

**Long range  $^{13}\text{C}$  -  $^1\text{H}$  correlations with  $^1\text{H}$ , by gHMBC. Strychnine with Cr Acac.**

We will look at the benefits of composite pulses, useful for covering broad spectral widths (like  $^{13}\text{C}$ ).

Setup for the HMBC is very like that for HSQC. Start with a good  $^1\text{H}$   $1d$  . . . . Also know the  $^{13}\text{C}$  pwx and corresponding (high) pwxlvl.

Type **gHMBC**.

Keep **dm='nnn'** The  $^1\text{H}$  is antiphase with respect to  $^{13}\text{C}$  at the beginning of at, so it will be cancelled out by decoupling. This is similar to the situation for DQCOSY, and likewise requires that a non-shifted sine bell be used for the window function in f2. **sb=at/2** and **sbs=0**. If you double at by forward linear prediction, also double sb.

Check in dg1 that you are in absolute value mode: or type **av** to be sure.

j1xh should be the average one bond C-H coupling constant  $\approx 140$  Hz and jnxh is your choice of target long range coupling constant. One is advised to err on the large side for this one because shooting for very small coupling constants is tantamount to choosing a very long delay, during which you will lose signal due to  $T_2$  relaxation. **jnxh = 8** is a common starting-point. If your spectrum is strong but you are missing peaks, you can then run another spectrum with a smaller jnxh. If the spectrum is too weak and  $1/(2*\text{jnxh})$  is  $\geq T_2$ , you may have to settle for a larger jnxh. Choose nt to be 4 or 8 times the nt required to get a good HSQC, the HMBC is a weaker spectrum.

For the  $^{13}\text{C}$  spectral window, you will need to choose dof and sw1 so as to include not only the resonances you can see in the HSQC, but also quaternary Cs, carbonyls and ketones. Since the latter are at shifts as great as 220 ppm, allow for such signals unless you are sure that your compound does not have such functionalities.

Choose d1 as usual, and do use **sspul='y'**.