

Identification of a Natural Product. A Spectroscopy Experiment.

Reading Klein, Chapter 16 and Pavia (5th edition) Techniques 25,26 and 27 and download the following from the class laboratory website: The NMR Spectrometer Guides – ¹H, ¹³C, DEPT, COSY, and HETCOR and the *Online NMR Spectroscopy Resources and Problems*.

Description

You work for Natural Products 'r Us (NPRU) – Laney College's preeminent chemical discovery lab. You and your fellow colleagues have recently isolated a pure natural product from a local plant and your Naturopathic associates have found very interesting medicinal properties for this material. So everyone is interested in knowing what it really is.

You have already determined that it contains carbon (C) and hydrogen (H), but the ratio is yet to be determined. The molecule might also contain oxygen and/or nitrogen in some amount. Given your extensive experience using NMR and IR spectroscopy to determine the complete structure of many organic molecules (in 1st semester O-chem) you are confident that it is only a matter of time (hours and minutes) before the structure of this natural product is elucidated.

At your disposal is the Anasazi 60 MHz FT-NMR spectrometer and the following standard methods:

- ¹H NMR
- ¹³C NMR
- DEPT method
- COSY method
- HETCOR method

Also at your disposal is the Perkin Elmer RX-1 FT-IR spectrophotometer:

- Liquids use NaCl plates
- Solids use KBr pellets

Prelab and Exercise

Read through the **Reading** sections above. In your notebook, summarize the detailed information that is available for the DEPT, COSY, and HETCOR methods. Download and print copies of each of the official method files for use on the Anasazi instrument at the class website.

Procedure

Your instructor will demonstrate how to run the NMR instrument during laboratory. Use the Guides listed above for the definite procedure for each method. Print copies of the resulting spectra.

To Complete the Experiment – Full Report

Using your results from the NMR methods, determine unequivocally, the structure of the natural product. Clearly describe how each spectroscopic method was used to elucidate the structure of the natural product.