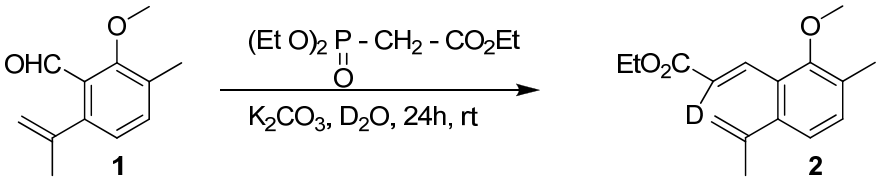
Deuterium Experiment:



Compound 2: Dry potassium carbonate (431 mg, 3.12 mmoles), deuterium oxide (2 ml) and triethylphosphonoacetate (0.265 mg, 1.18 mmoles) are stirred vigorously in a dry flask for 20 hours at room temperature under nitrogen atmosphere[1]. Aldehyde (150 mg, 0.78 mmoles) is then introduced and stirring is continued for 24 hours. Extraction (diethylether, 10ml x 3) is performed after addition of water (5 ml), and the combined organic layers were washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under reduced pressure. The crude product was purified on silica gel column chromatography using EtOAc-hexane as eluent to furnish the product (185 mg, 91%) as a yellow solid. *Rf* = 0.51 (EtOAc-hexane 3:97); **IR** (neat): ν_{max}/cm^{-1} 1713, 1619, 1593, 1476, 1218; **^{1}H NMR** (500 MHz, $CDCl_3$) δ 1.33 (t, *J* = 7.3 Hz, 3H), 2.01 (s, 3H), 2.29 (s, 3H), 3.67 (s, 3H), 4.25 (q, *J* = 7.3 Hz, 2H), 4.90 (br s, 1H), 5.24 (br s, 1H), 6.88 (d, *J* = 7.9 Hz, 1H), 7.12 (d, *J* = 7.9 Hz, 1H), 7.82 (s, 1H); **^{13}C NMR** (125 MHz, $CDCl_3$) δ 14.3, 15.9, 24.6, 59.8, 60.3, 116.7, 122.0(q), 124.3, 125.0, 130.4, 132.0, 139.8, 144.5, 144.8, 157.8, 167.7; **HRMS:** m/z calcd for $C_{16}H_{19}DNaO_3$ $[(M+Na)^+]$: 284.1373; Found: 284.1373.

O
EtO2C
D
2

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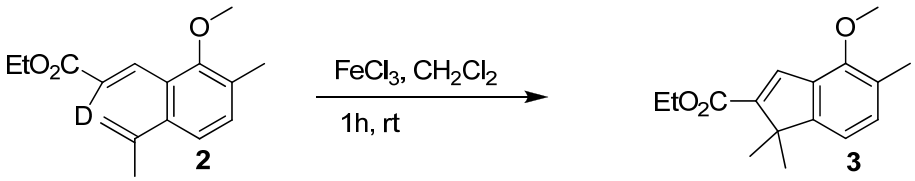
1. Pascale Seguineau, Jean Villieras, *Tetrahedron Letters.*, 1988, **29,** 477

Cyclization reaction on deuterated diene ester



Compound 3: Under inert atmosphere of argon, to a stirred solution of diene ester (50 mg, 0.19 mmol) in CH_2Cl_2 (50ml) and $FeCl_3$ (62 mg, 0.38 mmol) was added at 0^oC and stirred for 1h at RT. The reaction progress was monitored by TLC and after completion the reaction was quenched by sodium bisulphate. The reaction mixture was extracted with CH_2Cl_2 and the combined organic layers were washed with brine and dried over anhydrous Na_2SO_4. The solvent was removed under reduced pressure. The crude product was purified on silica gel column chromatography using EtOAc-hexane as an eluent to furnish the cyclised product (46 mg, 93%) as a yellow solid. *Rf* = 0.51 (EtOAc-hexane 3:97); **IR** (neat): ν_{max}/cm^{-1} 2979, 2928, 1704, 1568, 1478, 1419, 1244; **^{1}H NMR** (200 MHz, $CDCl_3$) δ 1.38 (t, *J* = 7.0 Hz, 3H), 1.44 (s, 6H), 2.29 (s, 3H), 3.94 (s, 3H), 4.3 (q, *J* = 7 Hz, 2H), 7.00 (d, *J* = 7.4 Hz, 1H), 7.17 (d, *J* = 7.4 Hz, 1H), 7.79 (s, 1H); **^{13}C NMR** (100 MHz, $CDCl_3$) δ 14.4, 15.8, 24.2, 49.8, 60.0, 61.5, 116.7, 128.5, 130.5, 131.3, 136.0, 145.0, 153.8, 157.0, 164.4; **HRMS** ($C_{16}H_{21}O_3$): Calc'd 261.1491 [$(M+H)^+$], Found 261.1495.