# An Efficient Perkin Synthesis of $^{13}$C-Labelled Cinnamic Acids From Acetic Acid as the Source of the Rare Isotope

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## 1 NMR spectroscopic product characterization

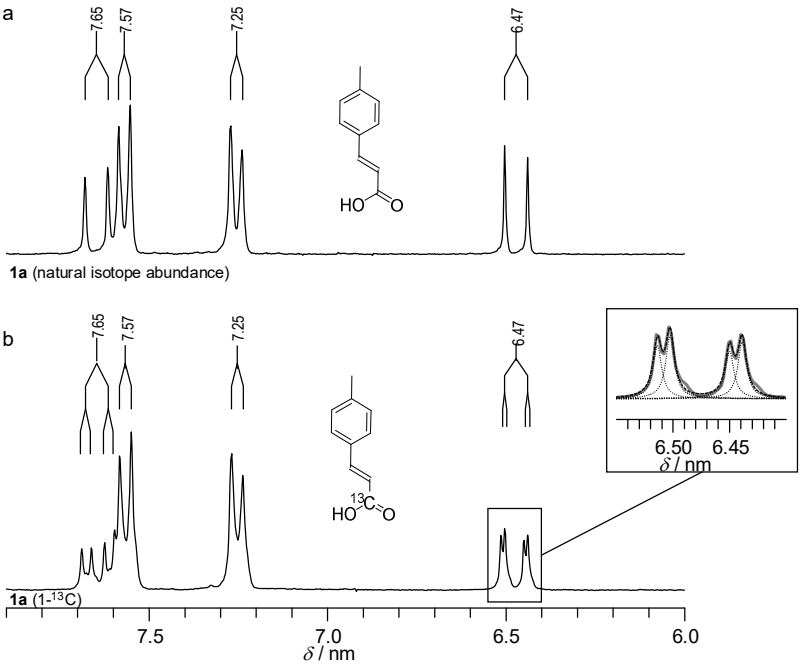



Figure S 1. $^{1}$H NMR spectra of **1a** in $(CD_3)_2CO$ recorded at 270 MHz: a. natural isotope abundance; b. 1-$^{13}$C. Note the additional splitting in the signals of the olefinic protons due to the coupling with 1-$^{13}$C (7 and 3 Hz, respectively). The Lorentzian lineshape analysis in the inset reveals that a doublet of doublets describes the spectral shape accurately (i.e. the fraction of 1-$^{12}$C is below detection).

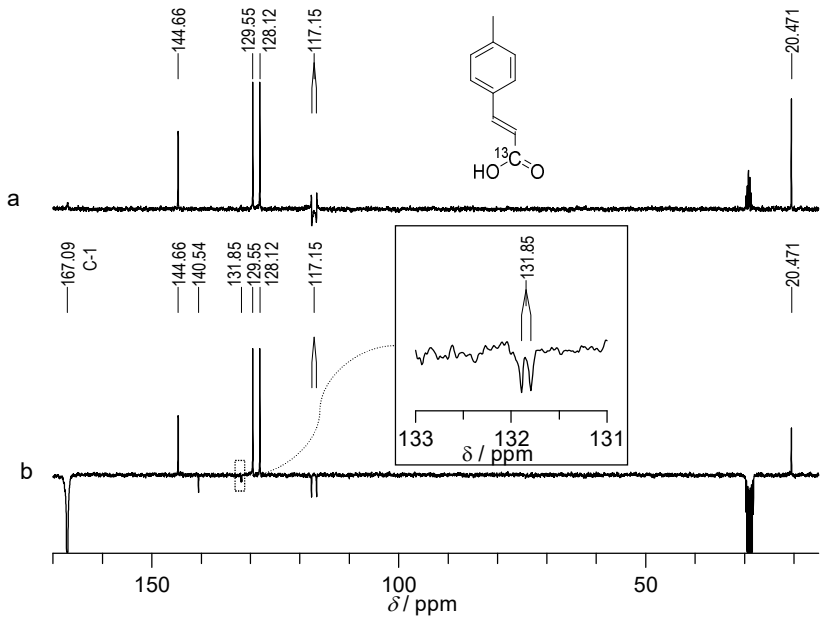
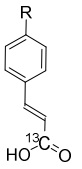



Figure S 2. $^{13}$C NMR spectra of **1a** in $(CD_3)_2CO$ recorded at 75 MHz: a. DEPT-135; b. APT. Note the splitting of signals at 131.85 and 117.15 ppm due to a *J*-coupling to C-1 of 7 and 77 Hz, resp.; these signals likely correspond to C-4 and C-2.

### 1.1 Spectral listing




**1a**: R = Me
**1b**: R = Et
**1c**: R = *tert*-Bu

**1**

Figure S 3.Structures of products.

**1a:** $^1$H-NMR (250 MHz, $(CD_3)_2CO$): $\delta$ = 7.65 (dd, $J_1(^1H\text{-}^1H)$ = 16 Hz, $J_2(^1H\text{-}^{13}C)$ = 7 Hz, 1H), 7.55 (d, 8 Hz, 2H), 7.25 (d, 8 Hz, 2H), 6.45 (dd, $J_1(^1H\text{-}^1H)$ =16 Hz, $J_2(^1H\text{-}^{13}C)$ =3 Hz, 1H, 2.4 ppm (s, 3H); $\{^1H\}^{13}$C NMR (75 MHz, $(CD_3)_2CO$): $\delta$ = 167.09, 144.66, 140.54, 131.85 (d, *J* = 7 Hz), 129.55, 128.12, 117.15 (d, *J* = 77 Hz), 20.47 ppm.

**1b**: $^1$H NMR (300 MHz, $(CD_3)_2CO$): $\delta$ = 7.66 (dd, $J_1(^1H\text{-}^1H)$ = 16 Hz, $J_2(^1H\text{-}^{13}C)$ = 7 Hz, 1H), 7.60 (d, *J* = 8 Hz, 2H), 7.29 (d, *J* = 8 Hz, 2H), 6.48 (dd, $J_1(^1H\text{-}^1H)$ = 16 Hz, $J_2(^1H\text{-}^{13}C)$ = 3 Hz, 1H), 2.67 (q, *J* = 8 Hz, 2H), 1.22 ppm (t, *J* = 8 Hz, 3H); $\{^1H\}^{13}$C NMR (75 MHz, $(CD_3)_2CO$): $\delta$ = 166.94, 146.85, 144.59, 128.31 (d, *J* = 13 Hz), 117.25 (d, *J* = 73 Hz), 28.40, 14.92 ppm.

**1c**: $^1$H NMR (300 MHz, $(CD_3)_2CO$): $\delta$ = 7.67 (dd, $J_1(^1H\text{-}^1H)$ = 16 Hz, $J_2(^1H\text{-}^{13}C)$ = 7 Hz, 1H), 7.61 (d, *J* = 8 Hz, 2H), 7.48 (d, *J* = 8 Hz, 2H), 6.49 (dd, $J_1(^1H\text{-}^1H)$ = 16 Hz, $J_2(^1H\text{-}^{13}C)$ = 3 Hz, 1H), 1.33 (s, 9H); $\{^1H\}^{13}$C NMR (75 MHz, $(CD_3)_2CO$): 167.14, 144.56, 131.82 (d, *J* = 7 Hz), 128.00, 125.82, 117.34 (d, *J* = 73 Hz), 35.14, 30.52 ppm.

### 1.2 Spectral overview

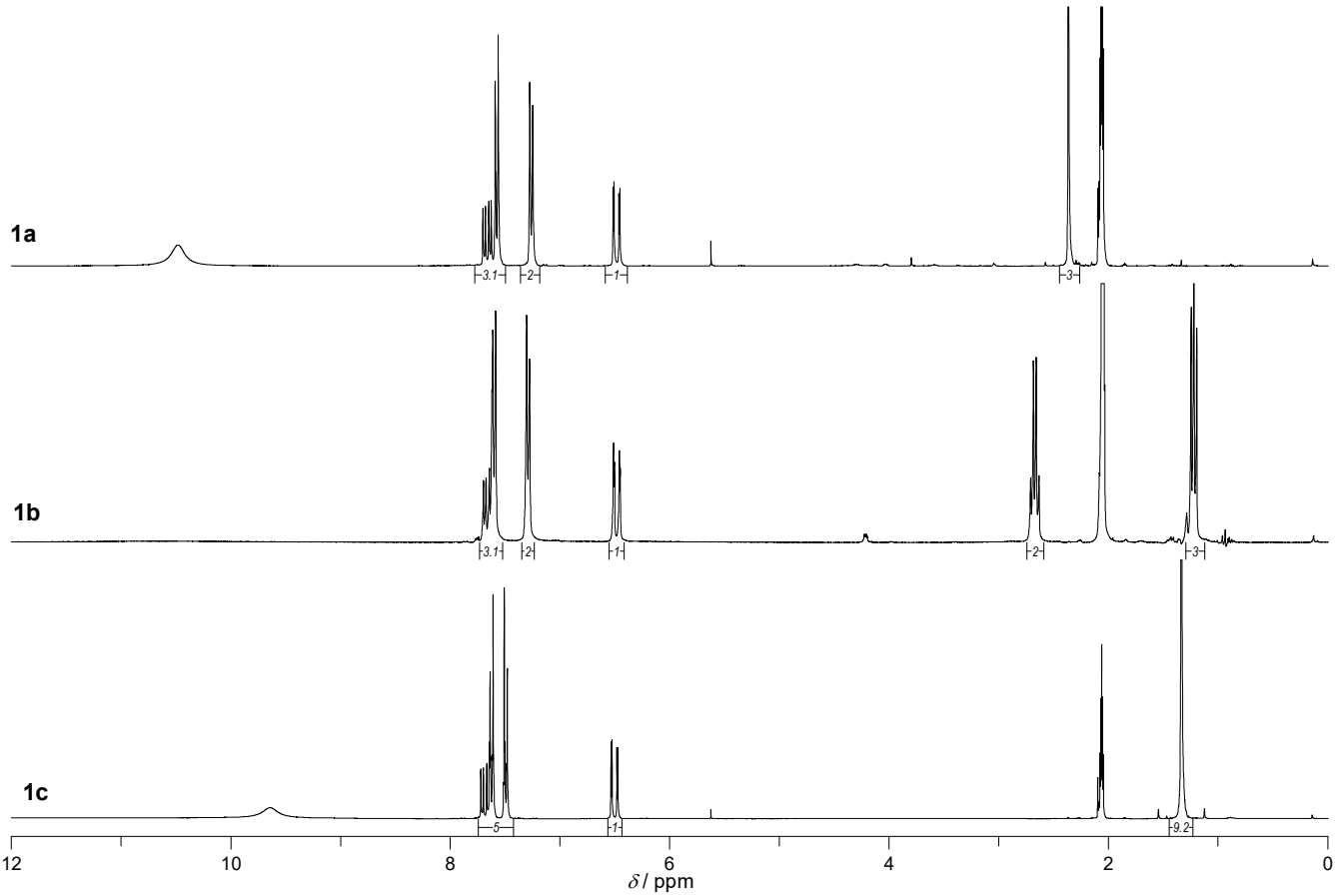



Figure S 4. $^{1}$H NMR spectra of **1a** to **1c** in $(CD_3)_2CO$. Note that close inspection reveals the couplings (as in Figure S 1) that indicate $^{13}$C labelling for all cases.