

Carbonyl Report Outline

0. Header
 - a. Title of lab
 - b. Date of experiment
 - c. Members in your group
1. Experimental
 - a. Make a hand drawn schematic of where/how the samplers were set up. Label it Figure 1 and add a caption (Figure 2. Schematic of sampling environment).
 - b. Make a hand drawn schematic of the sampler design/setup. Label it Figure 2 and add a caption (Figure 2. Schematic of DNPH cartridge sampling).
 - c. Write a description in narrative form to indicate how the experiment was performed. The description should walk the reader through the experimental setup and the steps taken during the experiment.
2. HPLC Calibration
 - a. Paste the chromatograms of the low and high-concentration calibration run into the notebook. Label then Figure 3. Chromatogram for the XX $\mu\text{g ml}^{-1}$ sample. and Figure 4. Chromatogram for the XX $\mu\text{g ml}^{-1}$ sample. **With a pencil**, annotate the peaks of one of the chromatograms. Include the molecular formula (e.g. CH_2O for formaldehyde). For aromatic compounds, show both the molecular formula and the Lewis structure.
 - b. Perform linear regression of peak area vs. concentration including the origin [0,0]. Provide the slope of the formula to obtain concentration concentration from peak area, i.e. $c = m \cdot A$, where c is the concentration in $\mu\text{g ml}^{-1}$, A is the peak area, and m is the slope. Make a graph, print it and paste it into the notebook. Label if Fig. 5. Linear regression of peak area versus concentration.
 - c. Make a table that lists all of the compounds in the standard, their molecular formula, their structure (linear or aromatic), their retention time in minutes, rounded to 2 decimal places, and the slopes m rounded to 3 decimal places. You can print it and paste it into the notebook and label it Table 1. Summary of compounds in the standard.
 - d. Describe the calibration results in narrative form. Start the section with "Figure 3 shows ...". The text should describe the steps needed to both identify and quantify the carbonyls from the HPLC analysis.
3. Indoor and Outdoor Carbonyls
 - a. Paste the chromatograms of the low and high-concentration calibration run into the notebook. Label then Figure 6. and Figure 7, and caption them similar to what you did for 2a. With a pencil, identify the carbonyls you identified, quantified and will discuss in the report. (That is, don't label all peaks).
 - b. Show how you derive airborne concentration of carbonyls in $\mu\text{g}/(\text{m}^3 \text{ air})$ from the observed peak areas.
 - c. Describe in narrative form identifying and quantifying concentrations of selected carbonyl species in the indoor and outdoor environment.
4. Discussion

- a. Discuss in narrative form (1) potential sources and other explanations for the observed carbonyl species, (2) how the observations differ from those reported in the peer-reviewed literature. You should find at least one paper that reports concentrations of your species in indoor and outdoor environments and compare your concentrations against those reported.
5. Summary
 - a. Write a summary paragraph for the lab, following the Nature summary paragraph style (<https://www.nature.com/documents/nature-summary-paragraph.pdf>).
6. Instrument Description
 - a. Make a nice hand drawn instrument schematic indicating how the HPLC works. Label it Figure 8 and add a caption (Figure 8. Schematic of High Performance Liquid Chromatograph).
 - b. Write a description of the instrument operation in narrative form. Start the section with "Figure 8 shows ...". The description should enable the reader to understand how HPLC separates and quantifies compounds, and identify some sources of error.

Aerosol Emission Factor