



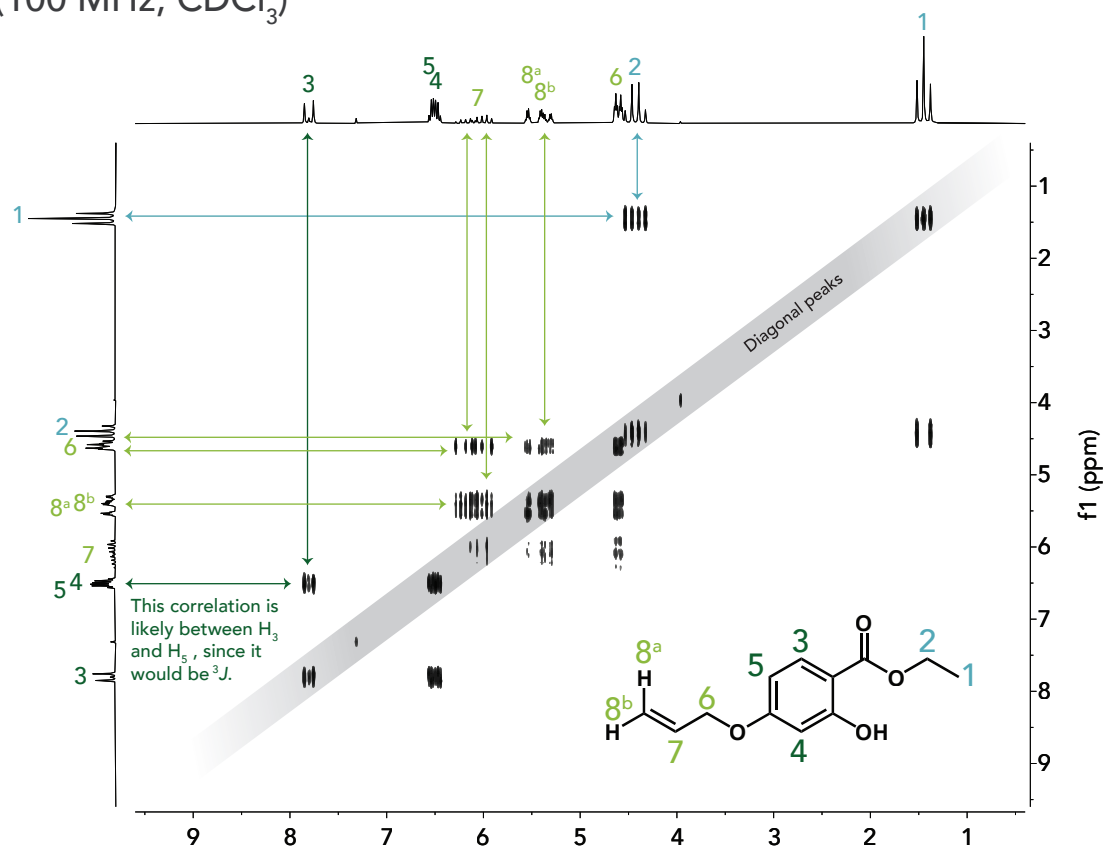
Get COSY

with this NMR experiment

Ethyl 4-(allyloxy)salicylate

¹H-¹H COSY NMR
(100 MHz, CDCl₃)

Diagonal peaks don't provide additional information as they represent the ¹H projection's chemical shift in each dimensional.



CORrelation SpectroscopY (COSY) is a popular 2D homonuclear experiment in NMR. ¹H-¹H COSY experiments show you the proton spins coupled to each other which are shown in the cross peaks off the diagonal.

COSY cross peak correlations are symmetric across the diagonal. This comes from the fact that the coupling constant is a reciprocal phenomenon where $J_{H^aH^b} = J_{H^bH^a}$

This experiment is especially useful when the sample of study is complex, and the interconnectivity cannot be solved with only J coupling values measured from the 1D spectrum.

The most common (¹H-¹H) coupling is three-bond coupling, denoted as $^3J_{HH}$. However, longer-range couplings can be observed particularly in aromatic systems.



COSY 90 Pulse Sequence

Check out these blogs that further highlight the COSY experiment here:

<https://www.nanalysis.com/nmready-blog/2017/10/31/hop-off-the-diagonal-cosy-spectrum-of-humulene>

<https://www.nanalysis.com/nmready-blog/2022/2/10/roses-are-red-violets-are-blue-hey-look-this-cosy-is-cool>