

Chem 2062 Spring 2006  
Clove oil report guidelines  
Due Friday, Feb 10

Since this was an isolation/analysis experiment, no hypothesis or balanced equation is required. You should however draw the structures of the major and minor product in place of the equation. You can make a single table that shows original mass of cloves used and masses and percentages (from the original cloves mass) of each product obtained. There will most certainly be deviations from the textbook's procedure so be sure to efficiently describe them. (Paragraph form, past tense, passive voice).

The major product is one of those pictured in the textbook's intro for this experiment (p. 85). You should be able to completely assign its NMR spectrum, including coupling constants for the peaks at 3.3 and 5.1 ppm if possible. Also, draw the structure and assign the peaks on the spectrum itself.

In your NMR table and on your spectrum, identify any impurity peaks as well (usually the bottom rows of the table). These may include water at 1.56,  $\text{CH}_2\text{Cl}_2$  at 5.30,  $\text{CHCl}_3$  (a contaminant in the  $\text{CDCl}_3$  NMR solvent) at 7.27 ppm. You should add column named "compound" to the table.

The sample you isolated as the minor component will inevitably also contain some of your major product. Why? Explain this in the discussion. The actual minor component is similar to the major component (it has an  $-\text{OAc}$  instead of an  $-\text{OH}$ ), with the corresponding addition of a new peak at around 2.3 ppm. (This peak should be almost identical in size and shape with another at around 3.8) There should be two peaks close together between 3.8 and 3.9 – one belongs to the major product, one belongs to the minor. Measure their integrals with a ruler to estimate the ratio of the two products in your sample. Assign as many other peaks as you can and tabulate them as described above.

In the discussion, be sure to indicate exactly how these two products were separated from each other (hint, the base extraction). From the internet or your text (p. 84), find how much clove oil is actually contained in a sample of cloves, and assess your procedure's efficiency based on that. Some related searches should also give you the names of the major and minor components. (Be sure to cite your sources!) Use the NMR data to assess your extraction procedure (the % of major product in your minor product sample), drying procedure (the water peak), and the solvent evaporation procedure (the  $\text{CH}_2\text{Cl}_2$  peak).

Be sure to attach all spectra.