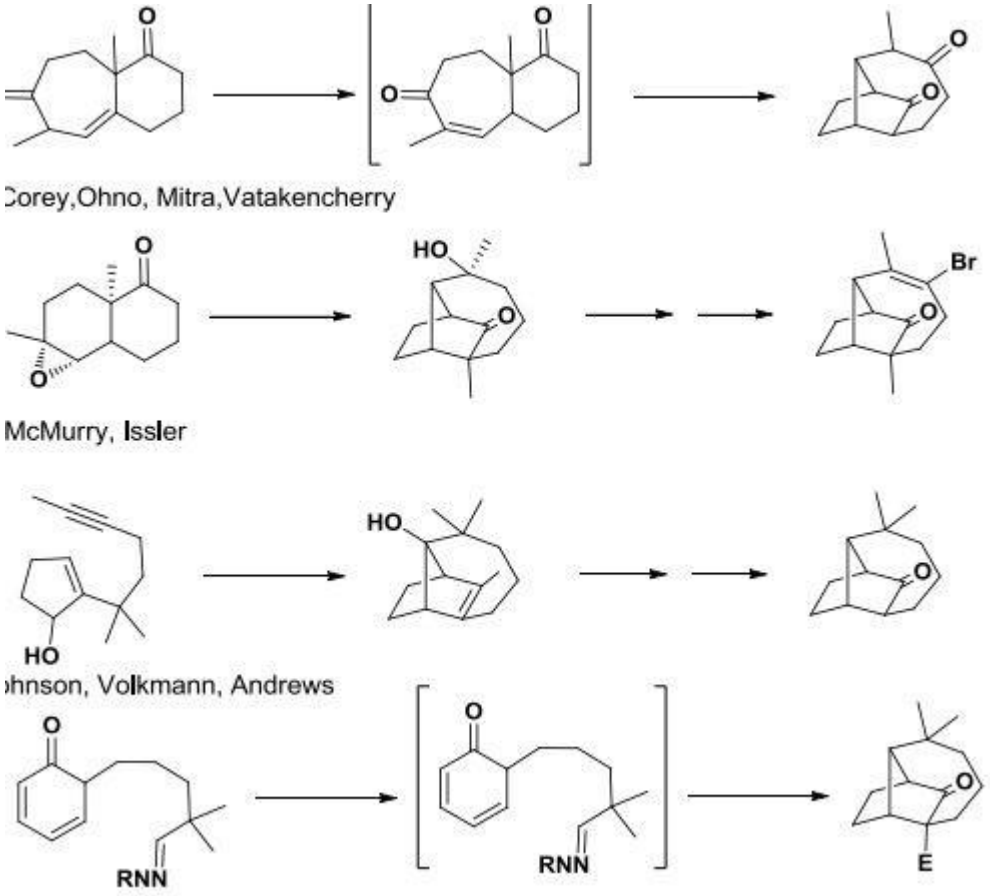
Materials and Methods

The procedure used in this experiment encompassed the use of the dilution technique where the soil samples were diluted in a series of fivefold dilutions to establish the extent and concentration of the volatile components within the soil sample. The first step involved two major steps. First, there was the identification of the volatile molecules through the process of using the mass spectral correlation theory. The next step involved the quantification of the volatile compounds present in the sample (Brunke 20) . The second step was carried out

through the performance of the HS-GC- MS where the standards prepared in the initial stages of the experiment were utilized to help come up with the required concentrations for analysis.

Results and Calculations

Isolation Mechanisms



Dilution concentration = Mass of analytes/mass of the solution

= 1.082/7.593

= 0.14 moles

First Dilution

= 0.239/ (0.239 + 3.980)

= 0.057 * 0.14 * 10^6

= 7930 ppm

Second Dilution

= 0.205/ (0.205 + 3.744)

= $0.052 * 0.41 * 10^6$

= 7268 ppm

Third Dilution

= 0.208/ (0.208 + 3.725)

= $0.053 * 0.14 * 10^6$

7404 ppm

Fourth Dilution

= 0.230/ (0.230 + 3.686)

= $0.059 * 0.14 * 10^6$

= 8223 ppm

Final Dilution

= 0.237/ (0.237 + 3.764)

= $0.059 * 0.14 * 10^6$

= 8223 ppm

Mass of solution = mass of soil + mass of canola oil

= 0.635 + 4.156

= 4.719g

Discussion

Based on the results obtained above, plus the calculations, it would be important to note that the experiment utilized the derivation reactions that helped in acknowledging the sensitivity in the case. The sensitivity of the measurement was increased by increasing the size of the headspace sample obtained from the soil (Ma, Yongpeng et al. 390) . The sample size was only increased alongside the increase in the peak width of the column used in the

spectrometry process. Large samples from the soil were offset by utilizing the cryogenic cooling and then refocusing on the head of the column of the soil sample.

Conclusions

In summary and as a way of improving the outcome of the experiment, it would be advisable to narrow the size of the sample to help in the clear deduction of the concentration of the organic compounds in the soil sample. It is also imperative to utilize the auto sampling system that would best align with the detection of minor organic compounds from the soil sample (Brunke 19) . Furthermore, a gas-tight syringe would be a better option to use in this experiment to keep the results in line with the hypothesis of the study.

Works Cited

Brunke, Ernst-Joachim, ed. *Progress in Essential Oil Research: Proceedings of the International Symposium on Essential Oils, Holzminden/Neuhaus, Federal Republic of Germany, Sept. 18–21, 1985*. Walter de Gruyter GmbH & Co KG, 2019.

Ma, Yongpeng, et al. "Bioassay-guided isolation of active compounds from Adenosma buchneroides essential oil as mosquito repellent against Aedes albopictus." *Journal of Ethnopharmacology* 231 (2019): 386-393.