

**CHEMBIOCHEM**

## Supporting Information

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# CHEMBIOCHEM

## Supporting Information

for

Protein Farnesyltransferase-Catalyzed Isoprenoid Transfer to Peptide Depends on  
Lipid Size and Shape, not Hydrophobicity

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Contents	Pages
Spectral data for <b>3, 4, 5, 6a-6ad, 7, 14, 15, 18a-18c, 19a-19c, 24a-24ad, 27a-27c, 28a-28c, 29a-29c, 30a-30c, 31a-31c, 32a-32c.</b>	2 – 6
<sup>1</sup> H spectra of <b>3, 15, 19a-d, 24a-ad</b> , <sup>1</sup> H, <sup>31</sup> P and LRMS spectra of <b>4, 5, 6a-6ad, 7, 9a-9c</b>	7 – 150

Spectral data for **3**, **4**, **5**, **6a-6ad**, **7**, **14**, **15**, **18a-18c**, **19a-19c**, **24a-24ad**, **27a-27c**, **28a-28c**, **29a-29c**, **30a-30c**, **31a-31c**, **32a-32c**. Spectroscopic data, (in the order of scheme numbers) <sup>1</sup>H spectral and LRMS data sheets for compounds **3**, **4**, **5**, **6a-6ad**, **7**, **9a-9c**, **13-16**, **18a-18d**, **19a-19d**, **24a-24ad**, **25**, **27a-27c**, **28a-28c**, **29a-29c**, **30a-30c**, **31a-31c** and **32a-32b**.

For Scheme 1

**2-((2E,6E)-3,7-Dimethyl-9-phenyl-nona-2,6-dienyloxy)-tetrahydro-pyran (14)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.28-1.85 (m, 12H), 2.00 (t, J = 8.4 Hz, 2H), 2.076 (t, J = 7.2Hz, 2H), 2.33 (t, J = 8.8 Hz, 2H), 2.60-2.68 (m, 2H), 3.46-3.51 (m, 1H), 3.97-4.02 (m, 1H), 4.10-4.23 (m, 1H), 4.57-4.61 (m, 1H), 5.07-5.11 (M, 1H), 5.27-5.34 (m, 1H), 7.09-7.26 (m, 5H)

**(2E,6E)-3,7-Dimethyl-9-phenyl-nona-2,6-dien-1-ol (15)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.63 (s, 3H), 1.64 (s, 3H), 1.98 (t, J = 8.4 Hz, 2H), 2.06-2.11 (m, 2H), 2.23-2.30 (m, 2H), 4.12 (d, J = 7.2 Hz, 2H), 5.07-5.10 (m, 1H), 5.34-5.39 (m, 1H), 7.13-7.16 (m, 3H), 7.23-7.26 (m, 2H).

**(2E,6E)-3,7-Dimethyl-9-phenyl-nona-2,6-dien-1-diphosphate (3)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.51 (s, 3H), 1.53 (s, 3H), 1.86 (t, J = 8.0 Hz, 2H), 1.93-2.0 (m, 2H), 2.15 (t, J = 7.6 Hz, 2H), 2.60 (t, J = 7.6 Hz, 2H), 4.30 (t, J = 6.8 Hz, 2H), 5.0 (t, J = 6.8 Hz, 1H), 5.26 (t, J = 6.8 Hz, 1H), 7.06-7.21 (m, 5H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) -6.37 (d, J = 22.0 Hz, 1P), -9.50 (d, J = 22.0Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 403 (M<sup>+</sup>) 404.

For Scheme 2

**(2E,6E)-3,7-Dimethyl-8-phenylsulfanyl-octa-2,6-dien-1-ol (19a)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.62 (s, 3H), 1.73 (s, 3H), 1.93 (t, J = 8.0 Hz, 2H), 2.05-2.10 (m, 2H), 3.48 (s, 2H), 4.11 (d, J = 6.8 Hz, 2H), 7.17-7.32 (m, 5H).

**(2E,6E)-8-Benzyloxy-3,7-dimethyl-octa-2,6-dien-1-ol (19b)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.71 (s, 3H), 2.10-2.24 (m, 4H), 3.92 (s, 2H), 4.16 (d, J = 6.2 Hz, 2H), 4.48 (s, 2H), 5.41-5.49 (m, 2H), 7.33-7.38 (m, 5H).

**(2E,6E)-3,7-Dimethyl-8-(3,4,5-trimethoxy-benzyloxy-octa-2,6-dien-1-ol (19c)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.53 (s, 3H), 1.66 (s, 3H), 2.056 (t, J = 8.0 Hz, 2H), 2.14-2.20 (m, 2H), 3.81 (s, 3H), 3.84 (s, 6H), 6.37 (d, J = 0.8 Hz, 2H), 4.13 (d, J = 6.8 Hz, 2H), 4.35 (s, 2H), 5.38-5.41 (m, 2H), 6.54 (s, 2H).

**(2E,6E)-3,7-Dimethyl-8-phenylsulfanyl-octa-2,6-dien-1-diphosphate (4)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.48 (s, 3H), 1.54 (s, 3H), 1.96 (t, J = 6.8 Hz, 2H), 2.05 (t, J = 7.2 Hz, 2H), 3.79 (s, 2H), 4.28 (t, J = 6.4 Hz, 2H), 5.28-5.33 (m, 2H), 7.21-7.25 (m, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ -7.20 (d, J = 20.2 Hz, 1P), -9.50 (d, J = 20.2 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 421 (M<sup>+</sup>) 422.

**(2E,6E)-8-Benzyloxy-3,7-dimethyl-octa-2,6-dien-1-diphosphate (5)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.45 (s, 3H), 1.52 (s, 3H), 1.74 (t, J = 8.0 Hz, 2H), 1.87-1.90 (m, 2H), 3.38 (s, 2H), 4.25 (t, J = 6.8 Hz, 2H), 4.63 (s, 2H), 5.04 (t, J = 6.4 Hz, 1H), 5.15 (t, J = 6.4 Hz, 1H), 7.12-7.24 (m, 5H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) -8.1 (d, J = 20.2 Hz, 1P), -9.30 (d, J = 20.2 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 419 (M<sup>+</sup>) 420.

**(2E,6E)-3,7-Dimethyl-8-(3,4,5-trimethoxy-benzyloxy-octa-2,6-dien-1-diphosphate (7)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.46 (s, 3H), 1.54 (s, 3H), 1.191 (t, J = 6.4 Hz, 2H), 1.99-2.02 (m, 2H), 3.58 (s, 3H), 3.66 (s, 6H), 3.72 (s, 2H), 4.20 (s, 2H), 4.29 (t, J = 6.0 Hz, 2H), 5.24-5.32 (m, 2H), 6.50 (s, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ -6.41 (d, J = 20.7 Hz, 1P), -9.43 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 509 (M<sup>+</sup>) 510.

For Scheme 3

**(2E,6E)-8-(p-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24a)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.67 (s, 3H), 1.73(s, 3H), 2.08 (t, J = 8.0 Hz, 2H), 2.18-2.24 (m, 2H), 4.13 (d, J = 7.6 Hz, 2H), 4.37 (s, 2H), 5.37-5.42 (m, 1H), 5.49-5.53 (m, 1H), 6.90-6.95 (m, 2H), 7.24-7.28 (m, 2H).

**(2E,6E)-8-(2-Fluoro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24b)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.66 (s, 3H), 1.73 (s, 3H), 2.06 (t, J = 8.0 Hz, 2H), 2.16-2.22 (m, 2H), 4.13 (d, J = 7.6 Hz, 2H), 4.44 (s, 2H), 5.36-5.40 (m, 1H), 5.49-5.52 (m, 1H), 6.84-7.08 (m, 4H).

**(2E,6E)-8-(3-Fluoro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24c)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.65 (s, 3H), 1.70 (s, 3H), 2.06 (t, J = 7.6 Hz, 2H), 2.15-2.22 (m, 2H), 4.12 (d, J = 6.8 Hz, 2H), 4.34 (s, 2H), 5.38 (t, J = 6.0 Hz, 1H), 5.49 (t, J = 7.6 Hz, 1H), 6.60-6.70 (m, 3H), 7.20-7.25 (m, 1H).

**(2E,6E)-8-(4-Fluoro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24d)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.67 (s, 3H), 1.71 (s, 3H), 2.07 (t, J = 8.0 Hz, 2H), 2.22-2.16 (m, 2H), 4.13 (d, J = 6.8 Hz, 2H), 4.32 (s, 2H), 5.37-5.42 (m, 1H), 5.47-5.51 (m, 1H), 6.80-6.85 (m, 2H), 6.91-6.07 (m, 2H).

**(2E,6E)-8-(2,6-Difluoro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24e)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.63 (s, 3H), 1.77 (s, 3H), 2.0 (t, J = 8.4 Hz, 2H), 2.11-2.17 (m, 2H), 4.12 (d, J = 6.8 Hz, 2H), 4.48 (s, 2H), 5.33-5.38 (m, 1H), 5.41-5.45 (m, 1H), 6.81-6.95 (m, 3H).

**(2E,6E)-8-(3,4-Difluoro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24f)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t, J = 8.0 Hz, 2H), 2.17-2.22 (m, 2H), 4.14 (d, J = 6.8 Hz, 2H), 4.31 (s, 2H), 5.38-5.42 (m, 1H), 5.47-5.51 (m, 1H), 6.56-6.60 (m, 1H), 6.67-6.73 (m, 1H), 6.98-7.06 (m, 1H).

**(2E,6E)-8-(2, 3-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24g)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.66 (s, 3H), 1.73 (s, 3H), 2.06 (t, J = 8.0 Hz, 2H), 2.16-2.22 (m, 2H), 4.14 (d, J = 6.8 Hz, 2H), 4.44 (s, 2H), 5.37-5.41 (m, 1H), 5.49-5.53 (m, 1H), 6.70-6.77 (m, 1H), 6.90-6.96 (m, 1H).

**(2E,6E)-8-(3, 5-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24h)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.66 (s, 3H), 2.06 (t, J = 8.0 Hz, 2H), 2.16-2.22 (m, 2H), 4.13 (d, J = 7.2 Hz, 2H), 4.32 (s, 2H), 5.36-5.41 (m, 1H), 5.47-5.50 (m, 1H), 6.34-6.43 (m, 3H).

**(2E, 6E)-3,7-Dimethyl-8-(2,3,5,6-tetrafluoro-phenoxy)-oct-2-en-ol (24i)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.64 (s, 3H), 1.75 (s, 3H), 2.00 (t, J = 8.0 Hz, 2H), 2.12-2.18 (m, 2H), 4.13 (d, J = 7.6 Hz, 2H), 4.57 (s, 2H), 5.35-5.38 (m, 1H), 5.44-5.48 (m, 1H), 6.70-6.79 (m, 1H).

**3-(2E,6E)-8-Hydroxy-2,6-dimethyl-octa-2,6-dienyloxy)-benzoxitrile (24j)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ 1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t, J = 8.0 Hz, 2H), 2.23-2.18 (m, 2H), 4.14 (d, J = 7.2 Hz, 2H), 4.39 (s, 2H), 5.37-5.42 (m, 1H), 5.49-5.53 (m, 1H), 7.11-7.13 (m, 2H), 7.20-7.23 (m, 1H), 7.32-7.36 (m, 1H).

**4-((2E,6E)-8-Hydroxy-2,6-dimethyl-octa-2,6-dimethyl-octa-2,6-dienyloxy)-benzoxitrile (24k)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.67 (s, 3H), 1.71 (s, 3H), 2.07 (t, J = 8 Hz, 2H), 2.18-2.23 (m, 2H), 4.14 (d, J = 6.8 Hz, 2H), 4.41 (s, 2H), 5.42-5.37 (m, 1H), 5.53-5.50 (m, 1H), 6.93 (d, J = 8.8 Hz, 2H), 7.55 (d, J = 8.8 Hz, 2H).

**(2E,6E)-8-(4-Nitro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24l)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.66 (s, 3H), 1.72 (s, 3H), 2.06

(t,  $J = 8.4$  Hz, 2H), 2.24-2.18 (m, 2H), 4.14 (d,  $J = 6.8$  Hz, 2H), 4.46 (s, 2H), 5.37-5.42 (m, 1H), 5.51-5.55 (m, 1H), 6.94 (d,  $J = 9.2$  Hz, 2H), 8.17 (d,  $J = 9.2$  Hz, 2H).

**(2E,6E)-8-(2-Bromo-phenoxy)-3,7-dimethyl-oct-2-en-1-ol (24m)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.75 (s, 3H), 2.08 (t,  $J = 8.0$  Hz, 2H), 2.2 (m, 2H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.44 (s, 1H), 5.38-5.42 (m, 1H), 5.52-5.56 (m, 1H), 6.8 (ddd,  $J = 1.6, 7.6, 7.6$  Hz, 1H), 6.87 (d,  $J = 11.5$  Hz, 1H), 7.19-7.24 (1H, m), 7.52 (dd,  $J = 1.6, 7.6$  Hz, 1H).

**(2E,6E)-8-(3-Bromo-phenoxy)-3,7-dimethyl-octa-2,6-dien-ol (24n)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.16-2.23 (m, 2H), 4.13 (d,  $J = 7.6$  Hz, 2H), 4.35 (s, 2H), 5.37-5.42 (m, 1H), 5.47-5.52 (m, 1H), 6.81-6.84 (m, 1H), 7.04-7.06 (m, 2H), 7.10 (t,  $J = 7.2$  Hz, 1H).

**(2E,6E)-8-(4-Bromo-phenoxy)-3,7-dimethyl-octa-2,6-dien-ol (24o)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.17-2.21 (m, 2H), 4.13 (d,  $J = 7.2$  Hz, 2H), 4.33 (s, 2H), 5.37-5.41 (m, 1H), 5.47-5.51 (m, 1H), 6.77 (d,  $J = 8.8$  Hz, 2H), 7.34 (d,  $J = 8.8$  Hz, 2H).

**(2E,6E)-8-(3-Trifluoromethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24p)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.72 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.15-2.23 (m, 2H), 4.13 (d,  $J = 7.2$  Hz, 2H), 4.40 (s, 2H), 5.38-5.42 (m, 1H), 5.51-5.54 (m, 1H), 7.04-7.19 (m, 3H), 7.35 (t,  $J = 8.0$  Hz, 1H).

**(2E,6E)-8-(3,5-dichloro-phenoxy)-3,7-dimethyl-oct-2-en-1-ol (24q)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8.4$  Hz, 2H), 2.17-2.23 (m, 2H), 4.14 (d,  $J = 7.6$  Hz, 2H), 4.34 (s, 2H), 5.38-5.42 (m, 1H), 5.47-5.52 (m, 1H), 6.79 (d,  $J = 1.6$  Hz, 2H), 6.92 (t,  $J = 1.6$  Hz, 1H).

**(2E,6E)-8-(3,4-Dichloro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24r)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.23-2.16 (m, 2H), 4.14 (d,  $J = 7.2$  Hz, 2H), 4.34 (s, 2H), 5.42-5.38 (m, 2H), 5.48-5.51 (m, 2H), 6.75 (dd,  $J = 2.8, 8.8$  Hz, 1H), 6.98 (d,  $J = 2.8$  Hz, 1H), 7.29 (d,  $J = 8.8$  Hz, 1H).

**(2E,6E)-8-(2-Iodo-phenoxy)-3,7-dimethyl-oct-2-en-1-ol (24s)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.76 (s, 3H), 2.08 (t,  $J = 7.6$  Hz), 2.24-2.19 (m, 2H), 4.14 (d,  $J = 6.8$  Hz, 2H), 4.42 (s, 2H), 5.54-5.58 (m, 1H), 6.68 (ddd,  $J = 2.0, 8, 8$  Hz, 1H), 6.78 (dd,  $J = 8.0, 1.2$  Hz, 1H), 7.23-7.27 (m, 1H), 7.75 (dd,  $J = 8.0, 2.0$  Hz, 1H).

**(2E,6E)-8-(3-Iodo-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24t)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8$  Hz, 2H), 2.23-2.17 (m, 2H), 4.13 (d,  $J = 7.6$  Hz, 2H), 4.34 (s, 2H), 5.38-5.42 (m, 2H), 5.52-5.48 (m, 2H), 6.84-6.87 (m, 1H), 6.96 (t,  $J = 8.0$  Hz, 1H), 7.27-7.24 (m, 2H).

**(2E,6E)-8-(4-Iodo-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24u)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.70 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.17-2.22 (m, 2H), 4.13 (d,  $J = 7.2$  Hz, 2H), 4.33 (s, 2H), 5.37-5.41 (m, 1H), 5.47-5.50 (m, 1H), 6.67 (d,  $J = 8.8$  Hz, 2H), 7.64 (d,  $J = 9.2$  Hz, 2H).

**(2E, 6E)-8-(2-Ethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24v)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.19 (t,  $J = 7.6$  Hz, 3H), 1.68 (s, 3H), 1.73 (s, 3H), 2.08 (t,  $J = 8, 2$  Hz), 2.16-2.24 (m, 2H), 2.65 (q,  $J = 0.8, 7.2, 7.2$  Hz, 2H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.37 (s, 2H), 5.38-5.43 (m, 1H), 5.49-5.54 (m, 1H), 6.81 (d,  $J = 8.0$  Hz, 1H), 6.87 (ddd,  $J = 0.8, 7.2, 7.2$  Hz, 1H), 7.10-7.15 (m, 2H).

**(2E,6E)-8-(3-Ethyl -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24w)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.22 (t,  $J = 7.6$  Hz, 3H), 1.76

(s, 3H), 1.72 (s, 3H), 2.08 (t,  $J = 8.0$  Hz, 2H), 2.17-2.23 (m, 2H), 2.61 (q,  $J = 7.6, 7.6$  Hz), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.36 (s, 2H), 5.37-5.42 (m, 1H), 5.49-5.53 (m, 1H), 6.70-6.83 (m, 3H), 7.17 (t,  $J = 8.0$  Hz, 1H).

**(2E,6E)-8-(4-ethyl -phenoxy)-3,7-dimethyl-oct-2-en-1-ol (24x)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.19 (t, 7.6 Hz, 3H), 1.67 (s, 3H), 1.71 (s, 3H), 2.07 (t,  $J = 8.4$  Hz, 2H), 2.17-2.23 (m, 2H), 2.57 (q,  $J = 8.8$  Hz, 1H), 4.13 (d,  $J = 7.6$  Hz, 2H), 4.34 (s, 2H), 5.37-5.42 (m, 1H), 5.52-5.48 (m, 1H), 6.82 (d,  $J = 8.8$  Hz, 2H), 7.08 (d,  $J = 8.8$  Hz, 2H).

**(2E,6E)-8-(3-Trifluoromethoxy -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24y)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.65 (s, 3H), 1.70 (s, 3H), 2.08 (t,  $J = 8.0$  Hz, 2H), 2.15-2.20 (m, 2H), 4.10 (d,  $J = 6.8$  Hz, 2H), 4.50 (s, 2H), 5.35 (t,  $J = 6.5$  Hz, 1H), 5.48 (t,  $J = 6.5$  Hz, 1H), 6.70-6.80 (m, 3H), 7.23-7.30 (m, 1H).

**(2E,6E)-8-(4-Trifluoromethoxy- phenoxy)-3,7-dimethyl-oct-2-en-1-ol (24z)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.71 (s, 3H), 2.08 (t,  $J = 8.4$  Hz, 2H), 2.18-2.23 (m, 2H), 4.14 (d,  $J = 7.2$  Hz, 2H), 4.35 (s, 2H), 5.38-5.42 (m, 1H), 5.48-5.52 (m, 1H), 6.87 (d,  $J = 9.2$  Hz, 2H), 7.11 (d,  $J = 9.2$  Hz, 2H).

**(2E,6E)-8-(3-Isopropyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24aa)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.22 (d,  $J = 7.2$  Hz, 6H), 1.67 (s, 3H), 1.73 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.16-2.23 (m, 2H), 2.80-2.90 (m, 1H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.36 (s, 2H), 5.38-5.42 (m, 1H), 5.49-5.53 (m, 1H), 6.70-6.73 (m, 1H), 6.78-6.80 (m, 1H), 8.0-8.1 (m, 1H), 7.17 (t,  $J = 7.2$  Hz, 1H).

**(2E,6E)-8-(4-Isopropyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24ab)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.67 (s, 3H), 1.72 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.16-2.23 (m, 2H), 2.79-2.89 (m, 1H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.34 (s, 2H), 5.37-5.42 (m, 1H), 5.48-5.52 (m, 1H), 6.83 (d,  $J = 8.8$  Hz, 2H), 7.11 (d,  $J = 8.4$  Hz, 2H).

**(2E,6E)-8-(2-phenyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24ac)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.62 (s, 3H), 1.65 (s, 3H), 2.03 (t,  $J = 8.4$  Hz, 2H), 2.12-2.17 (m, 2H), 4.10 (dd,  $J = 0.8, 7.2$  Hz, 2H), 4.35 (s, 2H), 5.34-5.43 (m, 2H), 6.94-7.03 (m, 2H), 7.25-7.40 (m, 5H), 7.52-7.54 (m, 2H).

**(2E,6E)-8-(4-benzyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (24ad)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ )  $\delta$  1.65 (s, 3H), 1.70 (s, 3H), 2.05 (t,  $J = 8.4$  Hz, 2H), 2.15-2.21 (m, 2H), 8.90 (s, 2H), 4.11 (d,  $J = 5.6$  Hz, 2H), 4.32 (s, 2H), 5.35-5.40 (m, 1H), 5.45-5.50 (m, 1H), 6.80-6.83 (m, 2H), 7.04-7.07 (m, 2H), 7.14-7.18 (m, 3H), 7.23-7.27 (m, 2H).

**(2E,6E)-3,7-Dimethyl-8-phenoxy-octa-2,6-dien-1-diphosphate (6a)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{D}_2\text{O}$ )  $\delta$  1.53 (s, 6H), 1.95 (t,  $J = 7.2$  Hz, 2H), 2.02-2.10 (m, 2H), 4.30 (t,  $J = 6.4$  Hz, 2H), 4.40 (s, 2H), 5.23 (t,  $J = 6.4$  Hz, 1H), 5.46 (t,  $J = 6.4$  Hz, 1H), 6.90-6.95 (m, 3H), 7.19-7.22 (m, 2H);  $^{31}\text{P NMR}$  ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta$  -5.51 (d,  $J = 20.7$  Hz, 1P), -9.20 (d,  $J = 20.7$  Hz, 1P). LRMS: (EI) ( $\text{M}^+ - \text{H}^+$ ) 405 ( $\text{M}^+$ ) 406.

**(2E,6E)-8-(2-Fluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6b)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{D}_2\text{O}$ )  $\delta$  1.50 (s, 3H), 1.53 (s, 3H), 1.91 (t,  $J = 7.6$  Hz, 2H), 2.01-2.06 (m, 2H), 4.26 (t,  $J = 6.4$  Hz, 2H), 4.41 (s, 2H), 5.23 (t,  $J = 7.2$  Hz, 1H), 5.40 (t,  $J = 7.2$  Hz, 1H), 6.80-6.86 (m, 1H), 6.94-7.03 (m, 3H);  $^{31}\text{P NMR}$  ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta$  -6.84 (d,  $J = 20.0$  Hz, 1P), -9.58 (d,  $J = 20.0$  Hz, 1P). LRMS: (EI) ( $\text{M}^+ - \text{H}^+$ ) 423 ( $\text{M}^+$ ) 424.

**(2E,6E)-8-(3-Fluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6c)**  
 $^1\text{H NMR}$  (400 MHz,  $\text{D}_2\text{O}$ )  $\delta$  1.52 (s, 6H), 1.94 (t,  $J = 7.2$  Hz, 2H), 2.03 - 2.08 (m, 2H), 4.28 (t,  $J = 6.8$  Hz, 2H), 4.33 (s, 2H), 5.25 (t,  $J = 6.8$  Hz, 1H), 5.41 (t,  $J = 6.8$  Hz, 1H), 6.58-6.66

(m, 3H), 7.12-7.18 (m, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.29 (d, J = 19.5 Hz, 1P), -9.05 (d, J = 19.5 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 423 (M<sup>+</sup>) 424.

**(2E,6E)-8-(4-Fluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6d)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.52 (s, 6H), 1.93 (t, J = 7.6 Hz, 2H), 2.02-2.07 (m, 2H), 4.28 (t, J = 6.4 Hz, 2H), 4.30 (s, 2H), 5.26 (t, J = 6.8 Hz, 1H), 5.40 (t, J = 6.4 Hz, 6.80-6.84 (m, 2H), 6.87-6.93 (m, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.28 (d, J = 22.0 Hz, 1P), -9.46 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 423 (M<sup>+</sup>) 424.

**(2E,6E)-8-(2, 6-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6e)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.48 (s, 3H), 1.61 (s, 3H), 1.84 (t, J = 7.6 Hz, 2H), 1.97-2.02 (m, 2H), 4.27 (t, J = 6.0 Hz, 2H), 4.42 (s, 2H), 5.20 (t, J = 7.2 Hz, 1H), 5.31 (t, J = 6.8 Hz, 1H), 6.84-7.00 (m, 3H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.14 (d, J = 22.0 Hz, 1P), -9.47 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 441 (M<sup>+</sup>) 442.

**(2E,6E)-8-(3, 4-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6f)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ 1.54 (s, 6H), 1.96 (t, J = 7.6 Hz, 2H), 2.05-2.10 (m, 2H), 4.31 (t, J = 7.2 Hz, 2H), 4.32 (s, 2H), 5.27 (t, J = 7.2 Hz, 1H), 5.42 (t, J = 6.8 Hz, 1H), 6.60-6.63 (m, 1H), 6.74-6.80 (m, 1H), 7.00-7.10 (m, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.74 (d, J = 18.2 Hz, 1P), -9.68 (d, J = 20.8 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 441 (M<sup>+</sup>) 442.

**(2E,6E)-8-(2, 3-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6g)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.54 (s, 3H), 1.55 (s, 3H), 1.95 (t, J = 7.6 Hz, 2H), 2.05-2.10 (m, 2H), 4.30 (t, J = 6.4 Hz, 2H), 4.42 (s, 2H), 5.27 (t, J = 6.0 Hz, 1H), 5.46 (t, J = 6.8 Hz, 1H), 7.07-7.10 (m, 1H), 7.20 (m, 2H), 7.35 (t, J = 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ -7.16 (d, J = 22.0 Hz, 1P), -9.56 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 441 (M<sup>+</sup>) 442.

**(2E,6E)-8-(3, 5-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6h)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.54 (s, 6H), 1.96 (t, J = 6.8 Hz, 2H), 2.04-2.11 (m, 2H), 4.30 (t, J = 6.4 Hz, 2H), 4.33 (s, 2H), 5.29 (t, J = 6.4 Hz, 2H), 5.44 (t, J = 6.8 Hz, 1H), 6.38-6.48 (m, 3H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.25 (d, J = 22.0 Hz, 1P), -9.52 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 441 (M<sup>+</sup>) 442.

**(2E,6E)-8-(2,3,5,6-Difluoro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6i)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.50 (s, 3H), 1.60 (s, 3H), 1.85 (t, J = 7.2 Hz, 2H), 1.97-2.04 (m, 2H), 4.27 (t, J = 6.4 Hz, 2H), 4.49 (s, 2H), 5.23 (t, J = 7.6 Hz, 1H), 5.37 (t, J = 6.8 Hz, 1H), 6.86-6.96 (m, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-5.89 (t, J = 22.0 Hz, 1P), -9.50 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 478 (M<sup>+</sup>) 478.

**(2E,6E)-8-(3-Cyano-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6j)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.53 (s, 3H), 1.54 (s, 3H), 1.94 (t, J = 6.8 Hz, 2H), 2.04-2.1 (m, 2H), 4.28 (t, J = 7.2 Hz, 2H), 4.38 (s, 2H), 5.26 (t, J = 6.4 Hz, 1H), 5.43 (t, J = 6.4 Hz, 1H), 7.13-7.23 (m, 3H), 7.31 (t, J = 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.60 (d, J = 19.5 Hz, 1P), -9.40 (d, J = 19.5 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 430 (M<sup>+</sup>) 431.

**(2E,6E)-8-(4-Cyano-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6k)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.60 (s, 6H), 1.97 (t, J = 7.6 Hz, 2H), 2.07-2.13 (m, 2H), 4.32 (t, J = 6.8 Hz, 2H), 4.43 (s, 2H), 5.29 (t, J = 7.6 Hz, 1H), 5.46 (t, J = 6.4 Hz, 1H), 6.95 (d, J = 8.8 Hz, 2H), 7.57 (d, J = 8.8 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.22 (d, J = 20.0 Hz, 1P), -9.68 (d, J = 20.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 430 (M<sup>+</sup>) 431.

**(2E,6E)-8-(4-Nitro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6l)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.53 (s, 3H), 1.55 (s, 3H), 1.95 (t, J = 7.2 Hz, 2H), 2.05-2.10 (m, 2H), 4.29 (t, J = 6.4 Hz,

2H), 4.45 (s, 2H), 5.26 (t, J = 6.4 Hz, 1H), 5.45 (t, J = 6.8 Hz, 1H), 6.93 (d, J = 9.2 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.41 (d, J = 20.7 Hz, 1P), -9.66 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 450 (M<sup>+</sup>) 451.

**(2E,6E)-8-(2-Bromo-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6m)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.52 (s, 3H), 1.56 (s, 3H), 1.93 (t, J = 7.6 Hz, 2H), 2.03-2.08 (m, 2H), 4.28 (t, J = 6.8 Hz, 2H), 4.43 (s, 2H), 5.24 (t, J = 6.4 Hz, 1H), 5.42 (t, J = 6.8 Hz, 1H), 6.77-6.81 (m, 1H), 6.95 (d, J = 8.0 Hz, 1H), 7.17-7.21 (m, 1H), 7.46 (dd, J = 1.6, 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.58 (d, J = 22.0 Hz, 1P), -7.00 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 483 (M<sup>+</sup>) 484.

**(2E,6E)-8-(3-Bromo-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6n)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.53 (s, 6H), 1.94 (d, J = 7.2 Hz, 2H), 2.04-2.09 (m, 2H), 4.28 (d, J = 6.4 Hz, 2H), 4.35 (s, 2H), 5.25 (t, J = 6.8 Hz, 1H), 5.41 (t, J = 5.6 Hz, 1H), 6.80-6.84 (m, 1H), 7.02-7.10 (m, 3H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.73 (d, J = 18.2 Hz, 1P), -9.11 (d, J = 18.2 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 483 (M<sup>+</sup>) 484.

**(2E,6E)-8-(4-Bromo-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6o)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.54 (s, 6H), 1.96 (t, J = 7.6 Hz, 2H), 2.01-2.10 (m, 2H), 4.31 (t, J = 6.4 Hz, 2H), 4.35 (s, 2H), 5.28 (t, J = 5.6 Hz, 1H), 5.43 (t, J = 6.8 Hz, 1H), 6.80 (d, J = 8.8 Hz, 2H), 7.33 (d, J = 8.8 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.60 (d, J = 20.8 Hz, 1P), -9.62 (d, J = 20.8 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 483 (M<sup>+</sup>) 484.

**(2E,6E)-8-(3-Trifluoromethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6p)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.55 (s, 3H), 1.56 (s, 3H), 1.97 (t, J = 7.6 Hz, 2H), 2.11-2.06 (m, 2H), 4.31 (t, J = 6.4 Hz, 2H), 4.35 (s, 2H), 5.30 (t, J = 6.8 Hz, 1H), 5.45 (t, J = 7.2 Hz, 1H), 6.84-6.86 (m, 3H), 6.96 (t, J = 1.6 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.53 (d, J = 21.8 Hz, 1P), -9.50 (d, J = 21.8 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 473 (M<sup>+</sup>) 474.

**(2E,6E)-8-(3,5-Dichloro-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6q)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.54 (s, 3H), 1.57 (s, 3H), 1.95 (t, J = 7.2 Hz, 2H), 2.05-2.11 (m, 2H), 4.30 (t, J = 6.8 Hz, 2H), 4.46 (s, 2H), 5.28 (t, J = 7.2 Hz, 1H), 5.45 (t, J = 7.2 Hz, 1H), 6.74-6.83 (m, 2H), 6.92-7.0 (m, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ 6.62 (d, J = 20.7 Hz, 1P), 7.53 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 474 (M<sup>+</sup>) 475.

**(2E,6E)-8-(3, 4-Dichloro -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6r)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.55 (s, 6H), 1.96 (t, J = 7.6 Hz, 2H), 2.05 - 2.11 (m, 2H), 4.31 (t, J = 6.8 Hz, 2H), 4.35 (s, 3H), 5.29 (t, J = 6.8 Hz, 1H), 5.44 (t, J = 6.8 Hz, 1H), 6.78 (dd, J = 3.2, 7.6 Hz, 1H), 7.03 (d, J = 2.8 Hz, 1H), 7.30 (d, J = 9.2 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-7.1 (d, J = 22.0 Hz, 1P), -9.53 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 474 (M<sup>+</sup>) 475.

**(2E,6E)-8-(2-Iodo -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6s)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.52 (s, 3H), 1.56 (s, 3H), 1.94 (t, J = 7.6 Hz, 2H), 2.03-2.08 (m, 2H), 4.28 (t, J = 6.8 Hz, 2H), 4.39 (s, 2H), 5.25 (t, J = 6.8 Hz, 1H), 5.44 (t, J = 9.0 Hz, 1H), 6.65 (t, J = 7.6 Hz, 1H), 6.86 (d, J = 8.4 Hz, 1H), 7.21 (t, J = 8.0 Hz, 1H), 7.68 (dd, J = 2.0, 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-6.47 (d, J = 20.7 Hz, 1P), -9.51 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 531 (M<sup>+</sup>) 532.

**(2E,6E)-8-(3-Iodo -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6t)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.50 (s, 3H), 1.52 (s, 3H), 1.92 (t, J = 7.6 Hz, 2H), 2.03 - 2.08 (m, 2H), 4.25 - 4.33 (m, 2H), 5.24 (t, J = 6.8 Hz, 1H), 5.37 (t, J = 6.8 Hz, 1H), 6.78 - 6.92 (m, 2H), 7.18 - 7.26 (m, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.93 (d, J = 22.0 Hz, 1P), -9.73 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 474 (M<sup>+</sup>) 475.

**(2E,6E)-8-(4-Iodo -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6u)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.50 (s, 3H), 1.51 (s, 3H), 1.91 (t, J = 7.6 Hz, 2H), 2.00 - 2.10 (m, 2H), 4.27 (s, 2H), 4.28 (t, 2H, J = 6.4 Hz, 2H), 5.25 (t, J = 5.6 Hz, 1H), 5.37 (t, J = 5.6 Hz, 1H), 6.61 (d, J = 8.8 Hz, 2H), 7.45 (8.8 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.03 (d, J = 20.8 Hz, 1P), -9.64 (d, J = 20.8 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 474 (M<sup>+</sup>) 475.

**(2E, 6E)-8-(2-Ethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6v)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.00 (t, J = 7.2 Hz, 3H), 1.53 (s, 3H), 1.56 (s, 3H), 1.95 (t, J = 7.2 Hz, 2H), 2.04-2.10 (m, 2H), 2.47 (q, J = 7.6, 7.6 Hz, 2H), 4.29 (t, J = 6.8 Hz, 2), 4.34 (s, 2H), 5.26 (t, J = 6.8 Hz, 1H), 5.42 (t, J = 6.8 Hz, 1H), 6.82-6.88 (m, 2H), 7.04-7.12 (m, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.51 (d, J = 20.7 Hz, 1P), -9.80 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 433 (M<sup>+</sup>) 434.

**(2E, 6E)-8-(3-Ethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6w)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.00 (t, J = 7.6 Hz, 3H), 1.53 (s, 6H), 1.94 (t, J = 7.6 Hz, 2H), 2.03-2.08 (m, 2H), 2.44 (q, J = 7.6, 7.6 Hz, 2H), 4.29 (t, J = 6.8 Hz, 2H), 4.34 (s, 2H), 5.25 (t, J = 6.4 Hz, 1H), 5.41 (t, J = 6.0 Hz, 1H), 6.67 (dd, J = 2.4, 8.0 Hz, 1H), 6.74 - 6.80 (m, 2H), 7.09 - 7.13 (m, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.51 (d, J = 20.7 Hz, 1P), -9.80 (d, J = 19.6 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 433 (M<sup>+</sup>) 434.

**(2E,6E)-8-(4-Ethyl -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6x)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.0 (t, J = 7.6 Hz, 3H), 1.52 (s, 6H), 1.94 (t, J = 7.6 Hz, 2H), 2.02 - 2.08 (m, 2H), 2.41 (q, J = 8.0, 8.0 Hz, 2H), 4.29 (t, J = 6.8 Hz, 2H), 4.32 (s, 2H), 5.25 (t, J = 6.0 Hz, 1H), 5.40 (t, J = 6.0 Hz, 1H), 6.79 (d, J = 8.8 Hz, 1H), 7.06 (d, J = 8.8 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.75 (d, J = 20.7 Hz, 1P), -9.05 (d, J = 20.7 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 433 (M<sup>+</sup>) 434.

**(2E,6E)-8-(3-Trifluoromethoxy -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6y)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.53 (s, 6H), 1.93 (t, J = 7.2 Hz, 2H), 2.02 - 2.10 (m, 2H), 4.28 (t, J = 6.4 Hz, 2H), 4.67 (s, 2H), 5.23 (t, J = 6.4 Hz, 1H), 5.42 (t, J = 6.4 Hz, 1H), 6.78 - 6.83 (m, 3H), 7.23 (t, J = 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.17(d, J = 21.0 Hz, 1P), -9.68(d, J = 21.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 489 (M<sup>+</sup>) 490.

**(2E,6E)-8-(4-Trifluoromethoxy-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6z)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.52 (s, 6H), 1.93 (t, J = 7.2 Hz, 2H), 2.03 - 2.08 (m, 2H), 2.90 (t, J = 6.8 Hz, 2H), 4.32 (s, 2H), 5.26 (t, J = 6.8 Hz, 1H), 5.40 (t, J = 6.8 Hz, 1H), 5.40 (t, J = 6.8 Hz, 1H), 7.3 (d, J = 9.2 Hz, 2H), 7.76 (d, J = 9.2 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-7.80 (d, J = 22.0 Hz, 1P), -9.63 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 489 (M<sup>+</sup>) 490.

**(2E,6E)-8-(3-Isopropyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6aa)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.02 (d, J = 6.8 Hz, 6H), 1.53 (s, 3H), 1.57 (s, 3H), 1.95 (t, J = 7.2 Hz, 2H), 2.05-2.10 (m, 2H), 3.12-3.19 (m, 1H), 4.29 (t, J = 6.0 Hz, 2H), 4.34 (s, 2H), 5.26 (t, J = 6.8 Hz, 1H), 5.42 (t, J = 6.8 Hz, 1H), 6.87-6.90 (m, 2H), 7.04-7.08 (m, 1H), 7.19 (dd, J = 1.6, 8.0 Hz, 1H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-9.38 (d, J = 22.0 Hz, 1P), -9.72 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 447 (M<sup>+</sup>) 448.

**(2E,6E)-8-(4-Isopropyl -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6ab)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.02 (d, J = 6.5 Hz, 6H), 1.53 (s, 6H), 1.93 (t, J = 7.6 Hz, 2H), 2.03-2.08 (m, 2H), 2.67-2.74 (m, 2H), 4.30 (t, J = 6.8 Hz, 2H), 4.32 (s, 2H), 5.2 (t, J = 6.4 Hz, 1H), 5.41 (t, J = 7.2 Hz, 1H), 6.8 (d, J = 8.4 Hz, 2H), 7.10 (d, J = 8.4 Hz, 2H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.41 (d, J = 22.0 Hz, 1P), -9.70 (d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 447 (M<sup>+</sup>) 448.

**(2E,6E)-8-(2-Phenyl -phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6ac)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.45(s, 3H), 1.52 (s, 3H), 1.91 (t, J = 6.8 Hz, 2H), 1.99-2.05 (m, 2H), 4.28 (t, J = 6.8 Hz, 2H), 4.30 (s, 2H), 5.23 (t, J = 7.2 Hz, 1H), 5.30 (t, J = 7.2 Hz, 1H), 6.97-7.03 (m, 2H), 7.22-7.29 (m, 3H), 7.33-7.40 (m, 6H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ=-8.78 (d, J = 22.0 Hz, 1P), -9.73(d, J = 22.0 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 481 (M<sup>+</sup>) 482.

**(2E,6E)-8-(4-Benzyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (6ad)** <sup>1</sup>H NMR (400 MHz, D<sub>2</sub>O) δ=1.51 (s, 6H), 1.93 (t, J = 6.8 Hz, 2H), 2.01-2.06 (m, 2H), 3.76 (s, 3H), 4.29 (t, J = 6.0 Hz, 2H), 4.30 (s, 2H), 5.25 (t, J = 6.4 Hz, 1H), 5.38 (t, J = 6.4 Hz, 1H), 6.77 (d, J = 8.4 Hz, 1H), 7.05-7.20 (m, 8H); <sup>31</sup>P NMR (D<sub>2</sub>O, 161.8 MHz) δ -8.17 (d, J = 20.8 Hz, 1P), -9.68 (d, J = 20.9 Hz, 1P). LRMS: (EI) (M<sup>+</sup>-H<sup>+</sup>) 495 (M<sup>+</sup>) 496.

For Scheme 4

**2-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-octa-2,6-dienyloxy)-benzoic acid methyl ester (27a)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ= 1.49-1.61 (m, 4H), 1.67 (s, 3H), 1.74 (s, 3H), 1.76-1.84 (m, 1H), 2.08 (d, J = 8.4 Hz, 2H), 2.18-2.23 (m, 2H), 3.47-3.53 (m, 1H), 3.85-3.91 (m, 4H, OMe protons merged with other proton), 3.98-4.03 (m, 1H), 4.21-4.25 (m, 1H), 4.50 (s, 2H), 4.60-4.62 (m, 1H), 5.34-5.38 (m, 1H), 5.54-5.57 (m, 1H), 6.92-6.97 (m, 1H), 7.39-7.43 (m, 1H), 7.77 (dd, J = 2.0, 8.0 Hz, 1H).

**3-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-octa-2,6-dienyloxy)-benzaldehyde (27b)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.47-1.59 (m, 4H), 1.67 (s, 3H), 1.69-1.70 (m, 1H), 1.72 (s, 3H), 1.79 -1.85 (m, 1H), 2.1 (t, J = 8.4 Hz, 2H), 2.18-2.23 (m, 2H), 3.47-3.54 (m, 1H), 3.85-3.90 (m, 1H), 3.97-4.02 (m, 1H), 4.20-4.24 (m, 1H), 4.44 (s, 2H), 4.58-4.62 (m, 1H), 5.35 (t, J = 7.2 Hz, 1H), 5.54 (t, J = 6.8 Hz, 1H), 7.16-7.19 (m, 1H), 7.38 -7.44 (m, 3H), 9.95 (s, 1H).

**4-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-octa-2,6-dienyloxy)-benzaldehyde (27c)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.50-1.60 (m, 5H), 1.65 (s, 3H), 1.69-1.70 (m, 1H), 1.71 (s, 3H), 2.1 (t, J = 8.4 Hz, 2H), 2.15-2.22 (m, 2H), 3.44-3.54 (m, 1H), 3.81-3.92 (m, 1H), 3.93-4.03 (m, 1H), 4.17-4.26 (m, 1H), 4.44 (s, 2H), 4.58-4.62 (m, 1H), 5.34 (t, J = 7.2 Hz, 1H), 5.52 (t, J = 6.8 Hz, 1H), 7.00 (d, J = 8.8Hz, 2H), 7.80 (d, J = 8.8Hz, 2H) 9.85 (s, 1H).

**2-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-nona-2,6-dienyl)-phenyl)-methanol (28a)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.49-1.61 (m, 4H), 1.67 (s, 3H), 1.72 (s, 3H), 1.80-1.85 (m, 1H), 2.08 (t, J = 8.0 Hz, 2H), 2.16-2.22 (m, 2H), 3.47-3.53 (m, 1H), 3.85-3.90 (m, 1H), 4.00-4.03 (m, 1H), 4.21-4.24 (m, 1H), 4.42 (s, 2H), 4.60-4.62 (m, 1H), 4.70 (s, 2H), 5.34-5.39 (m, 1H), 5.50-5.54 (m, 1H), 6.82-6.87 (m, 1H), 6.90-6.94 (m, 1H), 7.18-7.28 (m, 2H).

**3-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-octa-2,6-dienyloxy)-phenyl)-methanol (28b)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.49-1.60 (m, 4H), 1.66 (s, 3H), 1.70 (s, 3H), 1.79-1.84 (m, 1H), 3.47-3.53 (m, 1H), 3.85-3.97 (m, 1H), 4.00-4.05 (m, 1H), 4.20-4.23 (m, 1H), 4.38 (s, 2H), 4.60-4.61 (m, 1H), 4.65 (s, 2H), 5.32-5.35 (m, 1H), 5.48-5.53 (m, 1H), 6.81-6.84 (m, 1H), 6.90-6.93 (m, 2H), 7.22-7.30 (m, 1H).

**4-((2E,6E)-2,6-Dimethyl-8-(tetrahydro-pyran-2-yloxy)-octa-2,6-dienyloxy)-phenyl)-methanol (28c)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.56 (s, 6H), 1.70 (t, J = 8.0 Hz, 2H), 1.78-1.82 (m, 2H), 3.48-3.52 (m, 2H), 3.86-3.91 (m, 2H), 4.08-4.13 (m, 1H), 4.23-4.25 (m, 1H), 4.25-4.42 (m, 1H), 4.42 (d, J = 2.8 Hz, 2H), 4.44-4.48 (m, 1H), 4.48-4.76 (m, 4H), 5.75-5.79 (m, 2H), 6.80-6.84 (m, 1H), 6.92-6.93 (m, 2H), 7.21-7.24 (m, 2H).

**(2E,6E)-8-(2-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (29a)** <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>) δ=1.65(s, 3H), 1.70 (s,

3H), 2.03 (t,  $J = 8.0$  Hz, 2H), 2.19-2.02 (m, 2H), 4.10 (d,  $J = 6.8$  Hz, 2H), 4.40 (s, 2H), 4.70 (s, 2H), 6.82 (d,  $J = 8.0$  Hz, 1H), 6.91 (m, 1H), 7.22-7.28 (m, 1H).

**(2E,6E)-8-(3-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-dien-1-ol (29b)**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.66$  (s, 3H), 1.71 (s, 3H), 2.07 (t,  $J = 8.0$  Hz, 2H), 2.17-2.23 (m, 2H), 4.11 (d,  $J = 6.8$  Hz, 2H), 4.39 (s, 2H), 4.65 (s, 2H), 5.35 (t,  $J = 6.8$  Hz, 1H), 5.49 (t,  $J = 6.8$  Hz, 1H), 6.81-6.84 (m, 1H), 6.90-6.93 (m, 2H), 7.22-7.26 (m, 2H).

**(2E,6E)-8-(4-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-ol (29c)**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.64$  (s, 3H), 1.70 (s, 3H), 2.06 (t,  $J = 8.0$  Hz, 2H), 2.16-2.22 (m, 2H), 4.07 (dd,  $J = 2.8$ , 6.8 Hz, 2H), 4.38 (s, 2H), 4.60 (s, 2H), 5.28-5.33 (m, 1H), 5.45-5.49 (m, 1H), 6.88 (d,  $J = 8.4$  Hz, 2H), 7.26 (d,  $J = 8.4$  Hz, 2H).

**Compound 30a**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.56$ -1.75 (m, 15H), 2.04-2.90 (m, 2H), 2.15-2.18 (m, 2H), 3.50-3.56 (m, 1H), 3.88-4.03 (m, 1H), 4.37 (s, 2H), 4.52-4.64 (m, 2H), 4.75-4.81 (m, 1H), 5.11-5.23 (m, 1H), 5.30-5.36 (m, 1H), 5.45-5.48 (m, 1H), 6.20-6.26 (m, 1H), 6.81-6.86 (m, 1H), 6.90-6.94 (m, 1H), 7.18-7.30 (m, 1H), 7.40-7.45 (m, 2H), 7.60-7.70 (m, 2H), 7.94-8.00 (m, 1H).

**Compound 30b**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.50$ -1.72 (m, 15H), 2.05-2.25 (m, 4H), 3.40-3.57 (m, 2H), 3.84-4.06 (m, 2H), 4.39 (s, 2H), 4.56-4.62 (m, 1H), 5.10-5.27 (m, 1H), 5.28-5.47 (m, 2H), 6.22-6.29 (m, 1H), 6.82-6.97 (m, 2H), 7.18-7.31 (m, 1H), 7.40-7.46 (m, 1H), 7.59-7.73 (m, 2H), 7.83-8.00 (m, 2H).

**Compound 30c**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.57$ -1.92 (m, 15H), 2.08-2.19 (m, 4H), 3.44-3.60 (m, 1H), 3.84-4.07 (m, 2H), 4.20-4.29 (m, 1H), 4.37 (s, 2H), 4.55-4.73 (m, 2H), 5.30-5.52 (m, 2H), 6.18-6.29 (m, 1H), 6.88 (d,  $J = 13.2$  Hz, 2H), 7.23-7.29 (m, 3H), 7.39-7.48 (m, 1H), 7.63-7.70 (m, 1H), 7.83-7.99 (m, 1H).

**Compound 31a**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.66$  (s, 3H), 1.67 (s, 3H), 1.68 (s, 3H), 2.06 (t,  $J = 7.6$  Hz, 2H), 2.15-2.20 (m, 2H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.37 (s, 3H), 5.11-5.24 (m, 2H), 5.37-5.41 (m, 1H), 5.45-5.49 (m, 1H), 6.23-6.28 (m, 1H), 6.84 (d,  $J = 8.4$  Hz, 1H), 6.90 (t,  $J = 7.6$  Hz, 1H), 7.24-7.28 (m, 2H), 7.41-7.45 (m, 1H), 7.60-7.71 (m, 2H), 7.96 (dd,  $J = 1.6$ , 8.4 Hz, 1H).

**Compound 31b**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.66$  (s, 3H), 1.67 (s, 3H), 1.71 (s, 3H), 2.07 (t,  $J = 8.4$  Hz, 2H), 2.16-2.22 (m, 2H), 4.13 (t,  $J = 6.8$  Hz, 2H), 4.34 (s, 3H), 5.04 (dd,  $J = 12$ , 12 Hz, 2H), 5.37-5.41 (m, 1H), 5.48-5.52 (m, 1H), 6.24 (dd,  $J = 6.8$  Hz, 1H), 6.84-6.89 (m, 3H), 7.21-7.25 (m, 2H), 7.41-7.45 (m, 1H), 7.60-7.69 (m, 2H), 7.95-7.97 (m, 1H).

**Compound 31c**  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ )  $\delta = 1.65$  (s, 3H), 1.67 (s, 3H), 1.71 (s, 3H), 2.07 (t,  $J = 7.6$  Hz, 2H), 2.17-2.23 (m, 2H), 4.13 (d,  $J = 6.8$  Hz, 2H), 4.36 (s, 2H), 5.01 (dd,  $J = 12.4$ , 12.4 Hz, 2H), 5.38 (t,  $J = 7.2$  Hz, 1H), 5.50 (t,  $J = 7.2$  Hz, 1H), 6.21-6.26 (m, 1H), 6.86 (d,  $J = 8.8$  Hz, 2H), 7.25 (d,  $J = 8.8$  Hz, 2H), 7.41-7.45 (m, 1H), 7.60-7.68 (m, 2H), 7.95-7.97 (m, 1H).

**Compound 32a**  $^1\text{H}$  NMR (400 MHz,  $\text{D}_2\text{O}$ )  $\delta = 1.45$  (s, 3H), 1.49 (s, 3H), 1.50 (s, 3H), 1.87 (t,  $J = 6.4$  Hz, 2H), 1.95-2.00 (m, 2H), 4.25 (s, 2H), 4.28 (t,  $J = 6.4$  Hz, 2H), 4.50 (dd,  $J = 11.6$ , 11.6 Hz, 1H), 6.80-6.88 (m, 2H), 7.12 (d,  $J = 7.6$  Hz, 1H), 7.22 (t,  $J = 7.2$  Hz, 1H), 7.37 (t,  $J = 8.4$  Hz, 1H), 7.46 (d,  $J = 7.6$  Hz, 1H), 7.55 (t,  $J = 7.2$  Hz, 1H), 7.80 (d,  $J = 8.4$  Hz, 1H);  $^{31}\text{P}$  NMR ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta = -7.64$  (d,  $J = 22.0$  Hz, 1P), -9.66 (d,  $J = 22.0$  Hz, 1P).

**Compound 32b**  $^1\text{H}$  NMR (400 MHz,  $\text{D}_2\text{O}$ )  $\delta = 1.46$  (s, 9H), 1.86 (t,  $J = 7.2$  Hz, 2H), 1.95-2.05 (m, 2H), 4.24 (s, 2H), 4.63 (s, 2H, merged with  $\text{D}_2\text{O}$  peak), 4.88 (s, 2H), 5.18-5.24 (m, 1H), 5.30-5.36 (m, 1H), 5.90-5.96 (m, 1H), 6.62-6.66 (m, 1H), 6.70-6.80 (m, 2H), 7.00-7.15 (m, 1H), 7.28-7.35 (m, 1H), 7.36-7.42 (m, 1H), 7.45-7.51

(m, 1H), 7.75-7.80 (m, 1H);  $^{31}\text{P}$  NMR ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta = -7.77$  (d,  $J = 20.2$  Hz, 1P), -9.67 (d,  $J = 20.2$  Hz, 1P).

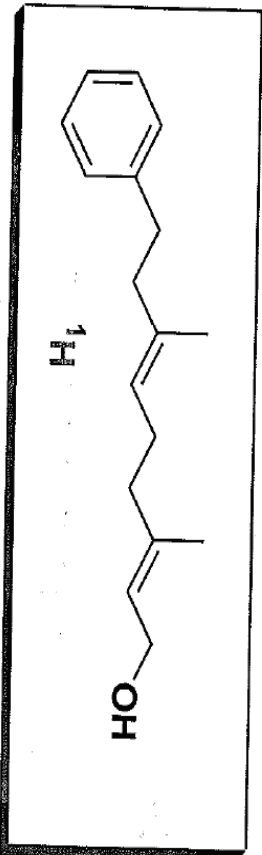
**(2E,6E)-8-(2-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (9a)**  $^1\text{H}$  NMR (400 MHz,  $\text{D}_2\text{O}$ )  $\delta = 1.52$  (s, 3H), 1.54 (s, 3H), 1.94 (t,  $J = 6.8$  Hz, 2H), 2.03-2.07 (m, 2H), 4.28 (t,  $J = 6.8$  Hz, 2H), 4.37 (s, 2H), 4.50 (s, 2H), 5.24 (t,  $J = 6.0$  Hz, 1H), 5.41 (t,  $J = 7.2$  Hz, 1H), 6.85-6.90 (m, 2H), 7.15-7.20 (m, 2H);  $^{31}\text{P}$  NMR ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta = -9.00$  (d,  $J = 20.0$  Hz, 1P), -9.474 (d,  $J = 20.0$  Hz, 1P).

**(2E,6E)-8-(3-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (9b)**  $^1\text{H}$  NMR (400 MHz,  $\text{D}_2\text{O}$ )  $\delta = 1.53$  (s, 3H), 1.54 (s, 3H), 1.94 (t,  $J = 7.6$  Hz, 2H), 2.03 - 2.083 (m, 2H), 4.28 (t,  $J = 6.4$  Hz, 2H), 4.36 (s, 2H), 4.43 (s, 2H), 5.26 (t,  $J = 6.0$  Hz, 1H), 5.42 (t,  $J = 6.0$  Hz, 1H), 6.78 - 6.86 (m, 3H), 7.16 - 7.20 (m, 1H);  $^{31}\text{P}$  NMR ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta = -6.40$  (d,  $J = 22.0$  Hz, 1P), -9.474 (d,  $J = 22.0$  Hz, 1P).

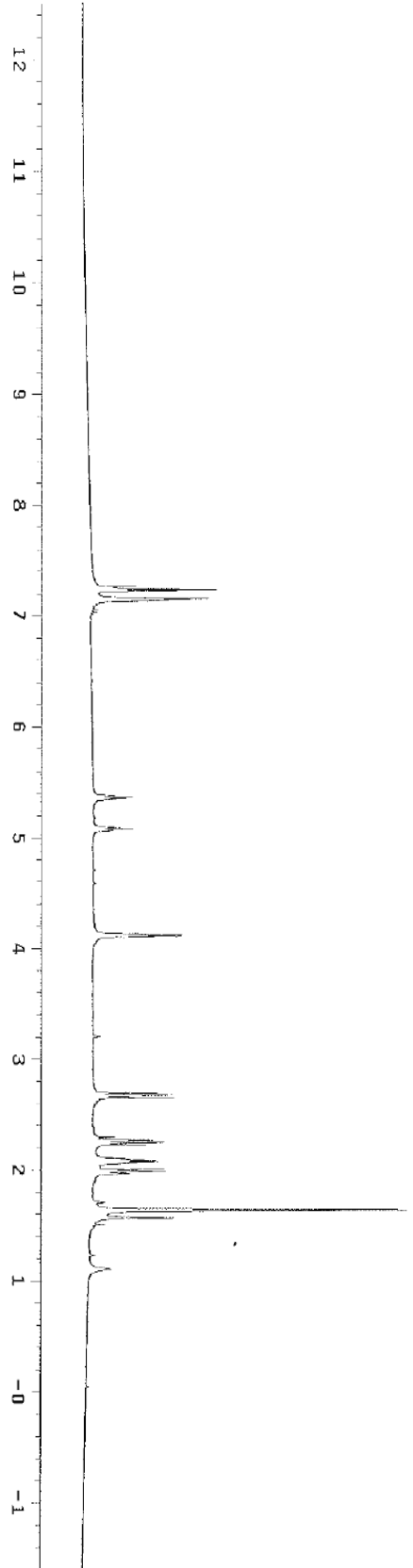
**(2E,6E)-8-(4-Hydroxymethyl-phenoxy)-3,7-dimethyl-octa-2,6-dien-1-diphosphate (9c)**  $^1\text{H}$  NMR (400 MHz,  $\text{D}_2\text{O}$ )  $\delta = 1.52$  (s, 3H), 1.54 (s, 3H), 1.94 (t,  $J = 7.2$  Hz, 2H), 2.04-2.09 (m, 2H), 4.28 (t,  $J = 6.4$  Hz, 2H), 4.36 (s, 2H), 4.40 (s, 2H), 5.25 (t,  $J = 6.8$  Hz, 1H), 5.42 (t,  $J = 6.8$  Hz, 1H), 6.85 (d,  $J = 8.4$  Hz, 2H), 7.17 (d,  $J = 8.4$  Hz, 2H);  $^{31}\text{P}$  NMR ( $\text{D}_2\text{O}$ , 161.8 MHz)  $\delta = -6.856$  (d,  $J = 22.0$  Hz, 1P), -9.52 (d,  $J = 22.0$  Hz, 1P).

TS-VI-118H-May25-2007  
 exp1 std1h

SAMPLE DEC. 8 VT  
 date MAY 26 2007 dfrq 399.717  
 solvent CDCl3 dr H1  
 file ACQUISITION exp dpr 42  
 file ACQUISITION exp dot 0  
 sfrq 399.717 dm mnm  
 at 3.744 dm  
 np 44932 dser 11146  
 sw 6000.6 dres 1.0  
 fb 3900 homo  
 ds 16  
 tpwr 7.8 wftie  
 pw 1.000 proc  
 nt 32 math  
 ct 16 werr  
 atock n wexp  
 gain not used wbs  
 wnt  
 11 n  
 1n n  
 1p n  
 1s n  
 DISPLAY nh  
 sp -1001.7  
 wp 6000.6  
 vs 61  
 sc 9  
 nc 250  
 vcm 4  
 f1 500.00  
 f1 1001.7  
 cfp 0  
 th 20  
 ins 100.000  
 nm cdc ph



Proton NMR of 15





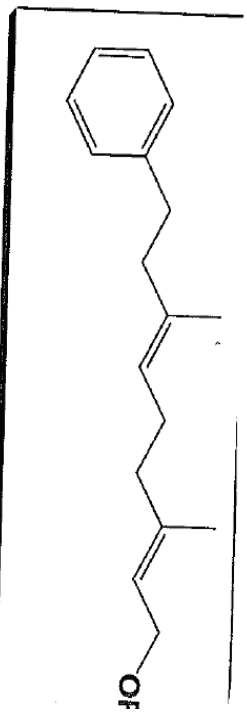
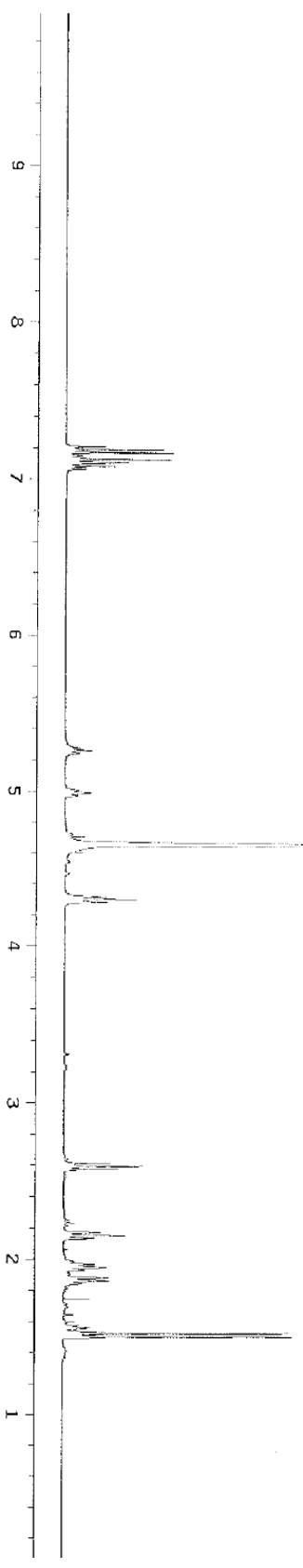
TS-II-69pp-Dec10-2004

exp2 stah

```

SAMPLE          DEC. & VT
data Dec 10 2004  dfreq 399.724
solvent DMSO-d6    dn
f1 180MHz/400MHz  dpr 42
f2 400MHz/100MHz  dpr 10
-60H-Dec10-2004-71~  dpr nm
-60H-Dec10-2004-71~  dpr nm
ACQUISITION     d 1148
sfrq 399.724    dseq 1.0
in HI          dres 1.0
st 3.744       homo 0
cp 44582      dfreq2 DECE2
pk 5000.6     f1q2 0
sk 501.6      f2q2 1
bs 1.6        dpr2 60
tpvr 7.3      dpr2 60
pw 1.000      dmh2 0
dl 0          dmh2 200
tcr 0         dmsq2 0
ci 329        dres2 1.0
clock 147     homo2 ADDRESSING
sain not used wflite
fl  n         proc ft
fn  n         fn  not used
dp  y         math
hs  n         math

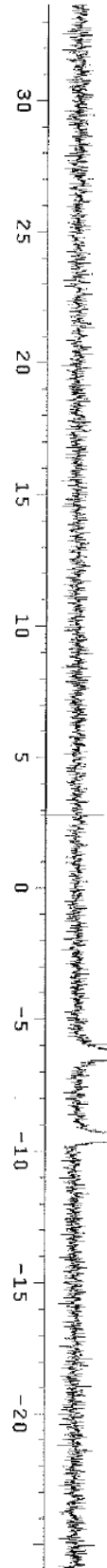
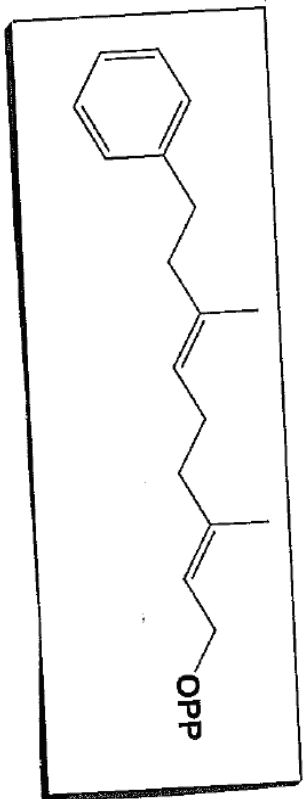
DISPLAY nm      warr
sp 4024.0     warr
vd 1417      warr
vc 0         warr
wc 250       warr
hznm 15.91   warr
fs 54.42     warr
f1 1001.7    warr
f2 0         warr
f3 0         warr
tms gdc ph  1.000
nm
  
```



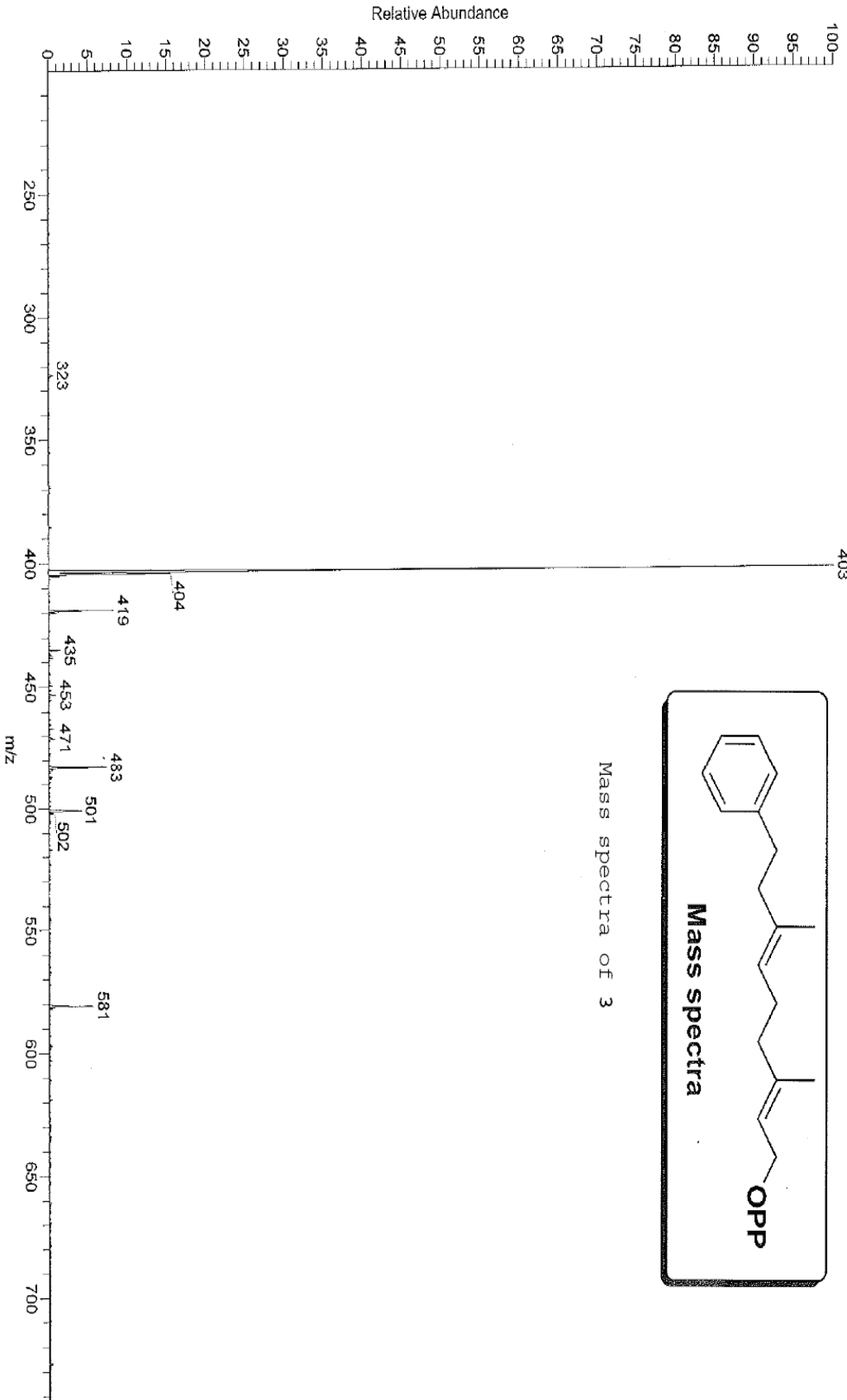
exp2 s2pu1

```

SAMPLE      DEC. & VT
date Dec 10 2004  dfrq 399.724
solvent D2O      dn
file /opt/dist/dat~dswr
a/ppe/S0880/TS-II-001
-80P-Dec10-2004-11~cm
ACQUISITION 3  cmpr 11148
sfreq 161.811  dresq
tn 0.800      dres2
at 15000      homo 1.0
np 10000.0   dfrq2  undefined
sw 5000      dn2  undefined
fb 64        dpcwr2  undefined
tpwr 55      dofs  undefined
pw 10.0      dm2  undefined
dl 0         cmr2  undefined
tof 640      csqc2  undefined
nt 640      dres2  undefined
ct 540      homo2  undefined
alock not used  PROCESSING
gain 1.00
ii          n  write
in          n  proc
dp          y  fr  not used
hs          n  math
DISPLAY
SD -4546.0  werr
WP 3998.0  wexp
V2 3       wnt
WC 20.250
hzmm 13281.78
fs 4547.8
rfp 0
th 20
ins 1.000
nm no ph
  
```



08-0046 #3-18 RT: 0.13-0.85 AV: 16 NL: 1.13E4  
T: - p Full ms [ 200.00-750.00]



TS-II-41-Oct13-2004  
 exp1 stdIn

SAMPLE DEC: 6 VT 399.723  
 date Oct 3 2004 dh  
 solvent CDCl3 dn  
 file /opt/dist/dat- dpr  
 a/pse/subs/TS-II- dof  
 -41-Oct13-2004.fid dn  
 ACQUISITION dm  
 strq 399.723 dat 11185  
 tn H1 d564  
 at 3.744 dres 1.0  
 nd 44932 homo  
 sw 6000.6  
 fb 5000 dffq2 DEC2  
 ba LI dn2  
 touw 64 dpr2 1  
 pw 7.3 dof2 0  
 dl 1.001 dn2 n  
 tor 164 dnt: c  
 nt 81 dnt: 200  
 ct dres2  
 dres2  
 gain not used homo2 1.0  
 flags PROCESSING n  
 f1 varfil  
 in n PROC n  
 dp y f0 not used f  
 hs nm meth

DISPLAY 378.4 uarr  
 WD 3411.2 wexp  
 VS 31.31 wds  
 SC 251  
 WC 14.41  
 hzwm 441.72  
 IS 1101.7  
 rfo 18  
 tm 1.108  
 nm cdc ph



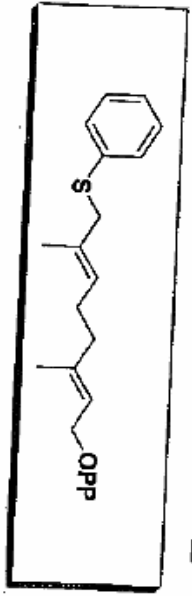
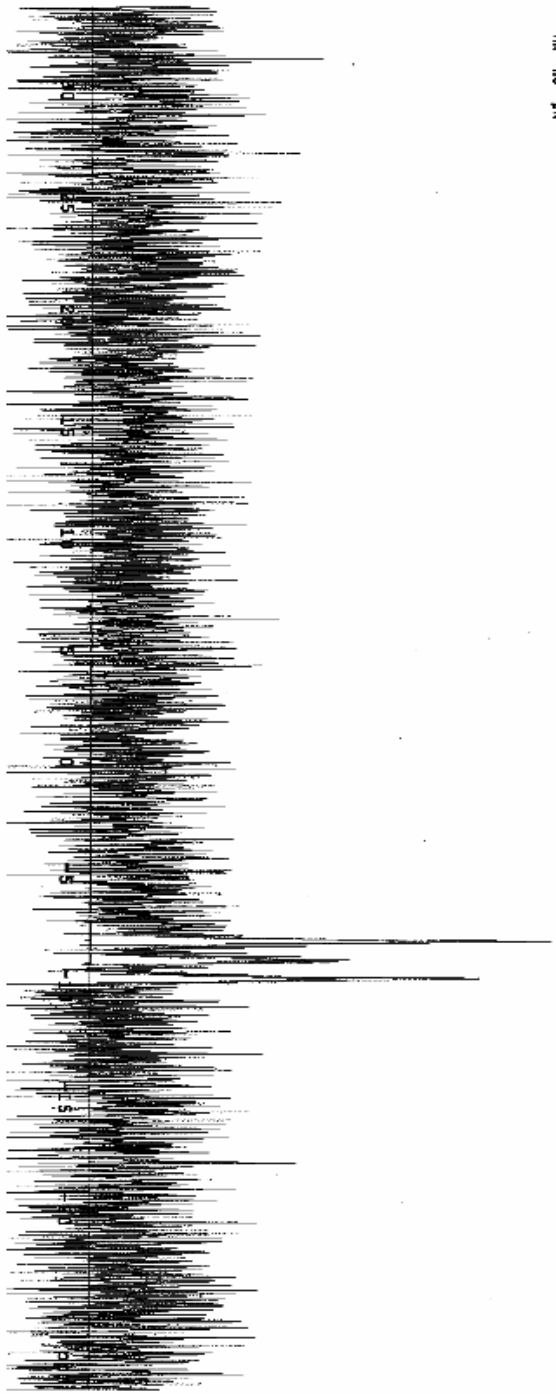
Proton NMR of 19a



```

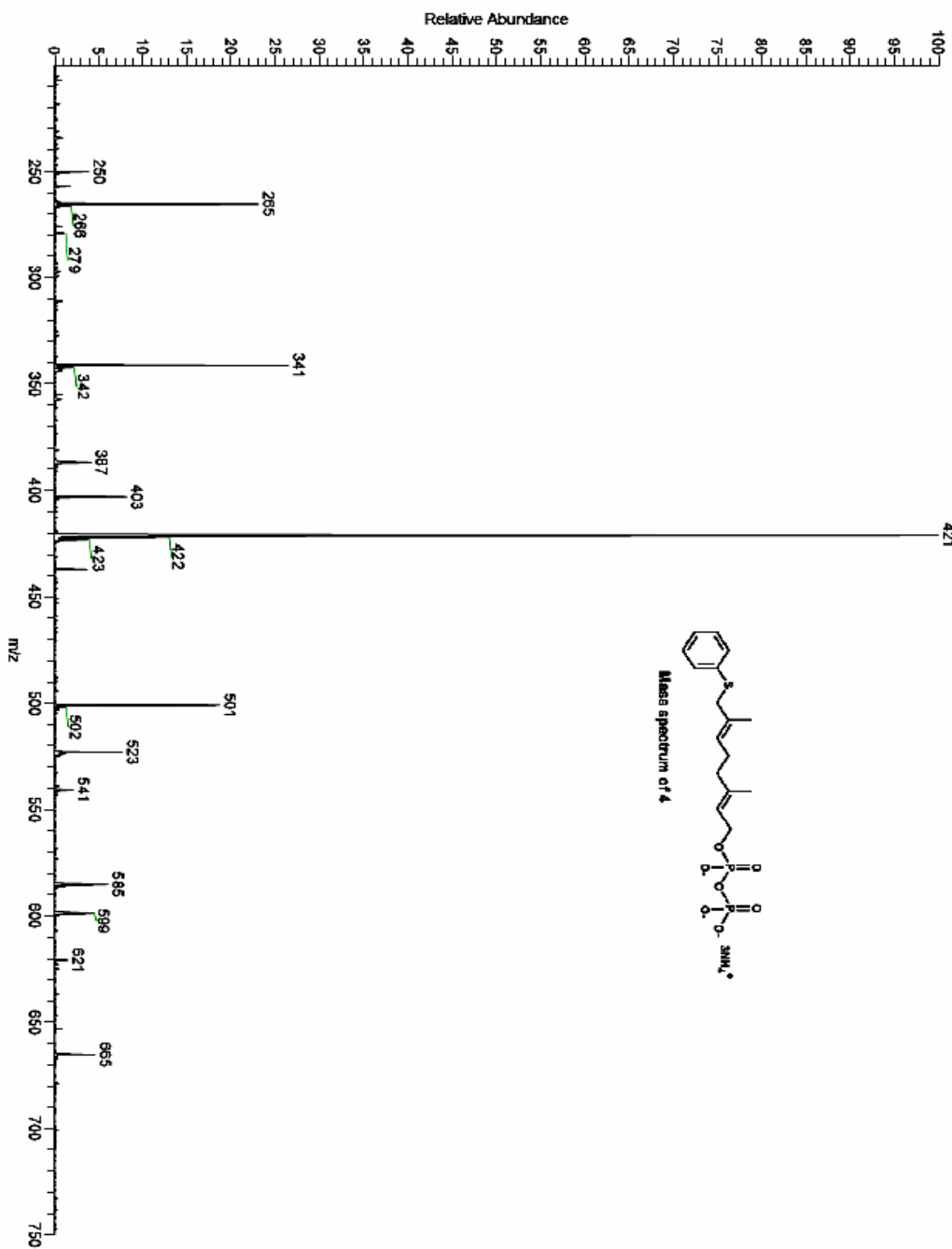
csp1 szpu1
SAMPLE DEC. 3 VT
date NOV 23 2108 dtrq 395.724
solvent D2O dn H1
F1E ACQUISITION exp dpuw 42
sfrq 161.811 dn 0
cn 0 P23 dn W
pc 15136 dcor 11145
sw 10001.0 dres 1.0
fb 6180 memo 1.0
D5 54 lb PROCESSING 1.00
tpwr 55 v+11e
D1 13.0 PROC FT
D2 0 FT not used
D3 3200 METH
CT 503
atloc n weff
gain hot used WBS
11 0 n vnt
10 0 n
09 0 n
NS DISPLAY nm
SD -4547.2
MD 10003.0
VS 73
SC 0
WC 250
N2MR 20.80
IS 388.60
IS1 4387.2
PFD 20
EN 20
TMC 100.430
nm no pn

```



Phosphorus NMR of 4

07-0694 #22-33 RT: 2.26-3.38 AV: 12 SM: 5B NL: 2.13E3  
P Full.ms [200.00-750.00]

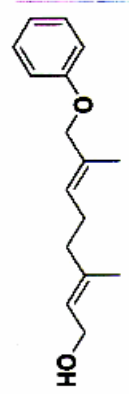


TS-II-23-sepia-2004

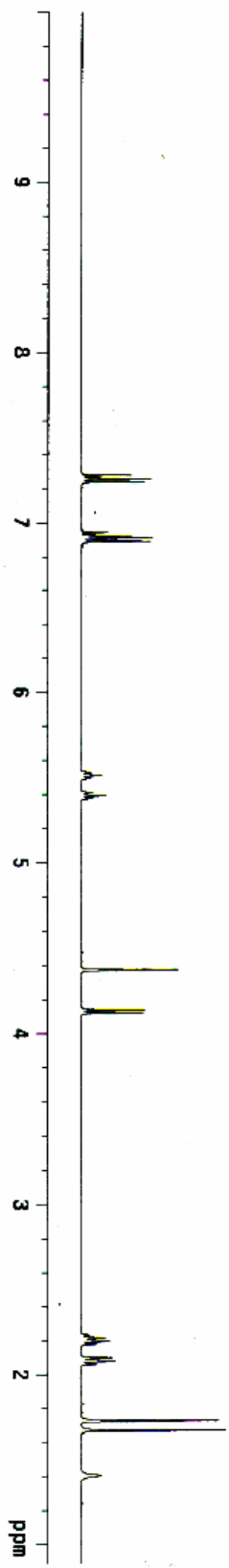
expt stdih

```

SAMPLE      Sep  4 2004   dfrc   DEC.  8  VT
date        Sep  4 2004   dfrc   399.723
solvent     CDC13         dn      H1
file        /opt/dist/dat~  dpr     42
a/beta/SUBBU/TS-II-  dof      8
-23-sepia-2004.fid    dm       nm
ACQUISITION 399.723   dwt     C
sfrq        399.723   dmw     11148
tn          H1       dresg
at          3.744   dres
np          44932   homo    1.0
sw          6000.6   DECC2
fd          3000    dfrq2   0
bs          16      dn2      1
tpwr       80      dprf2   1
pw         7.3     dotf2   0
d1         1.000   dm2     n
tof        0       dmf2    n
nt         32     dmf2    C
ct         32     dsdq2   200
atlock     n      dress2
gain       n      homo2   1.0
          not used
          PROCESSING
          ft
          not used
          f
          math
          DISPLAY
          werr
          wep
          wbs
          wnt
          hzmm
          is
          rfi
          rfn
          rfs
          nm
          cdc
          ph
          2.000
  
```



Proton NMR of 19c

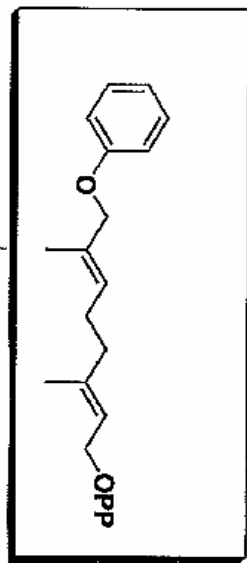
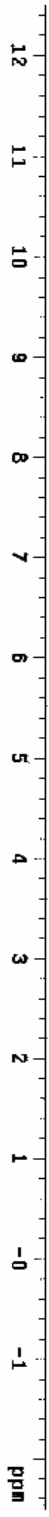


pppp-2

expt sedin

SAMPLE DEC. 8 VT  
 date May 15 2005 dfrq 399.724  
 solvent D2O dn HI  
 f1s exp dpr 42  
 ACQUISITION dof 0  
 sfrq 399.724 dn nnn  
 tn HI dm c  
 at 3.744 dat 11148  
 np 44332 dseq  
 sw 6000.5 dres 1.0  
 fb 3000 homo  
 bs 16 PROCESSING  
 tpwr 80 wt-11e  
 pw 7.3 Proc TT  
 dl 1.000 tn  
 tot 9 match not used Y  
 ne 3200  
 ce ds werr  
 atlock ti wexp  
 drin kds  
 flags not used  
 1) n  
 1a y  
 do y  
 ds n  
 bs n

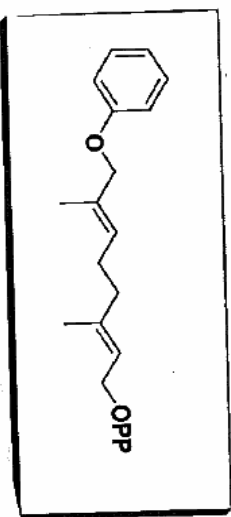
DISPLAY  
 -1001.7  
 sp 6080.6  
 wp 1328  
 ve 0  
 sc 250  
 wc 0  
 hznm 24.00  
 1s 500.00  
 rff1 1001.7  
 rfp 0  
 th 20  
 ins 2.000  
 nu cdc ph



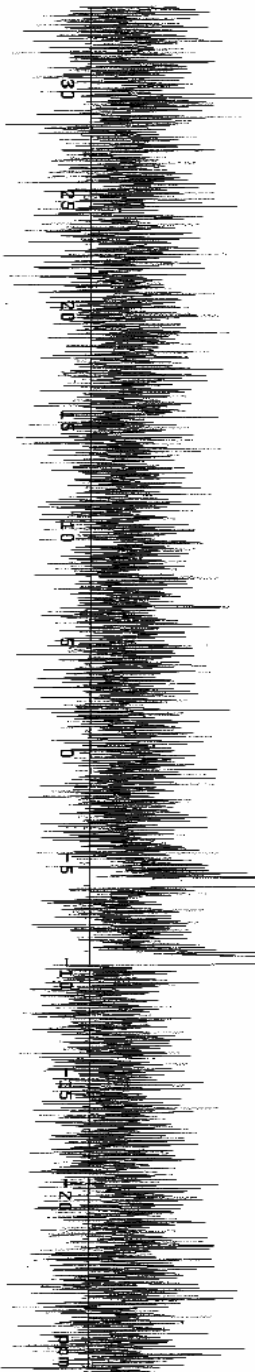


pppp-2  
expt szpnt1

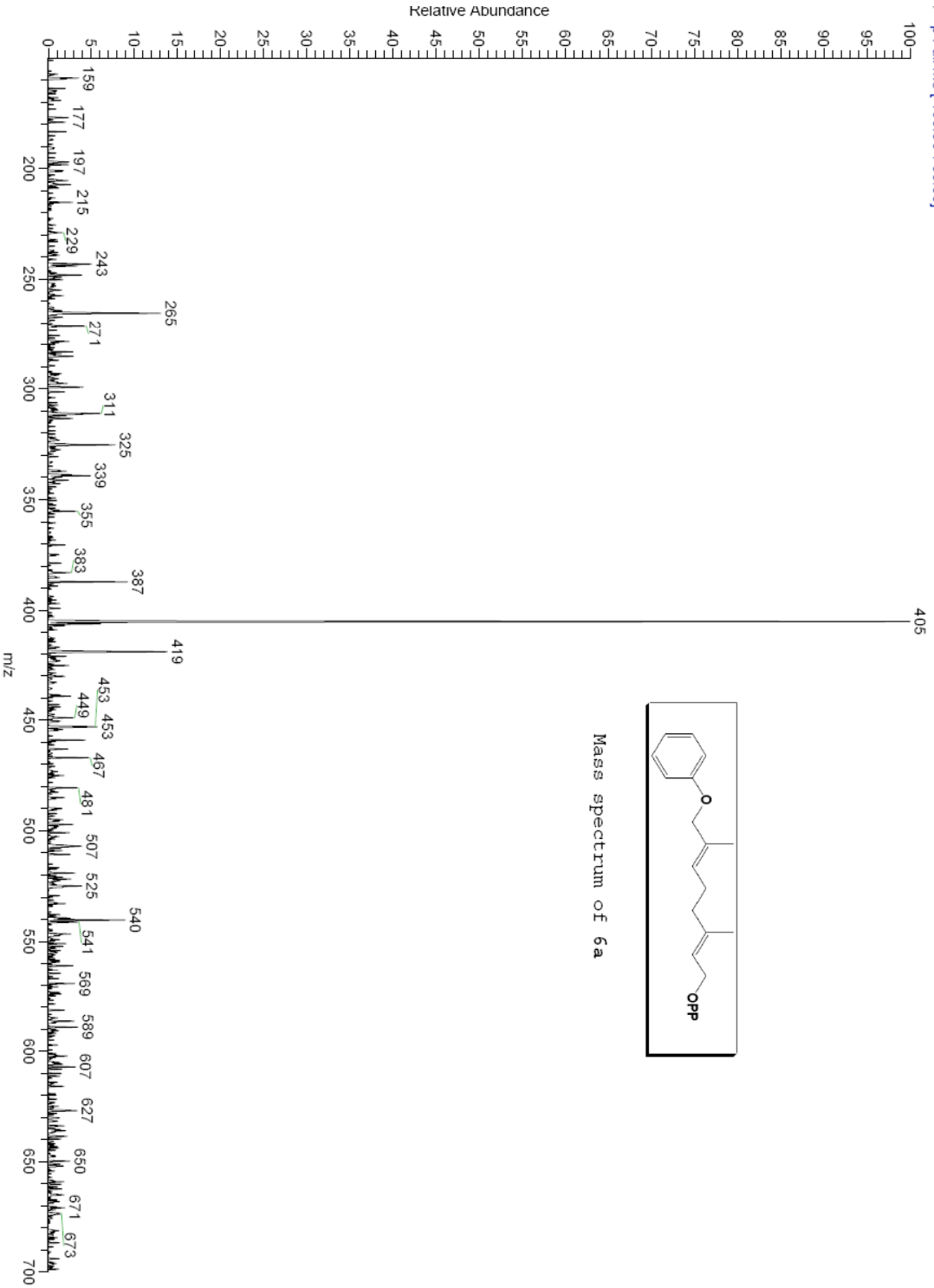
SAMPLE DEC. 8 VT  
date MAY 15 2006 dfrq 399.724  
solvent D2O dn 4  
F1 ACQUISITION exp dpr 4  
F2 ACQUISITION exp dpr 4  
sfreq 151.811 dm yyy  
in 0.800 dma 11148  
at 0.800 dseq  
sw 10000.0 dres 1.0  
fb 5000 homo n  
bs 5 lb PROCESSING 1.00  
zpw 10.0 wffia  
d1 0 fn proc not used  
ct 0 math  
nt 3200  
ct 120  
alock n werr  
gain not used werr  
flags n werr  
11 n y  
in n y  
dp n y  
hs n y  
DISPLY nm  
sd 4547.2  
wd 1801.8  
sc 118  
wc 250  
hzm 40.00  
fs 354.40  
cf 4347.2  
cp 20  
f1 20  
fns 100.000  
na no ph



Phosphorus NMR of 6a



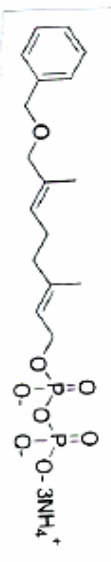
7-0623 #21-29\_RT: 2.20-3.02\_AV: 9\_SM: 58\_NL: 3.32E2  
: - p Full ms [150.00-700.00]





T3-benzylhexyppp  
 expt 82pul

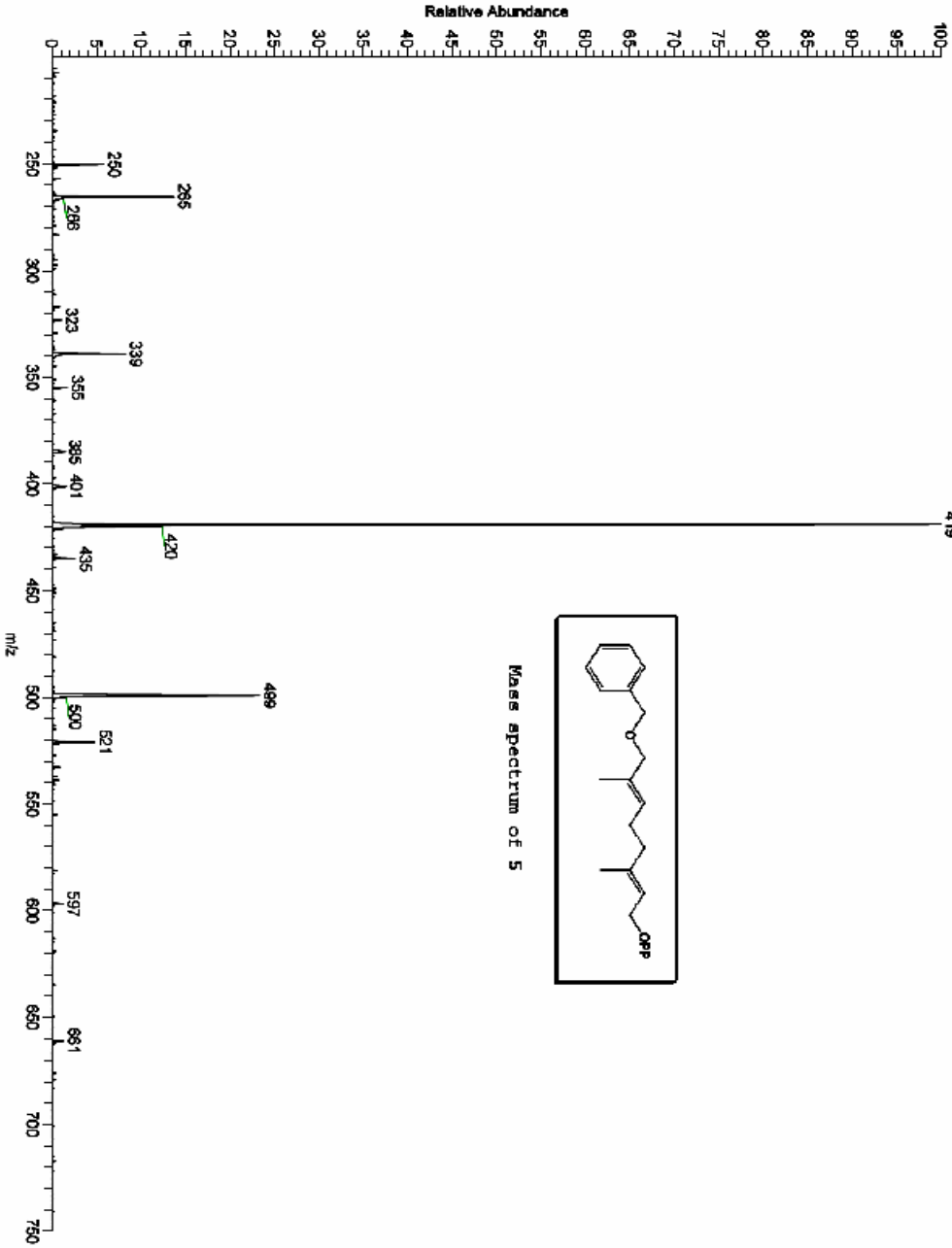
SAMPLE DEC. 9 2004 DEC. 8 VT  
 date Oct 9 2004 dfrq 399.784  
 solvent D2O dn  
 file /opt/dsl/dat- dpr 42  
 a/pete/SUBBU/Benzyl- 60f 0  
 hexypppophosphate- dm yyy w  
 lxypppophosphate- dm yyy w  
 fid dm 11149  
 dmf dm 11149  
 ACQUISITION  
 sfrq 161.811 d58q  
 cn P31 drcs 1.0  
 at 0.300 homo  
 np 16000 DECC  
 sw 10000.0 dfrq2 undefined  
 db 8000 gnc undefined  
 Dm 0.0 gpr2 undefined  
 Dm 0.0 gpr2 undefined  
 Dm 10.0 082 undefined  
 Dm 10.0 082 undefined  
 dl 0.0 dm2 undefined  
 tof 0 dm2 undefined  
 ne 160 dscq2 undefined  
 ce 160 drcs2 undefined  
 alocr 160 homo2 undefined  
 gain not used PROCESSION 1.00  
 flags  
 lb vrfine 1.00  
 l1 n n  
 l0 n n  
 l3 n n  
 l4 n n  
 y n  
 tm not used f  
 math  
 DISPLAY nm  
 SP -0.116.0 werr  
 SD 0.000000 werr  
 SE 0.000000 werr  
 SC 53 WDZ  
 WC 0  
 WZ 250  
 Hznm 40.00  
 f1 13764.37  
 f1 4547.2  
 f1 3  
 ch 84  
 tns 1.003  
 nm no ph



Phosphorus NMR of 5

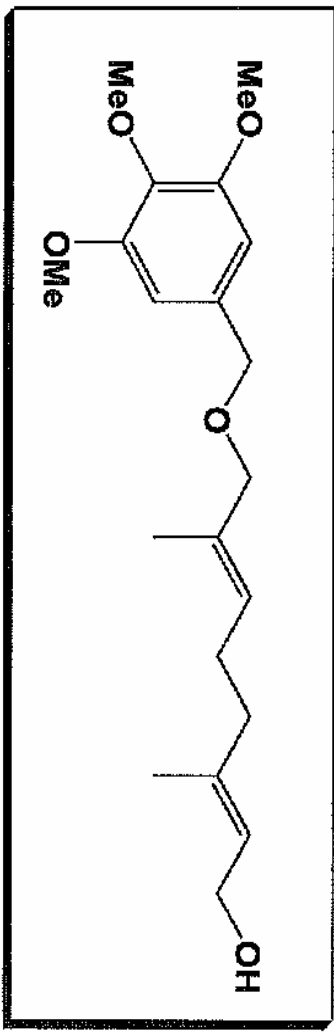


7-0636 #9-18 RT: 0.87-1.79 AV: 10 SM: SB NL: 178E3  
- p.ms [200.00-750.00]

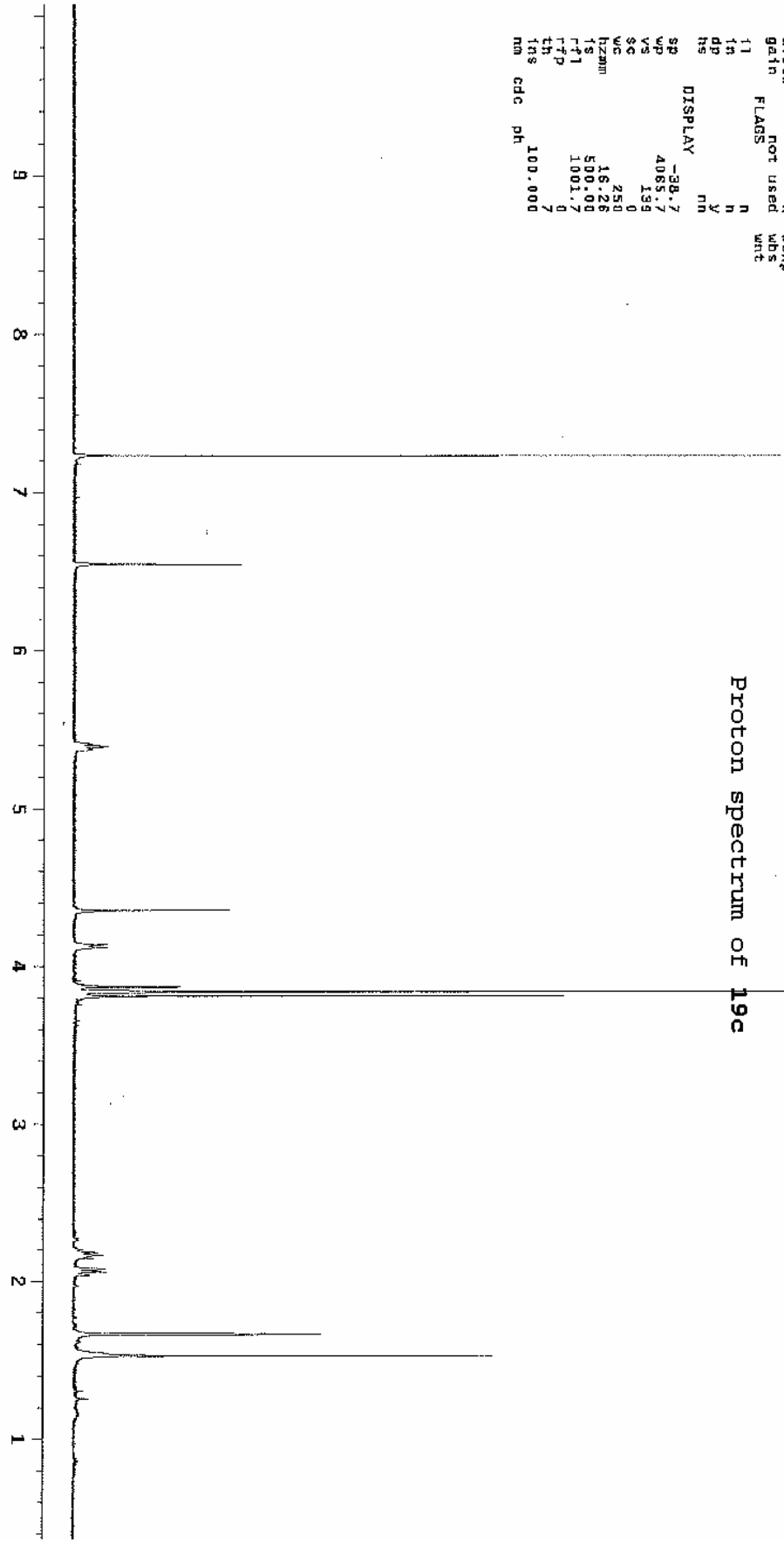


expl sid1h

date	NOV 14 2007	DEC. & VT	399.717
solvent	CDO13	dt	HI
file	exp	drwr	42
ACQUISITION	exp	dot	0
sfrq	399.717	dm	nnn
tr	HI	dm	c
at	3.744	st	11149
ap	44932	steg	
sw	6000.6	stes	
th	3000	homo	1.0
hs	16	PROCESSING	n
tpwr	60	wifite	
pv	7.3	ploc	ft
dl	1.000	tr	not used
lot	0	math	
rt	320	werr	b
ct	0	wexp	n
alock	not used	wbs	n
gain	not used	wht	n
flags	not used		
l1	n		
l2	n		
l3	y		
l4	n		
l5	nn		



Proton spectrum of 19c



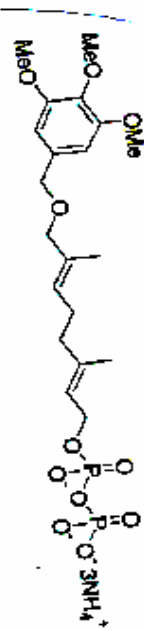
TS-11-Triethoxyph-MARCH18-2015

EXPT BEGIN

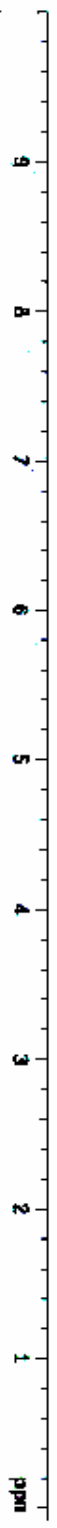
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SAMPLE          DEC: A VT
DATE            Oct 3 2004 dfrq  399.724
Solvent         DMSO d6
File /qpr/elist/halt-dpr
a/date/SUBD/Ts-11-dpr
-triethoxyph-dcr8-04
EUI4.71d dm
ACQUISITION    11448
dfrq            399.724 dmsd
ca             3.234 homo 1.0
nc             44925
f2             3000 dfrq  DEC2  0
f4             3000 dfrq  DEC2  0
f8             3000 dfrq  DEC2  0
f16            15 dprf2  1
f32            7.5 dprf2  0
f64            3.75 dprf2  0
d1             1.000 dmsd  200
nt             160 dprf2  1.0
ct             32 dprf2  1.0
atlock         n
gain           not used
proc           vtfile
prc            n
fn            n
v            n
math         n
ha            n
dsrplv        -31.3 wprf
mp            4829.3 wexd
vs            84 wds
vc            84 wds
wc            848
f16nmr        1571.14
f32           785.57
f64           392.78
f128          196.39
f256          98.195
mp cdc ph     2.080

```

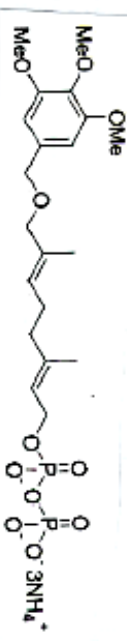


Proton NMR of 7



```

date      9 2000      dfreq      DEC.  4 VT
solvent   DMSO      sr          399.784
file      /opt/ds1/dat*  dpr          42
a/pete/subsub/TS-11-60f
-Tri-methoxy-pp-fiv  dm          0
v          yyy          0
w          v          11148
ACQUISITION
dfreq      161.011      eseq          1.0
en          p31      eres          n
nt          1.000      homo          n
nd          1.000      dfrq2          underfined
qd          1.000      dpr2          underfined
fb          6000      dpr2          underfined
lpr        55      dot2          underfined
pu          10.0      dm2          underfined
dl          0      dmz          underfined
cof        0      dafz          underfined
nt          150      dseq2          underfined
ct          150      dres2          underfined
atck       n          homo2          underfined
gain       n          PROCES31MO 1.00
flads     not used  fb          PROCES31MO 1.00
11        n          wfilla          n
in        n          prec          n
dp        y          fn          n
hs        n          kath          not used
DISPLAY   -1316.0      wgrt          n
wp        3998.0      wmp          n
vs        42      wos          n
vc        0      wot          n
sc        0
nc        14      200
l2am      1617.00
rf1       4347.2
rfp       0
th        15
lrs       1.000
om no ph
  
```

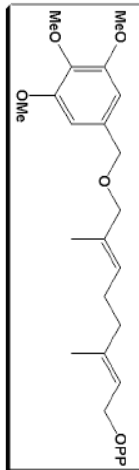


Phosphorus NMR of 7

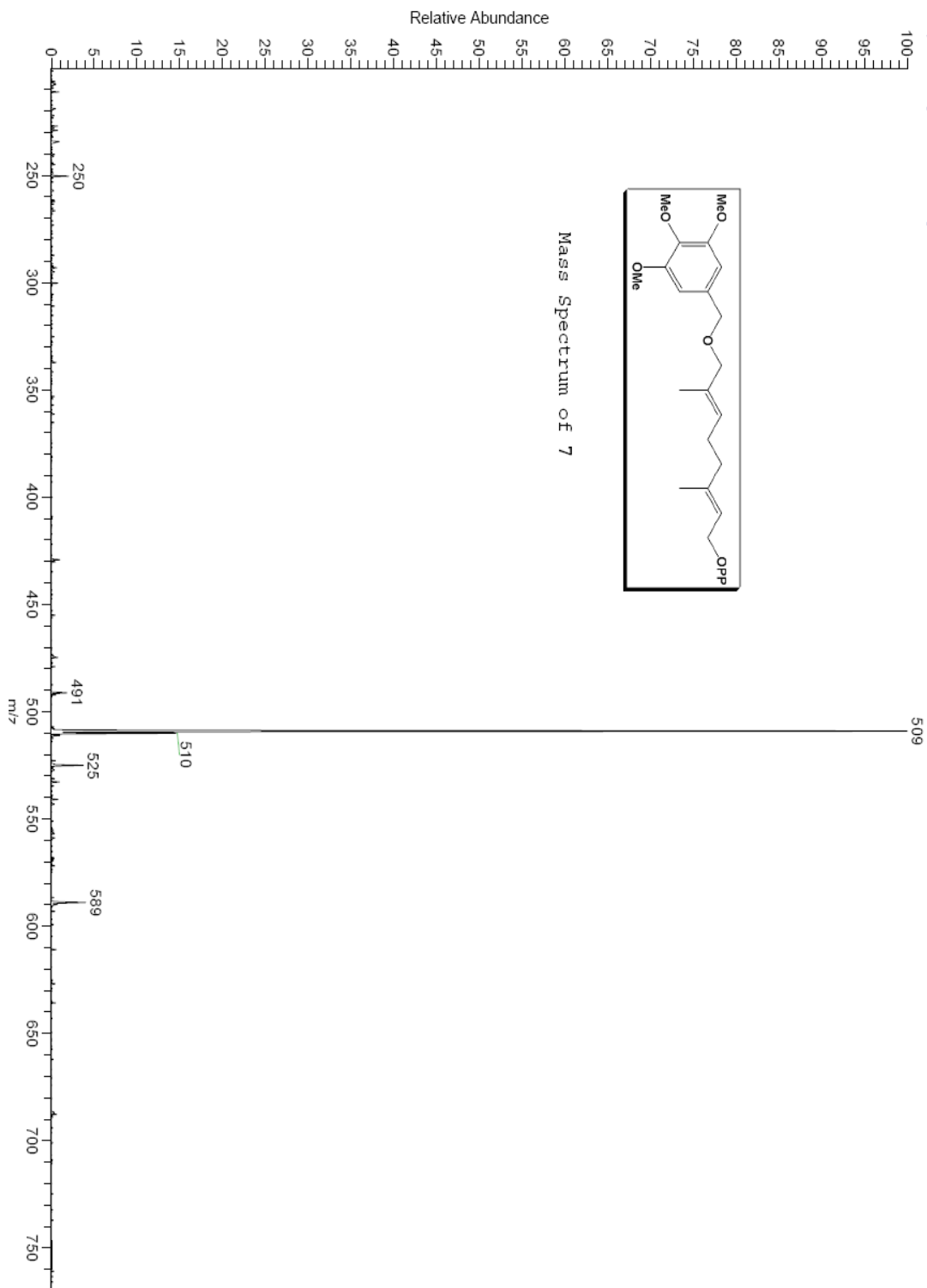




17-0636 #24-38 RT: 2.50-3.94 AV: 15 SM: 58 NL: 1.49E3  
T: - P Full ms [200.00-800.00]

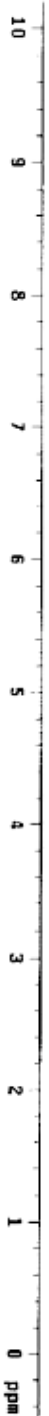
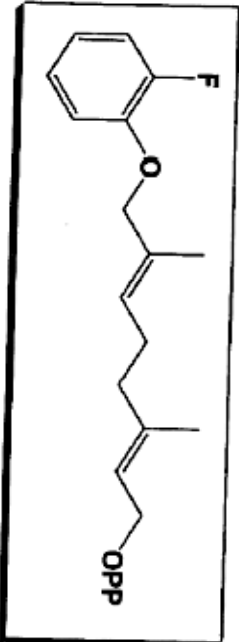


Mass Spectrum of 7



TS-DFPROPP  
 ex01 t1d1h

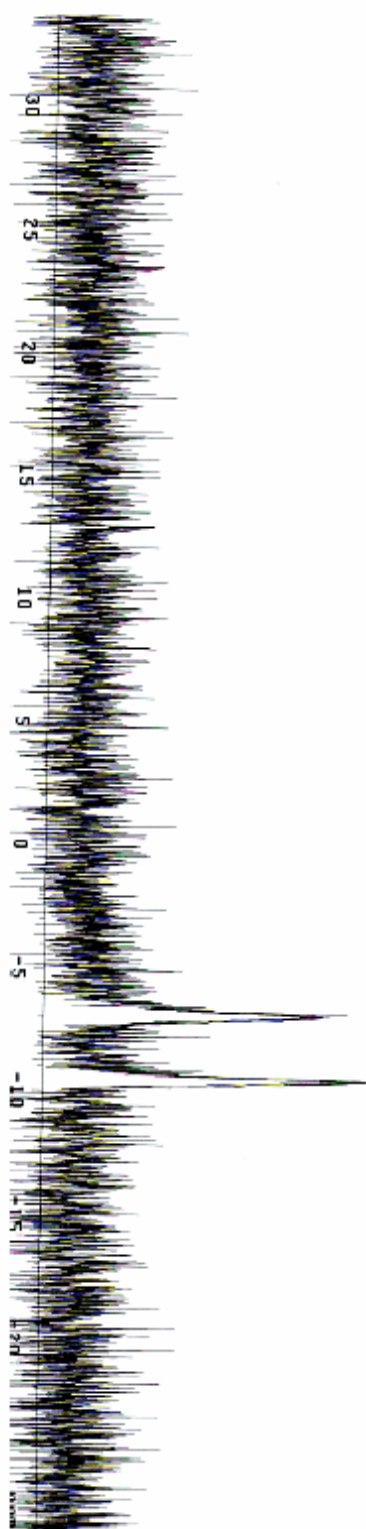
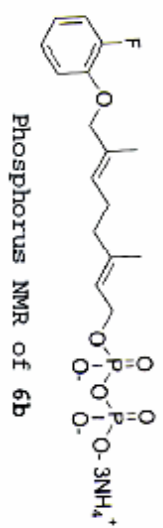
SAMPLE DEC. 8 VT  
 date May 24 2100 dfrq 388.724  
 solvent Me D2O dn n1  
 title /export/home/~dper 42  
 subou/DF-DFP-Me-dor 0  
 S44200-719 dm mm  
 S44200-719 dm mm  
 ACQUIS 388.724 dm 11148  
 SFRq 388.724 dm 1.0  
 IN M dreg  
 AT 5.744 dreg  
 NP 44832 hmo  
 SW 6034.8 vrf1ie  
 TB 3100 vrf1ie  
 BE 18 proc  
 TPW 60 fn not used  
 PW 7.13 math  
 S 1.400 vpr  
 TOF 320 vepd  
 NT 71 vbs  
 CT 1 vnt  
 a1ock n  
 gain not used  
 p1acs n  
 I1 n  
 I2 n  
 dn y  
 hs n  
 DISPLAY n  
 SP -203.8  
 WP 4276.4  
 VS 2684  
 GC 250  
 WC 250  
 HZMH 12.11  
 SFO 50.14  
 RF1 100.07  
 RF2 100.07  
 TH 20  
 Sns 100.000  
 nm cdc ph



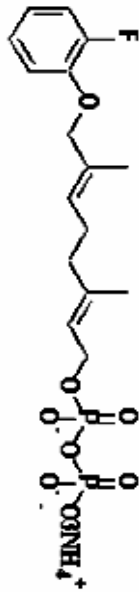
TS-O-F99pp  
 exp1 32pu1

```

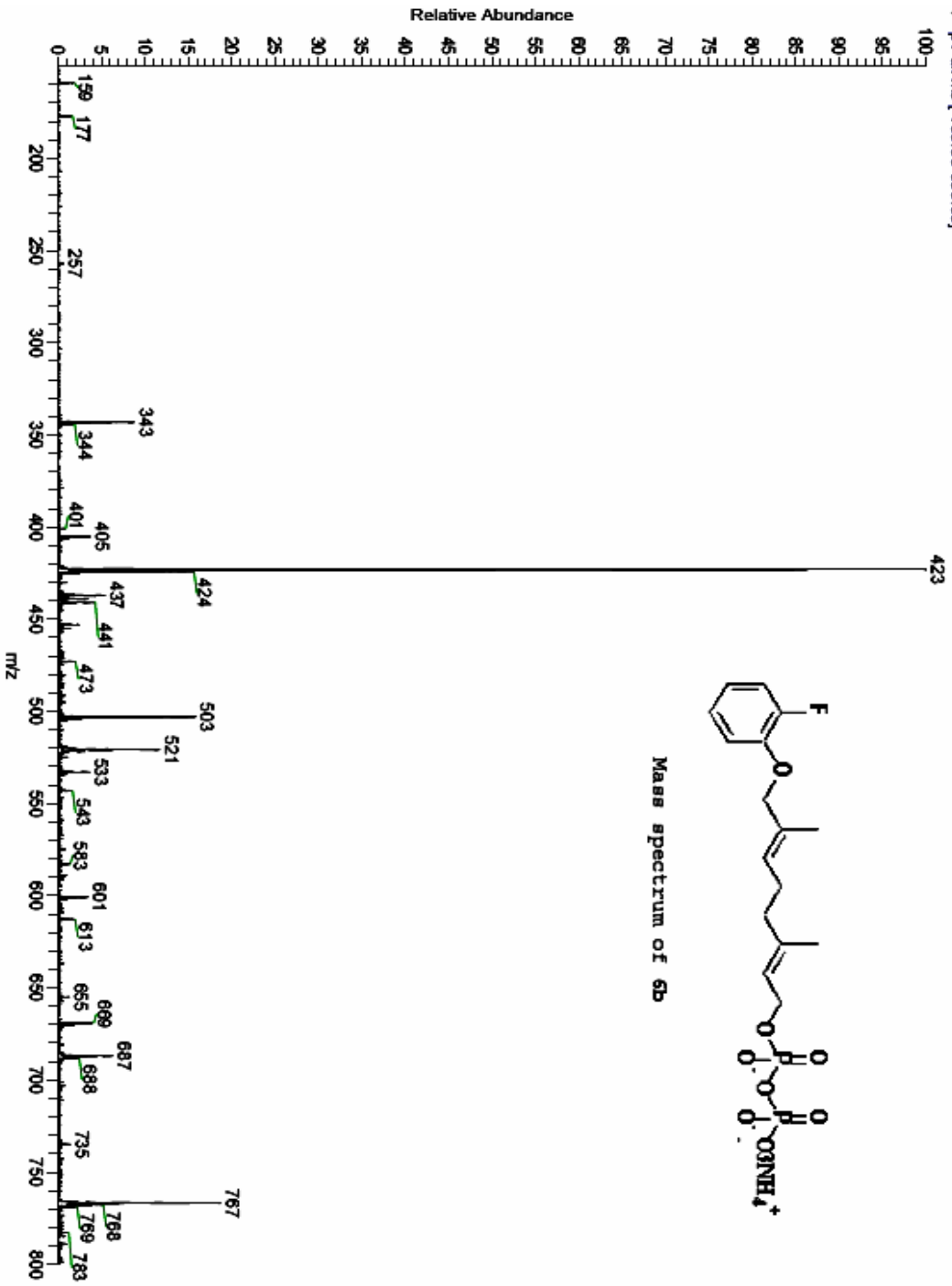
SAMPLE          DEC. 8 VT
date May 24 2000  dfrq 399.724
solvent DMSO-d6  acq  W1
file /opt/dls/data/ dprf  W2
a/peter/SUBBU/O-F-f- dprf  W3
dpp-4934-2805-71d dm  YYY
ACQUISITION    dm  11148
strq 161.811 daf
t0 0.000 dres 1.0
ac 1.890 homo
ns 1800.0
ds 8.0 dfrq2
pw 5.0 dprf2
t0f 10.4 dorf2
d1 0 dm2
nt 3200 dmf2
ct 990 dseq2
a/lock not used dres2
gain not used homo2
fls 11 n 1b wflite 1.00
fn n wflite
dp y proc
ns n math not used
  
```



18-0122 #92-111 RT: 2.08-2.48 AV: 20 NL: 3.99E6  
.: - pFull.ms [150.00-800.00]



Mass spectrum of 6b



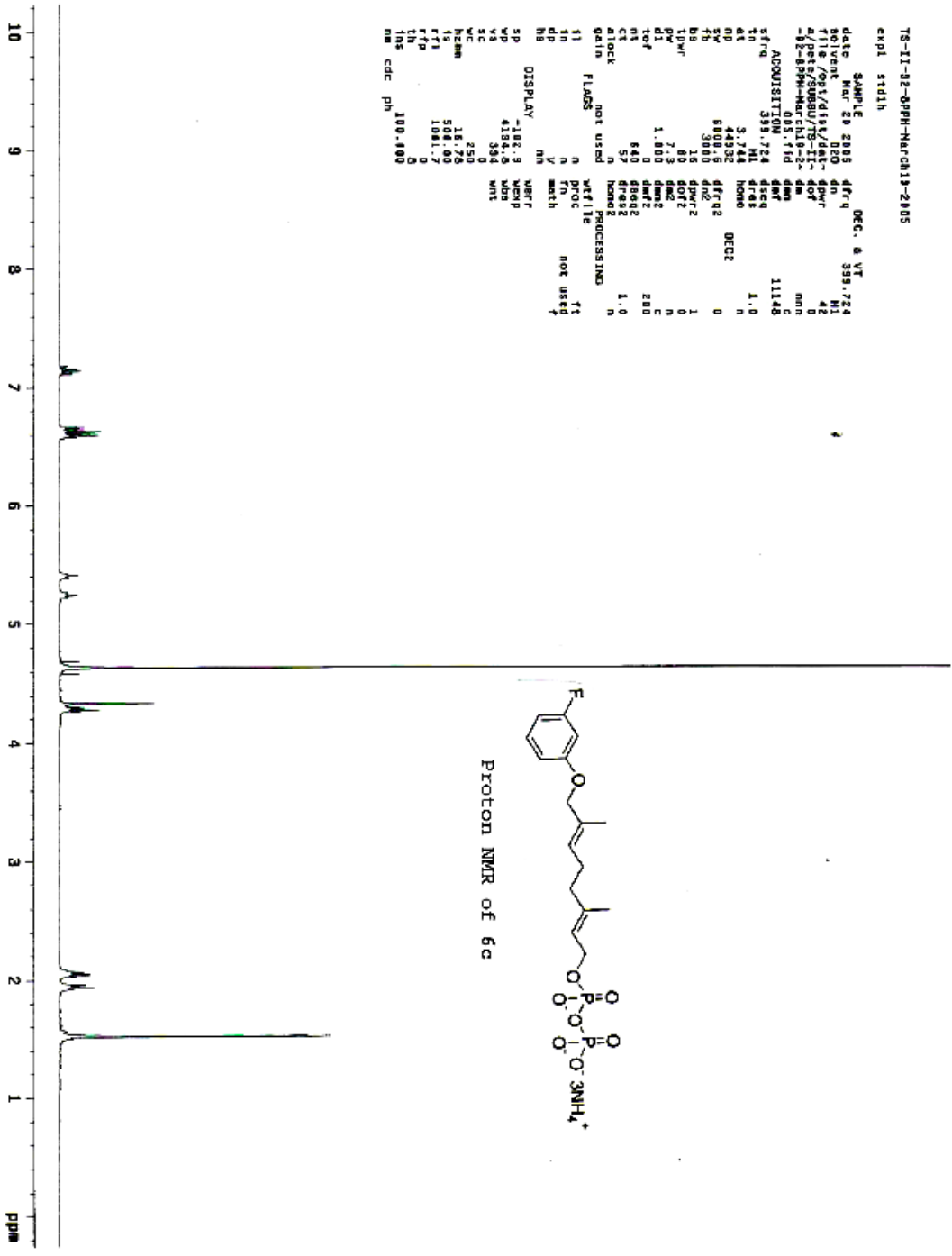
TS-II-82-6PPH-NARCH13-2405

expt stid1h

```

SAMPLE
date Nov 28 2005   freq DEC. 8 VT 339.724
solvent H2O   dn   HI
f1 f2 /Q11/8184/dsk-6PW
a/pete/SUBBU/TS-II-82-6PPH-NARCH13-2405
-82-6PPH-NARCH13-2405
ACQUISITION
freq 339.724   freq 111.48
to H1   dir3   n
dt 3.784   none   DEC2
nd 41932   freq2   0
fs 640   dir2   0
ts 3000   dir1   0
bw 15   dir2   1
gb 7.3   dir2   0
gv 1.800   dir2   n
to 640   dir2   240
nt 57   dir2   1.0
ct   n   none2
a1ock   n   none2
gain   not used
PROCESsing
flgds   not used
f1
fn   n   PROC   not used
v   math
ns
DISPLAY -182.9   NMRP
wp   NMRP
vs 4184.8   wds
sc 384   wnt
xc 230
ys 18.230
z 5081.00
fT1 1081.7
fT2
fT3
ns cdc ph 100.400

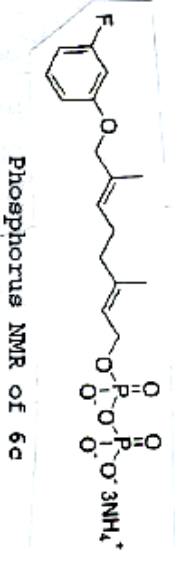
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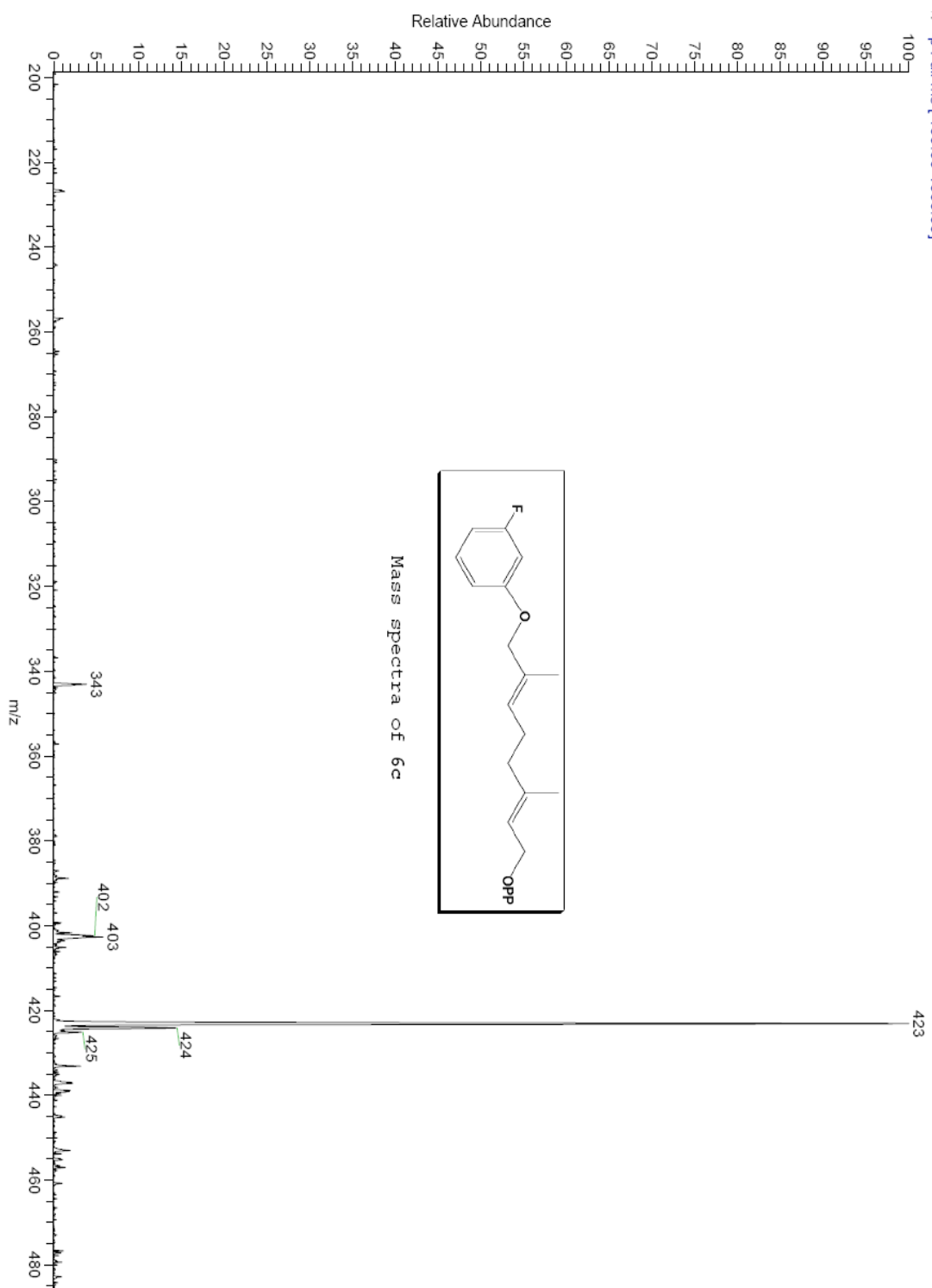


Proton NMR of 6c

expi szpu1

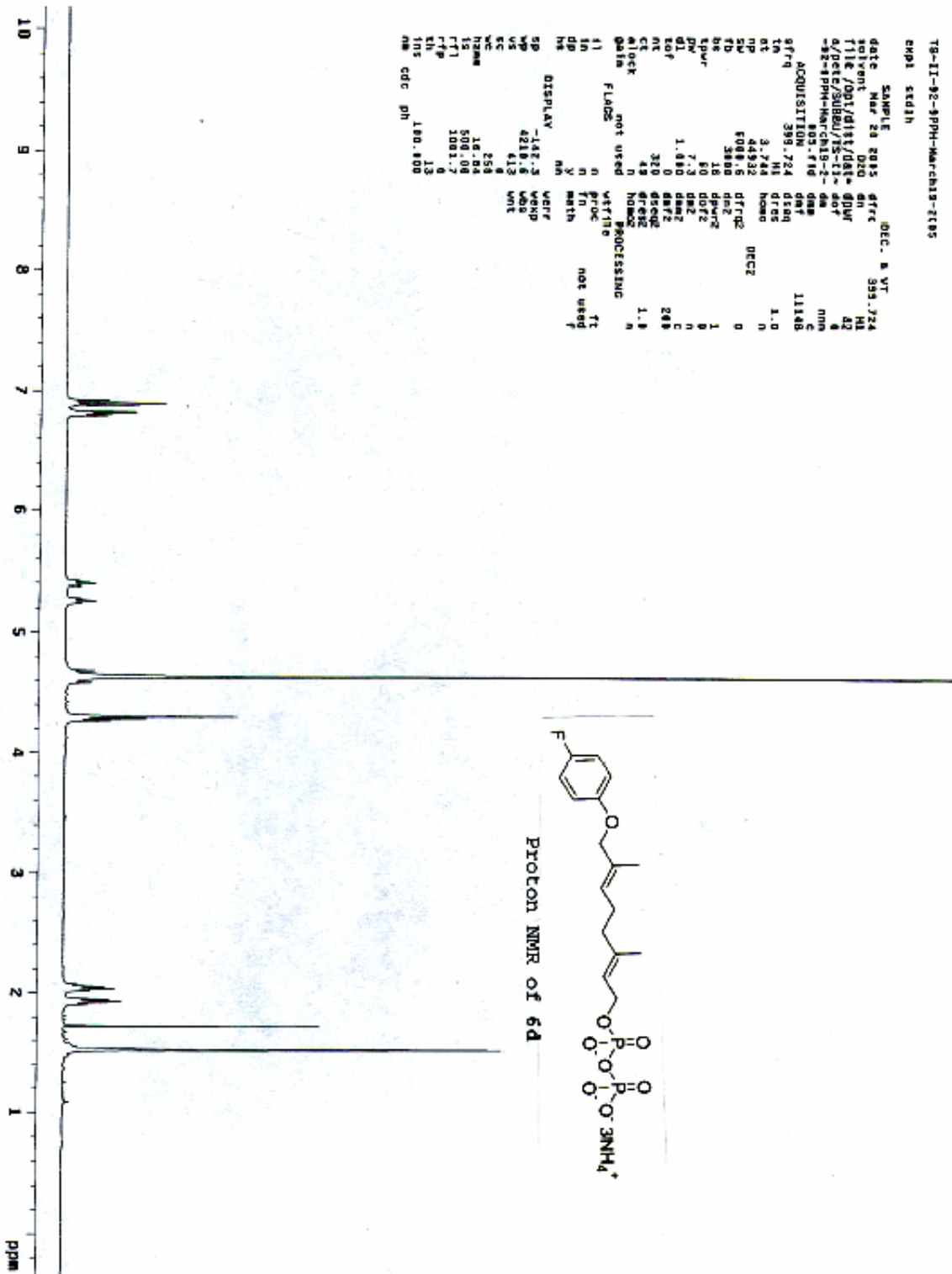
date	Mar 20 2005	dfreq	DEC: 8 VT	399.724
10	18000	dfq2	undefined	1.0
11	18000	dfq2	undefined	1.0
12	18000	dfq2	undefined	1.0
13	18000	dfq2	undefined	1.0
14	18000	dfq2	undefined	1.0
15	18000	dfq2	undefined	1.0
16	18000	dfq2	undefined	1.0
17	18000	dfq2	undefined	1.0
18	18000	dfq2	undefined	1.0
19	18000	dfq2	undefined	1.0
20	18000	dfq2	undefined	1.0
21	18000	dfq2	undefined	1.0
22	18000	dfq2	undefined	1.0
23	18000	dfq2	undefined	1.0
24	18000	dfq2	undefined	1.0
25	18000	dfq2	undefined	1.0
26	18000	dfq2	undefined	1.0
27	18000	dfq2	undefined	1.0
28	18000	dfq2	undefined	1.0
29	18000	dfq2	undefined	1.0
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31	18000	dfq2	undefined	1.0
32	18000	dfq2	undefined	1.0
33	18000	dfq2	undefined	1.0
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35	18000	dfq2	undefined	1.0
36	18000	dfq2	undefined	1.0
37	18000	dfq2	undefined	1.0
38	18000	dfq2	undefined	1.0
39	18000	dfq2	undefined	1.0
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41	18000	dfq2	undefined	1.0
42	18000	dfq2	undefined	1.0
43	18000	dfq2	undefined	1.0
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45	18000	dfq2	undefined	1.0
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47	18000	dfq2	undefined	1.0
48	18000	dfq2	undefined	1.0
49	18000	dfq2	undefined	1.0
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53	18000	dfq2	undefined	1.0
54	18000	dfq2	undefined	1.0
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95	18000	dfq2	undefined	1.0
96	18000	dfq2	undefined	1.0
97	18000	dfq2	undefined	1.0
98	18000	dfq2	undefined	1.0
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100	18000	dfq2	undefined	1.0





18-II-92-8PPM-March18-2185  
 SMP1 sed1h

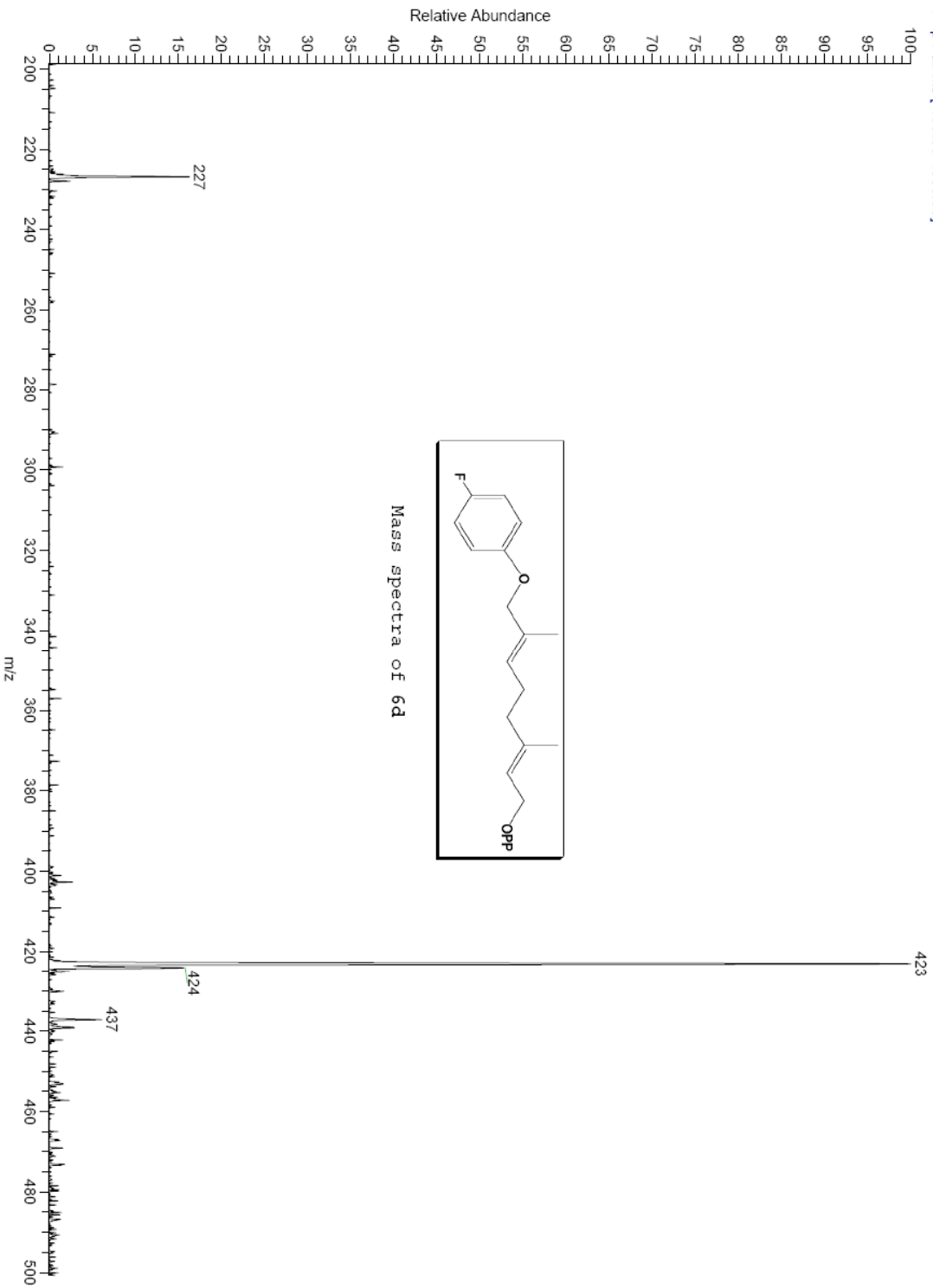
SAMPLE date Mar 24 2015 07:00 DEC. 8 VT  
 solvent H2O dn 399.724  
 file /001/d111/data/gmur H1  
 a/pete/subbu/18-ii-92-8  
 -92-8PPM-March18-2-1-407 H1  
 803.719 dmz 4  
 803.719 dmz 4  
 ACQUISITION 399.724 dmz 11148  
 399.724 dmz 1.0  
 3.294 homo  
 4.143  
 5081.6 d1r02 0  
 3880 ds2  
 18 dpu2 1  
 50 d0f2 0  
 7.3 dm2 0  
 1.080 dm2 0  
 0 dm2 0  
 320 ds02 200  
 49 ds02 1.8  
 HOME PROCESSING N  
 Data not used  
 F1/02 not used  
 11 FLDS 0  
 11 PR 0  
 11 FN 0  
 11 MATH 0  
 DISPLAY NA  
 GP -142.3 VPRF  
 UP 4218.4 WDR  
 VC 42 WNT  
 WC 258  
 18.84  
 500.00  
 1001.7  
 0  
 13  
 180.800  
 AN CDC PH







15-0341 #25-37 RT: 0.67-1.00 AV: 13 NL: 1.33E5  
F - P Full ms [ 100.00-1000.00]



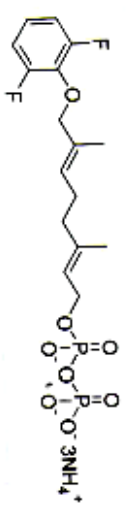
15-IV-35-2PPH-NOV4-2105

ex pl std1h

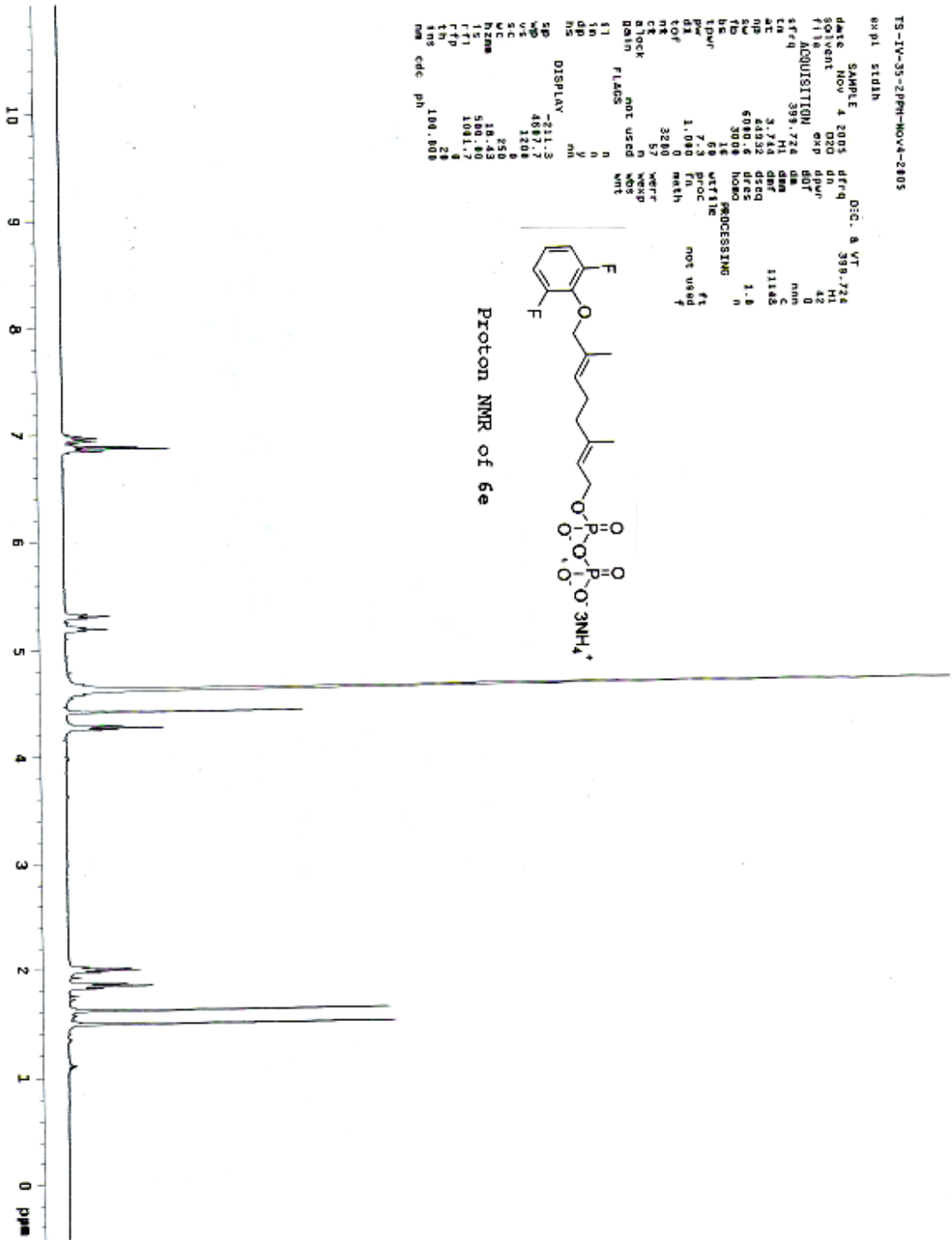
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SAMPLE      Dec. 8 VT
date Nov 4 2005   dfrq 399.724
solvent H2O      H1
F1 ACQUISITION 630 dpr 42
F2 ACQUISITION 630 dot 0
F3 ACQUISITION 399.724 dm nmh
F4 ACQUISITION 399.724 d1 c
CN 3.743 dfr 11145
AT 4.432 dscq 1.8
NU 60804 hres 1.0
HD 304 NoPO PROCESSING
TDW 7.3 WFTS 68
PW 1.080 Fu 41
DX 3200 math not used
TOF 3200 WFTS 57
TE 3200 WFTS 57
E1 LOCK 0 WFTS 57
E2 LOCK 0 WFTS 57
E3 LOCK 0 WFTS 57
E4 LOCK 0 WFTS 57
E5 LOCK 0 WFTS 57
E6 LOCK 0 WFTS 57
E7 LOCK 0 WFTS 57
E8 LOCK 0 WFTS 57
E9 LOCK 0 WFTS 57
E10 LOCK 0 WFTS 57
E11 LOCK 0 WFTS 57
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E95 LOCK 0 WFTS 57
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```



Proton NMR of 6e



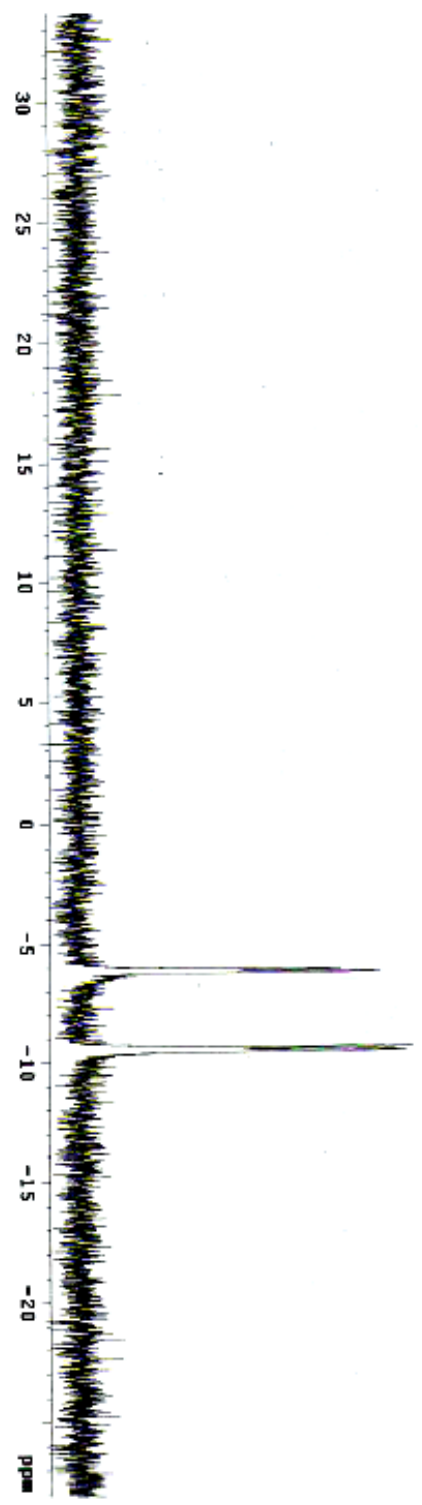
TS-IV-35-2PP-NOV4-2085

EXPI 62PU1

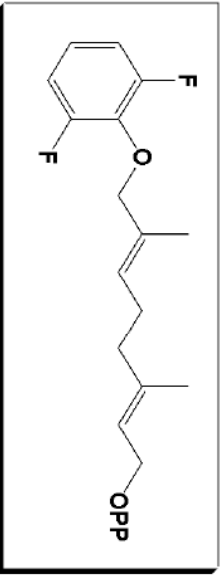
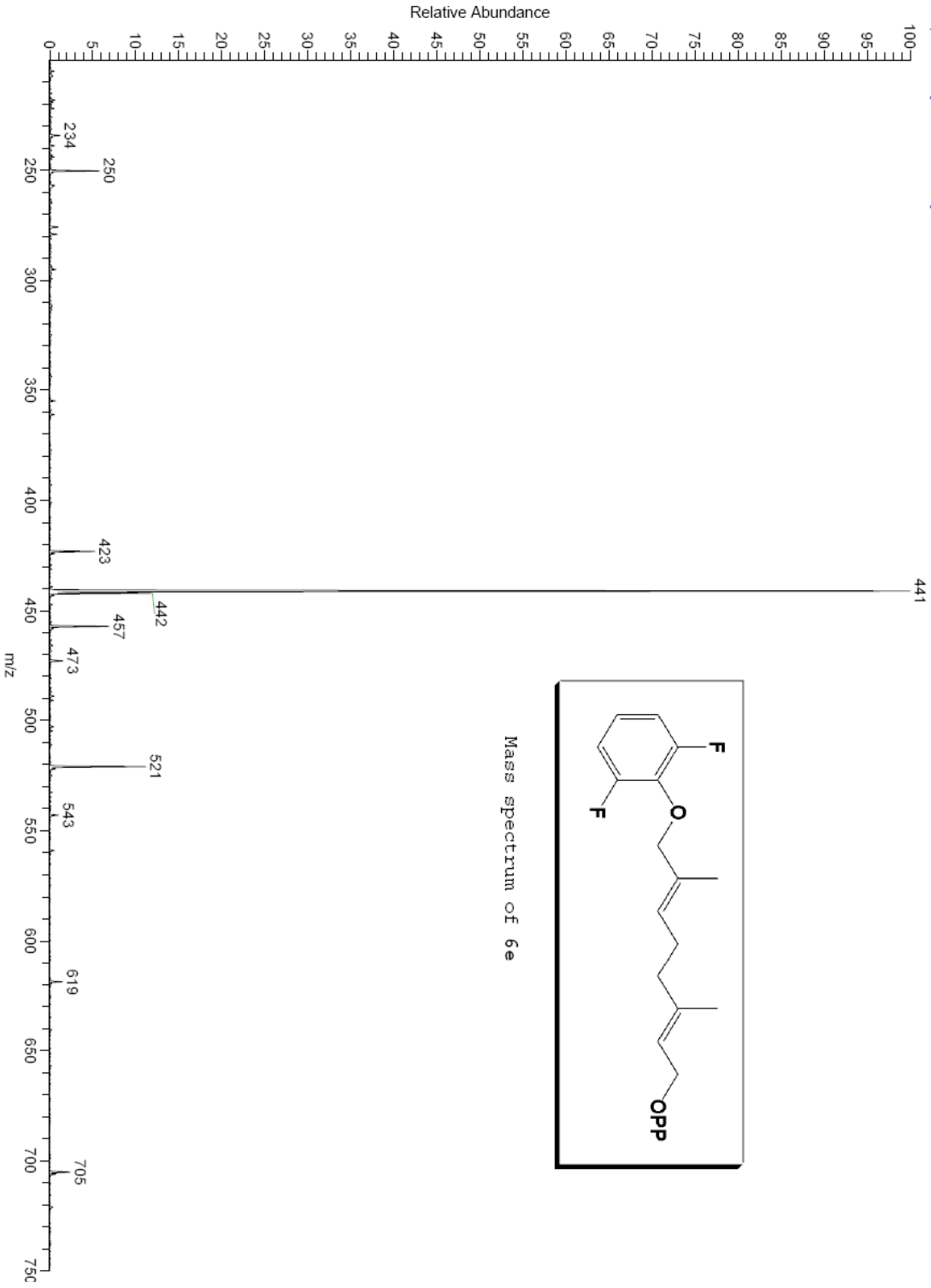
SAMPLE 4 2005 DEC. 4 VT 399.714  
 DATE Nov 4 2005 09:00  
 TIME 09:00  
 F118 H2O 42  
 ACQUISITION EXP DVT 42  
 DVT 0  
 SFRQ 181.811 0W 3VW  
 TR 0.808 P31 DM 11.110  
 AT 0.808 DM 1.0  
 ND 1.608 091Q  
 TD 1.608 091Q  
 TS 8.018 NORM  
 BE 54 55 1b PROCESSING 1.00  
 EPR 18.0 Wt111e  
 PW 0 PRC FT  
 DI 0 TN not used  
 FOR 3280 Math  
 NT 0  
 CT 430  
 ATOKH not used  
 DATA not used  
 I1 n  
 S1 n  
 DP Y  
 HS n  
 DISPLAY nm  
 SP -4583.2  
 WP 10000.8  
 SC 0  
 VC 250  
 Hz 40.80  
 F11 354.40  
 F12 4547.2  
 TN 24  
 TR 24  
 NM no ph 110.000



Phosphorus NMR of 6a



07-0628 #30-78 RT: 3.057.95 AV: 49 SM: 5B NL: 2.09E3  
F - p Full ms [200.00-750.00]

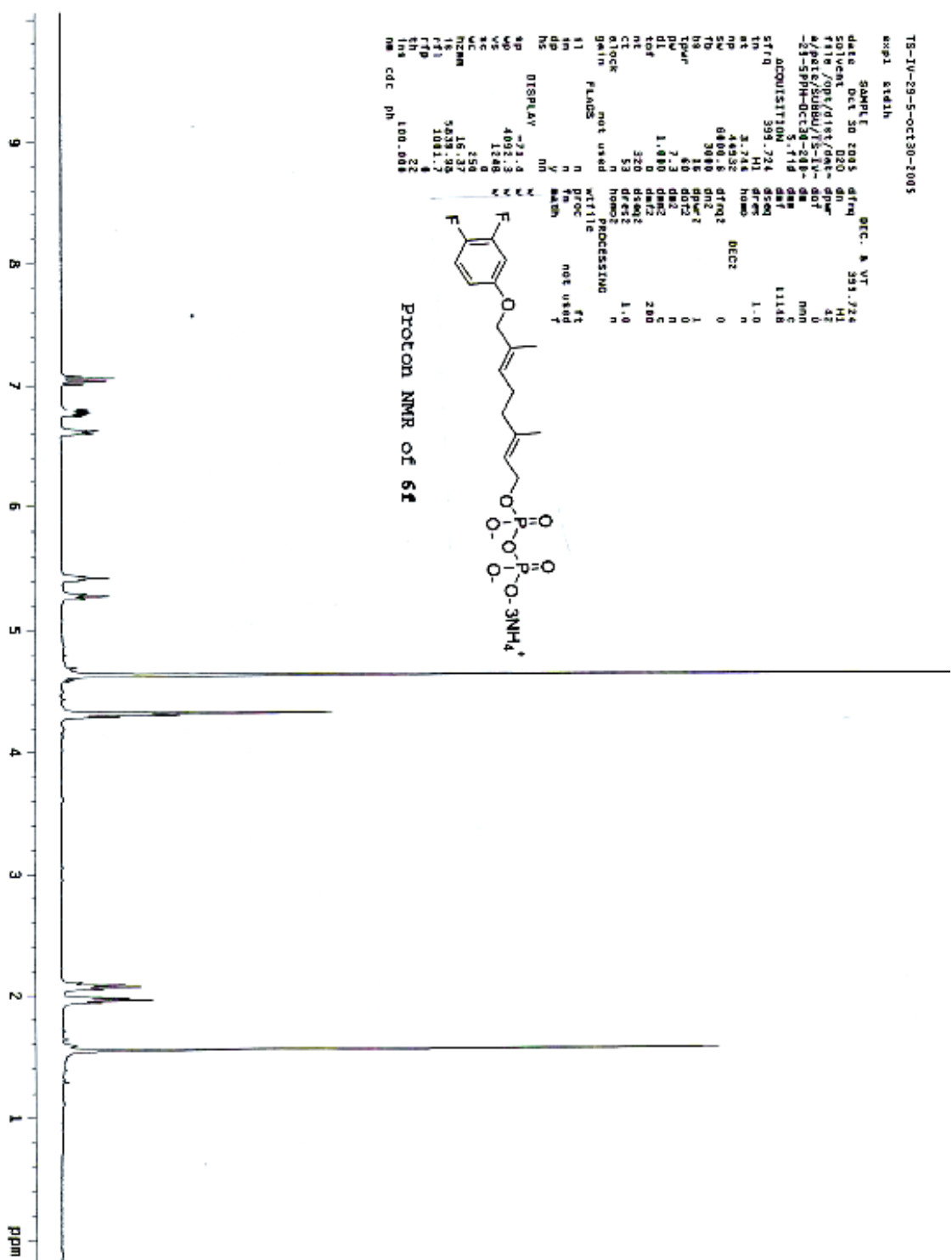
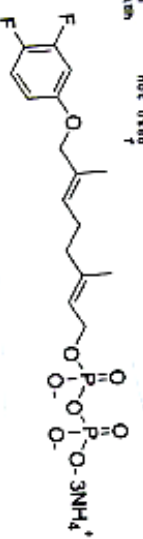


Mass spectrum of 6e

TS-IV-29-5-OCT30-2005  
 exp1 std1h

SAMPLE DTC. N VT 391.724  
 date DLT 30 2005 ofrg  
 solvent D2O dn  
 file /opt/0189/dat-epw  
 a/pack/SUBBU/5-14-007  
 -21-3PH-DCCL-418 dm  
 5-118 dm  
 ACQUISITION dmf 1118  
 ofrg 395.724 dsdq  
 tn HI ofrg 1.0  
 at 3.714 homo DECC  
 np 4432 ofrg2 0  
 sw 6800.6 ofrg2  
 fd 3918 ofrg2  
 Tpwf 7.3 dm2 1  
 dl 1.680 dm2 0  
 tof 320 dm2 200  
 ct 53 ofrg2 1.0  
 ofrg2 homo DECC 1.0  
 ofrg2 not used  
 gain not used  
 wfile  
 f1 n proc ft  
 sn n fm not used  
 dp y math  
 bs DISPLAY on n

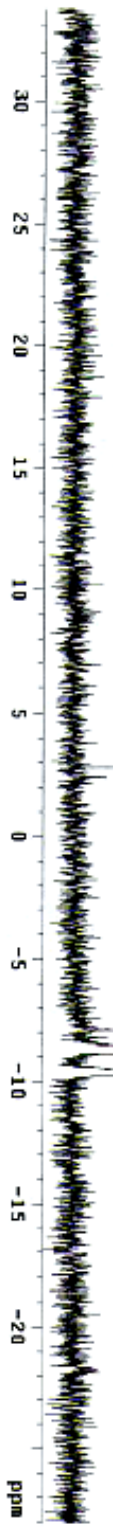
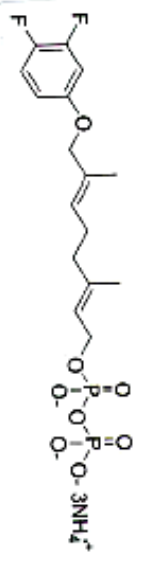
DISPLAY -21.4  
 up 4091.3  
 wv 1148  
 sc 0  
 uc 250  
 hznm 16.37  
 fs 5039.90  
 f1 1081.7  
 f2 2  
 f3 2  
 ins nm cdc ph 100.000



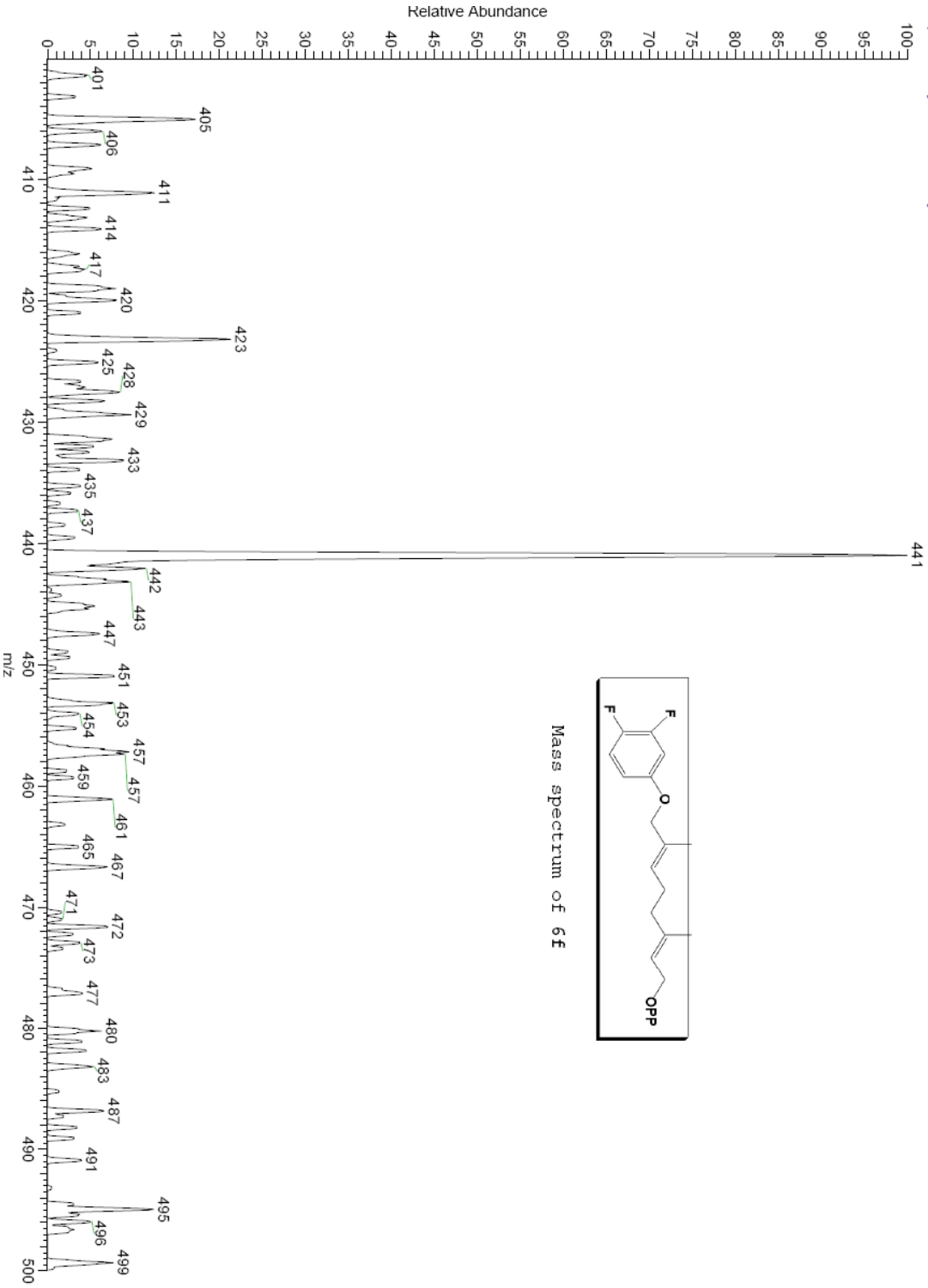
expl szpu 1

```

SAMPLE          DEC. 6 VT
date   Oct 30 2805  dfrz  399.724
solvent  Oct 30 2805  dn
118 /opt/d15t/dat- dpm
d/pate/SCUBAU/18-1y- ddf
29-5-oct88-2805-1- dm
yy
ACQUISITION  10  dm
L1148
s/frq  151.811  dref
tm      9.880  hocrz
nt      16080
sv      10000.0  dfrz2
fb      6080  dfrz2
d5      44  dpar2
dpar  10 35  ddr2
sl      10 0  dms
lof      0  ddf2
nt      3280  ddrz2
ct      416  dfrz2
alock  not used  hocrz2
gain  not used  hocrz2
PROCESSING  1.08
11      1b  write
11      n  proc
11      n  ft
dp      y  not used
ns      y  not used
DISPLAY  mn  hkrf
SP      -4546.0  wref
VP      9980.0  wref
V5      9980.75  wfs
vc      0  wnt
wc      230
nzm      28.48
ns1      324.48
ns2      494.76
rtp      6
th      28
ins no ph  100.088
    
```



7-0626 #29-47 RT: 2.92-4.59 AV: 19 SM: 58 NL: 4.63E1  
: p Full ms [400.00-500.00]



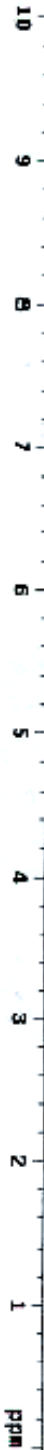


78-IU-35-1PPM-NOV-2015

expl stdth

date Nov 6 2015 8:24:05  
solvent D2O  
file 020  
exp 42  
ACQUISITION  
f1q 389.724  
f2q 389.724  
f3q 389.724  
f4q 389.724  
f5q 389.724  
f6q 389.724  
f7q 389.724  
f8q 389.724  
f9q 389.724  
f10q 389.724  
f11q 389.724  
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f95q 389.724  
f96q 389.724  
f97q 389.724  
f98q 389.724  
f99q 389.724  
f100q 389.724

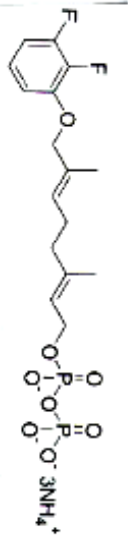
Proton NMR of 6g



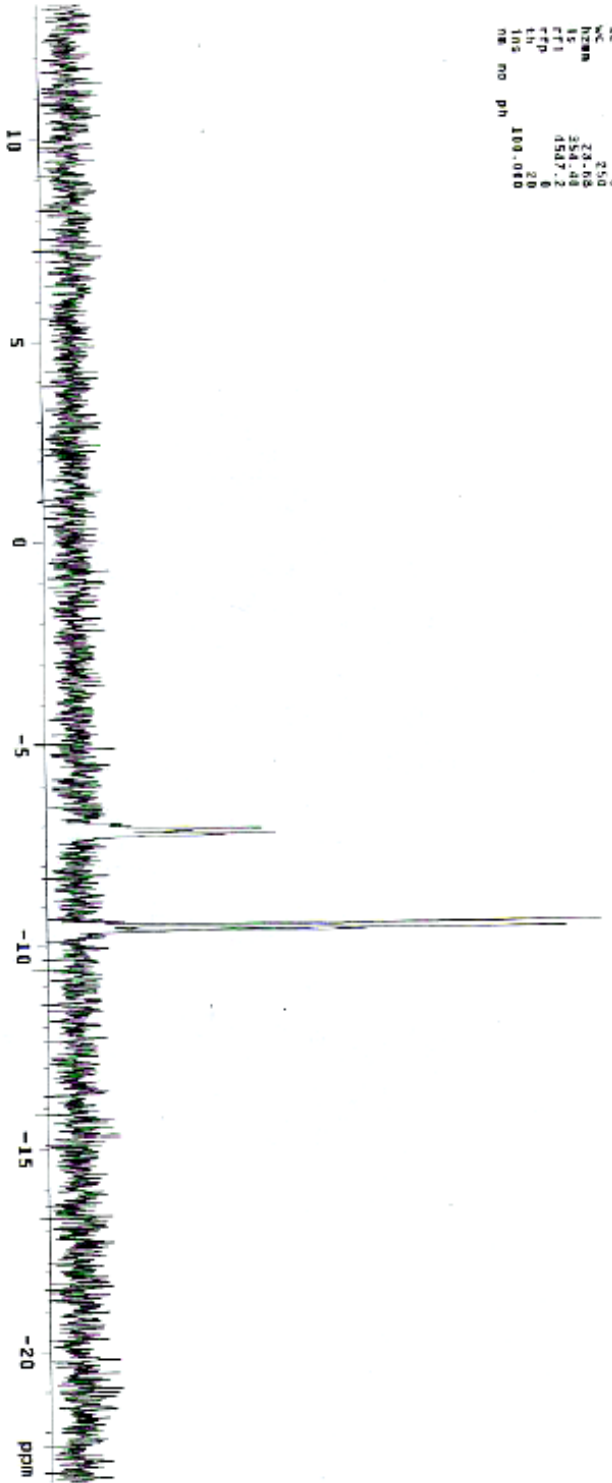
TS-IV-35-1PP-MOV4-2003

EXPT 52P01

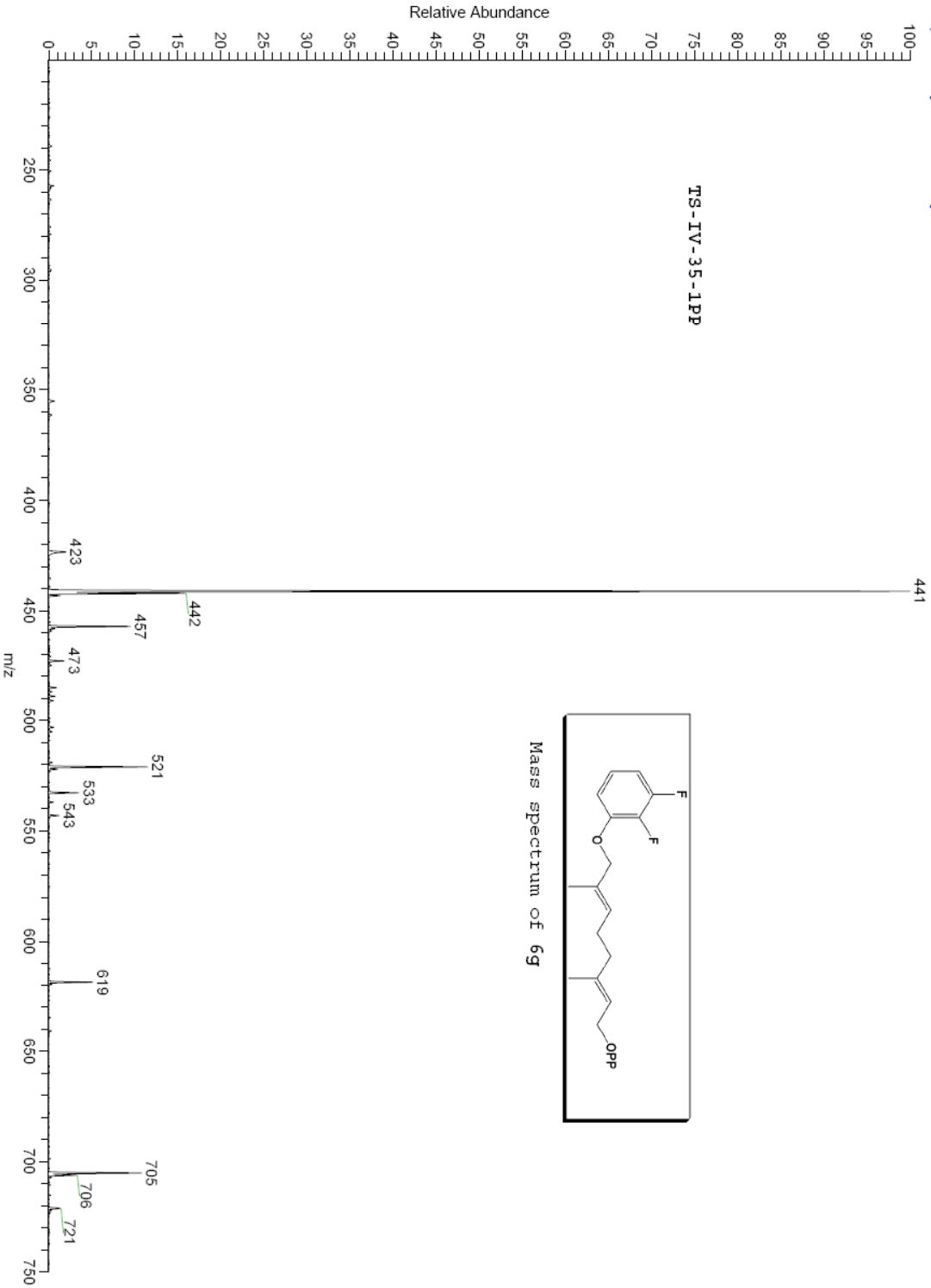
SAMPLE 4 2805 DTFR DEC. 8 VT  
 DATE NOV 020 020 020 389.724  
 SOLVENT 020 020 020 12  
 T1 ACQUISITION 0XP 000 0  
 DTFR TEL 811 dm 0 WYV  
 IN 0 0 0 0 0 0  
 AT 0.000 0.000 0.000 111.00  
 SV 10000.0 0.000 1.0  
 TD 0000 0000 0000 PROCESSING 1.00  
 T1 5 5 5 5 5 5  
 T2 10 10 10 10 10 10  
 DI 0 0 0 0 0 0  
 DT 0 0 0 0 0 0  
 TOT 3200 0 0 not used  
 CT 199 0 0  
 BLOCK 0 0 0  
 SWIN 0 0 0  
 FLAGS 0 0 0  
 T1 0 0 0  
 IN 0 0 0  
 HS 0 0 0  
 DISPLAY 0 0 0  
 SD -3283.5  
 WP 321.1  
 VS 0  
 VC 0  
 SC 250  
 Hzam 23.08  
 IS 354.48  
 FT1 4547.2  
 FFP 0  
 IN 0  
 NS 100.010  
 NO PH



Phosphorus NMR of 6g



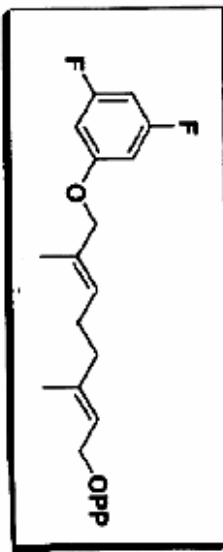
J7-0630 #20-28 RT: 1.94-2.73 AV: 9 SM: 58 NL: 1.38E4  
F: - P Full ms [200.00-750.00]



TS-V-3-S-01F9PP-2-aug11-2016

cmpl stdh

SAMPLE DEC. 3 11 539.724  
DATE AUG 11 2016 574  
MOVENT exp dof 42  
FILE ACQUISITION exp dof 42  
STRF 535.724 dm nmh  
ENI HI dm 11145  
OAE 3.744 dm  
NP 44502 dm  
FB 3000 Hz 1.1  
DB 18 PROCESSING  
TDW 60 vfile  
RW 7.2 Proc not used  
DL 1.000 F1  
KOP 3200 math  
CR 0  
a10ct not used  
Galtz not used  
Flade not used  
11 n  
1n n  
ap n  
ms y  
DISPLAY -1081.7  
SP 6080.6  
WP 6080.6  
V5 593  
SC 4  
WC 28  
NMAN 524.0  
FT1 1081.7  
FTD 4  
CH 28  
fms cac ph 100.000



Proton NMR of 6h



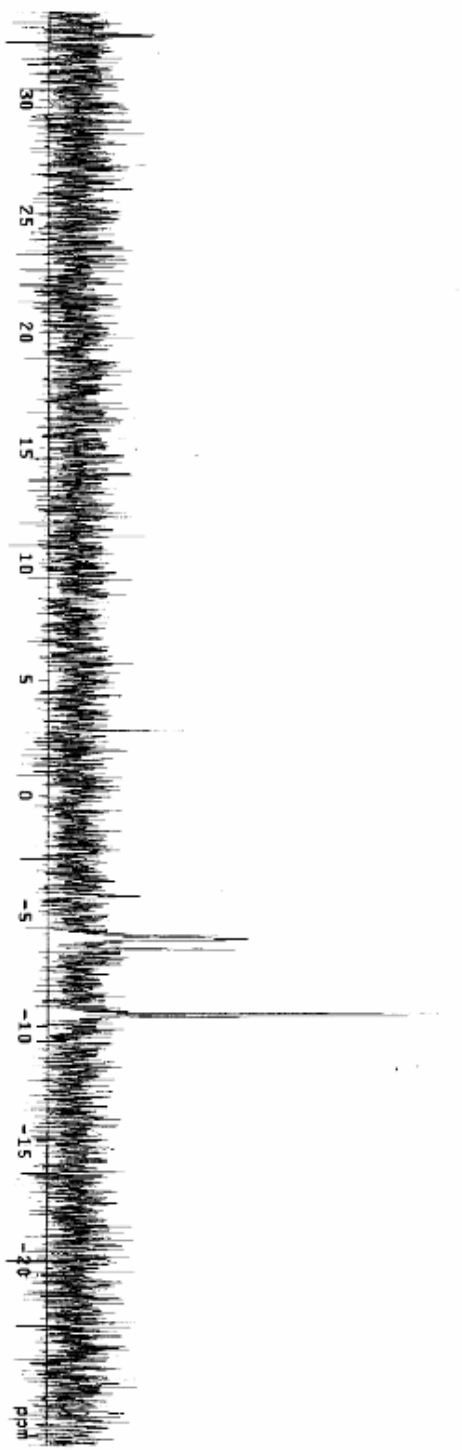
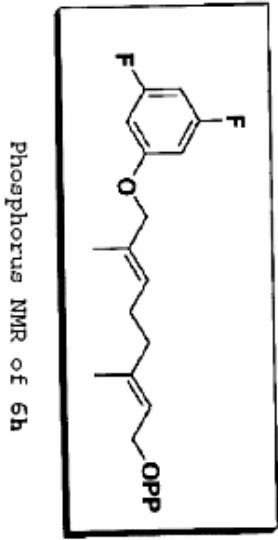
TS-V-3,5-DIFCOP-2-aug15-2005

EXP1 82DU1

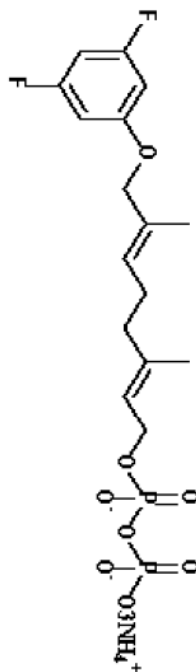
```

SAMPLE
DATE 08 15 2005 07:00 395.724
SOLVENT 020 00 42
F1 F2 0
ACQUISITION exp dof
sfreq 161.811 dm 2WV
IN P21 dmw
SP 0.280 0WV 11.18
SP 110.000 4500
7b 6800 homo 1.0
bs 64 1b PROCESSING 1.00
SPW 55 1b WFTF16
PV 18.0 WFTF16
G1 0 Proc
G2 0 Proc noc used
G3 0 Proc noc used
G4 0 Proc noc used
G5 0 Proc noc used
G6 0 Proc noc used
G7 0 Proc noc used
G8 0 Proc noc used
G9 0 Proc noc used
G10 0 Proc noc used
G11 0 Proc noc used
G12 0 Proc noc used
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G16 0 Proc noc used
G17 0 Proc noc used
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G24 0 Proc noc used
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G27 0 Proc noc used
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G31 0 Proc noc used
G32 0 Proc noc used
G33 0 Proc noc used
G34 0 Proc noc used
G35 0 Proc noc used
G36 0 Proc noc used
G37 0 Proc noc used
G38 0 Proc noc used
G39 0 Proc noc used
G40 0 Proc noc used
G41 0 Proc noc used
G42 0 Proc noc used
G43 0 Proc noc used
G44 0 Proc noc used
G45 0 Proc noc used
G46 0 Proc noc used
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G90 0 Proc noc used
G91 0 Proc noc used
G92 0 Proc noc used
G93 0 Proc noc used
G94 0 Proc noc used
G95 0 Proc noc used
G96 0 Proc noc used
G97 0 Proc noc used
G98 0 Proc noc used
G99 0 Proc noc used
G100 0 Proc noc used

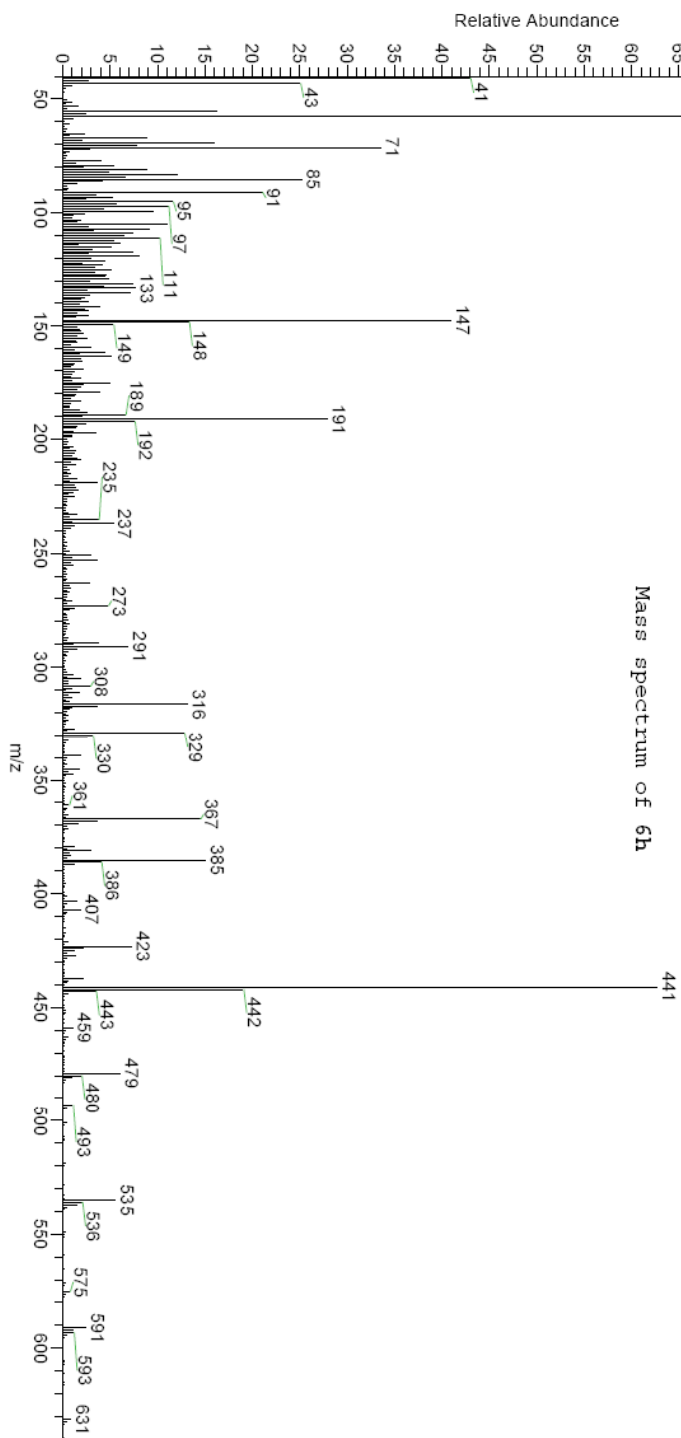
```



06-0522 #205-224 RT: 3.27-3.60 AV: 20 NL: 6.68E4  
T: + c Full ms [40.00-640.00]



Mass spectrum of 6h

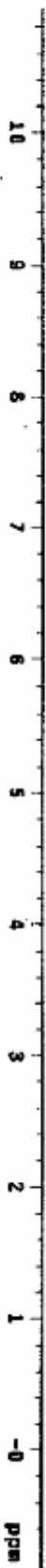
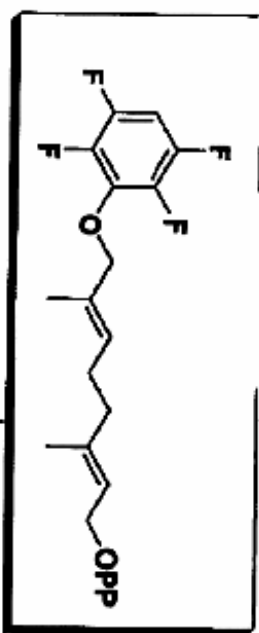


18-V-TETRAFPMP-2-angle-2008

exp3 stc1h

SAMPLE DEC. 8 UT 331.724  
date AUG 15 2008 0774  
solvent D2O dn  
T1 1.8  
ACQUISITION exp 0774  
0774 331.724 09  
IN M1 09  
AC 3.744 09  
NP 44832 0504  
BW 5000.8 0504  
TS 3088 homo 1.8  
DS 40  
CPUR 50 w/tilt  
PW 7.3 proc  
BI 1.000 tn  
TOT 3200 0  
CT alock 0  
GAIN not used  
FLAHS not used  
UNIT

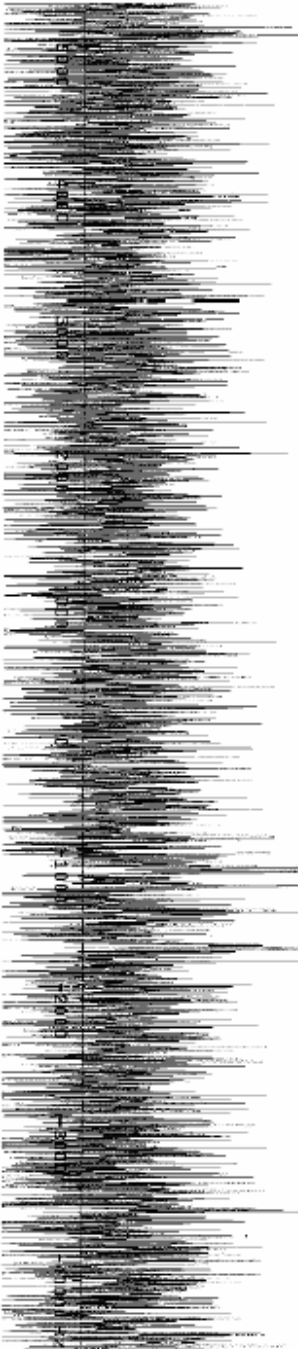
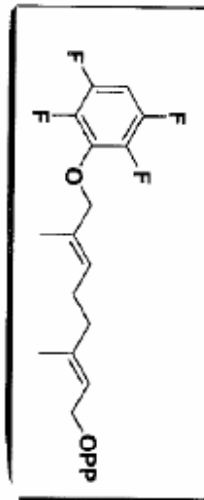
DISPLAY  
SP -381.0  
VP 4795.7  
VS 888  
WC 251  
PZM 18.84  
IS 598.81  
FT 1881.7  
FTP 4  
Tn 21  
ms cdc ps 2.001



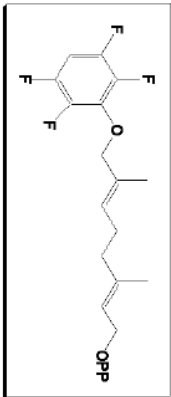
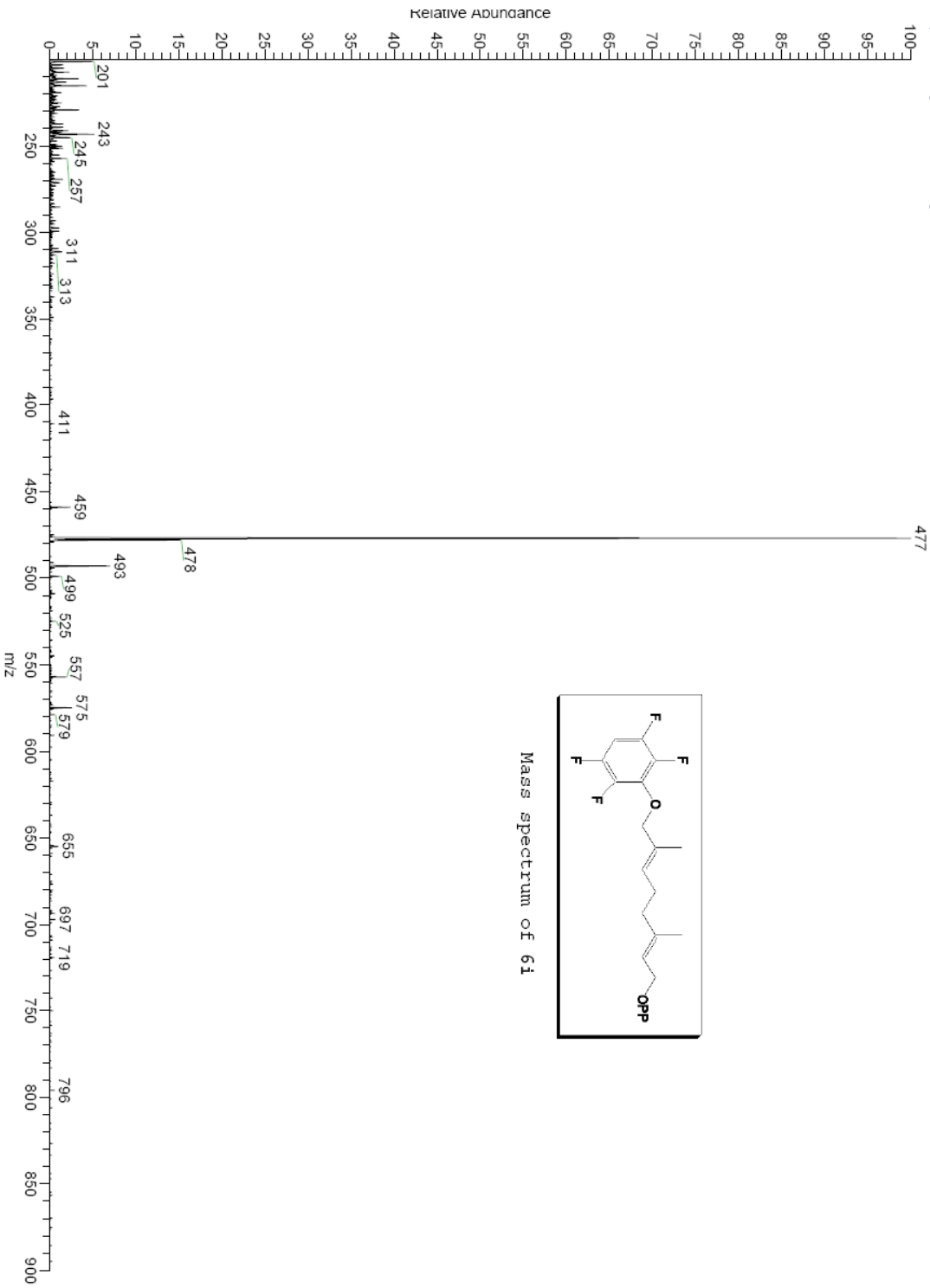
13-U-TETRAZ P2PP-3-wnd15-2008

EXPT 52901

DATE	NOV 15 2155	DTG	DEC. 8 VT
COL	120	CH	389/724
PROG	120	PR	11
ACQUISITION	120	DE	8
STRT	181.811	CH	109
END	231.088	CH	110
ACT	0.880	CH	111
SR	14001.0	CH	112
TR	6180	CH	113
DS	54	CH	114
SPUR	11.55	197118	1.08
DI	0	PROC	FT
TOF	0	FA	not used
INT	0	SEED	meth
CT	0	WERT	0
ALOCK	0	WERT	0
SMIN	0	WERT	0
FLAGE	0	WERT	0
INT	0	WERT	0
IN	0	WERT	0
SP	0	WERT	0
NS	0	WERT	0
DISPLAY	0	WERT	0
50	-4547.2	WERT	0
W9	11001.0	WERT	0
W8	132	WERT	0
W7	230	WERT	0
W6	240	WERT	0
W5	250.40	WERT	0
W4	4547.2	WERT	0
W3	20	WERT	0
W2	130.850	WERT	0
W1	130.850	WERT	0





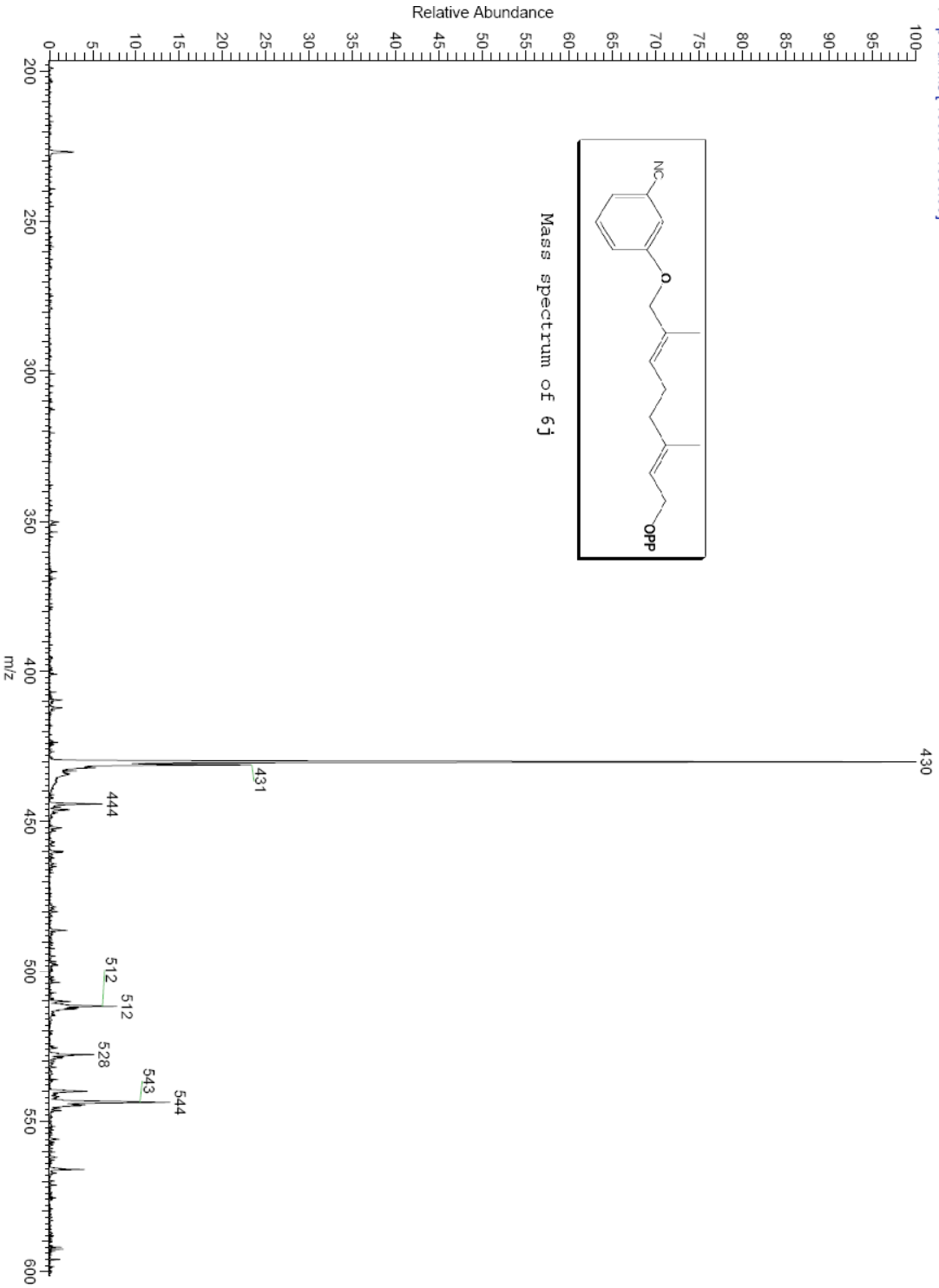


Mass spectrum of 6i





5-0343 #12-23 RT: 0.40-0.76 AV: 12 NL: 7.02E4  
: -p Full ms [100.00-1000.00]

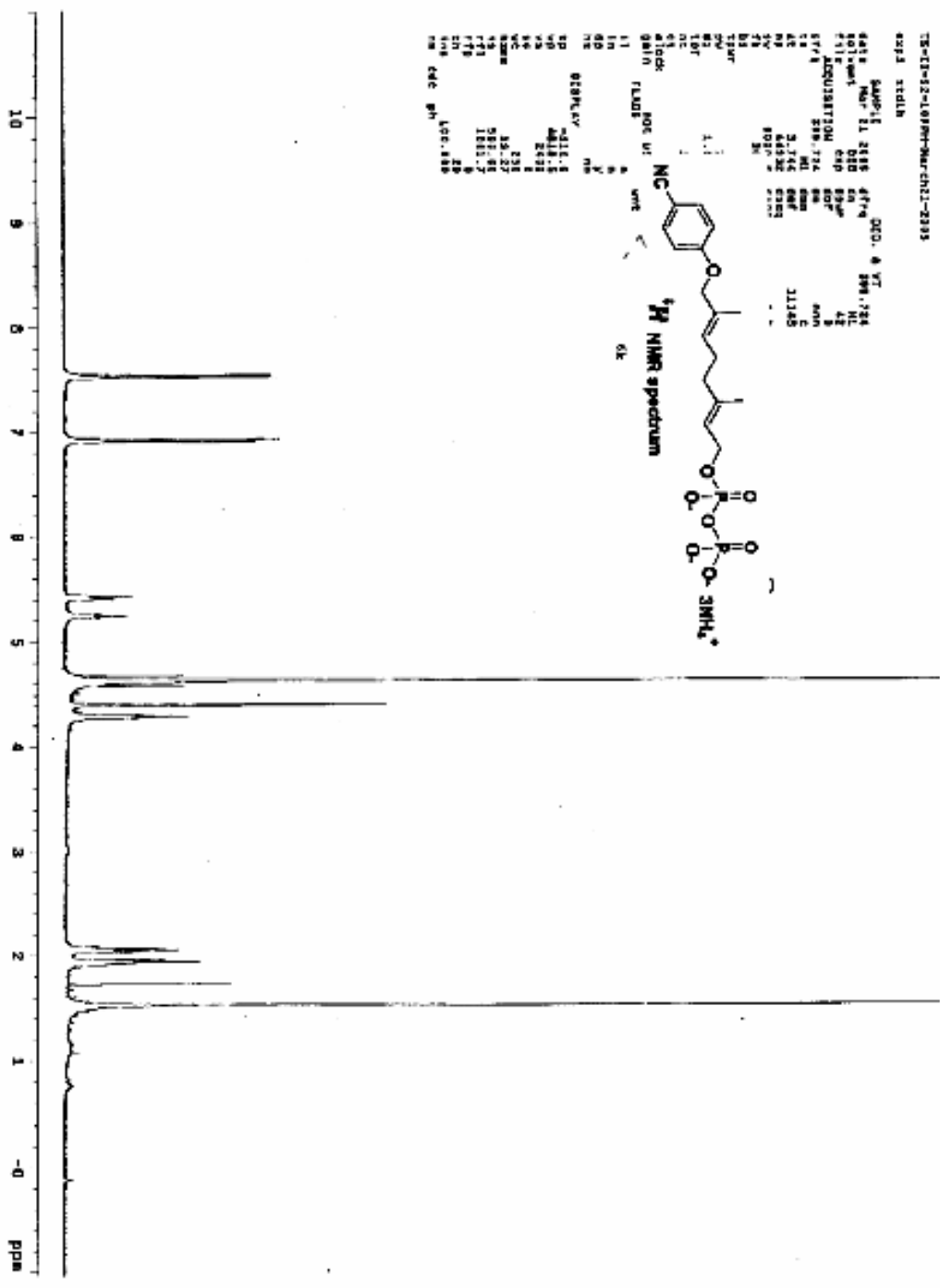


75-10-02-10899-001-2593  
 expd title

SAMPLE: 00001  
 NAME: Mar 21 2000  
 TIME: 07:19  
 DATE: DEC. 4 '97  
 INSTR: 500  
 PULPROG: zgpg30  
 APROB: 11195  
 ACQUISITION: 000  
 PROC: 42  
 F2: 500.136  
 F1: 500.136  
 NUC1: 13C  
 NUC2: 1H  
 PRG: 00001



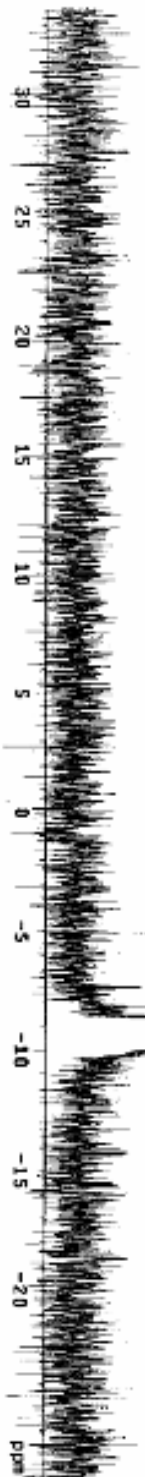
1.11  
 1.00  
 0.90  
 0.80  
 0.70  
 0.60  
 0.50  
 0.40  
 0.30  
 0.20  
 0.10  
 0.00  
 -0.10  
 -0.20  
 -0.30  
 -0.40  
 -0.50  
 -0.60  
 -0.70  
 -0.80  
 -0.90  
 -1.00



```

NAME: 12001
DATE: MAR 23 2025 07:34
SOLVENT: D2O
P1: 0.00
P2: 0.00
P3: 0.00
P4: 0.00
P5: 0.00
P6: 0.00
P7: 0.00
P8: 0.00
P9: 0.00
P10: 0.00
P11: 0.00
P12: 0.00
P13: 0.00
P14: 0.00
P15: 0.00
P16: 0.00
P17: 0.00
P18: 0.00
P19: 0.00
P20: 0.00
P21: 0.00
P22: 0.00
P23: 0.00
P24: 0.00
P25: 0.00
P26: 0.00
P27: 0.00
P28: 0.00
P29: 0.00
P30: 0.00
P31: 0.00
P32: 0.00
P33: 0.00
P34: 0.00
P35: 0.00
P36: 0.00
P37: 0.00
P38: 0.00
P39: 0.00
P40: 0.00
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P45: 0.00
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P52: 0.00
P53: 0.00
P54: 0.00
P55: 0.00
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P60: 0.00
P61: 0.00
P62: 0.00
P63: 0.00
P64: 0.00
P65: 0.00
P66: 0.00
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P72: 0.00
P73: 0.00
P74: 0.00
P75: 0.00
P76: 0.00
P77: 0.00
P78: 0.00
P79: 0.00
P80: 0.00
P81: 0.00
P82: 0.00
P83: 0.00
P84: 0.00
P85: 0.00
P86: 0.00
P87: 0.00
P88: 0.00
P89: 0.00
P90: 0.00
P91: 0.00
P92: 0.00
P93: 0.00
P94: 0.00
P95: 0.00
P96: 0.00
P97: 0.00
P98: 0.00
P99: 0.00
P100: 0.00

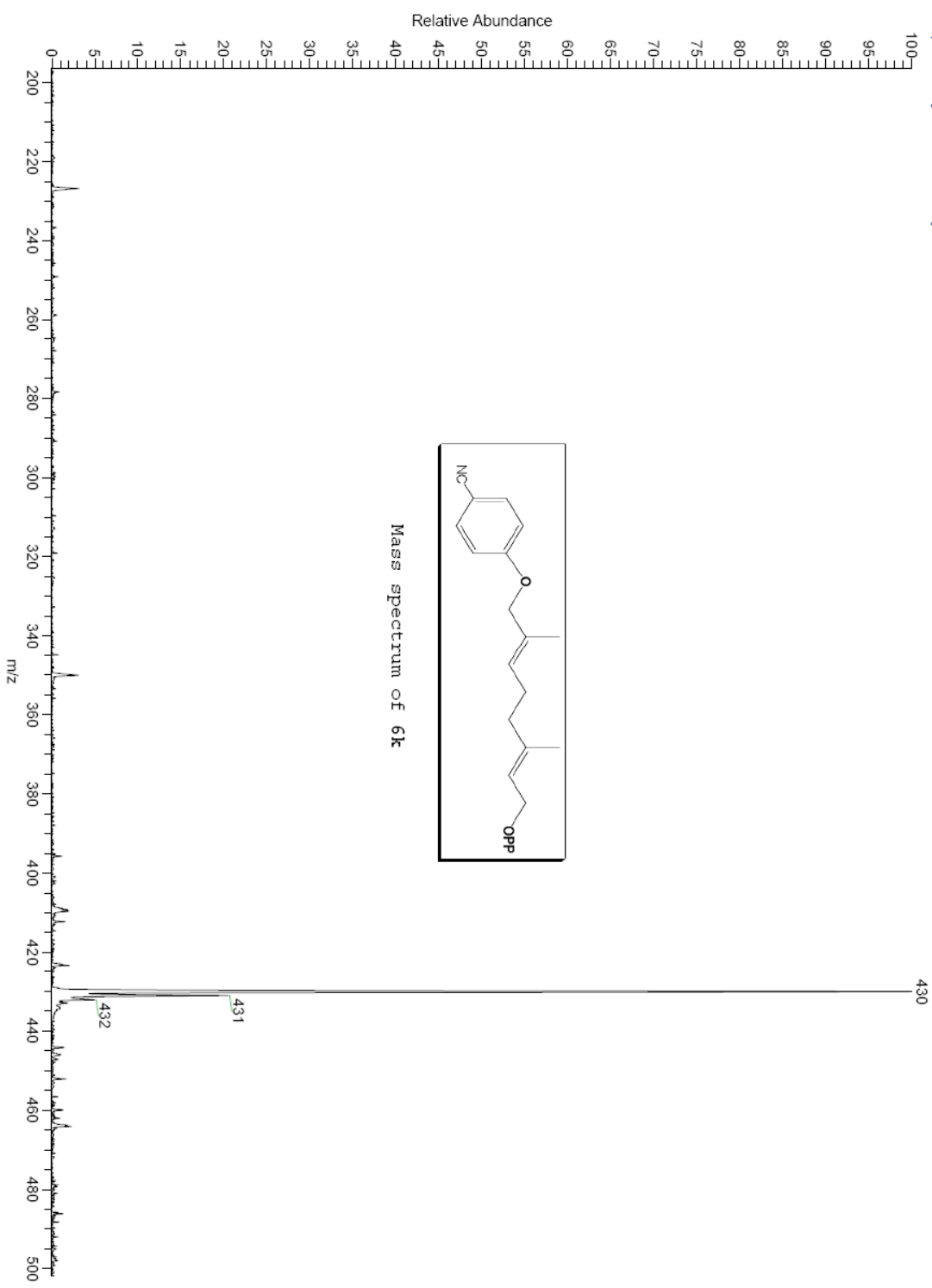
```



C:\Xcalibur\data\UKMSF\05-0342  
15-0342 #154-219 RT: 4.72-6.69 AV: 66 NL: 4.04E4  
T: - P Full ms [100.00-1000.00]

03/28/2005 12:02:15 PM

TS-11-92-10



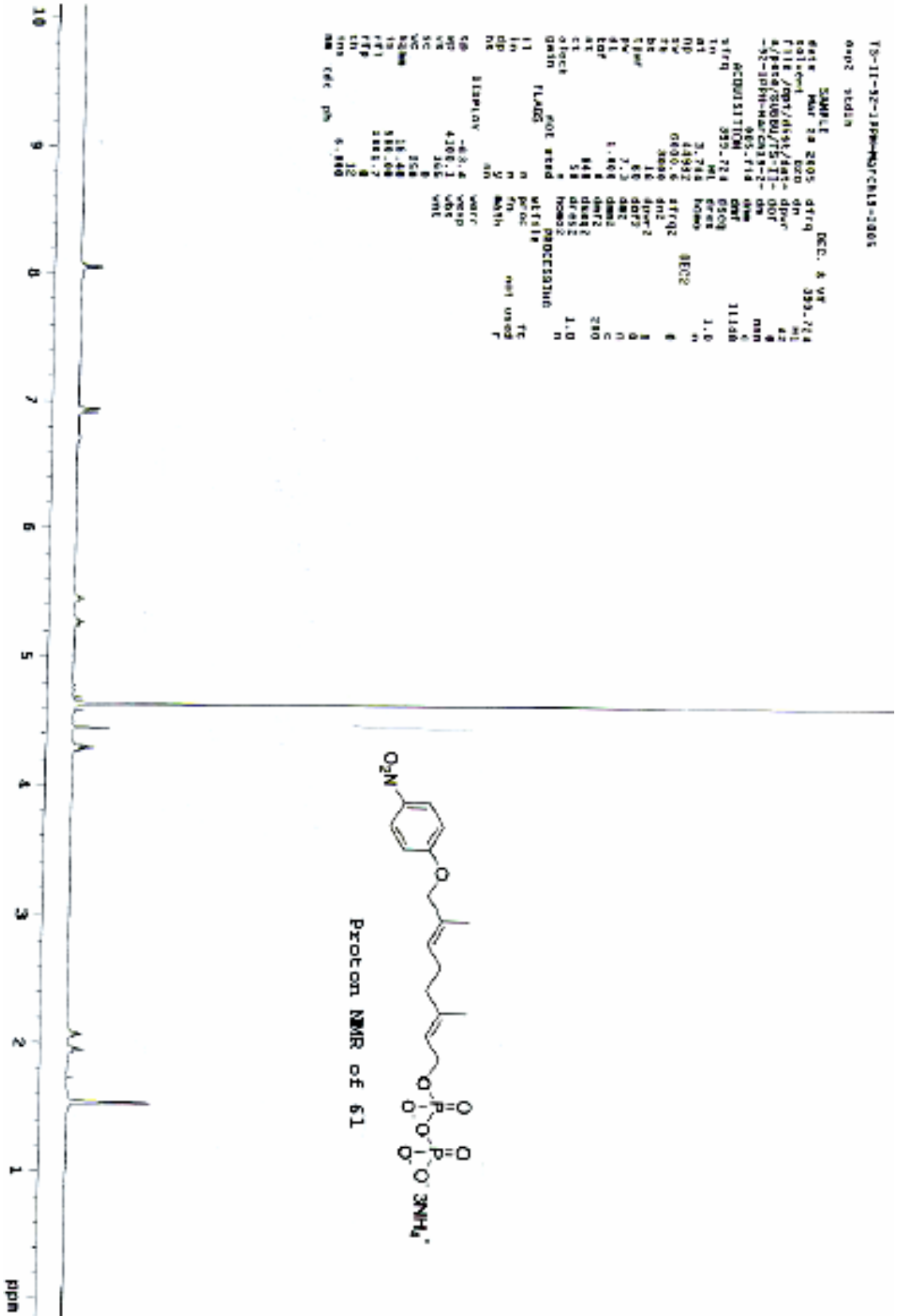
10-11-92-18PM-MORCIS-1005

0002 tddin

```

SAMPLE
Date Mar 29 2005 DECI. 8 VR
Solvent H2O d1 399.724
F1 F2 /cp1/619k/441- d1 42
a/pse/7500/75-11-007 8
-32-18PM-MORCIS-2-05 non
985.714 05m
ACQUISITION 11130
1 Freq 399.724 0508
IN 1.0
M1 3.744 8000
M2 44932 8000
S2 000.6 8000
S3 8000 8000
S4 16 8000
S5 80 8000
S6 7.2 8000
S7 1.804 8000
S8 848 8000
S9 58 8000
S10 1.0
PROC
NAME 9002
PROCESSED 1.0
F1 11 n
F2 n
F3 n
F4 n
F5 n
F6 n
F7 n
F8 n
F9 n
F10 n
F11 n
F12 n
F13 n
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F27 n
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F30 n
F31 n
F32 n
F33 n
F34 n
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F36 n
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F44 n
F45 n
F46 n
F47 n
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F49 n
F50 n
F51 n
F52 n
F53 n
F54 n
F55 n
F56 n
F57 n
F58 n
F59 n
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F62 n
F63 n
F64 n
F65 n
F66 n
F67 n
F68 n
F69 n
F70 n
F71 n
F72 n
F73 n
F74 n
F75 n
F76 n
F77 n
F78 n
F79 n
F80 n
F81 n
F82 n
F83 n
F84 n
F85 n
F86 n
F87 n
F88 n
F89 n
F90 n
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F94 n
F95 n
F96 n
F97 n
F98 n
F99 n
F100 n

```



Proton NMR of 61



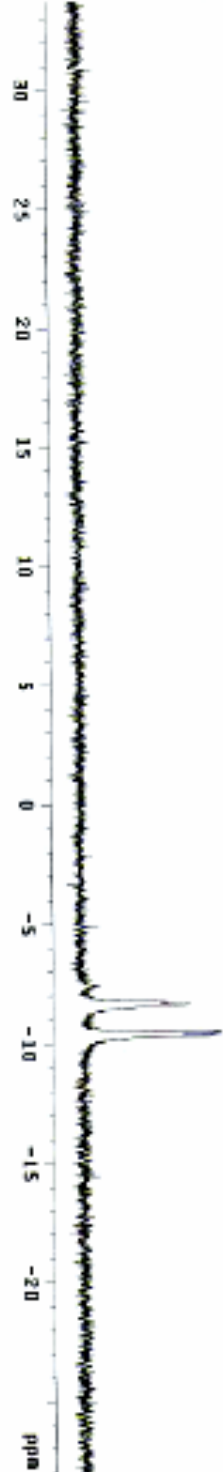
19-13-26-31F-MW-nals-2023

exp2 12901

```

SAMPLES          EC2   8  VT
DATE    Mar 28 2025  09:37:04
SOLVENT  MeCN
ACQUISIT 03/21/2025 09:42
NAME  61
INSTRUM  FTNMR-1
PROBHD  5mm 1H/13
PULPROG  zgpg30
AQ      0.5172
RG      655.36
SR      400.146
FIDRES  0.340000
AQRES   0.001000
SFO      400.146
SF01     100.626
SF02     400.146
SF03     100.626
SF04     100.626
SF05     100.626
SF06     100.626
SF07     100.626
SF08     100.626
SF09     100.626
SF10     100.626
SF11     100.626
SF12     100.626
SF13     100.626
SF14     100.626
SF15     100.626
SF16     100.626
SF17     100.626
SF18     100.626
SF19     100.626
SF20     100.626
SF21     100.626
SF22     100.626
SF23     100.626
SF24     100.626
SF25     100.626
SF26     100.626
SF27     100.626
SF28     100.626
SF29     100.626
SF30     100.626
SF31     100.626
SF32     100.626
SF33     100.626
SF34     100.626
SF35     100.626
SF36     100.626
SF37     100.626
SF38     100.626
SF39     100.626
SF40     100.626
SF41     100.626
SF42     100.626
SF43     100.626
SF44     100.626
SF45     100.626
SF46     100.626
SF47     100.626
SF48     100.626
SF49     100.626
SF50     100.626
SF51     100.626
SF52     100.626
SF53     100.626
SF54     100.626
SF55     100.626
SF56     100.626
SF57     100.626
SF58     100.626
SF59     100.626
SF60     100.626
SF61     100.626
SF62     100.626
SF63     100.626
SF64     100.626
SF65     100.626
SF66     100.626
SF67     100.626
SF68     100.626
SF69     100.626
SF70     100.626
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SF77     100.626
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SF80     100.626
SF81     100.626
SF82     100.626
SF83     100.626
SF84     100.626
SF85     100.626
SF86     100.626
SF87     100.626
SF88     100.626
SF89     100.626
SF90     100.626
SF91     100.626
SF92     100.626
SF93     100.626
SF94     100.626
SF95     100.626
SF96     100.626
SF97     100.626
SF98     100.626
SF99     100.626
SF100    100.626

```

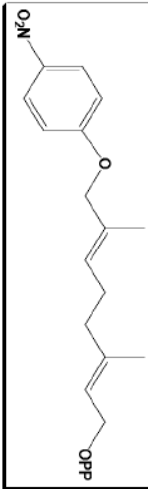


15-0333 #15-25 RT: 0.72-1.07 AV: 11 NL: 4.79E4  
 [- p Full ms [ 100.00-1000.00]

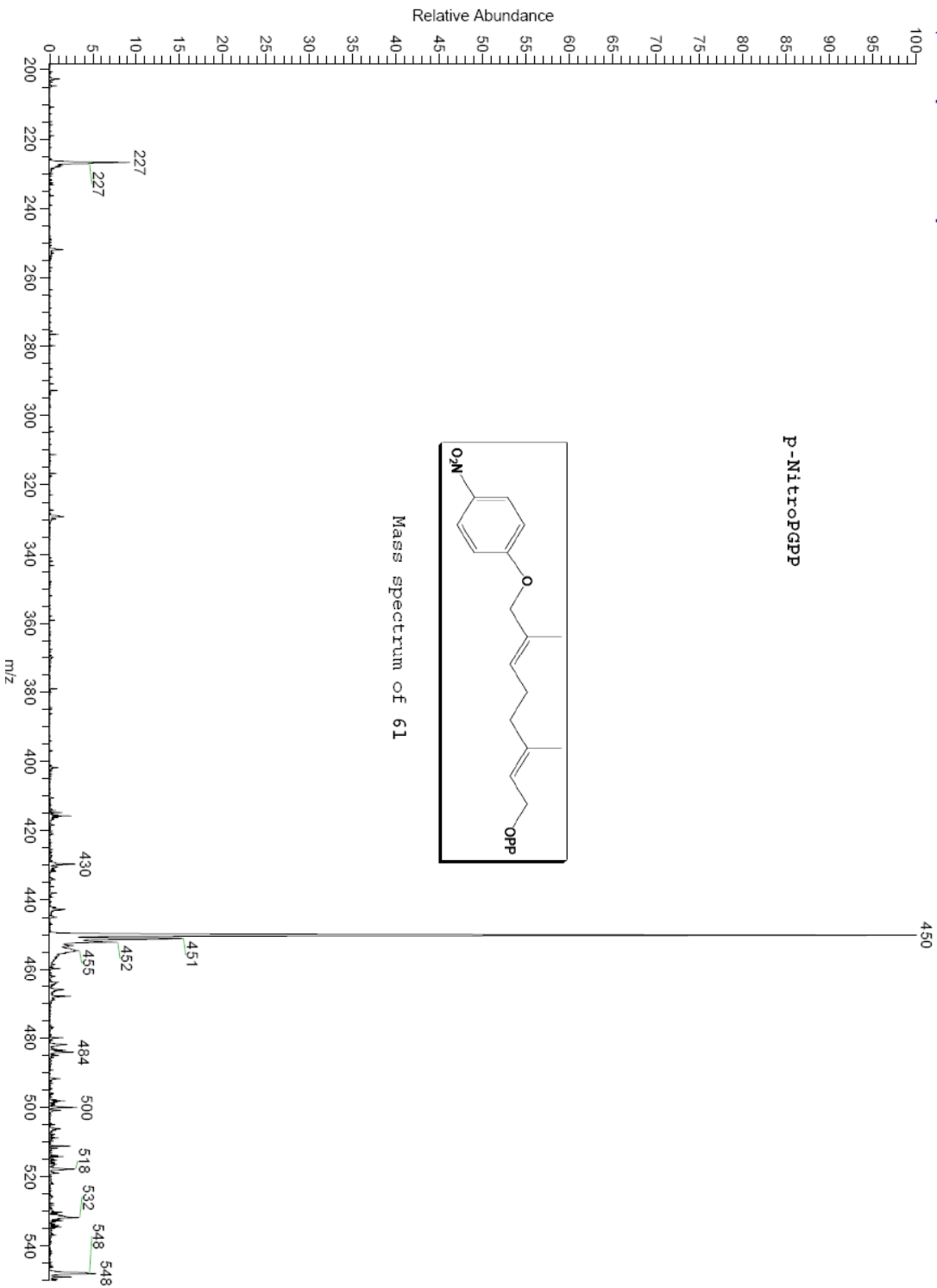
US/EW 2000 US/US 42 PM

10/11/2011

**p-NitroPpp**



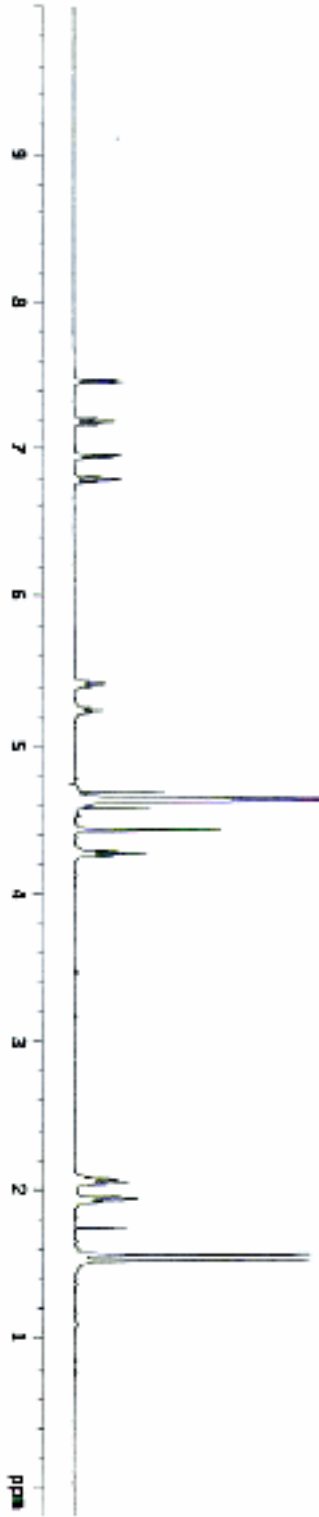
Mass spectrum of 61



15-11-93-27PM-NM-C033-2103

expt statn

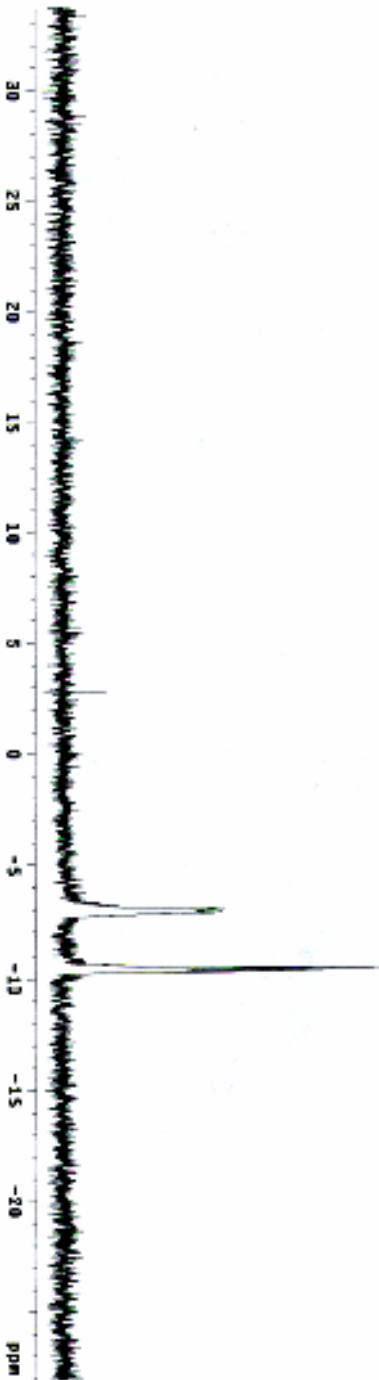
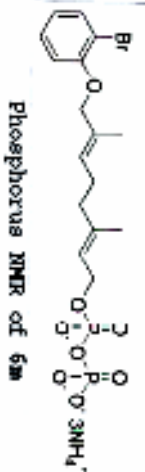
SAMPLE NAME: 15-11-93-27PM-NM-C033-2103  
 DATE: 15-11-93  
 TIME: 11:18  
 OPERATOR: [unreadable]  
 INSTRUMENT: [unreadable]  
 PULPROG: zgpg30  
 ACQUISITION: 805.71d  
 F1: 805.71d  
 F2: 805.71d  
 F3: 805.71d  
 F4: 805.71d  
 F5: 805.71d  
 F6: 805.71d  
 F7: 805.71d  
 F8: 805.71d  
 F9: 805.71d  
 F10: 805.71d  
 F11: 805.71d  
 F12: 805.71d  
 F13: 805.71d  
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 F15: 805.71d  
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 F22: 805.71d  
 F23: 805.71d  
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 F33: 805.71d  
 F34: 805.71d  
 F35: 805.71d  
 F36: 805.71d  
 F37: 805.71d  
 F38: 805.71d  
 F39: 805.71d  
 F40: 805.71d  
 F41: 805.71d  
 F42: 805.71d  
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75-11-13-28P-Mar-0113-2883  
expt 152013

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q3	02/018/500880/75-11-001	svf	8
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q6	02/018/500880/75-11-001	svf	8
q7	02/018/500880/75-11-001	svf	8
q8	02/018/500880/75-11-001	svf	8
q9	02/018/500880/75-11-001	svf	8
q10	02/018/500880/75-11-001	svf	8
q11	02/018/500880/75-11-001	svf	8
q12	02/018/500880/75-11-001	svf	8
q13	02/018/500880/75-11-001	svf	8
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q26	02/018/500880/75-11-001	svf	8
q27	02/018/500880/75-11-001	svf	8
q28	02/018/500880/75-11-001	svf	8
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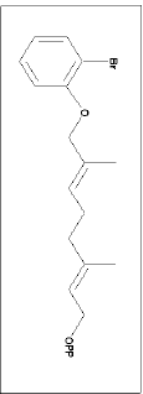
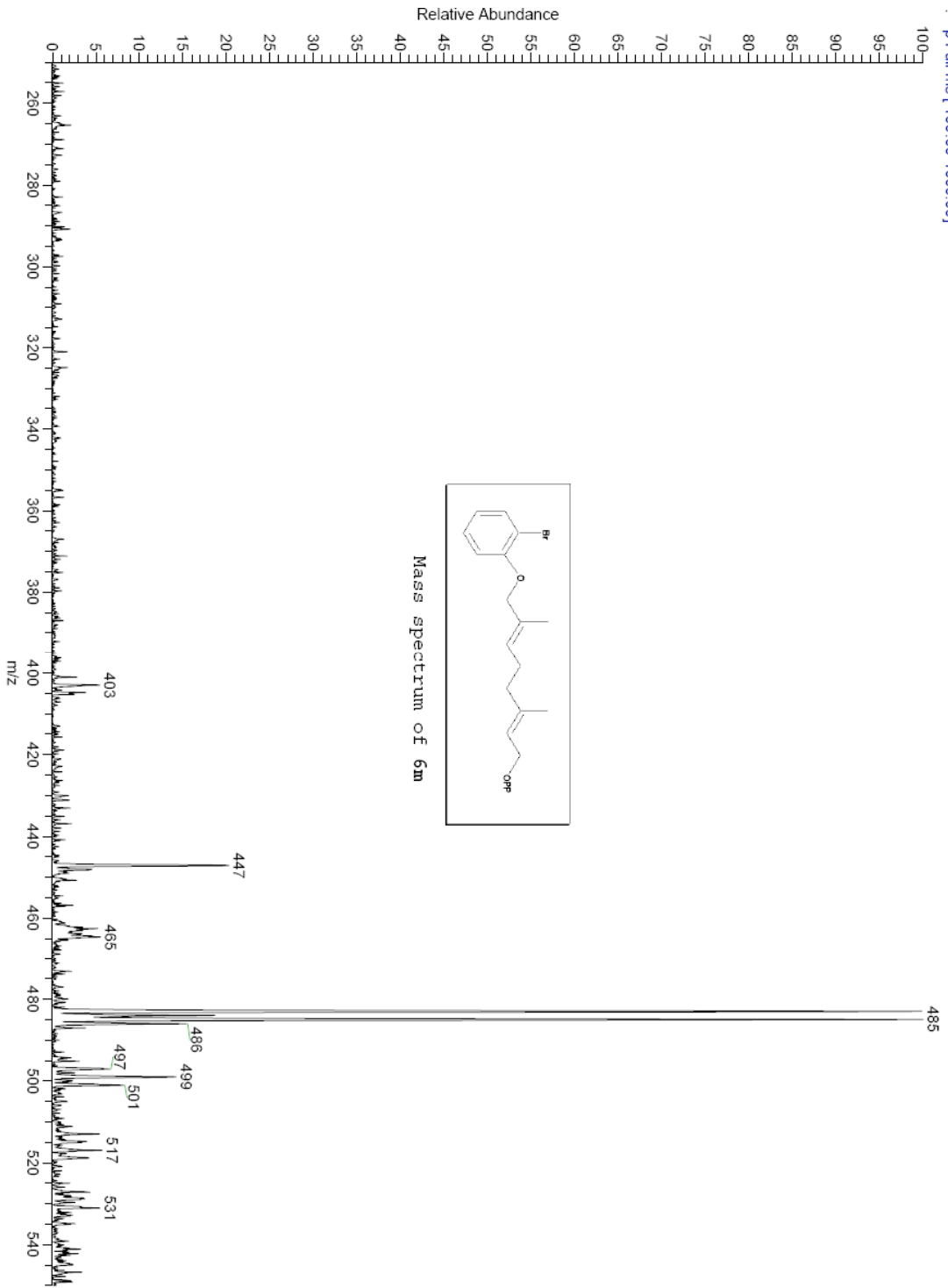
ACQUISITION 151 ALL 113.040  
SOLVENT CHL  
PULPROG 1.000  
INSTRUM spect  
PROC 41  
PROCESSED 1.00



:\Xcalibur\data\UKMSF\05-0347  
5-0347 #14-25 RT: 0.40-0.74 AV: 12 NL: 3.95E4  
- p Full ms [100.00-1000.00]

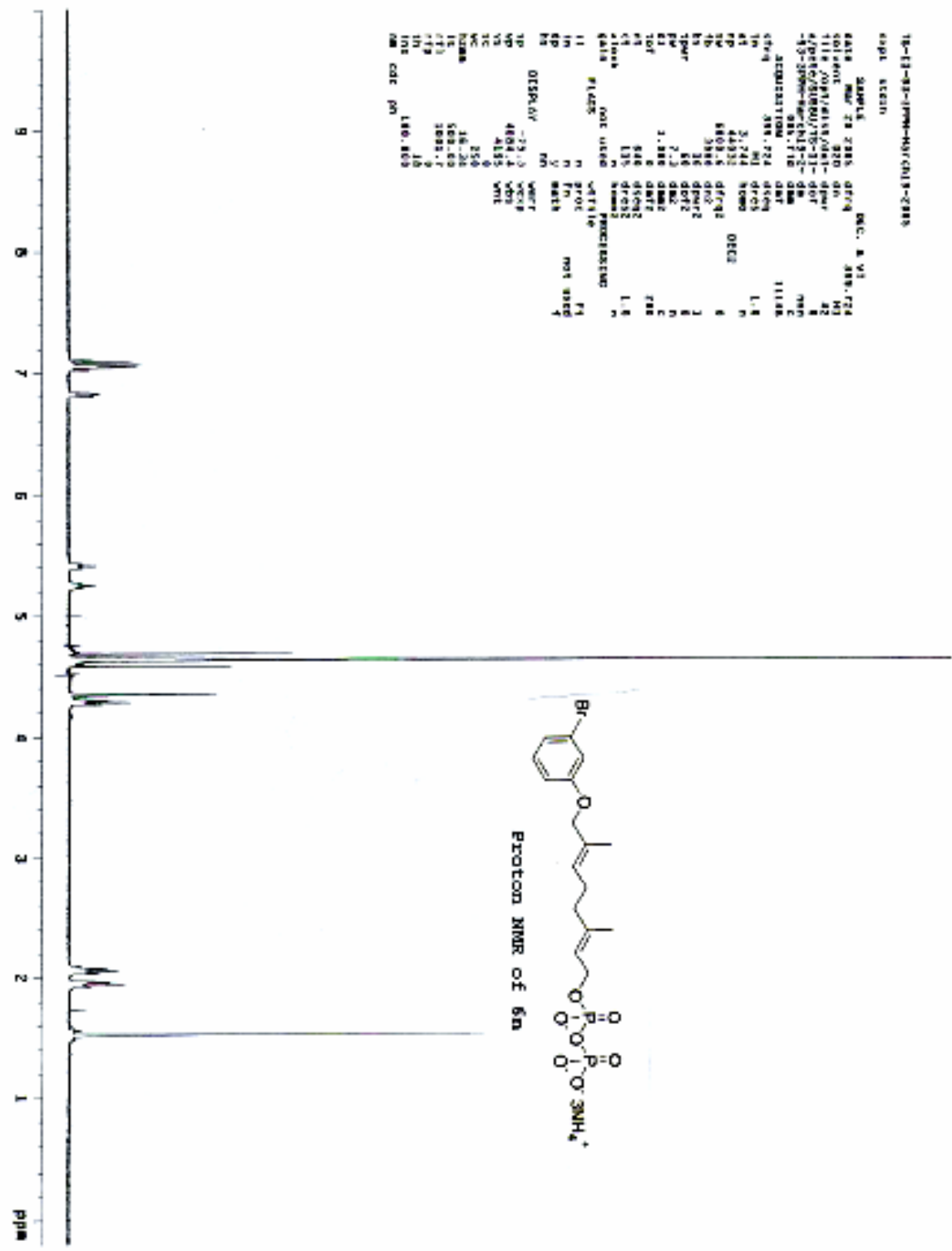
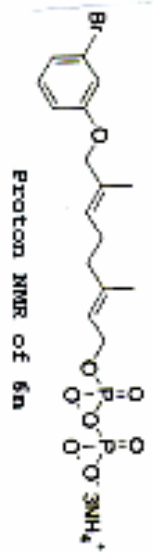
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TS-11-93-6

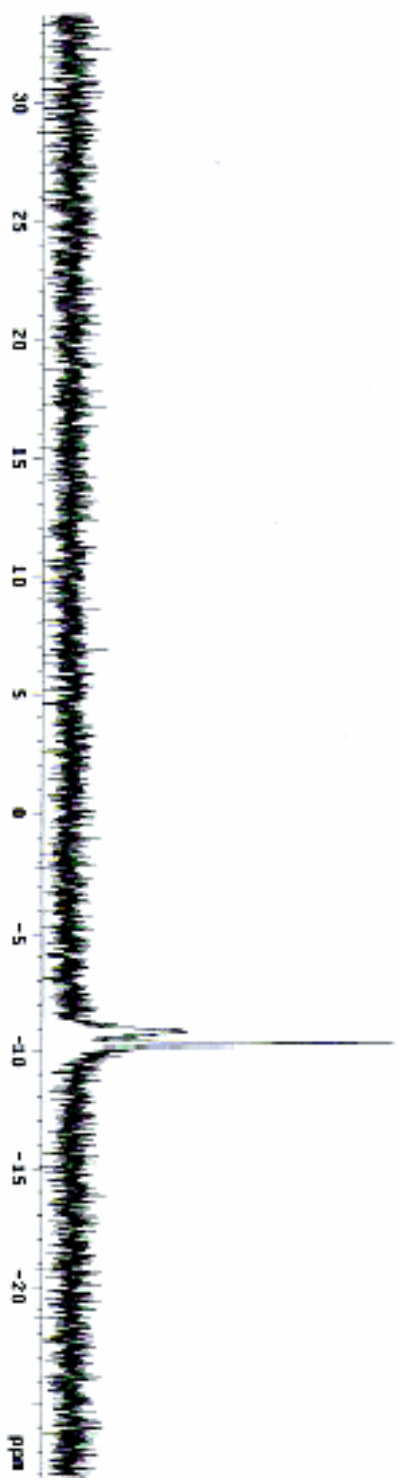
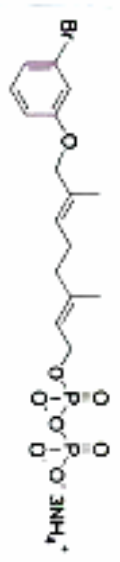


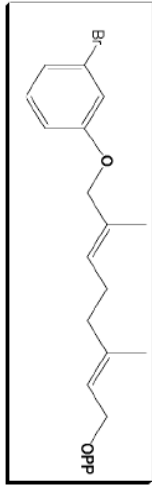
16-13-88--1pmw-HJF-DLR-2885  
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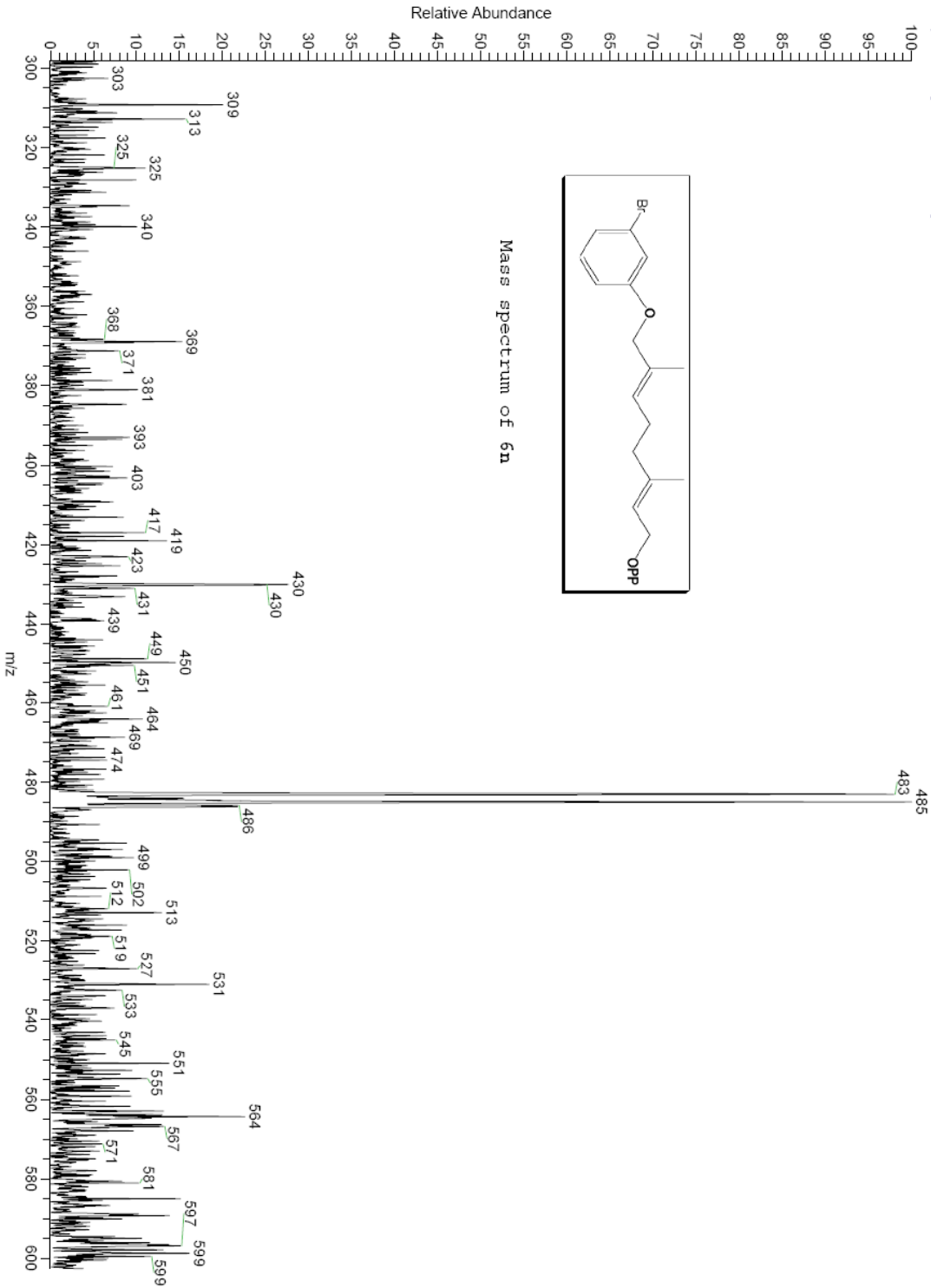


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 solvent R2O dm 399.724  
 file /m07051/0641-0040  
 acqfile/20060715-11-004  
 -35-32P-MARCONIS-234-DM 599  
 ACQUISITION: DM 11334  
 dfreq 151.811 dmeg  
 ta 321 dreg  
 dt 6.889 Nobs 1.8  
 09 16889 OFTQ2 OFF2  
 18498.0 682 Underfired  
 H1 6880 682 Underfired  
 T2P2 5.0 0.2 Underfired  
 T3P2 5.0 0.2 Underfired  
 T4P2 5.0 0.2 Underfired  
 DI 18.0 DM2 Underfired  
 TAP 0 DM4Z Underfired  
 NI 0 0447 Underfired  
 CI 3280 05472 Underfired  
 2310 05472 Underfired  
 Nobs2 Underfired  
 MISCX N  
 Gain FLDG 19 9800516.0 1.68  
 I1 0 atFile 1  
 I2 0 prec 1  
 I3 0 TR not used  
 IN 0  
 DS V TR  
 DC W math  
 GP 819P14V  
 41845.0 WFR  
 35242.0 MRP  
 25242.0 MFI  
 50 MFI  
 0 WFI  
 MC 230  
 NC 40.80  
 PZ 354.40  
 FT1 4547.2  
 FT2 0  
 FT3 0  
 FT4 166.880  
 RM no ps

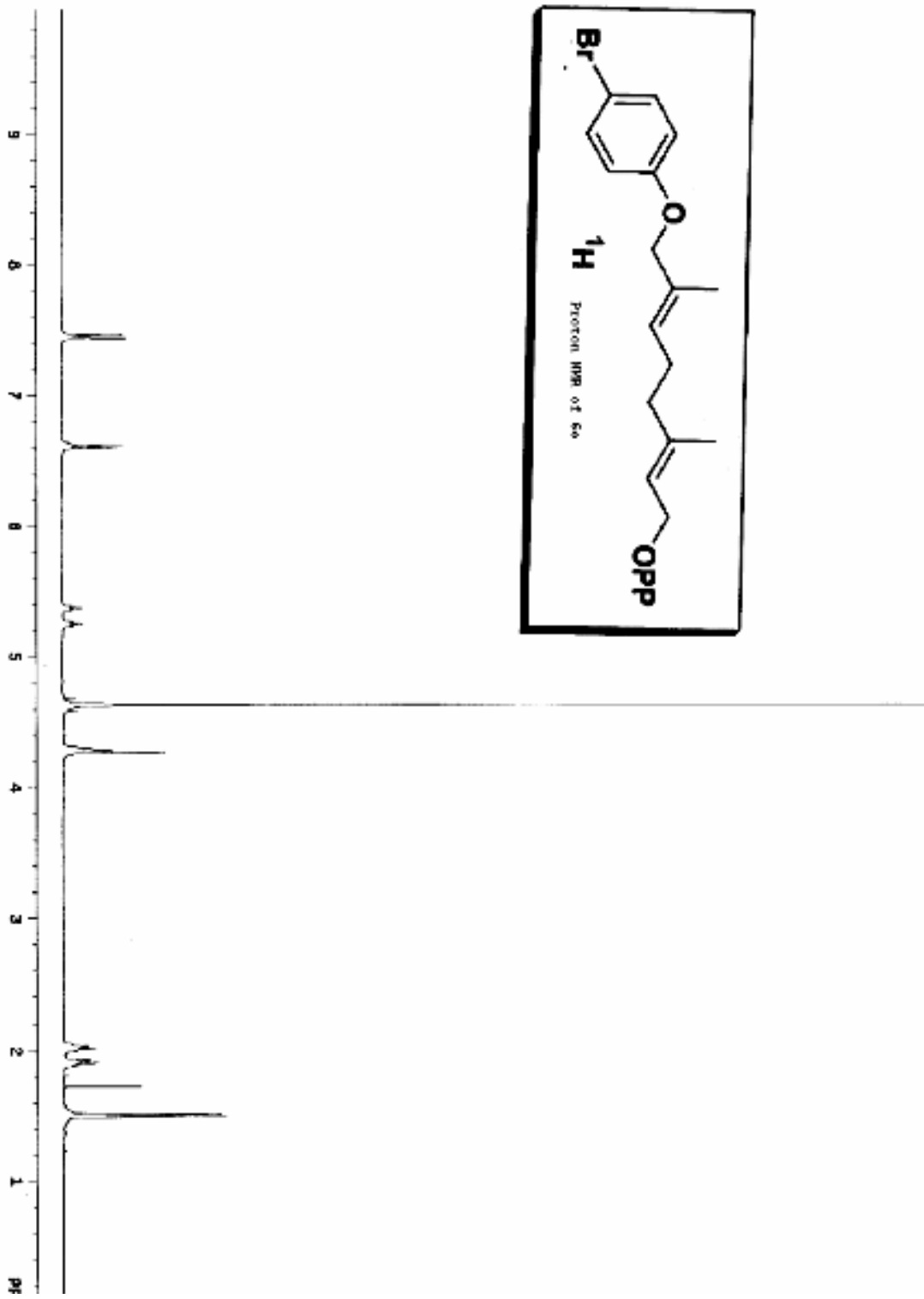
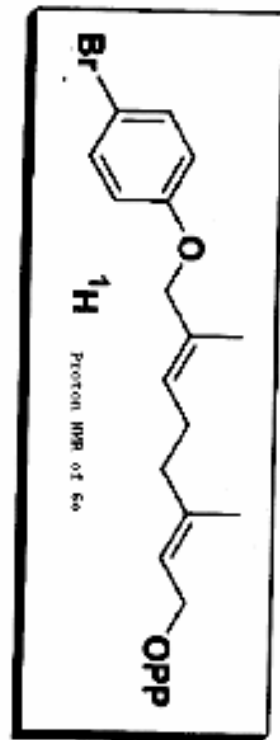


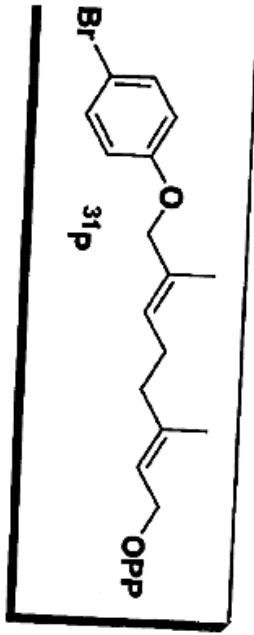


Mass spectrum of 6n

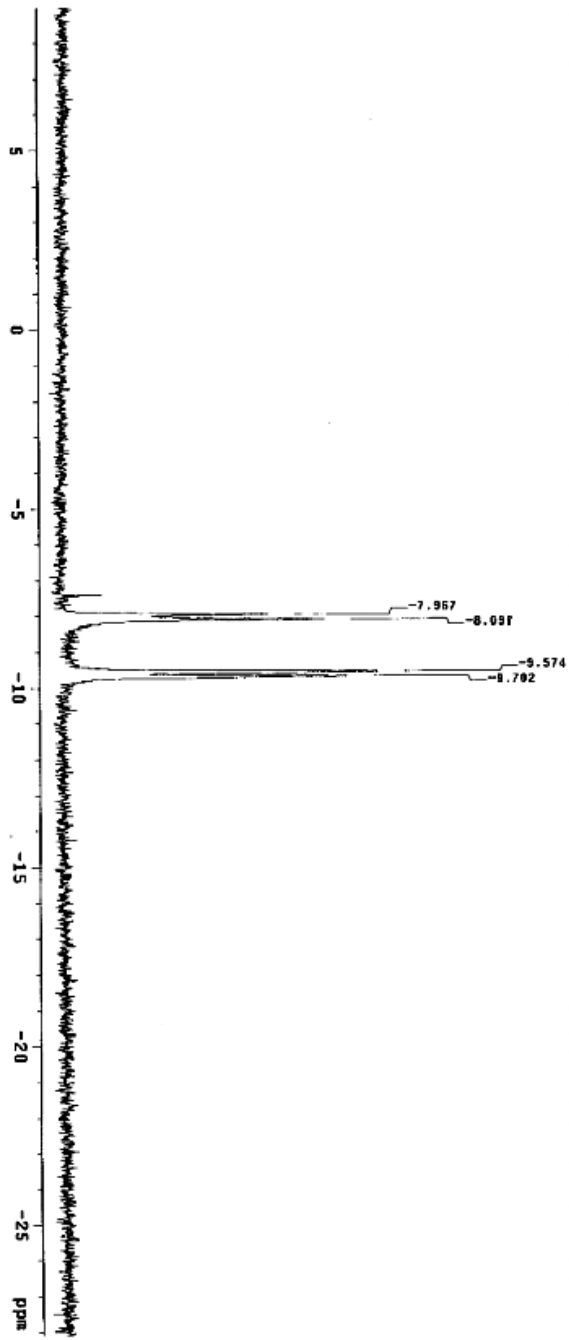




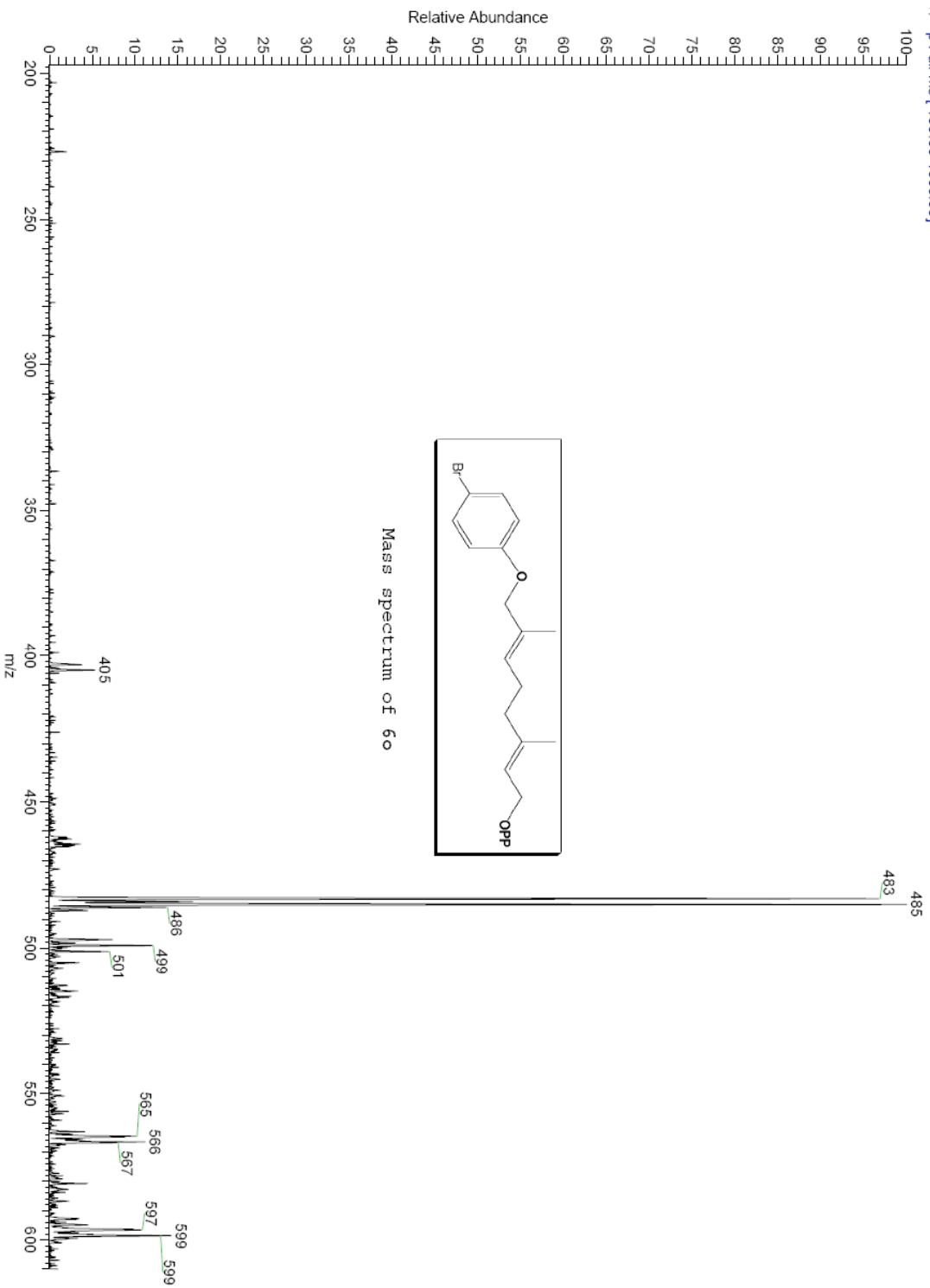




phospholipid NMR of 60

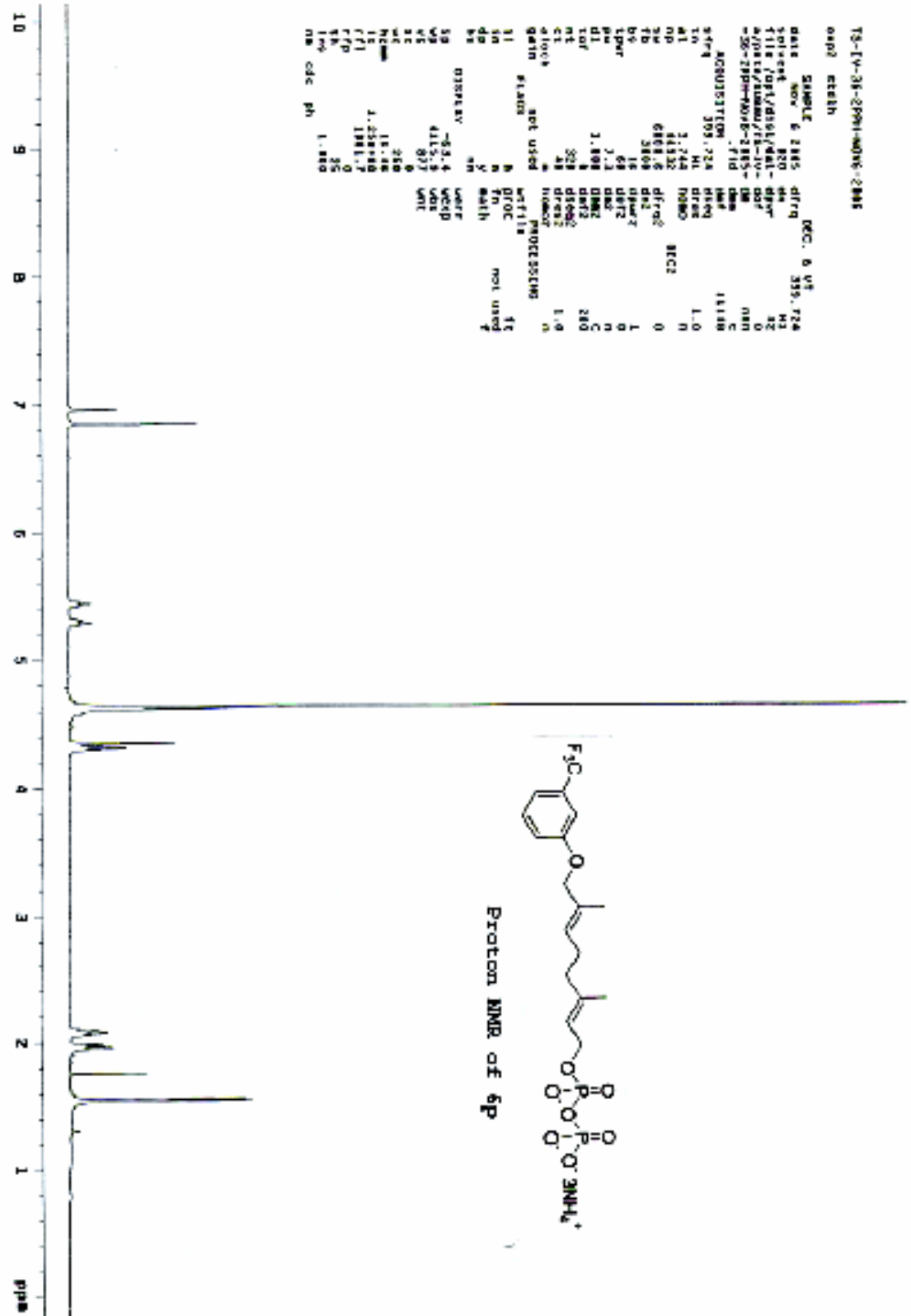


15-0344 #13-21 RT: 0.35-0.57 AV: 9 NL: 1.67E5  
1 - P Full ms [100.00-1000.00]

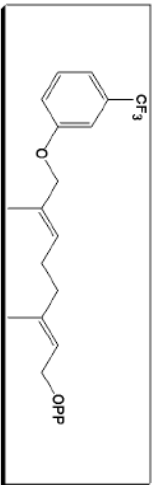


13-IV-36-2PPH-0036-2885  
 exp2 cteath

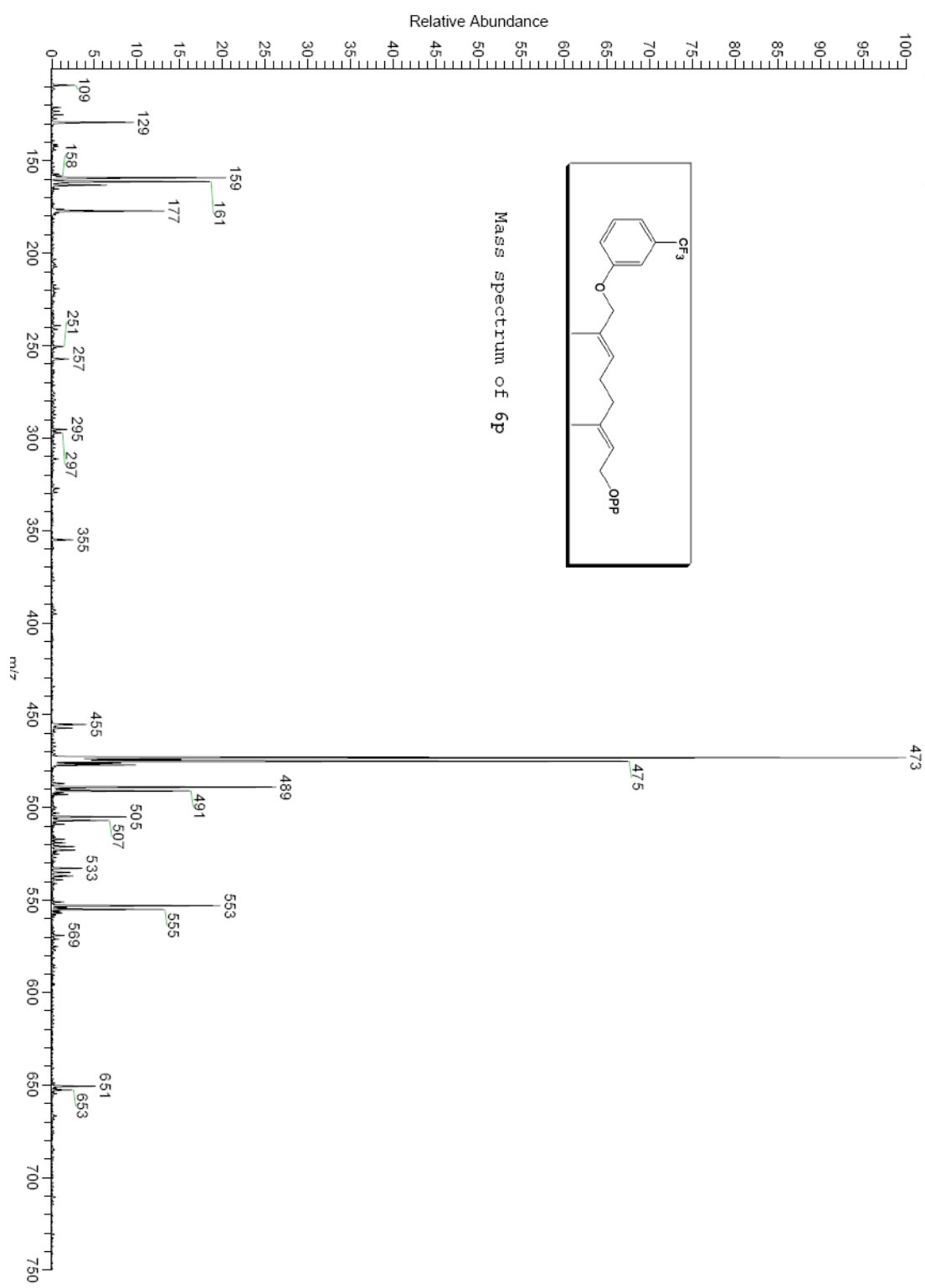
SAMPLE NO 6 2885 dfrq DEC. 8 1974  
 301948 820 Hz  
 title /DPL/DISL/DEL- dpar  
 a/axis/stamu/16-iv- dof  
 -35-2PPH-0036-2885- 0M  
 -fid  
 name  
 15158  
 ACQUISITION  
 start 309.724 dteq  
 stop 1.744 dteq  
 op 84532 dfrq 8000  
 sw 2808 dte  
 by 16 dpar  
 spwr 1.808 dte  
 dl 328 dte  
 tot 328 dte  
 re 328 dte  
 gain 1.0  
 slope  
 gain  
 scan  
 da  
 de  
 ke  
 display  
 59 -53.4 WCPD  
 58 415.5 WCPD  
 57 897 WCPD  
 56 0 WCPD  
 55 18.48 WCPD  
 54 1.258880 WCPD  
 53 1.188117 WCPD  
 52 0 WCPD  
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 49 1.880 WCPD  
 na cdc ph







Mass spectrum of 6p

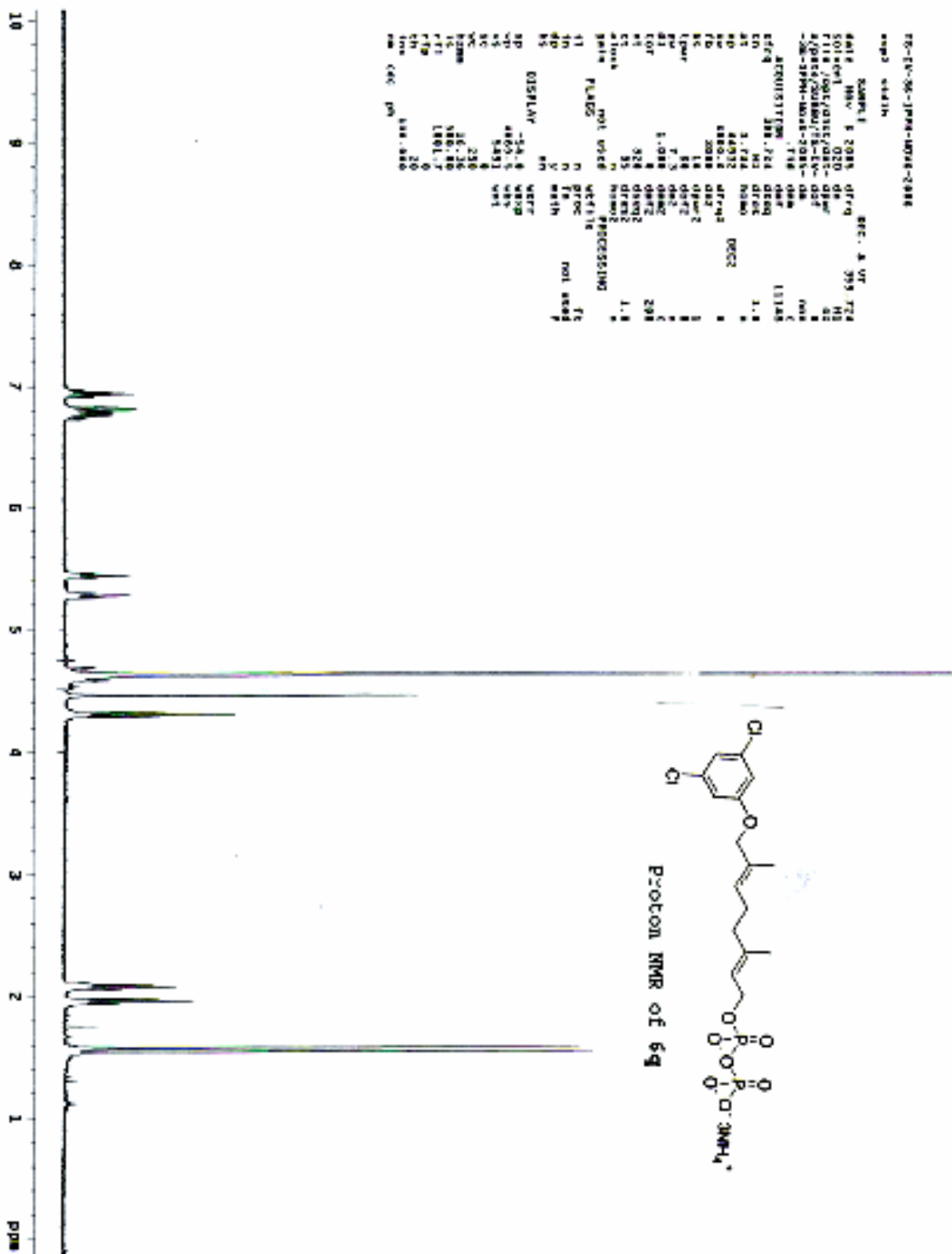
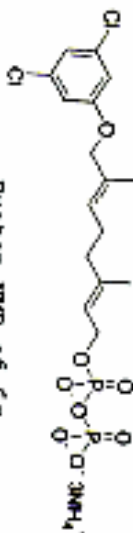


76-14-96-1004-1004-2004  
 exp1 1411h

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NAME: 1
PROC: 1
FILE: /opt/proc/1004-2004
SUBJ: 1004-2004-2004
ACQUISITION: 1411h
PROBHD: 5mm QNP1H
NUC1: 13C
PULPROG: zgpg30
PCPDPRG2: zgpg30
PCPDPRG1: zgpg30
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PCPDPRG5: zgpg30
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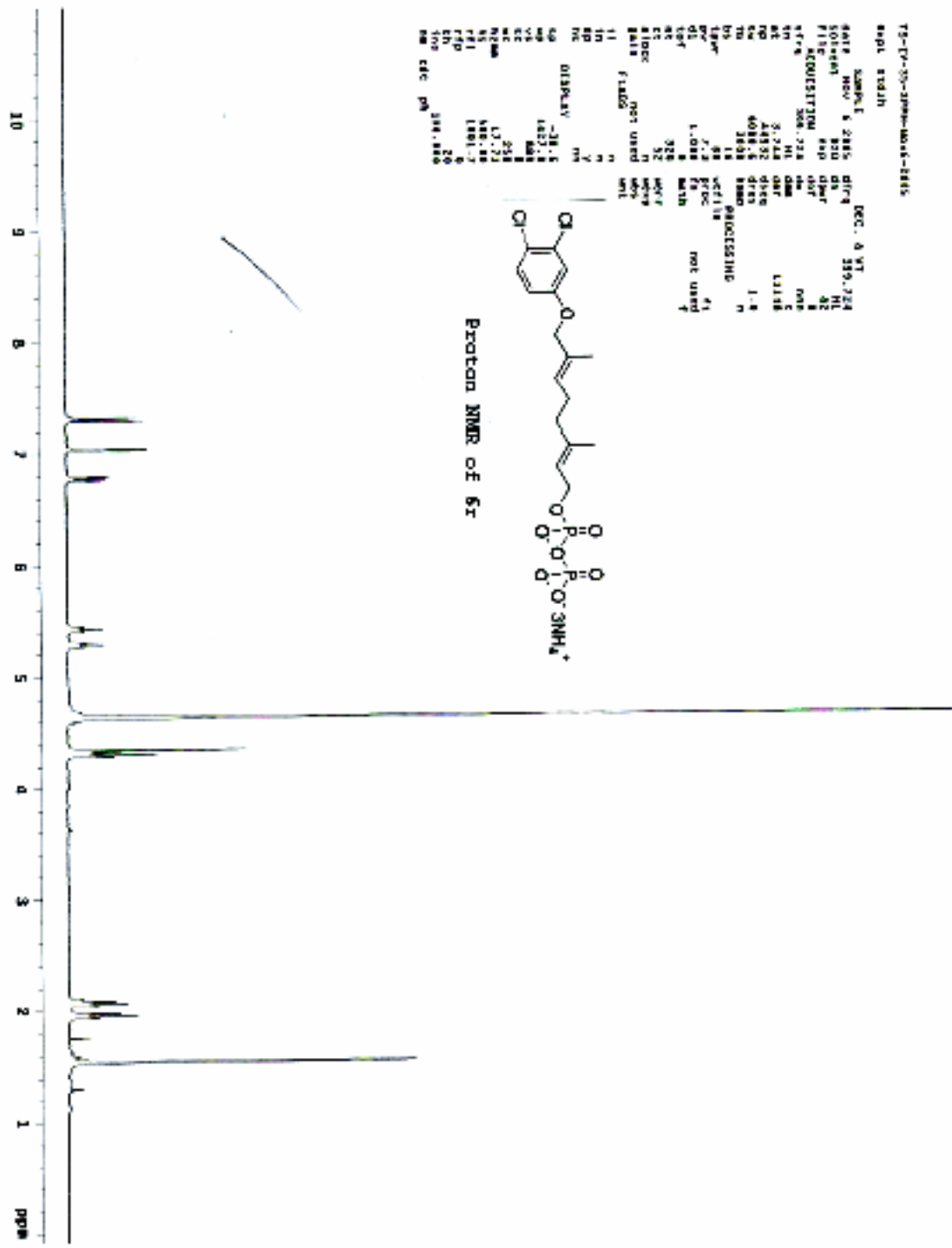
75-17-55-3298-0465-2885

SEPL STADN

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SOLVENT  H2O  DS      HL
FILE  ACQU0517204  exp  dbr      42
PROC  ACQU0517204  acq  oar      8
PRG    300.724      dm               PFG
SI      3.724  dar      L1156
SW      4084.5  drcs     1.4
TG      2400    SMOO      PACISSIMS
DS      18      PDC118
SRPR    7.24  PRC  not used ?
DI      1.000  F#
TSP      328  Math
ES      52
AQ      328  not used ?
AQLOC  0
SLOTS  1
SATS  11      not used
IN      1      "
AP      0      "
PC      0      "
DISPLAY  -18.5  "
WD      1427.8  "
VS      600
ES      17.24  "
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TSP      1981.5  "
AQ      20
TOS  200.880  "
END  CFC  PFG  359.724
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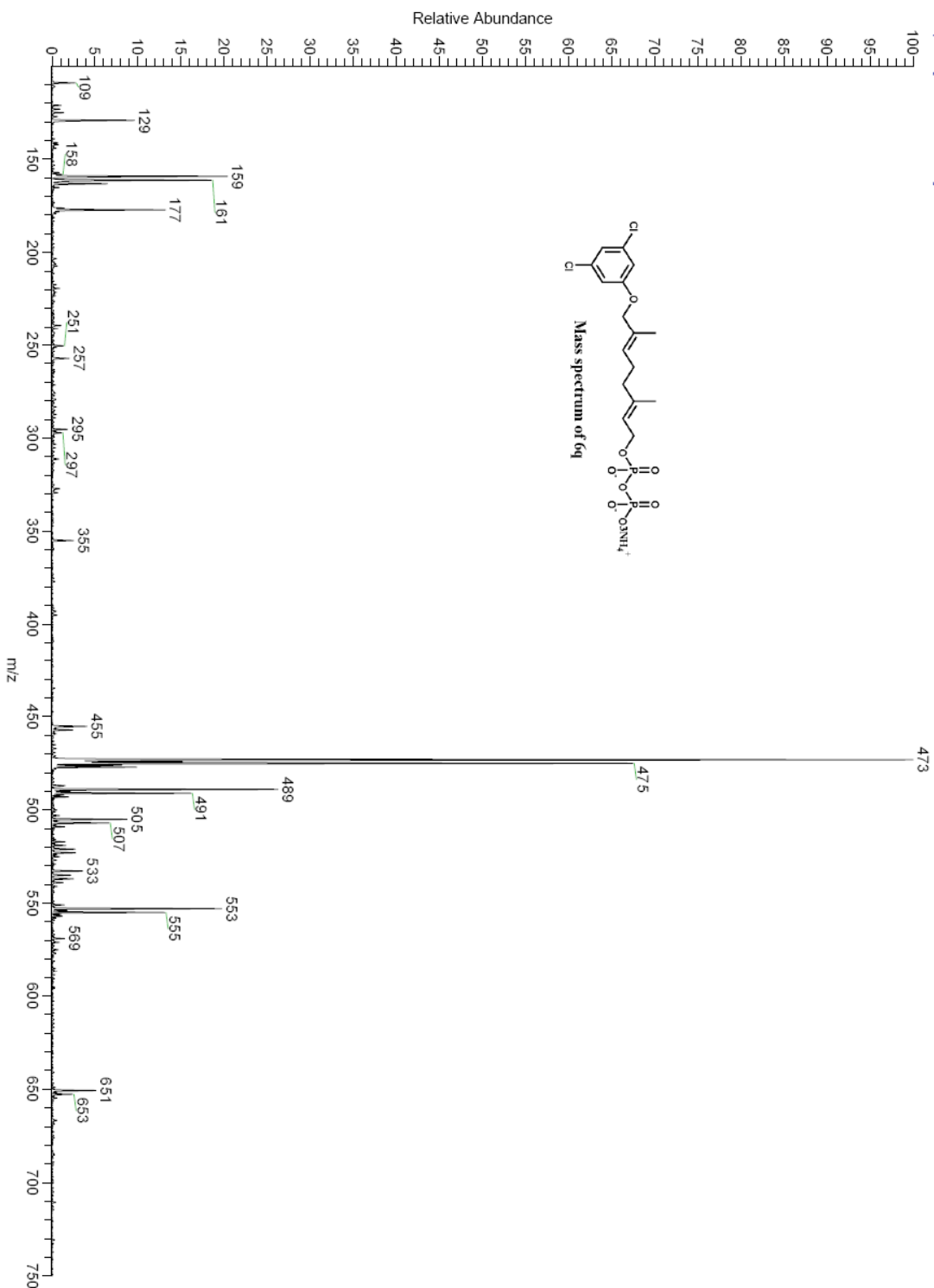
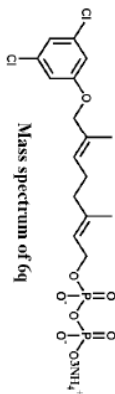


Proton NMR of 6r





J7-0631 #28-37 RT: 2.02-2.95 AV: 10 SM: 5B NL: 3.58E3  
[- p.ms [100.00-750.00]]

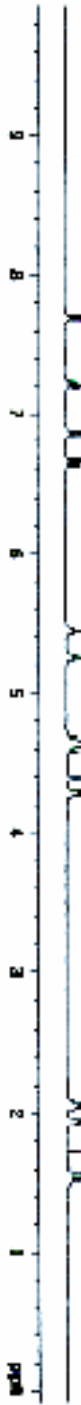
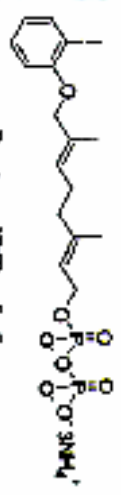


78-31-91-2000-mar-01-8-2000

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TIME: 08:00:00  
INSTR: spect  
PROC: 1D  
F2: 100.625  
F1: 400.130  
SOLVENT: CDCl3  
ACQUISITION: 1024 64000  
NAME: 78-31-91-2000-mar-01-8-2000

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5	3.00	3.00	CH3
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7	4.00	3.00	CH3
8	4.50	3.00	CH3
9	5.00	3.00	CH3
10	5.50	3.00	CH3
11	6.00	3.00	CH3
12	6.50	3.00	CH3
13	7.00	3.00	CH3
14	7.50	3.00	CH3
15	8.00	3.00	CH3
16	8.50	3.00	CH3
17	9.00	3.00	CH3



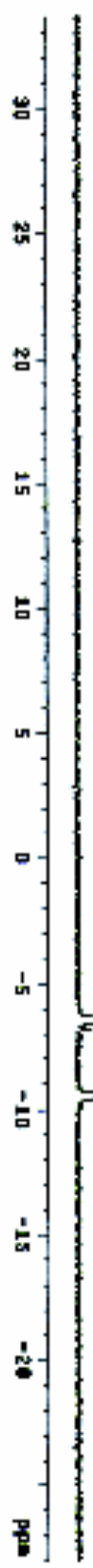
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65 4.810 0000 0000
66 4.810 0000 0000
67 4.810 0000 0000
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70 4.810 0000 0000
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91 4.810 0000 0000
92 4.810 0000 0000
93 4.810 0000 0000
94 4.810 0000 0000
95 4.810 0000 0000
96 4.810 0000 0000
97 4.810 0000 0000
98 4.810 0000 0000
99 4.810 0000 0000
100 4.810 0000 0000

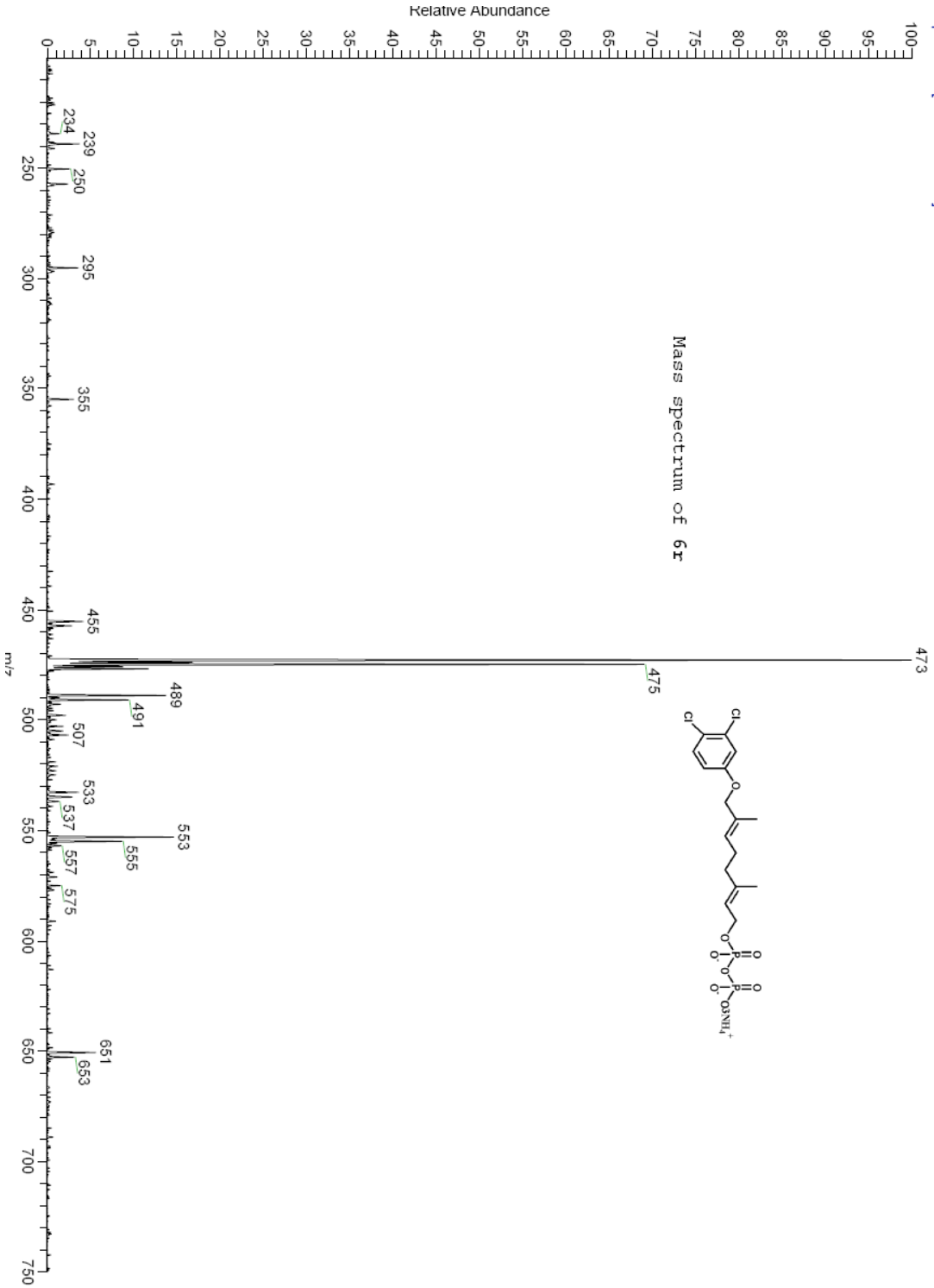
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Phenolphthalein NMR of 5m

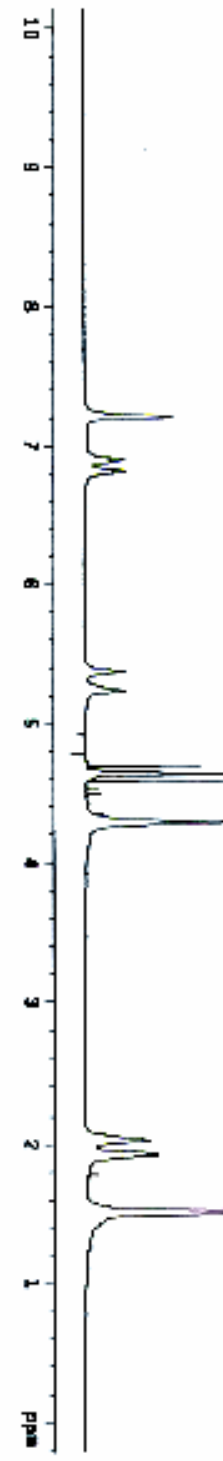


7-0629 #17-24\_RT: 1.69-2.40\_AV: 8\_SM: 58\_NL: 3.36E3  
: -p-Full.ms [200.00-750.00]



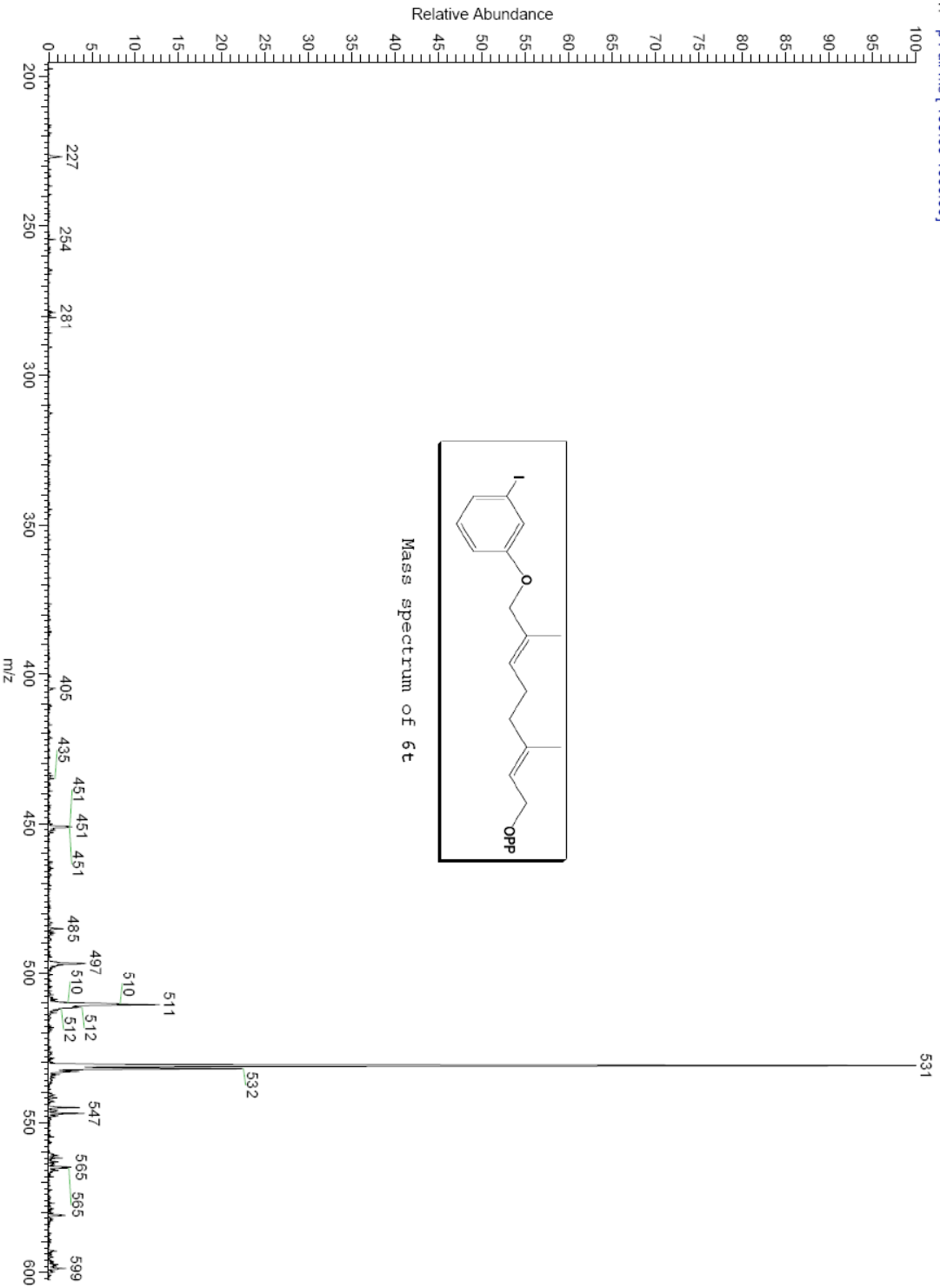
79-11-61-300M-Harshis-6645  
mp: 210-211

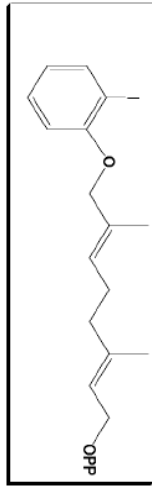
```
      SAMPLE      SEC. 8. VJ 285.754  
DATE  MAR 58 2405  DTG  010  
INSTR  MR 500  RSD  010  
FILE  JPM/DATE/NAME-OPR  010  
APPROV  MR/DATE/TIME-OPR  010  
%SOLV  MR/DATE/TIME-OPR  010  
ACQUISITION  891.748  000  151.46  
DTG  285.754  0000  1.0  
IN  1.244  0000  0  
SC  4.932  DTG03  0002  
TR  810  012  
DR  15  010  
DPR  7.3  0002  1  
OL  8.109  0002  0  
OT  25  0102  240  
OT  25  0102  240  
DATA  not saved  0  
FLAG  not saved  0  
UNIT  1.0  
PROC  11  
PRG  400 WFO  
M  N  
AP  2  
SI  3  
DI  2  
DISP  40  
SP  -47.4  0002  
VP  4139.5  0002  
VE  3457  0002  
SI  25  
SC  151.46  
IN  2849.50  
RT  2881.7  
TH  8  
SU  19  
MS  2.1008  
MS  CDC  84
```



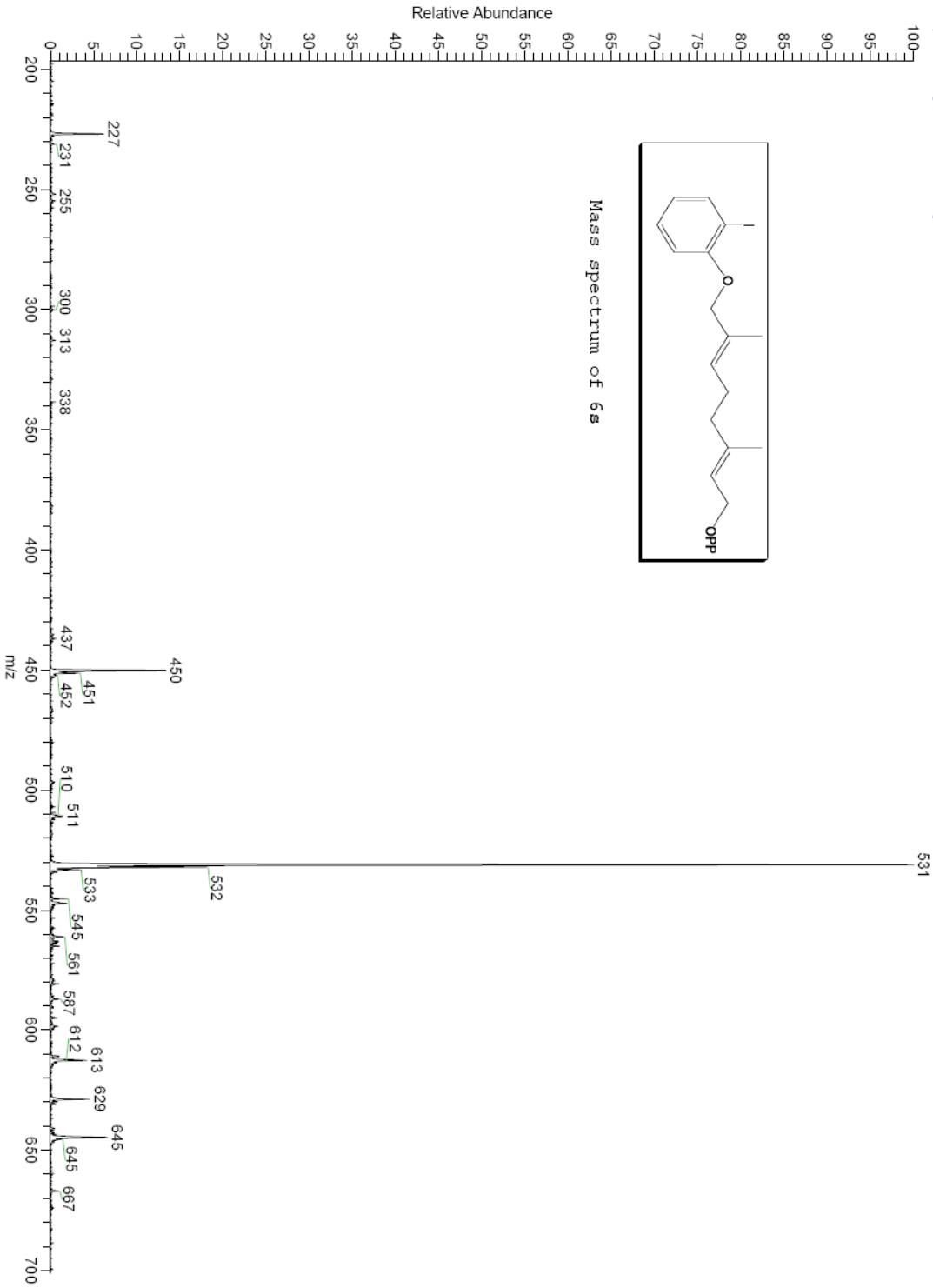








Mass spectrum of 6s



15-11-87-40111-000-0113-1103  
 NAME: 40111

Sample: 40111  
 Date: 11/11/87  
 Time: 10:00  
 File: /usr/local/lib/chem/40111-1103-0113-1103  
 Acquisition: 1103-1103-0113-1103  
 Processing: 1103-1103-0113-1103  
 Name: 40111

Chrg	Mass	Area	Int	Ratio
1	312.0	11110	1.0	1.0

Acquisition: 1103-1103-0113-1103  
 Name: 40111

Chrg	Mass	Area	Int	Ratio
1	312.0	11110	1.0	1.0

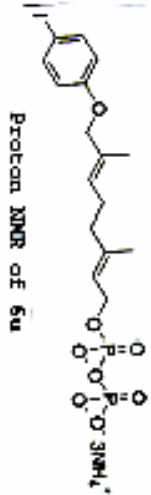
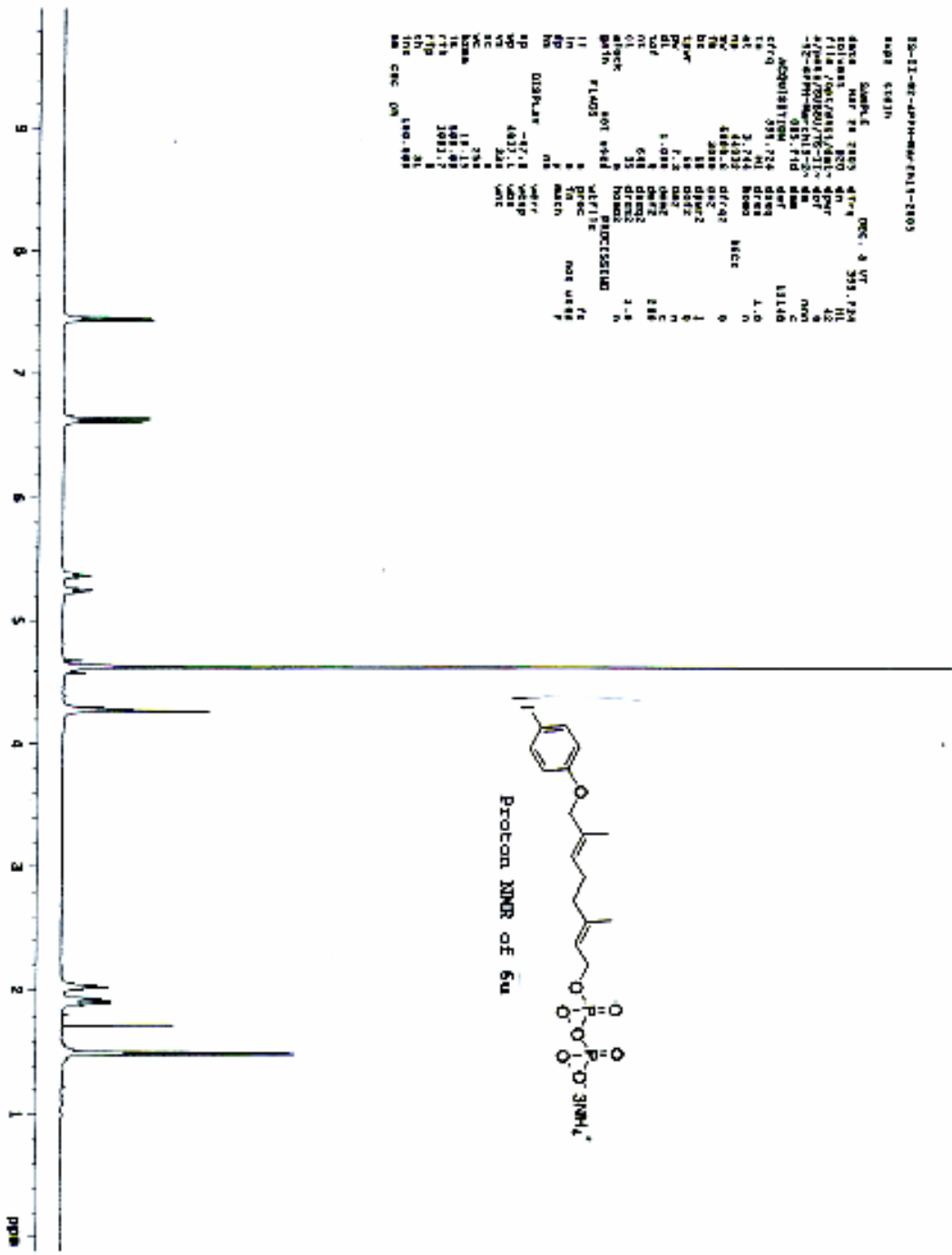
Processing: 1103-1103-0113-1103  
 Name: 40111

Chrg	Mass	Area	Int	Ratio
1	312.0	11110	1.0	1.0

Reference: 1103-1103-0113-1103  
 Name: 40111

Chrg	Mass	Area	Int	Ratio
1	312.0	11110	1.0	1.0

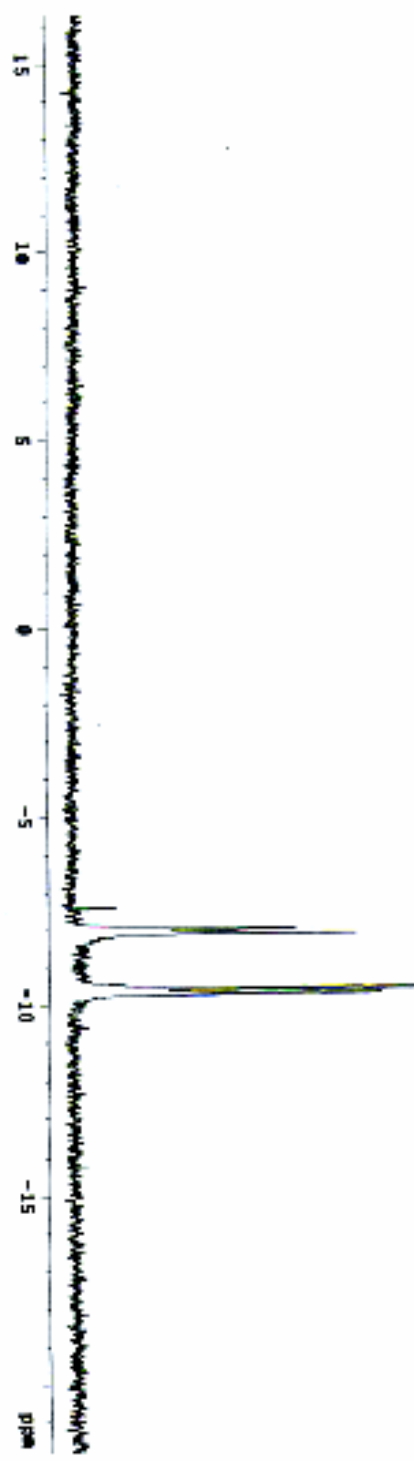
Reference: 1103-1103-0113-1103  
 Name: 40111



13-03-02-02F-MAR-01-01-0003

4001 07361

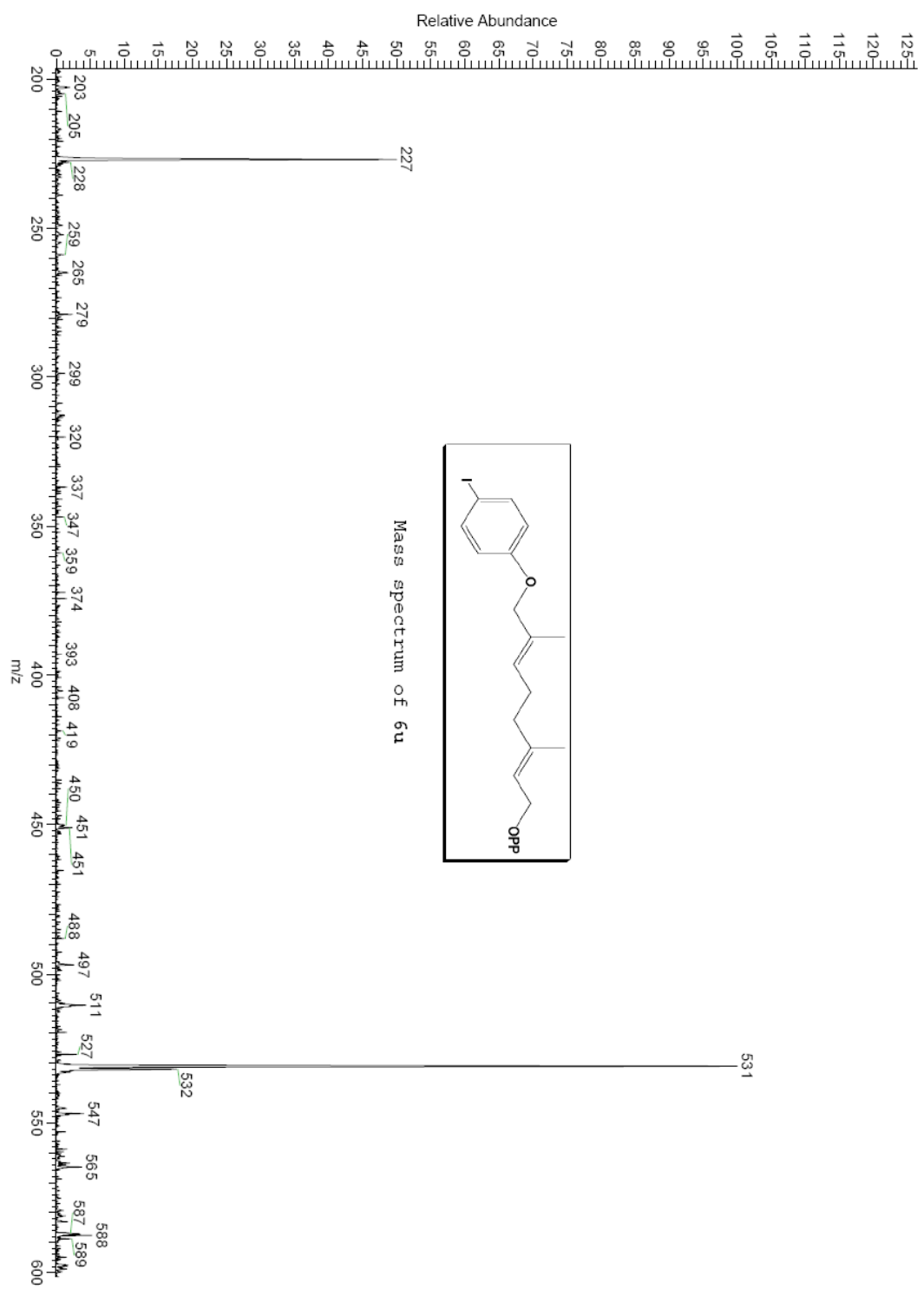
DATE SAMPLE REC. & WT  
 03-MAR-2005 09:03 724  
 1717048/8181/401-000-000  
 4/28/05/08BU75-11-00F  
 32-408-MAR-01-01-0003  
 81-718 000  
 81-718 000  
 ACQUISITION 00F 23244  
 P1RE 151.011 0524 1.4  
 41 8.488 0000  
 00 18000  
 01 18000  
 02 18000  
 03 18000  
 04 18000  
 05 18000  
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 98 18000  
 99 18000  
 100 18000



J:\Calibration\data\UKMISH-U-9-0336  
15-0336 #10-24\_RT: 0.33-0.85\_AV: 15\_NL: 1.72E4  
I: - P Full ms [100.00-1000.00]

USJ26/2009 10:02:21 AM

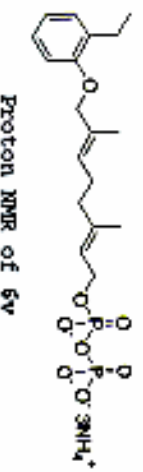
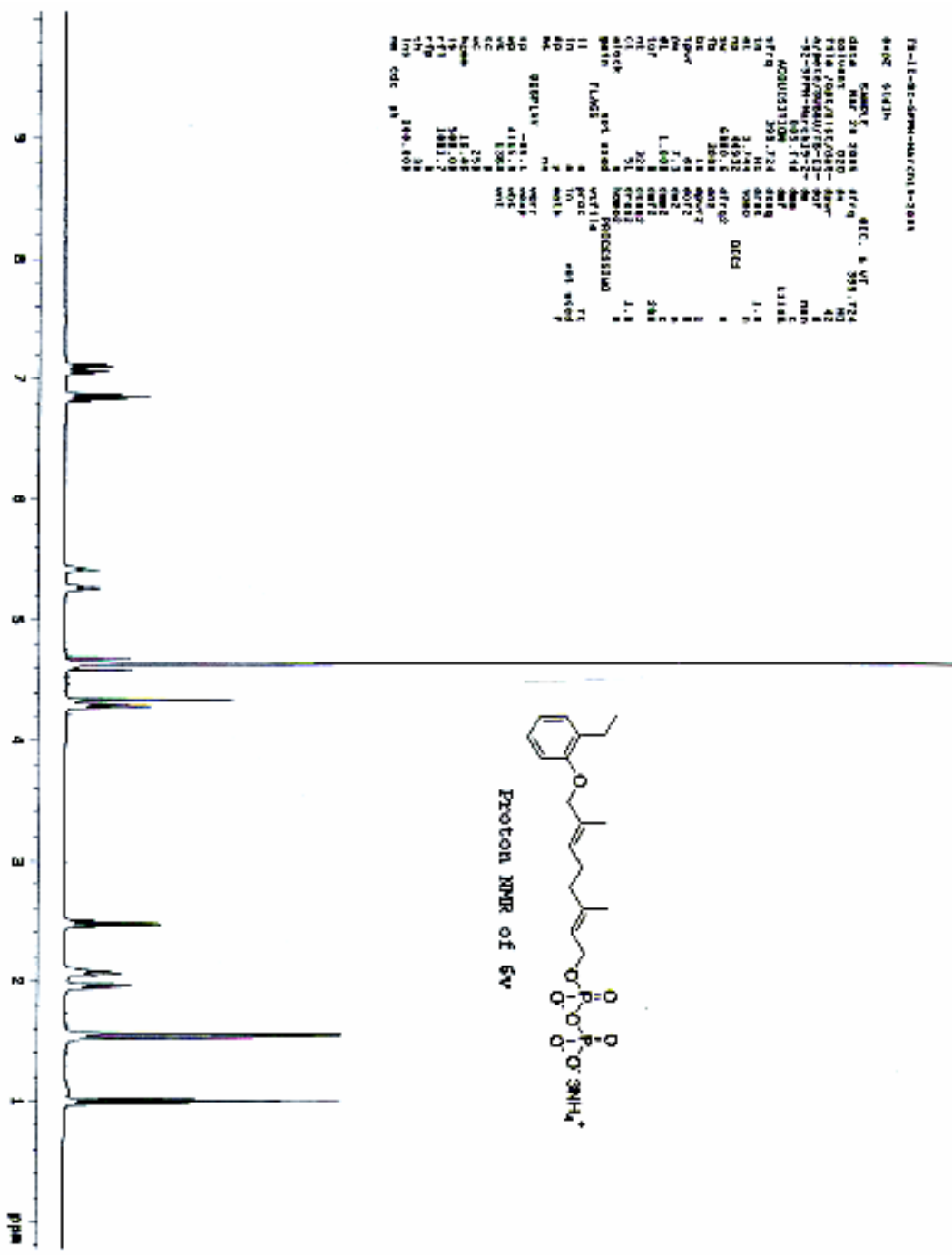
13-11-92-4



```

78-11-81-dpm-marc11-1988
NAME SIGMA
=====
DATE MAR 26 1988  TIME 8:46
SOLVENT D2O 80
F1A /081/151/081- 800
A/PMT/20000/75-12- 407
-82-9PM-MARC11-19- 20
=====
FREQ 400.151305 190 MHz 131.48
ACQUISITION 295.724 5200
IN HE 4788 1.6
AQ 3.244 3000
RG 64801 4800
FID 2048 2048
=====
PROC 48 600.72 1.6
DC 48 600.72 1.6
AQ 7.13 596.2
RG 1.609 4800
FID 328 528
CI 51 51
=====
A/D CHAN 1 1
MODE PROGRESSIVE
GAIN FLAGE 380
=====
=====
11 11 11 11
IN 8 8 8 8
AQ 7 7 7 7
MC DISPLX 7 7
=====
SQ DISPLX -18.1 78
SP 4155.5 124
SC 1368 36
=====
Name 11 11 11 11
F1 588.08 1811.7 3
F2 74 74 74 74
F3 10 10 10 10
=====
mp cdc at 100-105

```

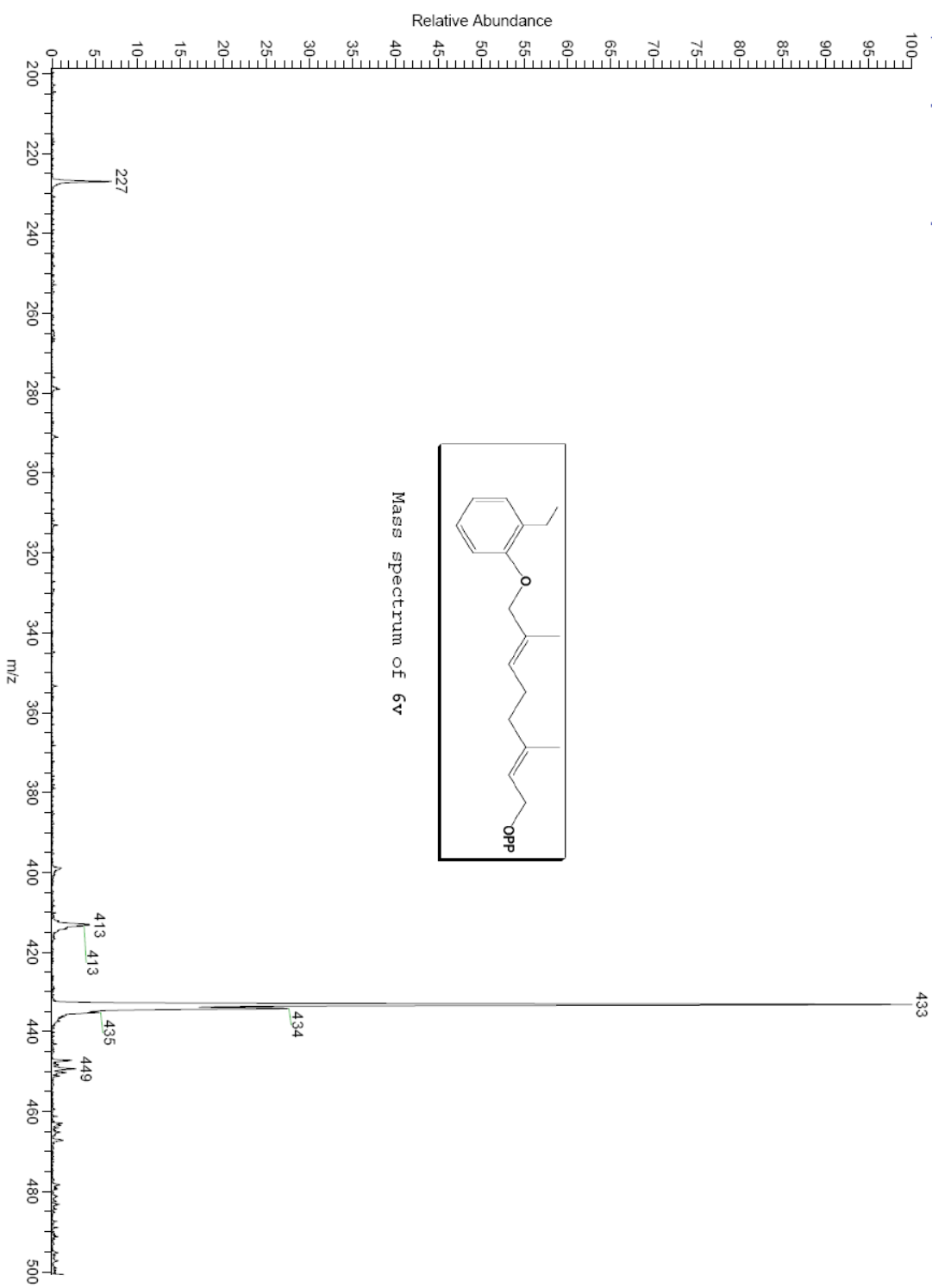




15-0337 #13-22\_RT\_0.55-0.94\_AV\_10\_NL\_5.09E4  
T: - P Full ms [100.00-1000.00]

03/28/2005 10:20:48 AM

TS-11-92-5

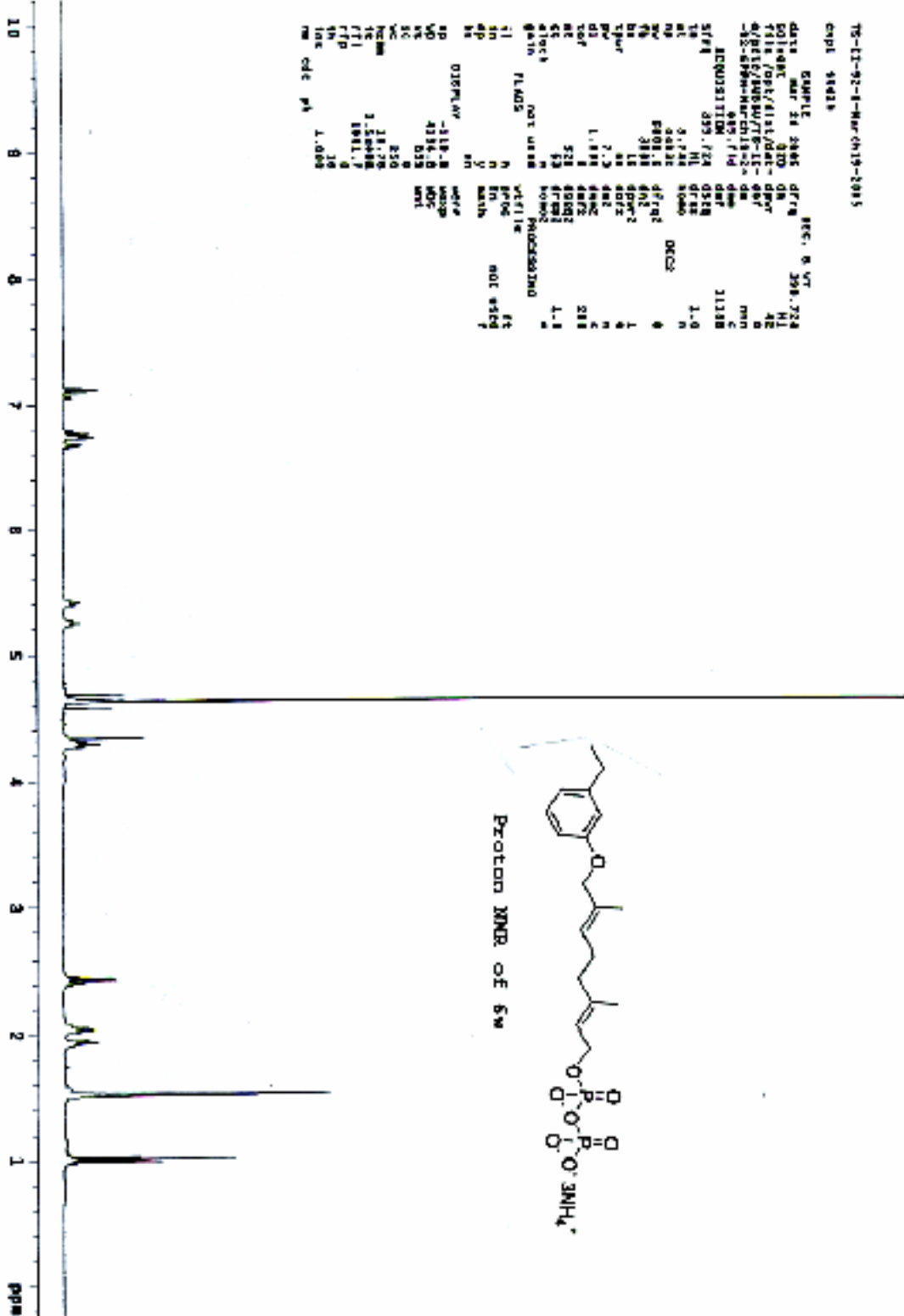




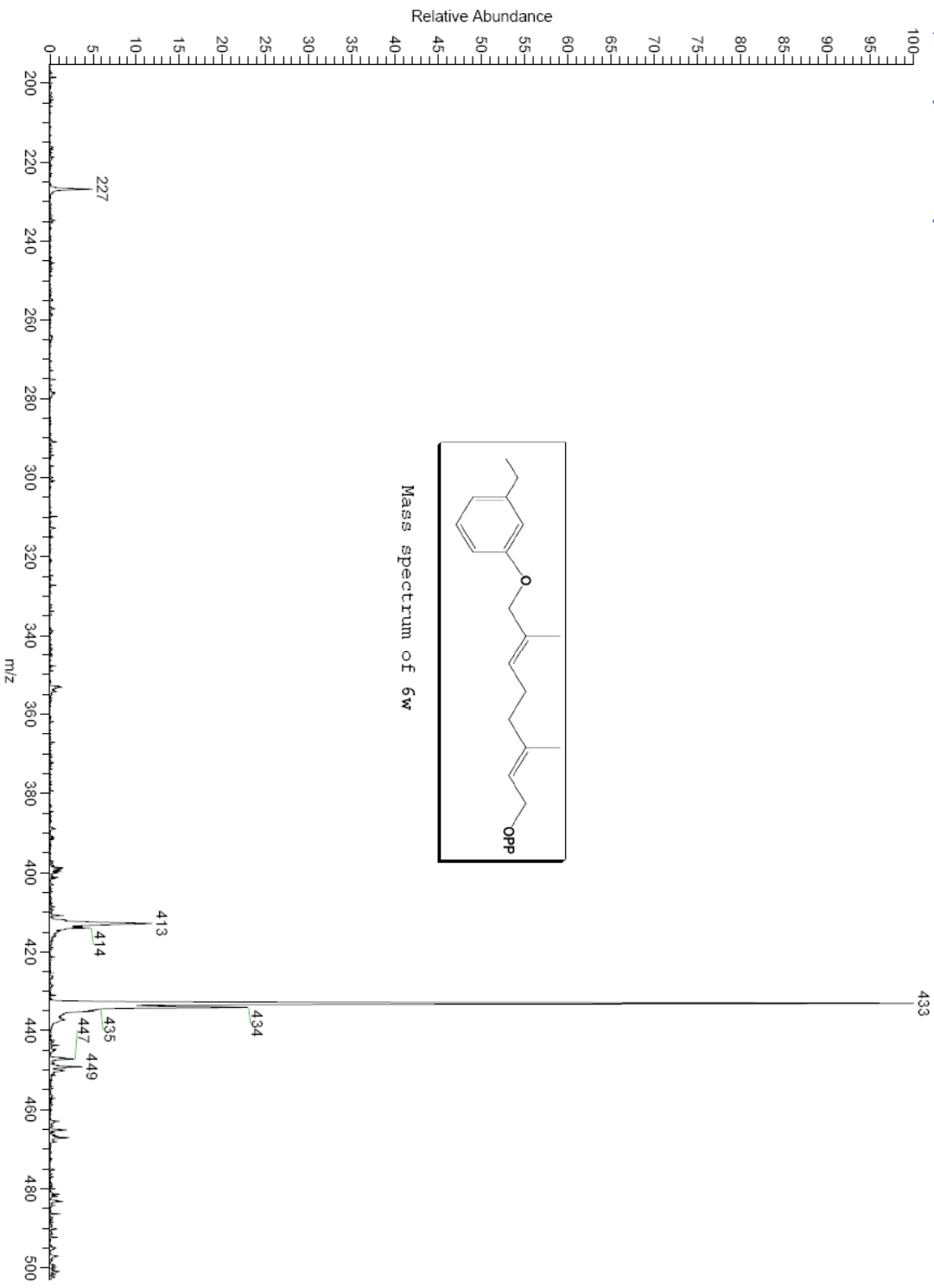
exp1 910218

```

SAMPLE 24 2406 6798 REC: 8 VT
DATE 011902T MAR 24 2006 6798 206.724
D11000000000000000000000000000000
D11000000000000000000000000000000
41100000000000000000000000000000
41100000000000000000000000000000
-32.000000000000000000000000000000
-60.000000000000000000000000000000
690 FID dm 11.888
ACQUISITION 350.724 6518 dmf 11.888
S/F# 350.724 6518 6518 1.0
IS 3.746 NI dfrs 1.0
NI 3.746 NI 3000
NP 3000 DECS 0
NR 3000 dfrqs 0
FR 3188 NI 4
BI 3188 NI 4
SPR 3188 NI 4
SD 1.889 NI 4
WOF 528 40002 283
SE 53 dfrms 1.1
stact 53 home2
gain not used Processing
FLMS 11 vertic
IN NI PROC
EP NI EN NOT STED
SI Y math
SI NI
DI0PLAY -118.8 wdrw
NO 4184.0 wdrw
SI 328 MDR
SI 328 MDR
SC 520
SCM 18.78
TC 1.50000
TFI 1881.7
TFP 0
TM 10
loc cdc pk 1.000
    
```

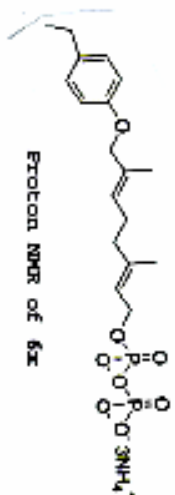
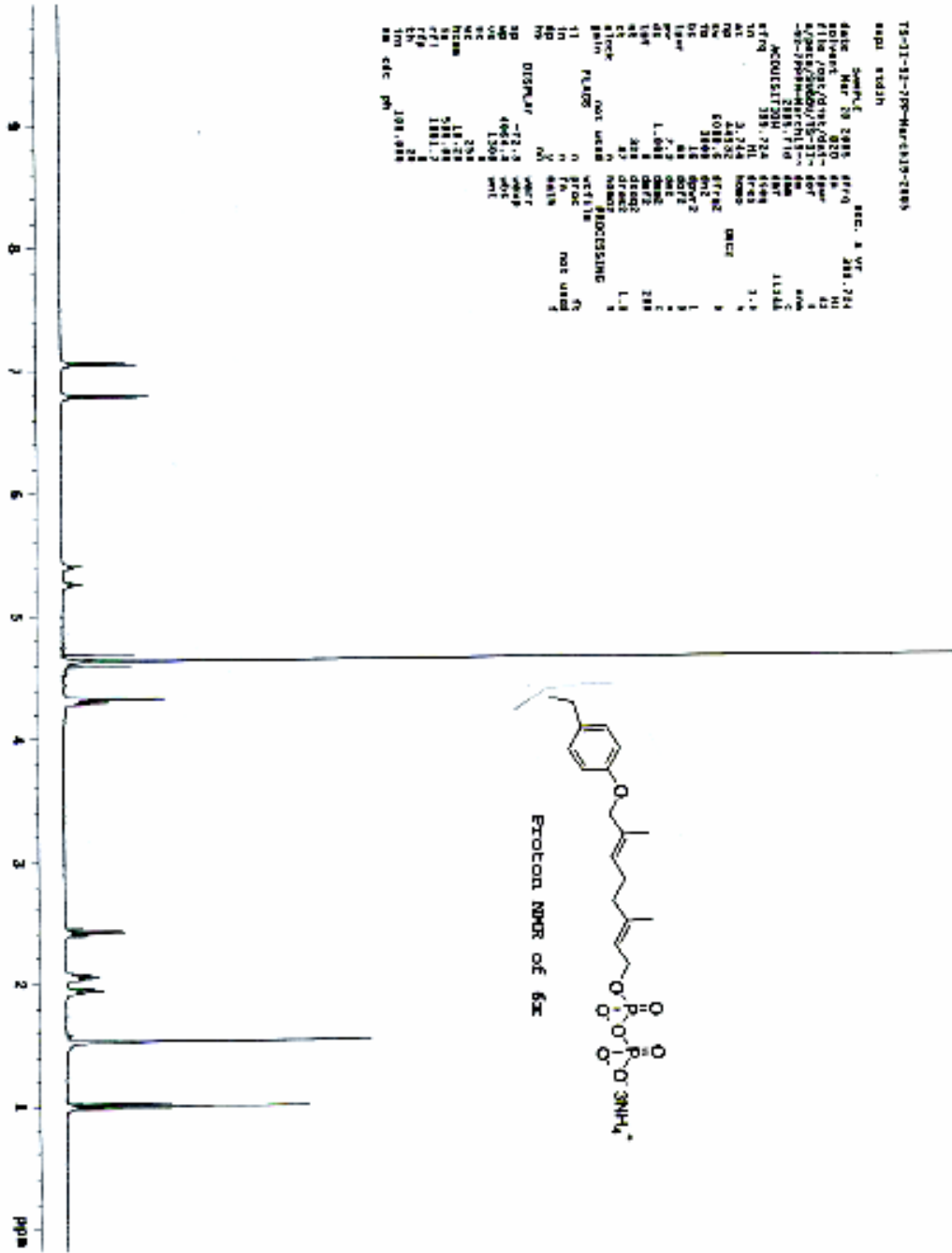






13-11-91-7P-MARCK19-2893

NAME: 5AMP.F SEC: 3 VF  
DATE: Mar 29 2005 8:00 AM 288.724  
FILE: /D01/0191/001-494-43  
EXPER: 2005/03/29/15-11-407  
ACQUISITION: 15-11-407  
PROC: 2005/03/29/15-11-407  
ACQUISITION: 288.724 5000  
IN: H<sub>2</sub>O 1.0  
AL: 2.744 10000  
NO: 50000 57.02 1  
DS: 16 5000 2  
PR: 48 5000 2  
DE: 1.000 5000 2  
VE: 288 5000 2  
ET: 47 5000 2  
BLOCK: not used  
BIN: FLEURS not used  
IN: 0 proc not used  
IP: 0 file  
NP: 0 data  
DISP: -71.0 1000  
WC: 4004.8 1000  
CC: 1200 1000  
NC: 200 1000  
PC: 18.28 1000  
SI: 288.724 1000  
FID: 1000 1000  
SN: 1000 1000  
IN: 1000 1000  
aa etc pr 1000.000

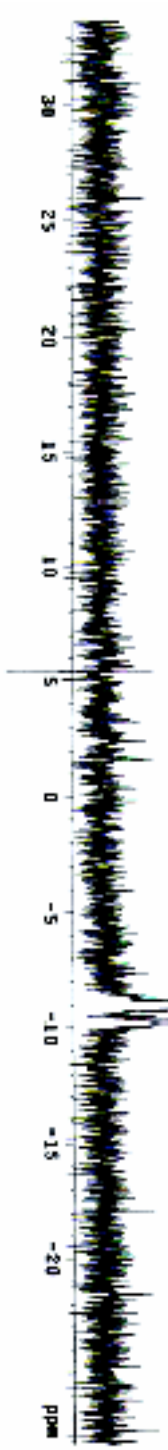
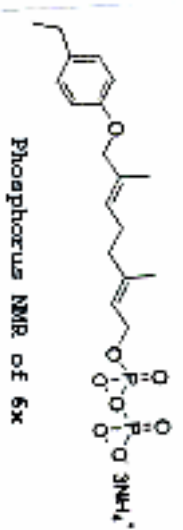


28-11-87--2ppm-mw/zn13-2885

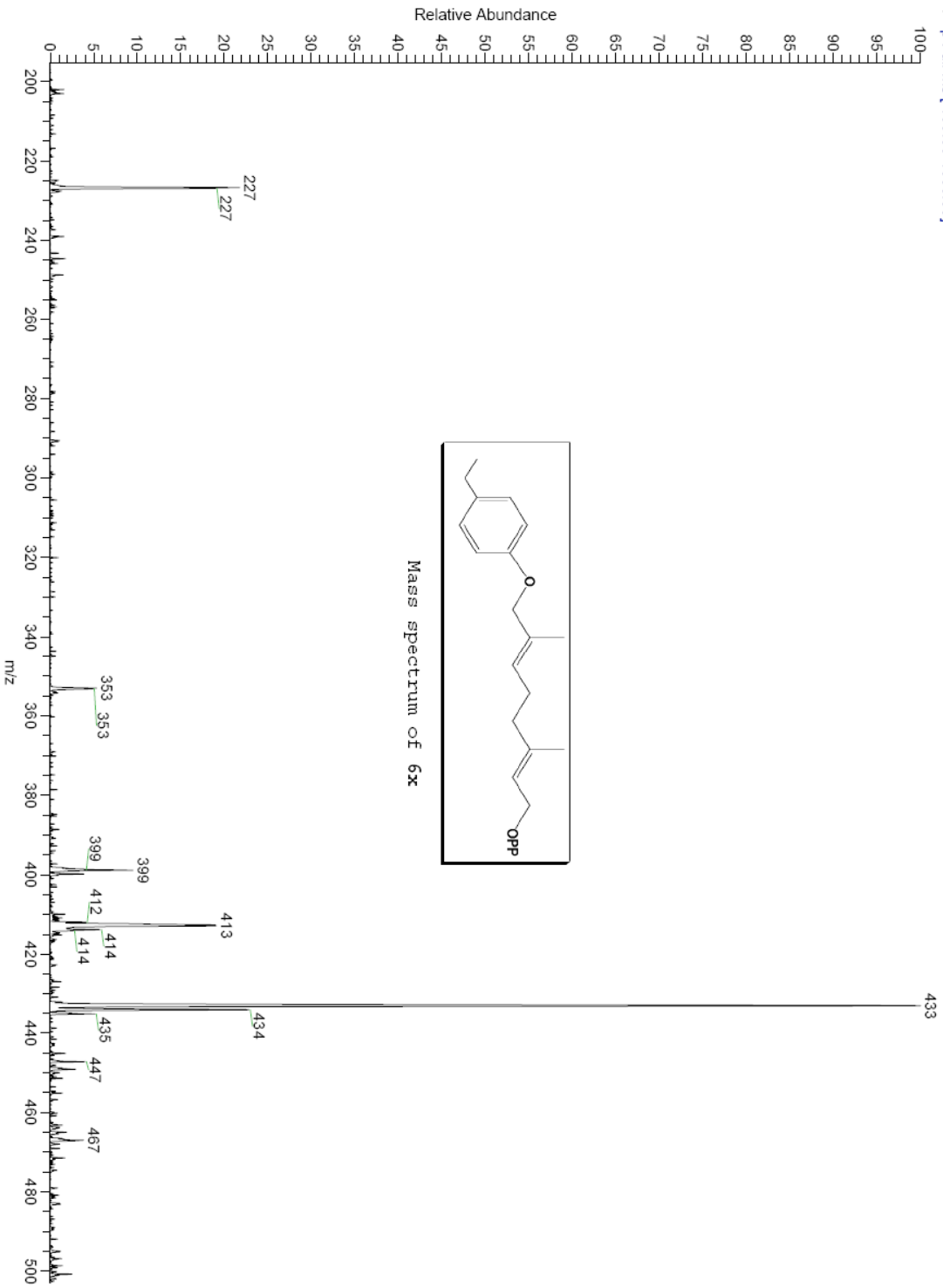
0801 42801

```

          Channel 1: 31P 2885   dfrq  sec. 8.07
          Name      Mar 28 2885   020   da   118
          File      /opt/gm1312/2885-020-   8
          4/PPM-86/2885-020-   8
          25-2885-86/2885-020-   8
          ACQUISITION  25.710   dm   11888
          5719   181.211   d2a2
          56   181.211   d2a2
          55   181.211   30000
          54   181.211   30000
          53   181.211   30000
          52   181.211   30000
          51   181.211   30000
          50   181.211   30000
          49   181.211   30000
          48   181.211   30000
          47   181.211   30000
          46   181.211   30000
          45   181.211   30000
          44   181.211   30000
          43   181.211   30000
          42   181.211   30000
          41   181.211   30000
          40   181.211   30000
          39   181.211   30000
          38   181.211   30000
          37   181.211   30000
          36   181.211   30000
          35   181.211   30000
          34   181.211   30000
          33   181.211   30000
          32   181.211   30000
          31   181.211   30000
          30   181.211   30000
          29   181.211   30000
          28   181.211   30000
          27   181.211   30000
          26   181.211   30000
          25   181.211   30000
          24   181.211   30000
          23   181.211   30000
          22   181.211   30000
          21   181.211   30000
          20   181.211   30000
          19   181.211   30000
          18   181.211   30000
          17   181.211   30000
          16   181.211   30000
          15   181.211   30000
          14   181.211   30000
          13   181.211   30000
          12   181.211   30000
          11   181.211   30000
          10   181.211   30000
          9    181.211   30000
          8    181.211   30000
          7    181.211   30000
          6    181.211   30000
          5    181.211   30000
          4    181.211   30000
          3    181.211   30000
          2    181.211   30000
          1    181.211   30000
    
```



15-0339\_#22-34\_RT\_0.63-0.98\_AV\_13\_NL\_3.81E4  
- p-Full.ms [100.00-1000.00]





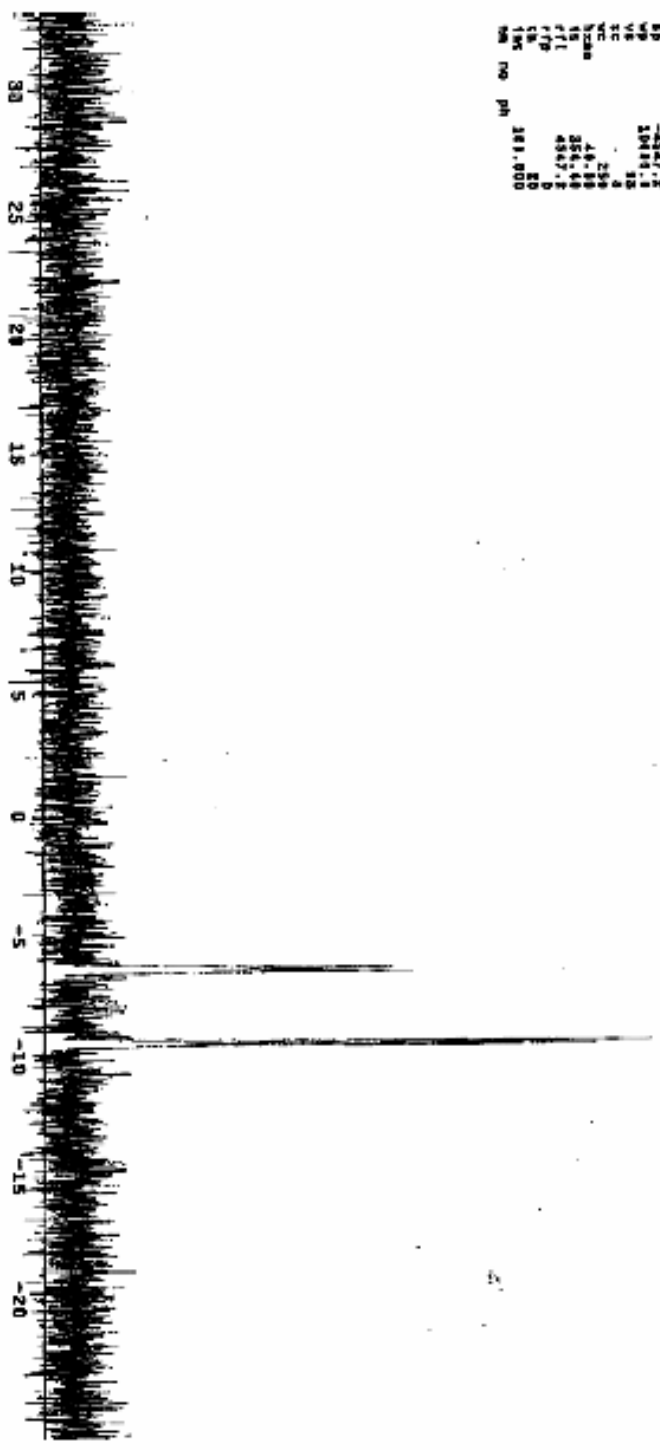
```

SOLVENT  H2O
PULSE  12.00
PROG  1
F1  100.625
F2  100.625
F3  100.625
F4  100.625
F5  100.625
F6  100.625
F7  100.625
F8  100.625
F9  100.625
F10  100.625
F11  100.625
F12  100.625
F13  100.625
F14  100.625
F15  100.625
F16  100.625
F17  100.625
F18  100.625
F19  100.625
F20  100.625
F21  100.625
F22  100.625
F23  100.625
F24  100.625
F25  100.625
F26  100.625
F27  100.625
F28  100.625
F29  100.625
F30  100.625
F31  100.625
F32  100.625
F33  100.625
F34  100.625
F35  100.625
F36  100.625
F37  100.625
F38  100.625
F39  100.625
F40  100.625
F41  100.625
F42  100.625
F43  100.625
F44  100.625
F45  100.625
F46  100.625
F47  100.625
F48  100.625
F49  100.625
F50  100.625
F51  100.625
F52  100.625
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F56  100.625
F57  100.625
F58  100.625
F59  100.625
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F61  100.625
F62  100.625
F63  100.625
F64  100.625
F65  100.625
F66  100.625
F67  100.625
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F69  100.625
F70  100.625
F71  100.625
F72  100.625
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F74  100.625
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F76  100.625
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F78  100.625
F79  100.625
F80  100.625
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F89  100.625
F90  100.625
F91  100.625
F92  100.625
F93  100.625
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F97  100.625
F98  100.625
F99  100.625
F100  100.625

```

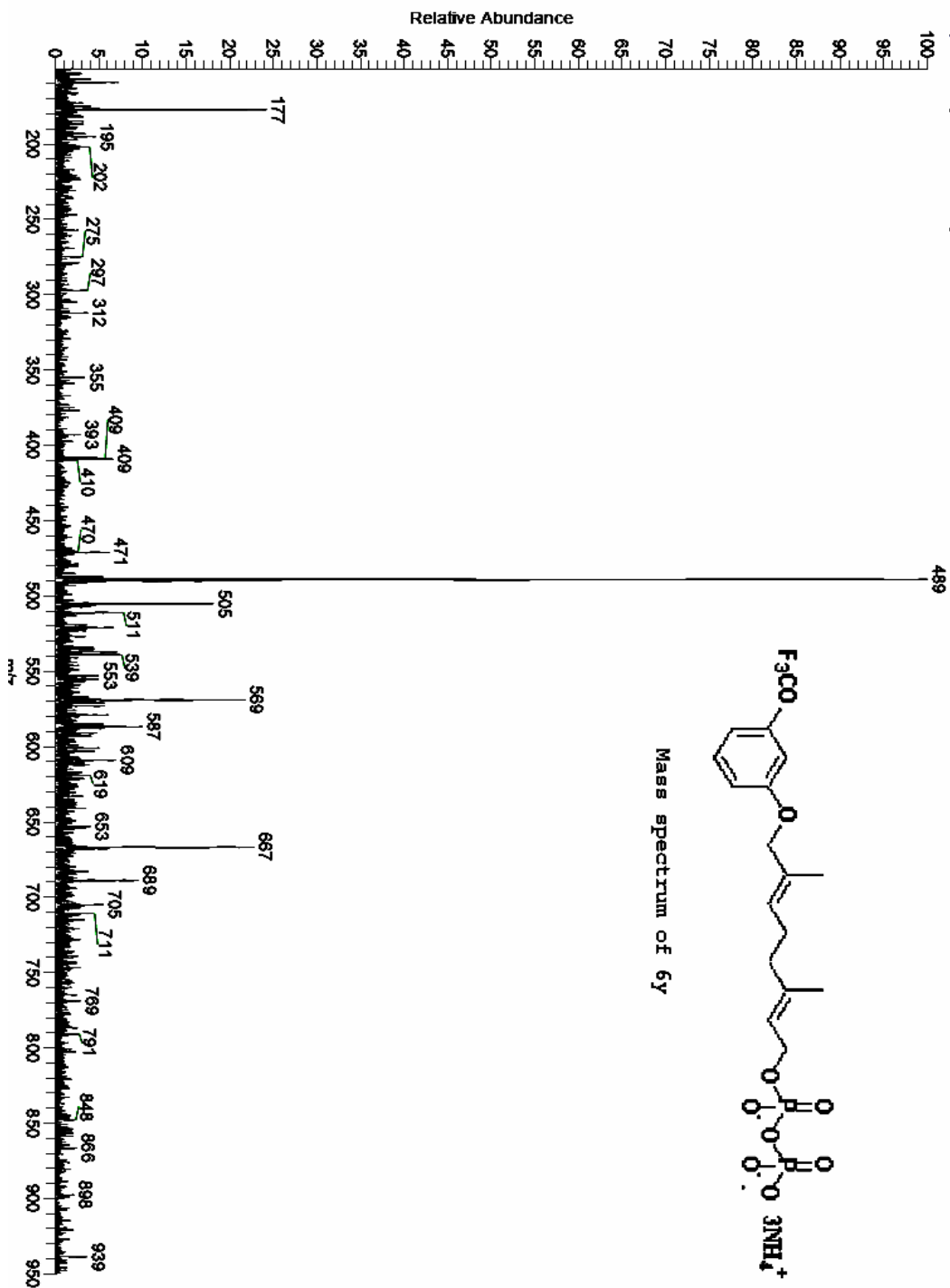


<sup>31</sup>P NMR spectrum of 4y

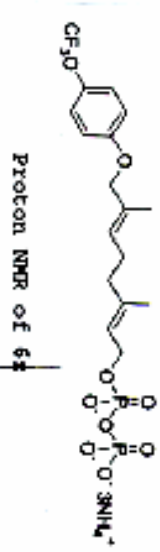




09-0121 #65-76 RT: 1.71-2.00 AV: 12 NL: 1.05ES  
T: - p Full ms [150.00-950.00]

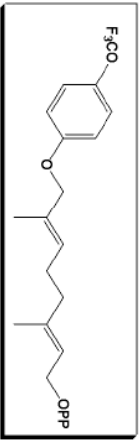


```
13C-NMR-400MH-DMF-d7-2000
NOE1 41616
=====
SAMPLE NO: 2825 dfrq: 600.0 MHz
DATE: MAR 21 2000 dfrq: 125.76 MHz
PROC. BY: JI/SJ/SLP-qip
PROG: 4000075-11-d0f
4000075-11-d0f
43-33H-NMR-2825-1-24
INSTRUM: JEOL-FTS
PULPROG: zgpg30
ACQUISITION: 754 scans
SOLVENT: dmf
NS: 200
DS: 4
SWH: 13091.200 Hz
F2: 125.760 MHz
F1: 400.141 MHz
AQ: 1.50000000 sec
RG: 327.680
AQ1: 0.03125000 sec
RG1: 1.310
DELTA: 2.00000000 sec
DECPHY: 4150.2 MHz
NUC1: 13C
NUC2: 1H
IR1: 100.625 MHz
IR2: 400.141 MHz
WDW: EM
SSB: 0
LB: 0.30000000 Hz
GB: 0
PC: 2.00000000 sec
DECT: 1
TE: 300.2 K
DELTA2: 2.00000000 sec
SFO1: 125.760 MHz
SFO2: 400.141 MHz
SFO3: 100.625 MHz
SFO4: 400.141 MHz
SFO5: 400.141 MHz
SFO6: 400.141 MHz
SFO7: 400.141 MHz
SFO8: 400.141 MHz
SFO9: 400.141 MHz
SFO10: 400.141 MHz
=====
PROC. BY: JI/SJ/SLP-qip
DATE: MAR 21 2000
TIME: 14.54
=====
DATE: MAR 21 2000
TIME: 14.54
=====
```

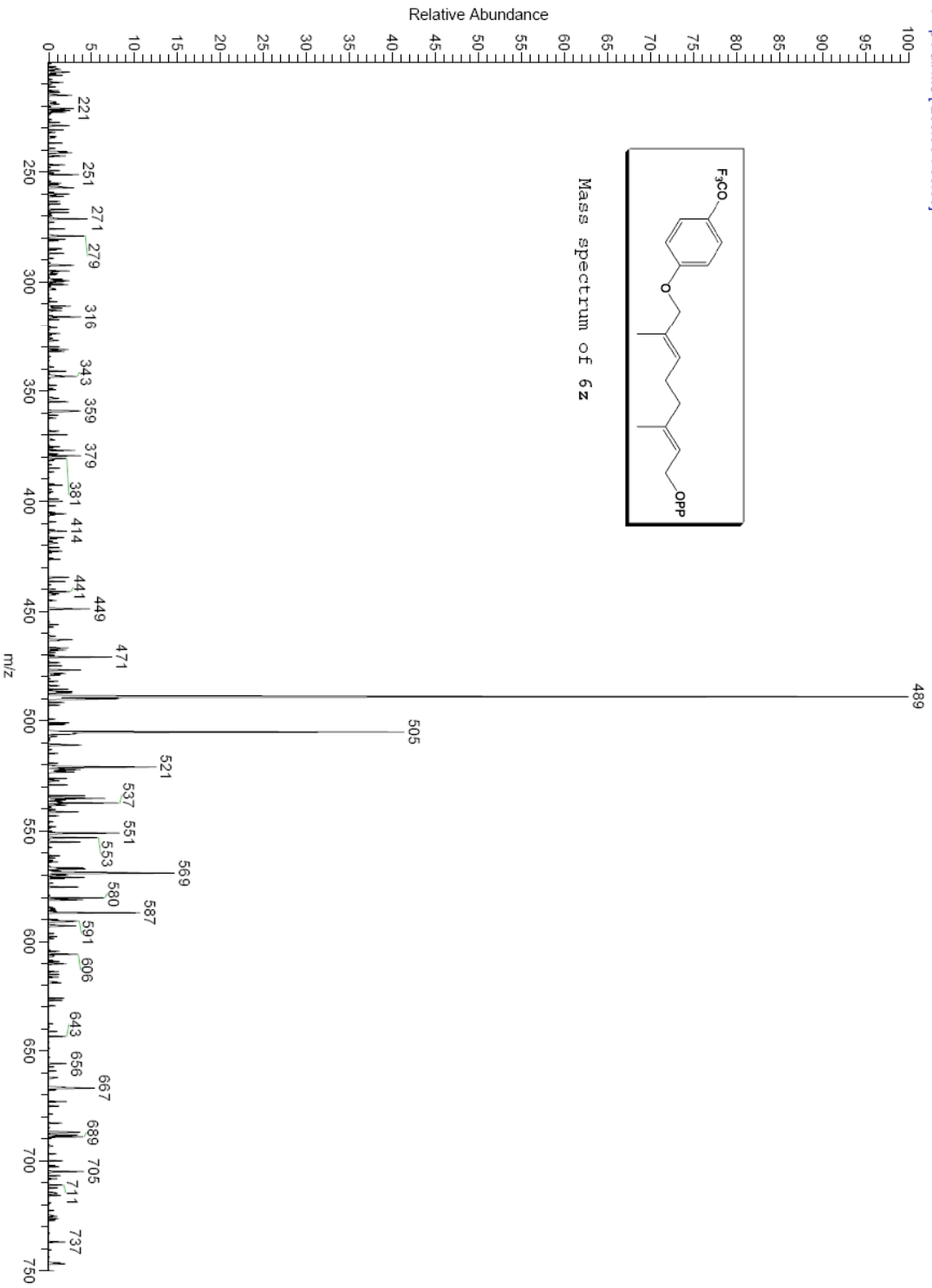




17-0632 #10-18 RT: 0.99-1.81 AV: 9 SM: 5B NL: 1.30E2  
- p Full ms [200.00-750.00]



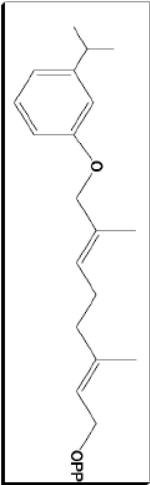
Mass spectrum of 6z



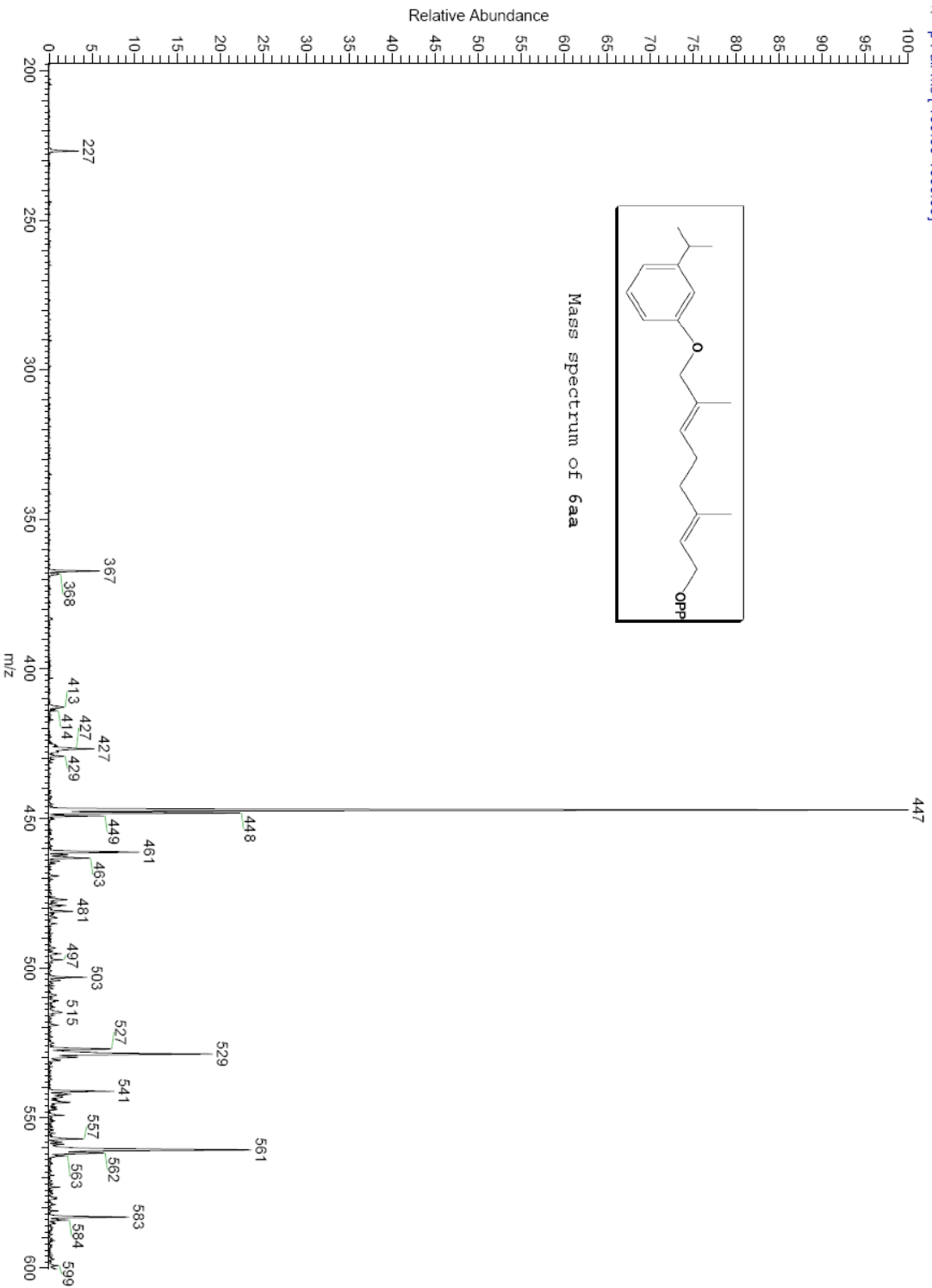




15-0346 #17-27 RT: 0.49-0.79 AV: 11 NL: 1.69E5  
F: - P Full ms [ 100.00-1000.00]



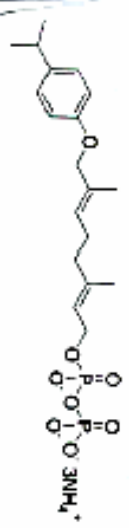
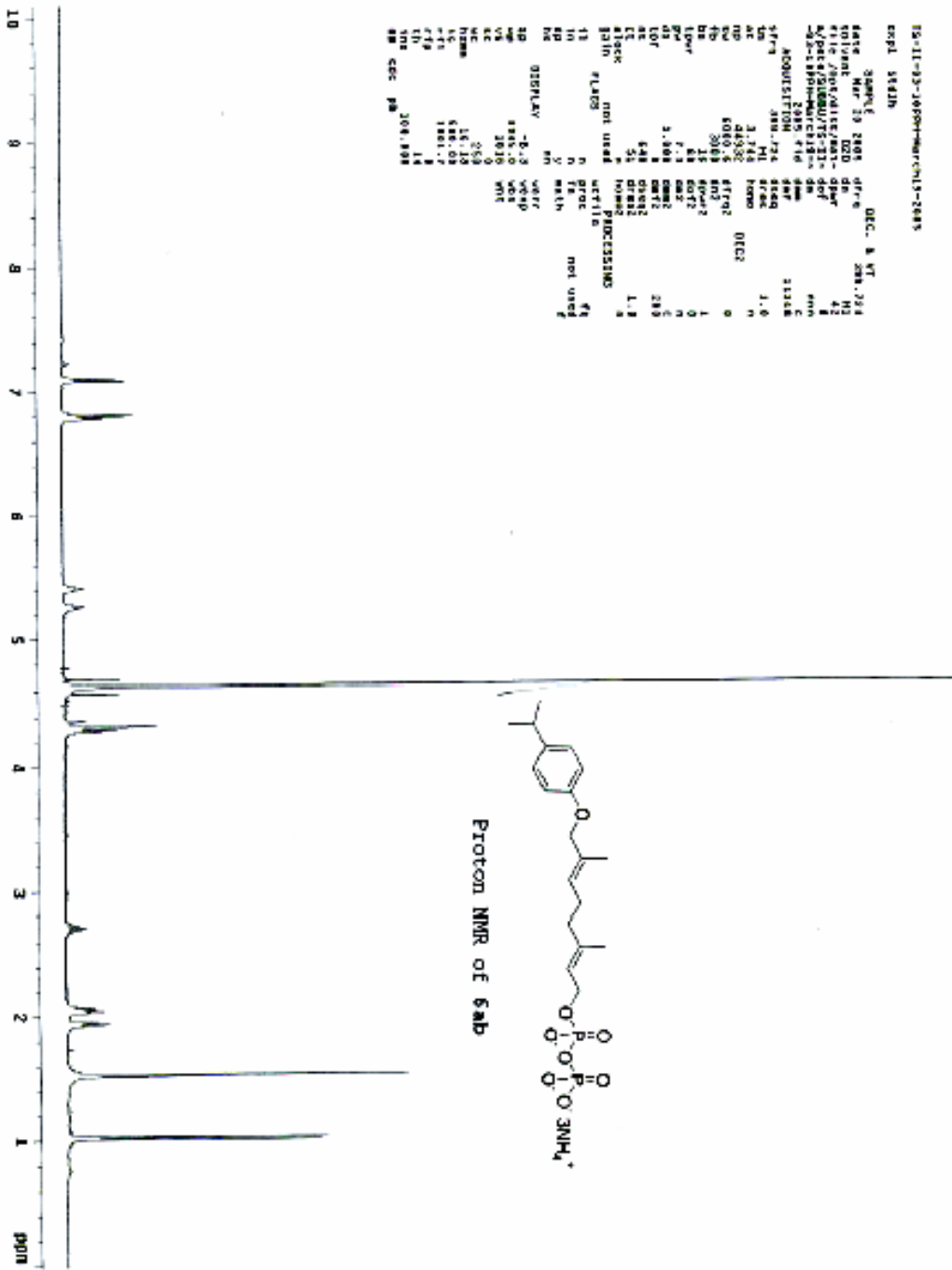
Mass spectrum of 6aa



15-11-23-28589-March13-2885  
 EXPL 1682M

```

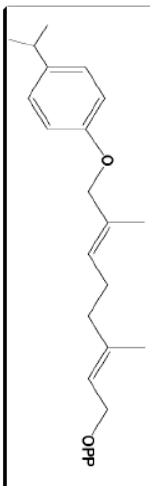
SAMPLE 5      Mar 23 2005  dr-e  DEC. 8 VT  288.234
SOLVENT  CHLOROFORM-d3  dm  1.0
ACQ 400Mhz 131-dof  400  1.0
PROB  zgpg30  131-dof  1.0
-2-1890-March13--dm  288.234  1.0
2885 416  dm  288.234  1.0
ACQUISITION  288.234  dm  288.234  1.0
1275  3.744  fomo  1.0
ac  2885  3.744  fomo  1.0
np  48932  61792  0
nu  5010  61792  0
b1  2012  61792  1
b2  2012  61792  1
lpw  7.1  61792  0
ds  3.369  61792  283
LOF  548  61792  1
IT  51  61792  1
stack  not used  writing  L. 8
spin  not used  writing  PROCESSING
13  f1a03  n  f1a03  not used
10  n  n  f1a03  not used
sp  n  n  f1a03  not used
hc  y  meth  n  meth  not used
018MAY -5.3  4876
ms  16.12  4876
vs  2015  4876
ec  2.52  4876
nc  16.12  4876
-75  586.03  1881.7
-77a  1881.7  18
-77b  18  18
sm  csc  pm  208.898
  
```



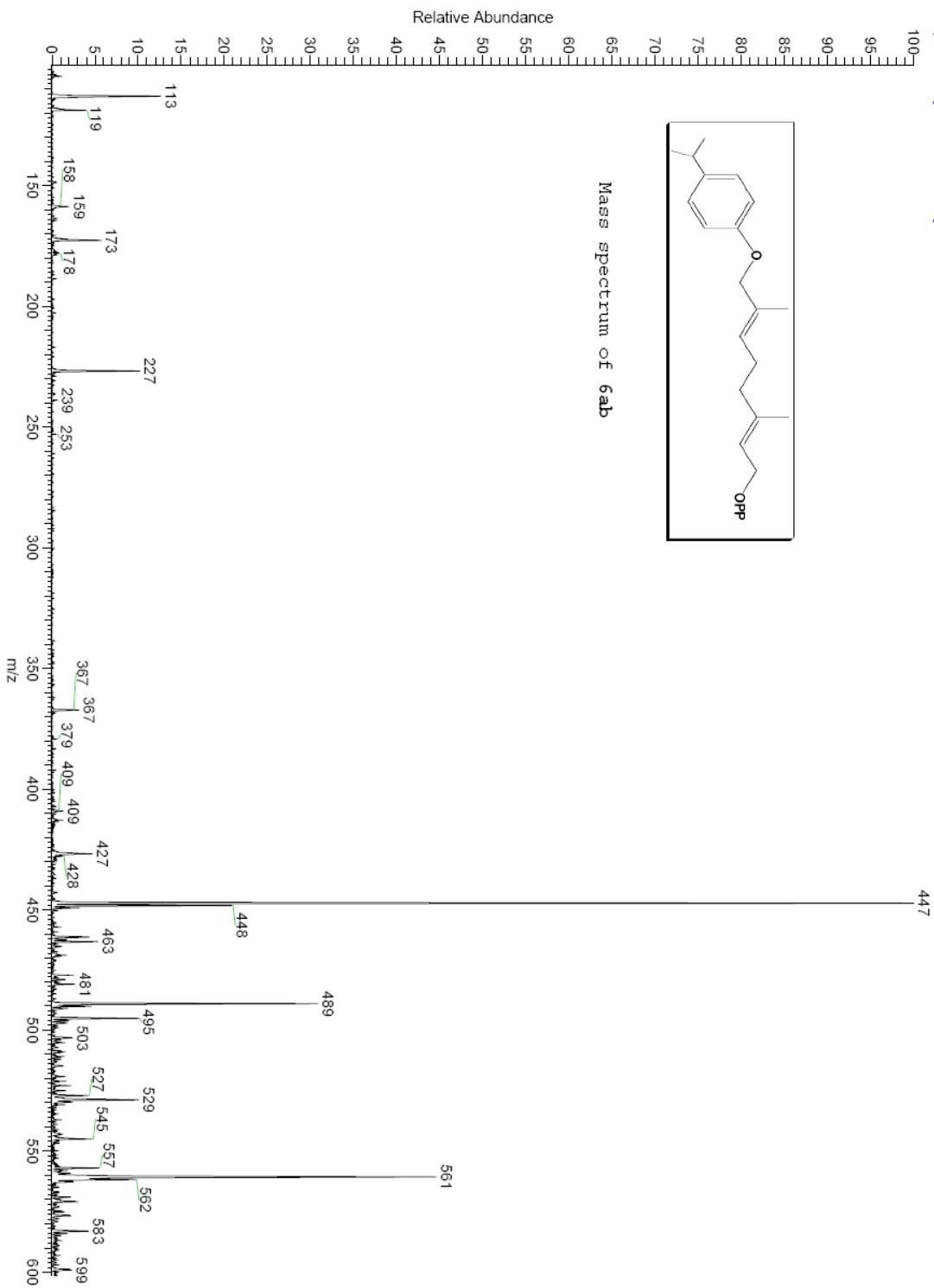




15-0349 #14-22 RT: 0.39-0.63 AV: 9 NL: 1.54E5  
T: - P Full ms [100.00-1000.00]



Mass spectrum of 6ab



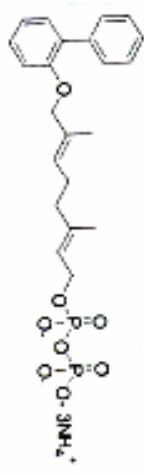


76-30-76-1-1-Jand-1000  
 C002 S2001

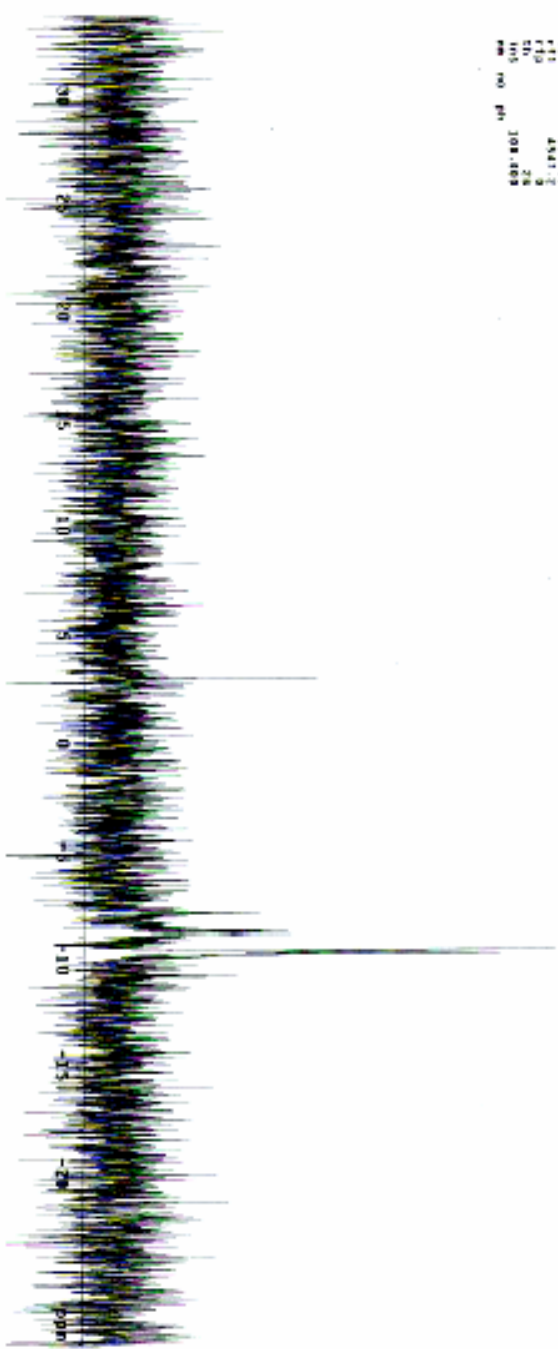
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NAME SAMPLE REC. # V#
DATE JAN 5 1966 FROM 388-734
SOLVENT CDCl3 DE CDCl3 H3
FILE 000 DPAR 42
ACQUISITION 000 DCF 910
NAME 181-211 DM 1118
AT 1.062 DM 1118
Q0 10800.8 9405 1-8
54 10805.8 9405 1-8
HD 5398.8 9405 1-8
NAME 181-211 DM 1118
P0 1.8 9405 1-8
P1 1.8 9405 1-8
P2 1.8 9405 1-8
P3 1.8 9405 1-8
P4 1.8 9405 1-8
P5 1.8 9405 1-8
P6 1.8 9405 1-8
P7 1.8 9405 1-8
P8 1.8 9405 1-8
P9 1.8 9405 1-8
P10 1.8 9405 1-8
P11 1.8 9405 1-8
P12 1.8 9405 1-8
P13 1.8 9405 1-8
P14 1.8 9405 1-8
P15 1.8 9405 1-8
P16 1.8 9405 1-8
P17 1.8 9405 1-8
P18 1.8 9405 1-8
P19 1.8 9405 1-8
P20 1.8 9405 1-8
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P22 1.8 9405 1-8
P23 1.8 9405 1-8
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P25 1.8 9405 1-8
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P28 1.8 9405 1-8
P29 1.8 9405 1-8
P30 1.8 9405 1-8
P31 1.8 9405 1-8
P32 1.8 9405 1-8
P33 1.8 9405 1-8
P34 1.8 9405 1-8
P35 1.8 9405 1-8
P36 1.8 9405 1-8
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P42 1.8 9405 1-8
P43 1.8 9405 1-8
P44 1.8 9405 1-8
P45 1.8 9405 1-8
P46 1.8 9405 1-8
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P50 1.8 9405 1-8
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P72 1.8 9405 1-8
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P77 1.8 9405 1-8
P78 1.8 9405 1-8
P79 1.8 9405 1-8
P80 1.8 9405 1-8
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P83 1.8 9405 1-8
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P87 1.8 9405 1-8
P88 1.8 9405 1-8
P89 1.8 9405 1-8
P90 1.8 9405 1-8
P91 1.8 9405 1-8
P92 1.8 9405 1-8
P93 1.8 9405 1-8
P94 1.8 9405 1-8
P95 1.8 9405 1-8
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P97 1.8 9405 1-8
P98 1.8 9405 1-8
P99 1.8 9405 1-8
P100 1.8 9405 1-8

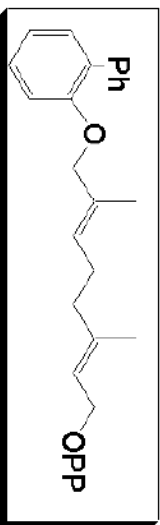
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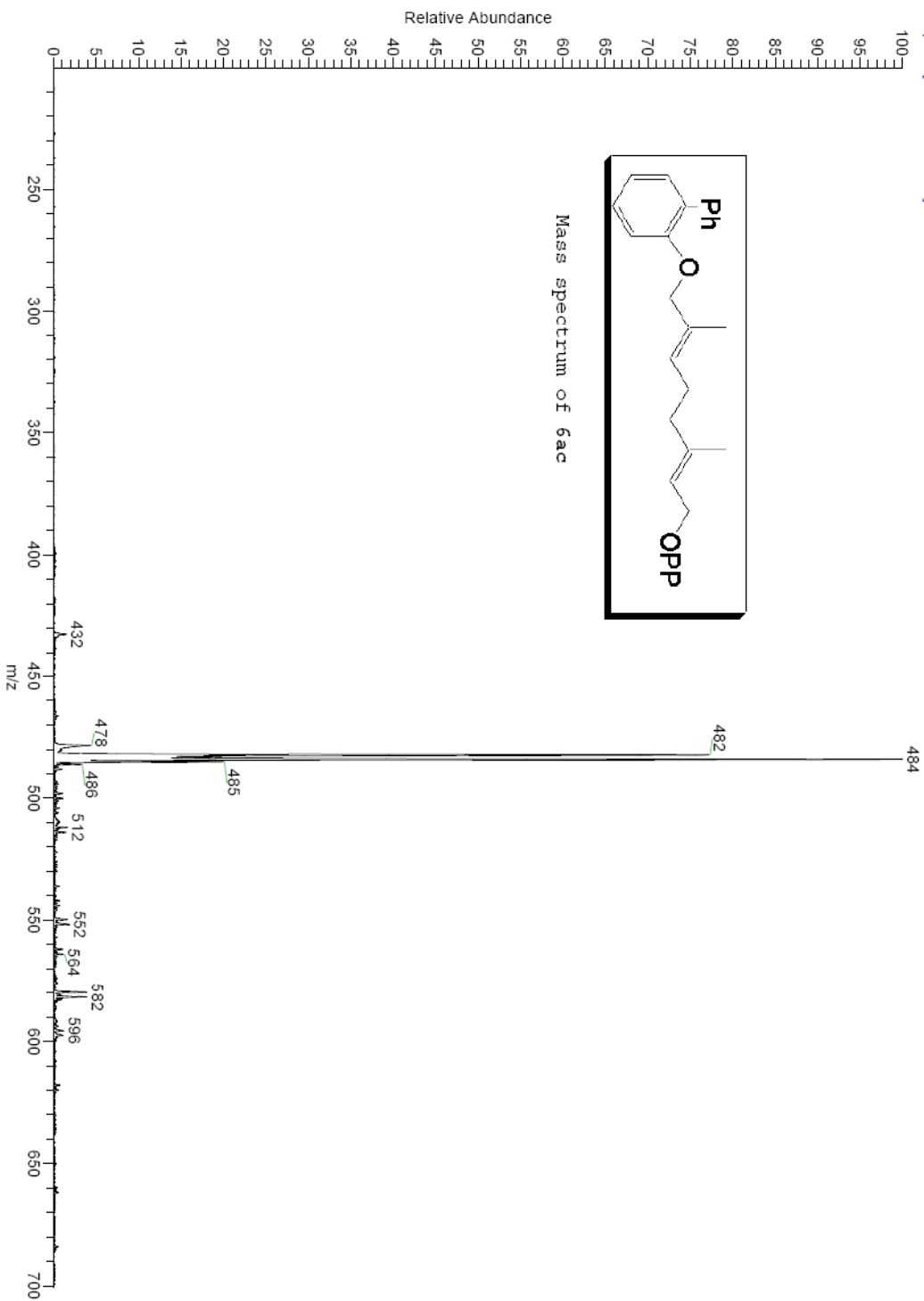
Phosphorus NMR of 6ac



05-0208 #4-16 RT: 0.10-0.46 AV: 13 SM: 6B NL: 2.57E5  
T: - p.ms [200 00-1000.00]



Mass spectrum of 6ac



TR-22-99-17PM-HA-0139-2895

mol% stable

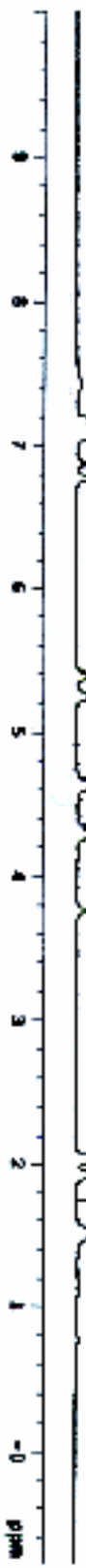
```

Sample Name: 28 2885 0174 DEC: 4 VT 319.124
Date: Nov 29 2001 09:00
Time: 10:41:13
File: /usr/local/nmr/28-18-01
Acq: 2885-18-01
28-17PM-HA-0139-2
400.13 MHz
ACQUISITION: 180
PROC: 180
F1: 400.1324
F2: 400.1324
F3: 400.1324
F4: 400.1324
F5: 400.1324
F6: 400.1324
F7: 400.1324
F8: 400.1324
F9: 400.1324
F10: 400.1324
F11: 400.1324
F12: 400.1324
F13: 400.1324
F14: 400.1324
F15: 400.1324
F16: 400.1324
F17: 400.1324
F18: 400.1324
F19: 400.1324
F20: 400.1324
F21: 400.1324
F22: 400.1324
F23: 400.1324
F24: 400.1324
F25: 400.1324
F26: 400.1324
F27: 400.1324
F28: 400.1324
F29: 400.1324
F30: 400.1324
F31: 400.1324
F32: 400.1324
F33: 400.1324
F34: 400.1324
F35: 400.1324
F36: 400.1324
F37: 400.1324
F38: 400.1324
F39: 400.1324
F40: 400.1324
F41: 400.1324
F42: 400.1324
F43: 400.1324
F44: 400.1324
F45: 400.1324
F46: 400.1324
F47: 400.1324
F48: 400.1324
F49: 400.1324
F50: 400.1324
F51: 400.1324
F52: 400.1324
F53: 400.1324
F54: 400.1324
F55: 400.1324
F56: 400.1324
F57: 400.1324
F58: 400.1324
F59: 400.1324
F60: 400.1324
F61: 400.1324
F62: 400.1324
F63: 400.1324
F64: 400.1324
F65: 400.1324
F66: 400.1324
F67: 400.1324
F68: 400.1324
F69: 400.1324
F70: 400.1324
F71: 400.1324
F72: 400.1324
F73: 400.1324
F74: 400.1324
F75: 400.1324
F76: 400.1324
F77: 400.1324
F78: 400.1324
F79: 400.1324
F80: 400.1324
F81: 400.1324
F82: 400.1324
F83: 400.1324
F84: 400.1324
F85: 400.1324
F86: 400.1324
F87: 400.1324
F88: 400.1324
F89: 400.1324
F90: 400.1324
F91: 400.1324
F92: 400.1324
F93: 400.1324
F94: 400.1324
F95: 400.1324
F96: 400.1324
F97: 400.1324
F98: 400.1324
F99: 400.1324
F100: 400.1324

```



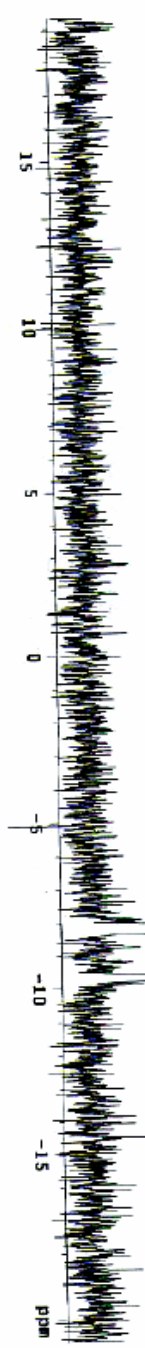
Proton NMR of 6ad

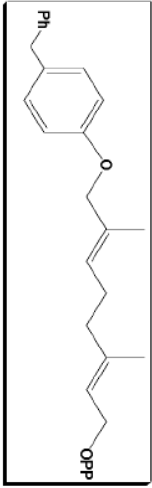


expt 32mu1

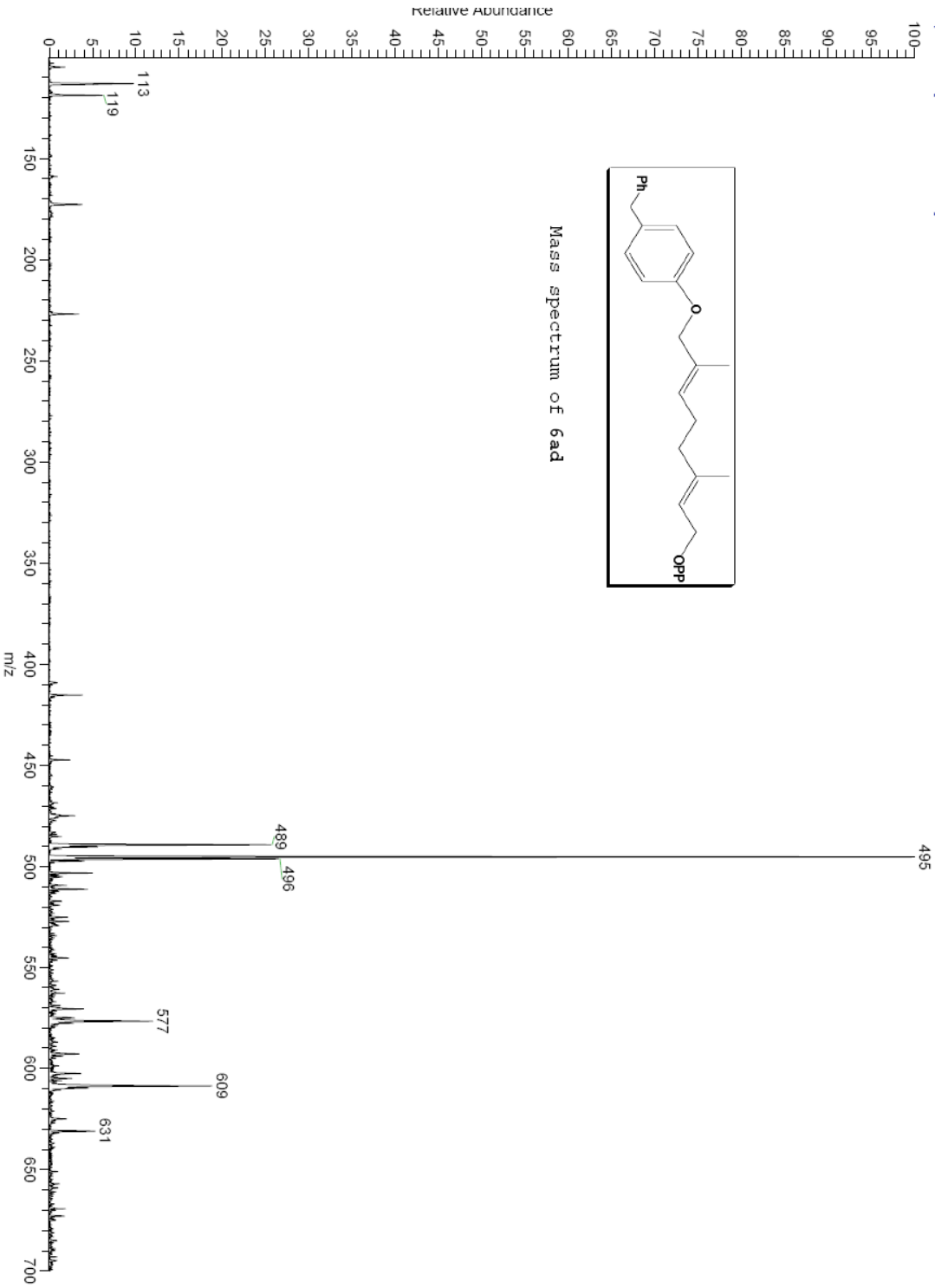
SAMPLE DEC. 4 VT  
 date Mar 20 2005 ofr q  
 218 /ont/dist/dat~ dpu  
 a/jctc/SUBW/TS-13~ dot  
 -33-7pp-March19-20~ ch  
 05.710 DM 11148  
 ACQUISITION 181.811 dseq  
 ofr q 1.0  
 at 0.800 homo  
 np 1000.0 ofr qz  
 sw 1000.0  
 fd 0.5  
 hz 55 dofz  
 touw 18.8 dm2  
 pw 0 gmc  
 di 0 gmc  
 tot 540 dseq  
 nt 540 dseq  
 stock 0 none  
 gath not used  
 flags not used 1.00  
 11 n write  
 1n n prot not used  
 12 n math  
 13 n  
 DISPLAY  
 sp -351.0 mnr  
 wp 8377.3 meq  
 vs 187 mds  
 sc 4 wts  
 258  
 hzmn 25.91  
 15 354.10  
 fti 4547.2  
 ftp  
 2  
 180.40  
 nm no ph

Phosphorus NMR of 6ad





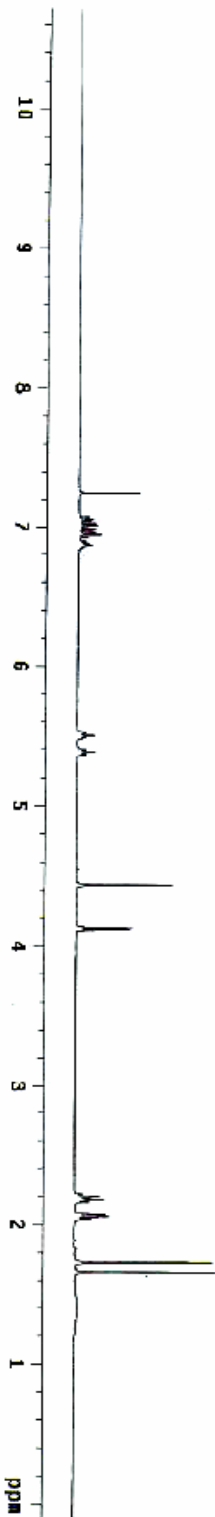
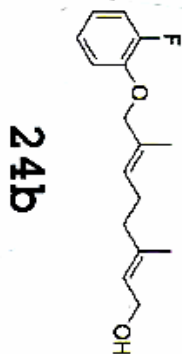
Mass spectrum of Gad





EXPL STD1H

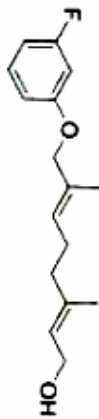
SAMPLE DEC. 8 VT 399.723  
date MAY 19 2006 dfrq  
solvent CDCl3 dn H1  
file /opt/4list/dcl- dprv 42  
S/PAGE/SUBBU/78-V-- dof 0  
S-12-M5Y18-2006.17-- dm nm  
ACQUISITION 1d dm 111.48  
389.723 dsq  
tn HI dres 1.0  
at 3.744 homo DEC2 9  
np 44932 dfrq2  
sw 5000.6 dfrq2  
fz 3980 dn2  
ds 16 dprv2 1  
IDPR 50 dof2 0  
pw 7.3 dm2 n  
d1 1.000 dm2 C  
TOR 0 dm2 200  
nt 320 dsdq2  
33 dres2 1.0  
LOCK not used n  
GAIN not used n  
FLAOS not used n  
f1 n prec ft  
in n fn not used f  
dp v match  
hs nm  
DISPLAY nm  
SP -50.4 wprf  
WP 4354.5 wds  
VS 23 wnt  
VC 250  
SC 0  
N2M 17.34  
F1 500.00  
F7P 1001.7  
Th 20  
InS cdc ph 100.000



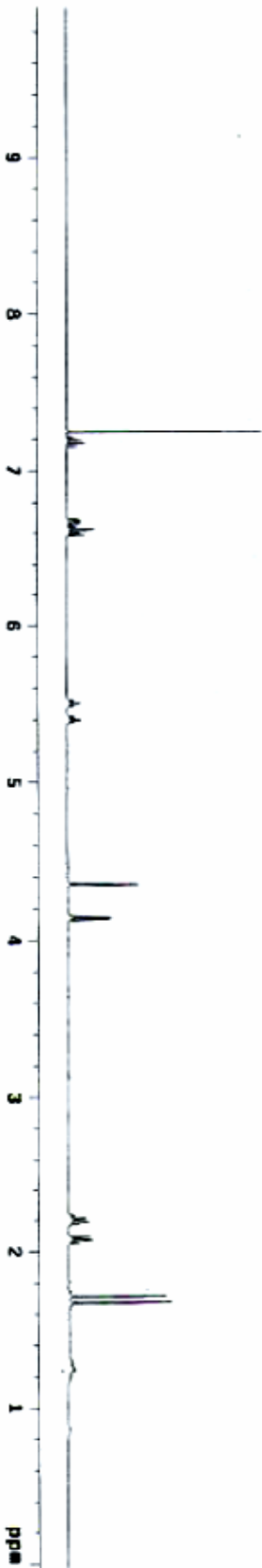
```

NAME STD1H
SAMPLE JAN 3 2006 DEC. 8 VT
DATE JAN 3 2006 07:00 399.723
TOI WENT/4/4181000 41
4/1810/15-IV-00F 4
-38-2-Jan3-2005.F1-00 nmm
ACQUISITION d 11146
STRG 399.723 00F
IN HI 1.0
AQ 3.744 HOMO DECC 0
NU 44532
RW 6880.6 0792 0
TD 3000 012 1
BS 16 0DP2 4
DPR 7.3 002 4
DI 1.000 00F2 C
TOF 0 00F2 208
AT 320 05002
CT 01 07002 1.0
ALOCK n homo2 PROCESSING
GAIN not used wfile
11 n n n
IN n n n
DP n n n
NS V MATH not used
SP DISPLAY -15.1 WRT
UP 3997.0 WKP
VS 33 WBS
VC 0 WNT
WC 250
HZ 15.99
FS 121.27
FT1 1001.7
FT2 0
FT3 0
TMS nm cdc pH 100.000

```

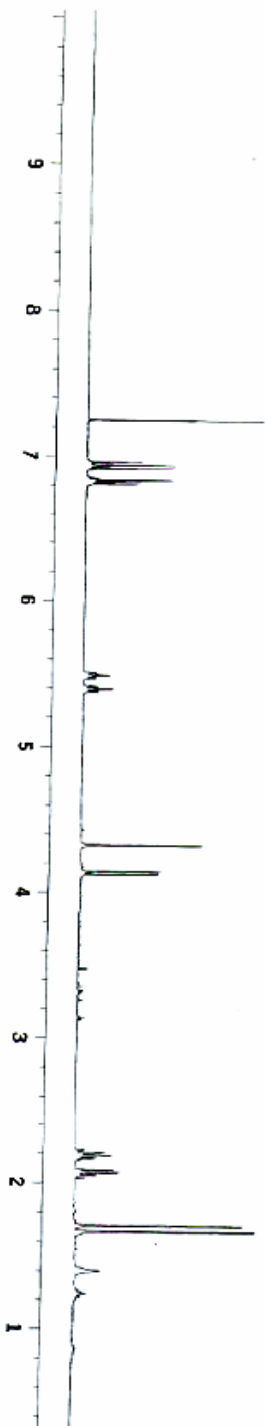
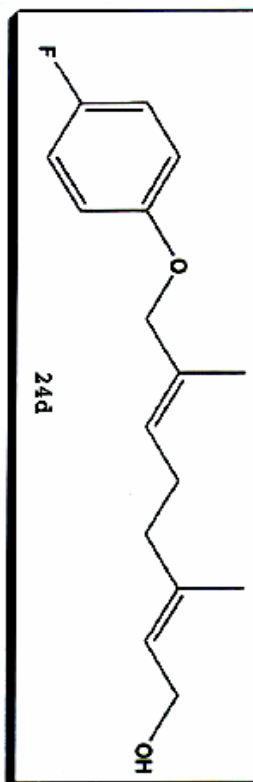


24c



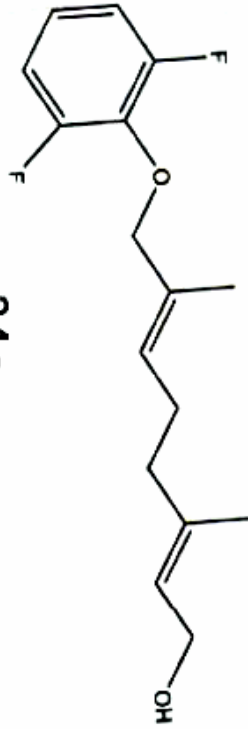
p-r

exp: stearn  
SAMPLE date Oct 6 2015 dfreq DEC. A VI 599.723  
solvent CMC13 dn 42  
file ACQUISITION exp dbrf 42  
sfrq 399.723 dm mnd  
en H1 dm 11146  
at 3.724 ddf  
np 44932 dseq  
sw 6400.6 dres 1.0  
fd 3000 homo  
bs 16 PROCESSING  
tpr 60 wfile  
dw 7.3 proc ft  
tdf 1.000 tn not used  
nt 32 math  
ct 25 wefr  
atock n wds  
gain not used wt  
flags not used  
11 n  
1n n  
dp y  
hs nh  
015PLAY  
sp -2.6  
wp 4829.4  
vz 29  
vc 0  
vcl 250  
hzmm 15.250  
ls 500.0  
fz1 1001.7  
fz0 0  
th 20  
ins 100.000  
nm cdc ph

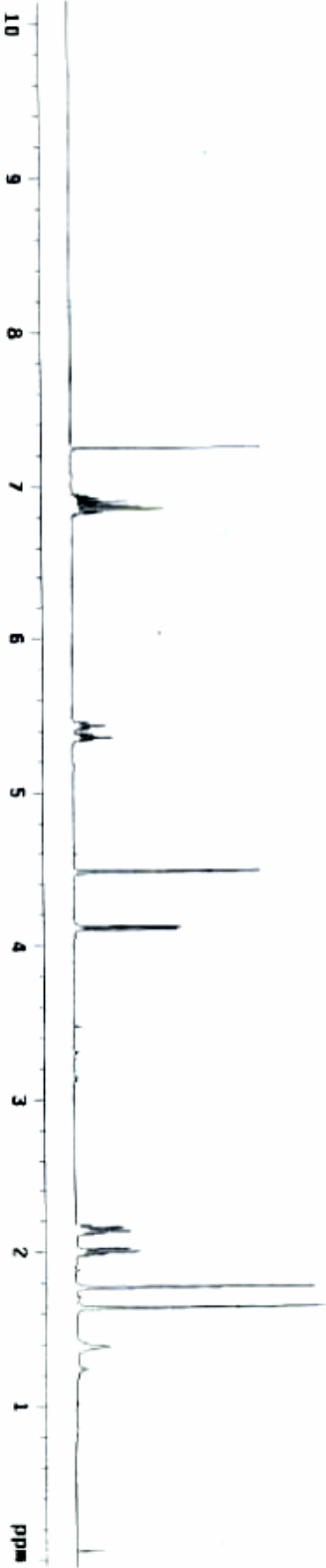


13-17-JR-9-OCT19-2893  
EXPI CTID18

SAMPLE DEC. A VT  
DATE OCT 9 2005 04:44 308.723  
SOLVENT CDCl3 01 42  
F116 ACQUISITION 01 42  
SFRQ 359.723 01 42  
IN 01 01 11148  
AC 3.274 01 42  
SU 2.454 01 42  
FB 6800.5 01 42  
BS 3000 01 42  
1Pur 15 60 WRTTLE FT  
PU 7.3 01 42  
DL 1.000 01 42  
LOF 0 0 0 0  
NT 32 01 42  
CT 19 01 42  
GLOCK 19 01 42  
GAIN not used 01 42  
FLAOS not used 01 42  
11 0 01 42  
10 0 01 42  
DP 0 01 42  
NS 0 01 42  
DISPLAY -23.1 01 42  
WD 4880.7 01 42  
VT 41 01 42  
SC 0 01 42  
WC 250 01 42  
N2M 10.32 01 42  
F1 500.00 01 42  
F13 1001.7 01 42  
14 0 01 42  
15 0 01 42  
165 cdc ph 100.000 01 42

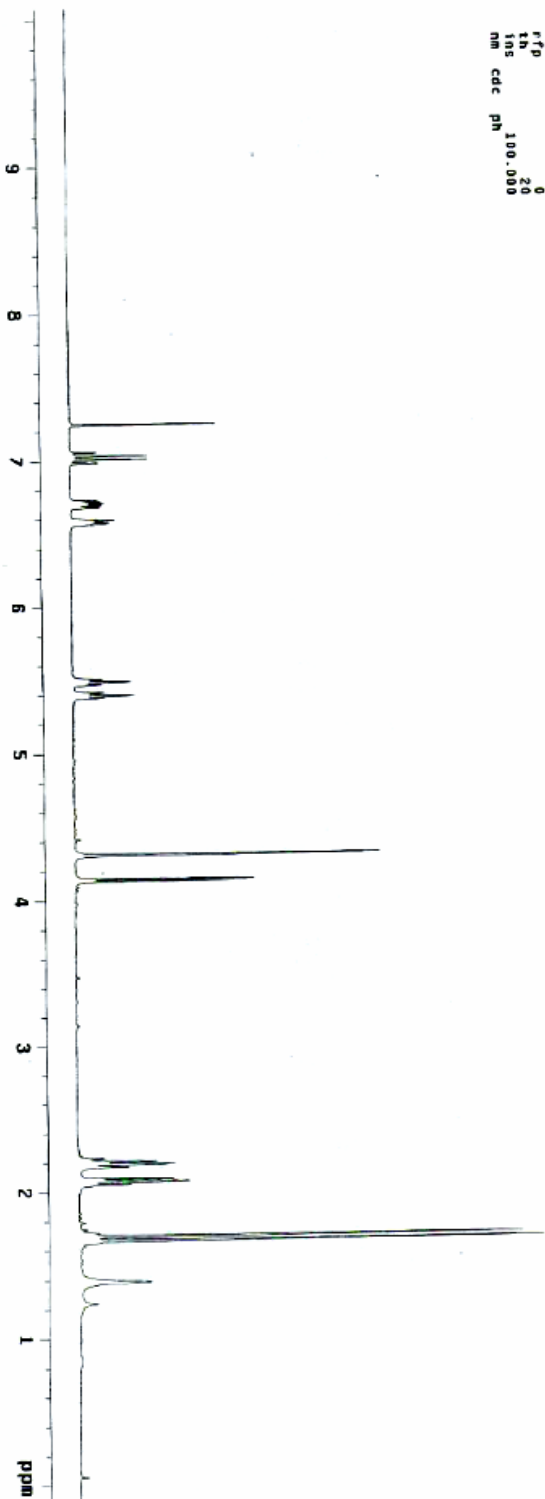
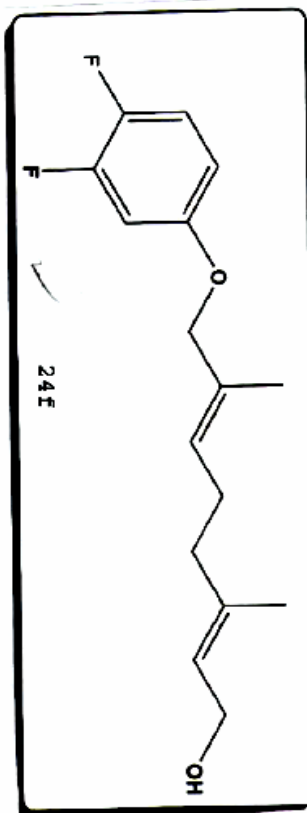


24e



exp1 sdr1h

SAMPLE DEC. 8 VT  
date Oct 9 2005 dfrq 399.723  
solvent CDCl3 dn H1  
F18 ACQUISITION exp ddr 4  
sf-rq 399.723 dm nnn  
tn H1 dmm 11148  
at 3.744 dmt 1.8  
nd 44932 dseq  
sw 6000.6 dres  
rb 3800 homo  
bs 16  
tpar 63  
pw 73  
prc 1.000  
tor 0  
nt 32  
ct 25  
atlock n  
gain not used  
fls n  
t1 n  
t2 y  
t3 y  
t4 n  
t5 n  
hs DISPLAY  
sp -45.6  
wp 4073.2  
vs 7  
vc 250  
hzmm 16.29  
ls 508.08  
rft1 1001.7  
rft2 0  
rft3 20  
rft4 0  
rft5 0  
nm cdc ph 100.000



```

SAMPLE          DEC. 8 VT 339.723
date Dec 28 2015      freq 339.723
solvent Dec DMS-d6
file /opt/dist/deat-dpur
a/pnts/SUNBU/TS-TV-6of
-38-6-dec28-2885-T-
ACQUISITION
freq 339.723      dmsq 11148
in 3.743      dres 1.0
at 44892      homo 0
no 68892      DECI 0
fb 38140      dnc 0
bp 11      dpr2 1
pwr 60      dof2 0
d1 7.3      dnc 0
dof 1.880      dnm2 0
nt 220      dnt2 208
ct 48      dsq2 1.0
atock N      homo2 N
gain not used
procs PROCESsing
11 11      wrtle 0
in N      Proc 0
dp N      math not used
hs N
DISPLAY      mn user 0
sp -118.7      uexp 0
wp 4188.8      wbs 0
vs 15      wnt 0
sc 258
wc 16.48
Nmem 1218.48
FTI 1001.7
CFP 6
tb 24
ins cdc ph 180.888

```

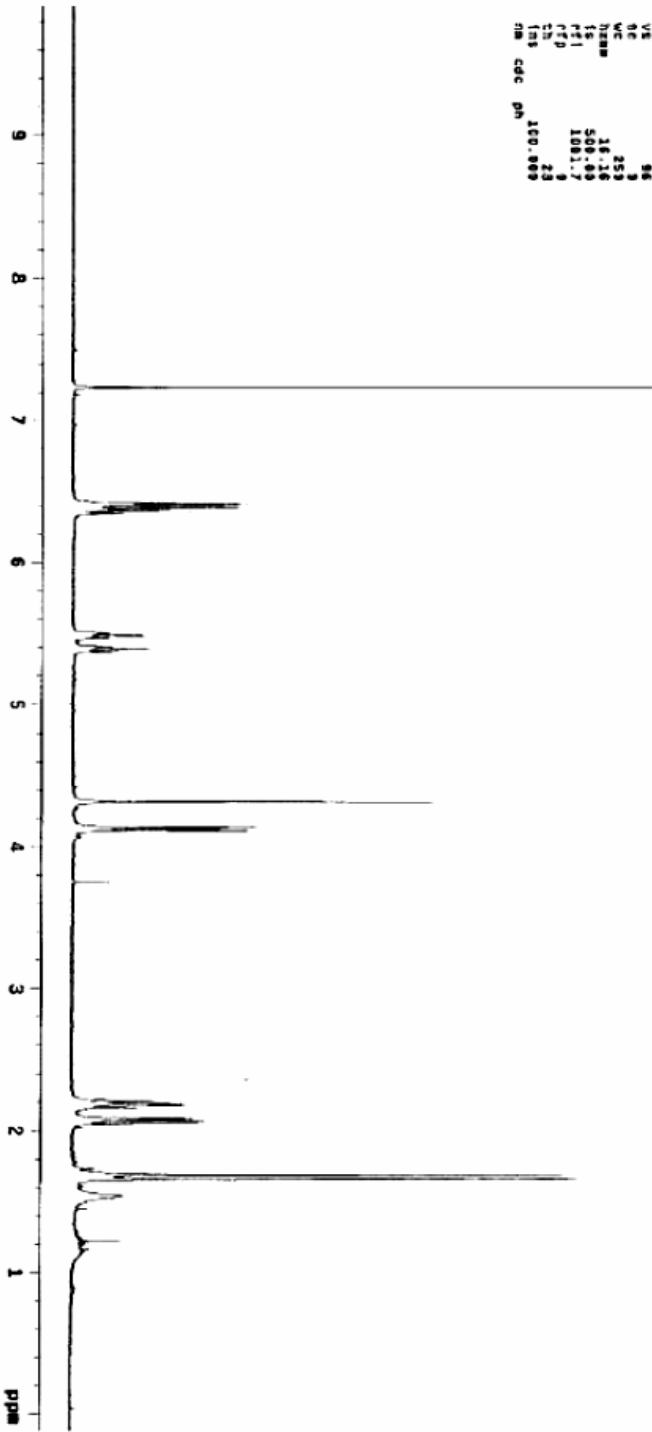
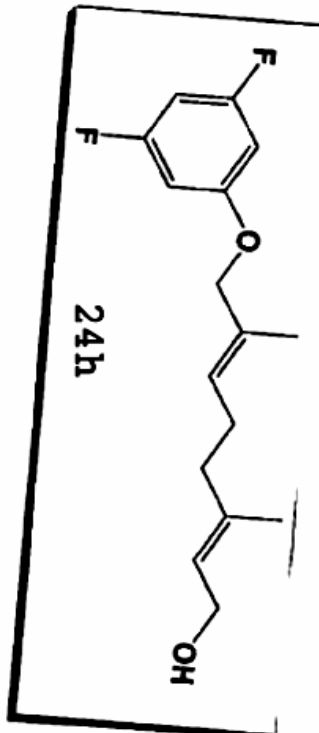


24g



```

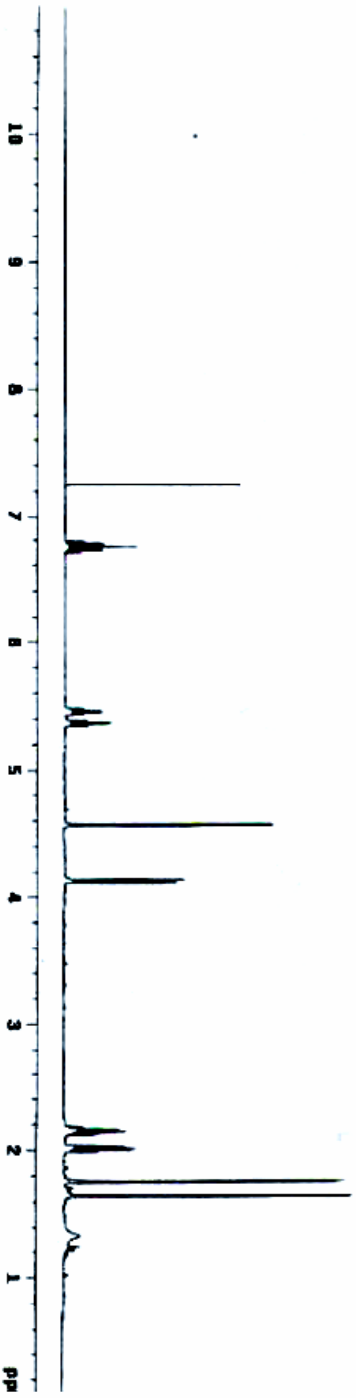
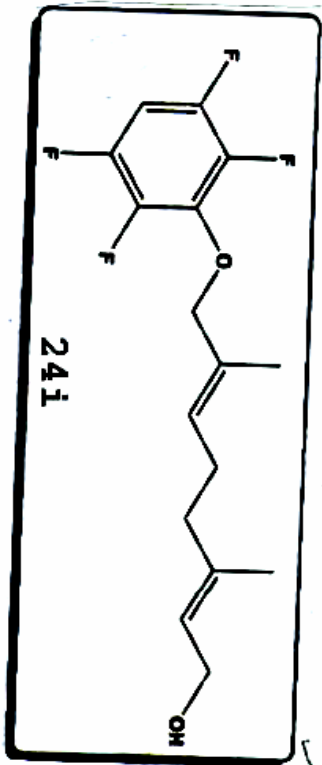
solvent  CDCl3  dn
file      ACQUISITION  exp  expur  H1  42
          350.717  sm  got  B  8
          3.74  sm  11140  C  1
          44832  sm  1.0  n  1
          6080.6  dpts  1.0  n  1
          3000  hom  n
          16  vrt11e  n
          69  vrt11e  n
          7.3  proc  not used  f1
          1.009  m  not used  f
          375  m  not used  f
          12  wprt  not used  f
          12  wexp  not used  f
          gain  not used  vnt
          flags  not used  vnt
          11  n  n
          1a  n  y
          d2  n  y
          ne  n  m
          00  display  -17.3
          v2  4004.3
          v3  4004.06
          v4  253
          v5  16.16
          v6  500.00
          v7  1001.7
          v8  9
          v9  100.000
          nm  cdc  gn  150.000
  
```



```

exp1 std1a
SAMPLE 2 2885 474 m.c. 4 VT 380.723
SOLVENT Oct 2 CHCl3 42
PULSE ACQUISITION EMP 42
474 353.723 11145
AT 3.744 427
AP 4432 4524 1.0
AQ 4828.4 4724
AR 3888 1.0
AS 1.0
AV 7.2 1.0
AW 1.864 1.0
AX 1.0
AY 1.0
AZ 1.0
BA 1.0
BB 1.0
BC 1.0
BD 1.0
BE 1.0
BF 1.0
BG 1.0
BH 1.0
BI 1.0
BJ 1.0
BK 1.0
BL 1.0
BM 1.0
BN 1.0
BO 1.0
BP 1.0
BQ 1.0
BR 1.0
BS 1.0
BT 1.0
BU 1.0
BV 1.0
BW 1.0
BX 1.0
BY 1.0
BZ 1.0
CA 1.0
CB 1.0
CC 1.0
CD 1.0
CE 1.0
CF 1.0
CG 1.0
CH 1.0
CI 1.0
CJ 1.0
CK 1.0
CL 1.0
CM 1.0
CN 1.0
CO 1.0
CP 1.0
CQ 1.0
CR 1.0
CS 1.0
CT 1.0
CU 1.0
CV 1.0
CW 1.0
CX 1.0
CY 1.0
CZ 1.0
DA 1.0
DB 1.0
DC 1.0
DD 1.0
DE 1.0
DF 1.0
DG 1.0
DH 1.0
DI 1.0
DJ 1.0
DK 1.0
DL 1.0
DM 1.0
DN 1.0
DO 1.0
DP 1.0
DQ 1.0
DR 1.0
DS 1.0
DT 1.0
DU 1.0
DV 1.0
DW 1.0
DX 1.0
DY 1.0
DZ 1.0
EA 1.0
EB 1.0
EC 1.0
ED 1.0
EE 1.0
EF 1.0
EG 1.0
EH 1.0
EI 1.0
EJ 1.0
EK 1.0
EL 1.0
EM 1.0
EN 1.0
EO 1.0
EP 1.0
EQ 1.0
ER 1.0
ES 1.0
ET 1.0
EU 1.0
EV 1.0
EW 1.0
EX 1.0
EY 1.0
EZ 1.0
FA 1.0
FB 1.0
FC 1.0
FD 1.0
FE 1.0
FF 1.0
FG 1.0
FH 1.0
FI 1.0
FJ 1.0
FK 1.0
FL 1.0
FM 1.0
FN 1.0
FO 1.0
FP 1.0
FQ 1.0
FR 1.0
FS 1.0
FT 1.0
FU 1.0
FV 1.0
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FX 1.0
FY 1.0
FZ 1.0
GA 1.0
GB 1.0
GC 1.0
GD 1.0
GE 1.0
GF 1.0
GG 1.0
GH 1.0
GI 1.0
GJ 1.0
GK 1.0
GL 1.0
GM 1.0
GN 1.0
GO 1.0
GP 1.0
GQ 1.0
GR 1.0
GS 1.0
GT 1.0
GU 1.0
GV 1.0
GW 1.0
GX 1.0
GY 1.0
GZ 1.0
HA 1.0
HB 1.0
HC 1.0
HD 1.0
HE 1.0
HF 1.0
HG 1.0
HH 1.0
HI 1.0
HJ 1.0
HK 1.0
HL 1.0
HM 1.0
HN 1.0
HO 1.0
HP 1.0
HQ 1.0
HR 1.0
HS 1.0
HT 1.0
HU 1.0
HV 1.0
HW 1.0
HX 1.0
HY 1.0
HZ 1.0
IA 1.0
IB 1.0
IC 1.0
ID 1.0
IE 1.0
IF 1.0
IG 1.0
IH 1.0
II 1.0
IJ 1.0
IK 1.0
IL 1.0
IM 1.0
IN 1.0
IO 1.0
IP 1.0
IQ 1.0
IR 1.0
IS 1.0
IT 1.0
IU 1.0
IV 1.0
IW 1.0
IX 1.0
IY 1.0
IZ 1.0
JA 1.0
JB 1.0
JC 1.0
JD 1.0
JE 1.0
JF 1.0
JG 1.0
JH 1.0
JI 1.0
JJ 1.0
JK 1.0
JL 1.0
JM 1.0
JN 1.0
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JQ 1.0
JR 1.0
JS 1.0
JT 1.0
JU 1.0
JV 1.0
JW 1.0
JX 1.0
JY 1.0
JZ 1.0
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KB 1.0
KC 1.0
KD 1.0
KE 1.0
KF 1.0
KG 1.0
KH 1.0
KI 1.0
KJ 1.0
KK 1.0
KL 1.0
KM 1.0
KN 1.0
KO 1.0
KP 1.0
KQ 1.0
KR 1.0
KS 1.0
KT 1.0
KU 1.0
KV 1.0
KW 1.0
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KY 1.0
KZ 1.0
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LB 1.0
LC 1.0
LD 1.0
LE 1.0
LF 1.0
LG 1.0
LH 1.0
LI 1.0
LJ 1.0
LK 1.0
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LM 1.0
LN 1.0
LO 1.0
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LT 1.0
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LV 1.0
LW 1.0
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LY 1.0
LZ 1.0
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ME 1.0
MF 1.0
MG 1.0
MH 1.0
MI 1.0
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NU 1.0
NV 1.0
NW 1.0
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OG 1.0
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OL 1.0
OM 1.0
ON 1.0
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OP 1.0
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OU 1.0
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OW 1.0
OX 1.0
OY 1.0
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PE 1.0
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PY 1.0
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RV 1.0
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SL 1.0
SM 1.0
SN 1.0
SO 1.0
SP 1.0
SQ 1.0
SR 1.0
SS 1.0
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SU 1.0
SV 1.0
SW 1.0
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SY 1.0
SZ 1.0
TA 1.0
TB 1.0
TC 1.0
TD 1.0
TE 1.0
TF 1.0
TG 1.0
TH 1.0
TI 1.0
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TM 1.0
TN 1.0
TO 1.0
TP 1.0
TQ 1.0
TR 1.0
TS 1.0
TU 1.0
TV 1.0
TW 1.0
TX 1.0
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UA 1.0
UB 1.0
UC 1.0
UD 1.0
UE 1.0
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UG 1.0
UH 1.0
UI 1.0
UJ 1.0
UK 1.0
UL 1.0
UM 1.0
UN 1.0
UO 1.0
UP 1.0
UQ 1.0
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UT 1.0
UU 1.0
UV 1.0
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UX 1.0
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UZ 1.0
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VG 1.0
VH 1.0
VI 1.0
VJ 1.0
VK 1.0
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VN 1.0
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VR 1.0
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WC 1.0
WD 1.0
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WG 1.0
WH 1.0
WI 1.0
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WM 1.0
WN 1.0
WO 1.0
WP 1.0
WQ 1.0
WR 1.0
WS 1.0
WT 1.0
WU 1.0
WV 1.0
WW 1.0
WX 1.0
WY 1.0
WZ 1.0
XA 1.0
XB 1.0
XC 1.0
XD 1.0
XE 1.0
XF 1.0
XG 1.0
XH 1.0
XI 1.0
XJ 1.0
XK 1.0
XL 1.0
XM 1.0
XN 1.0
XO 1.0
XP 1.0
XQ 1.0
XR 1.0
XS 1.0
XT 1.0
XU 1.0
XV 1.0
XW 1.0
XX 1.0
XY 1.0
XZ 1.0
YA 1.0
YB 1.0
YC 1.0
YD 1.0
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YF 1.0
YG 1.0
YH 1.0
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YJ 1.0
YK 1.0
YL 1.0
YM 1.0
YN 1.0
YO 1.0
YP 1.0
YQ 1.0
YR 1.0
YS 1.0
YT 1.0
YU 1.0
YV 1.0
YW 1.0
YX 1.0
YZ 1.0
ZA 1.0
ZB 1.0
ZC 1.0
ZD 1.0
ZE 1.0
ZF 1.0
ZG 1.0
ZH 1.0
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ZJ 1.0
ZK 1.0
ZL 1.0
ZM 1.0
ZN 1.0
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ZP 1.0
ZQ 1.0
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ZU 1.0
ZV 1.0
ZW 1.0
ZX 1.0
ZY 1.0
ZZ 1.0

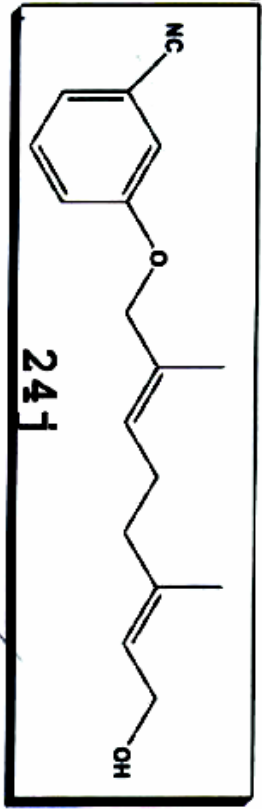
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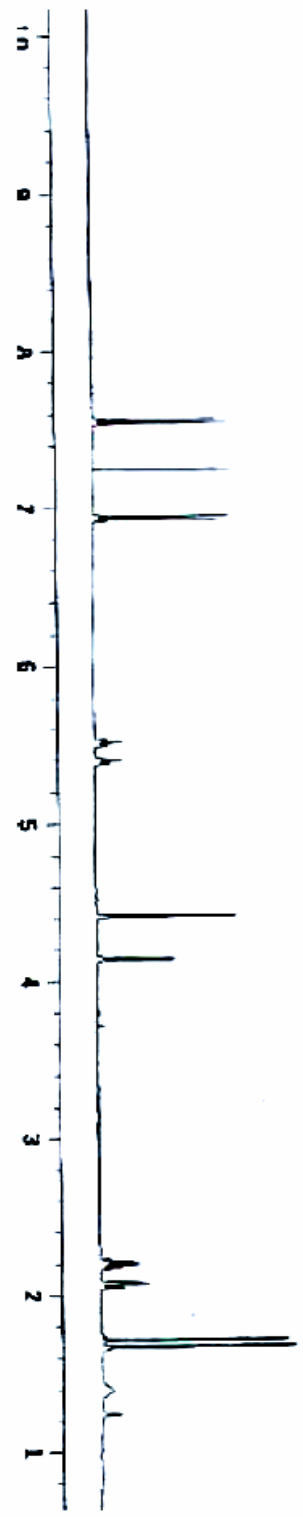
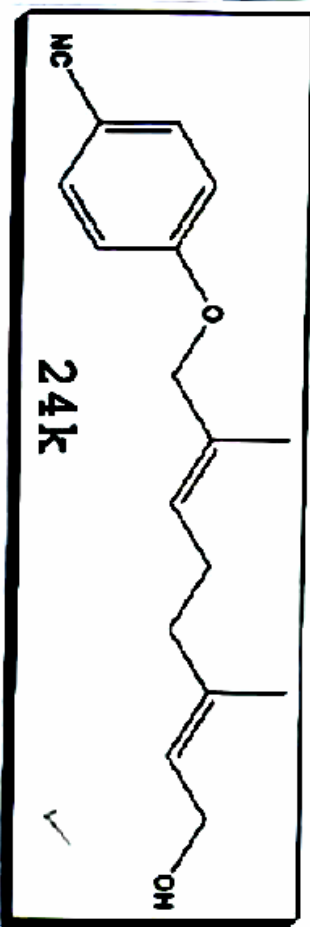


18-11-13-9-0011-0000  
expi 11d1h

SAMPLE DEC. 6 VT  
date Oct 2 2003 dfrn 349.723  
solvent CDCl3 dn H1  
FILE ACQUISITION exp 42  
SFRN 391.723 dm H1  
AS 3.744 dm H1  
NB 44932 dres 11148  
SW 6000.6 dres 1.0  
TB 3800 homo  
DS 16  
TPWR 60 vrtile  
PV 7.5 proc T1  
EDF 1.098 FM not used Y  
MATH 4  
WATER 32  
MEEP 0  
FLMGS not used Y  
DISP LAY 225.4  
UP 3159.6  
VS 14  
SC 4  
NC 258  
NEM 12  
RF1 31.25  
RF2 1801.7  
RF3 0  
RF4 20  
RF5 100.800  
na cdc ph



60 WCT118 f1  
 7.3 proc f1  
 1.008 fn not used f  
 D math  
 SE  
 SE year  
 P year  
 not used  
 SE  
 SE  
 0  
 0  
 0  
 V  
 nm  
 -AV  
 -0.2  
 4974.3  
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 214  
 17.14  
 62.54  
 1001.7  
 28  
 100.000  
 pH

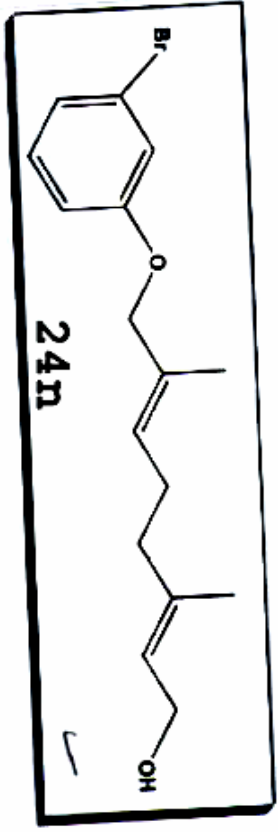






TS-IV-31-3-oct7-2005  
 exp#1 6101h

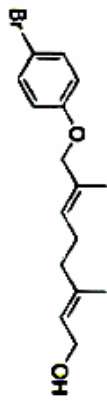
SAMPLE DEC. A VT  
 date Oct 6 2005 dfrq 399.723  
 solvent CDCl3 dn 42  
 file ACQUISITION QNP QNP 0  
 dfrq 399.723 dm mm  
 at 3.744 dm 11148  
 nu 44932 dref 1.0  
 th 6888.6 homo PROCESSING  
 ds 16 vcf/1e  
 pw 2.3 pdec f1  
 tof 1.600 n not used  
 ct 32 mch  
 alock n verf  
 gain not used vds  
 wnt  
 11 n  
 12 n  
 13 n  
 14 n  
 15 n  
 16 n  
 17 n  
 18 n  
 19 n  
 20 n



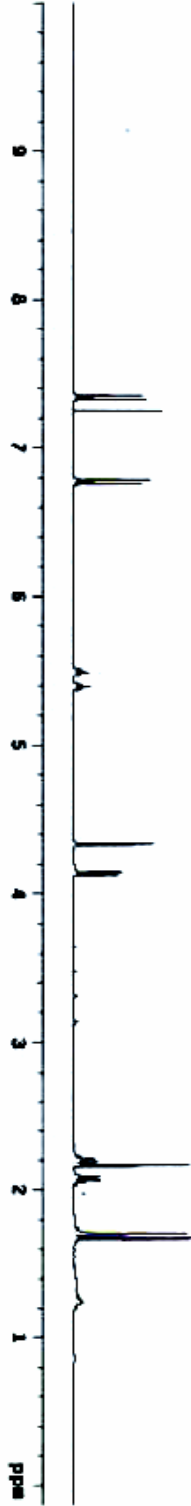
18-IV-26-3-2am3-2605

EXPL STBIN

SAMPLE DEC 26 2005 DFRQ DEC. 4 VT 399.723  
 DATE Dec 26 2005 DFRQ DEC. 4 VT 399.723  
 SOLVENT dm  
 FILE /OPI/0151/dat-0151  
 M/PROC/SMBAD/15-15-07  
 -05-3-eclec-2195-17-07  
 ACQUISITION 14  
 DFRQ 288.723 dreg 111.66  
 TN H1 dreg 1.0  
 NT 1.744 homo  
 RP 44932 dfrq2 DEC2 0  
 RV 6888.8 dfrq2  
 TD 2888.8 dfrq2  
 ZD 18 dfrq2  
 ZBAR 18 dfrq2  
 PD 7.3 dm2  
 DI 1.668 dm2  
 NT 328 dreg2 208  
 CI 37 dreg2 1.0  
 SLOCK  
 GAIN not used  
 FREQS not used  
 11  
 IN  
 DP  
 HE  
 SP  
 WP  
 VE  
 VC  
 N2  
 R2  
 RFD  
 TN  
 MS  
 NS  
 CDC  
 PH



240



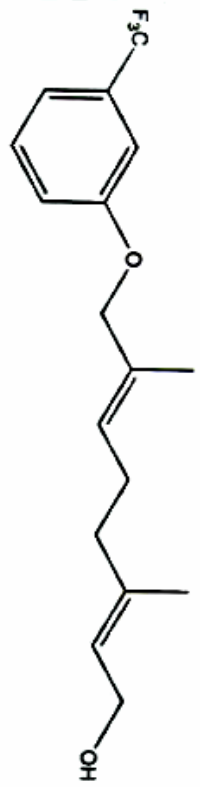
TS-IV-30-8-oct17-2005

EXPL 1101H

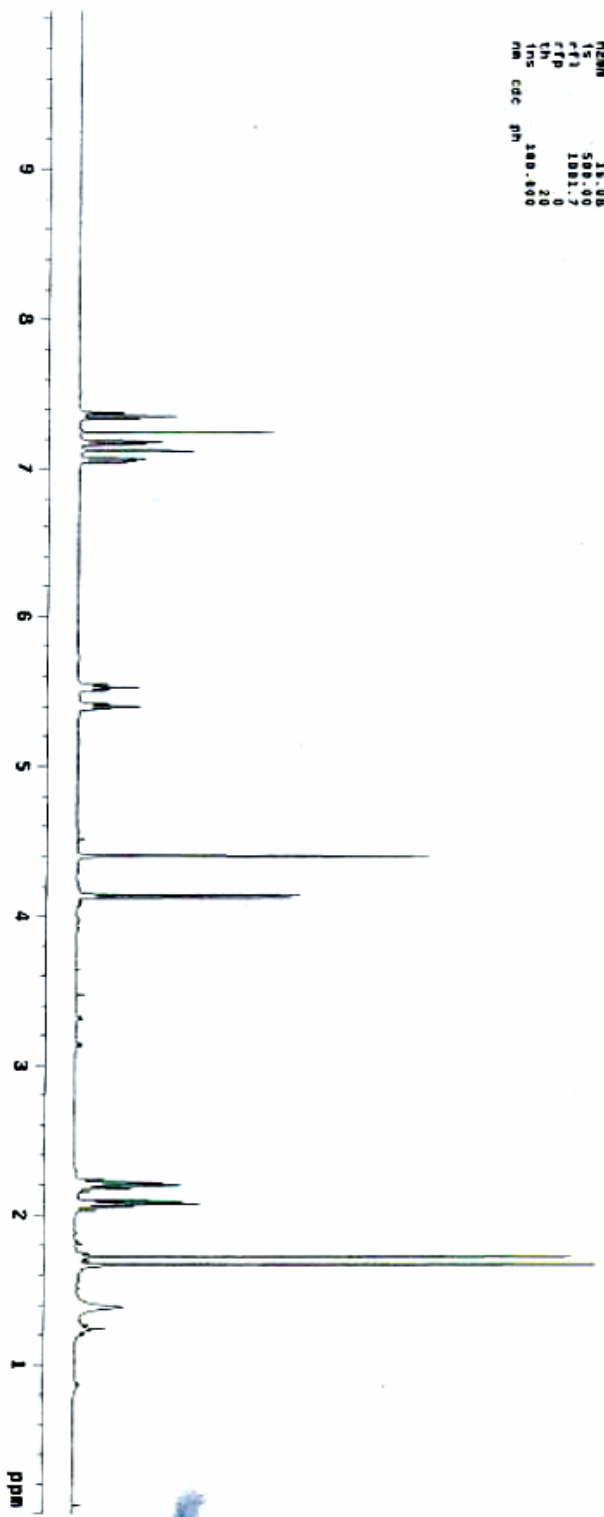
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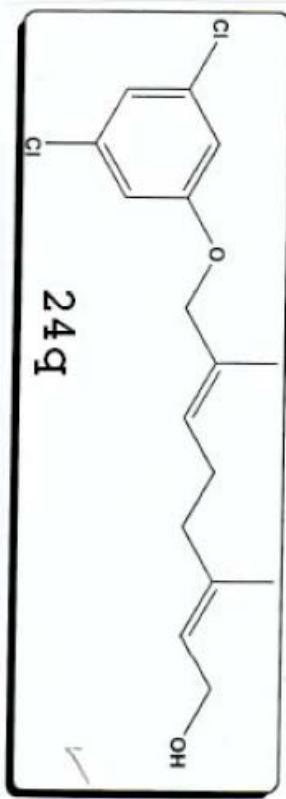
SAMPLE      DEC. 8 VT
DATE      DEC 8 2005  399.723
TIME      00:13      NI
FILE      exp      NI
ACQUISITION  exp      NI
SFRq      399.723  dm
CN        H1 dm
AT        2.744  dm  1148
NP        4832  dseq
SU        6000.0  dres  1.0
TD        3880  ROMD
ZD        4.6  Wt11/18
TOWR      7.3  PROC
DI        1.600  Tm  not used †
COR       0  math
NT        32
CT        10  verr
ALOCK     N  wep
DATA     not used  wds
FLDMS    N  wrt
I1        N
I2        N
IN        Y
DP        N
HE        NH
DISPLAY  -2.6
SP        4028.4
WD        0
SD        0
SC        250
HCMM      15.08
F13       500.00
F17       1001.7
F7P       0
TH        20
INS CODE  100.800
nm code  ph

```



24p





SAMPLE DEC. & VT  
 date Oct 2 2005 dfrq 399.723  
 solvent CDCl3 dn HI  
 FILE ACQUISITION exp dpr 42  
 399.723  
 to 31 dnm min  
 at 3.744 dar 11145  
 np 44932 dseq  
 sw 4800.6 d-rs 1.8  
 fd 3008 homo n  
 ds 16 PROCESSING  
 sduf 7.65 wct11r ft  
 di 1.000 proc not used  
 tof 6 math  
 nt 32  
 ct 16 wep  
 alock n wep  
 gain not used vbi  
 11 n  
 in n  
 dp v  
 hs nm  
 DISPLAY  
 sp -8.2  
 wf 4374.2  
 vc 0  
 sc 0  
 hnm 17.50  
 fs 52.50  
 rfd 1891.7  
 0  
 28  
 nm 188.089  
 nm cdc ph



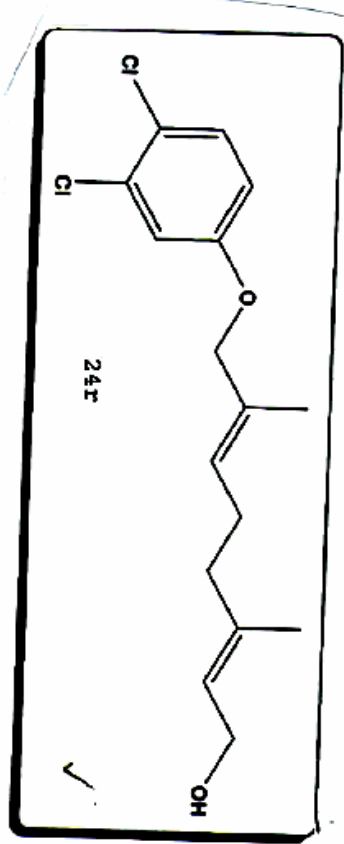


exp2 sidin

SAMPLE DEC. 4 VT 399.723  
 date Oct 2 2005 dfrq  
 solvent CDCl3 dn  
 a/pete/SUBBU/TS-BI- dbr  
 -15-13-Oct2-5805 f- dm  
 15-13-Oct2-5805 f- dm  
 15-13-Oct2-5805 f- dm  
 ID

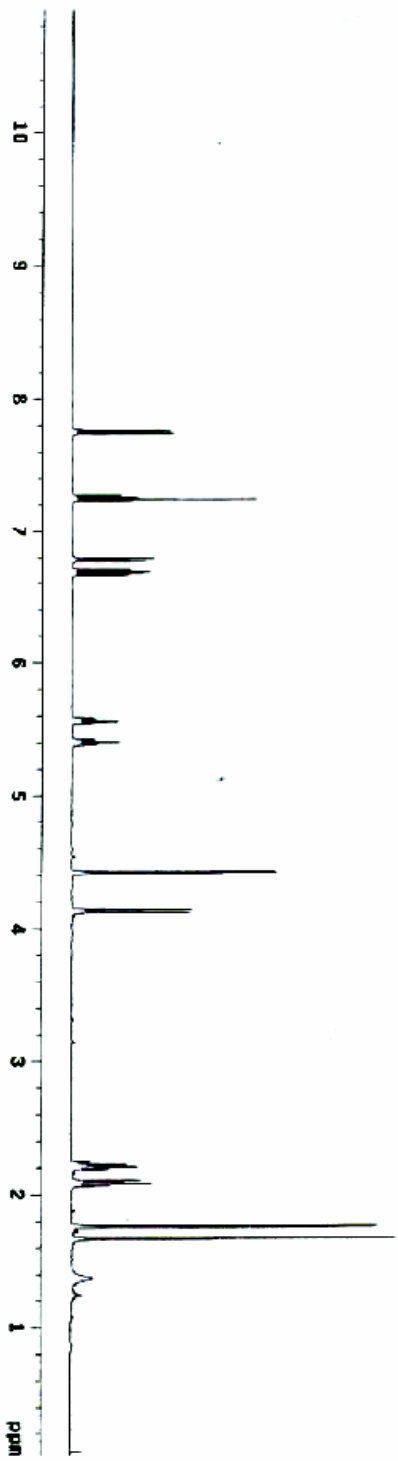
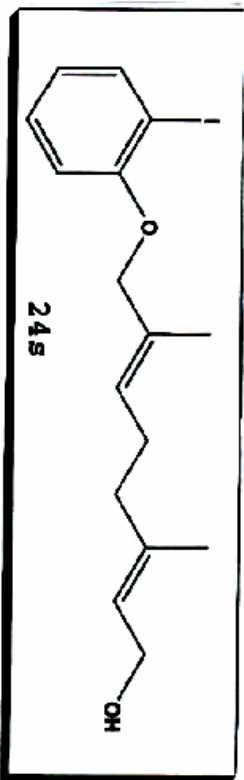
ACQUISITION 399.723 dmT 12145  
 STRQ 399.723 dteq dteq 1.0  
 TR 3.744 H1 dres 1.0  
 A1 64932 dfrq2 DEC2 0  
 T0 3846 dteq2  
 BS 15 dbr2 1  
 1Dbr 88 dot2 0  
 PV 7.3 dm2 n  
 d1 1.008 dm2 C  
 TOF 32 dm2 280  
 RT 32 dteq2  
 32 dres2  
 CLOCK not used  
 dbrin not used  
 S1 n  
 S2 n  
 S3 n  
 S4 n  
 S5 n  
 S6 n  
 S7 n  
 S8 n  
 S9 n  
 S10 n  
 S11 n  
 S12 n  
 S13 n  
 S14 n  
 S15 n  
 S16 n  
 S17 n  
 S18 n  
 S19 n  
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 S40 n  
 S41 n  
 S42 n  
 S43 n  
 S44 n  
 S45 n  
 S46 n  
 S47 n  
 S48 n  
 S49 n  
 S50 n

DISPLAY 559.7 webr  
 VP 343.4 webr  
 VC 250 webr  
 SC 0 webr  
 HNAME 13.75  
 IS 62.50  
 RF1 1001.7  
 SF 0  
 SS 20  
 MS CDC JH 100.000



```

SAMPLE          DEC. 6 VT
date   Oct 2 2005   dfrq   359.723
solvent  CDCl3   dn      ml
title  ACQUISITION exp   42
f1q    581.723   dpr    6
f2q    3.724   dfr    mc
f3q    44932   dnm    1146
f4q    580.6   dres   1.8
f5q    3080   homo   n
f6q    16   wfr18   n
f7q    73   f1oc   ft
f8q    1.088   fr   not used
f9q    B   math   t
f10q   nt   22   wepr
f11q   ct   25   wepr
f12q   alock n   wepr
f13q   gain not used wnt
f14q   f1dos n
f15q   n   y
f16q   n   y
f17q   n   y
f18q   n   y
f19q   n   y
f20q   n   y
f21q   n   y
f22q   n   y
f23q   n   y
f24q   n   y
f25q   n   y
f26q   n   y
f27q   n   y
f28q   n   y
f29q   n   y
f30q   n   y
f31q   n   y
f32q   n   y
f33q   n   y
f34q   n   y
f35q   n   y
f36q   n   y
f37q   n   y
f38q   n   y
f39q   n   y
f40q   n   y
f41q   n   y
f42q   n   y
f43q   n   y
f44q   n   y
f45q   n   y
f46q   n   y
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f55q   n   y
f56q   n   y
f57q   n   y
f58q   n   y
f59q   n   y
f60q   n   y
f61q   n   y
f62q   n   y
f63q   n   y
f64q   n   y
f65q   n   y
f66q   n   y
f67q   n   y
f68q   n   y
f69q   n   y
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f73q   n   y
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f75q   n   y
f76q   n   y
f77q   n   y
f78q   n   y
f79q   n   y
f80q   n   y
f81q   n   y
f82q   n   y
f83q   n   y
f84q   n   y
f85q   n   y
f86q   n   y
f87q   n   y
f88q   n   y
f89q   n   y
f90q   n   y
f91q   n   y
f92q   n   y
f93q   n   y
f94q   n   y
f95q   n   y
f96q   n   y
f97q   n   y
f98q   n   y
f99q   n   y
f100q  n   y
nm      cdc ph 180.400
  
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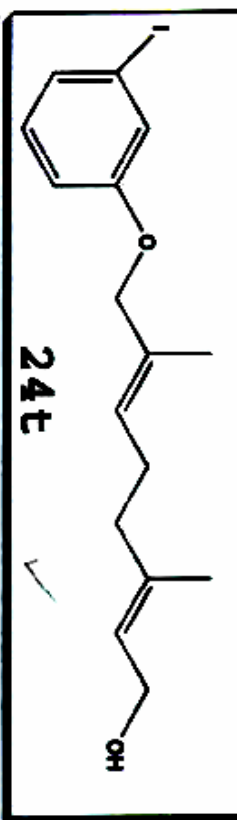


TS-11-16-571-I-Oct-1-2005

expl stain

```

SAMPLE # 5083 STR# DMC. 8 VT
DATE OCT 01 0013 SP STR# 809.722
TIME 649 SPCR 42
ACQUISITION 649 SPCR 42
STR# 308.722 SR 11145
LN 3.744 NL 11145
RT 4892 STR#
SU 4892 LAMS 1.0
SD 30.18 NAME PROCESSING
SI 15 NAME
TI 7.3 PRG OFFICE
PI 1.000 VA not used
TOF 7.3 math
CI 32 VERT
MT 7 VERT
CT 7 VERT
ALOCK M VERT
BLNK M VERT
WDM not used
SI 9 M
IN 9 M
DP 9 M
NS 9 M
DISPLAY 37.9
SP 4281.4
UP 1.0
CE 1.0
W0 258
NS 21.25
F01 1981.7
F02 0
TM 20
IMS cdc ph 180.980
  
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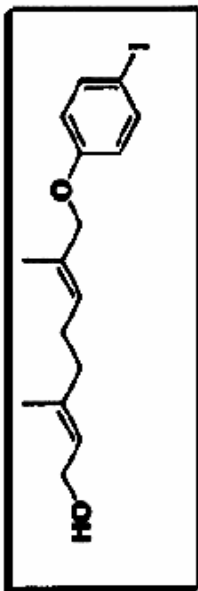
78-0-06-8-000/01-0105

expd 010116

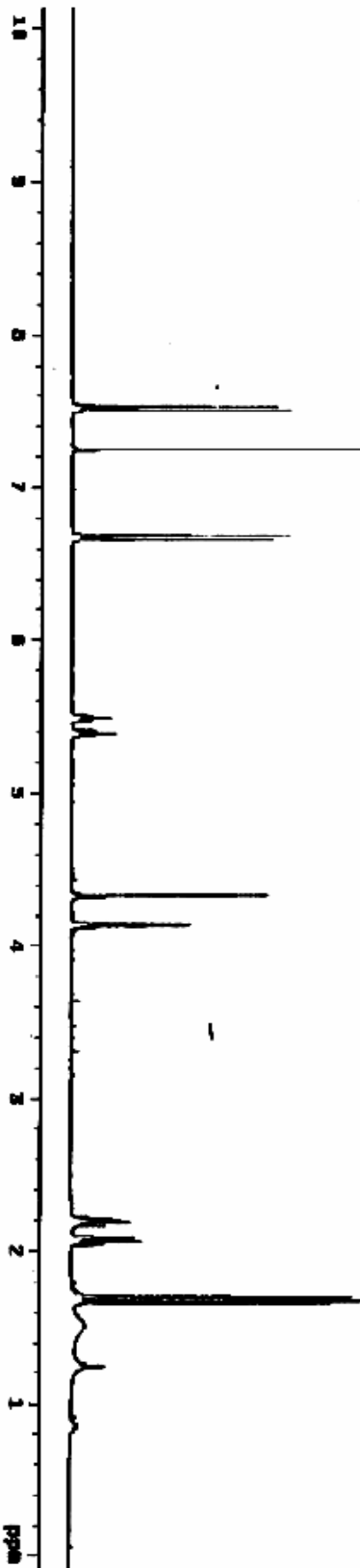
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SAMPLE          NAME          8774  REC. 8  VT  888.718
DATE          MON 28 2004  8774  01  41
TIME          11:00:00  8774  01  41
F11          ACQUISITION  8774  01  41
F11          589.723  8774  01  41
F2          589.723  8774  01  41
F3          589.723  8774  01  41
F4          589.723  8774  01  41
F5          589.723  8774  01  41
F6          589.723  8774  01  41
F7          589.723  8774  01  41
F8          589.723  8774  01  41
F9          589.723  8774  01  41
F10         589.723  8774  01  41
F11         589.723  8774  01  41
F12         589.723  8774  01  41
F13         589.723  8774  01  41
F14         589.723  8774  01  41
F15         589.723  8774  01  41
F16         589.723  8774  01  41
F17         589.723  8774  01  41
F18         589.723  8774  01  41
F19         589.723  8774  01  41
F20         589.723  8774  01  41
F21         589.723  8774  01  41
F22         589.723  8774  01  41
F23         589.723  8774  01  41
F24         589.723  8774  01  41
F25         589.723  8774  01  41
F26         589.723  8774  01  41
F27         589.723  8774  01  41
F28         589.723  8774  01  41
F29         589.723  8774  01  41
F30         589.723  8774  01  41
F31         589.723  8774  01  41
F32         589.723  8774  01  41
F33         589.723  8774  01  41
F34         589.723  8774  01  41
F35         589.723  8774  01  41
F36         589.723  8774  01  41
F37         589.723  8774  01  41
F38         589.723  8774  01  41
F39         589.723  8774  01  41
F40         589.723  8774  01  41
F41         589.723  8774  01  41
F42         589.723  8774  01  41
F43         589.723  8774  01  41
F44         589.723  8774  01  41
F45         589.723  8774  01  41
F46         589.723  8774  01  41
F47         589.723  8774  01  41
F48         589.723  8774  01  41
F49         589.723  8774  01  41
F50         589.723  8774  01  41
F51         589.723  8774  01  41
F52         589.723  8774  01  41
F53         589.723  8774  01  41
F54         589.723  8774  01  41
F55         589.723  8774  01  41
F56         589.723  8774  01  41
F57         589.723  8774  01  41
F58         589.723  8774  01  41
F59         589.723  8774  01  41
F60         589.723  8774  01  41
F61         589.723  8774  01  41
F62         589.723  8774  01  41
F63         589.723  8774  01  41
F64         589.723  8774  01  41
F65         589.723  8774  01  41
F66         589.723  8774  01  41
F67         589.723  8774  01  41
F68         589.723  8774  01  41
F69         589.723  8774  01  41
F70         589.723  8774  01  41
F71         589.723  8774  01  41
F72         589.723  8774  01  41
F73         589.723  8774  01  41
F74         589.723  8774  01  41
F75         589.723  8774  01  41
F76         589.723  8774  01  41
F77         589.723  8774  01  41
F78         589.723  8774  01  41
F79         589.723  8774  01  41
F80         589.723  8774  01  41
F81         589.723  8774  01  41
F82         589.723  8774  01  41
F83         589.723  8774  01  41
F84         589.723  8774  01  41
F85         589.723  8774  01  41
F86         589.723  8774  01  41
F87         589.723  8774  01  41
F88         589.723  8774  01  41
F89         589.723  8774  01  41
F90         589.723  8774  01  41
F91         589.723  8774  01  41
F92         589.723  8774  01  41
F93         589.723  8774  01  41
F94         589.723  8774  01  41
F95         589.723  8774  01  41
F96         589.723  8774  01  41
F97         589.723  8774  01  41
F98         589.723  8774  01  41
F99         589.723  8774  01  41
F100        589.723  8774  01  41

```



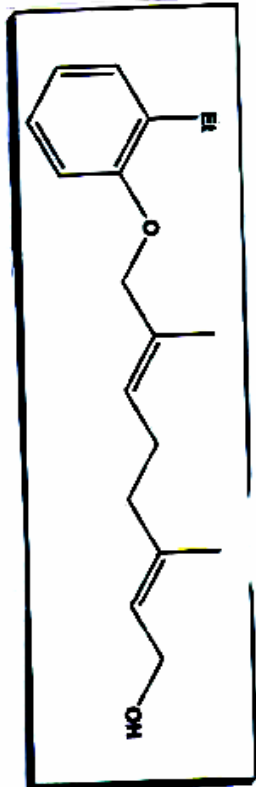
24u



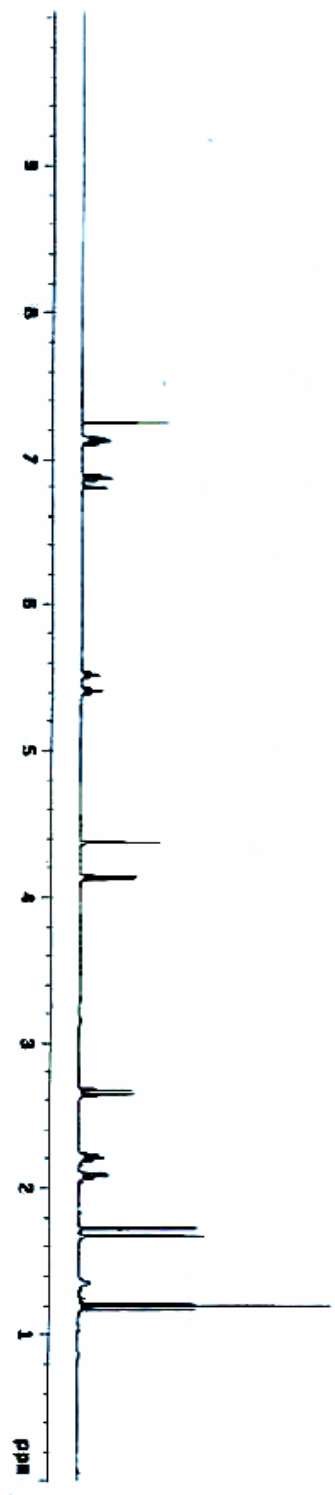
TE-IV-30-6-9017-2885

ENSL SIDLIN

SAMPLE	Oct 6 8915	9779	DEC. 6 VT
SOLVENT	CDCl3	8979	281.723
TITLE	ADDITION	IMP	42
ADDITION	589.723	8979	0
STRT	MI	8979	11345
ST	3.744	8979	1.0
ND	68402	8979	1.0
TD	3008	8979	1.0
OR	18	PROCESSED	TE
IPUR	7.8	proc	not used
ST	3.089	METH	
NT	88		
CT	22	water	
ALDCL	5	wash	
BALCL	5	wash	
FLDCL	5	wash	
11	7	wt	
11	7	wt	
49	7	wt	
86	7	wt	
DISPLAV	-2.8		
UP	4820.4		
VS	44		
WC	288		
FRMM	16.08		
FCI	209.08		
TRP	1881.7		
TRP	42		
TRP	42		
MS CDC PH	188.881		



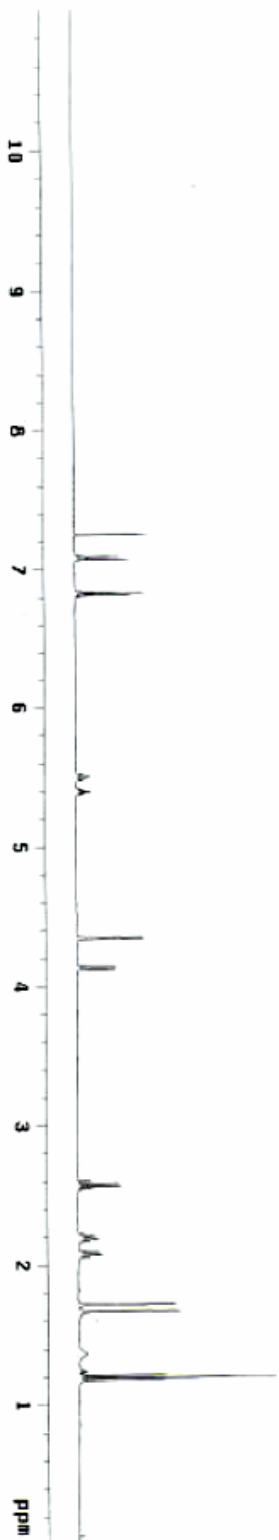
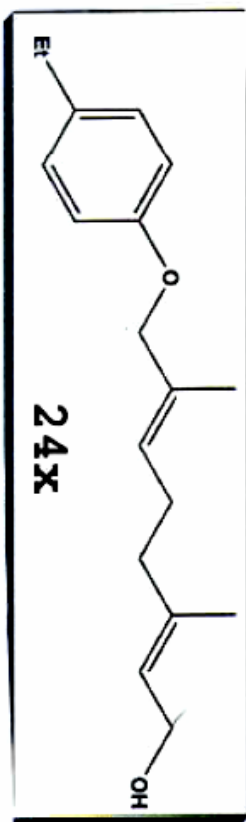
24V





exp1 stat1

SAMPLE DEC. 8 VT  
date Oct 2 2005 dfrq 399.723  
solvent CDCl3 dn H1  
f1le CDC13 exp dn 42  
ACQUISITION  
sfrq 399.723 da mn  
tn H1 dm L1140  
ac 3.243 ddr c  
np 44932 ddr 1.0  
rk 68900 PPM  
ds 18 PPM  
tpr 50 vttle PROCESSING  
pw 7.3 proc ft  
di 1.000 fa not used  
tof 0 math  
ct 32 werr  
ct block not used  
delt FLAG not used  
vns  
f1 n  
t1 n  
dp Y  
hs mh  
DISPLAY 7-1  
sp 4399.32  
vp 32  
vs 8  
vc 228  
vc 8  
vznm 17.250  
vzm 500.100  
rfl 1001.7  
rtp 0  
rns 20  
nm cdc ph 100.000

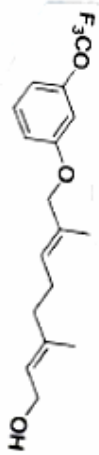


1S-1v-express9-Jan29-2006

expl 11d1h

DEC. 6 VI

SAMPLE Jan 29 2006 07:00 359.723  
 solvent CDCl3 in M1  
 title exp dpwr 42  
 ACQUISITION 407 B  
 359.723 359.723 dm B mm  
 IN M1 dm c  
 AC 3.274 dm 11.149  
 AP 4.474 dm  
 SP 6.887 dm 1.0  
 FB 3800 homo n  
 DS 16  
 TPW 00 WITTE  
 DW 7.3 proc ft  
 DL 1.680 fn not used f  
 LOF 0 math  
 NE 32  
 CL 32  
 CLCK 32 WERR  
 DATA not used WLS  
 WIT  
 FLAGE not used  
 I1 n  
 IN n  
 DA y  
 HS nm  
 DISPLAY -8.1  
 SB 48328  
 WP 0  
 SC 0  
 MC 280  
 Hzmax 16.17  
 F1 500.90  
 FT1 1001.7  
 FFP 0  
 TN 20  
 Ins cdc ph 2.000



24y

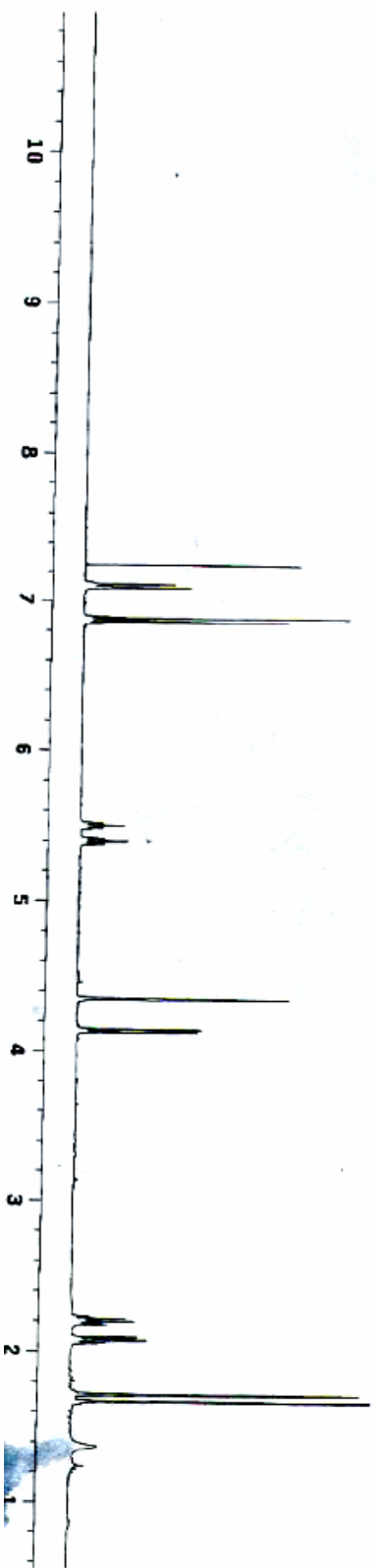
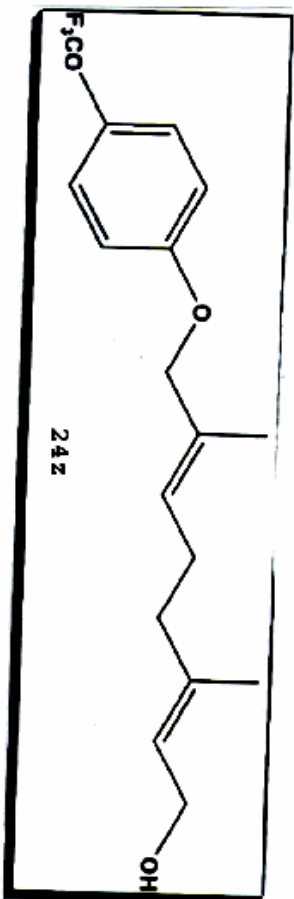




```

date Oct 2 2005 dfrq 399.723
solvent CDCl3 d1n H1
f1le C013 d1n H1
ACQUISITION exp 42
sfrq 399.723 de 0
tn H1 dm mnm
at 3.764 ddm 11148
np 44932 deeg
fb 6000.6 dres 1.0
bs 3880 homo 1.0
tpwr 15 PROCESSING
pw 68 vffile
d1 7.3 proc ft
t0r 1.080 tn not used
ct 0 math
nt 32 warr
alock n wexp
gain not used
FLAUS n wnt
11 n
12 n
13 n
14 n
15 n
16 n
17 n
18 n
19 n
20 n
ns Y
SD DISPLAY -8.2
vp 4374.2
vs 47
sc 0
vc 258
bzmm 17.58
is 52.20
rf1 1801.7
rfp 0
th 20
ins 100.000
na cdc ph

```



TS-14-10-7-OCT-2005

expt 1101h

date	Dec 4 2005	dfreq	DEC. A VT	399.723
solvent	CDCl3	dn	H1	42
ft/acquisition	exp	spwr	42	9
tfreq	399.723	dot	nmr	nmr
en	H1	dmn	11148	1.0
nl	3.744	dnt		
np	4832	dsod		
lv	6880.6	dres		
rb	3008	homo		
bs	16	wtflg	PROCESING	
cpwr	60	proc	ft	ft
pl	7.3	tn	not used	
dl	1.008	smth		
lof	9	whrt		
ct	32	wexp		
stoc	7	whs		
gain	not used	wt		
flags	not used			
l1	n			
l2	n			
l3	y			
l4	nn			
l5	nn			
l6	nn			
l7	nn			
l8	nn			
l9	nn			
l10	nn			
l11	nn			
l12	nn			
l13	nn			
l14	nn			
l15	nn			
l16	nn			
l17	nn			
l18	nn			
l19	nn			
l20	nn			
l21	nn			
l22	nn			
l23	nn			
l24	nn			
l25	nn			
l26	nn			
l27	nn			
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l29	nn			
l30	nn			
l31	nn			
l32	nn			
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l34	nn			
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l98	nn			
l99	nn			
l100	nn			



24aa

✓



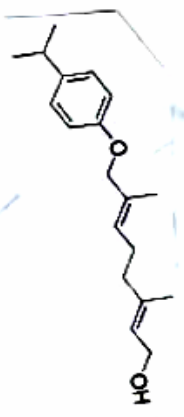
79-1V-18-5-oct7-2005

EX01 STD1H

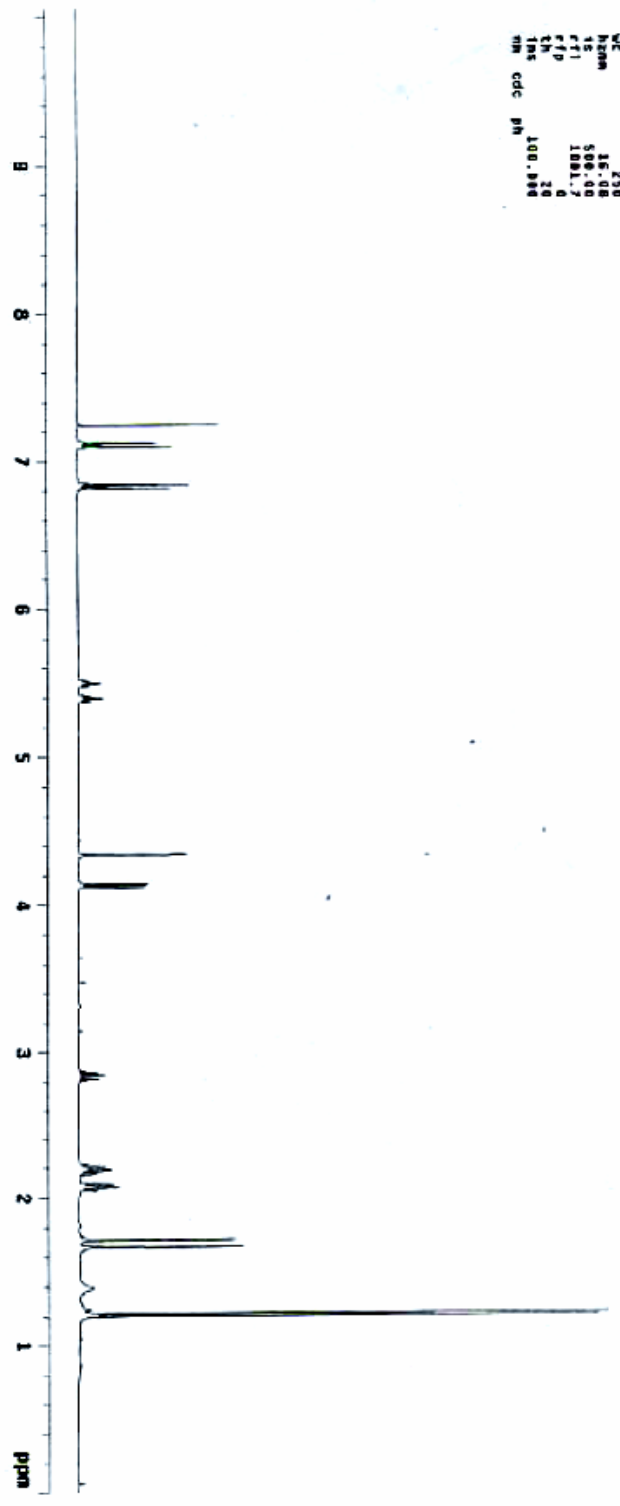
SAMPLE DEC. 4 VT 359.723  
 date Oct 9 2005 dfrq 359.723  
 solvent CDCl3 dm 4  
 F1 ACQUISITION exp dof 4  
 sfrq 359.723 dm 4  
 EN 3.724 dmf 11148  
 nt 4832 dseq  
 bw 600.6 drcs 1.0  
 fb 3000 homo PROCESSING  
 bs 16 vrfir  
 spwr 73 proc  
 dt 1.008 fr not used  
 tof 8 math  
 nt 32  
 ct 18 vort  
 alock n weap  
 data not used whs  
 FLAG5 not used vnt

1) M  
 1h M  
 1n M  
 1d M  
 1s M

DISPLAY -2.6  
 sp 4820.4  
 vp 80  
 vs 80  
 sc 0  
 vc 230  
 vcm 0  
 hznm 16.48  
 f1 58.48  
 f2 100.62  
 rfp 0  
 th 18  
 ins 100.888  
 nm cdc pn

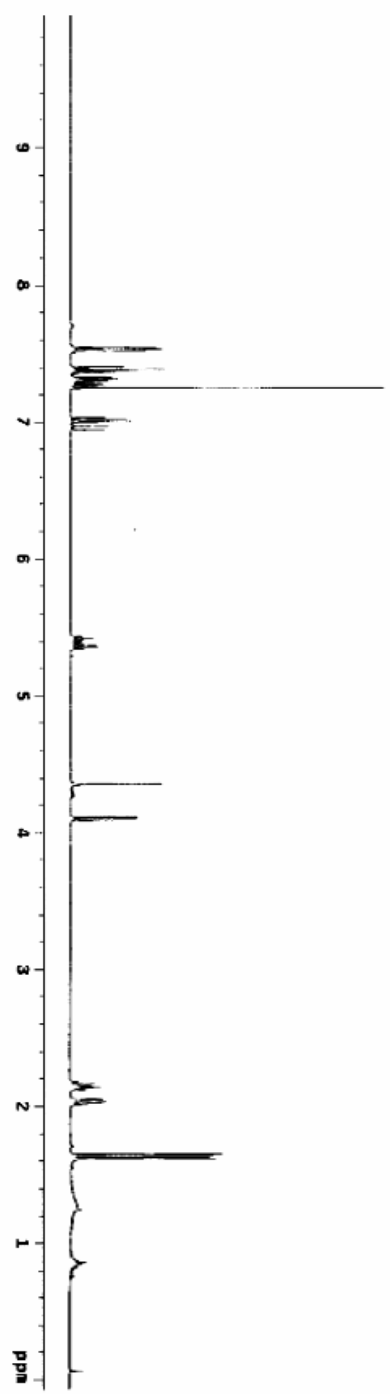
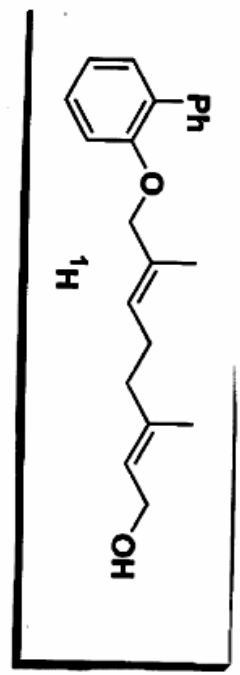


24ab



TS-O-PhCOOH  
 PU189-349000Ac: 120u1  
 exp1 stali1

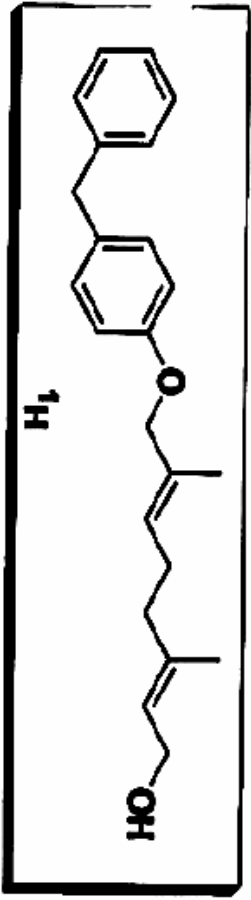
SAMPLE 58.2805 DEC. 8 VT 388.723  
 date DEC 8 2005 freq MHz 42  
 solvent CDCl3 sh 0  
 file /export/home/~spvr 42  
 subbu/TS-U-38-7-d-807 nm  
 NUC1 13C-110 dm  
 ACQUISITION 388.723 1148  
 freq MHz 100  
 nu1 42848  
 nu2 68848  
 nu3 8880  
 nu4 3880  
 nu5 15  
 nu6 15  
 nu7 7.2  
 nu8 1.990  
 nu9 0  
 nu10 328  
 nu11 328  
 nu12 328  
 nu13 328  
 nu14 328  
 nu15 328  
 nu16 328  
 nu17 328  
 nu18 328  
 nu19 328  
 nu20 328  
 nu21 328  
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 nu89 328  
 nu90 328  
 nu91 328  
 nu92 328  
 nu93 328  
 nu94 328  
 nu95 328  
 nu96 328  
 nu97 328  
 nu98 328  
 nu99 328  
 nu100 328  
 gain not used  
 flags not used  
 in n  
 tn n  
 dp v  
 ns nm  
 SP DISPLAY -30.4  
 vp 4811.3  
 vs 61  
 sc 258  
 hc 16.85  
 hnm 250.89  
 ft1 1801.7  
 tn 28  
 ns 188.088  
 no crc ph



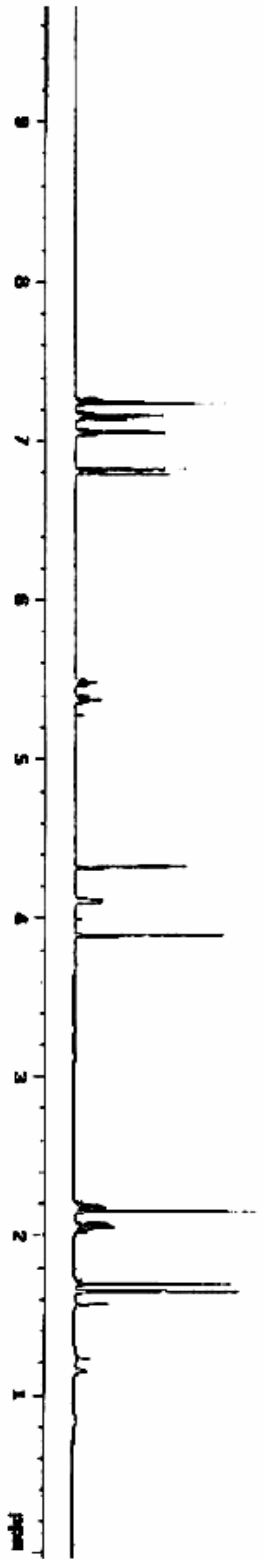
S-VII-47-1-1-NOV-28-2007

```

NOT STABLE
SAMPLE      Sample 8 VT  Dec. 9 VT
NAME        mov 88 8887 878 888 888-747
DISSOLV     CHCl3  50  500
ACQUISITION  200.717  500  1114.5
PROG        200.717  500  1114.5
P1          3.274  800  1.0
P2          4.832  800  1.0
P3          6.888  800  1.0
P4          8.444  800  1.0
P5          9.999  800  1.0
PROC        10  VETTER  PROCESSION  75
WV          2.12  3700  not used
FID          1.888  500  not used
LOCK        not used
ALIM        not used
FLAME       not used
M          0
P          0
Q          0
R          0
S          0
T          0
DISPLAY     -15.0
          4000.0
          2000.0
          1000.0
          500.00
          100.00
          20
          100.000
          20
          100.000
    
```



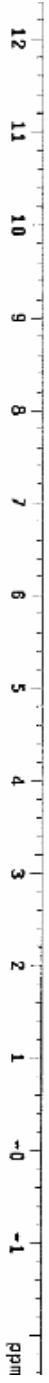
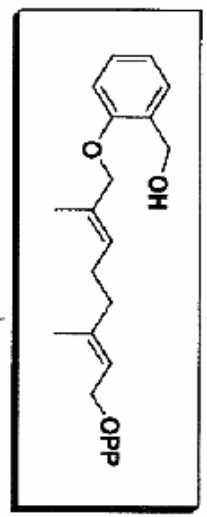
24ad



TS-VI-25H-sep11-2006

expl etdah

SAMPLE QFC: \* VT  
DATE Sep 13 2006 020 dn 389.718 HI  
SOLVENT exp dpr 42  
FILE ACQUISITION det 0  
NAME 389.718 dm nm  
ET 4.728 dm 11165  
NU 4.428 dm 11165  
FR 6.304 dm 1.0  
TR 3810 NORD 1.0  
BA 19 vrf:ie PROCESSING n  
TPVR 60 vrf:ie vrf:ie n  
PW 7.3 pvc not used f  
SI 1.000 Th not used f  
TO 0 math  
CT 3200 NMR  
CLOCK 180 NMRP  
GAIN not used vht  
FLGS 11 n  
10 y  
11 n  
12 n  
13 y  
14 n  
15 n  
16 n  
17 n  
18 n  
19 n  
20 n  
21 n  
22 n  
23 n  
24 n  
25 n  
26 n  
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95 n  
96 n  
97 n  
98 n  
99 n  
100 n

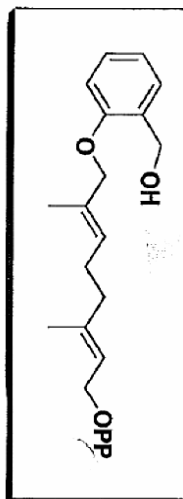


expt 52pu1

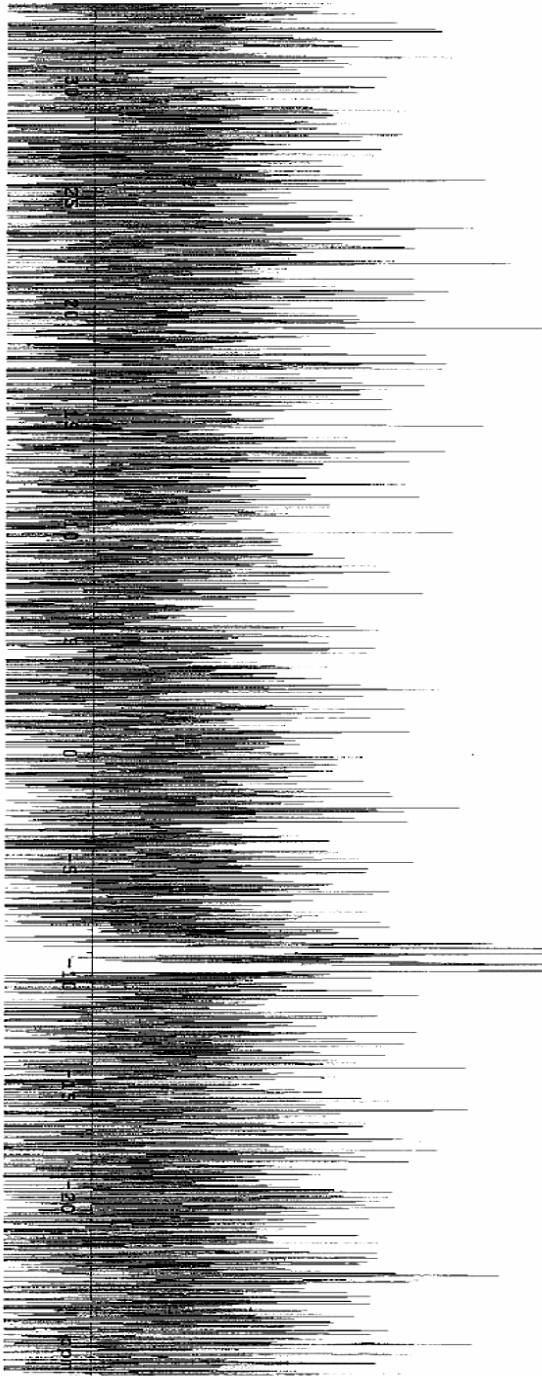
date	Sep 10 2006	dfreq	DEC. & VT	399.718
solvent	D2O	dn	H1	0
file	ACQUISITION	exp	gpr	42
sfreq	161.408	dm	yy	0
tn	161.408	dm	yy	0
at	0.400	dseq	11148	
np	18000	dres	1.0	
sw	10000.0	homo	n	
fb	6000	PROCESsing	1.00	
DS	54	1b	Wf11e	
CPMR	55	Wf11e		
dl	10.0	proc		
nt	0	fn		
tof	0	math	not used	f
ci	3200			
alock	1856	werr		
gain	n	wexp		
flags	not used	wcs		
11	n	mts		
in	n			
dp	y			
hs	nh			

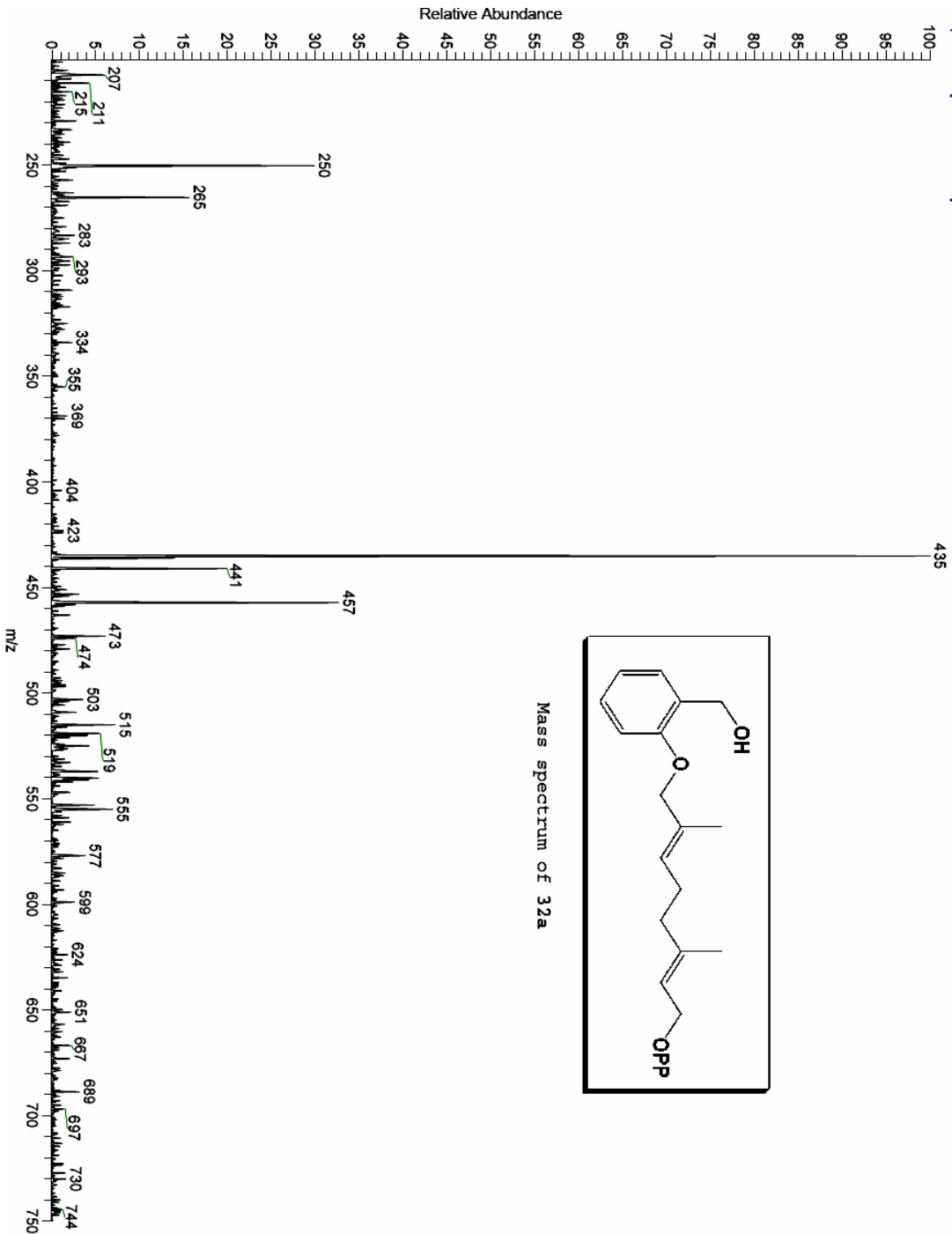
SP	DISPLAY	-4547.3	
WD		20000.0	
WD		15.0	
SC		0	
WC		250	
hzmm		29.99	
15		354.40	
CF1		4547.3	
CF2		0	
CF3		20	
CF4		0	
CF5		0	
nm	no	ph	100.080



Phosphorus NMR of 32a

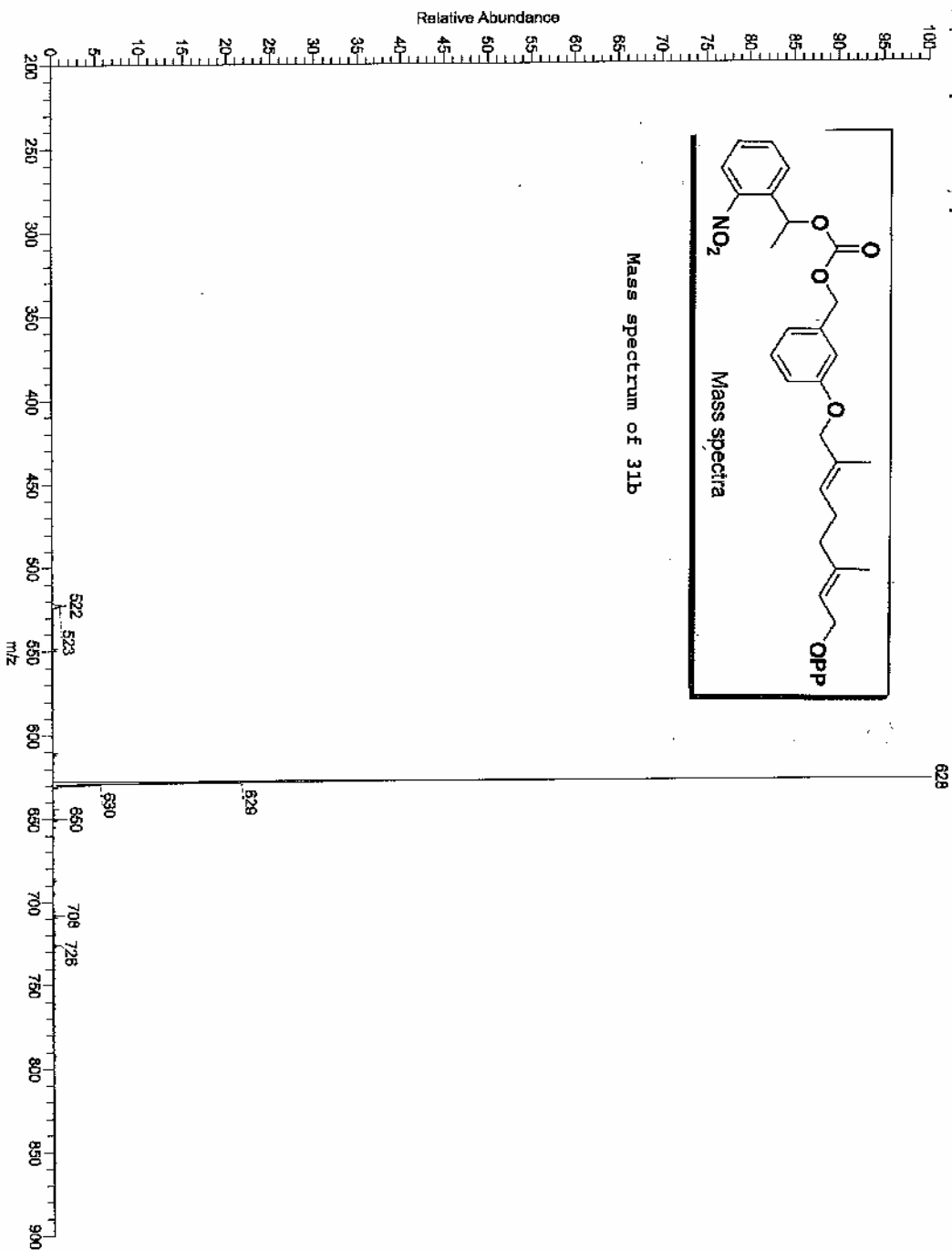


7-0637 #36-48\_RT\_4.144.86\_AV\_8\_SM\_58\_NL\_1.40E3  
: p Full ms [200.00-750.00]





06-0150 #45-64 RT: 2.26-2.61 AV: 10 NL: 1.16ES  
1: - p Full ms [100.00-1000.00]



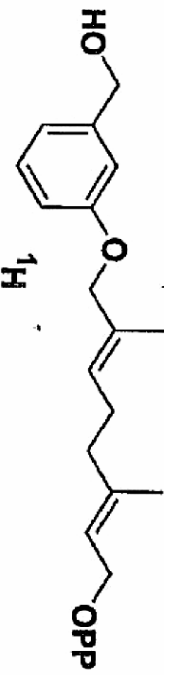
TS-V-89-1-irradiated-Feb22-2008

Exp1 std1h

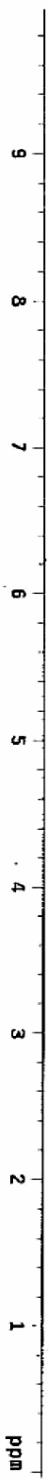
```

SAMPLE      DEC. 4 UT
date      Feb 22 2008  rfrq      399.724
solvent   D2O           dn           HI
f1b       exp      dpwr      42
ACQUISITION exp      dof           0
sfrq      399.724  dn           non
tn        HI      dam           C
ac        3.744  dnt           11148
np        44982  dseg
sw        6000.5  dres           1.0
fb        3800   homo
bs        15     PROCESSIONS
tdwr      80     wittle
pw        7.3   proc           FT
d1f       1.000  fn           not used
c0f       32000  math
ct        122   wgt
gain      not used  wexp
lock      not used  wbs
flaos     not used  wnt
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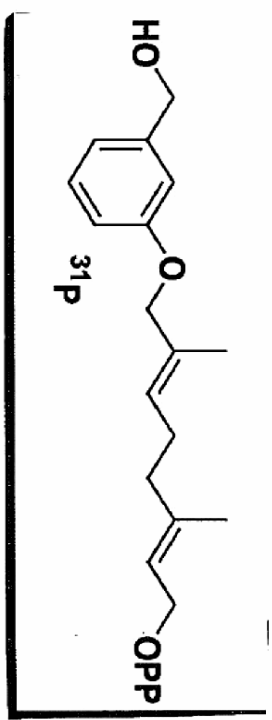


Proton NMR of 32b

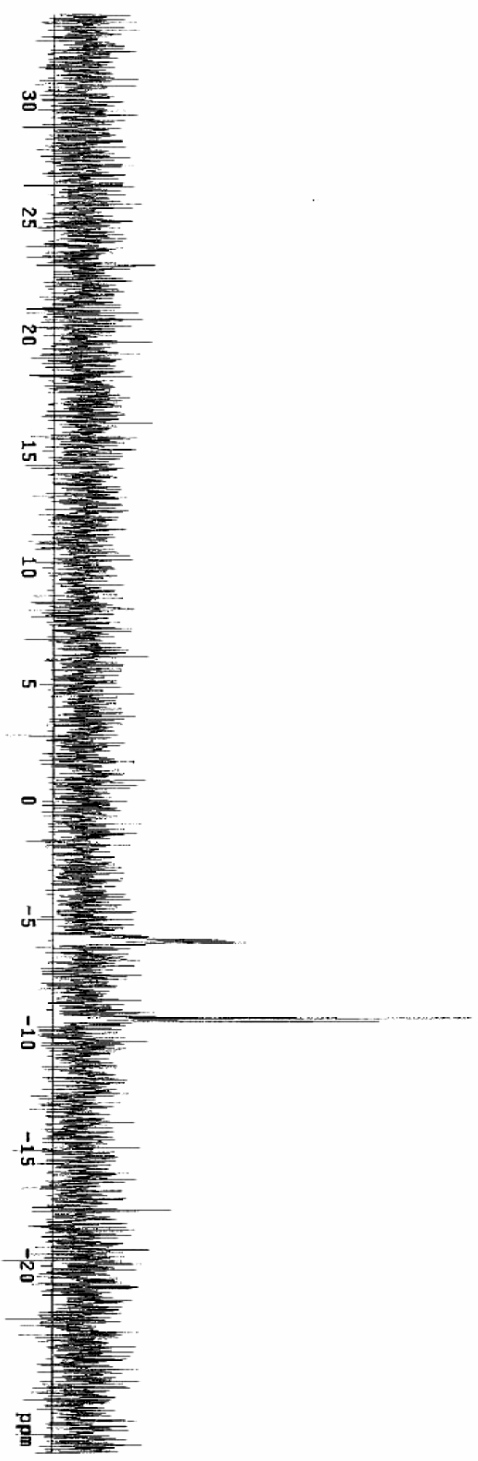


TS-Irradiated.ppp  
 exp1 szpu1

SAMPLE DEC. 8 VI 389.724  
 date Feb 14 2006 dfrq 389.724  
 solvent D2O dn HL  
 title /export/home/~ dpvr 42  
 Subbu/TS-V-281IR-4~ dot 0  
 EBI4-2006.714 dm vvv  
 sfreq 101.931 dmw 11145  
 ACQUISITION 911 dmw  
 sh 0  
 ai 0.800 dres 1.0  
 np 16000 homo  
 sw 10000.0  
 fd 5000.0 rb PROCESSING 1.00  
 bs 64 wtitle  
 tpvr 55 proc not used f  
 pw 10.0 fn  
 d1 0 math  
 tot 0  
 nt 32000 werr  
 ct 320 wexp  
 block 320 wcp  
 wpr not used  
 gain FLAAS not used wnt  
 11 n  
 in n  
 dp y  
 hs mn  
 DISPLAY  
 sp -4547.2  
 wp 10000.0  
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 vc 250  
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 rfp 0  
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 tns 100.000  
 nm no ph



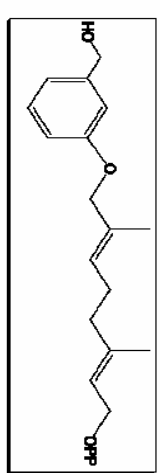
Phosphorus NMR of 32b



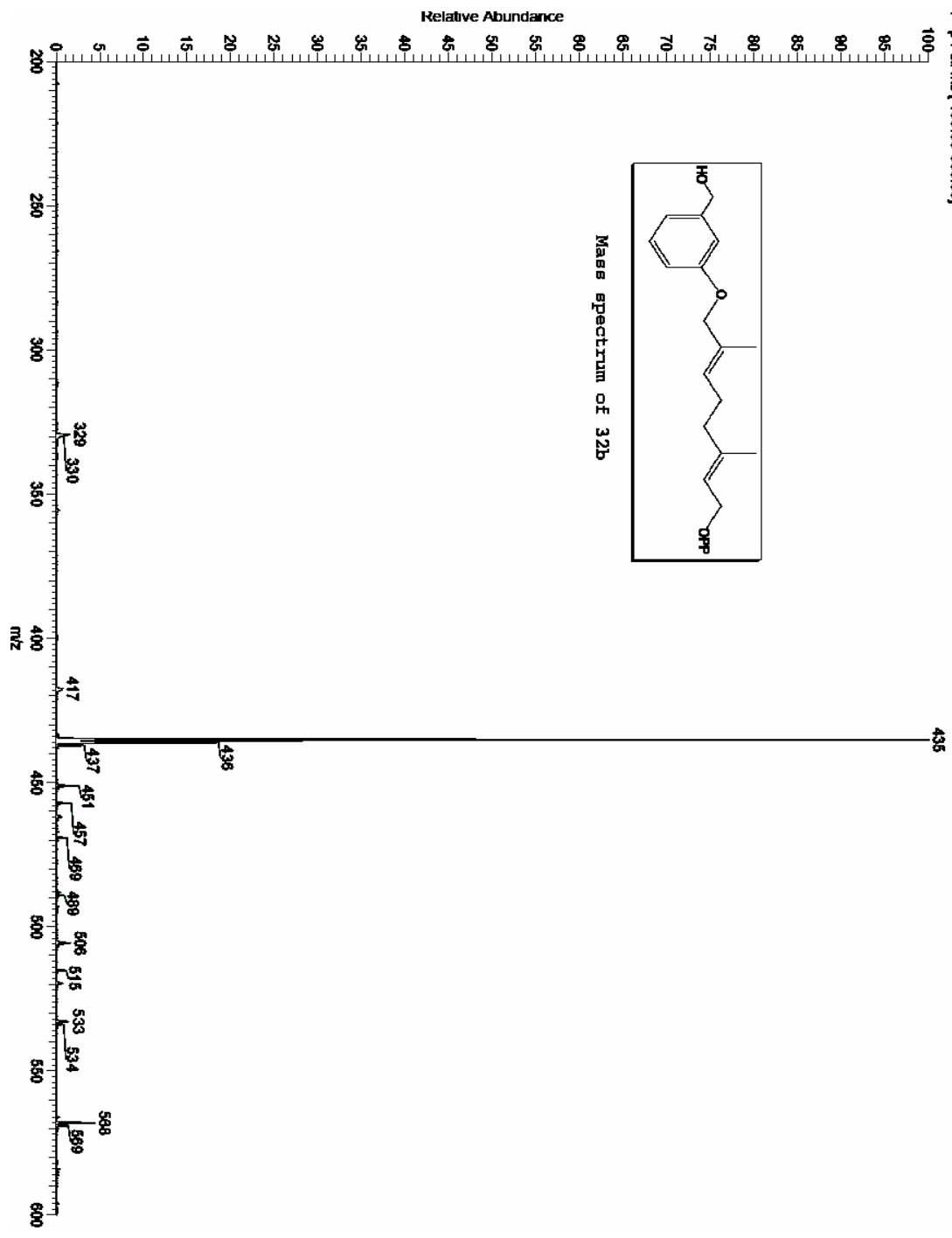
\\Cgalbur\data\U\KMSF\08-0149  
8-0149 #57-92 RT: 1.78-2.87 AV: 36 NL: 7.21E4  
- p Full ms [100,00-900,00]

02/19/2008 08:50:08 AM

TS-V-28-P



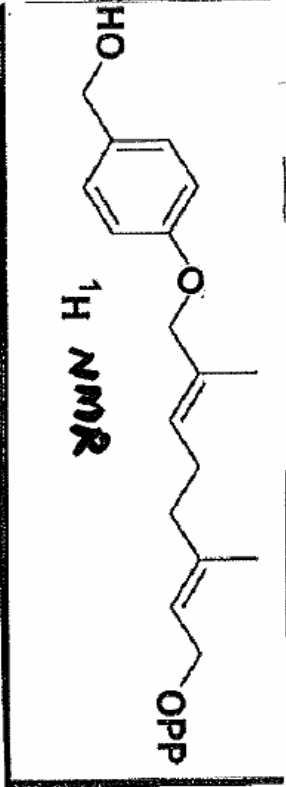
Mass spectrum of 32b



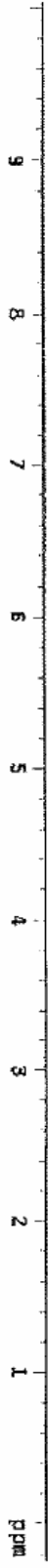
7S-p-hydroxyethylhexene

exptl std:ib

SAMPLE 30116 2005 DEC. 8 VI  
 date 30116 2005 07:24  
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 subbu /TSU-P-Hydro-...  
 AcetylfiphenonyOPP-...  
 acquisition: 1:50  
 07:24 399.724 d1e0 111.45  
 00 01 1.0  
 02 02 3.742 homo PROCESSING 1  
 03 03 2.832 v1e11e  
 04 04 6000.0 proc  
 05 05 3000 1% not used  
 06 06 60 sash  
 07 07 7.3 vert  
 08 08 1.000 vert  
 09 09 0 wshp  
 10 10 0 wshp  
 11 11 2800 wsh  
 12 12 003 wsh  
 13 13 001 wsh  
 14 14 001 wsh  
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 f992 n  
 f993 n  
 f994 n  
 f995 n  
 f996 n  
 f997 n  
 f998 n  
 f999 n  
 f1000 n



Proton NMR of 9c



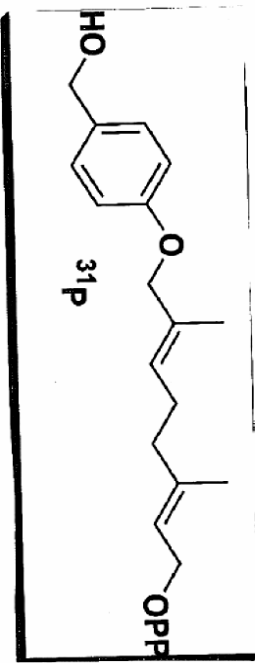
TS-p-hydroxymethyl)POP

expt: s8pu1

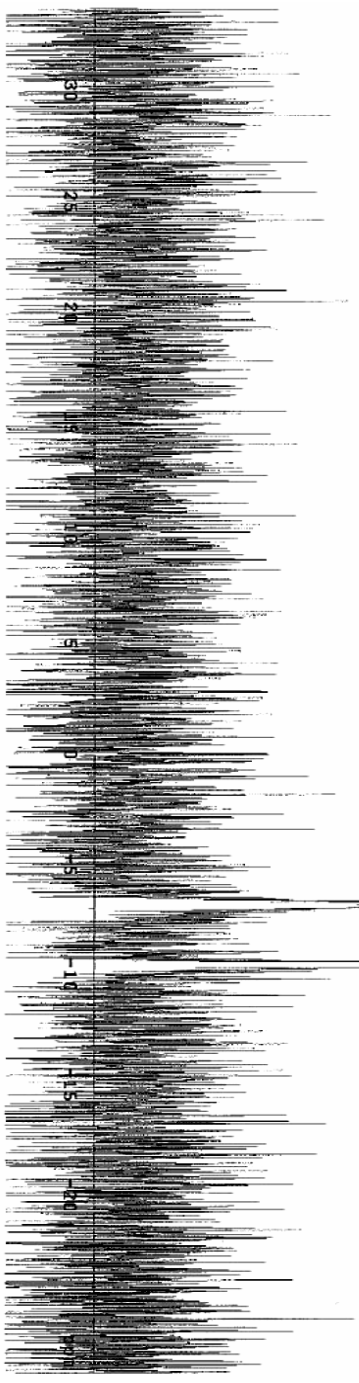
SAMPLE DEC. & VI  
 date Jul 16 2006 dfrq 333.724  
 solvent D2O dn H1  
 subbu/TS-p-hydro- ddr 46  
 xymethyl)phenoxy/gpp- dm yyy  
 \*fid dmw 11148  
 ACQUISITION  
 sfrq 161.811 dseq 1.0  
 tn P31 dres  
 nt 1.800 homo  
 ns 10000 1p PROCESSING 1.00  
 fd 8000 wfttle  
 bs 64 proc ft  
 tpwr 10.0 math not used  
 pv 0 werr  
 of 0 werr  
 cf 3200 werr  
 ct 991 wds  
 atock r wti  
 gath not used

FLAGS  
 11 n  
 1n n  
 4n y  
 8p y  
 DISPLAY mh

SP -4547.2  
 WP 10000.0  
 VS 101  
 SC 250  
 VC 48.00  
 NZmm 354.40  
 FFI 4547.2  
 FFI 0  
 th 40  
 rms no ph 100.000



Phosphorus MMR of 9c



7-0633 #78-95 RT: 7.128.85 AV: 18 SM: 58 NL: 4.87E2  
- p Full ms [200.00-750.00]

