

Unprecedented “In Water” Imidazole-Carbonylation: Paradigm shift for Preparation of Urea and Carbamate

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General Information: All reactions were run in the air with magnetic stirring. All the reaction were carried out in tap water (pH was measured between 6.0 to 6.5). Use of deionized water did not added any advantage to reactions in terms of yield or separation of product formed. All reagents were purchased from commercial suppliers and used without further purification. Organic solutions were concentrated under reduced pressure on a Heidolph rotary evaporator. Reactions were monitored by thin layer chromatography on silica gel precoated aluminium plates (Merck, TLC silica gel 60 F₂₅₄). UV light at 254 nm or KMnO₄ stains were used to visualize TLC plates. Flash column chromatography from Combiflash companion was used for purification of compound 1h, when prepared using solvent other than water. Chemical yields refer to pure isolated substances unless stated otherwise. ¹H-NMR spectra were recorded on a Bruker 300 spectrometer and the chemical shifts are reported in ppm relative to tetramethylsilane with the solvent resonance as the internal standard. Liquid chromatography–tandem mass spectrometry (LC/MS/MS) were performed on a Thermo-Finnigan Accela UHPLC system. The system was equipped with auto sampler, Accela pump, Photo diode array detector using Waters Acquity BEH C18 (50 x 2.1 mm X 1.7 micron) column. System was interfaced with a Thermo Finnigan LCQ Advantage Max ion trap mass spectrometer via an ESI probe. All data were collected in the positive ion mode. Instrument parameters were: heated capillary, 320°C; sheath gas (N₂), 55; auxiliary gas (N₂), 15; total two micro scans; maximum injection time, 200 ms. For MS experiments, the mass range scanned was m/z 50–900. MS/MS parameters were: IW 1.0; RCE 40%.

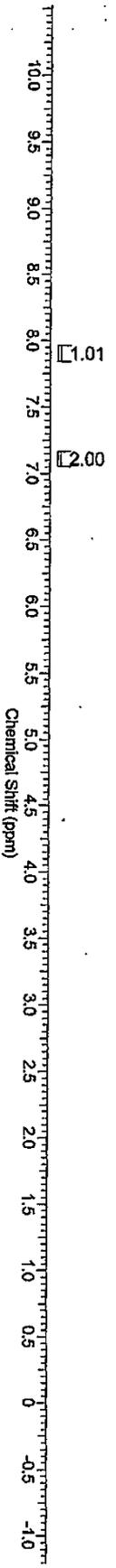
General Procedure for preparation of Carbonylimidazolide of amine : Amine (1 mmol) was taken in water and stirred at 0°C. CDI (1.2 mmol) was added in reaction mixture at 0°C. Reaction mixture was stirred at 0°C for 1 hr and then warm upto room temperature. Reaction was monitored with TLC. Complete conversion was observed within 20 min for most of the amine. In most cases product gets precipitated out in aqueous solution. Reaction mixture was filtered; precipitate obtained was washed with cold water and dried. In case if there's no precipitation of product Reaction mixture was extracted with 3 to 4 times by ethyl acetate. Organic layer was washed thrice with water, dried over sodium sulphate, evaporated in vacuu, and purified by column chromatography

General Procedure for preparation of Urea / Carbamate / Thiocarbamate:- Amine (1 mmol) was taken in water at room temperature and stirred at 0°C. CDI (1.2 mmol) was added in reaction mixture at 0°C. Reaction mixture was stirred at 0°C for 1 hr and then warm upto room temperature. Reaction was monitored with TLC. After complete formation of carbonylimidazolide, nucleophile (R-NH₂ / R-OH / R-SH) (1.2 mmol) was added. Reaction mixture was stirred at room temperature and monitored by TLC. In most cases complete conversion was observed within 2 h. Reaction mixture was filtered; precipitate obtained was washed with cold water and dried. In case if there's no precipitation of product, reaction mixture was extracted with 3 to 4 times by ethyl acetate. Organic layer was washed thrice with water, dried over sodium sulphate, evaporated in vacuu, and purified by column chromatography.

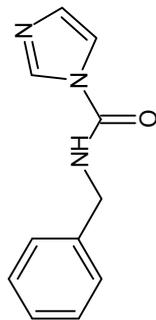
¹H NMR (300MHz, DEUTERIUM OXIDE) δ = 7.90 (s, 1H), 7.10 (d, $J=0.8$ Hz, 2H), 4.70 (s, 3H), 3.23 (s, 1H)
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10733/MUKP/212001

CDI, δ° -10 min, D₂O
in at δ°
D₂O
 δ°

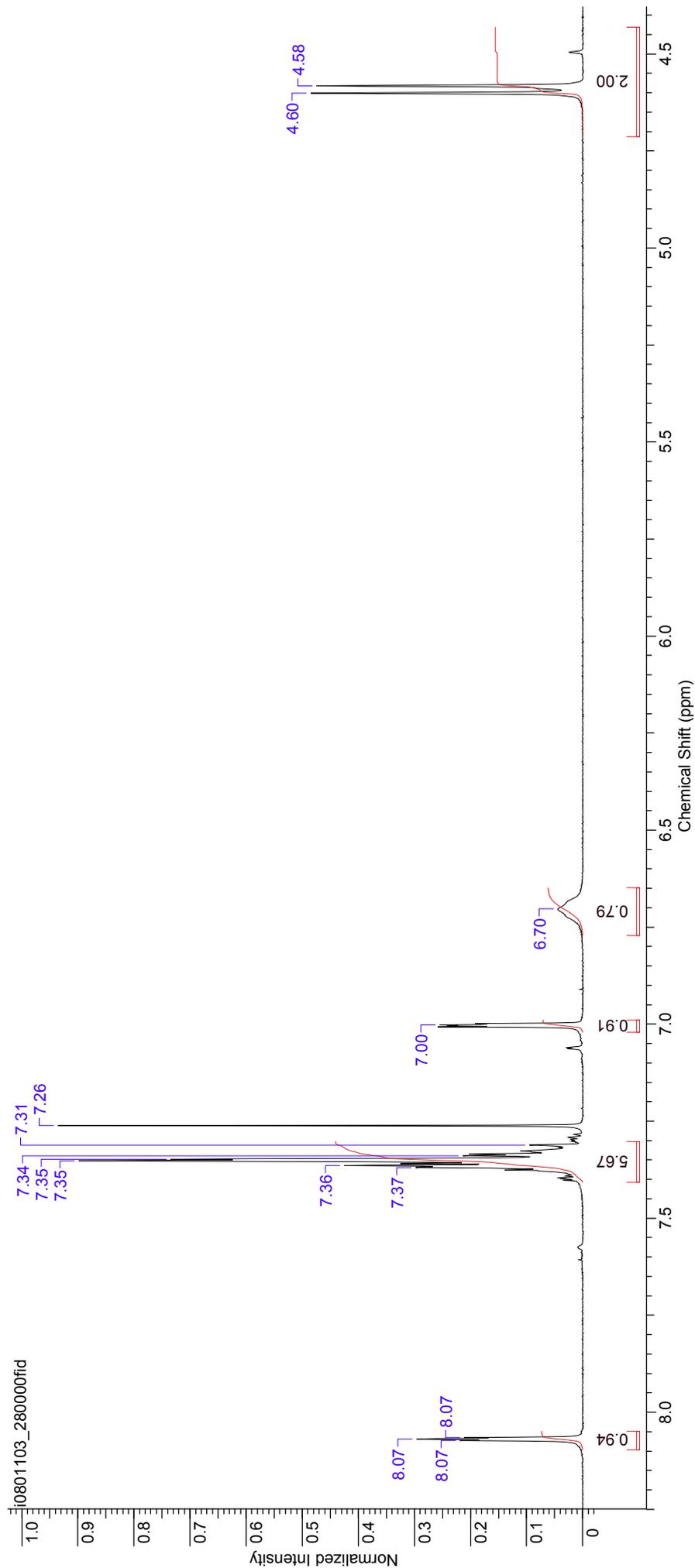


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Comment	11273/MUKJP/021/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d

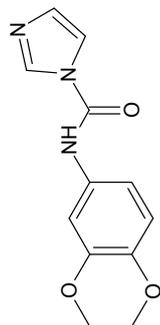


1b

¹H NMR (CHLOROFORM-d, 300MHz): δ = 8.07 (t, 1 H), 7.30 - 7.41 (m, 6 H), 6.99 - 7.02 (m, 1 H), 6.70 (br. s., 1 H), 4.59 ppm (d, J =5.7 Hz, 2 H)

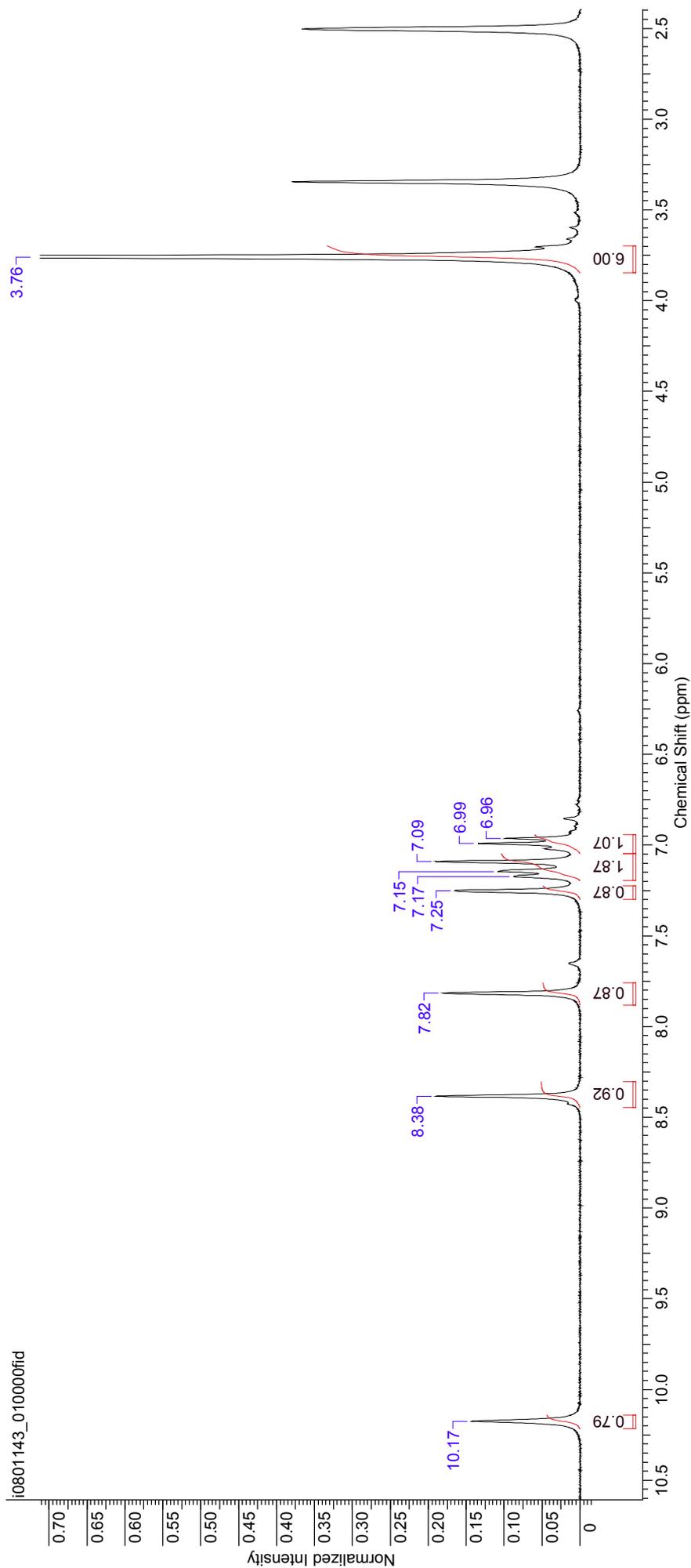


Date	14 Jan 2008 04:35:12
Comment	11227/MUKJP/234/001
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Nucleus	¹ H
Solvent	DMSO-d6

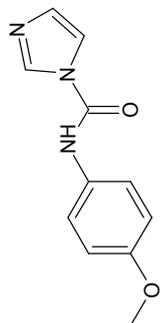


1c

¹H NMR (DMSO-d₆, 300MHz): δ = 10.17 (br. s., 1 H), 8.38 (s, 1 H), 8.38 (s, 1 H), 7.82 (s, 1 H), 7.82 (s, 1 H), 7.25 (br. s., 1 H), 7.05 - 7.20 (m, 2 H), 6.98 (d, J =8.7 Hz, 1 H), 3.76 ppm (s, 6 H)

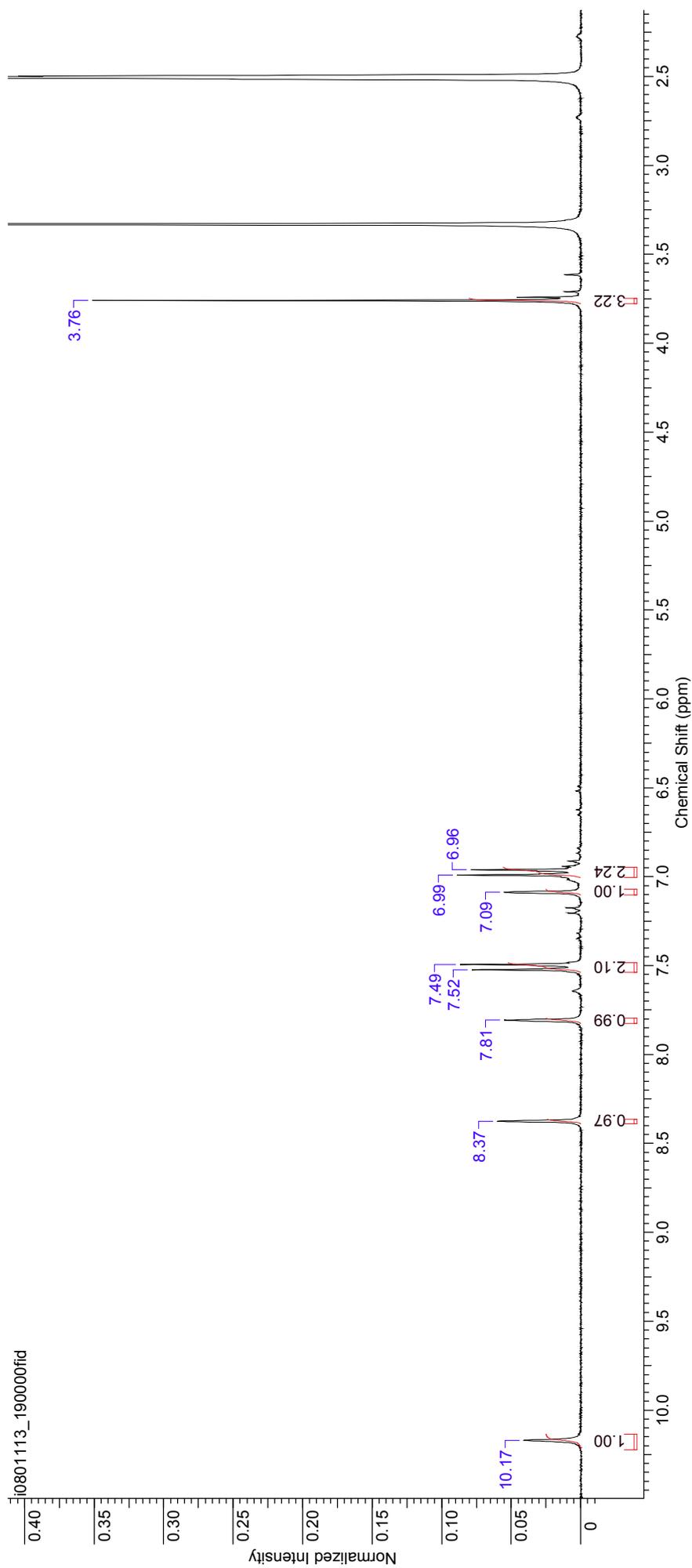


Date	11 Jan 2008 07:08:48
Comment	11227/MUKJP/235/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d ₆

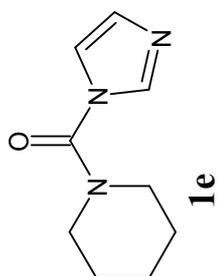


1d

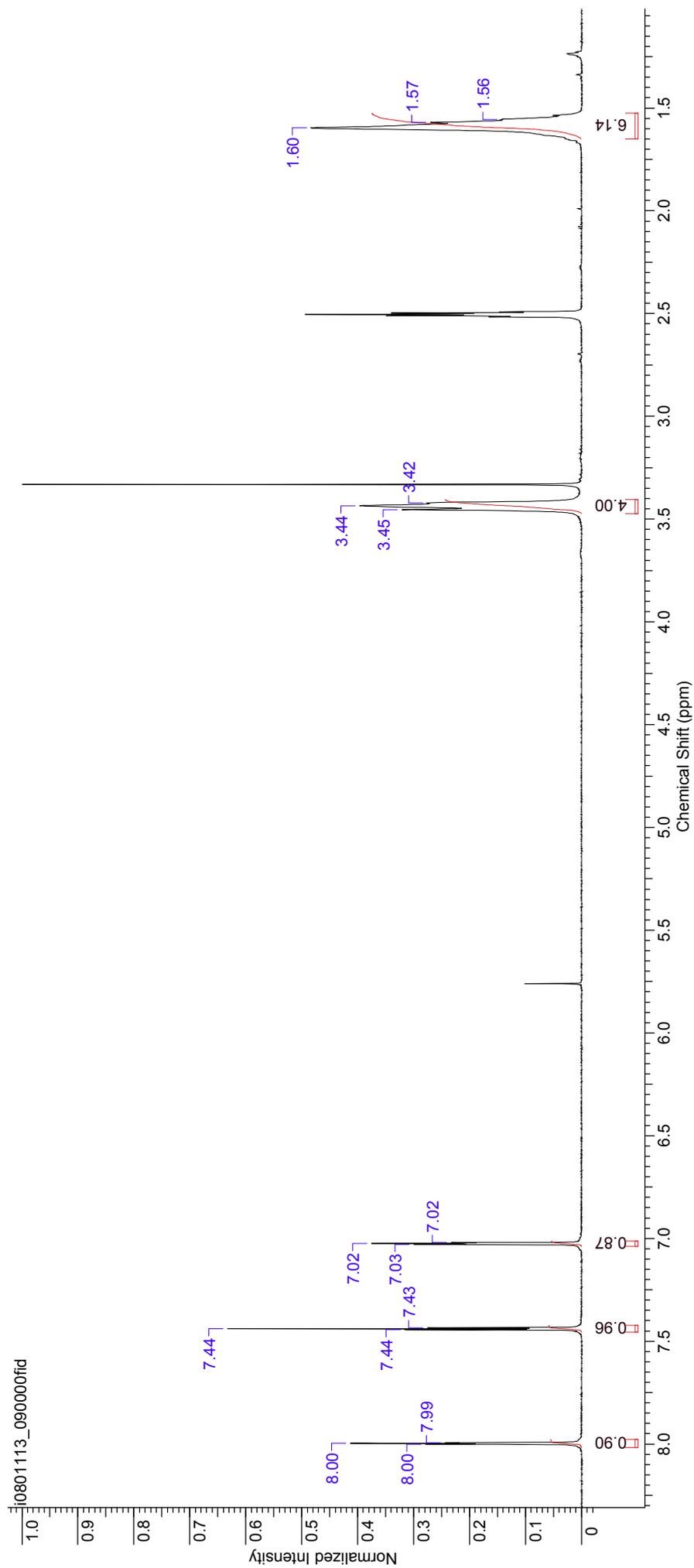
¹H NMR (DMSO-d₆, 300MHz): δ = 10.17 (s, 1 H), 8.37 (s, 1 H), 7.81 (s, 1 H), 7.81 (s, 1 H), 7.51 (d, J =9.1 Hz, 2 H), 7.09 (s, 1 H), 6.98 (d, J =9.1 Hz, 2 H), 3.76 ppm (s, 3 H)



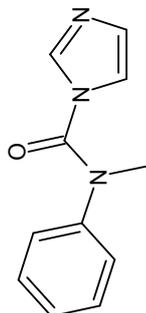
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Nucleus	¹ H
Solvent	DMSO-d6



¹H NMR (DMSO-d₆, 300MHz): δ = 8.00 (t, J =1.1 Hz, 1 H), 7.44 (t, J =1.5 Hz, 1 H), 7.02 (t, J =1.3 Hz, 1 H), 3.40 - 3.47 (m, 4 H), 1.53 - 1.65 ppm (m, 7 H)

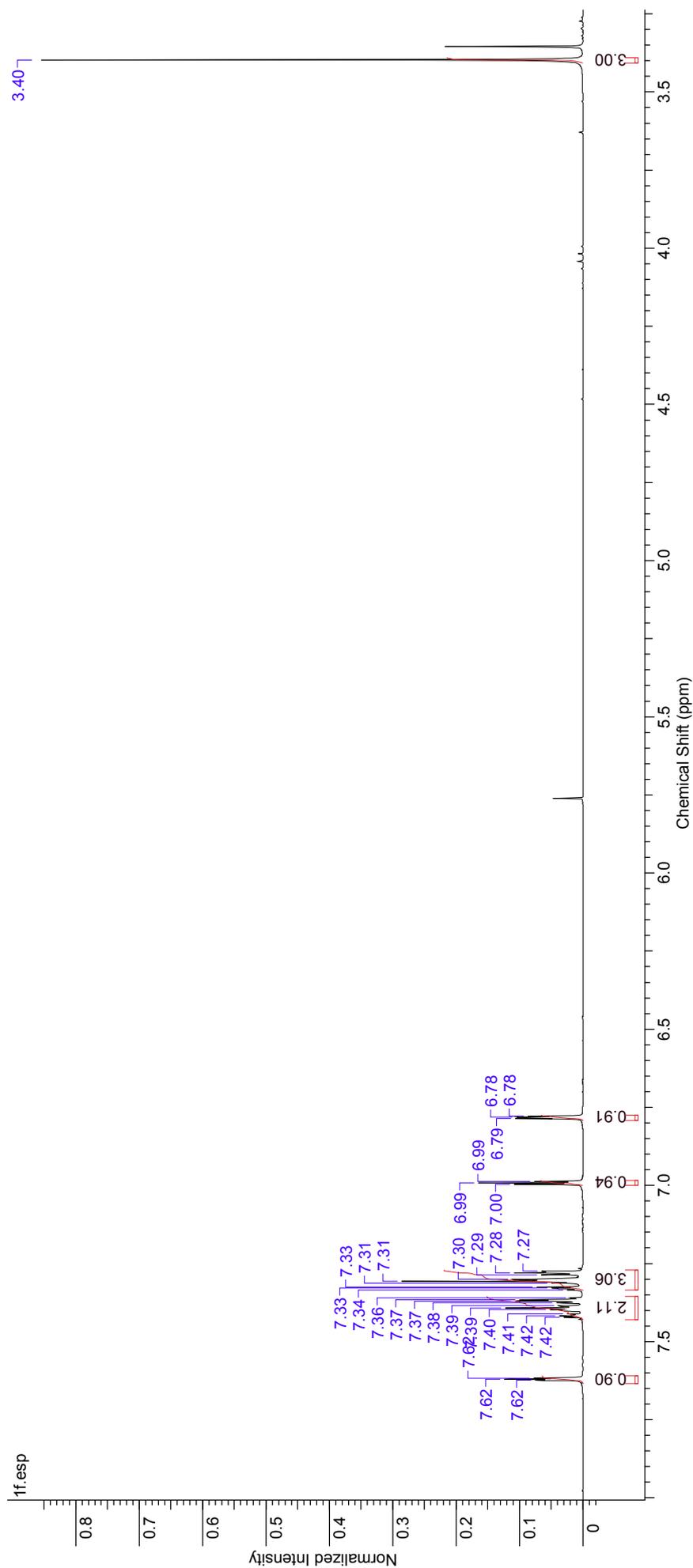


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Nucleus	¹ H
Solvent	DMSO-d ₆

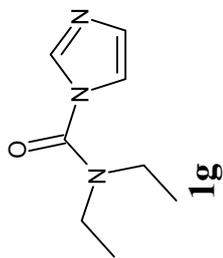


1f

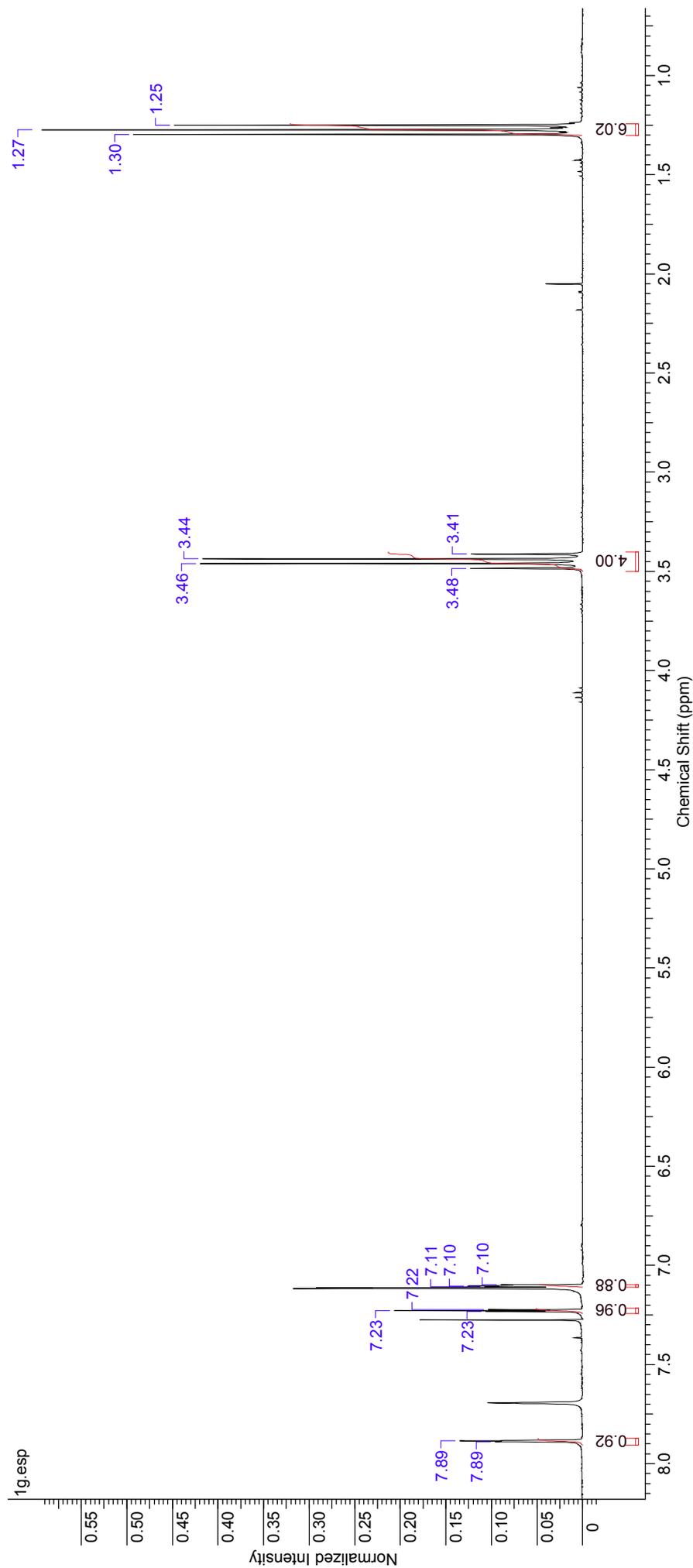
¹H NMR (DMSO-d₆, 300MHz): δ = 7.62 (t, *J*=0.9 Hz, 1 H), 7.36 - 7.43 (m, 2 H), 7.27 - 7.34 (m, 3 H), 6.98 - 7.00 (m, 1 H), 6.77 - 6.79 (m, 1 H), 3.40 ppm (s, 3 H)



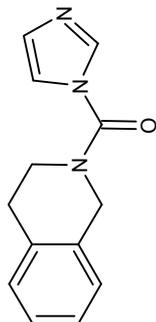
Date	21 Nov 2007 07:51:28
Comment	10733/MUKJP/119/301
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d



¹H NMR (CHLOROFORM-d, 300MHz): δ = 7.89 (d, J =1.1 Hz, 1 H), 7.23 (t, J =1.5 Hz, 1 H), 7.10 - 7.11 (m, 1 H), 3.45 (q, J =7.2 Hz, 4 H), 1.27 ppm (t, J =7.2 Hz, 6 H)

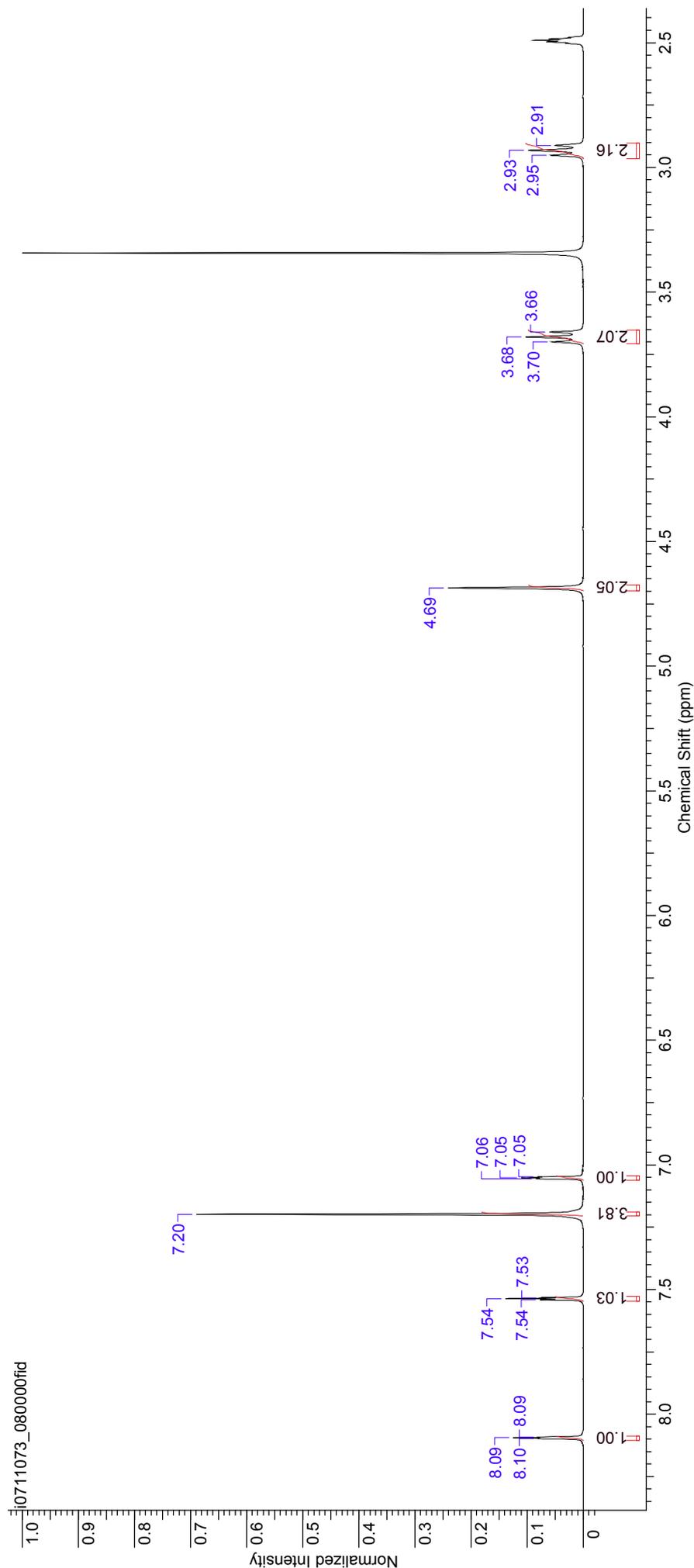


Date	07 Nov 2007 06:38:56
Comment	10733/MUKJP/109/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

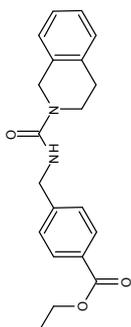


1h

¹H NMR (DMSO-d₆, 300MHz): δ = 8.09 (t, J =0.8 Hz, 1 H), 7.54 (t, J =1.3 Hz, 1 H), 7.20 (s, 4 H), 7.05 (t, 1 H), 7.04 - 7.06 (m, 1 H), 4.69 (s, 2 H), 3.68 (t, J =5.9 Hz, 2 H), 2.93 ppm (t, J =5.9 Hz, 2 H)

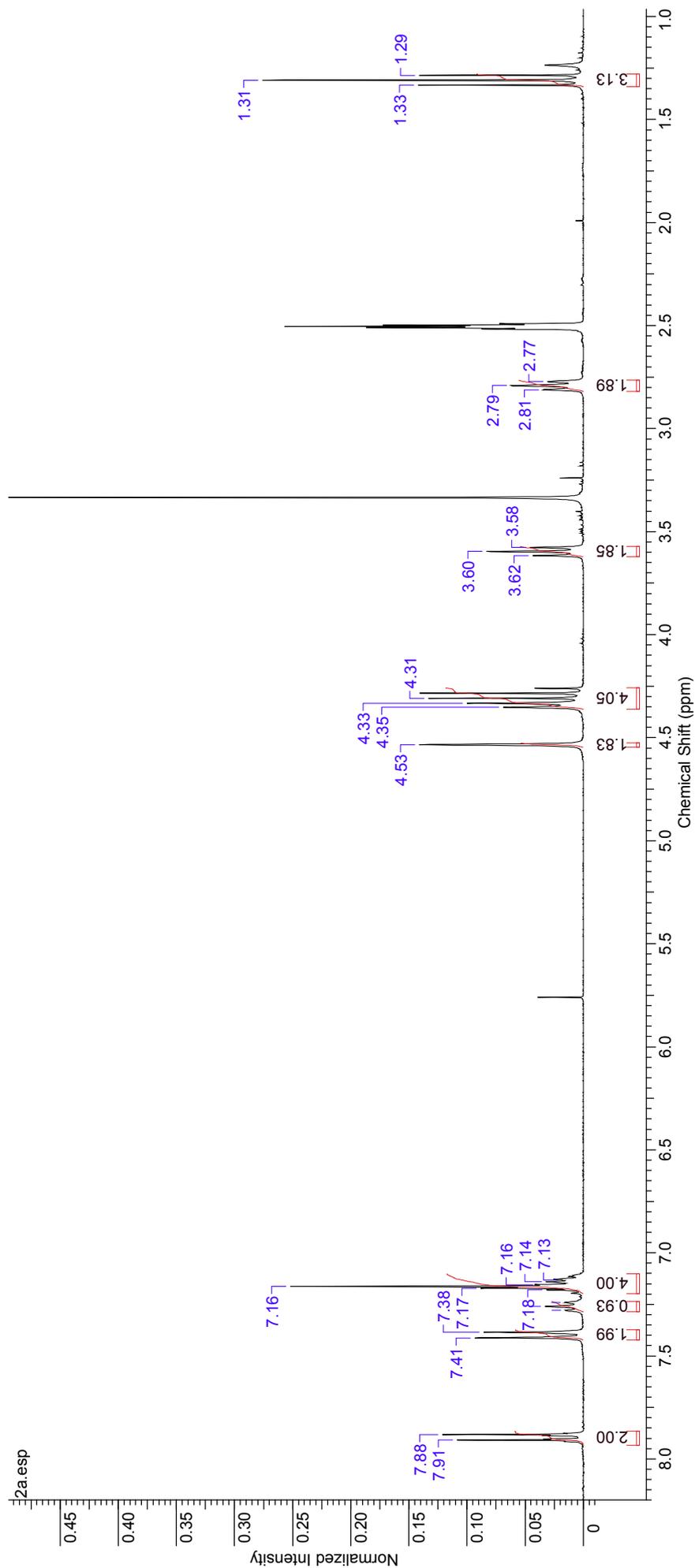


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Comment	11272MUKJP079/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

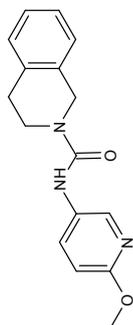


2a

¹H NMR (DMSO-d₆, 300MHz): δ = 7.90 (d, J =8.3 Hz, 2 H), 7.40 (d, J =8.7 Hz, 2 H), 7.26 (t, J =5.9 Hz, 1 H), 7.12 - 7.18 (m, 4 H), 4.53 (s, 2 H), 4.26 - 4.36 (m, 4 H), 3.60 (t, J =6.0 Hz, 2 H), 2.79 (t, J =5.9 Hz, 2 H), 1.31 ppm (t, J =7.0 Hz, 3 H)

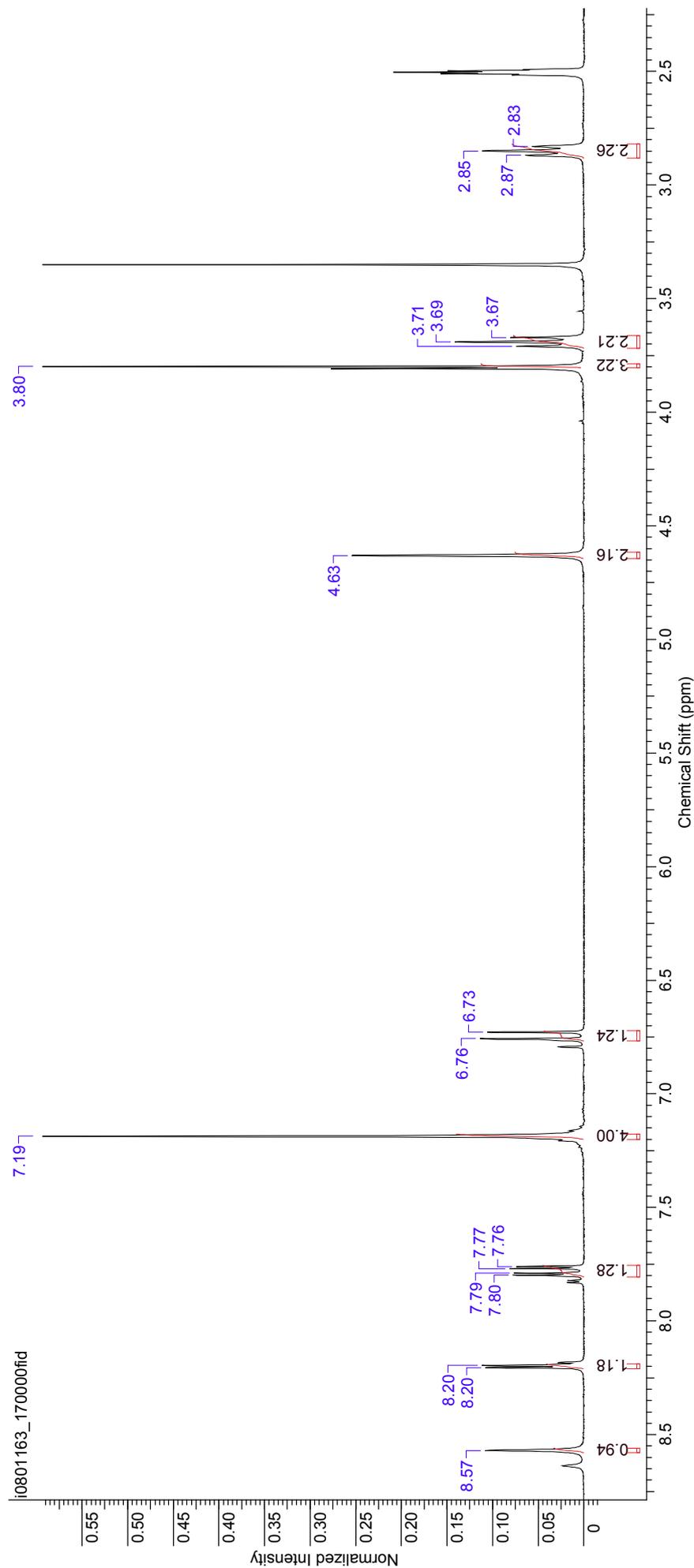


Date	16 Jan 2008 06:58:08
Comment	10733/MUKJP/216/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

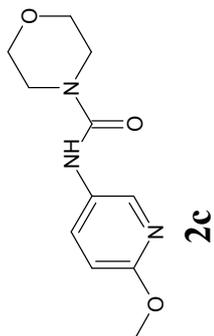


2b

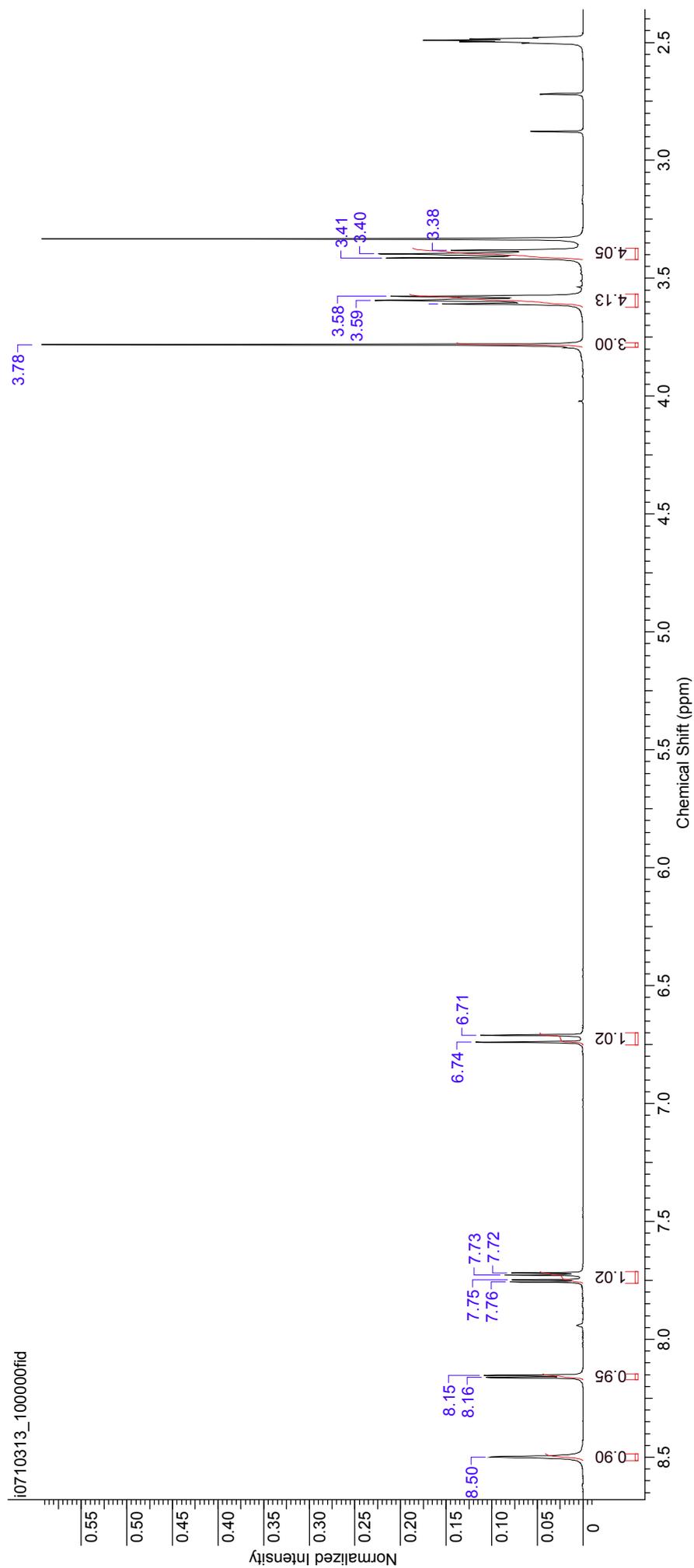
¹H NMR (DMSO-d₆, 300MHz): δ = 8.57 (s, 1 H), 8.20 (d, J =2.6 Hz, 1 H), 7.78 (dd, J =8.7, 2.6 Hz, 1 H), 7.19 (s, 4 H), 6.74 (d, J =8.7 Hz, 1 H), 4.63 (s, 2 H), 3.80 (s, 3 H), 3.69 (t, J =5.9 Hz, 2 H), 2.85 ppm (t, J =5.9 Hz, 2 H)



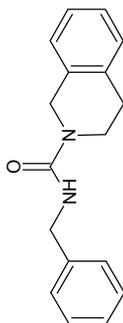
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Comment	10733/MUKJP/103/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6



¹H NMR (DMSO-d₆, 300MHz): δ = 8.50 (s, 1 H), 8.16 (d, $J=2.6$ Hz, 1 H), 7.74 (dd, $J=8.7, 2.6$ Hz, 1 H), 6.73 (d, $J=8.7$ Hz, 1 H), 3.78 (s, 3 H), 3.57 - 3.62 (m, 5 H), 3.37 - 3.42 ppm (m, 5 H)

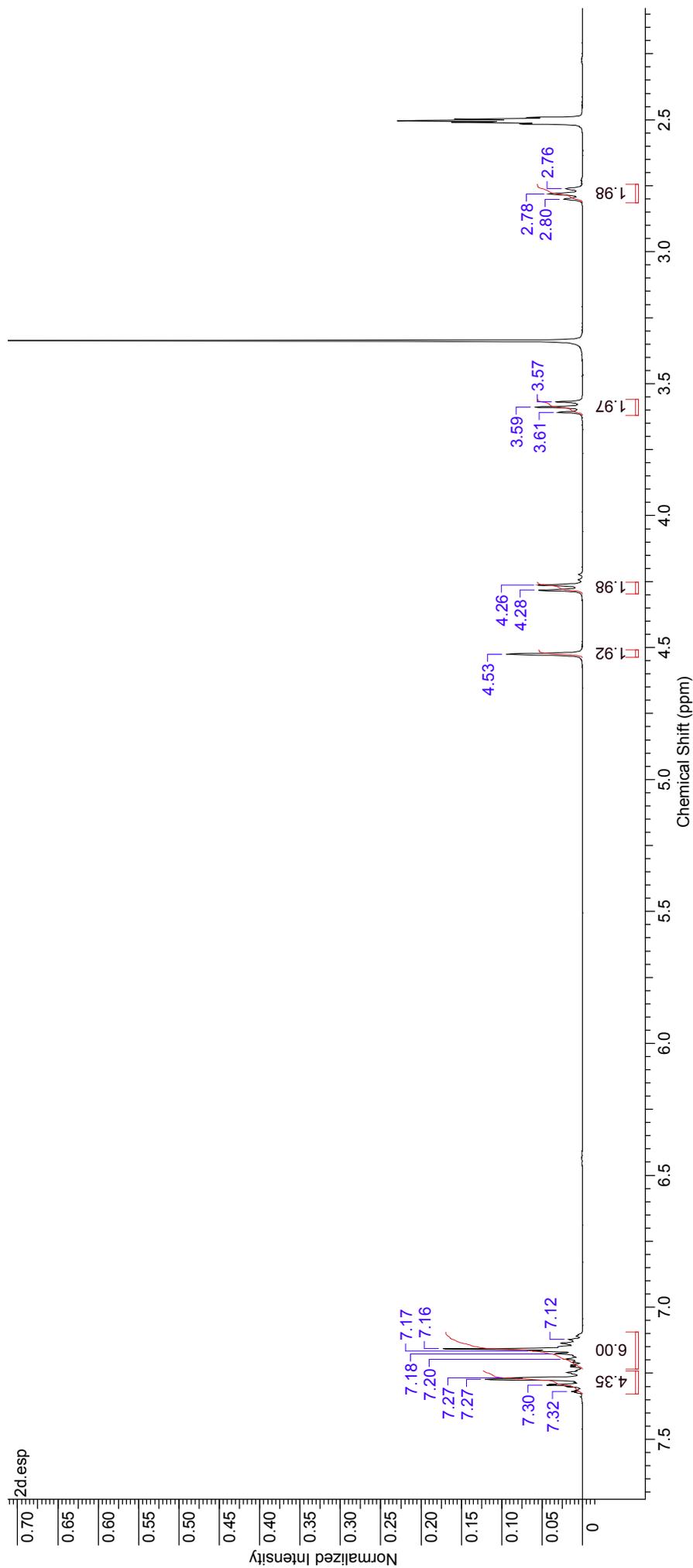


Date	15 Jan 2008 10:54:56
Comment	11273/MUKJP/022/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

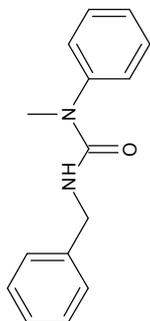


2d

¹H NMR (DMSO-d₆, 300MHz): δ = 7.24 - 7.33 (m, 4 H), 7.09 - 7.23 (m, 6 H), 4.53 (s, 2 H), 4.27 (d, J =5.7 Hz, 2 H), 3.59 (t, J =6.0 Hz, 2 H), 2.78 ppm (t, J =6.0 Hz, 2 H)

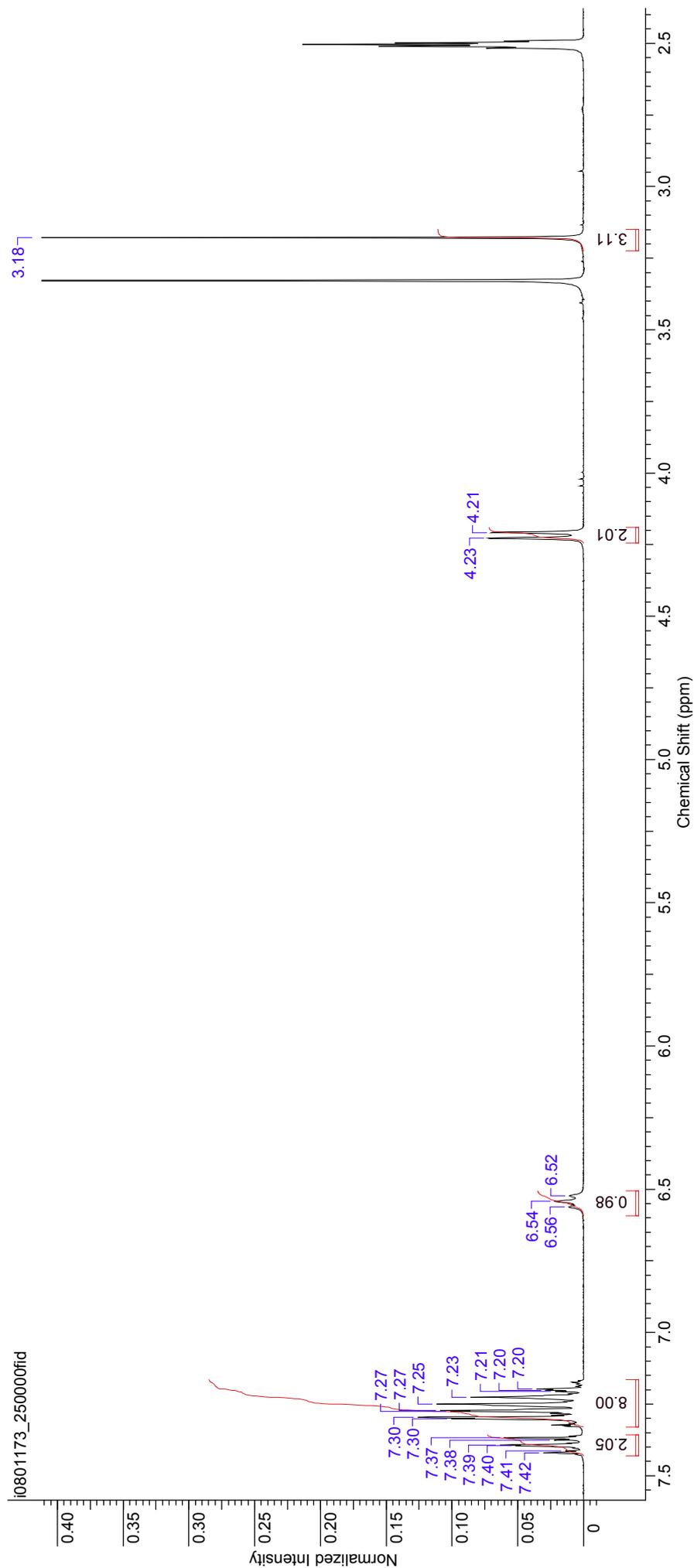


Date	17 Jan 2008 11:01:20
Comment	11273/MUKJP/023/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

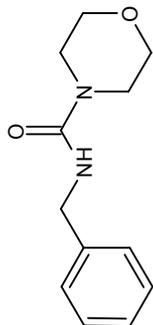


2e

¹H NMR (DMSO-d₆, 300MHz): δ = 7.36 - 7.43 (m, 2 H), 7.17 - 7.33 (m, 8 H), 6.54 (t, J =5.9 Hz, 1 H), 4.22 (d, J =5.7 Hz, 2 H), 3.18 ppm (s, 3 H)

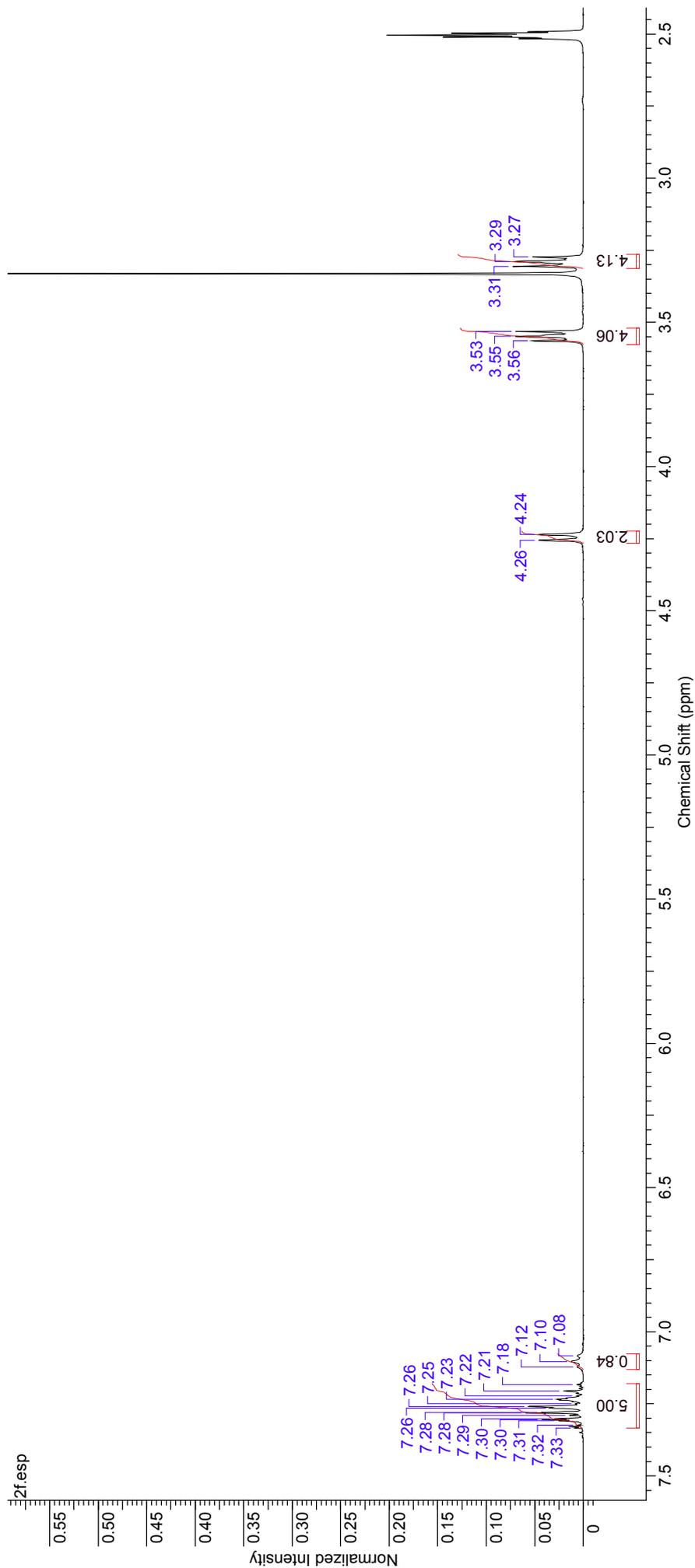


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Comment	11273/MUKJP/027/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

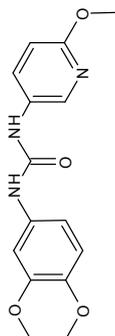


2f

¹H NMR (DMSO-d₆, 300MHz): δ = 7.18 - 7.33 (m, 5 H), 7.10 (t, J =5.9 Hz, 1 H), 4.25 (d, J =6.0 Hz, 2 H), 3.52 - 3.58 (m, 4 H), 3.26 - 3.31 ppm (m, 4 H)

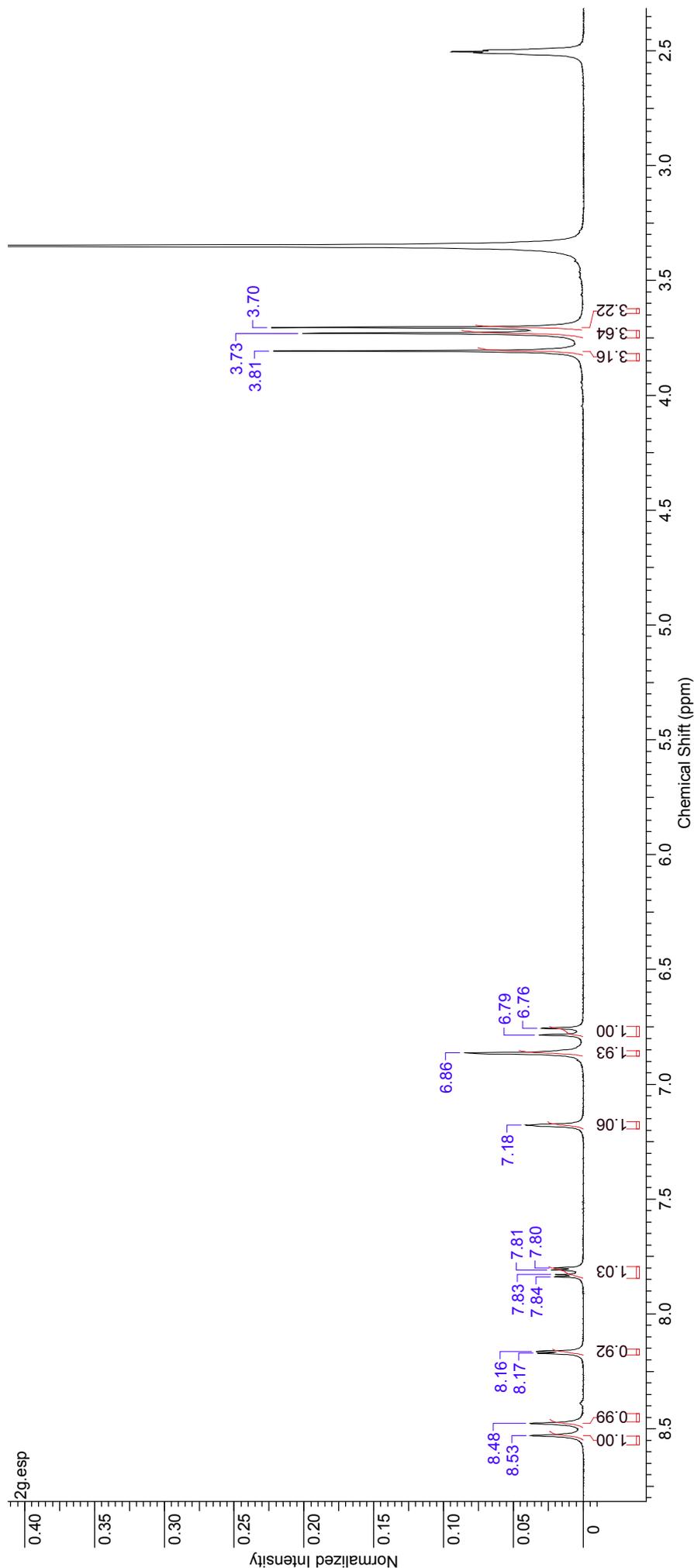


Date	18 Jan 2008 05:34:56
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Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

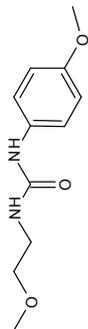


2g

¹H NMR (DMSO-d₆, 300MHz): δ = 8.53 (s, 1 H), 8.48 (s, 1 H), 8.17 (d, J =2.3 Hz, 1 H), 7.82 (dd, J =8.9, 2.8 Hz, 1 H), 7.18 (s, 1 H), 6.86 (s, 2 H), 6.77 (d, J =8.7 Hz, 1 H), 3.81 (s, 3 H), 3.73 (s, 3 H), 3.70 ppm (s, 3 H)

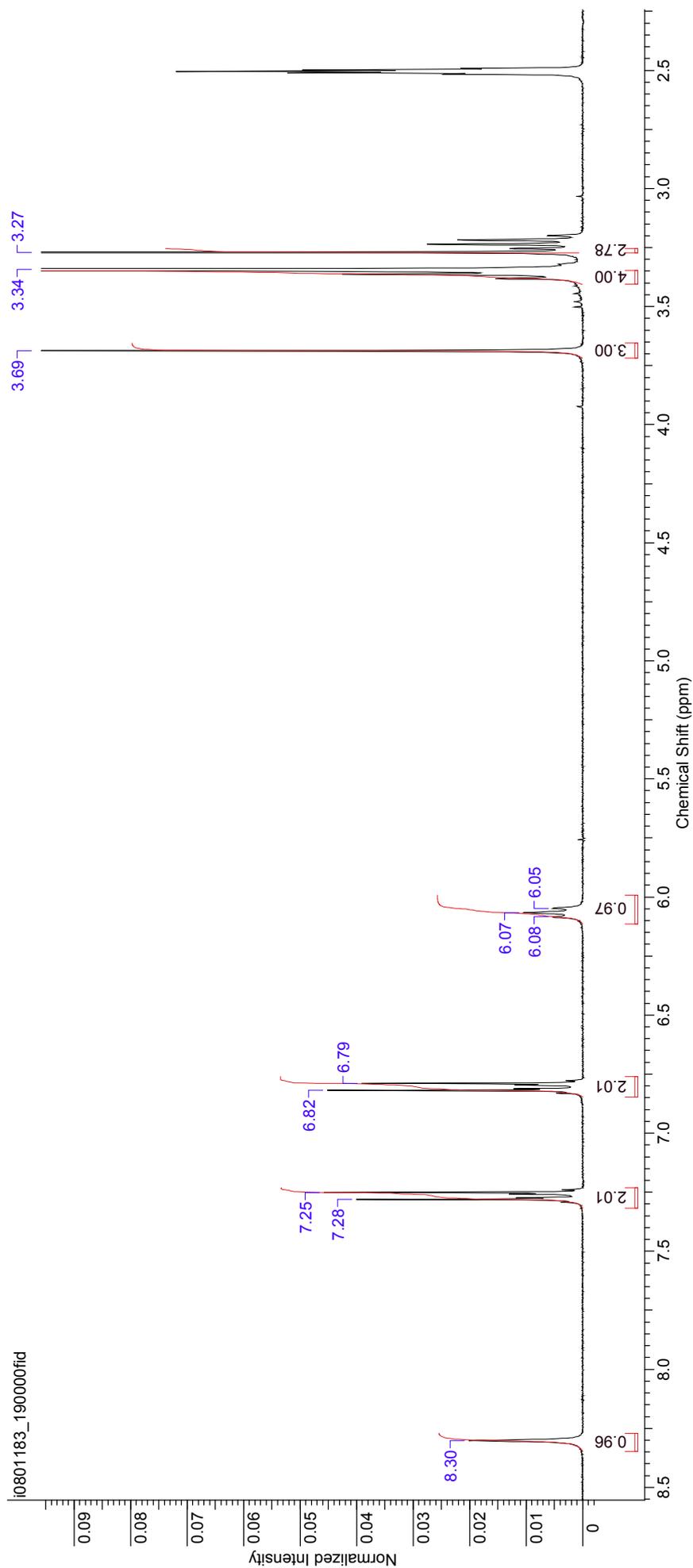


Date	18 Jan 2008 06:53:52
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Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d ₆

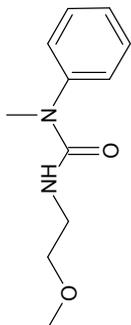


2h

¹H NMR (DMSO-d₆, 300MHz): δ = 8.30 (s, 1 H), 7.27 (d, J =9.1 Hz, 2 H), 6.80 (d, J =9.1 Hz, 2 H), 6.07 (t, J =5.5 Hz, 1 H), 3.69 (s, 3 H), 3.35 - 3.41 (m, 4 H), 3.27 ppm (s, 3 H)

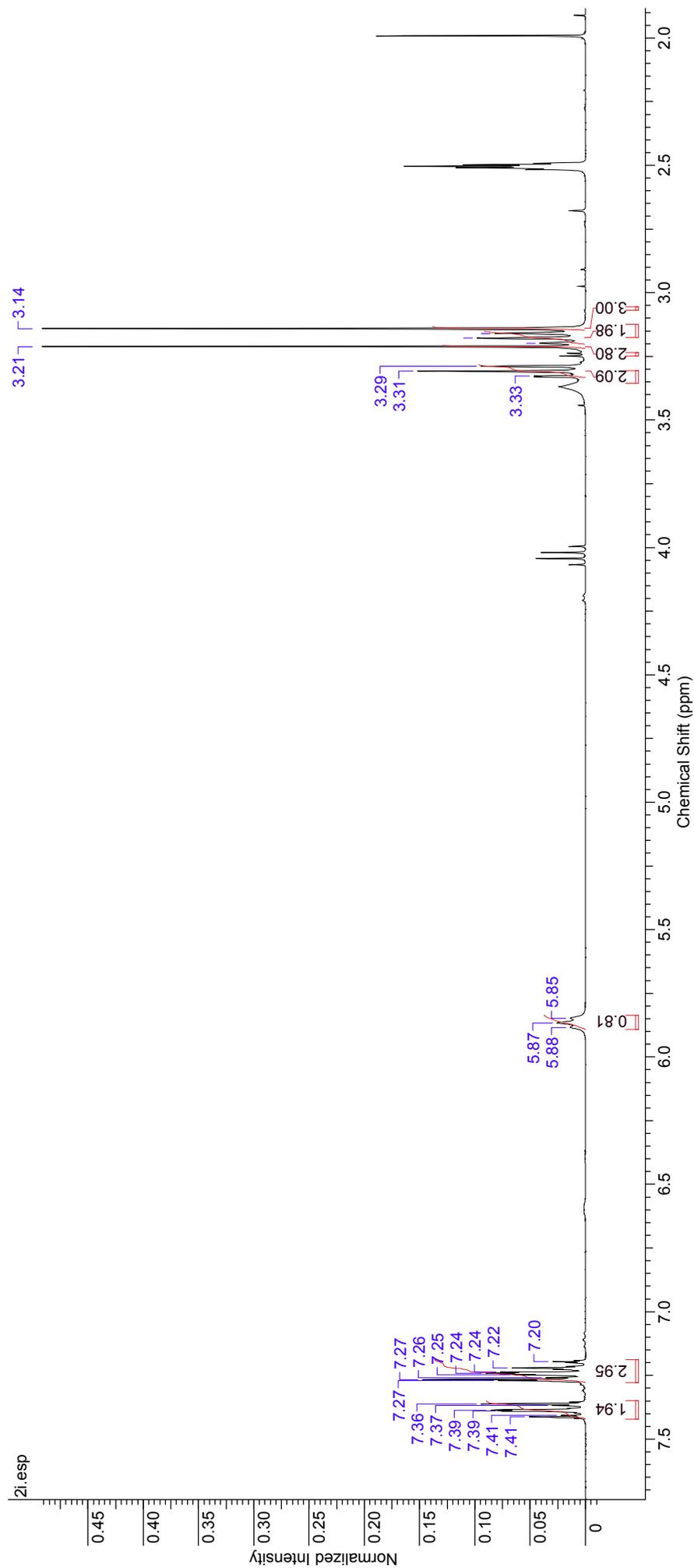


Date	18 Jan 2008 06:58:08
Comment	11266/MUKJP/108/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

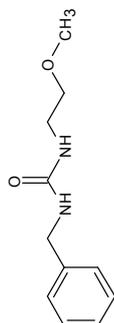


2i

¹H NMR (DMSO-d₆, 300MHz): δ = 7.35 - 7.42 (m, 2 H), 7.19 - 7.28 (m, 4 H), 5.87 (t, *J*=5.5 Hz, 1 H), 3.28 - 3.33 (m, 2 H), 3.21 (s, 3 H), 3.15 - 3.20 (m, 2 H), 3.14 ppm (s, 3 H)

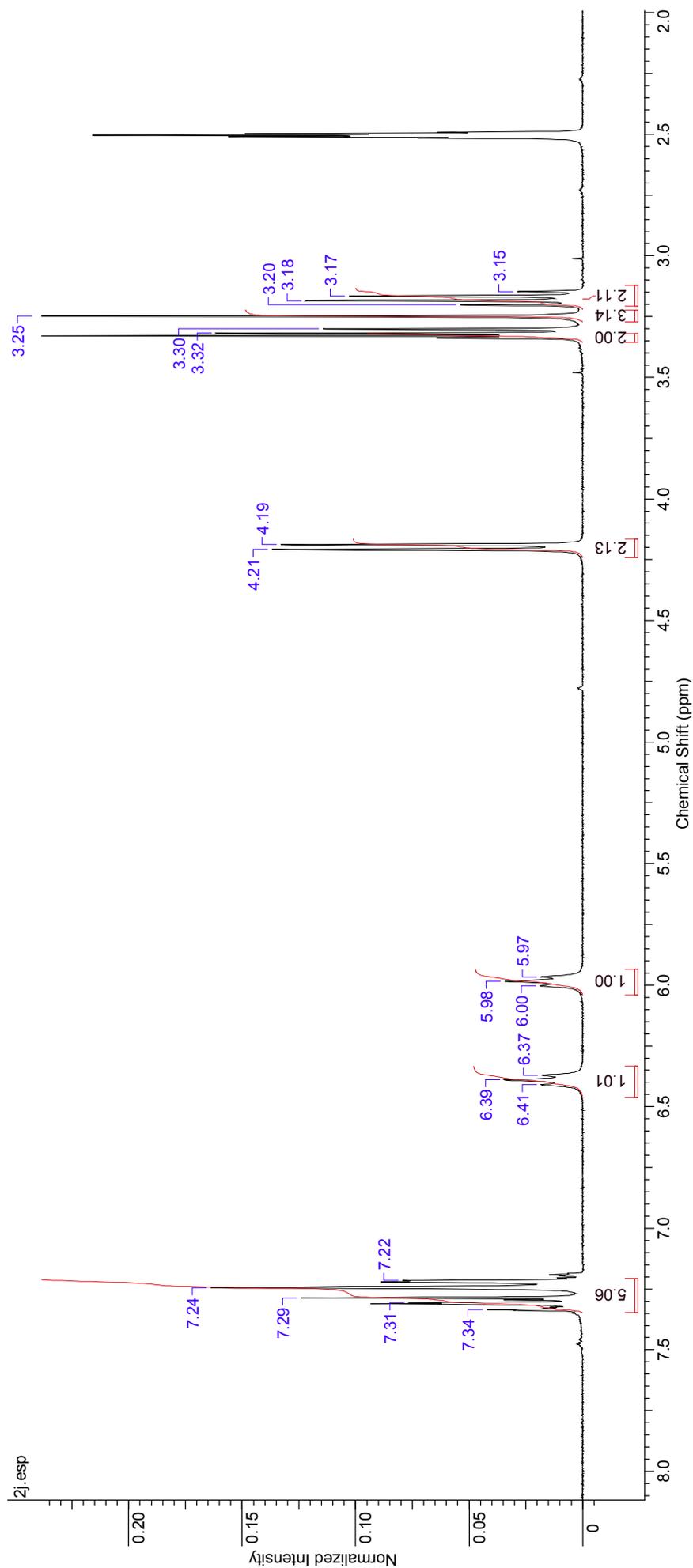


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Comment	11266/MUKJP/109/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d ₆

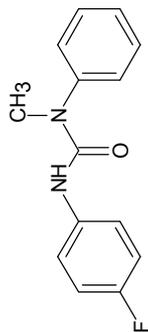


2j

¹H NMR (DMSO-d₆, 300MHz): δ = 7.21 - 7.35 (m, 5 H), 6.39 (t, J =5.5 Hz, 1 H), 5.98 (t, J =5.5 Hz, 1 H), 4.20 (d, J =6.0 Hz, 2 H), 3.33 (s, 2 H), 3.25 (s, 3 H), 3.18 ppm (q, J =5.5 Hz, 2 H)

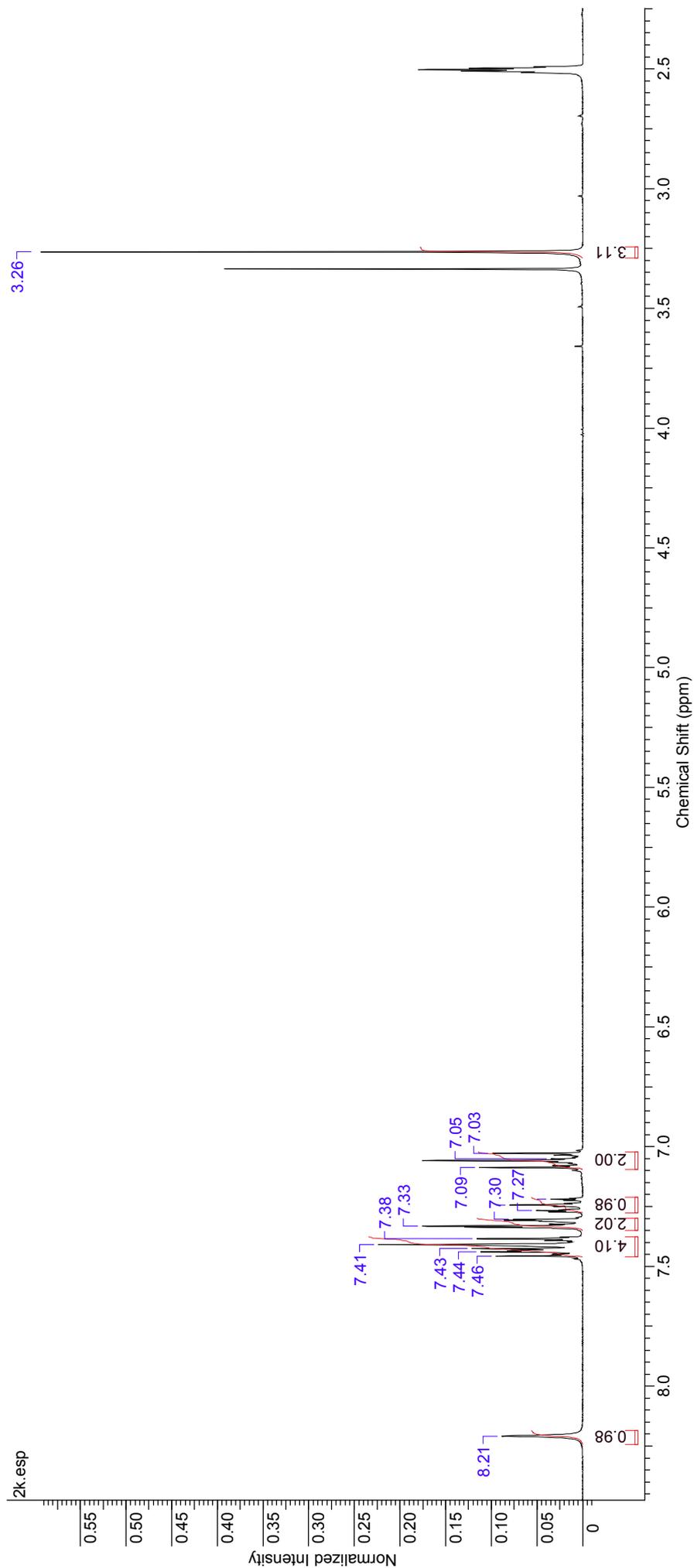


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Comment	11246/MUKJP/181/005
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

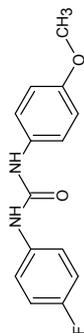


2k

¹H NMR (DMSO-d₆, 300MHz): δ = 8.21 (s, 1 H), 7.38 - 7.46 (m, 4 H), 7.30 - 7.35 (m, 2 H), 7.21 - 7.28 (m, 1 H), 7.02 - 7.10 (m, 2 H), 3.26 ppm (s, 3 H)

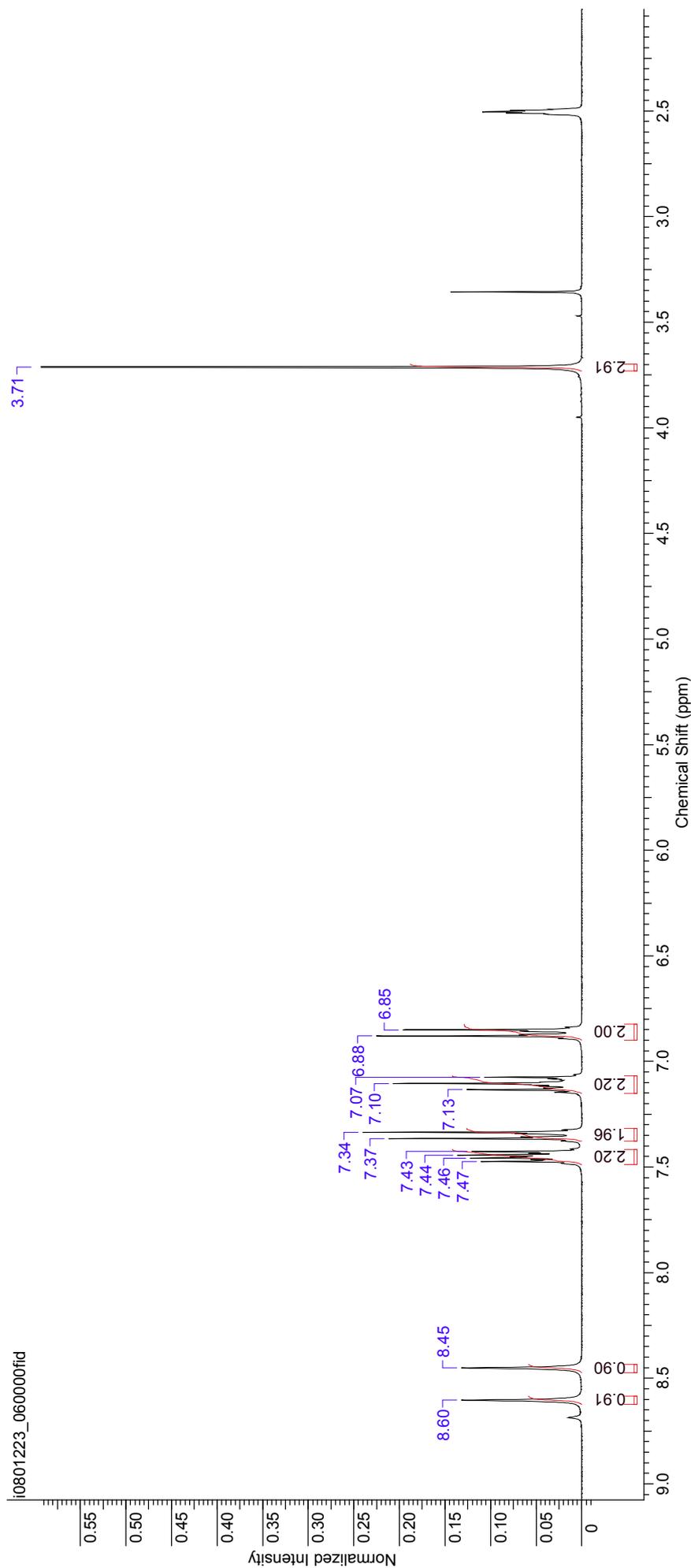


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Comment	11246/MUKJP/181/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

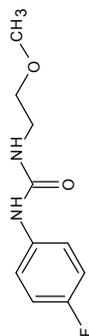


2I

¹H NMR (DMSO-d₆, 300MHz): δ = 8.60 (s, 1 H), 8.45 (s, 1 H), 8.45 (s, 1 H), 7.45 (dd, $J=9.1$, 4.9 Hz, 2 H), 7.35 (d, $J=8.9$ Hz, 2 H), 7.10 (t, $J=8.9$ Hz, 2 H), 6.87 (d, $J=8.7$ Hz, 2 H), 3.71 ppm (s, 3 H)

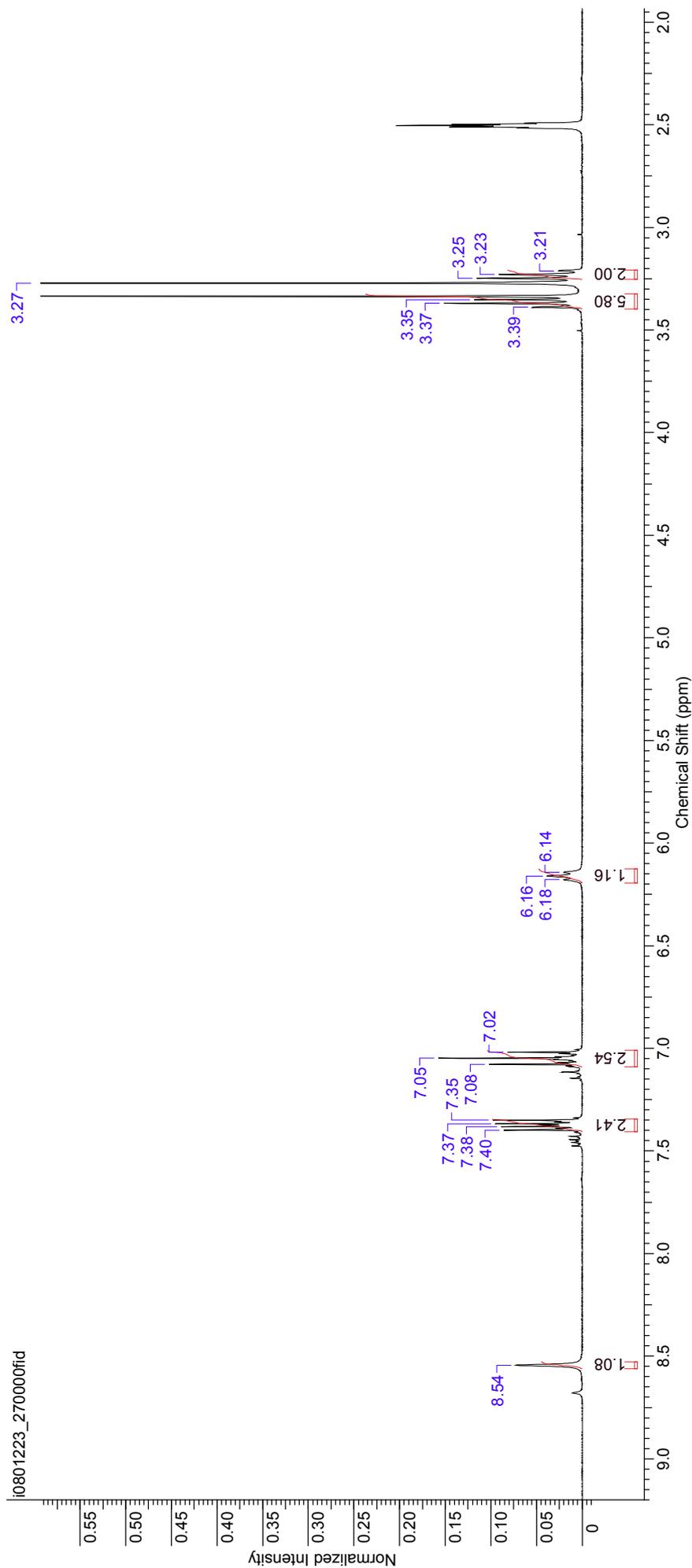


Date	22 Jan 2008 09:40:16
Comment	11246/MUKJP/181/003
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

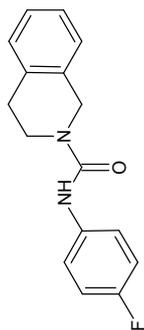


2m

¹H NMR (DMSO-d₆, 300MHz): δ = 8.54 (s, 1 H), 7.37 (dd, J=9.3, 5.1 Hz, 2 H), 7.05 (t, J=9.1 Hz, 2 H), 6.16 (t, J=5.5 Hz, 1 H), 3.32 - 3.40 (m, 5 H), 3.21 - 3.25 ppm (m, 2 H)

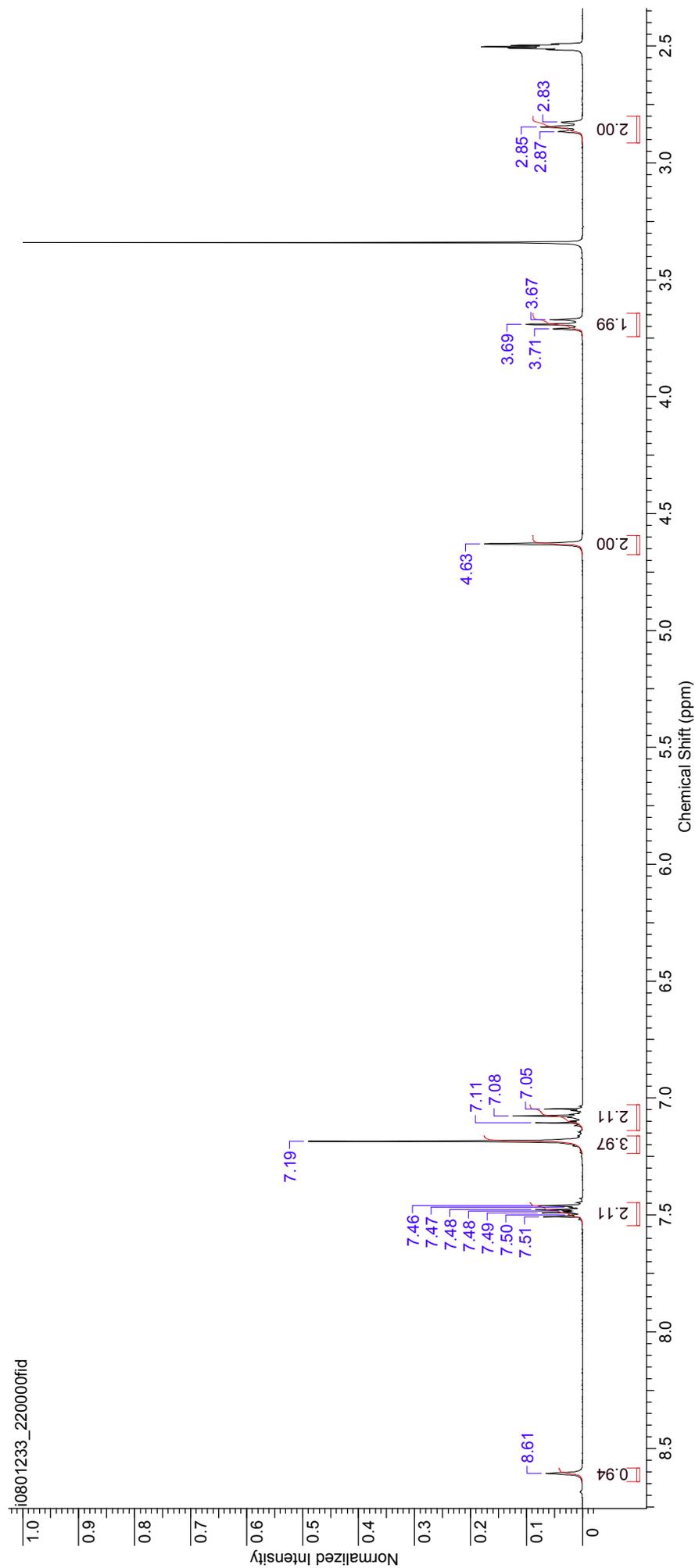


Date	23 Jan 2008 08:53:20
Comment	11246/MUKJP/181/006
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

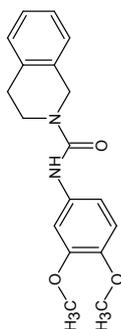


2n

¹H NMR (DMSO-d₆, 300MHz): δ = 8.61 (s, 1 H), 7.45 - 7.55 (m, 2 H), 7.19 (s, 4 H), 7.08 (t, 2 H), 7.05 (s, 4 H), 7.11 (s, 4 H), 7.46 (t, 2 H), 4.63 (s, 2 H), 3.69 (t, J =5.9 Hz, 2 H), 2.85 ppm (t, J =6.0 Hz, 2 H)

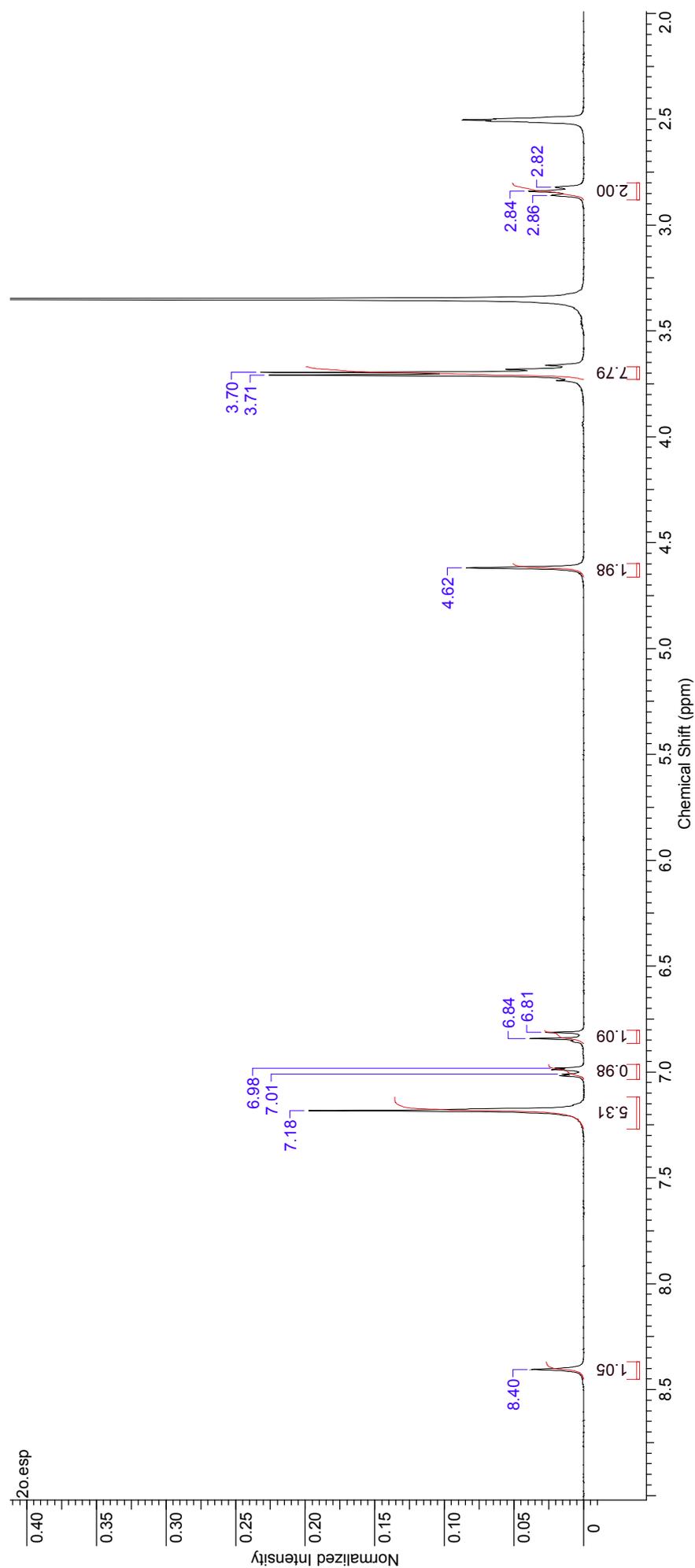


Date	18 Jan 2008 05:20:00
Comment	11227/MUKJP/240/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d ₆

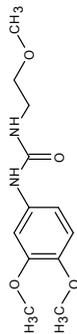


20

¹H NMR (DMSO-d₆, 300MHz): δ = 8.40 (s, 1 H), 7.18 (s, 5 H), 7.00 (d, J =8.7 Hz, 1 H), 6.83 (d, J =8.7 Hz, 1 H), 4.62 (s, 2 H), 3.70 (d, J =4.2 Hz, 8 H), 2.84 ppm (t, J =5.9 Hz, 2 H)

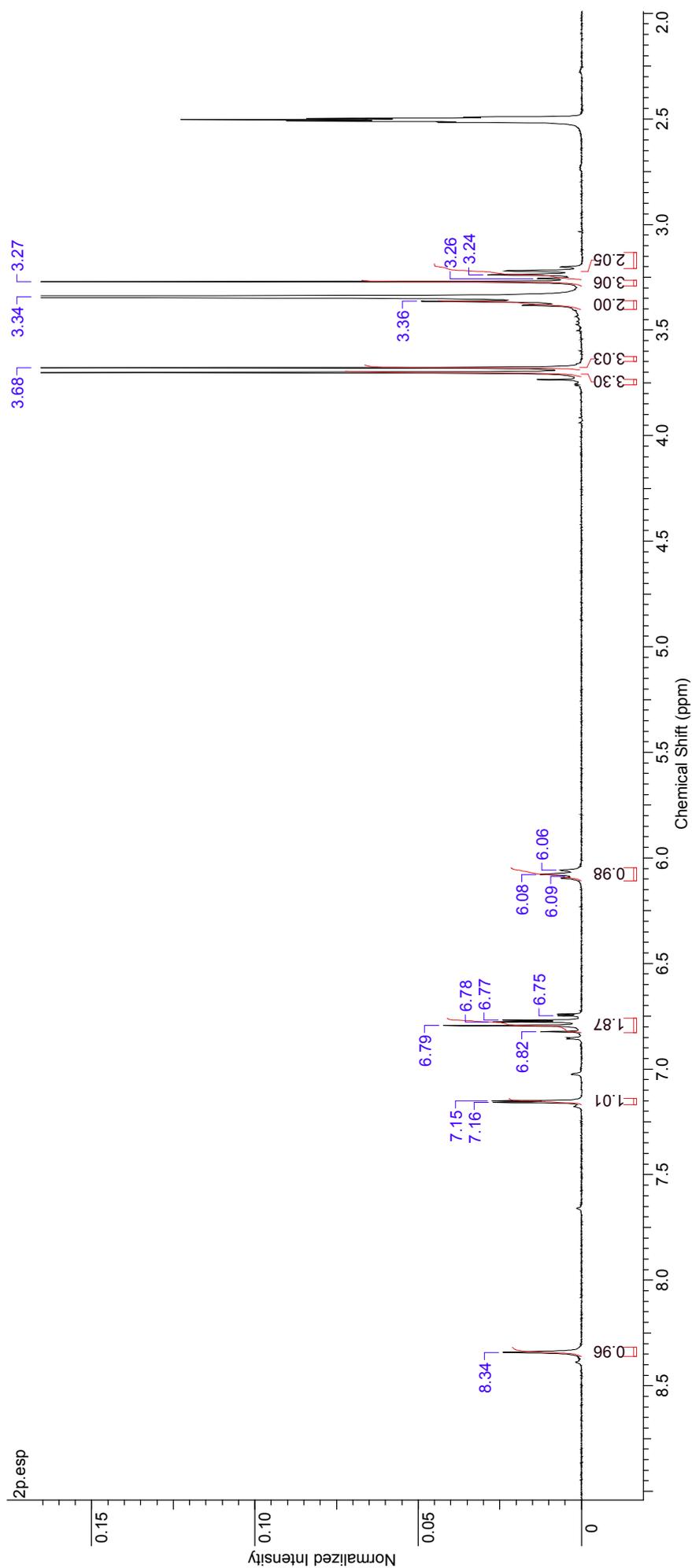


Date	17 Jan 2008 06:38:56
Comment	11227/MUKJP/240/004
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

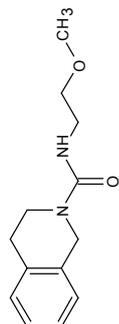


2p

¹H NMR (DMSO-d₆, 300MHz): δ = 8.34 (s, 1 H), 7.15 (d, J =2.3 Hz, 1 H), 6.76 - 6.83 (m, 2 H), 6.05 - 6.11 (m, 1 H), 3.70 (s, 4 H), 3.68 (s, 3 H), 3.36 (s, 2 H), 3.27 (s, 3 H), 3.19 - 3.26 ppm (m, 2 H)

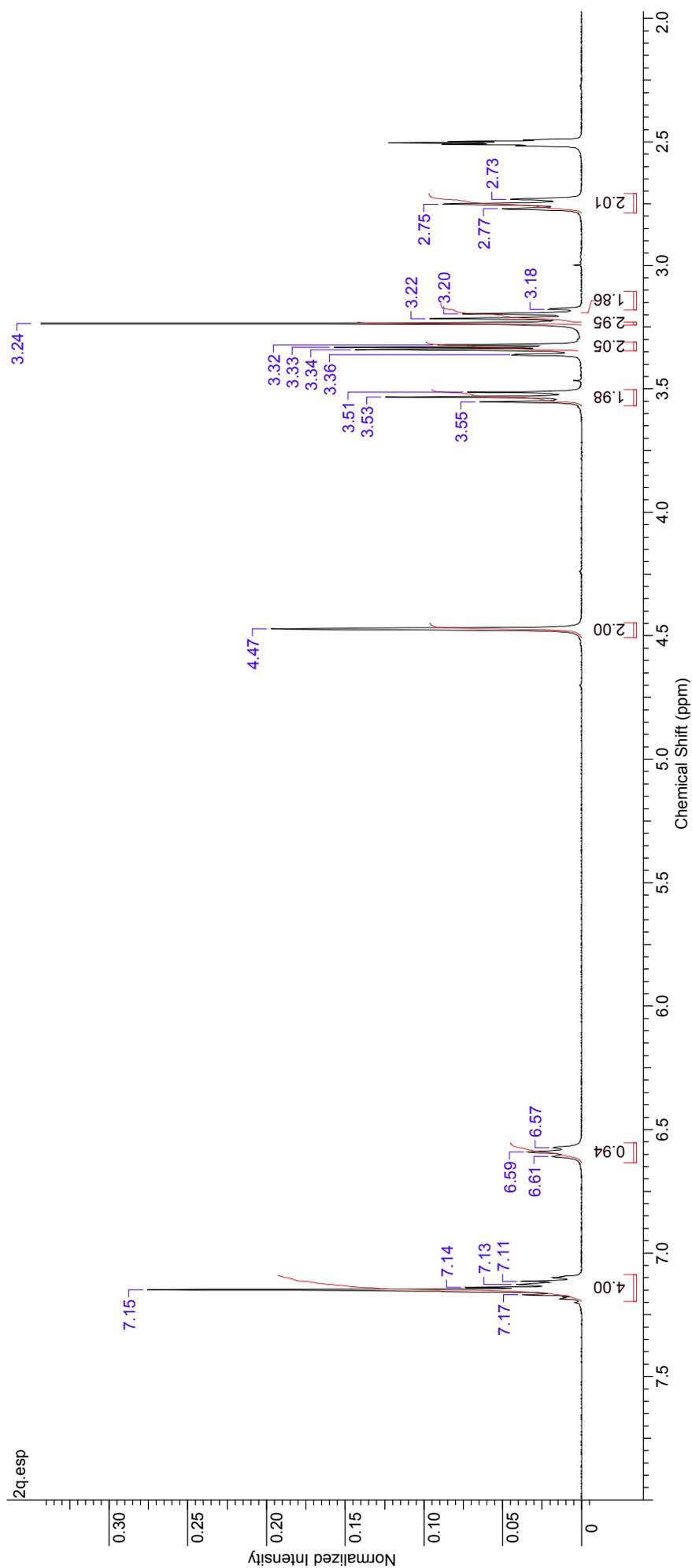


Date	18 Jan 2008 07:08:48
Comment	11266/MUKJP/110/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

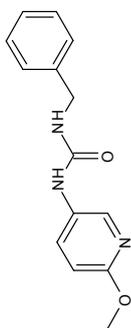


2q

¹H NMR (DMSO-d₆, 300MHz): δ = 7.09 - 7.20 (m, 4 H), 6.59 (t, J =5.5 Hz, 1 H), 4.47 (s, 2 H), 3.53 (t, J =5.9 Hz, 2 H), 3.31 - 3.35 (m, 2 H), 3.31 - 3.35 (m, 2 H), 3.24 (s, 3 H), 3.15 - 3.23 (m, 2 H), 2.75 ppm (t, J =5.9 Hz, 2 H)

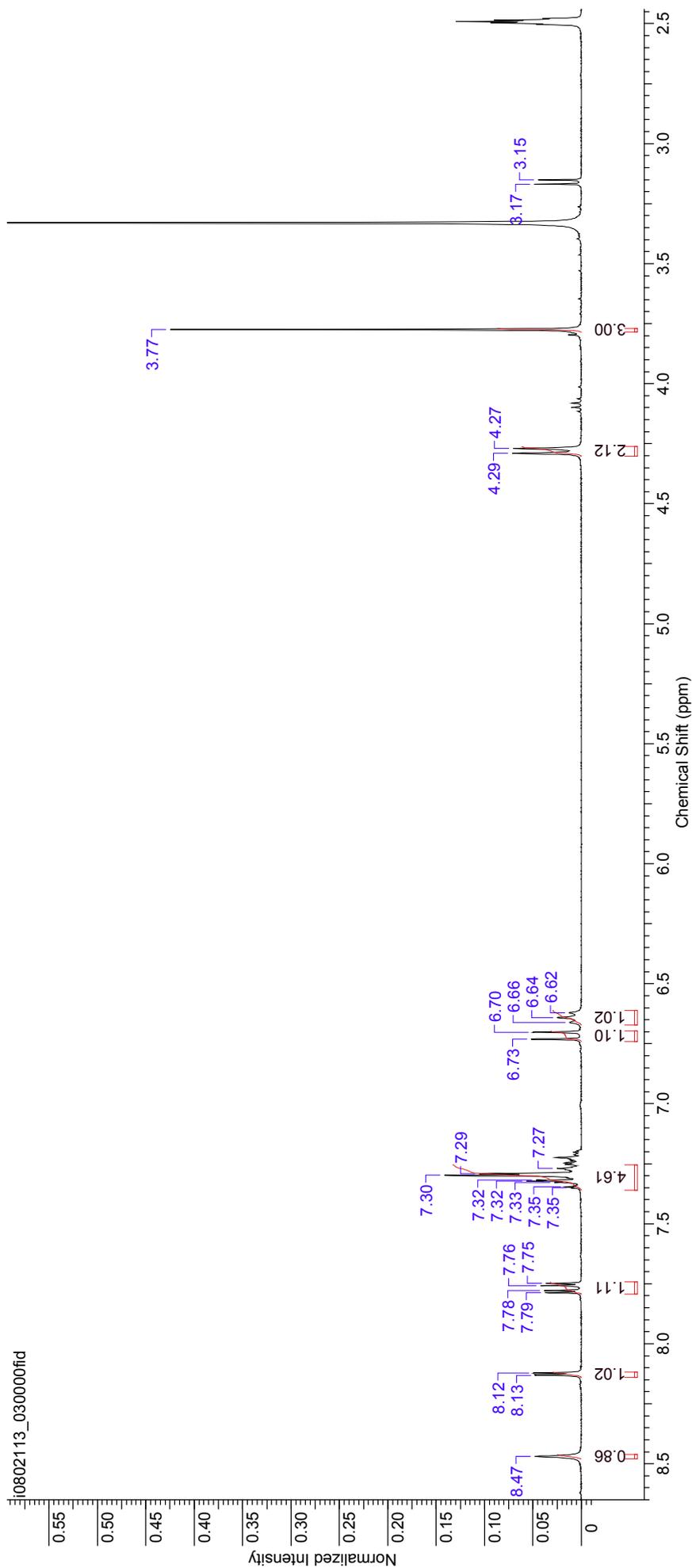


Date	11 Feb 2008 05:13:36
Comment	10733/MUKJP/242/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

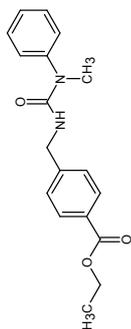


2r

¹H NMR (DMSO-d₆, 300MHz): δ = 8.47 (s, 1 H), 8.13 (d, $J=3.0$ Hz, 1 H), 7.77 (dd, $J=8.7, 2.6$ Hz, 1 H), 7.25 - 7.36 (m, 5 H), 6.72 (d, $J=8.7$ Hz, 1 H), 6.64 (t, $J=6.0$ Hz, 1 H), 4.28 (d, $J=5.7$ Hz, 2 H), 3.77 ppm (s, 3 H)

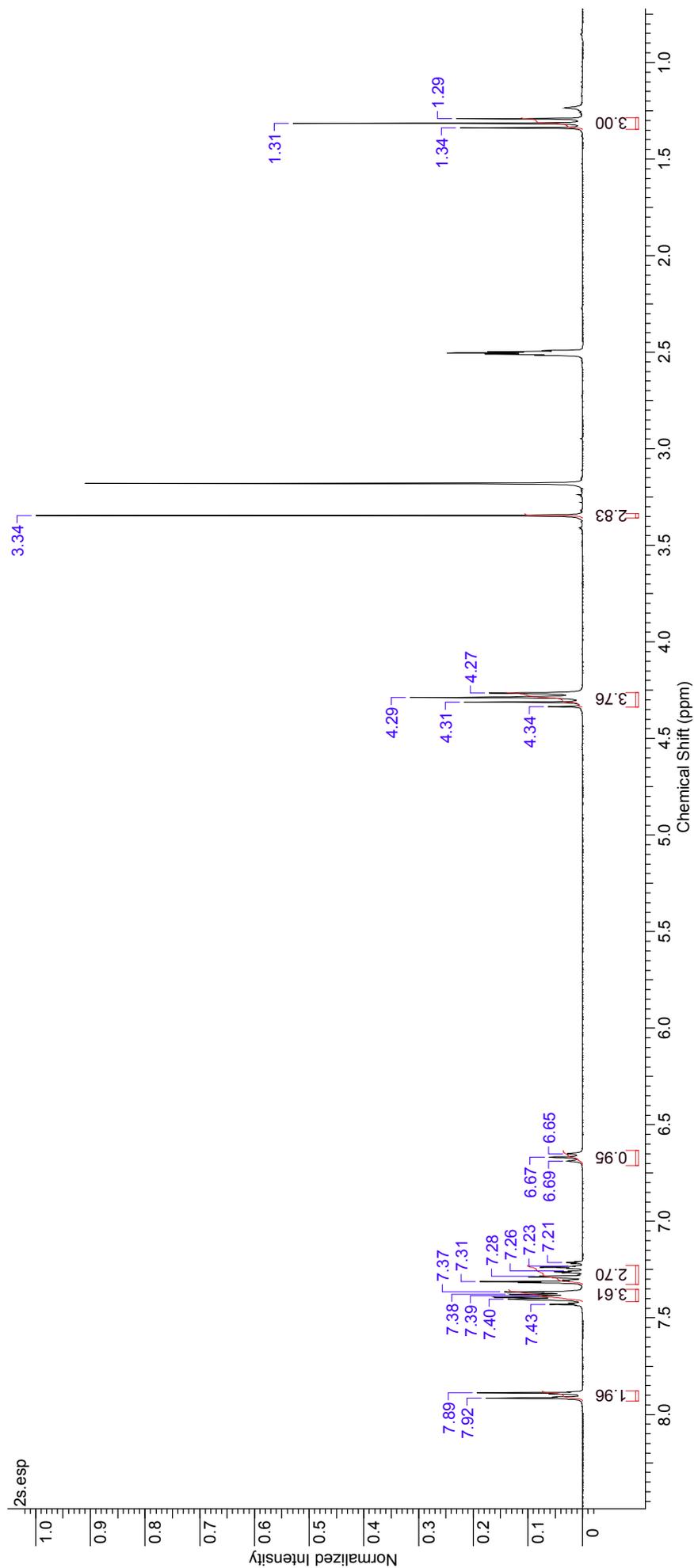


Date	12 Mar 2008 04:05:20
Comment	11272MUKJP080/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

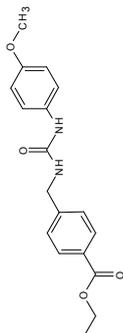


2s

¹H NMR (DMSO-d₆, 300MHz): δ = 7.90 (d, J =8.3 Hz, 2 H), 7.35 - 7.41 (m, 4 H), 7.23 - 7.33 (m, 3 H), 6.67 (t, J =5.9 Hz, 1 H), 4.26 - 4.34 (m, 4 H), 3.34 (s, 3 H), 1.31 ppm (t, J =7.2 Hz, 3 H)

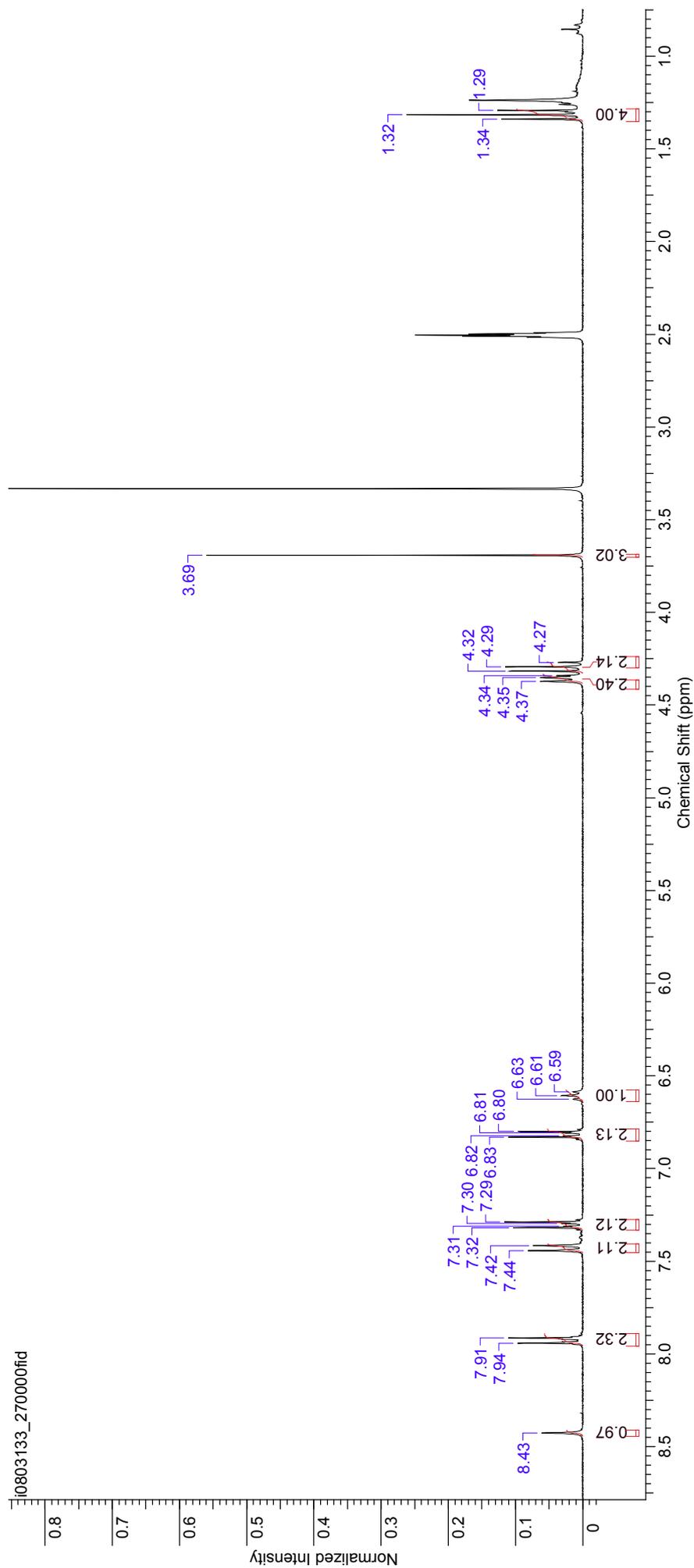


Date	13 Mar 2008 11:05:36
Comment	11272MUKJP084/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

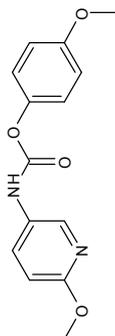


2t

¹H NMR (DMSO-d₆, 300MHz): δ = 8.43 (s, 1 H), 7.93 (d, J =8.3 Hz, 2 H), 7.43 (d, J =8.3 Hz, 2 H), 7.27 - 7.33 (m, 2 H), 6.79 - 6.85 (m, 2 H), 6.61 (t, J =6.0 Hz, 1 H), 4.33 - 4.38 (m, 2 H), 4.27 - 4.33 (m, 2 H), 3.69 (s, 3 H), 1.32 ppm (t, J =7.2 Hz, 4 H)

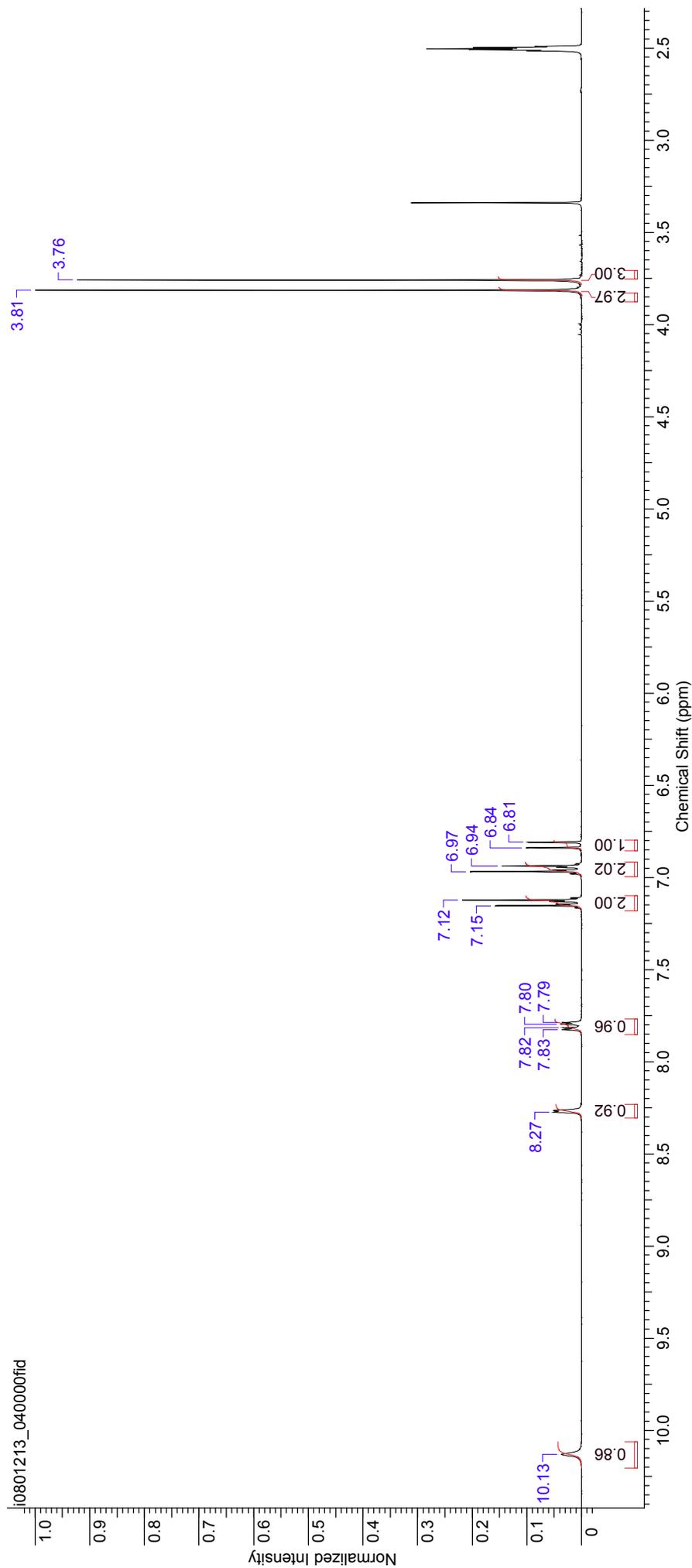


Date	21 Jan 2008 04:48:00
Comment	10733/MUKJP/218/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

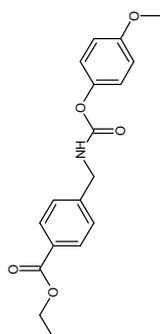


3a

¹H NMR (DMSO-d₆, 300MHz): δ = 10.13 (s, 1 H), 8.27 (s, 1 H), 8.27 (s, 1 H), 7.81 (dd, J =8.9, 2.8 Hz, 1 H), 7.14 (d, J =9.1 Hz, 2 H), 6.95 (d, J =9.4 Hz, 2 H), 6.82 (d, J =9.1 Hz, 1 H), 3.81 (s, 3 H), 3.76 (s, 3 H)

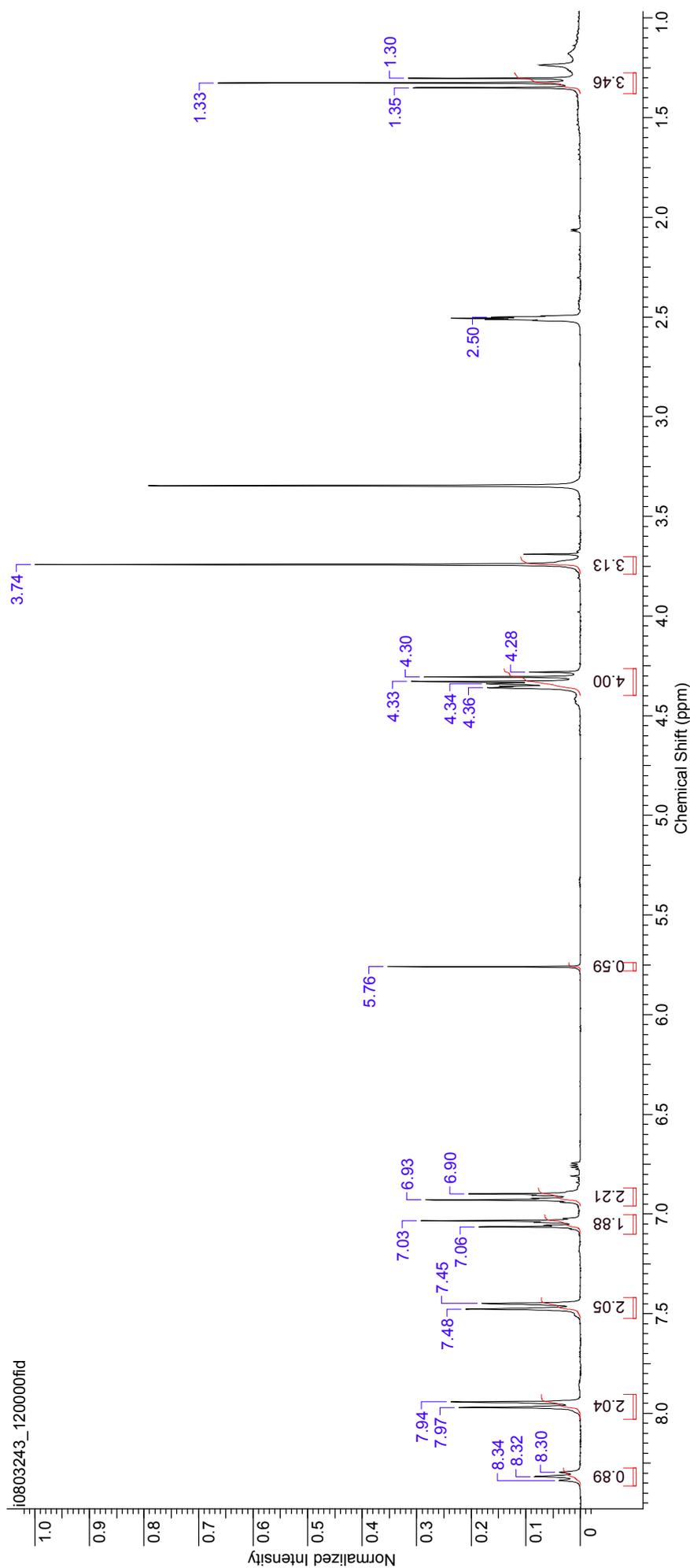


Date	24 Mar 2008 05:52:00
Comment	11272MUKJP092/201
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

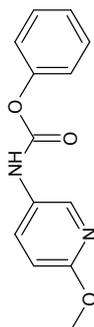


3b

¹H NMR (DMSO-d₆, 300MHz): δ = 8.32 (t, J =6.2 Hz, 1 H), 7.96 (d, J =8.3 Hz, 2 H), 7.46 (d, J =8.3 Hz, 2 H), 7.05 (d, 2 H), 6.91 (d, J =9.1 Hz, 2 H), 4.27 - 4.40 (m, 4 H), 3.74 (s, 3 H), 1.33 ppm (t, J =7.2 Hz, 2 H)

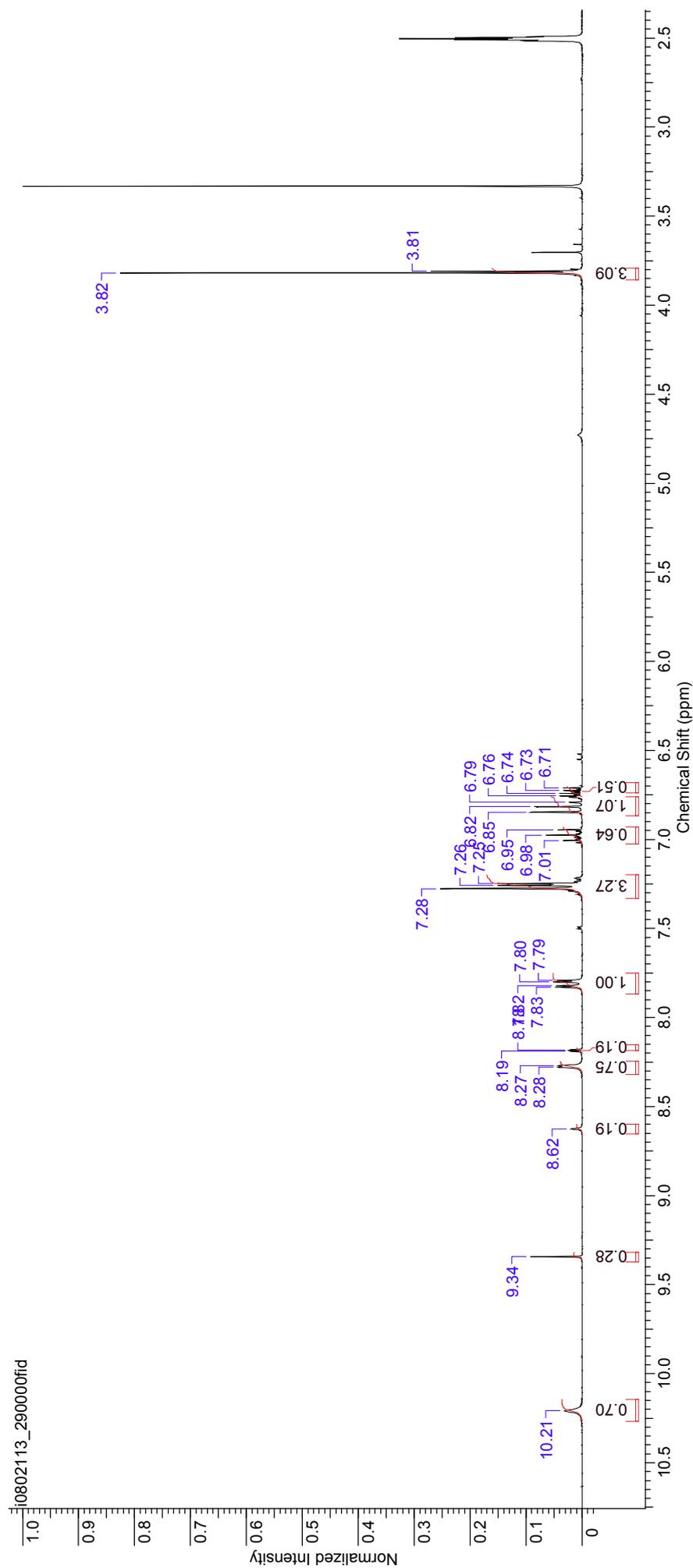


Date	11 Feb 2008 12:24:32
Comment	10733/MUKJP/243/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

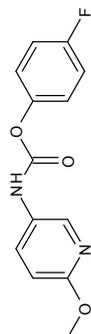


3c

¹H NMR (DMSO-d₆, 300MHz): δ = 10.21 (br. s., 1 H), 8.28 (d, J =2.3 Hz, 1 H), 8.28 (d, J =8.9, 2.8 Hz, 1 H), 7.81 (dd, J =8.9, 2.8 Hz, 1 H), 7.20 - 7.33 (m, 3 H), 6.98 (t, J =8.9 Hz, 1 H), 6.76 - 6.87 (m, 1 H), 6.73 (dd, J =9.1, 4.5 Hz, 1 H), 3.79 - 3.86 ppm (m, 3 H)

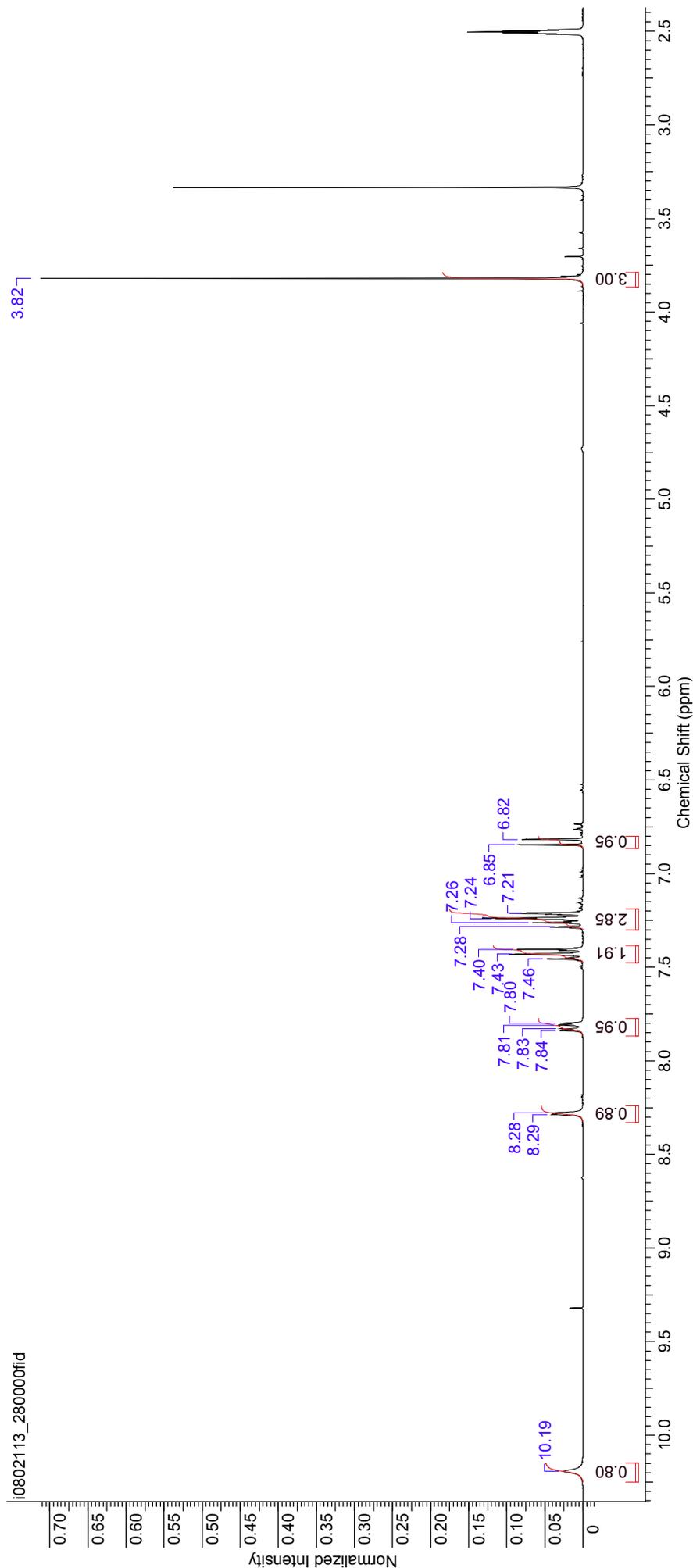


Date	11 Feb 2008 12:20:16
Comment	10733/MUKJP/244/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

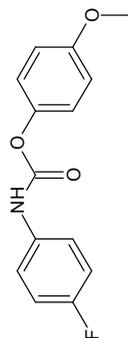


3d

¹H NMR (DMSO-d₆, 300MHz): δ = 10.19 (br. s., 1 H), 8.28 (d, J =2.6 Hz, 1 H), 8.28 (d, J =8.7, 2.6 Hz, 1 H), 7.43 (t, 2 H), 7.19 - 7.30 (m, 3 H), 6.83 (d, J =8.3 Hz, 1 H), 3.82 ppm (s, 3 H)

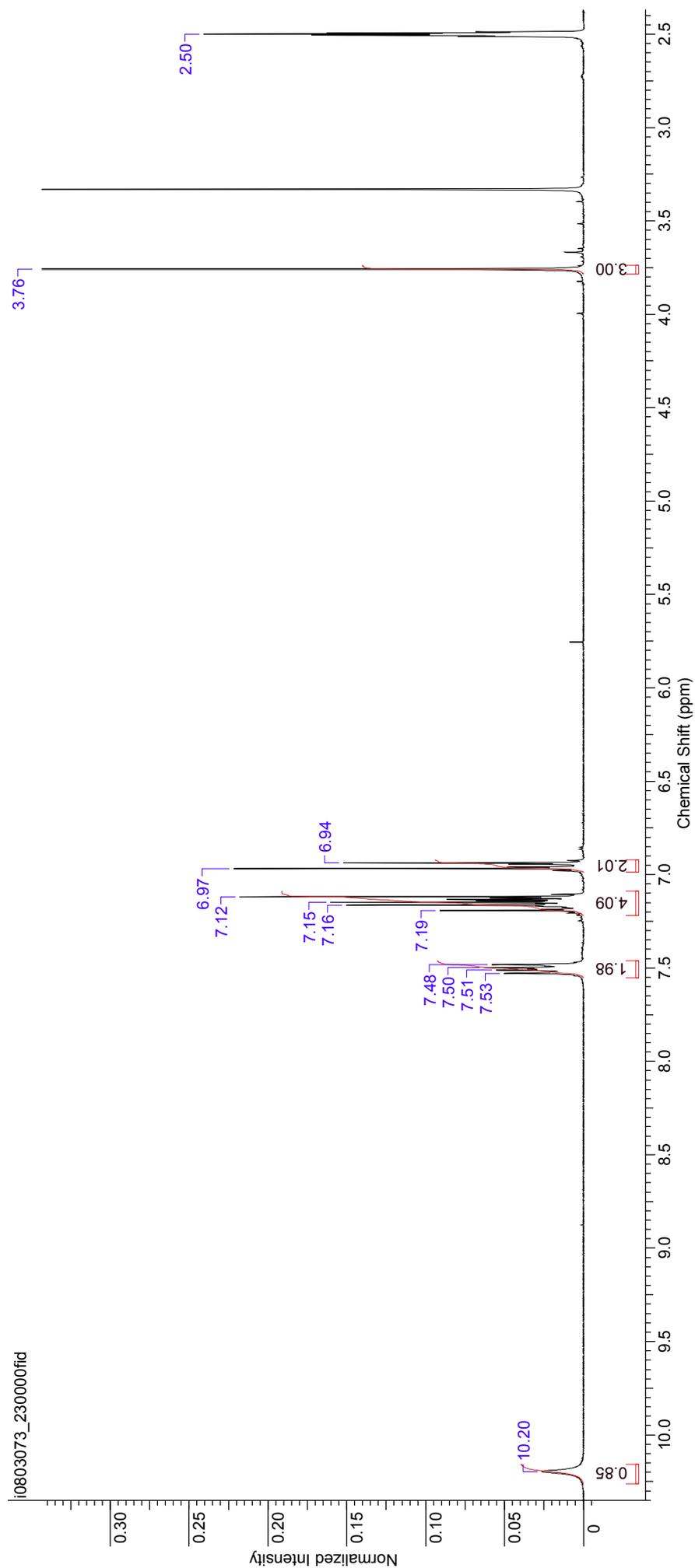


Date	07 Mar 2008 14:21:52
Comment	11246MUKJP227/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

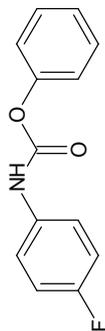


3e

¹H NMR (DMSO-d₆, 300MHz): δ = 10.20 (br. s., 1 H), 7.51 (dd, $J=9.1, 4.9$ Hz, 2 H), 7.09 - 7.22 (m, 4 H), 6.95 (d, $J=9.1$ Hz, 2 H), 3.76 ppm (s, 3 H)

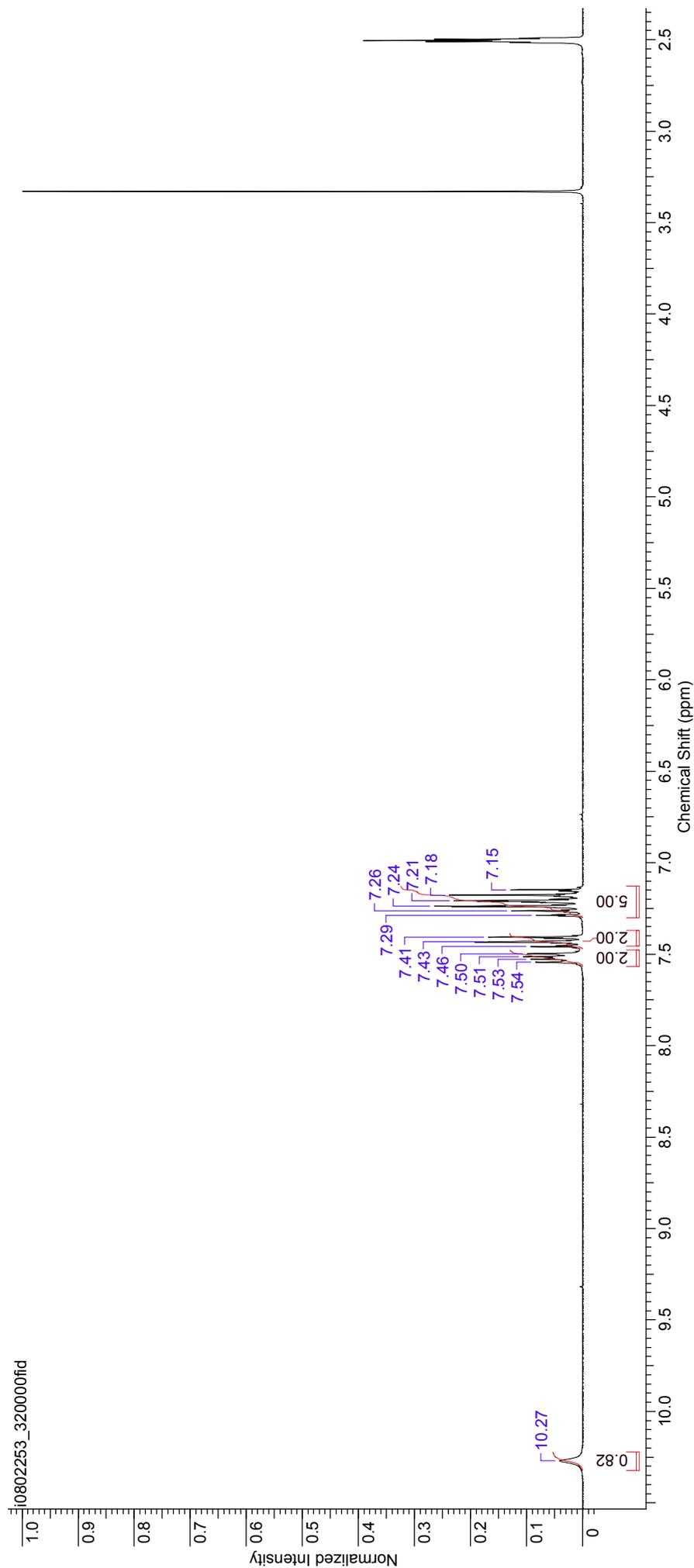


Date	25 Feb 2008 07:55:44
Comment	11246/MUKJP/207/201
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

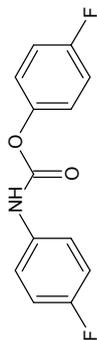


3f

¹H NMR (DMSO-d₆, 300MHz): δ = 10.27 (br. s., 1 H), 7.52 (dd, J =9.1, 4.9 Hz, 2 H), 7.39 - 7.47 (m, 2 H), 7.13 - 7.30 ppm (m, 5 H)

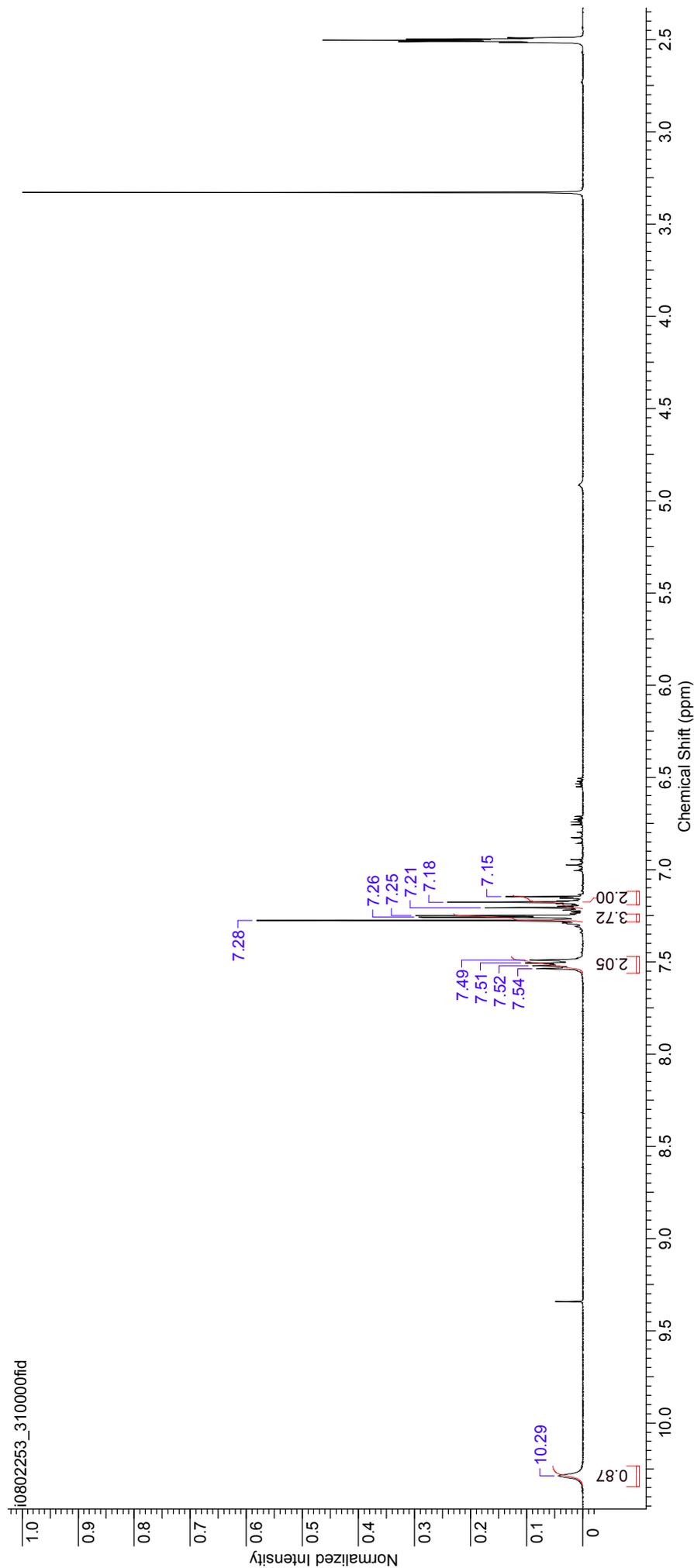


Date	25 Feb 2008 07:51:28
Comment	11246/MUKJP/207/202
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

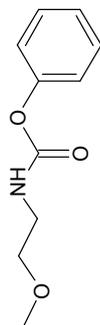


3g

¹H NMR (DMSO-d₆, 300MHz): δ = 10.29 (br. s., 1 H), 7.51 (dd, $J=9.1$, 4.9 Hz, 2 H), 7.24 - 7.29 (m, 4 H), 7.18 ppm (t, $J=8.9$ Hz, 2 H)

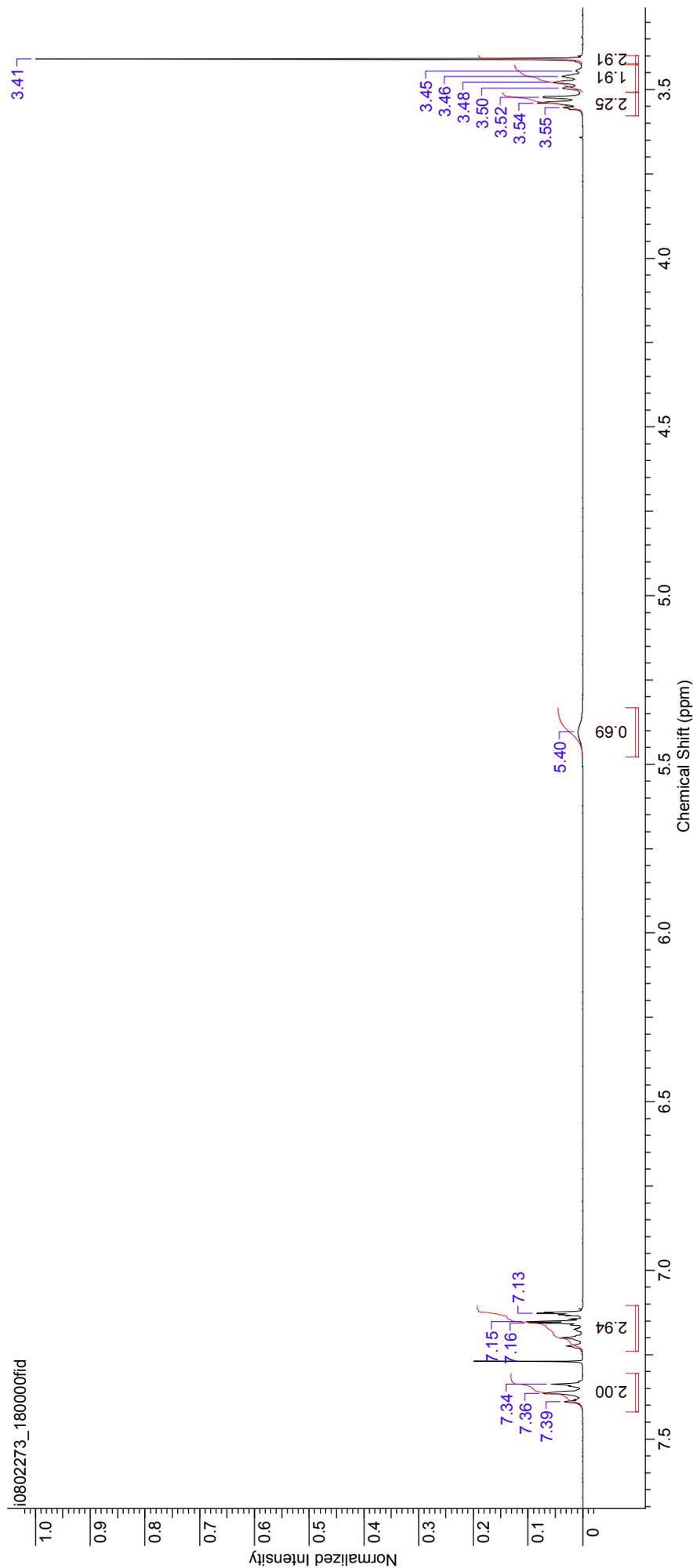


Date	27 Feb 2008 08:55:28
Comment	11266MUKJP134/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d

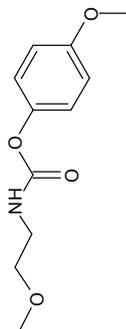


3h

¹H NMR (CHLOROFORM-d, 300MHz): δ = 7.32 - 7.41 (m, 2 H), 7.10 - 7.24 (m, 3 H), 5.40 (br. s., 1 H), 3.51 - 3.58 (m, 2 H), 3.43 - 3.51 (m, 2 H), 3.41 (s, 3 H)

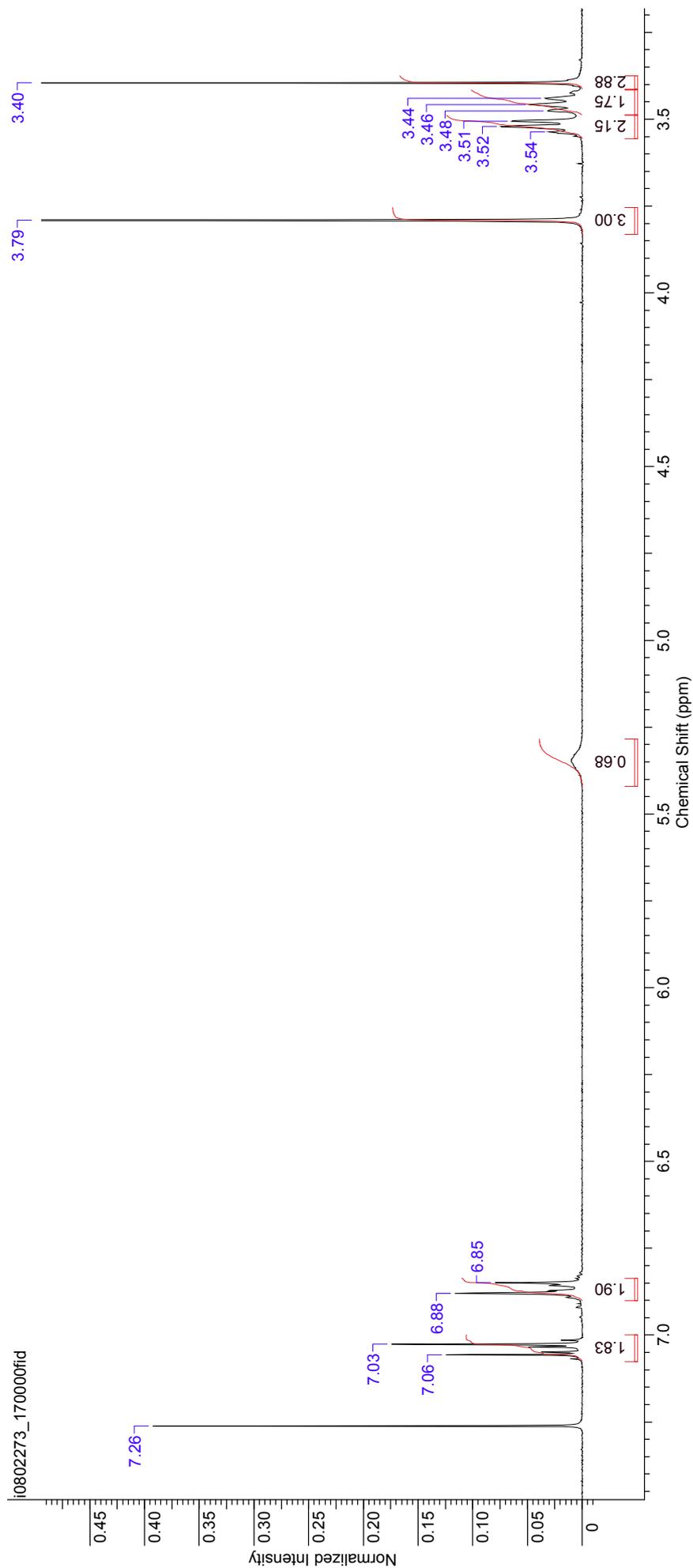


Date	27 Feb 2008 08:49:04
Comment	11266MUJJP135/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d

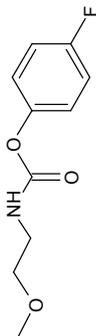


3i

¹H NMR (CHLOROFORM-d, 300MHz): δ = 7.04 (d, $J=9.4$ Hz, 2 H), 6.86 (d, $J=9.1$ Hz, 2 H), 5.28 - 5.42 (m, 1 H), 3.79 (s, 3 H), 3.49 - 3.56 (m, 2 H), 3.46 (t, $J=5.5$ Hz, 2 H), 3.40 ppm (s, 3 H)

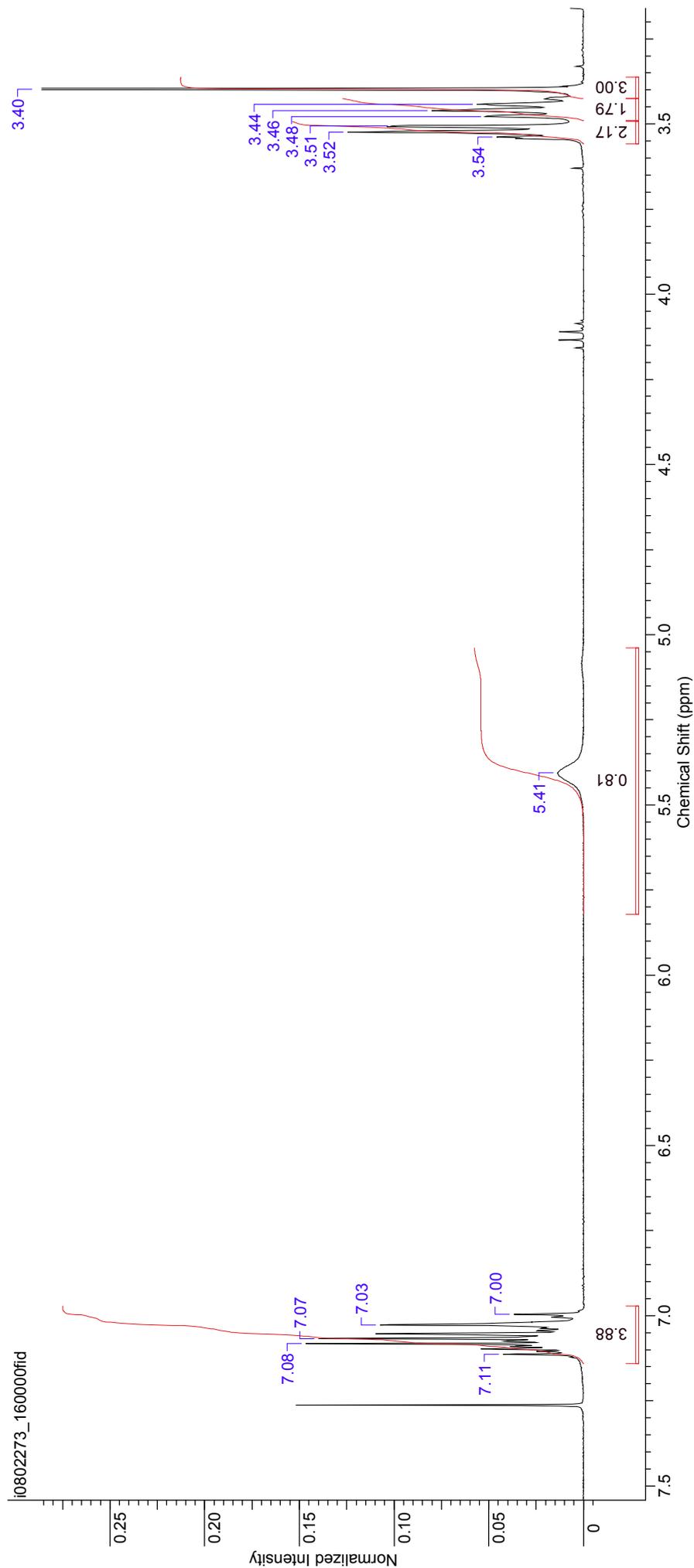


Date	27 Feb 2008 08:44:48
Comment	11266MUKJP136/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d

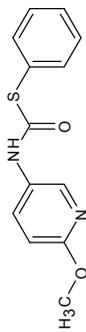


3j

¹H NMR (CHLOROFORM-d, 300MHz): δ = 6.97 - 7.14 (m, 4 H), 5.41 (br. s., 1 H), 3.49 - 3.56 (m, 2 H), 3.46 (t, J =5.5 Hz, 2 H), 3.40 ppm (s, 3 H)

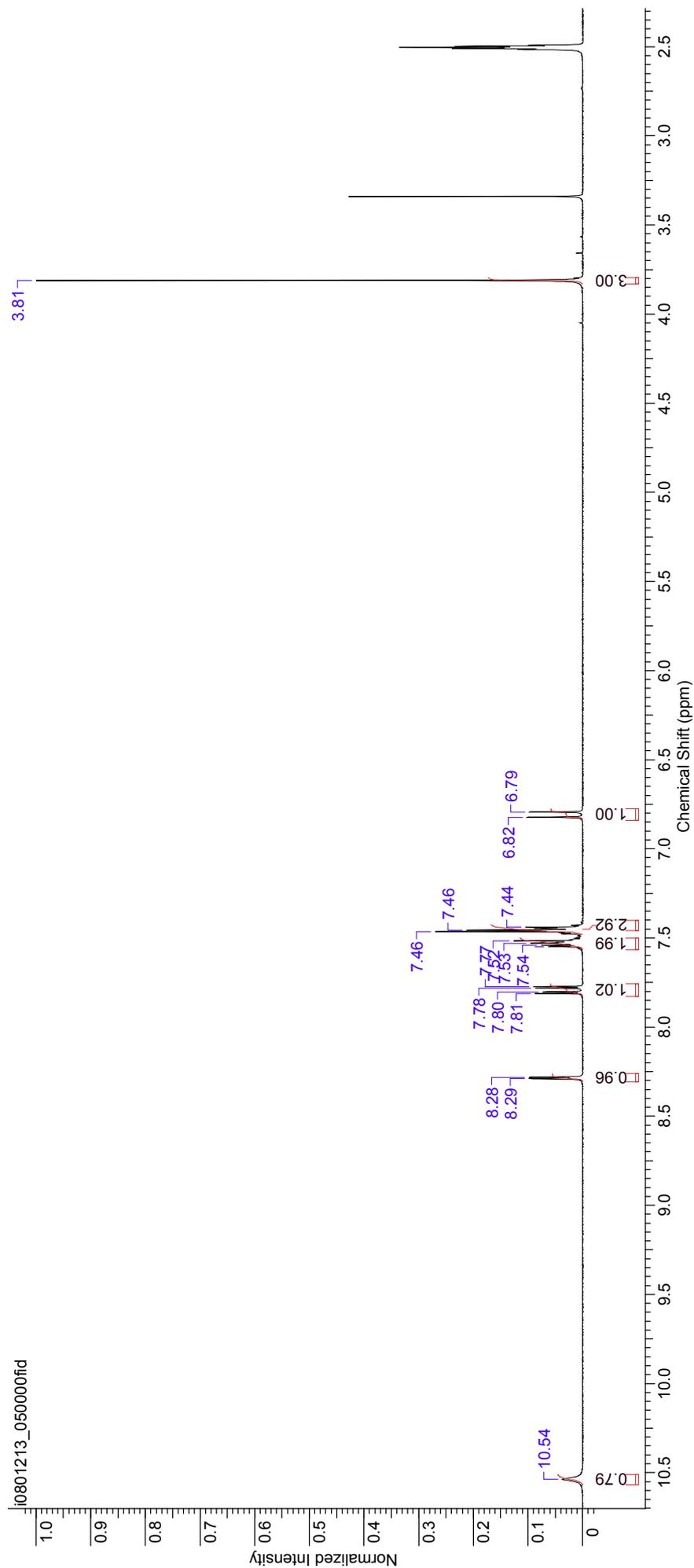


Date	21 Jan 2008 04:52:16
Comment	10733/MUKJP/219/101
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

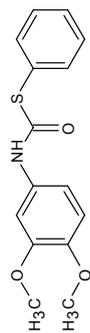


4a

¹H NMR (DMSO-d₆, 300MHz): δ = 10.54 (br. s., 1 H), 8.29 (d, J =2.3 Hz, 1 H), 7.79 (dd, J =9.1, 2.6 Hz, 1 H), 7.50 - 7.57 (m, 2 H), 7.42 - 7.48 (m, 3 H), 6.81 (d, J =8.7 Hz, 1 H), 3.81 ppm (s, 3 H)

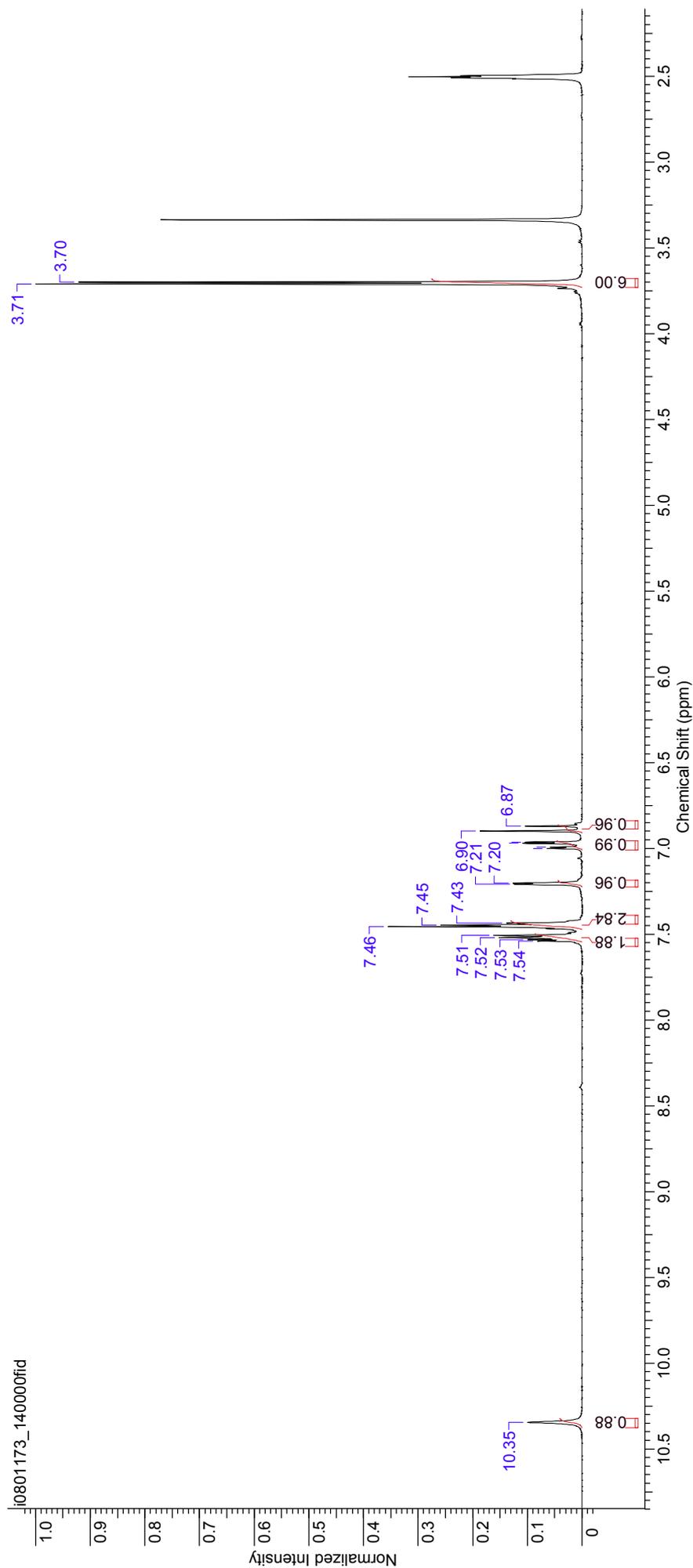


Date	17 Jan 2008 06:43:12
Comment	11227/MUKJP/240/006
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d ₆

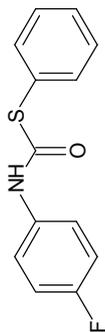


4b

¹H NMR (DMSO-d₆, 300MHz): δ = 10.35 (s, 1 H), 7.50 - 7.55 (m, 2 H), 7.42 - 7.47 (m, 3 H), 7.21 (d, J =2.3 Hz, 1 H), 6.95 - 7.01 (m, 1 H), 6.86 - 6.91 (m, 1 H), 3.71 ppm (d, J =3.0 Hz, 6 H)

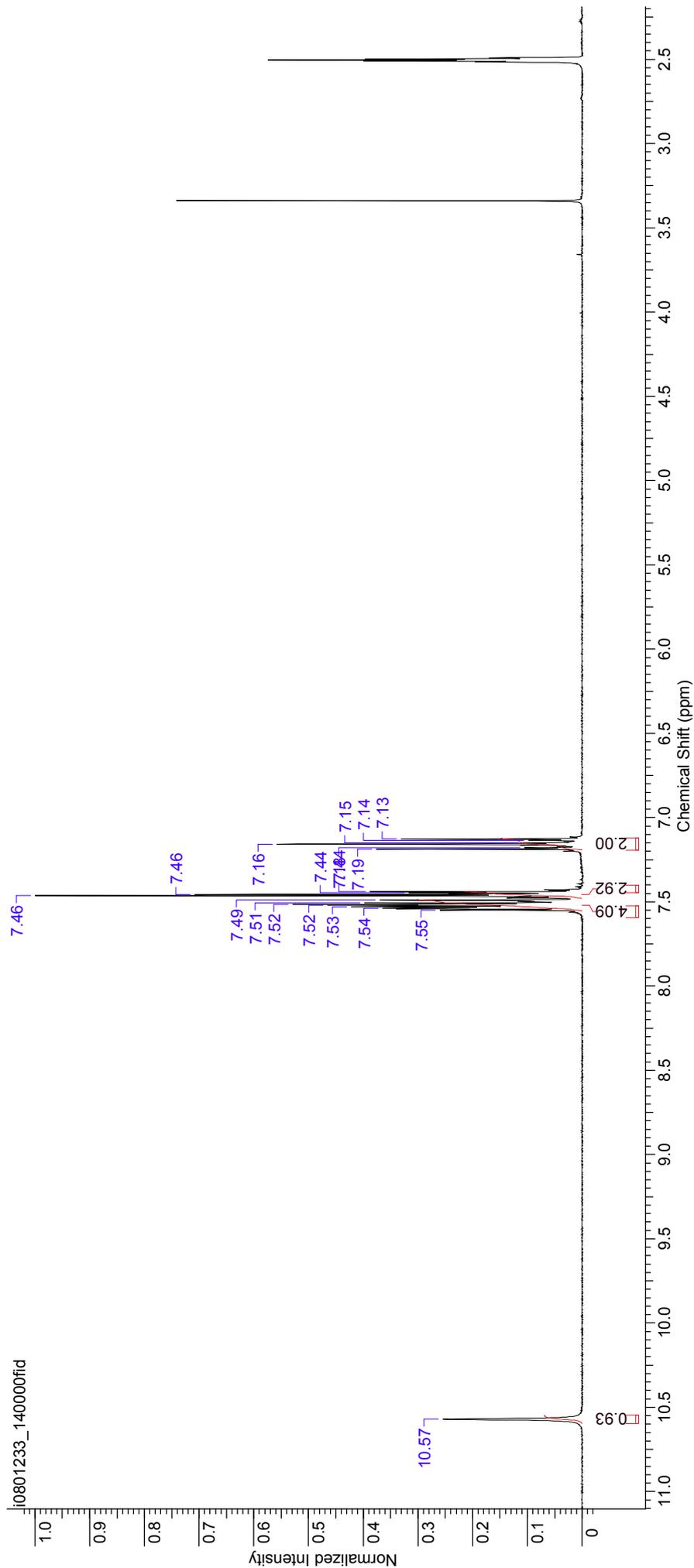


Date	23 Jan 2008 06:13:20
Comment	11246/MUKJP/181/004
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	DMSO-d6

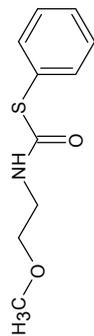


4C

¹H NMR (DMSO-d₆, 300MHz): δ = 10.57 (s, 1 H), 7.48 - 7.56 (m, 4 H), 7.44 - 7.48 (m, 3 H), 7.12 - 7.19 ppm (m, 2 H)

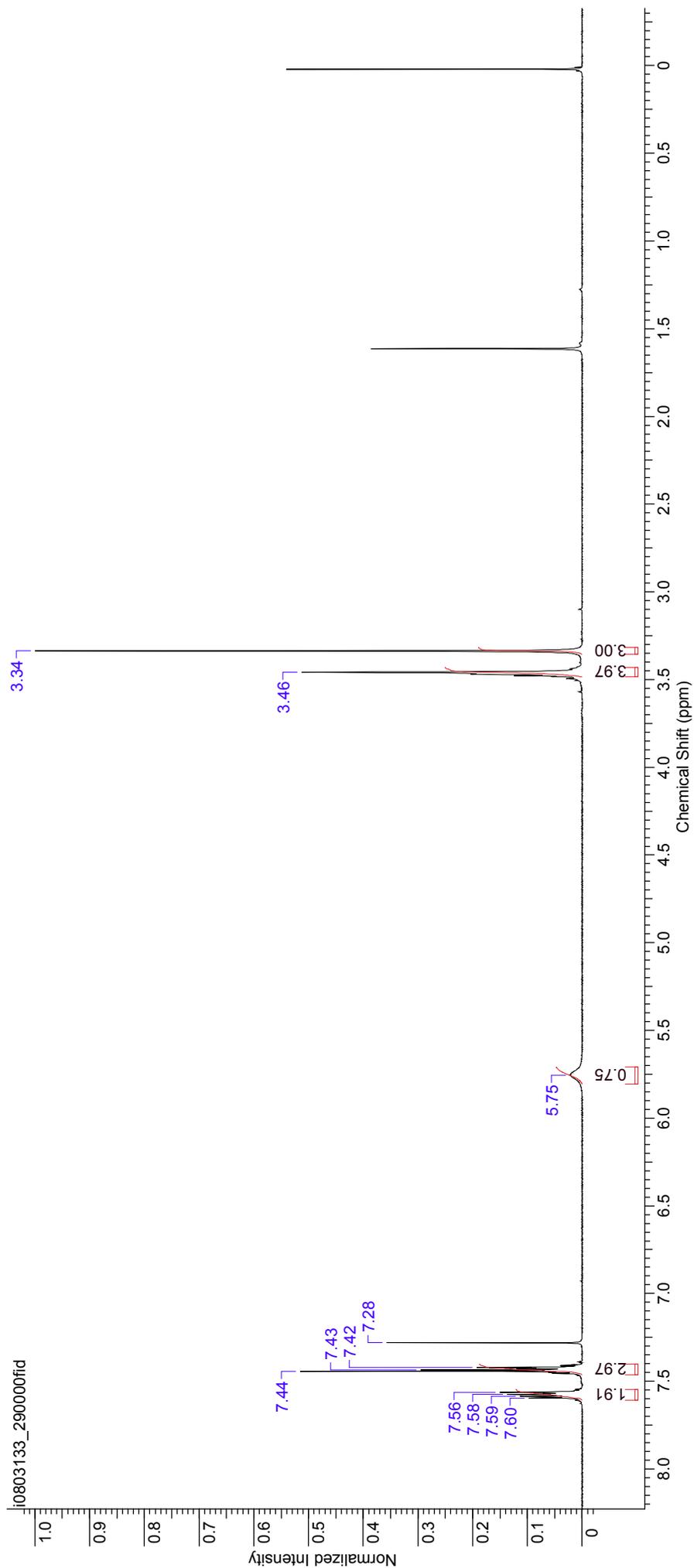


Date	13 Mar 2008 11:22:40
Comment	11266MUKJP147/001
Frequency (MHz)	300.13
Nucleus	¹ H
Solvent	CHLOROFORM-d



4d

¹H NMR (CHLOROFORM-d, 300MHz): δ = 7.58 (dd, J =6.6, 3.2 Hz, 2 H), 7.40 - 7.46 (m, 3 H), 5.75 (br. s., 1 H), 3.46 (s, 4 H), 3.34 ppm (s, 3 H)

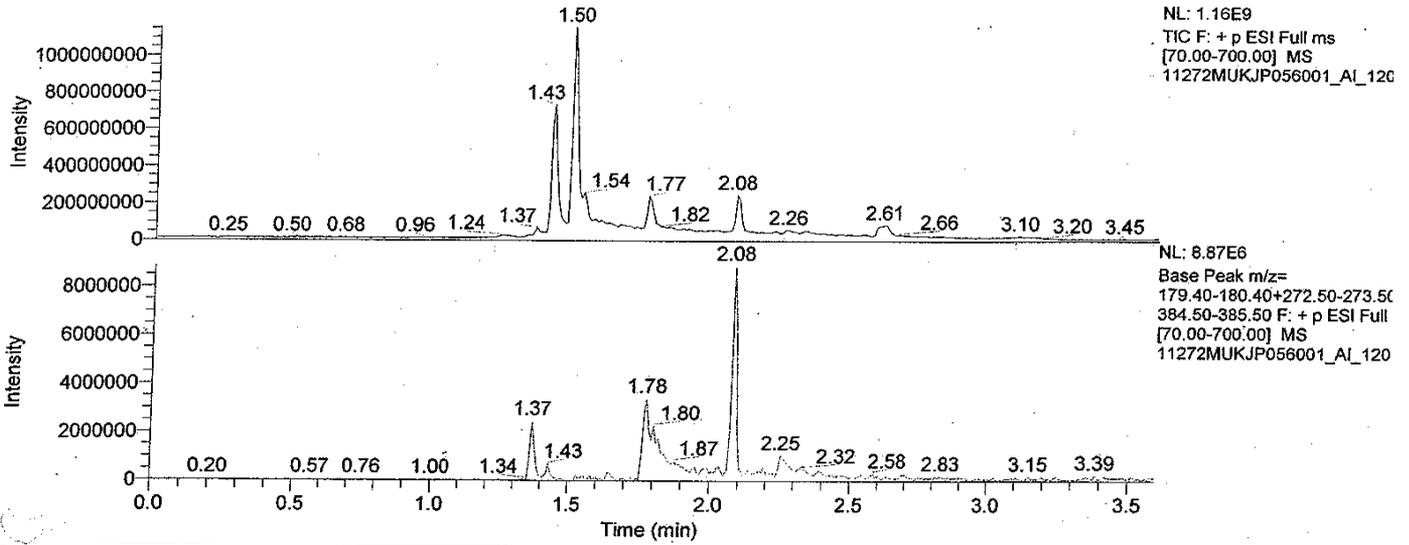


11272MUKJP056001_AI_120108_01
 11272/MUKJP/056/001
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

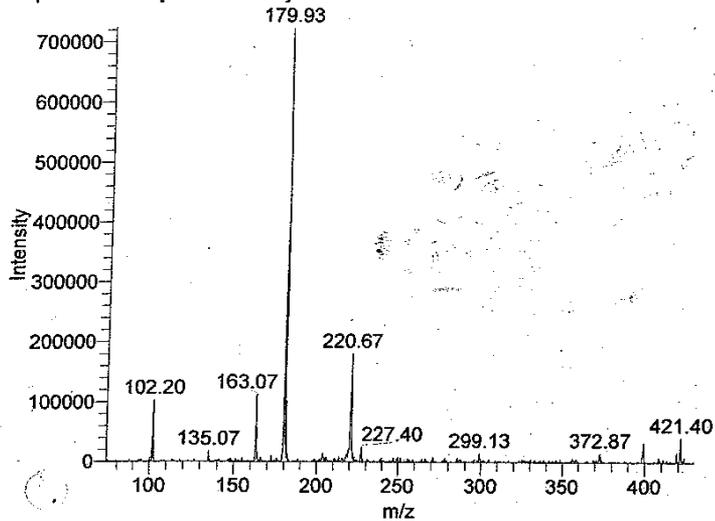
1/12/2008 11:41:51 AM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins - 100% A

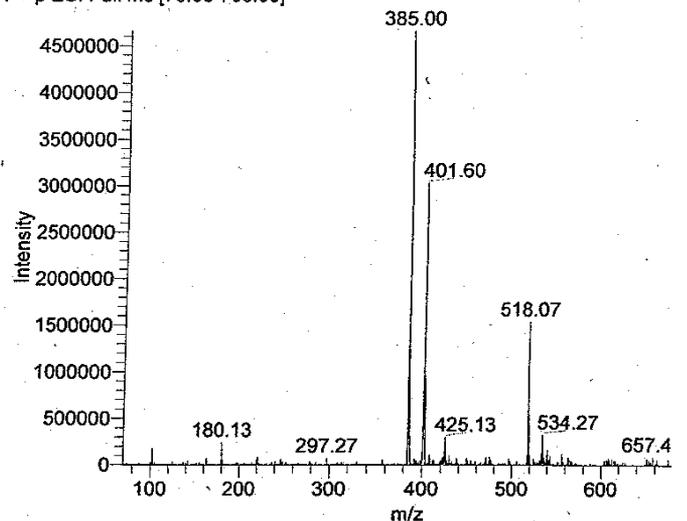
RT: 0.00 - 3.59



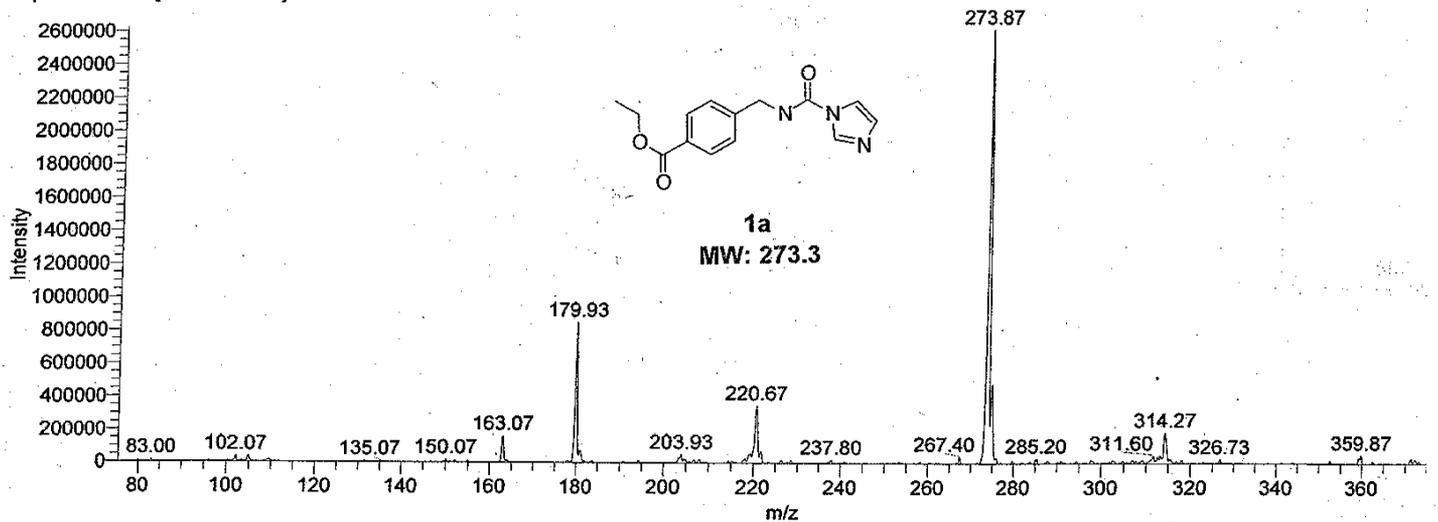
11272MUKJP056001_AI_120108_01 #139-143 RT: 1.36-1.40 AV: 5 SB: 247
 T: + p ESI Full ms [70.00-700.00]



11272MUKJP056001_AI_120108_01 #222-225 RT: 2.07-2.10 AV: 4 SB:
 T: + p ESI Full ms [70.00-700.00]



11272MUKJP056001_AI_120108_01 #186-194 RT: 1.76-1.83 AV: 9 SB: 373 0.06-1.77, 1.85-3.59 SM: 11G NL: 2.62E6
 F: + p ESI Full ms [70.00-700.00]

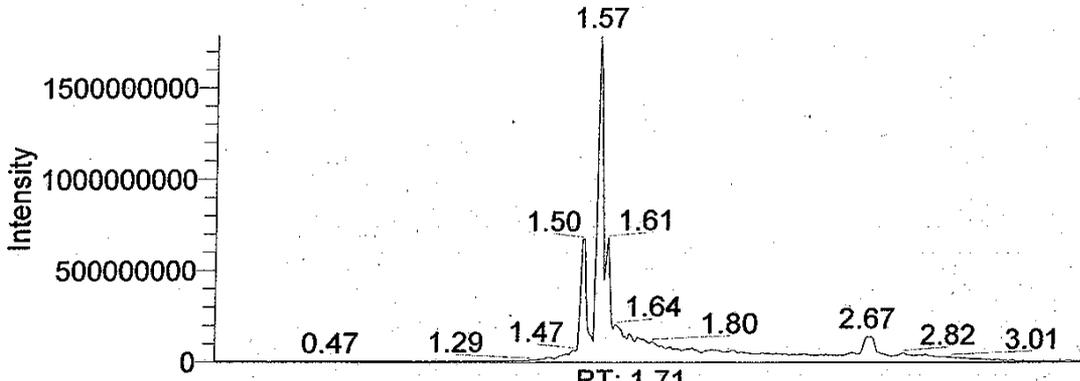


273MUKJP021001_AI_240108_44
 273/MUKJP/021/001
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

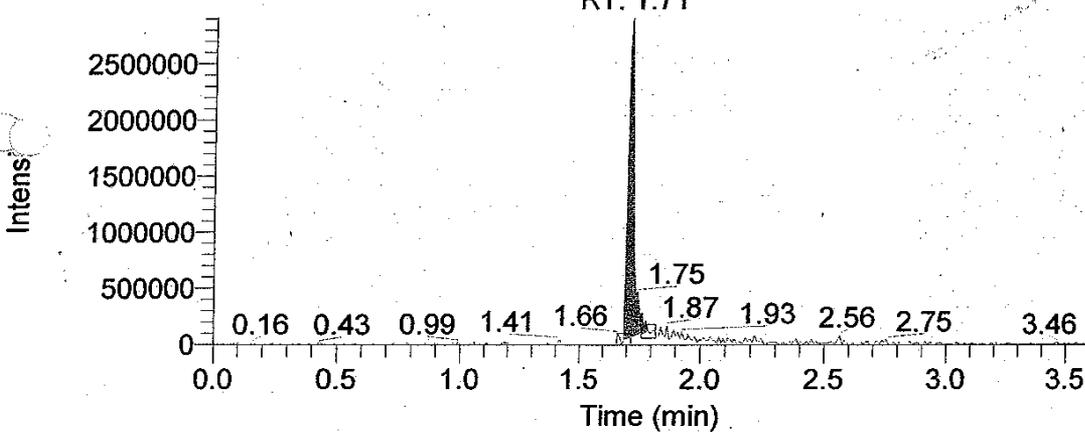
1/24/2008 4:56:55 PM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins - 100% A

T: 0.00 - 3.59

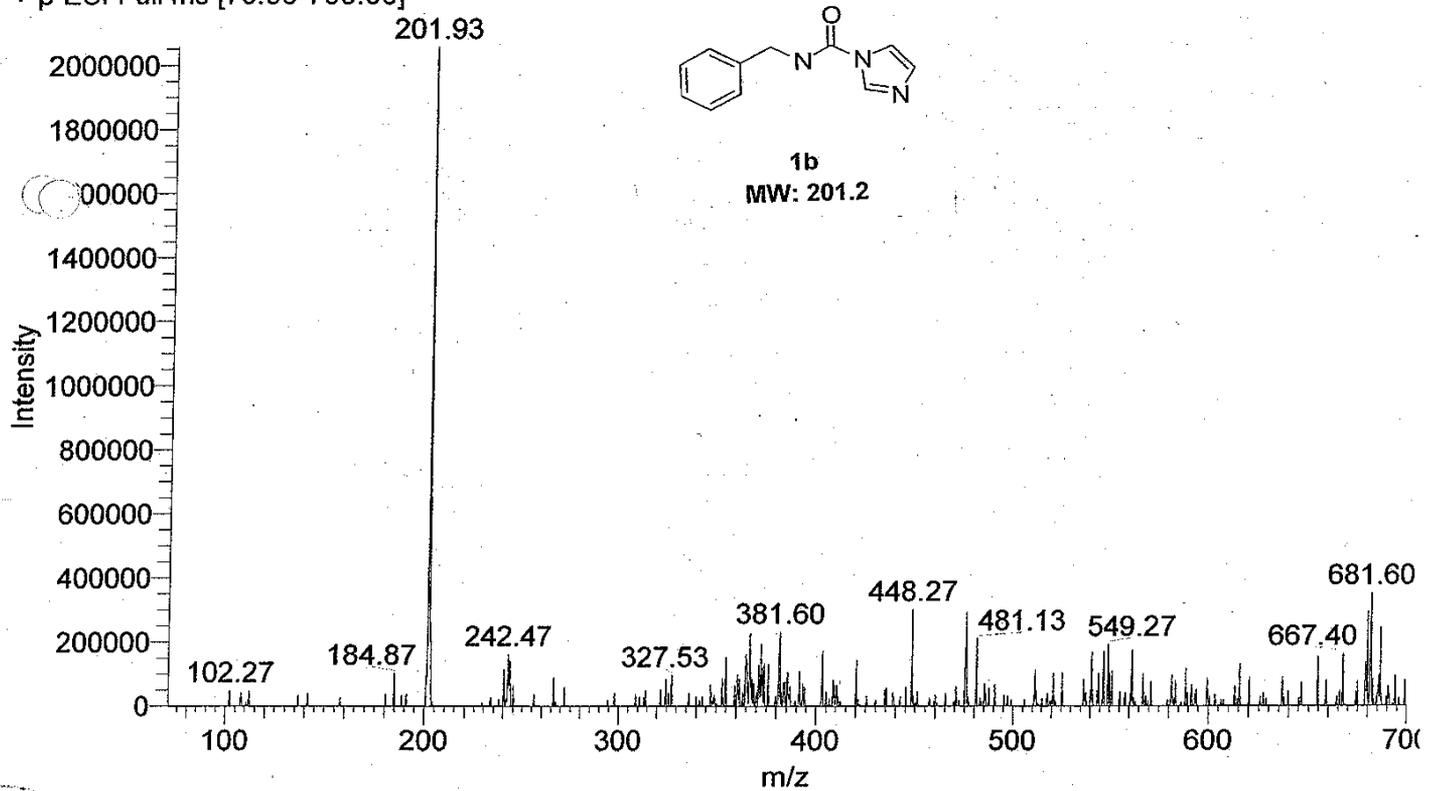


NL: 1.79E9
 TIC F: + p ESI Full ms
 [70.00-700.00] MS
 11273MUKJP021001_
 240108_44



NL: 2.91E6
 Base Peak m/z=
 201.50-202.50 F: + p E
 Full ms [70.00-700.00]
 MS
 11273MUKJP021001_
 240108_44

273MUKJP021001_AI_240108_44 #179 RT: 1.71 AV: 1 SB: 253 0.06-2.41 SM: 11G NL: 2.06E6
 + p ESI Full ms [70.00-700.00]



11246MUKJP168001_AI_110108_10

11246/MUKJP/168/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/11/2008 10:36:14 AM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

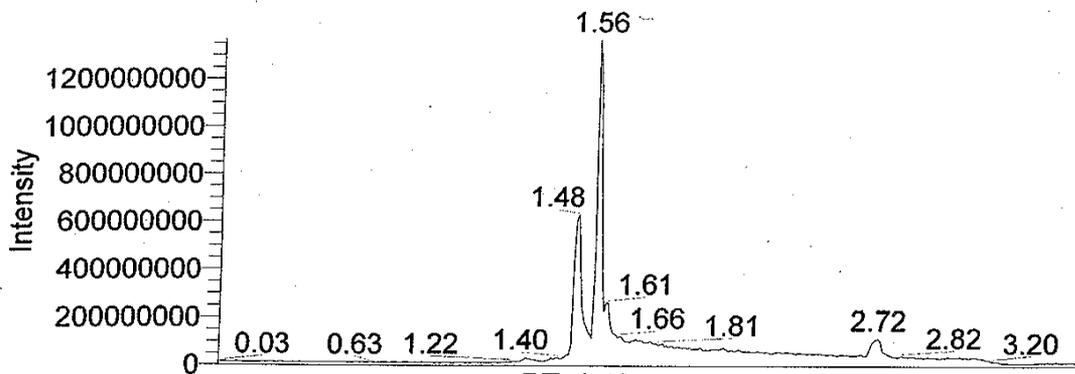
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.60



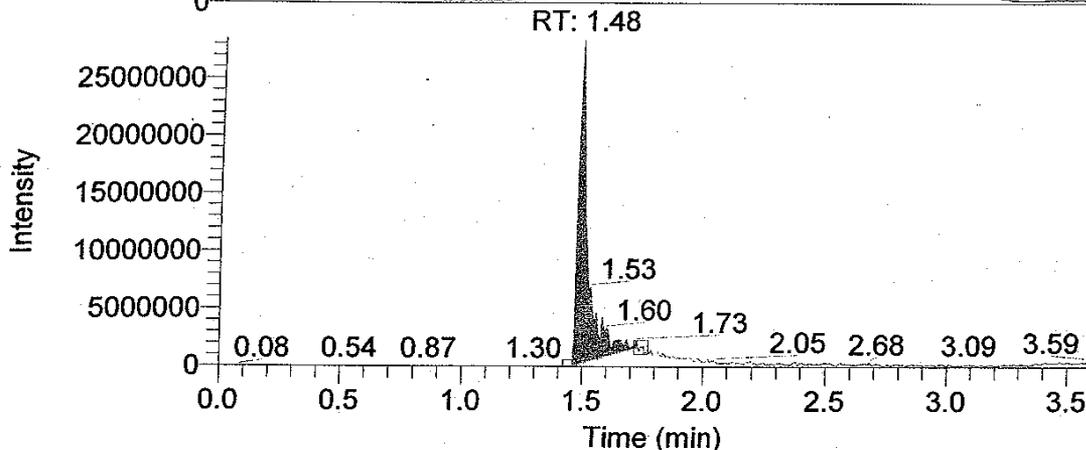
NL: 1.37E9

TIC F: + p ESI Full m

[70.00-700.00] MS

11246MUKJP168001

110108_10



NL: 2.84E7

Base Peak m/z=

179.50-180.50 F: + p

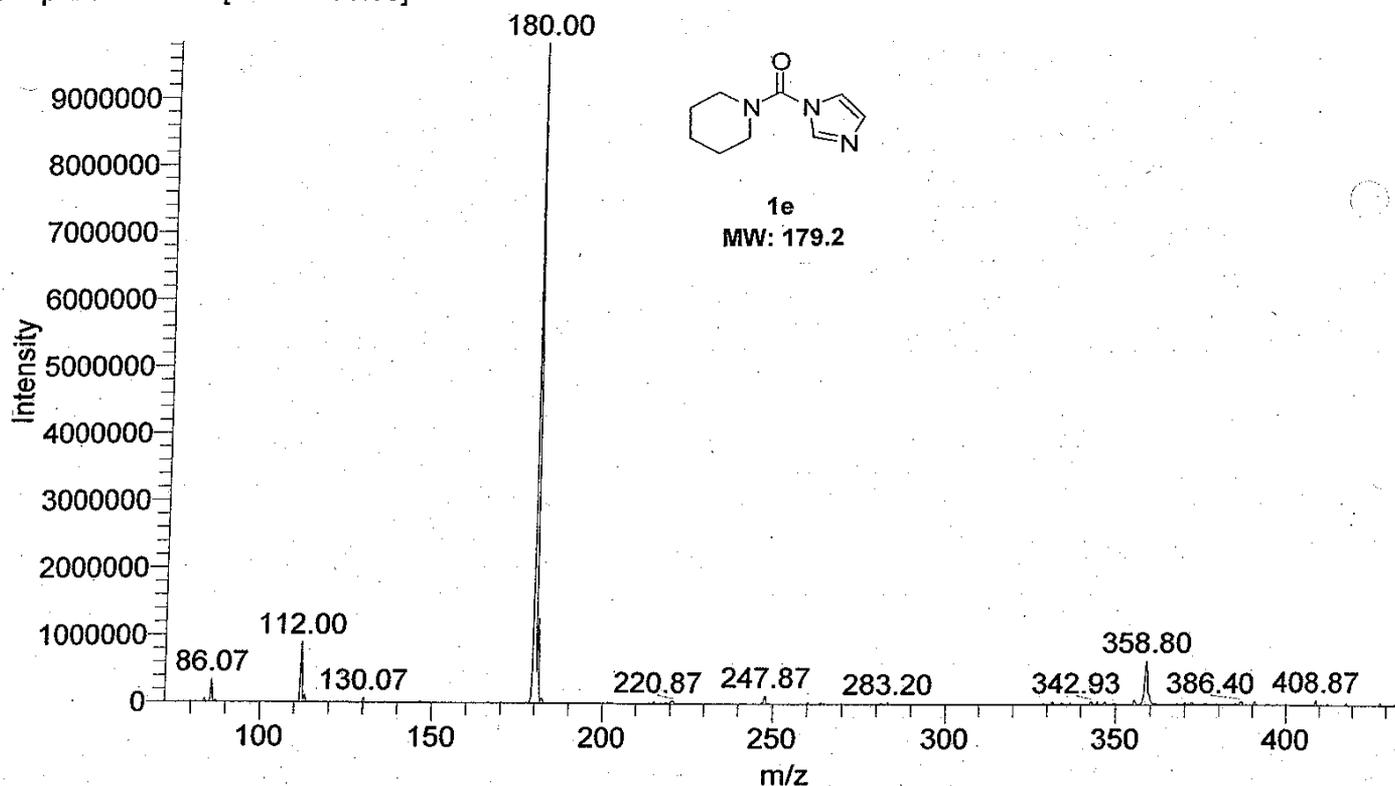
Full ms [70.00-700.00]

MS

11246MUKJP168001

110108_10

1246MUKJP168001_AI_110108_10 #148-154 RT: 1.45-1.50 AV: 7 SB: 374 0.02-1.43, 1.52-3.57 SM: 11
: + p ESI Full ms [70.00-700.00]

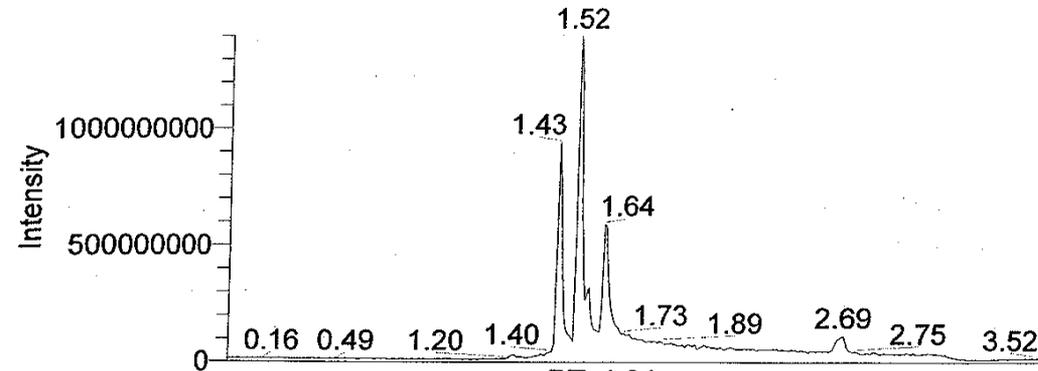


11246MUKJP167001_AI_110108_09
 11246/MUKJP/167/001
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

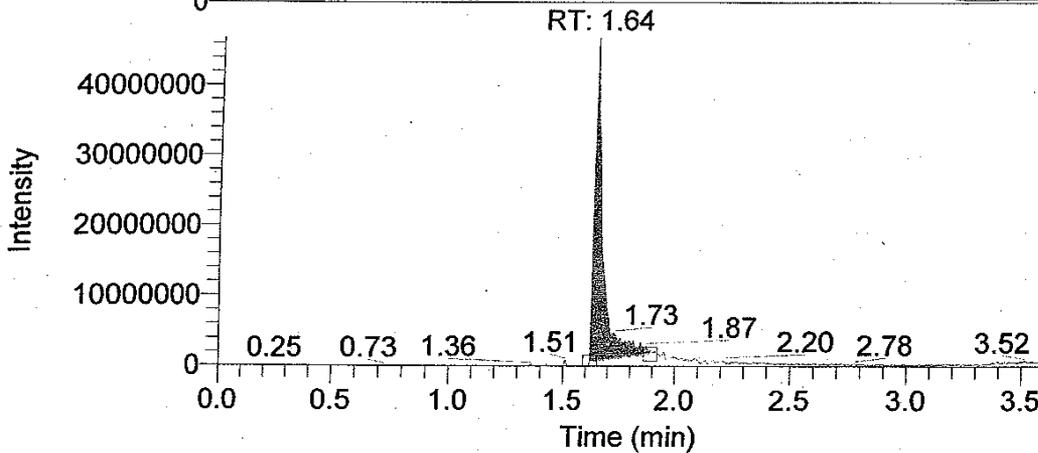
1/11/2008 10:31:50 AM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins-100%A

RT: 0.00 - 3.59

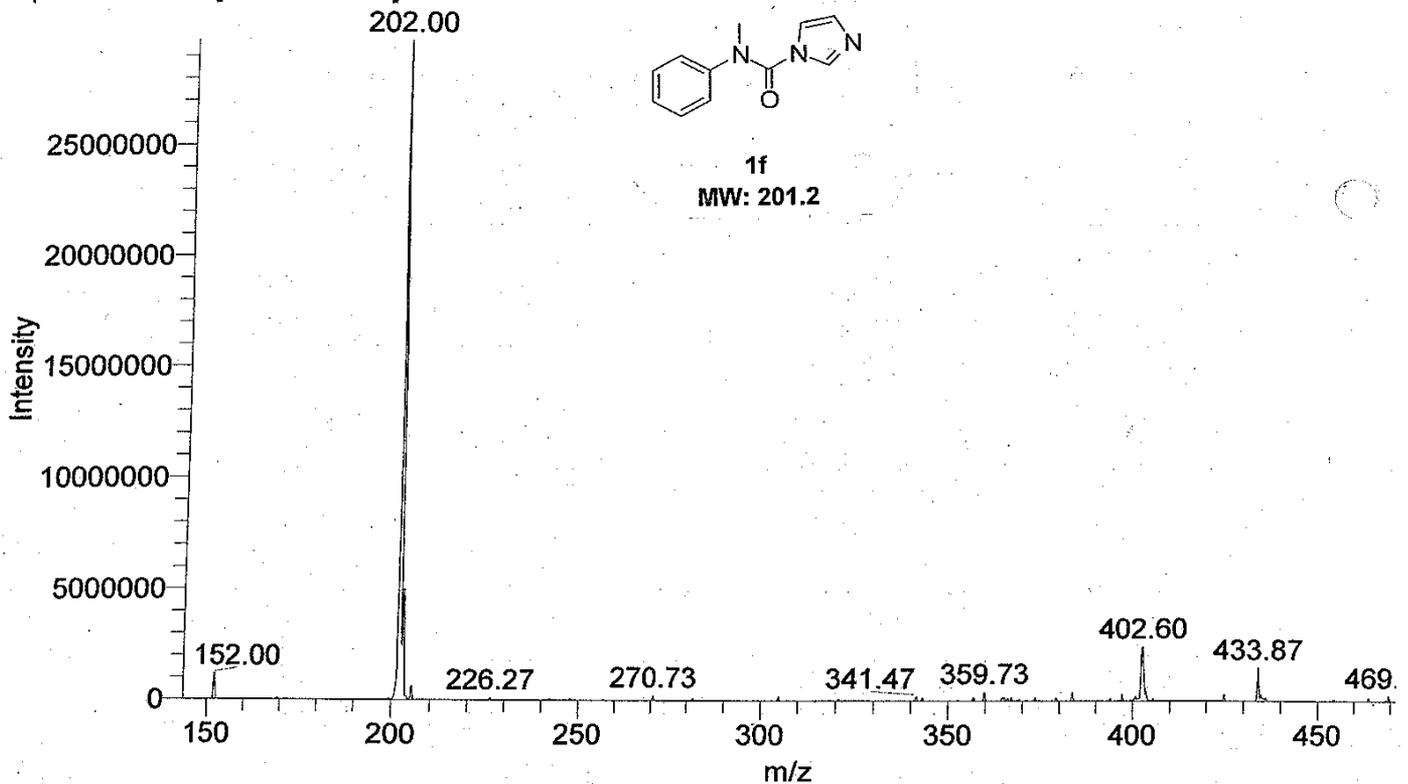


NL: 1.40E9
 TIC F: + p ESI Full ms
 [70.00-700.00] MS
 11246MUKJP167001_AI_108_09



NL: 4.68E7
 Base Peak m/z=
 201.50-202.50+
 398.50-399.50 F: + p ESI
 Full ms [70.00-700.00] M
 11246MUKJP167001_AI_108_09

11246MUKJP167001_AI_110108_09 #172. RT: 1.64 AV: 1 SB: 361 0.17-2.45, 2.55-3.59 SM: 11G NL: F: + p ESI Full ms [70.00-700.00]



10733MUKJP109001_AI_071107_11

10733/MUKJP/109/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Acquity UPLC BEH C18 (50 x 2.1 mm x 1.7 microns)

11/7/2007 11:56:29 AM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

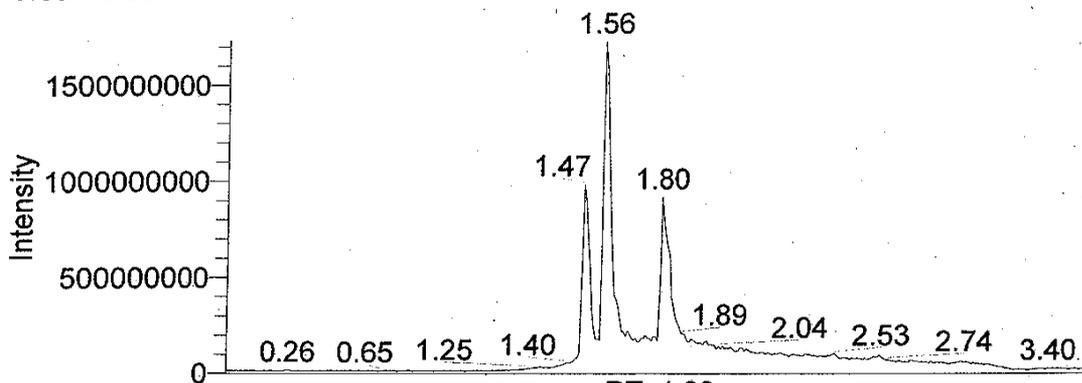
0.2 mins - 100% A

2.25 mins - 100% B

2.5 mins - 100% B

2.6 mins - 100% A

RT: 0.00 - 3.60



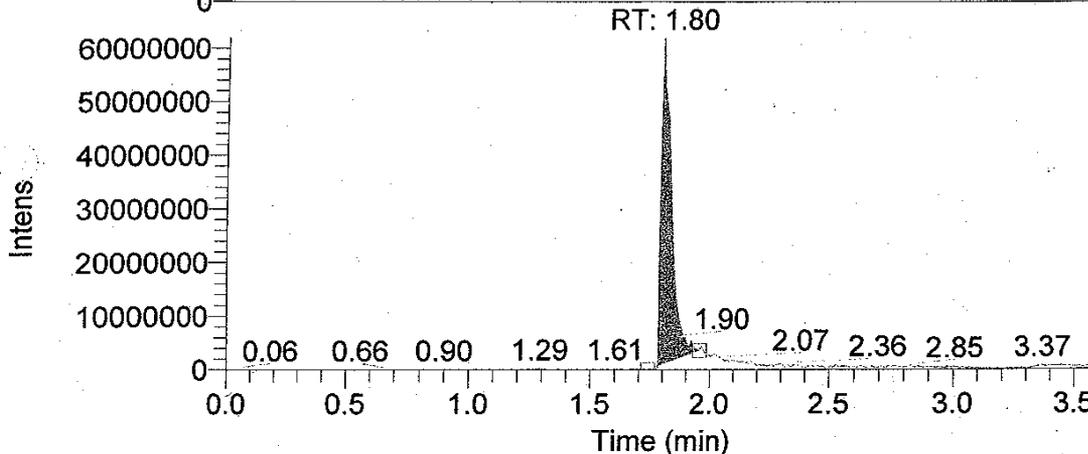
NL: 1.73E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

10733MUKJP109001_

_071107_11



NL: 6.19E7

Base Peak m/z=

227.50-228.50 F: + p E

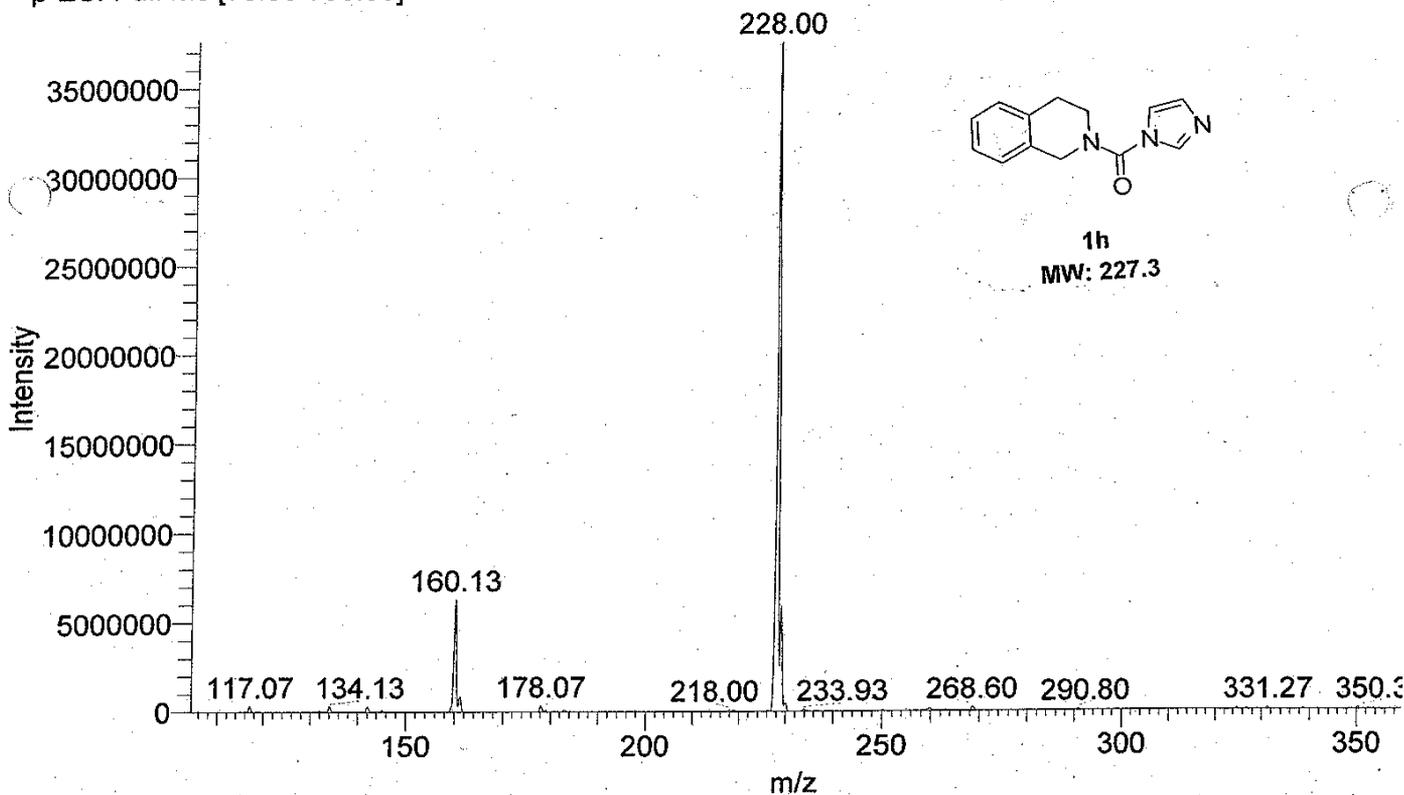
Full ms [70.00-700.00]

MS

10733MUKJP109001_

_071107_11

10733MUKJP109001_AI_071107_11 #190-193 RT: 1.79-1.81 AV: 4 SB: 387 0.01-1.79, 1.86-3.60 SM: 1
T: + p ESI Full ms [70.00-700.00]



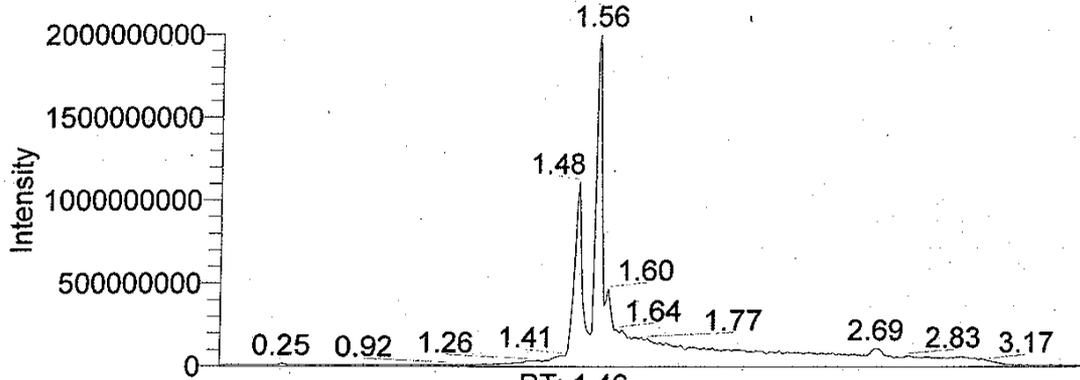
10733MUKJP103001_AI_311007_08
10733/MUKJP/103/001

Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Acquity UPLC BEH C18 (50 x 2.1 mm x 1.7 microns)

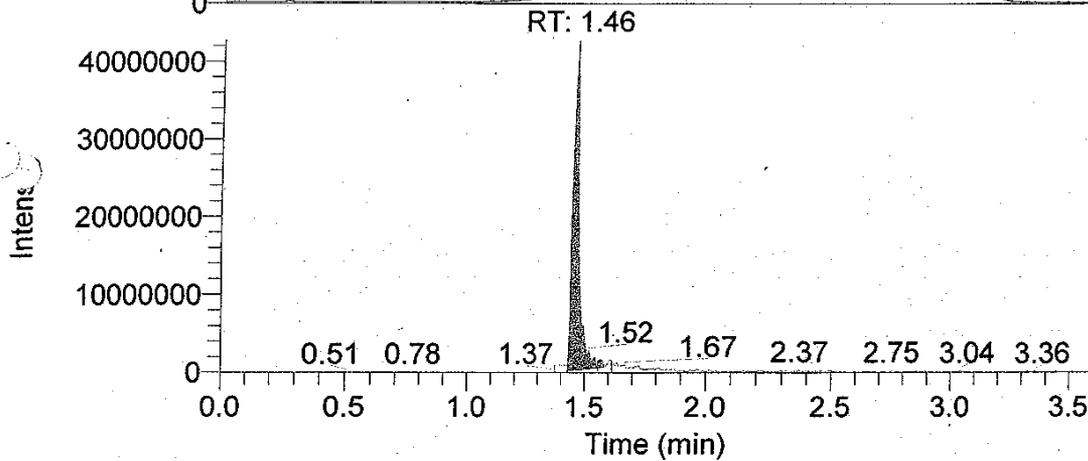
10/31/2007 10:41:35 AM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.5 mins - 100% B
2.6 mins - 100% A

RT: 0.00 - 3.60

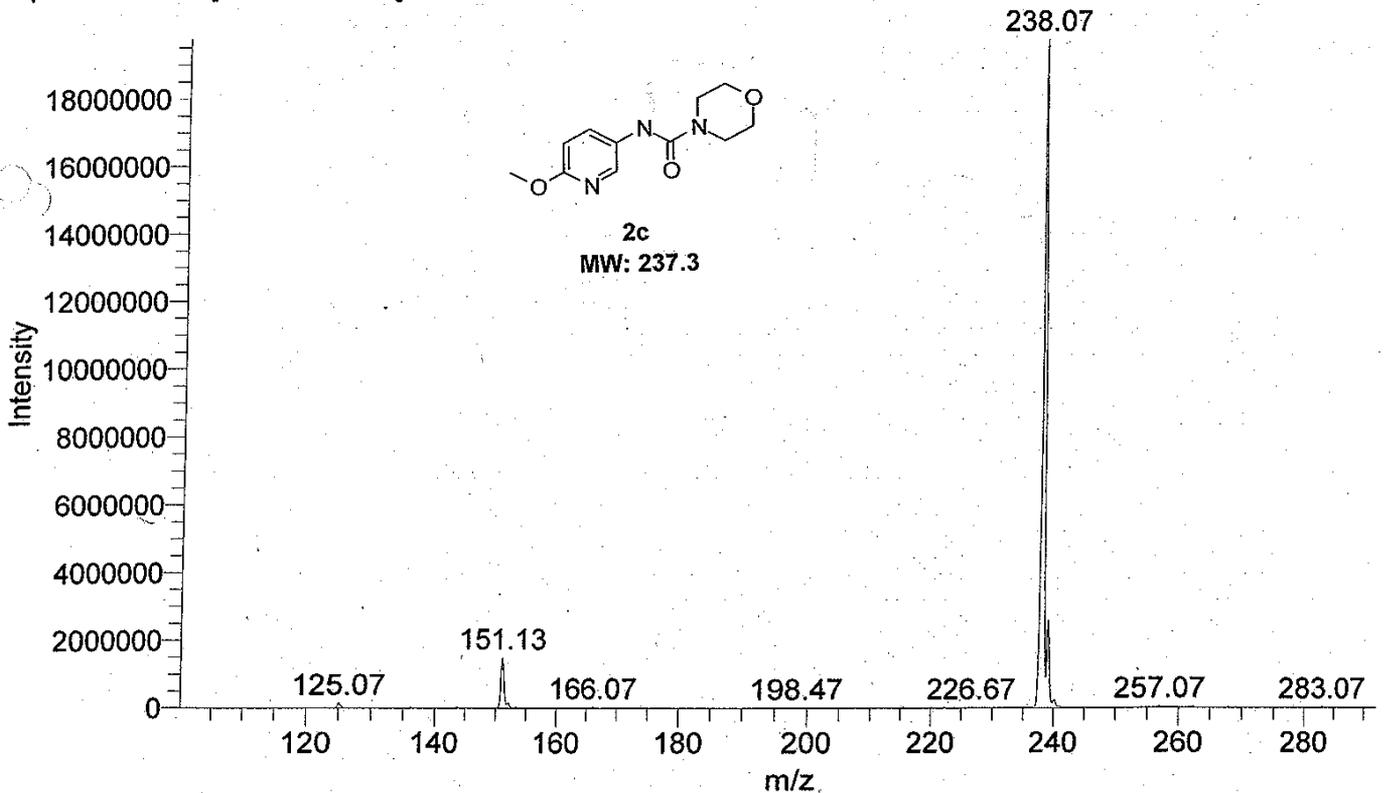


NL: 2.00E9
TIC F: + p ESI Full n
[70.00-700.00] MS
10733MUKJP10300
_311007_08



NL: 4.28E7
Base Peak m/z=
237.50-238.50 F: + p
Full ms [70.00-700.0
MS
10733MUKJP10300
_311007_08

10733MUKJP103001_AI_311007_08 #148-152 RT: 1.44-1.47 AV: 5 SB: 384 0.01-1.43, 1.52-3.60 SM:
T: + p ESI Full ms [70.00-700.00]



273MUKJP022001_AI_140108_29

273/MUKJP/022/001

bile Phase:

bile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

bile Phase B: 90% ACN with 5 mM AA buffer

lumn:Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/14/2008 12:56:25 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

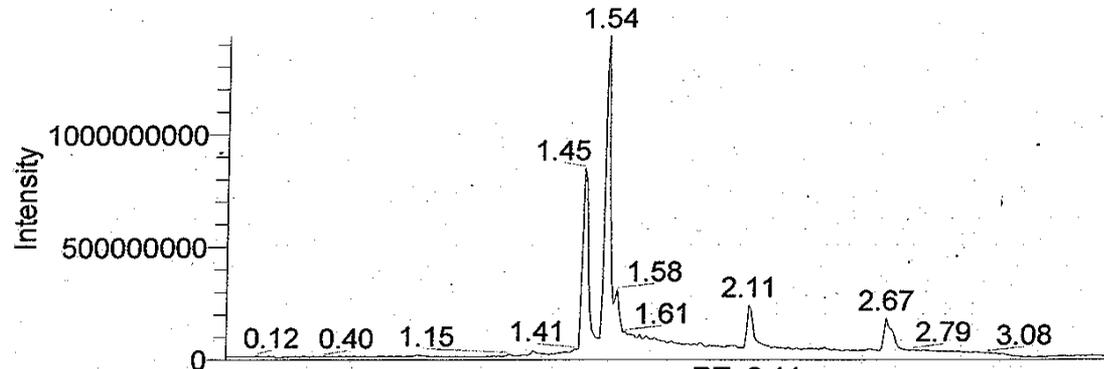
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

F: 0.00 - 3.59



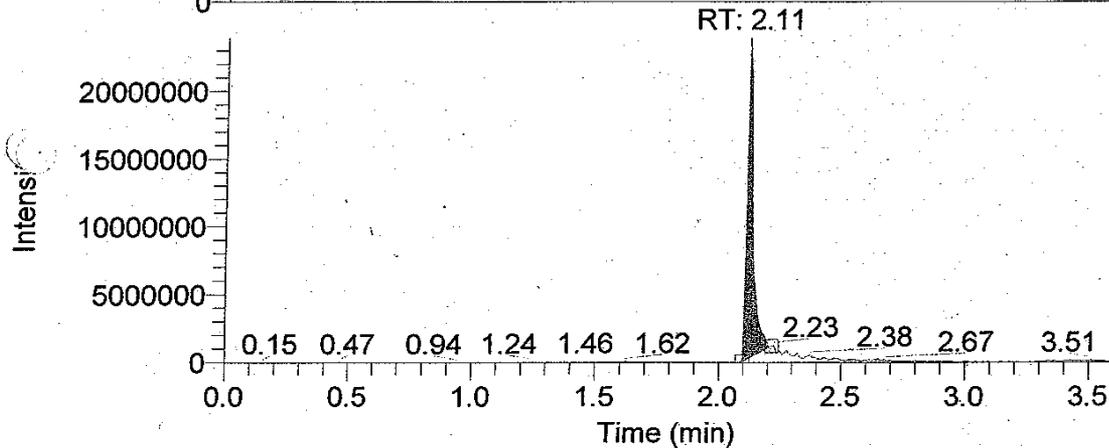
NL: 1.44E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11273MUKJP022001_

_140108_29



NL: 2.39E7

Base Peak m/z=

266.50-267.50 F: + p E

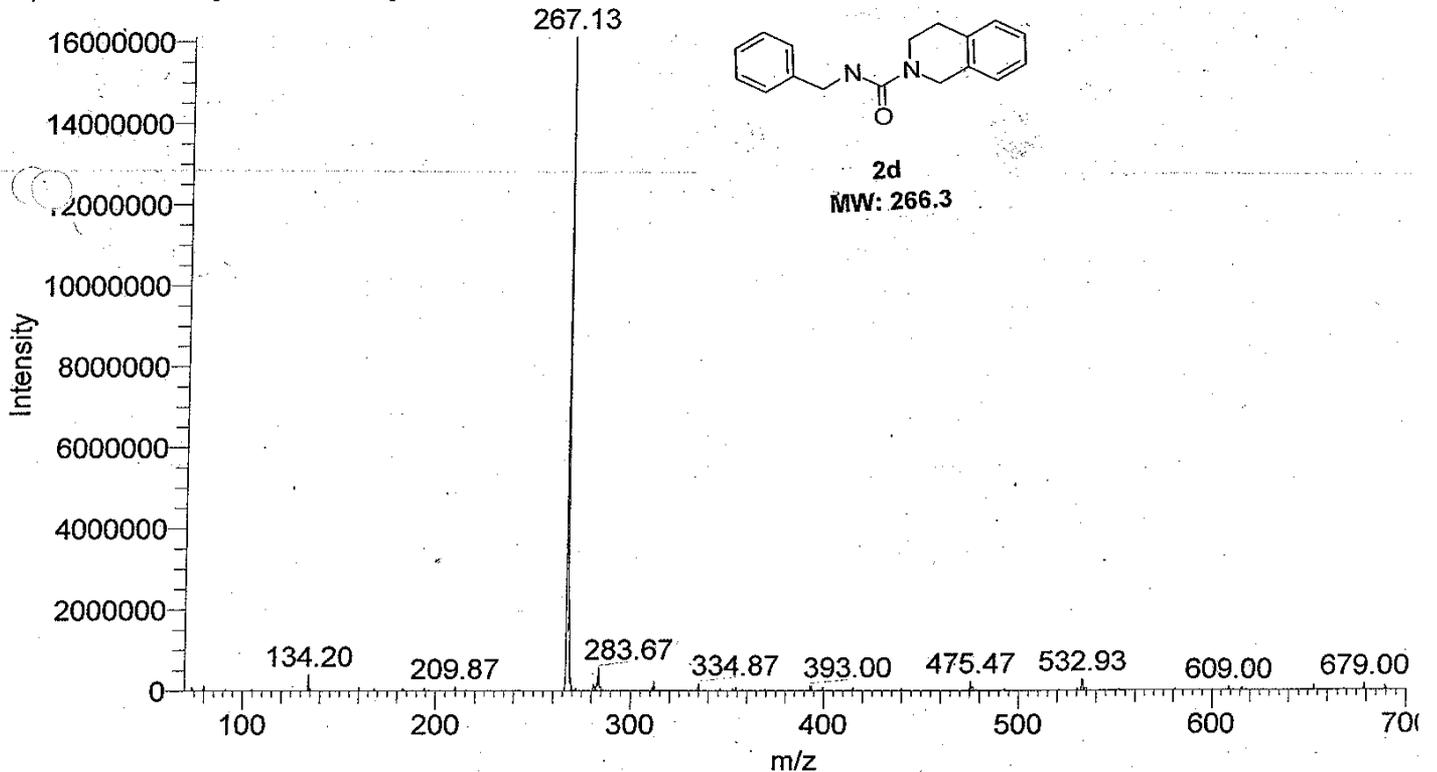
Full ms [70.00-700.00]

MS

11273MUKJP022001_

_140108_29

273MUKJP022001_AI_140108_29 #228 RT: 2.12 AV: 1 SB: 260 0.07-2.46 SM: 11G NL: 1.61E7
+ p ESI Full ms [70.00-700.00]



273MUKJP023001_AI_170108_33

273/MUKJP/023/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/17/2008 4:37:02 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

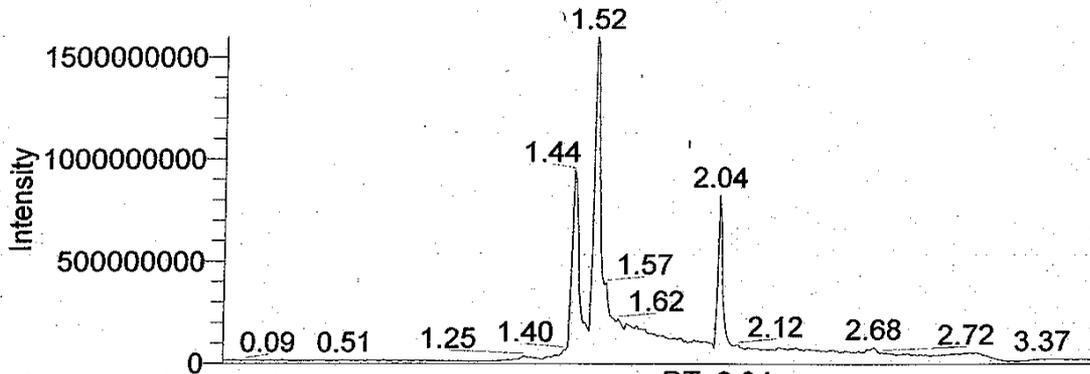
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

T: 0.00 - 3.59



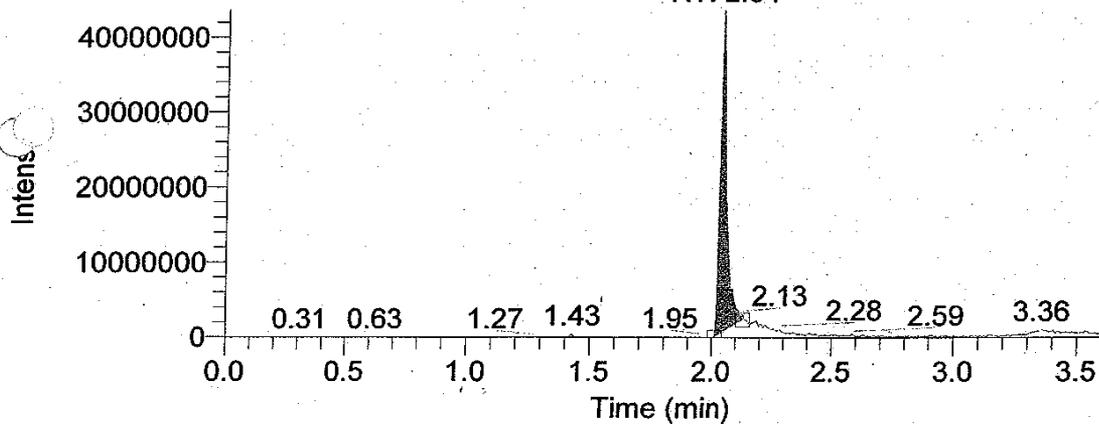
NL: 1.60E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11273MUKJP023001_

170108_33



NL: 4.37E7

Base Peak m/z=

240.50-241.50 F: + p E

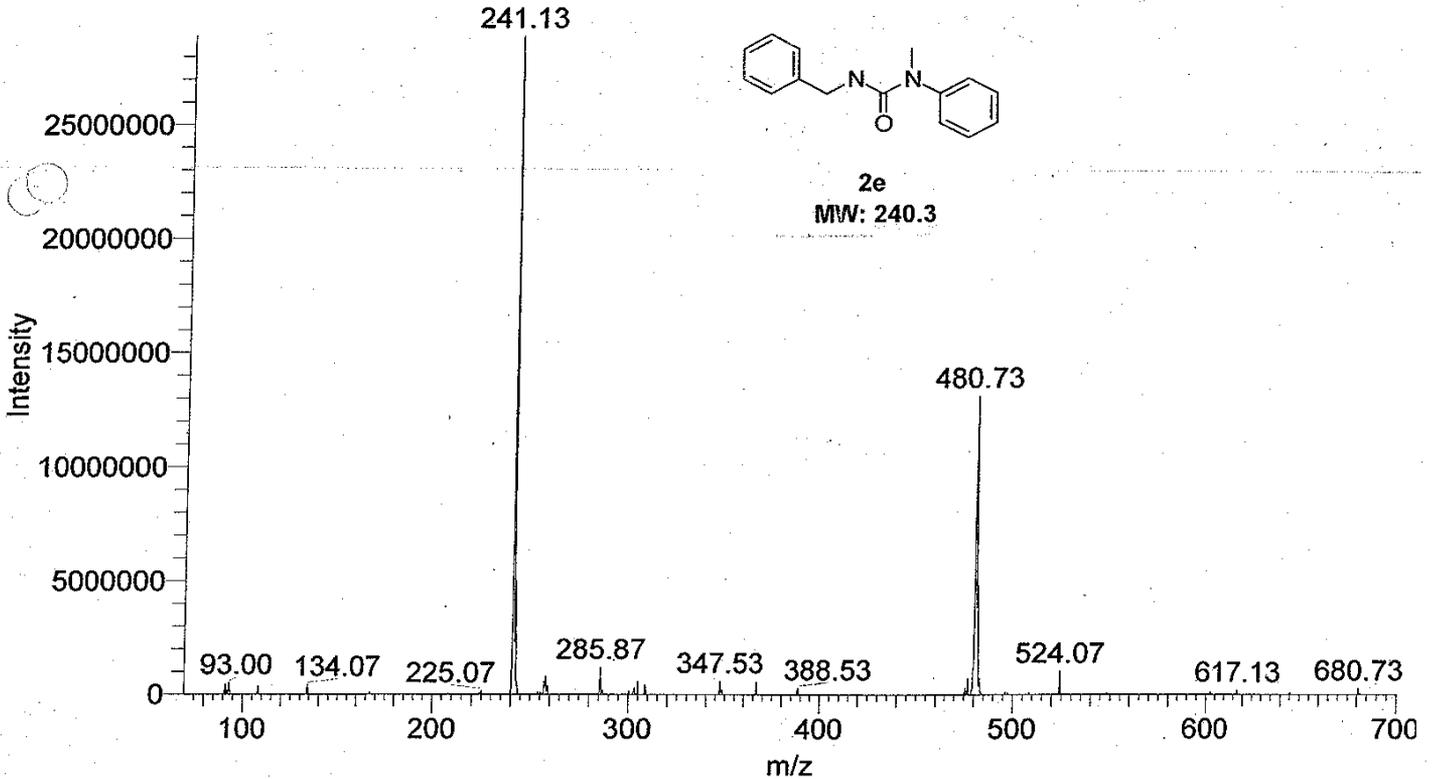
Full ms [70.00-700.00]

MS

11273MUKJP023001_

170108_33

273MUKJP023001_AI_170108_33#220 RT: 2.04 AV: 1 SB: 258 0.07-2.43 SM: 11G NL: 2.89E7
+ p ESI Full ms [70.00-700.00]



273MUKJP027001_A1_160108_47

273/MUKJP/027/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/16/2008 5:23:35 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

T: 0.00 - 3.59

NL: 1.58E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11273MUKJP027001_A1_

0108_47

NL: 1.01E7

Base Peak m/z=

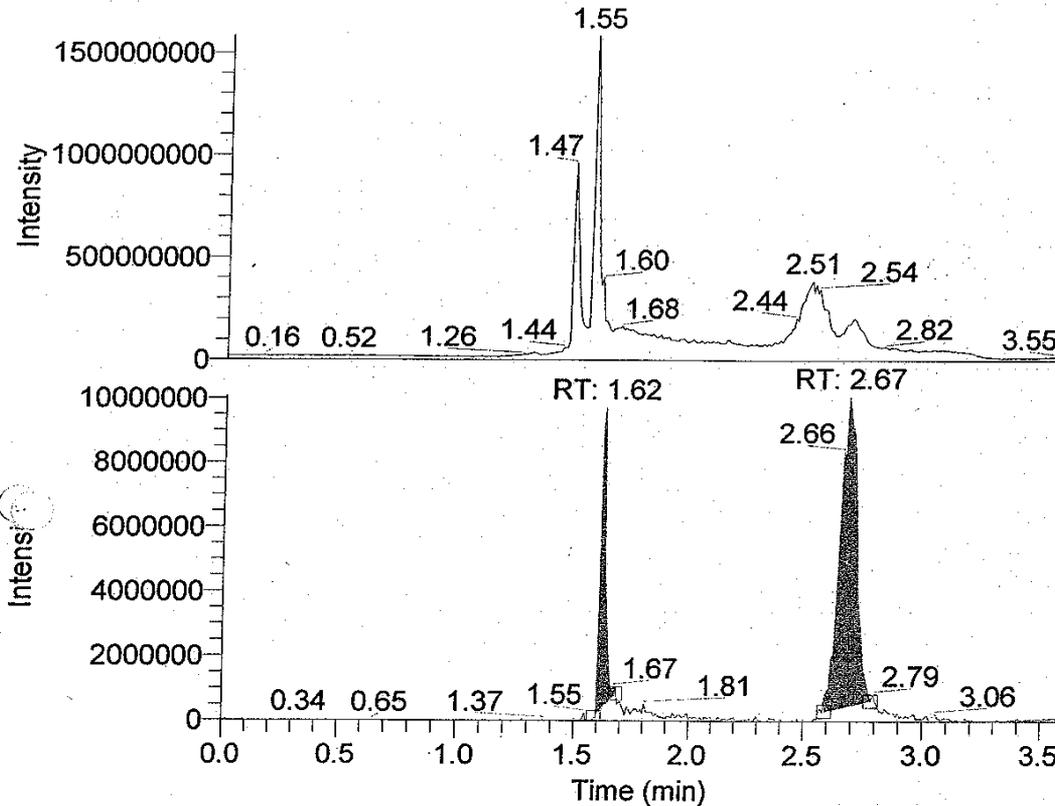
220.50-221.50+

565.50-566.50 F: + p ESI

Full ms [70.00-700.00] MS

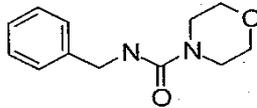
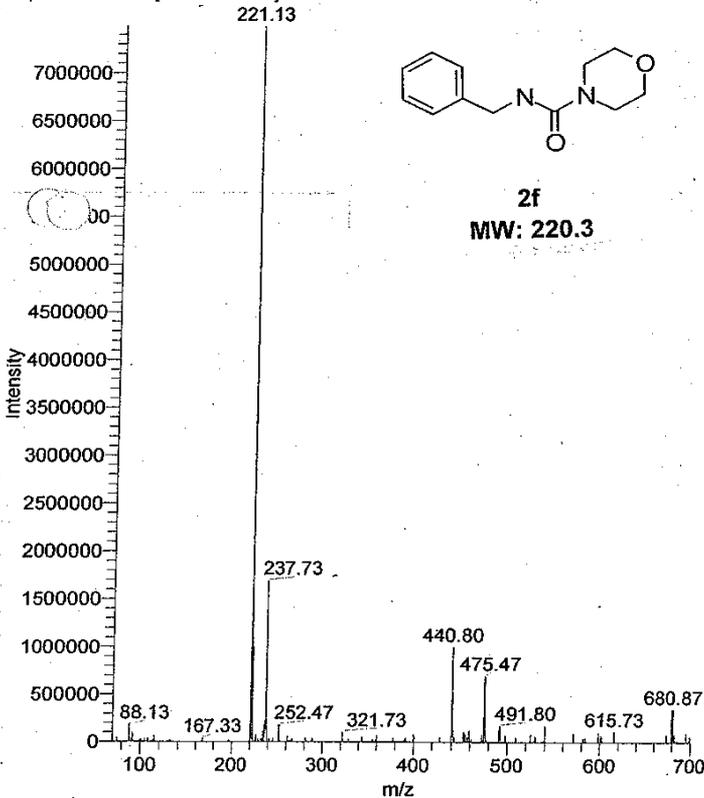
11273MUKJP027001_A1_

0108_47

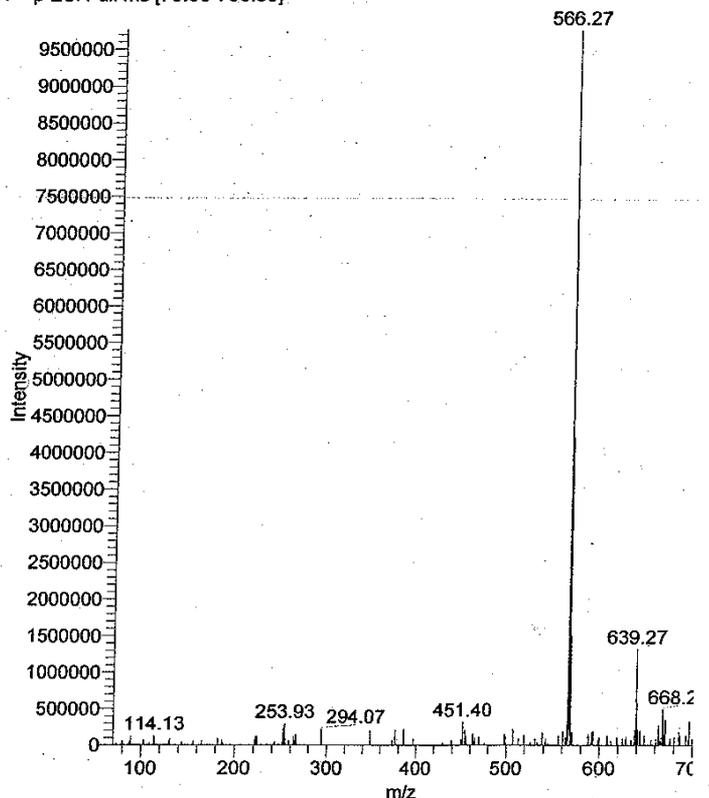


273MUKJP027001_A1_160108_47 #169 RT: 1.61 AV: 1 SB: 256 0.06-2.41

11273MUKJP027001_A1_160108_47 #294 RT: 2.67 AV: 1 SB: 318



2f
MW: 220.3



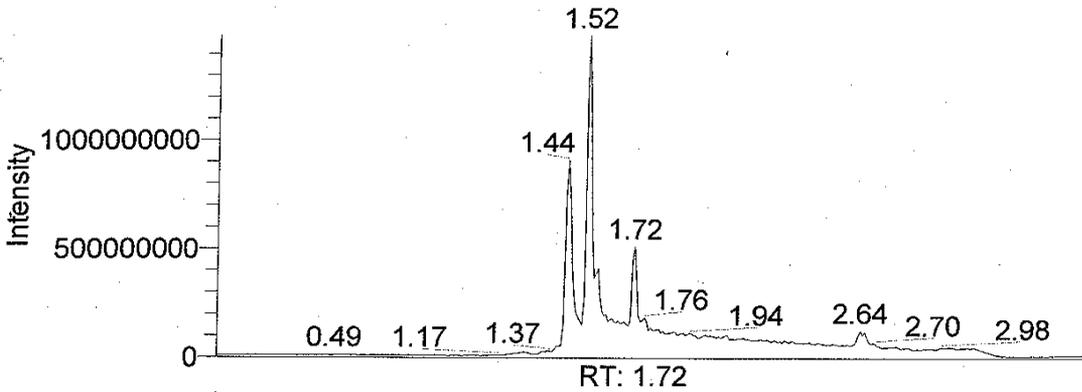
11227MUKJP240005_AI_180108_12
11227/MUKJP/240/005

Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

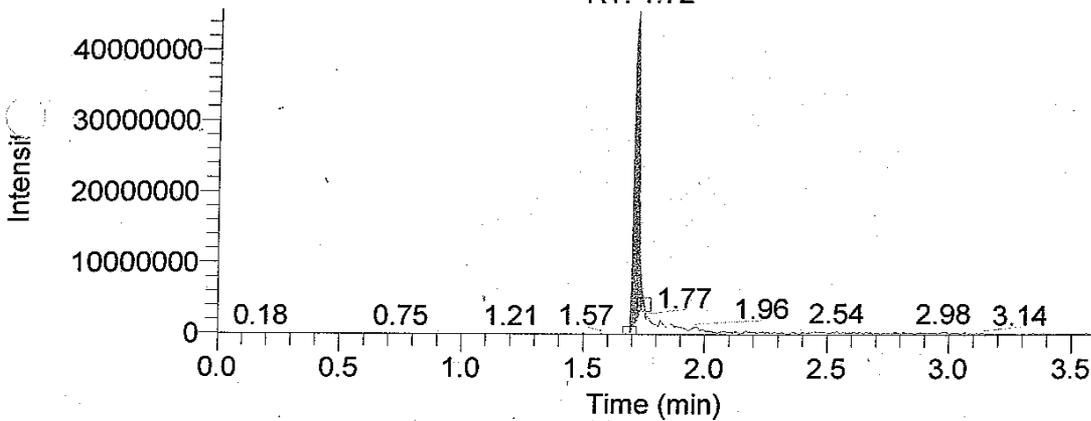
1/18/2008 10:37:38 AM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 3.59

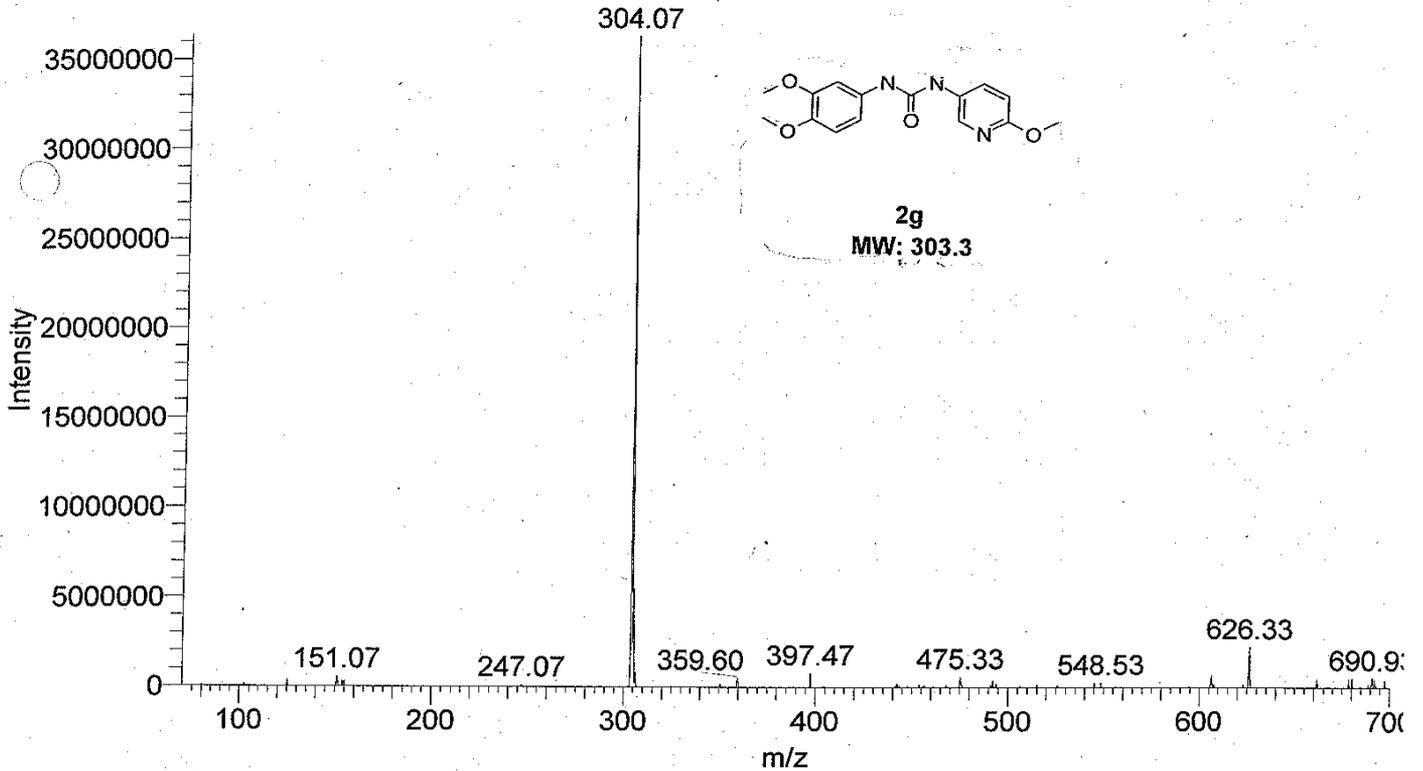


NL: 1.49E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11227MUKJP240005_
_180108_12



NL: 4.57E7
Base Peak m/z=
303.50-304.50 F: + p E
Full ms [70.00-700.00]
MS
11227MUKJP240005_
_180108_12

11227MUKJP240005_AI_180108_12 #181 RT: 1.72 AV: 1 SB: 170 0.03-1.65 SM: 11G NL: 3.64E7
F: + p ESI Full ms [70.00-700.00]

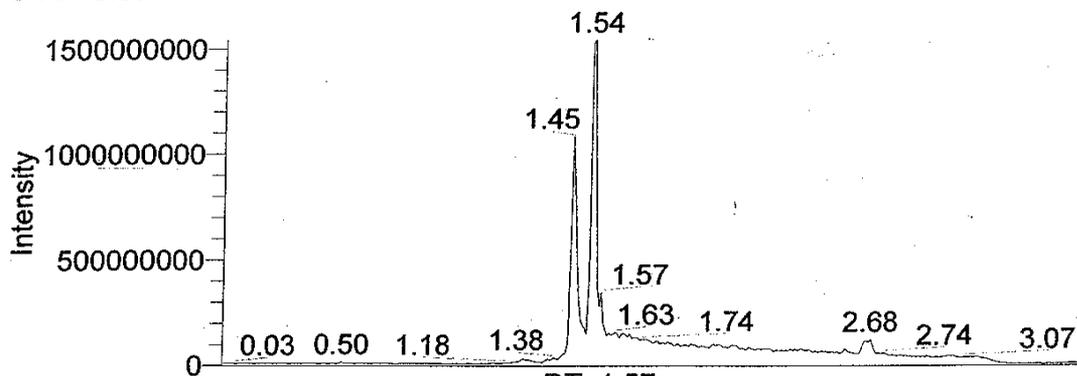


11266MUKJP107101_AI_180108_22
11266/MUKJP/107/101
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

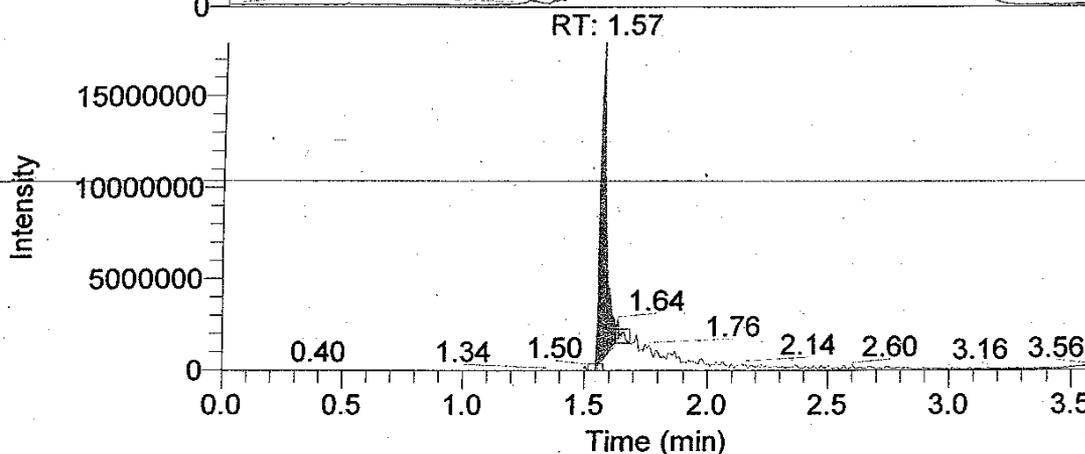
1/18/2008 12:23:40 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 3.59

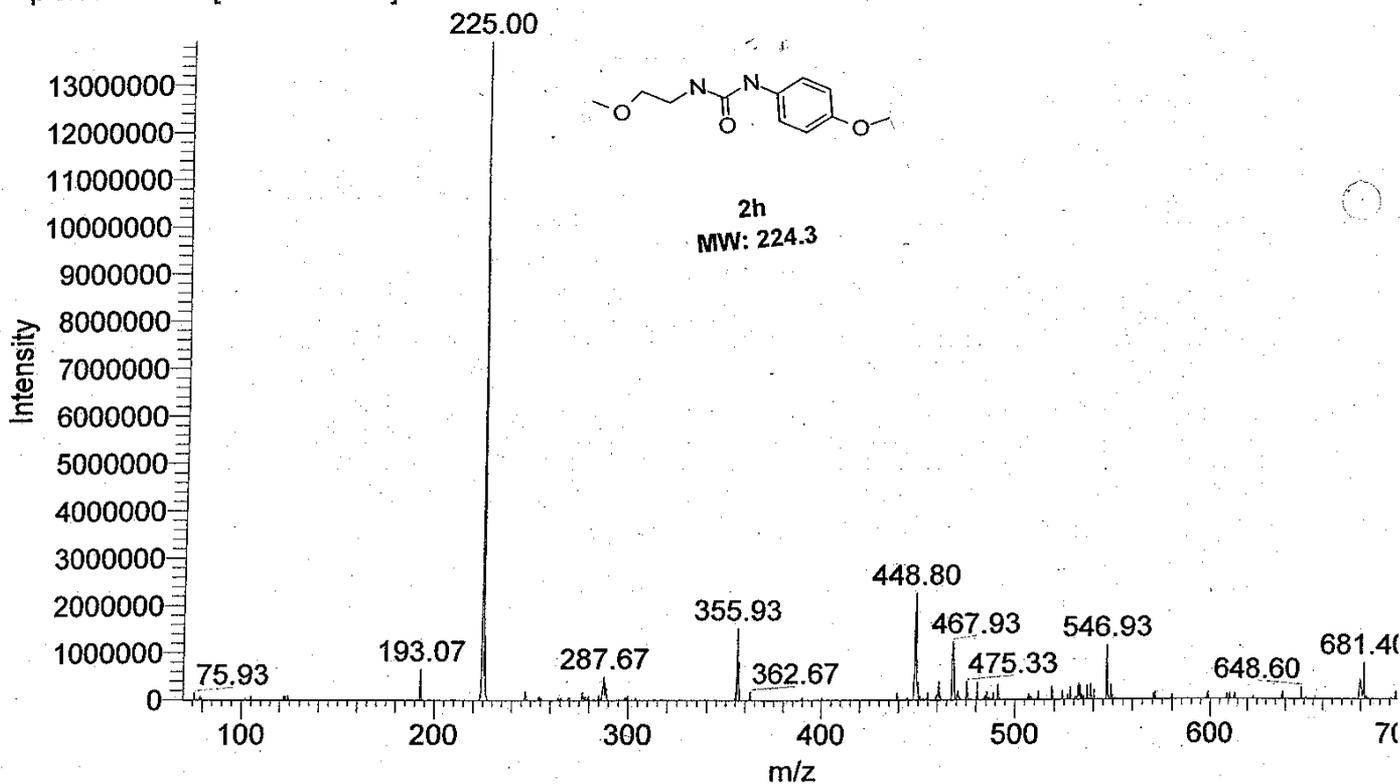


NL: 1.54E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11266MUKJP107101_180108_22



NL: 1.79E7
Base Peak m/z=
224.50-225.50 F: + p |
Full ms [70.00-700.00]
MS
11266MUKJP107101_180108_22

11266MUKJP107101_AI_180108_22 #163 RT: 1.57 AV: 1 SB: 255 0.06-2.41 SM: 11G NL: 1.39E7
F: + p ESI Full ms [70.00-700.00]

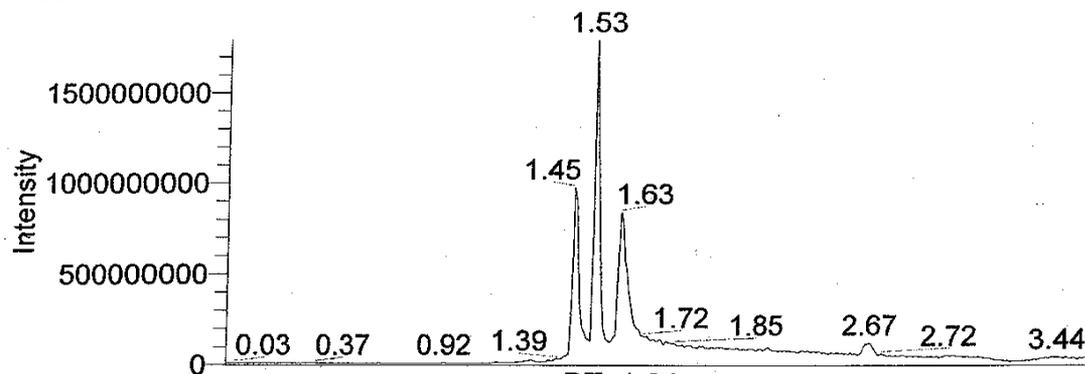


11266MUKJP108001_AI_180108_23
11266/MUKJP/108/001
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

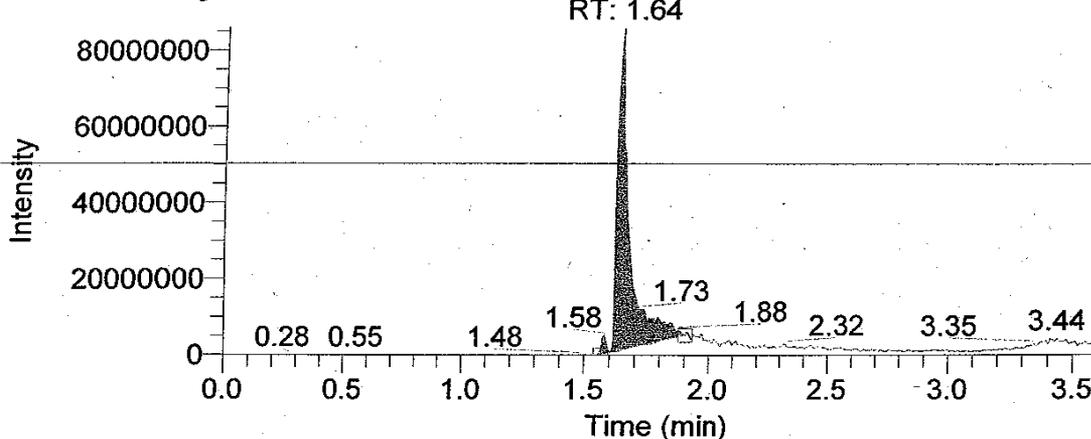
1/18/2008 12:28:07 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 3.59

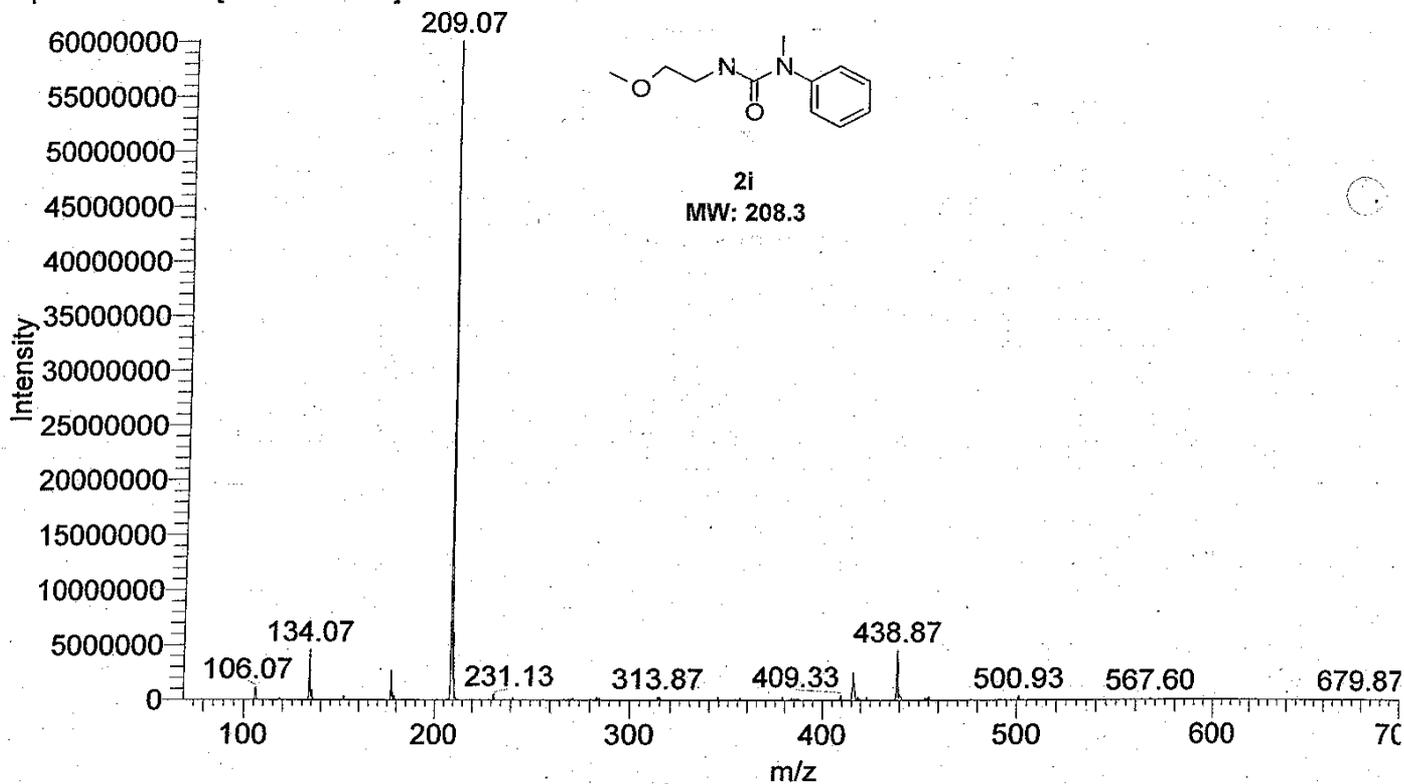


NL: 1.80E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11266MUKJP108001_180108_23

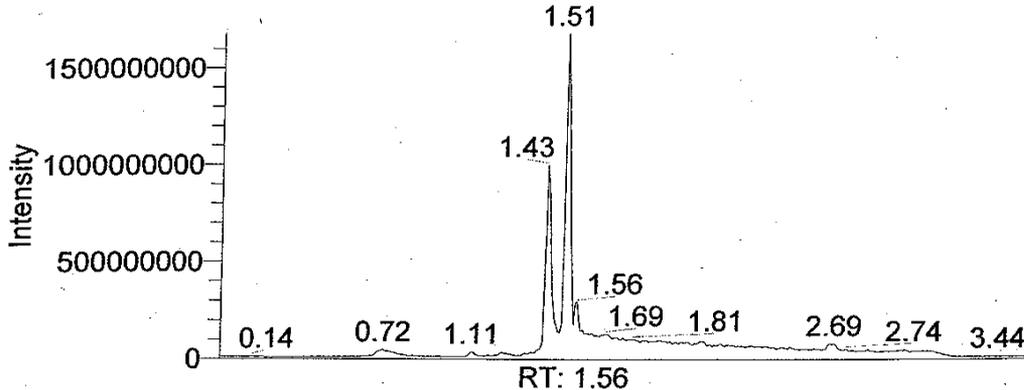


NL: 8.60E7
Base Peak m/z=
208.50-209.50 F: + p l
Full ms [70.00-700.00]
MS
11266MUKJP108001_180108_23

11266MUKJP108001_AI_180108_23 #171 RT: 1.63 AV: 1 SB: 255 0.07-2.41 SM: 11G NL: 6.01E7
F: + p ESI Full ms [70.00-700.00]



RT: 0.00 - 3.60

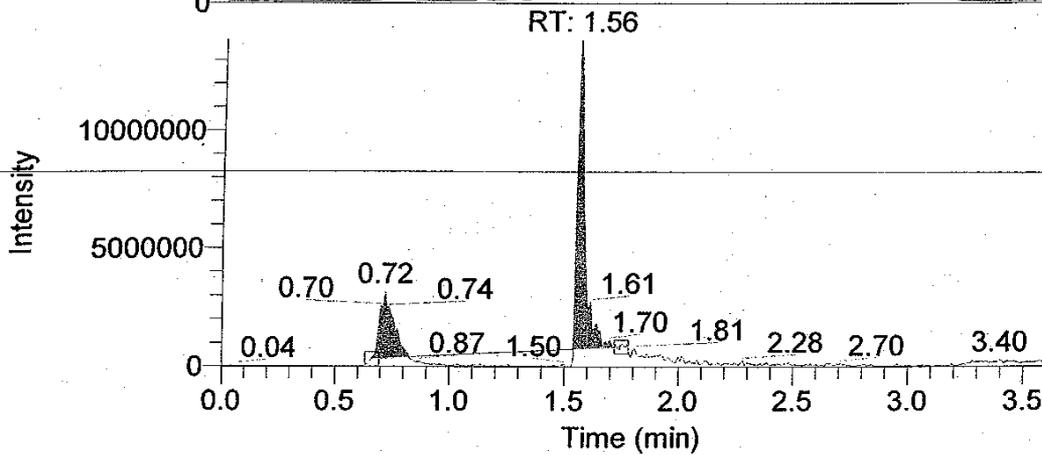


NL: 1.68E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11266MUKJP109001_AI_108_19



NL: 1.39E7

Base Peak m/z=

107.50-108.50+

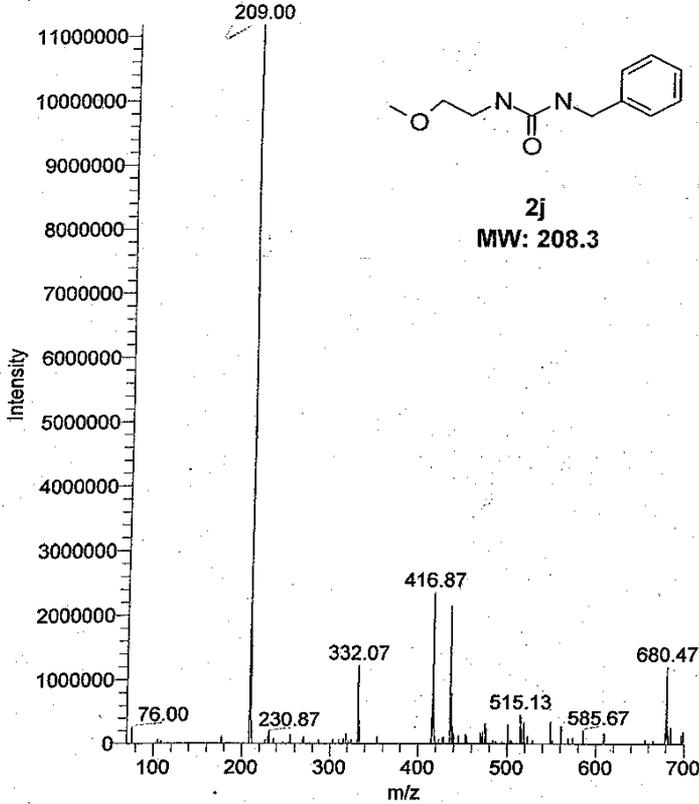
208.50-209.50 F: + p ESI

Full ms [70.00-700.00] M

11266MUKJP109001_AI_108_19

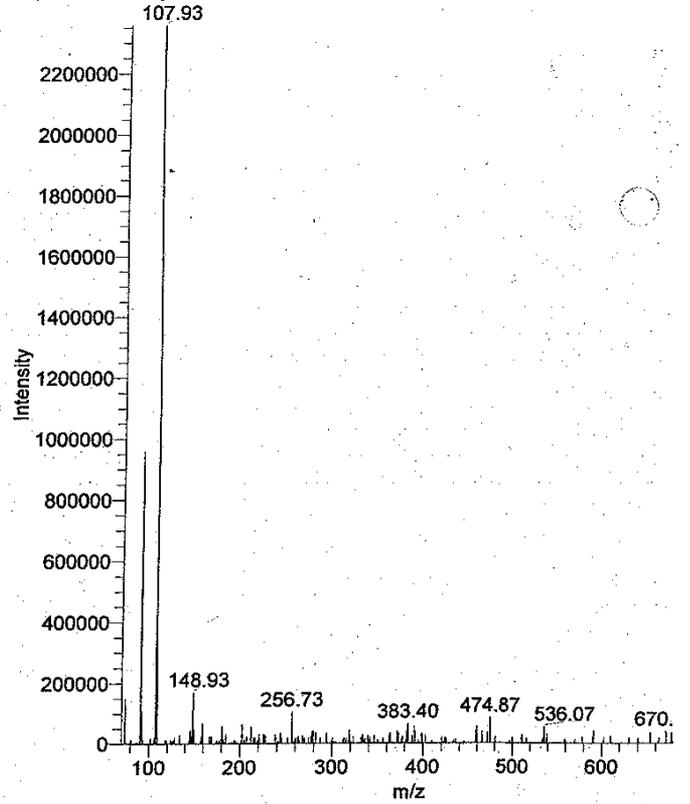
11266MUKJP109001_AI_150108_19 #164 RT: 1.56 AV: 1 SB: 383

F: + p ESI Full ms [70.00-700.00]



11266MUKJP109001_AI_150108_19 #73 RT: 0.71 AV: 1 SB: 377

T: + p ESI Full ms [70.00-700.00]

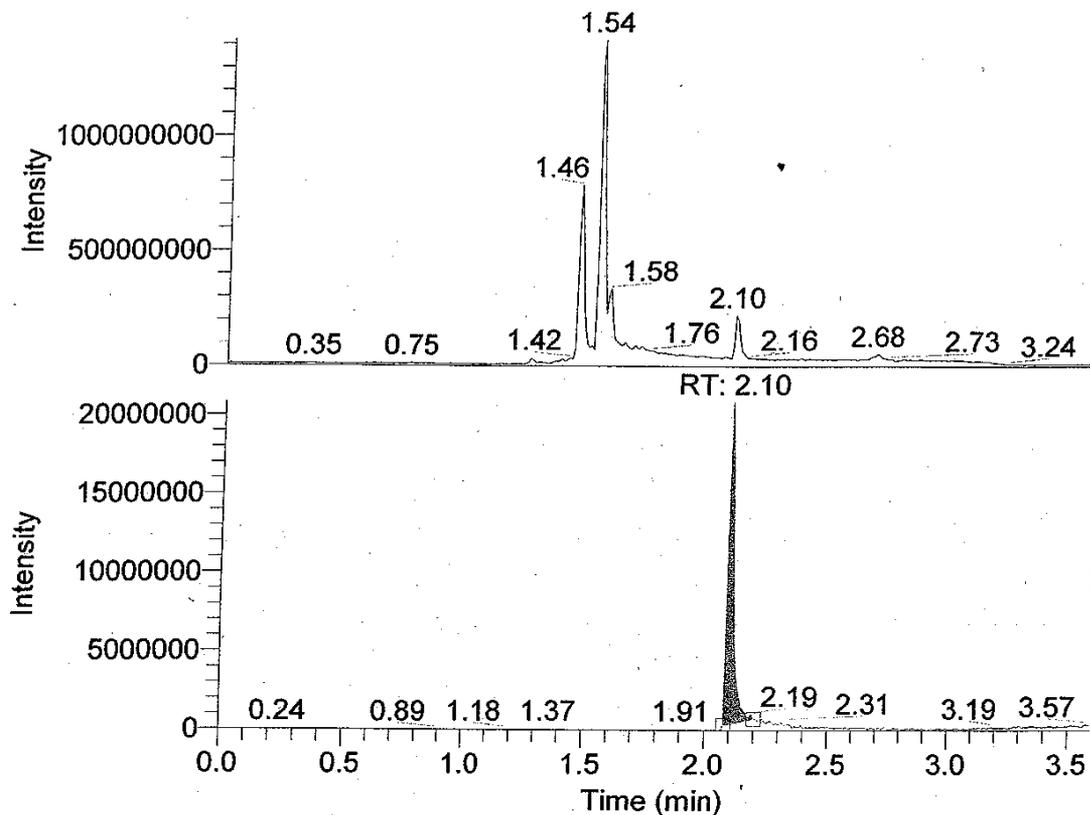


11246MUKJP181005_AI_240108_15
 11246/MUKJP/181/005
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/24/2008 11:46:34 AM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins-100%A

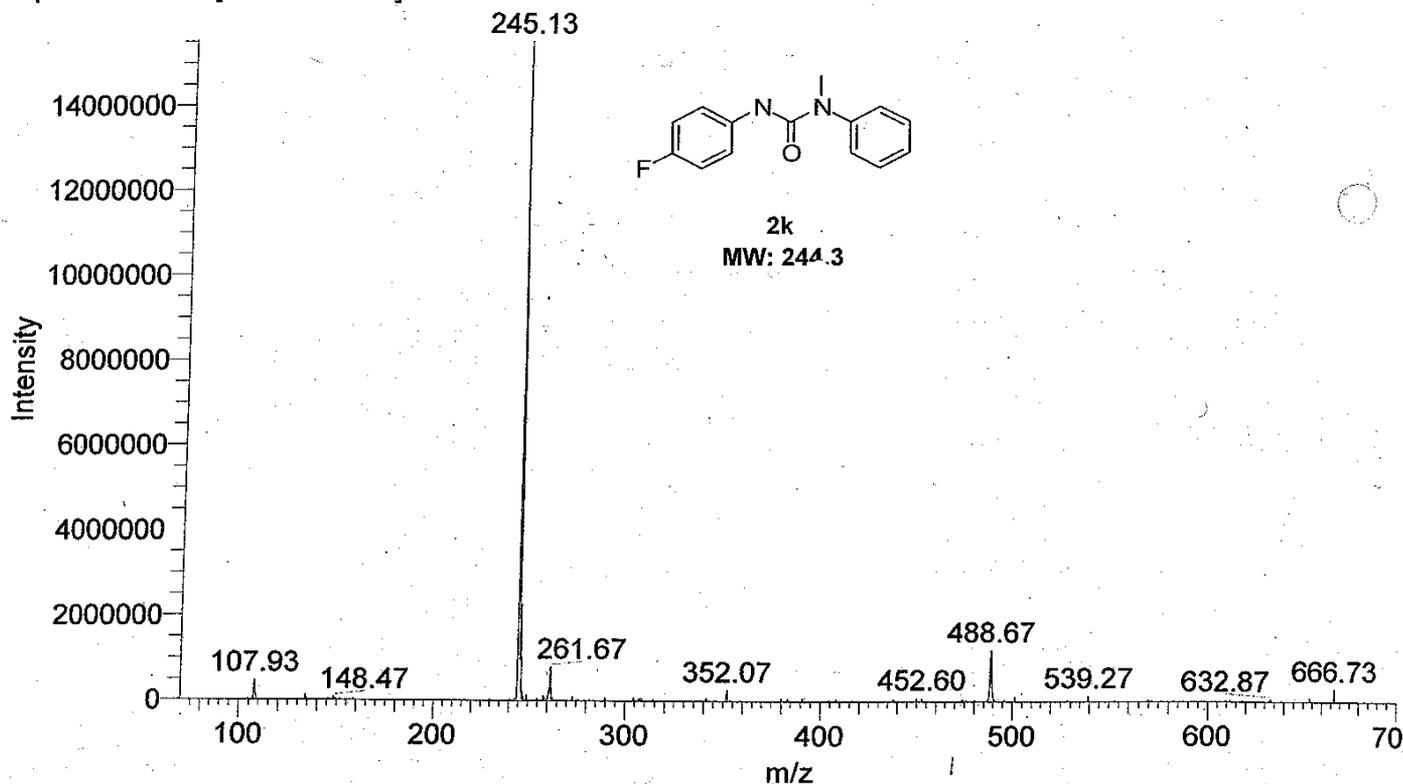
RT: 0.00 - 3.59



NL: 1.42E9
 TIC F: + p ESI Full ms
 [70.00-700.00] MS
 11246MUKJP181005_240108_15

NL: 2.08E7
 Base Peak m/z=
 244.50-245.50 F: + p l
 Full ms [70.00-700.00]
 MS
 11246MUKJP181005_240108_15

11246MUKJP181005_AI_240108_15 #222 RT: 2.10 AV: 1 SB: 251 0.06-2.41 SM: 11G NL: 1.55E7
 F: + p ESI Full ms [70.00-700.00]

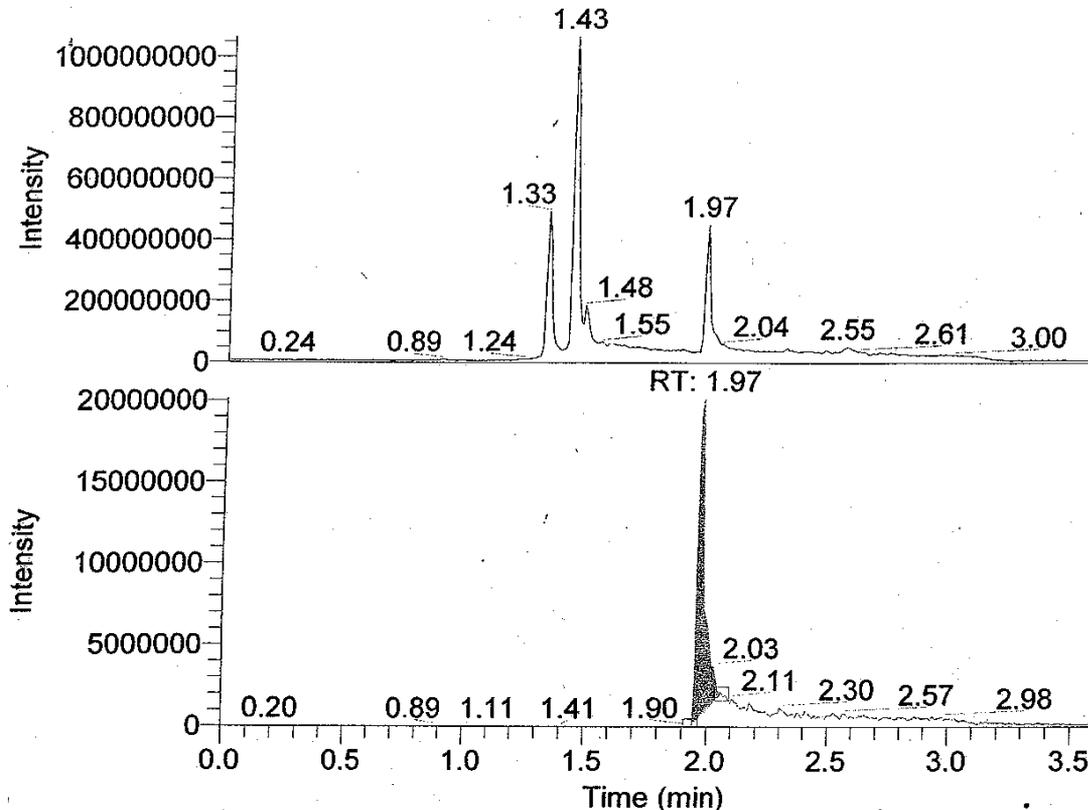


11246MUKJP181001_AI_250108_30
 11246/MUKJP/181/001
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/25/2008 3:30:23 PM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins - 100% A

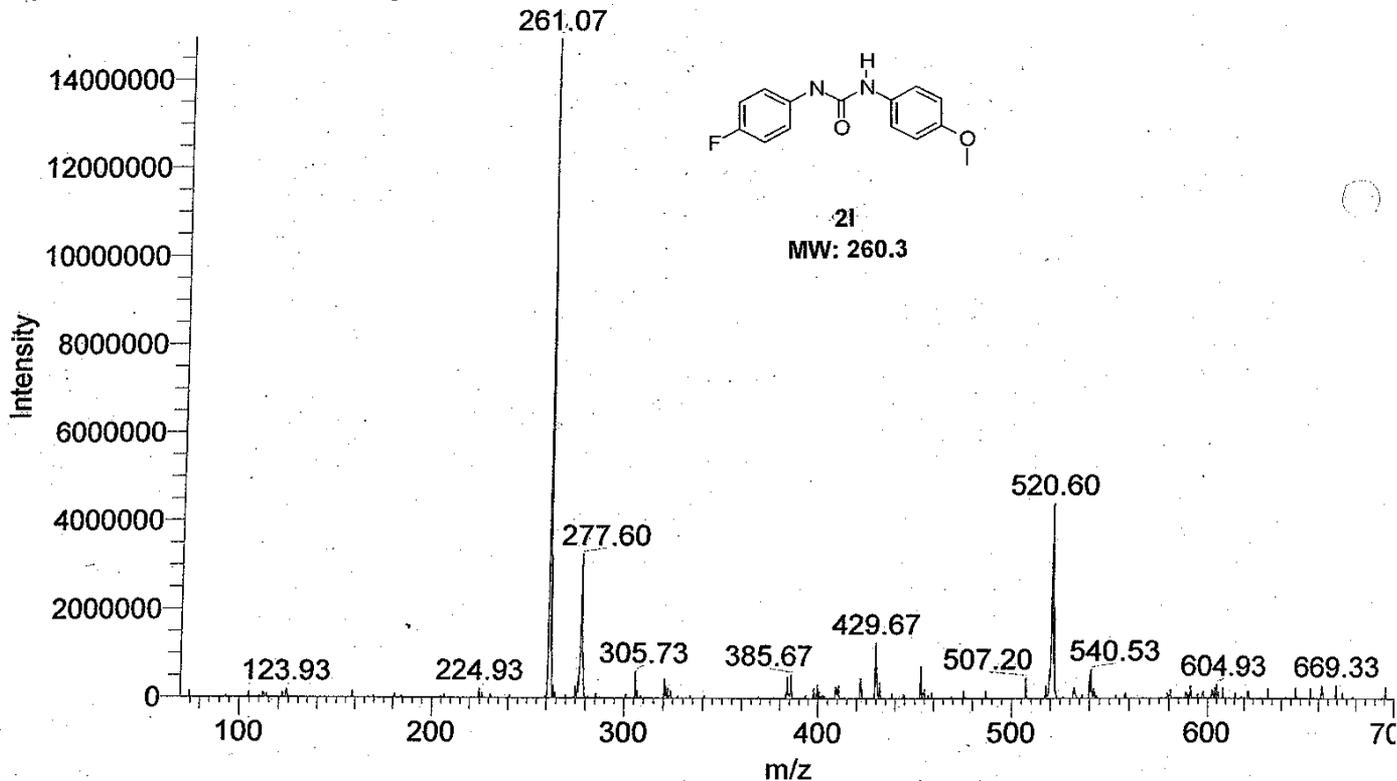
RT: 0.00 - 3.59



NL: 1.07E9
 TIC F: + p ESI Full m:
 [70.00-700.00] MS
 11246MUKJP181001_1
 250108_30

NL: 2.01E7
 Base Peak m/z=
 260.50-261.50 F: + p |
 Full ms [70.00-700.00]
 MS
 11246MUKJP181001_1
 250108_30

11246MUKJP181001_AI_250108_30 #208 RT: 1.97 AV: 1 SB: 375 0.02-1.71, 1.74-3.56 SM: 11G NL:
 F: + p ESI Full ms [70.00-700.00]



11246MUKJP181003_AI_250108_31

11246/MUKJP/181/003

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/25/2008 3:34:49 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

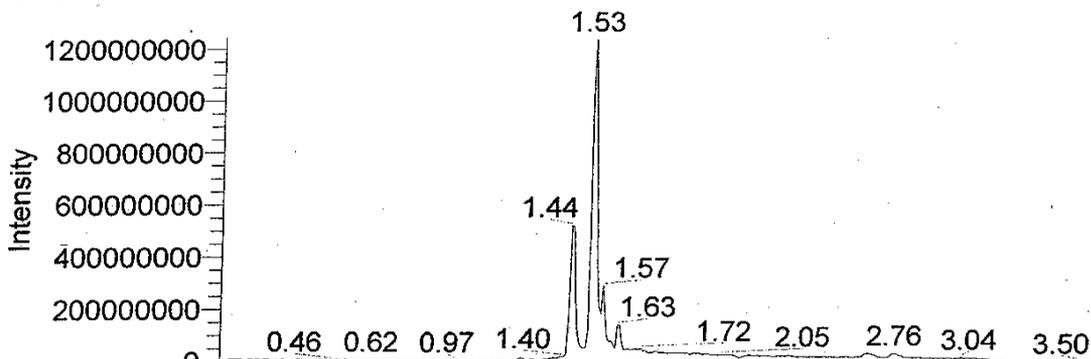
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.60



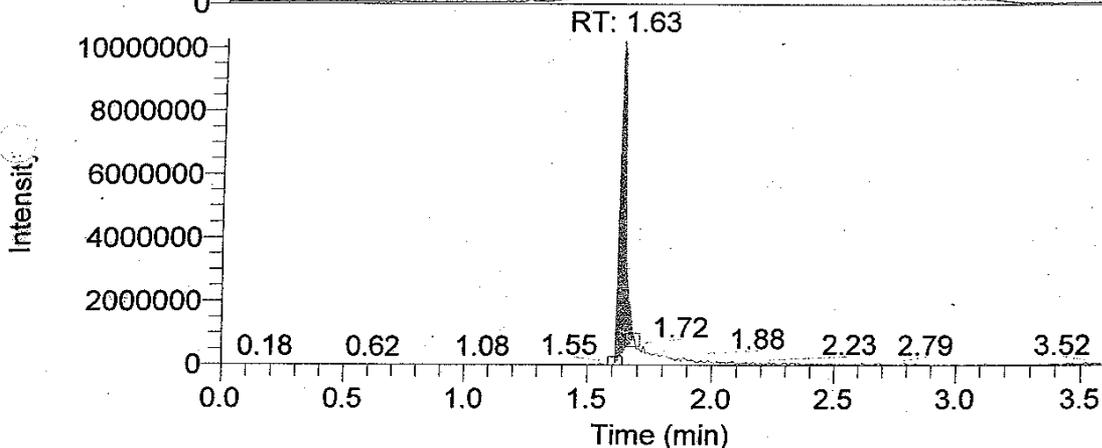
NL: 1.24E9

TIC F: + p ESI Full m

[70.00-700.00] MS

11246MUKJP181003

_250108_31



NL: 1.03E7

Base Peak m/z=

212.50-213.50 F: + p

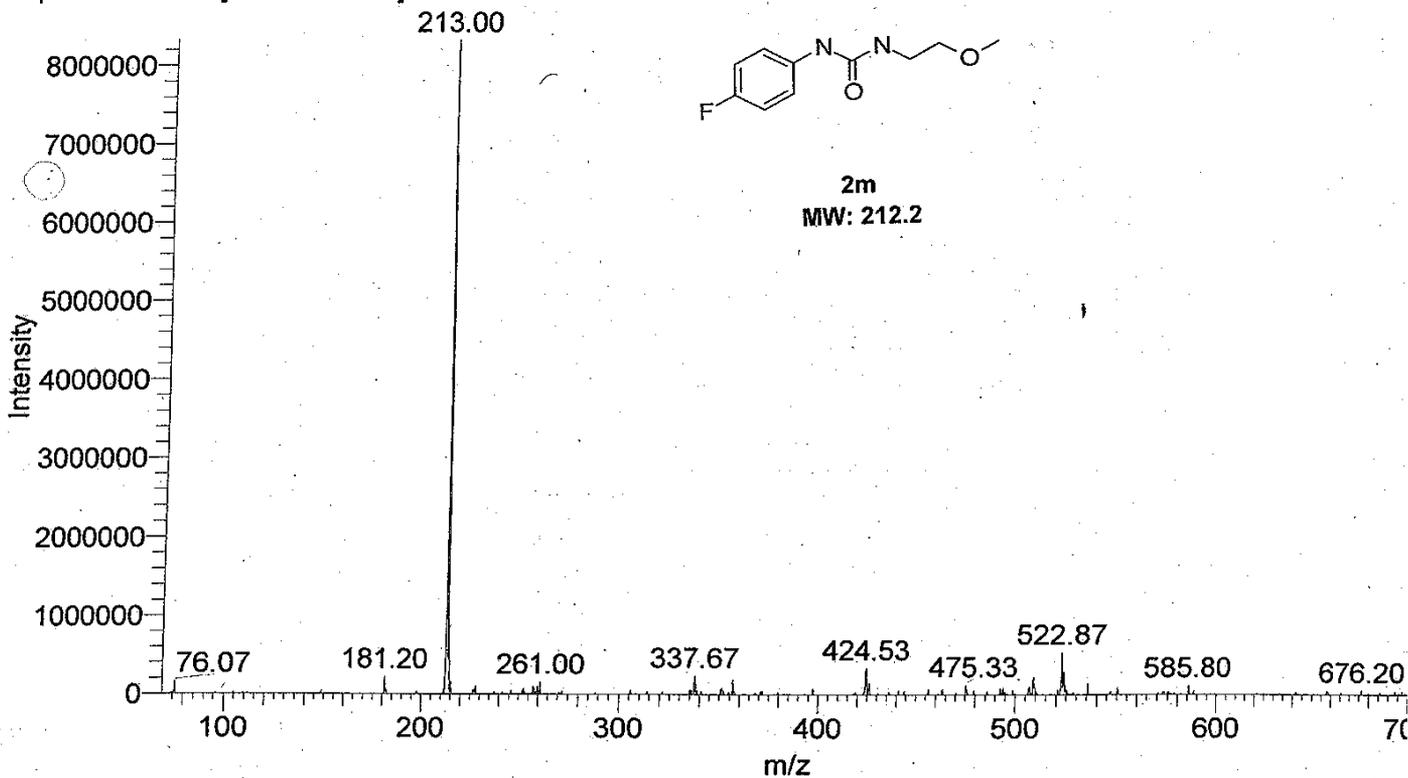
Full ms [70.00-700.00

MS

11246MUKJP181003

_250108_31

11246MUKJP181003_AI_250108_31 #169 RT: 1.63 AV: 1 SB: 177 0.02-1.71 SM: 11G NL: 8.33E6 F: + p ESI Full ms [70.00-700.00]

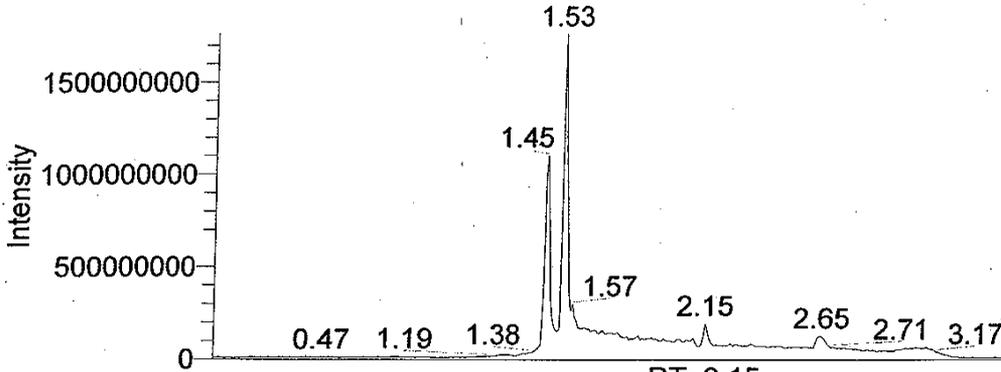


11246MUKJP180006_AI_230108_27
 11246/MUKJP/180/006
 Mobile Phase:
 Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
 Mobile Phase B: 90% ACN with 5 mM AA buffer
 Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/23/2008 1:53:22 PM
 Initial composition: 100: 0
 Run time: 3.6 mins
 Flow rate: 613 ul/min

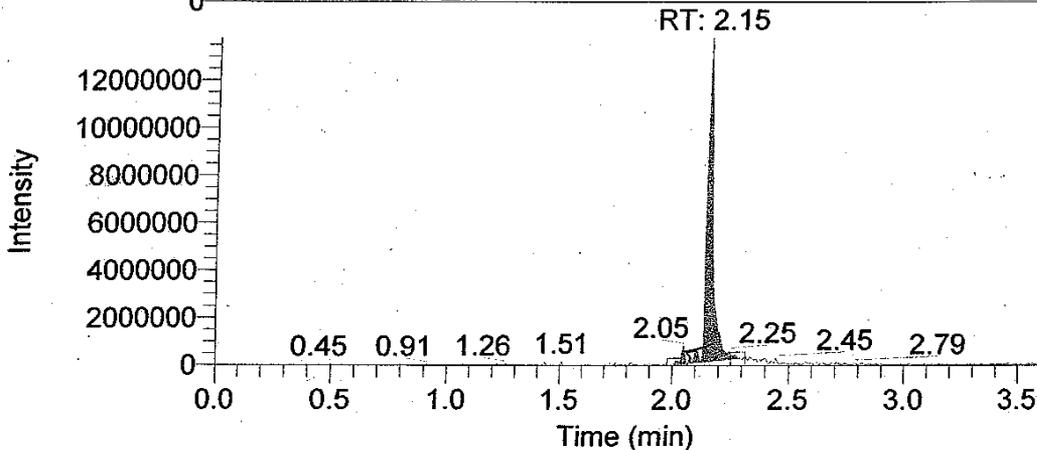
Gradient conditions:
 0 mins - 100% A
 0.2 mins - 100% A
 2.25 mins - 100% B
 2.50 mins - 100% B
 2.6 mins - 100% A
 3.6 mins - 100% A

RT: 0.00 - 3.60



NL: 1.77E9

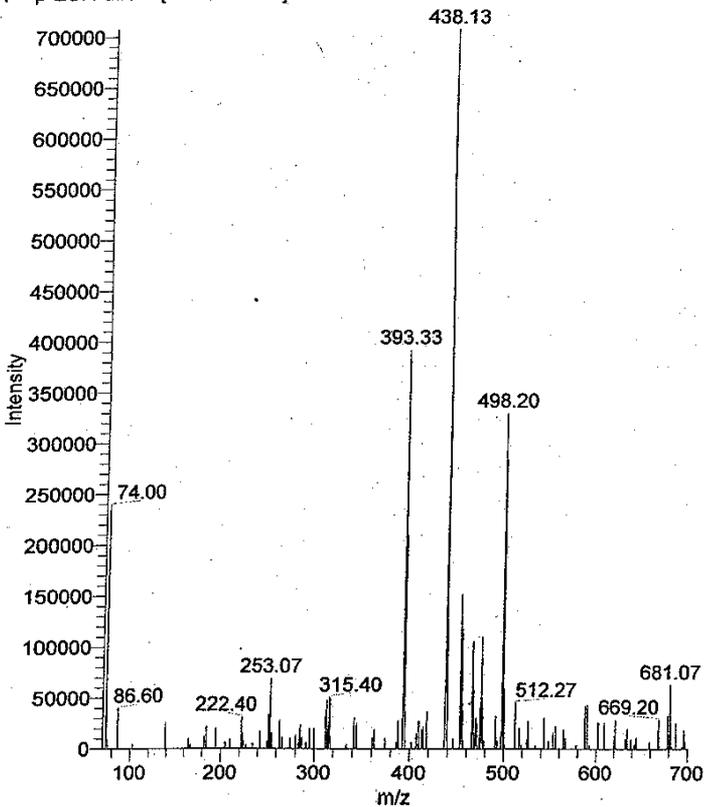
TIC F: + p ESI Full ms
 [70.00-700.00] MS
 11246MUKJP180006_AI_108_27



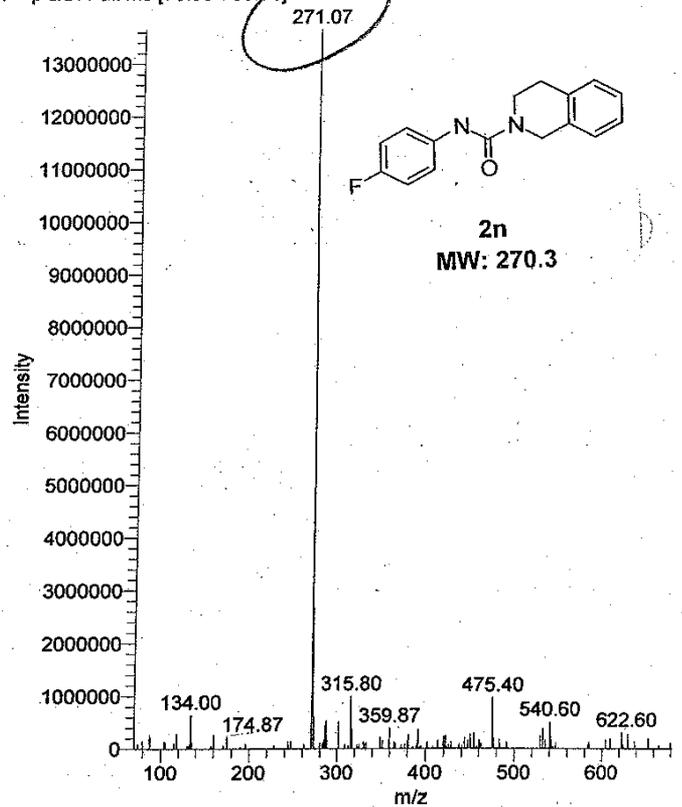
NL: 1.38E7

Base Peak m/z=
 270.50-271.50+
 392.50-393.50 F: + p ESI
 Full ms [70.00-700.00] M
 11246MUKJP180006_AI_108_27

11246MUKJP180006_AI_230108_27 #227 RT: 2.11 AV: 1 SB: 175 0.07-1.73
 F: + p ESI Full.ms [70.00-700.00]



11246MUKJP180006_AI_230108_27 #232 RT: 2.15 AV: 1 SB: 384
 T: + p ESI Full.ms [70.00-700.00]



11227MUKJP240001_AI_180108_09

11227/MUKJP/240/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/18/2008 10:24:24 AM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

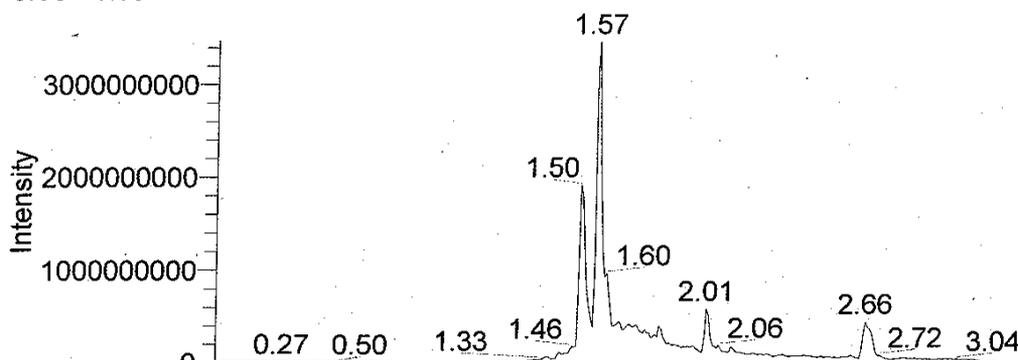
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.59



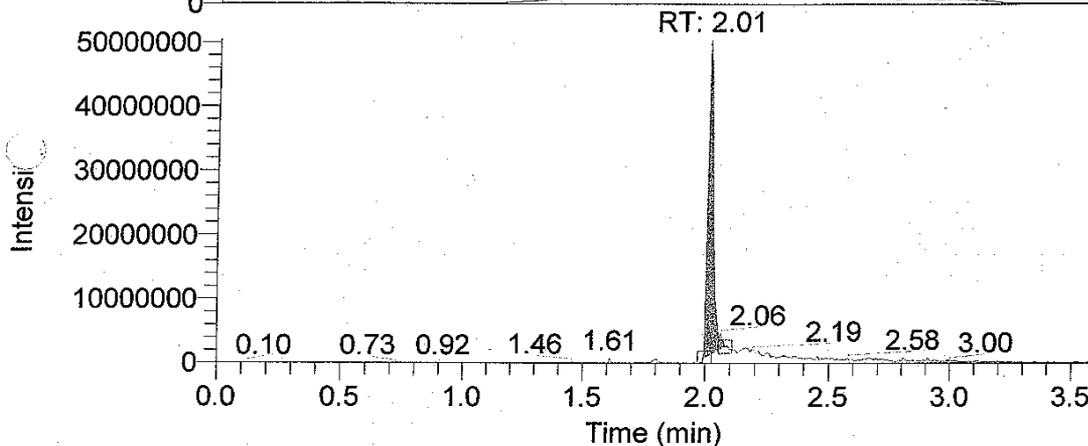
NL: 3.47E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11227MUKJP240001_

_180108_09



NL: 5.04E7

Base Peak m/z=

312.50-313.50 F: + p E

Full ms [70.00-700.00]

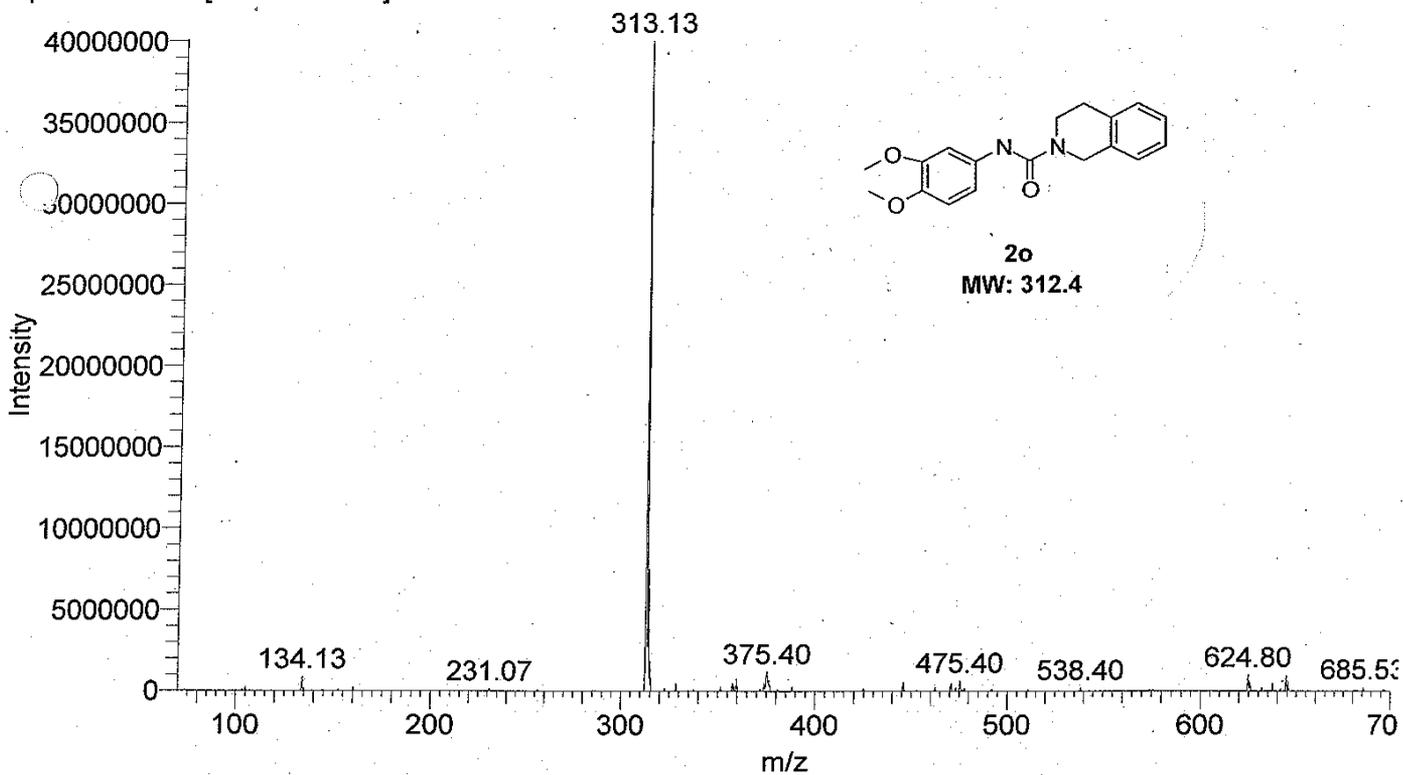
MS

11227MUKJP240001_

_180108_09

11227MUKJP240001_AI_180108_09 #218 RT: 2.01 AV: 1 SB: 171 0.03-1.65 SM: 11G NL: 4.01E7

T: + p ESI Full ms [70.00-700.00]



11227MUKJP240004_AI_170108_20

11227/MUKJP/240/004

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/17/2008 12:52:18 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

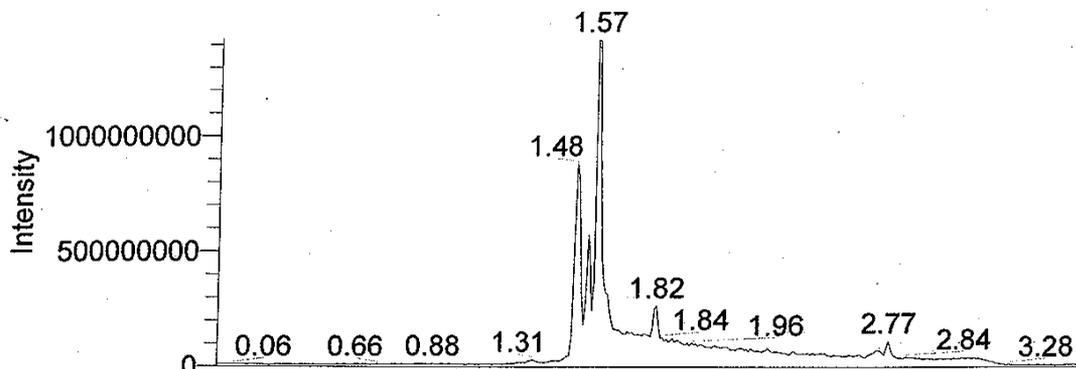
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.59



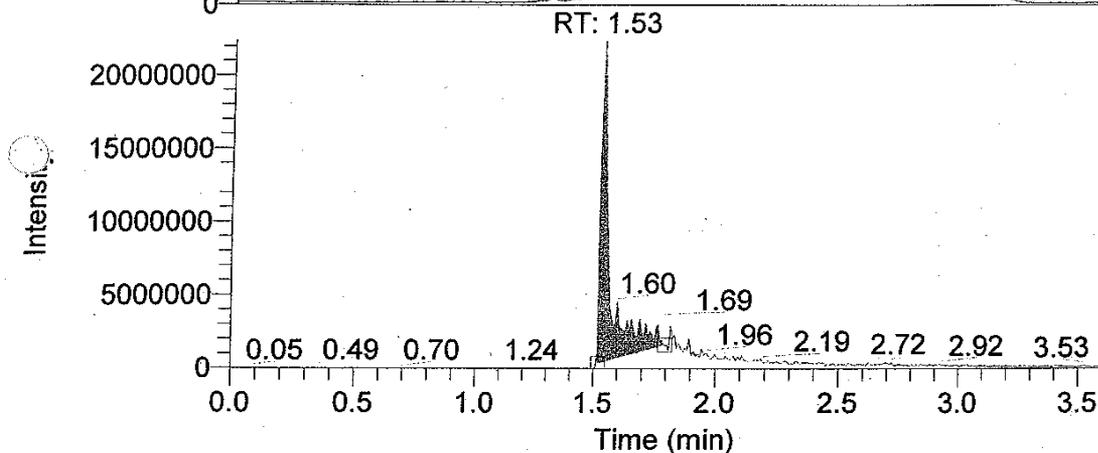
NL: 1.42E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11227MUKJP240004_

170108_20



NL: 2.24E7

Base Peak m/z=

254.50-255.50 F: + p |

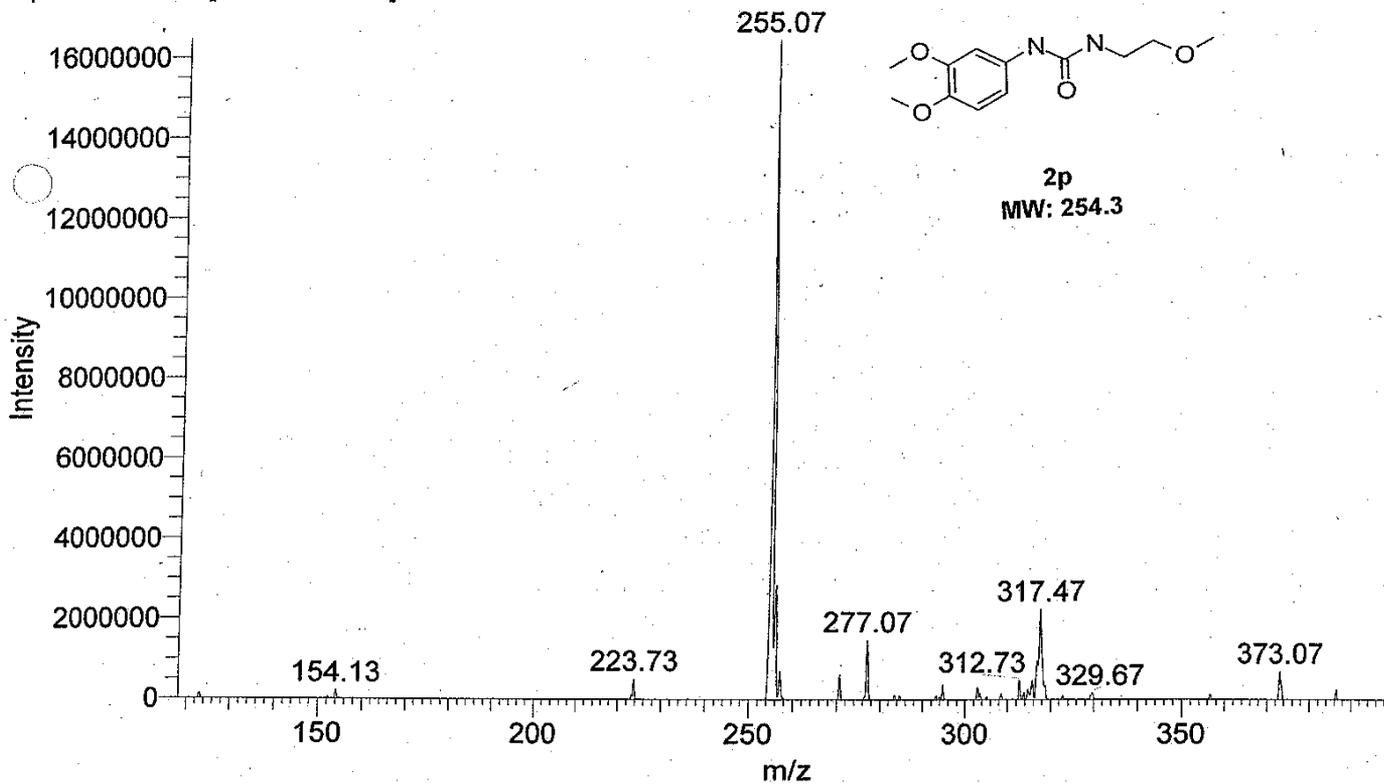
Full ms [70.00-700.00]

MS

11227MUKJP240004_

170108_20

11227MUKJP240004_AI_170108_20 #158 RT: 1.53 AV: 1 SB: 258 0.07-2.45 SM: 11G NL: 1.65E7
F: + p ESI Full ms [70.00-700.00]

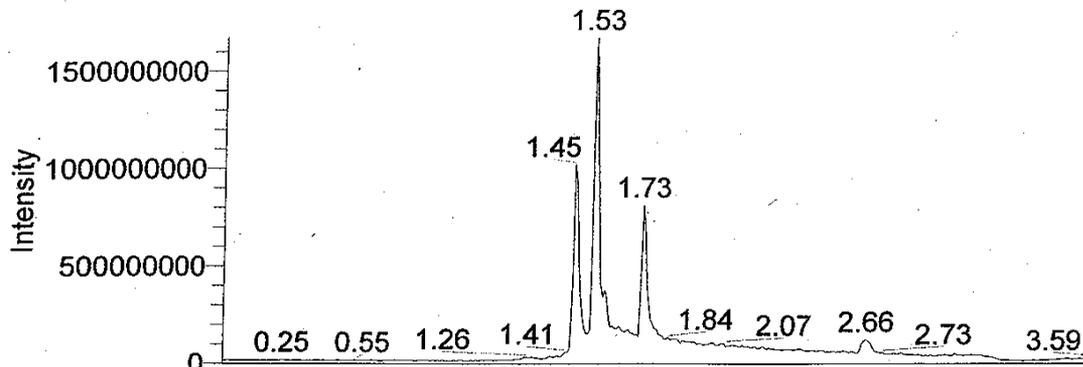


11266MUKJP110001_AI_180108_25
11266/MUKJP/110/001
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

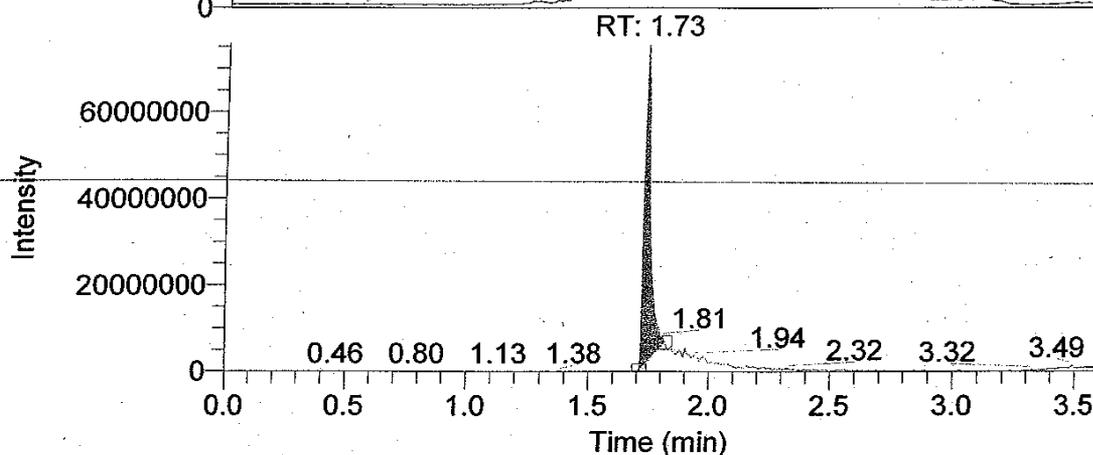
1/18/2008 12:36:54 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 3.60

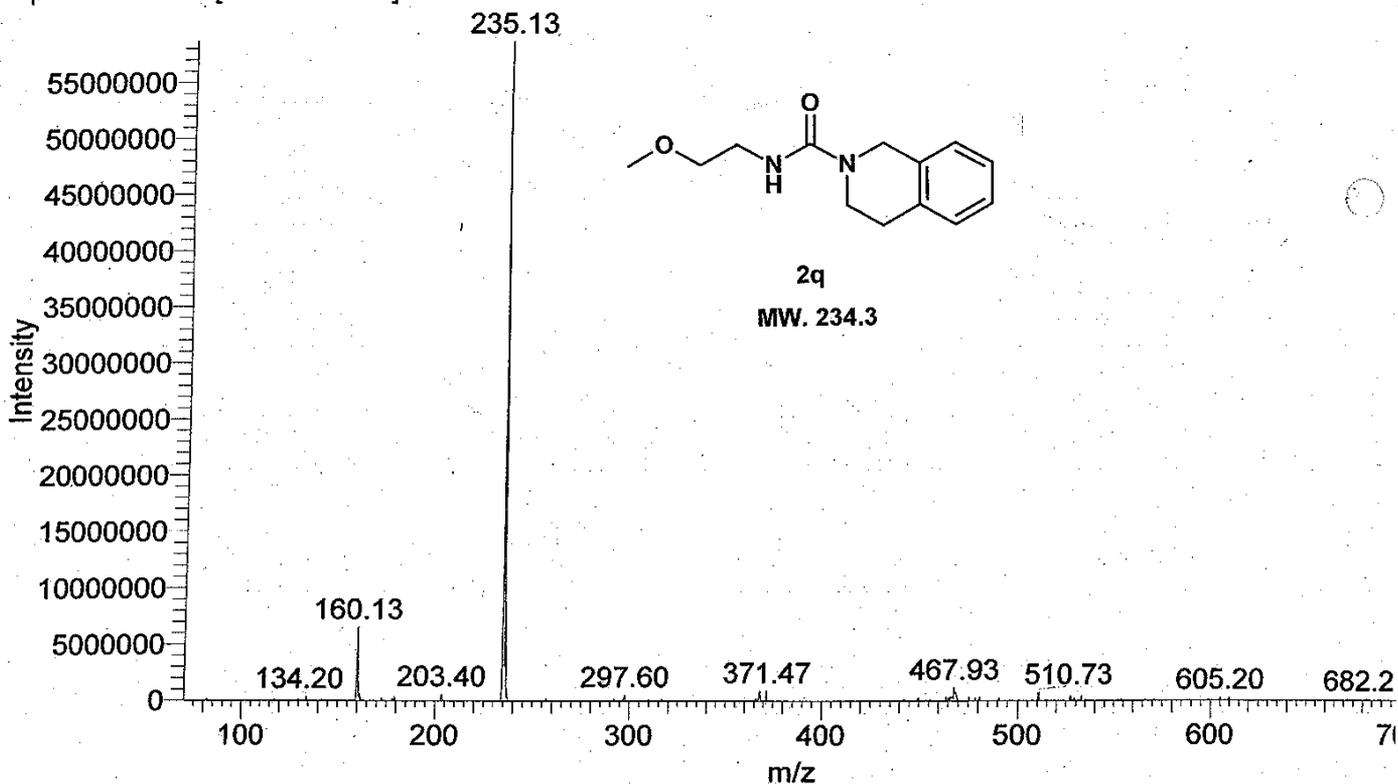


NL: 1.67E9
TIC F: + p ESI Full m:
[70.00-700.00] MS
11266MUKJP110001
180108_25



NL: 7.56E7
Base Peak m/z=
234.50-235.50 F: + p
Full ms [70.00-700.00]
MS
11266MUKJP110001
180108_25

[11266MUKJP110001_AI_180108_25 #184 RT: 1.73 AV: 1 SB: 257 0.06-2.41 SM: 11G NL: 5.87E7
F: + p ESI Full ms [70.00-700.00]

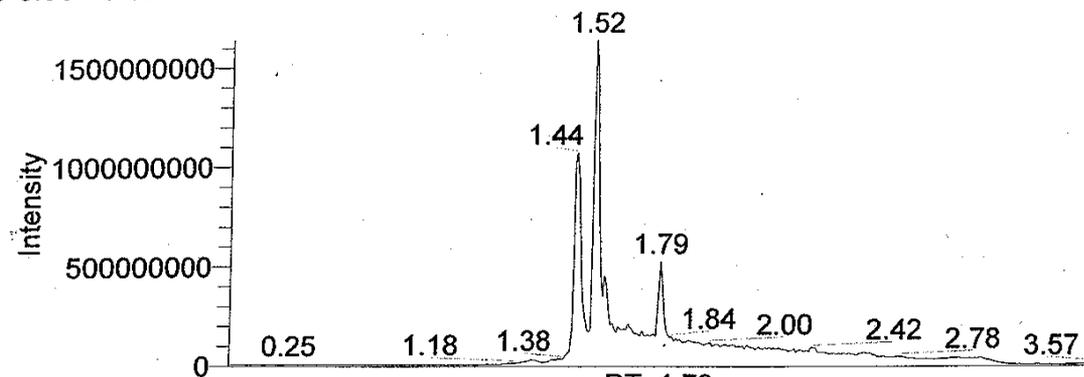


10733MUKJP242101_AI_110208_28
10733/MUKJP/242/101
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

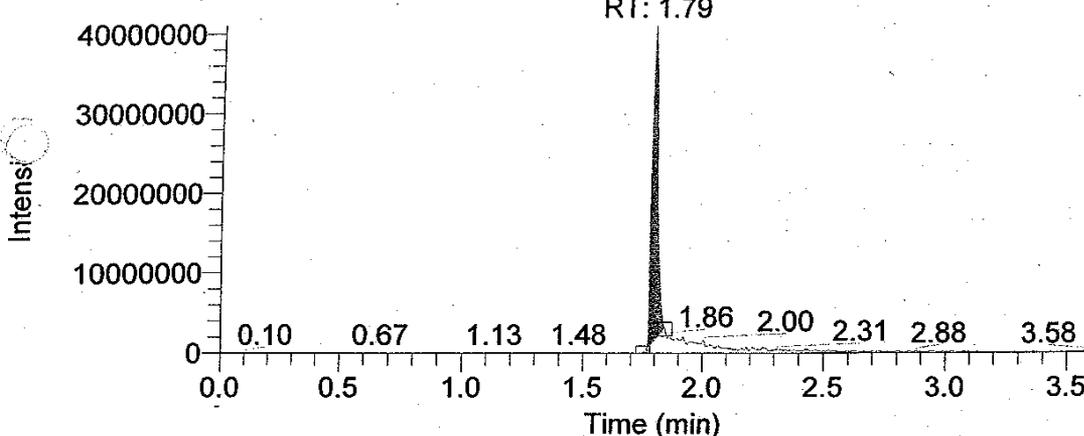
2/11/2008 4:30:37 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins-100%A

RT: 0.00 - 3.59

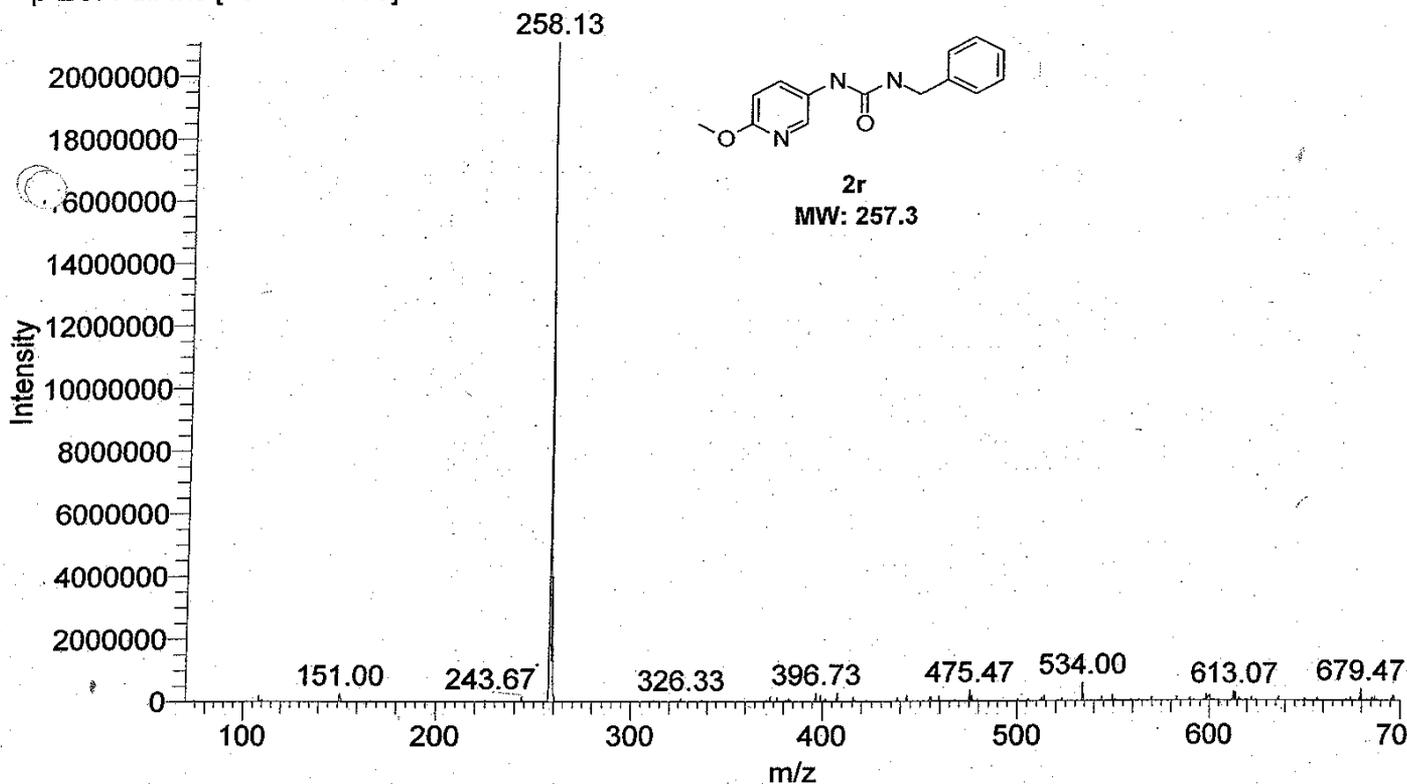


NL: 1.64E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
10733MUKJP242101_110208_28



NL: 4.11E7
Base Peak m/z=
257.50-258.50 F: + p E
Full ms [70.00-700.00]
MS
10733MUKJP242101_110208_28

10733MUKJP242101_AI_110208_28 #189 RT: 1.78 AV: 1 SB: 311 0.01-1.99, 2.02-2.86 SM: 11G NL: F: + p ESI Full ms [70.00-700.00]



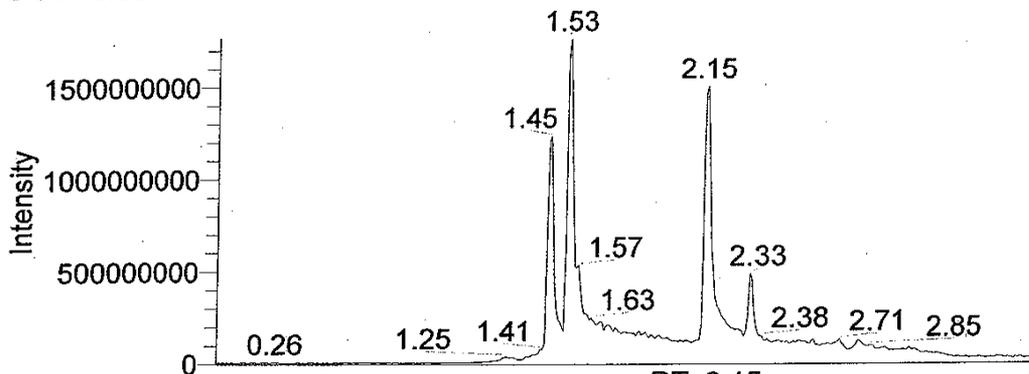
11272MUKJP080101_AI_120308_03
11272/MUKJP/080/101

Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

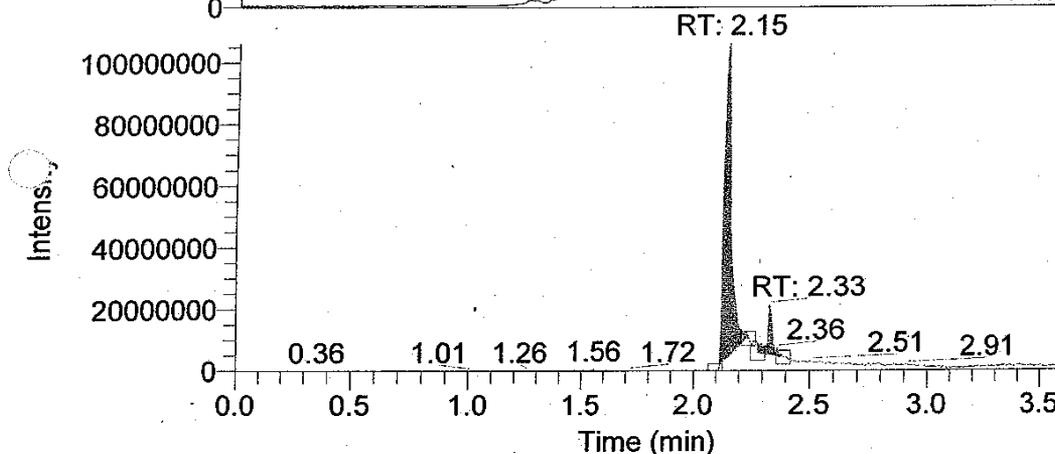
3/12/2008 9:45:44 AM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 3.60

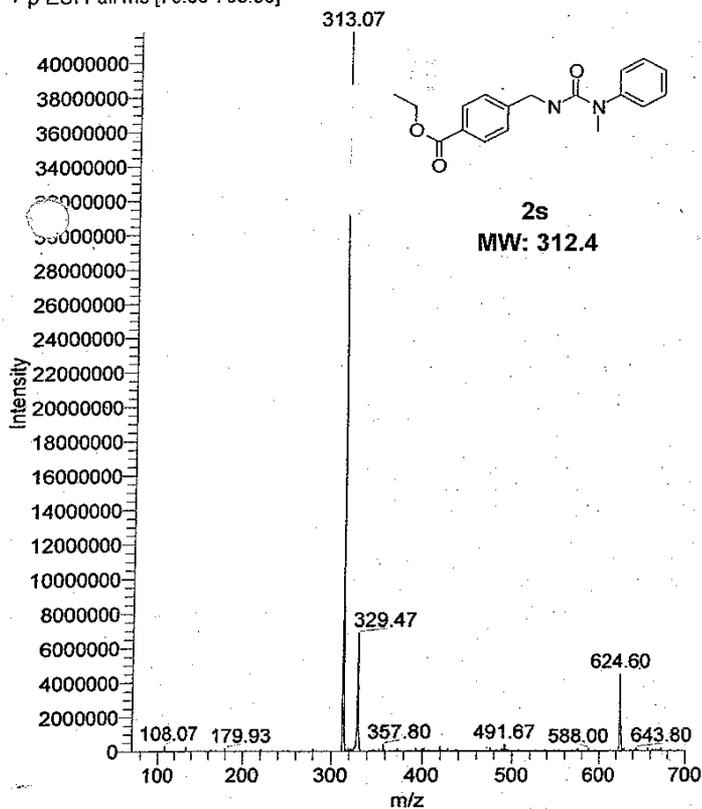


NL: 1.77E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11272MUKJP080101_AI_308_03

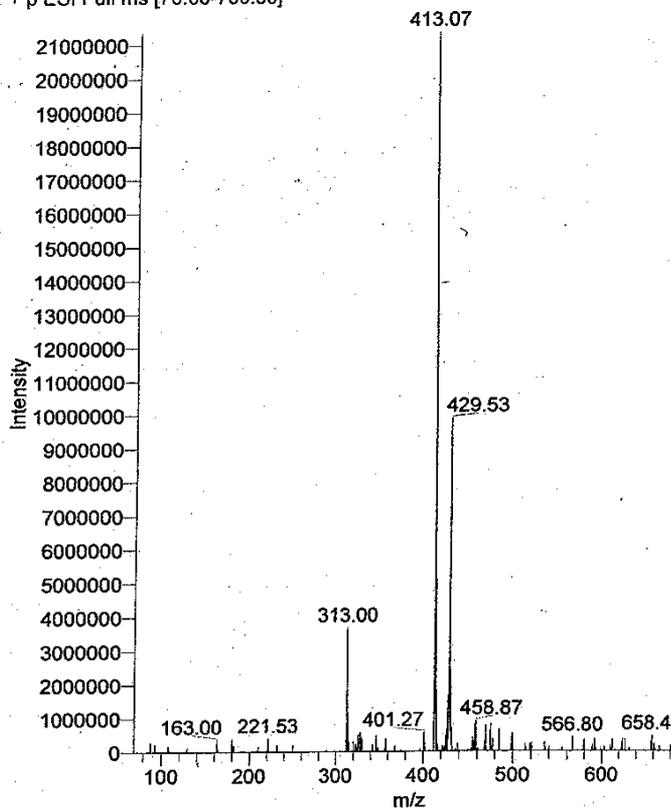


NL: 1.06E8
Base Peak m/z=
312.50-313.50+
412.50-413.50 F: + p ESI
Full ms [70.00-700.00] M:
11272MUKJP080101_AI_308_03

11272MUKJP080101_AI_120308_03 #229-236 RT: 2.11-2.17 AV: 8 SB: 396
F: + p ESI Full ms [70.00-700.00]



11272MUKJP080101_AI_120308_03 #255 RT: 2.33 AV: 1 SB: 392
T: + p ESI Full ms [70.00-700.00]



11272MUKJP084101_AI_130308_38

11272/MUKJP/084/101

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

3/13/2008 3:46:02 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

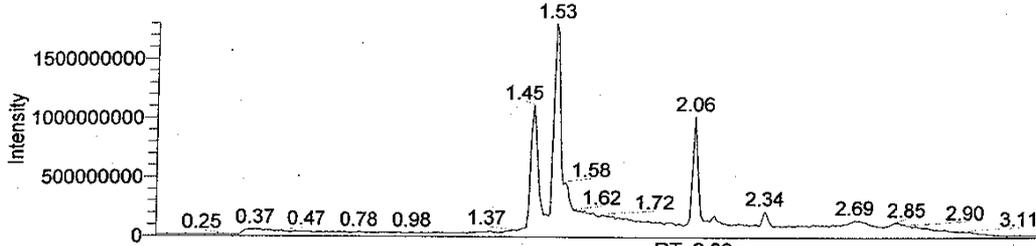
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

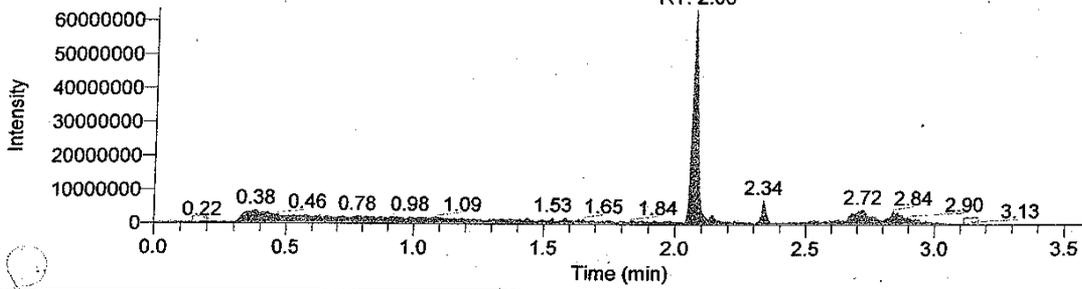
3.6 mins-100%A

RT: 0.00 - 3.59



NL: 1.80E9

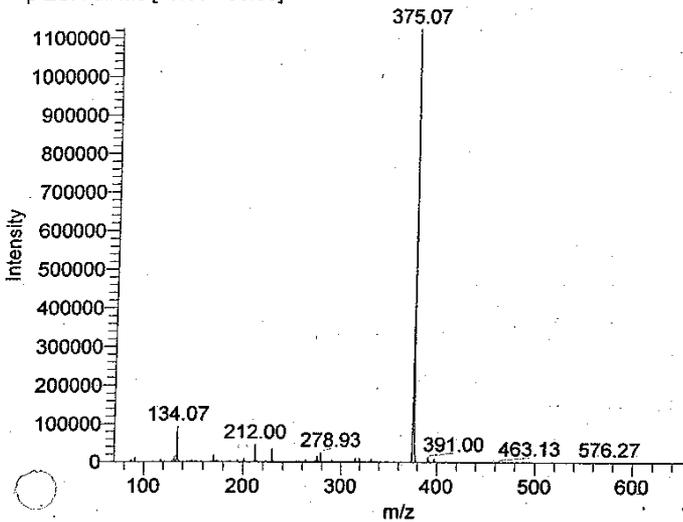
TIC F: + p ESI Full ms [70.00-700.00]
11272MUKJP084101_AI_130308_38



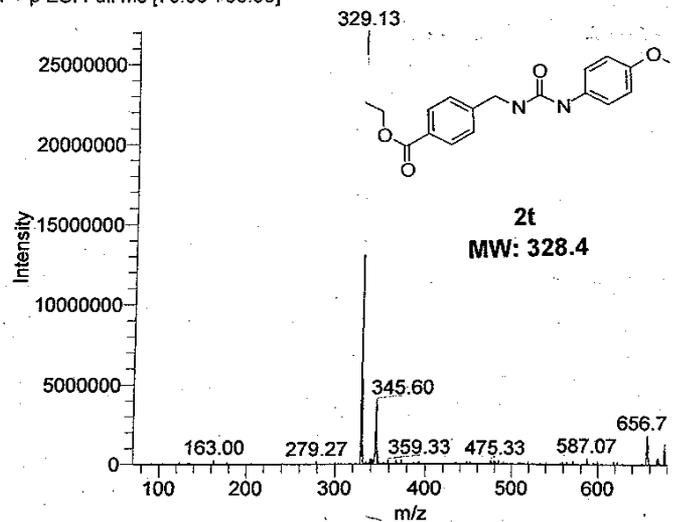
NL: 6.35E7

Base Peak m/z=
328.50-329.50+374.50-375.50+
400.50-401.50+412.50-413.50+
562.50-563.50 F: + p ESI Full ms
[70.00-700.00] MS
11272MUKJP084101_AI_130308_38

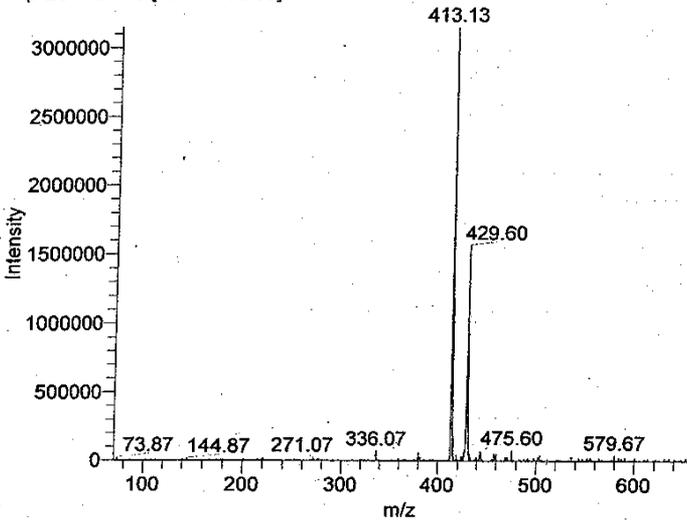
11272MUKJP084101_AI_130308_38 #31-56 RT: 0.30-0.53 AV: 26 SB: 263
F: + p ESI Full ms [70.00-700.00]



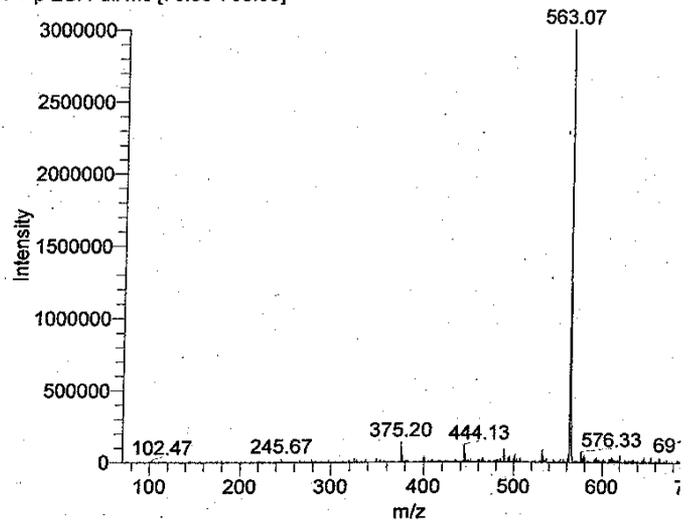
11272MUKJP084101_AI_130308_38 #226-231 RT: 2.04-2.08 AV: 6 SB: 6
T: + p ESI Full ms [70.00-700.00]



11272MUKJP084101_AI_130308_38 #259-262 RT: 2.32-2.34 AV: 4 SB: 263
F: + p ESI Full ms [70.00-700.00]



11272MUKJP084101_AI_130308_38 #301-311 RT: 2.68-2.76 AV: 11 SB: 11
T: + p ESI Full ms [70.00-700.00]



10733MUKJP218101_AI_210108_08

10733/MUKJP/218/101

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/21/2008 10:53:04 AM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

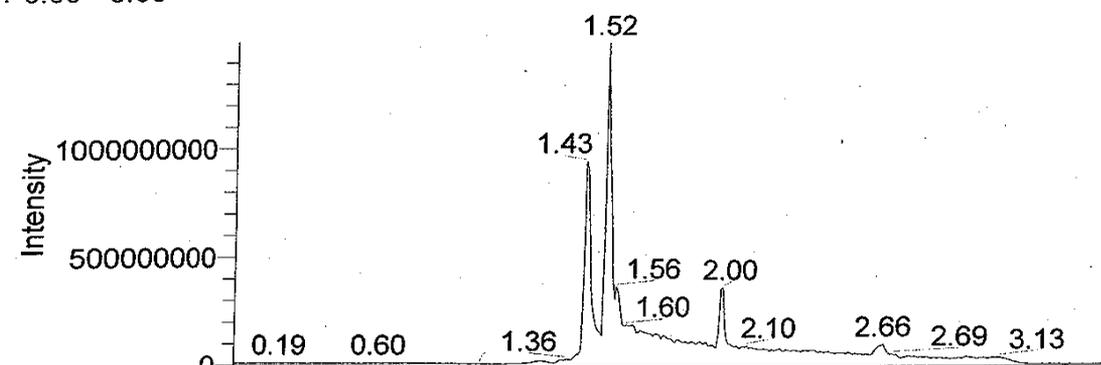
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.60



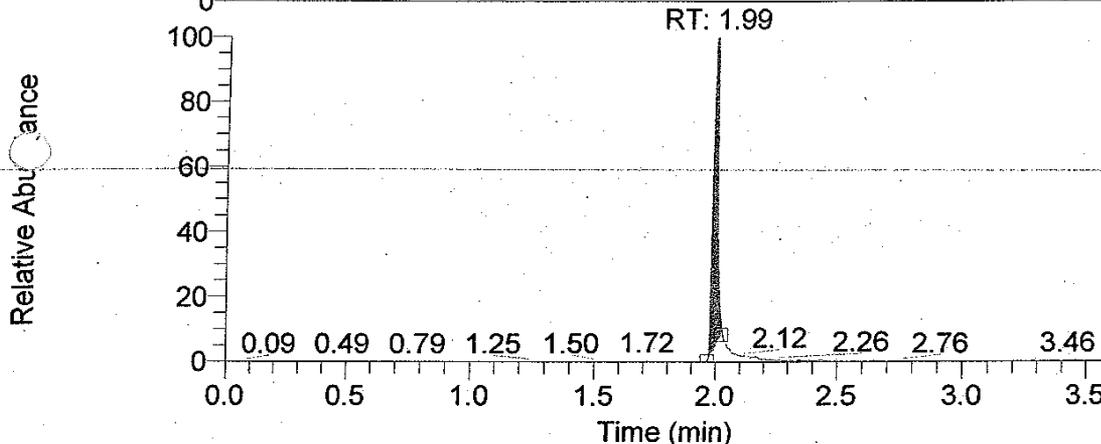
NL: 1.50E9

TIC F: + p ESI Full m

[70.00-700.00] MS

10733MUKJP218101

_210108_08



NL: 3.79E7

Base Peak m/z=

274.50-275.50 F: + p

Full ms [70.00-700.00

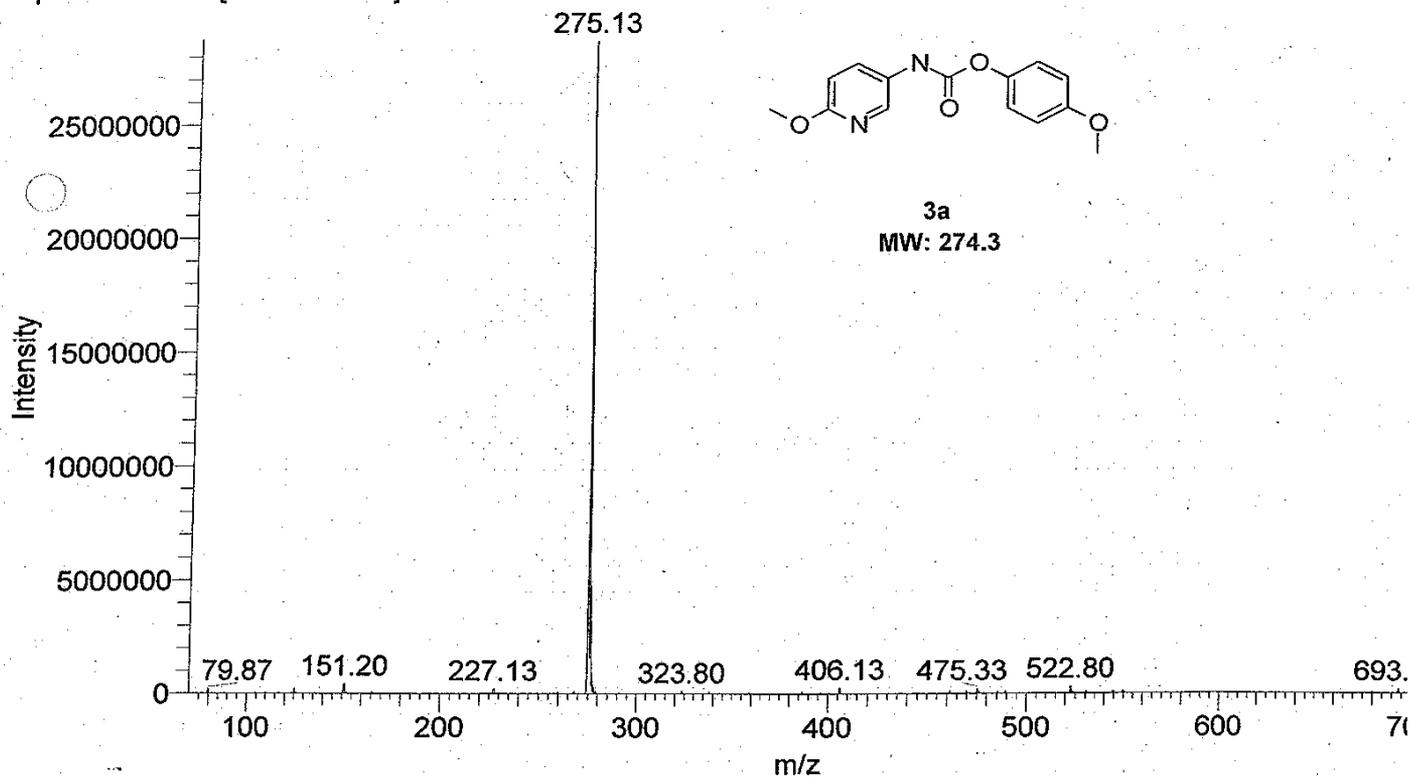
MS

10733MUKJP218101

_210108_08

0733MUKJP218101_AI_210108_08 #213 RT: 1.99 AV: 1 SB: 218 0.10-2.12 SM: 11G NL: 2.87E7

: + p ESI Full ms [70.00-700.00]



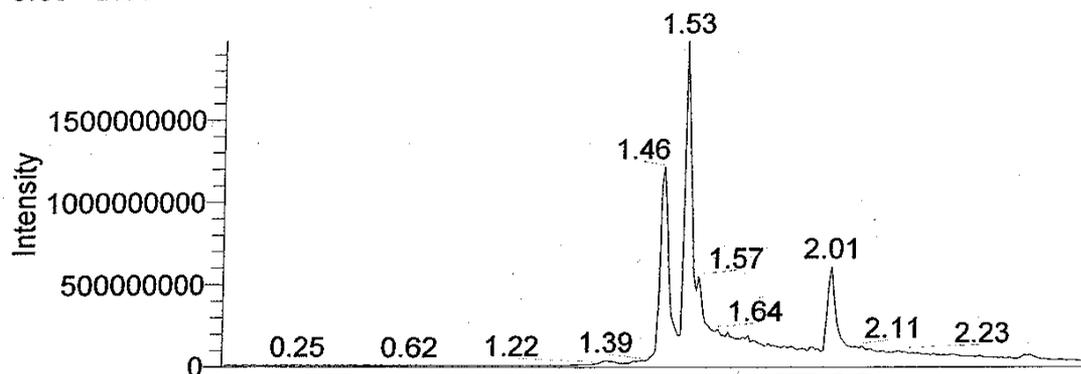
10733MUKJP243001_AI_110208_27
10733/MUKJP/243/001

Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

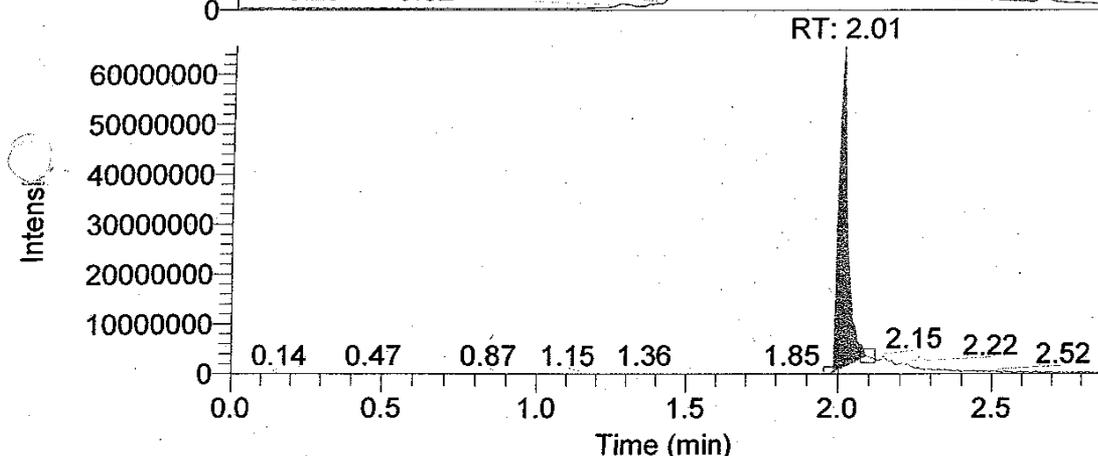
2/11/2008 4:26:11 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

RT: 0.00 - 2.86

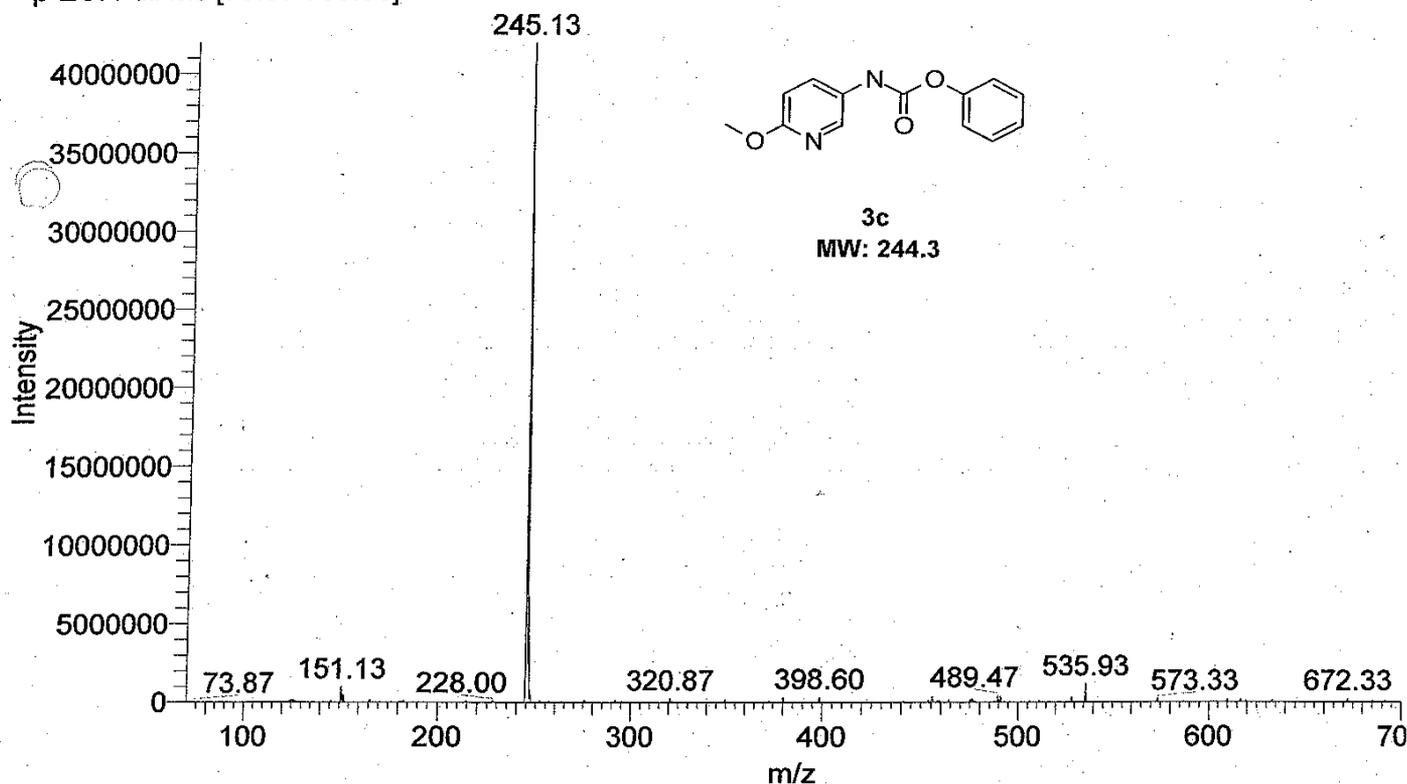


NL: 1.99E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
10733MUKJP243001_
110208_27



NL: 6.57E7
Base Peak m/z=
244.50-245.50 F: + p E
Full ms [70.00-700.00]
MS
10733MUKJP243001_
110208_27

10733MUKJP243001_AI_110208_27 #215 RT: 2.00 AV: 1 SB: 310 0.01-1.99, 2.03-2.86 SM: 11G NL:
Γ: + p ESI Full ms [70.00-700.00]



10733MUKJP244001_AI_110208_26

10733/MUKJP/244/001

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

2/11/2008 4:21:45 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 uL/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

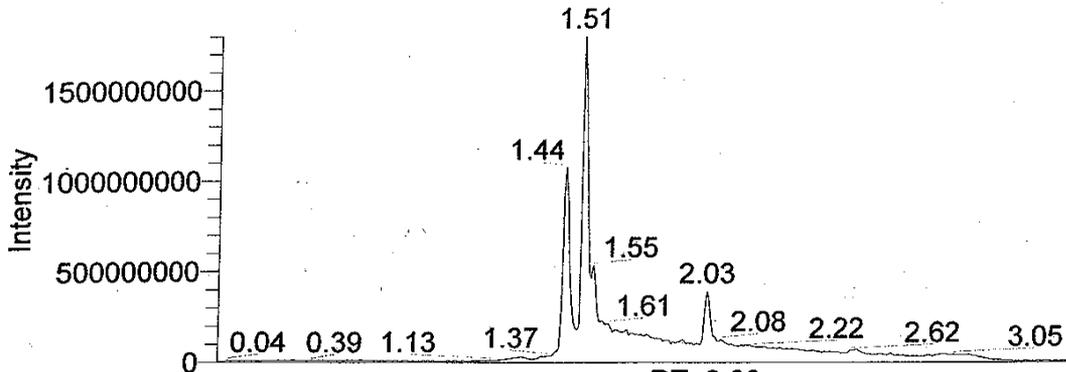
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.59



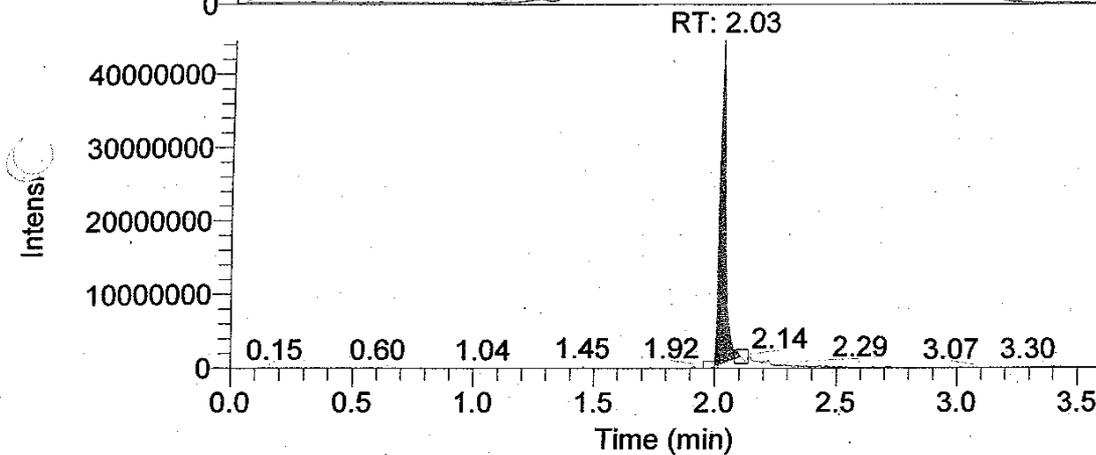
NL: 1.80E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

10733MUKJP244001_

110208_26



NL: 4.45E7

Base Peak m/z=

262.50-263.50 F: + p E

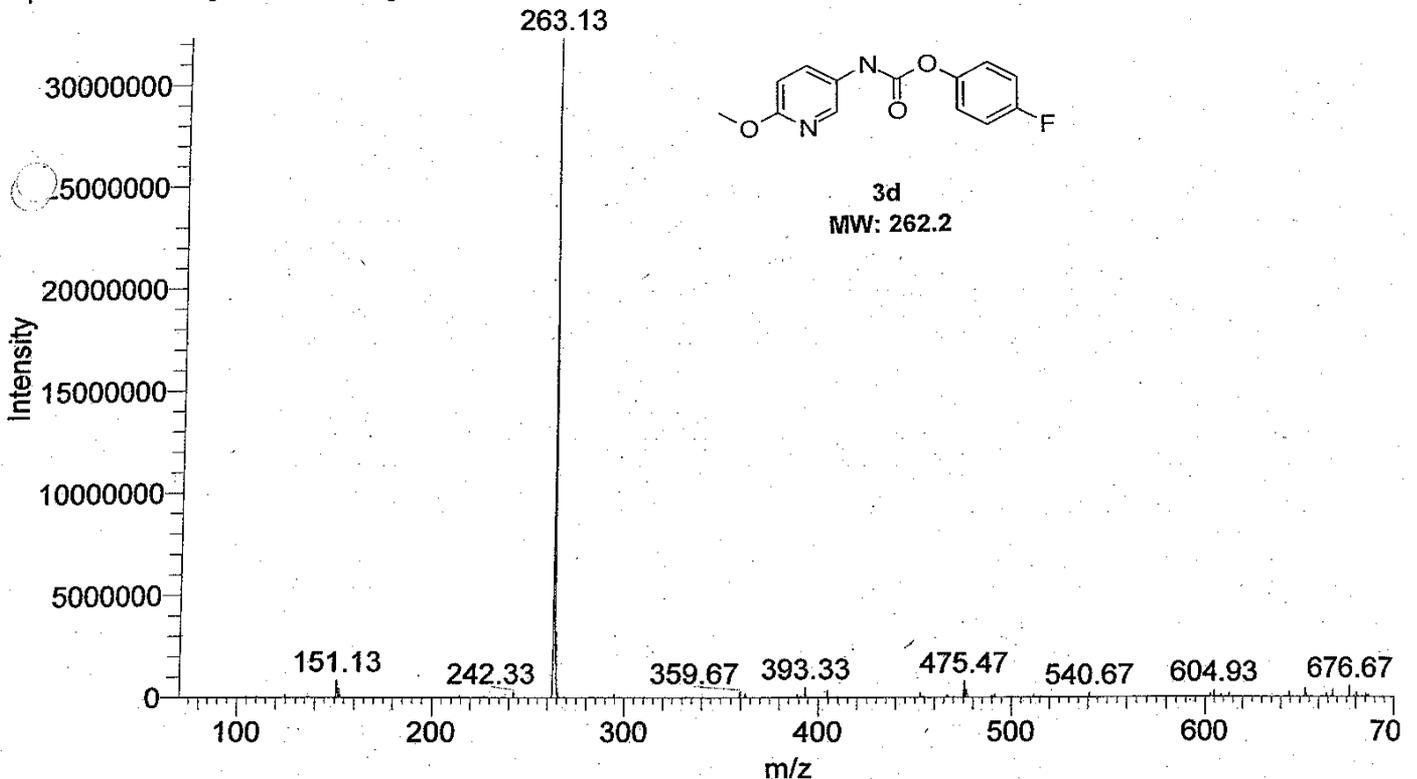
Full ms [70.00-700.00]

MS

10733MUKJP244001_

110208_26

10733MUKJP244001_AI_110208_26 #218 RT: 2.03 AV: 1 SB: 389 0.00-1.75, 1.78-3.59 SM: 11G NL: F: + p ESI Full ms [70.00-700.00]



11266MUKJP134101_AI_270208_26

11266/MUKJP/134/101

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

2/27/2008 3:05:27 PM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% A

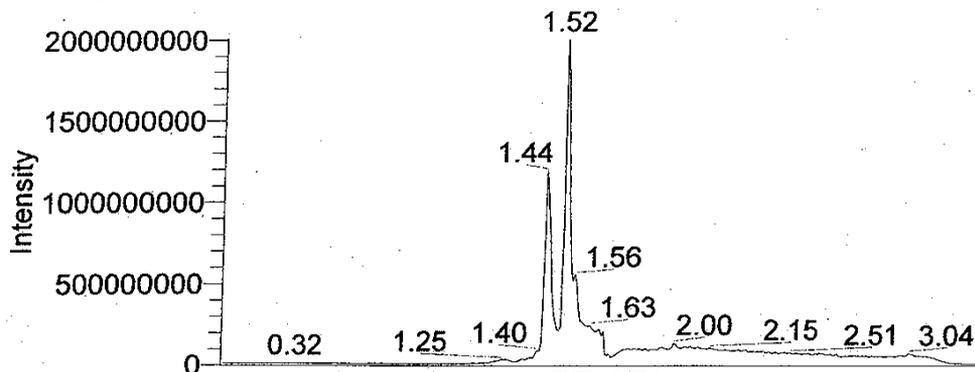
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.60

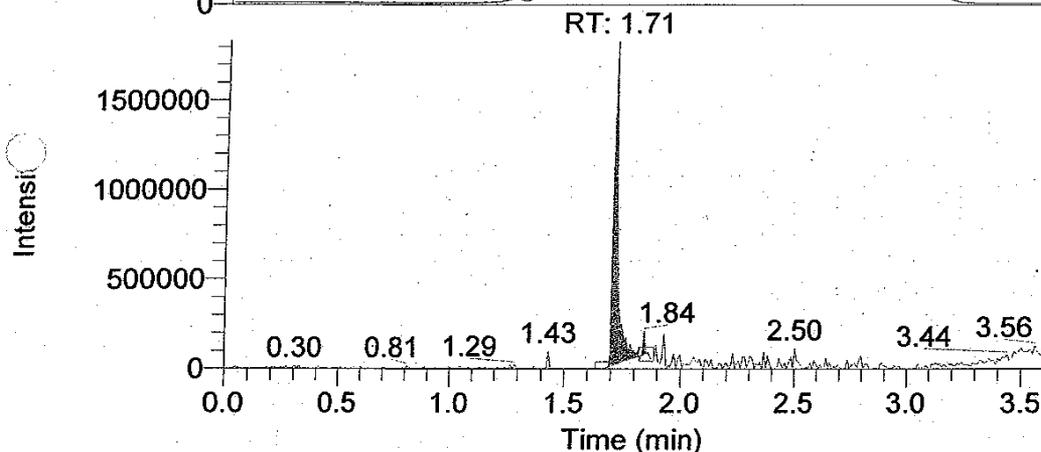


NL: 2.01E9

TIC F: + p ESI Full ms

[70.00-700.00] MS

11266MUKJP134101_AI_208_26



NL: 1.84E6

Base Peak m/z=

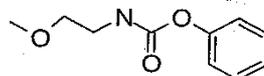
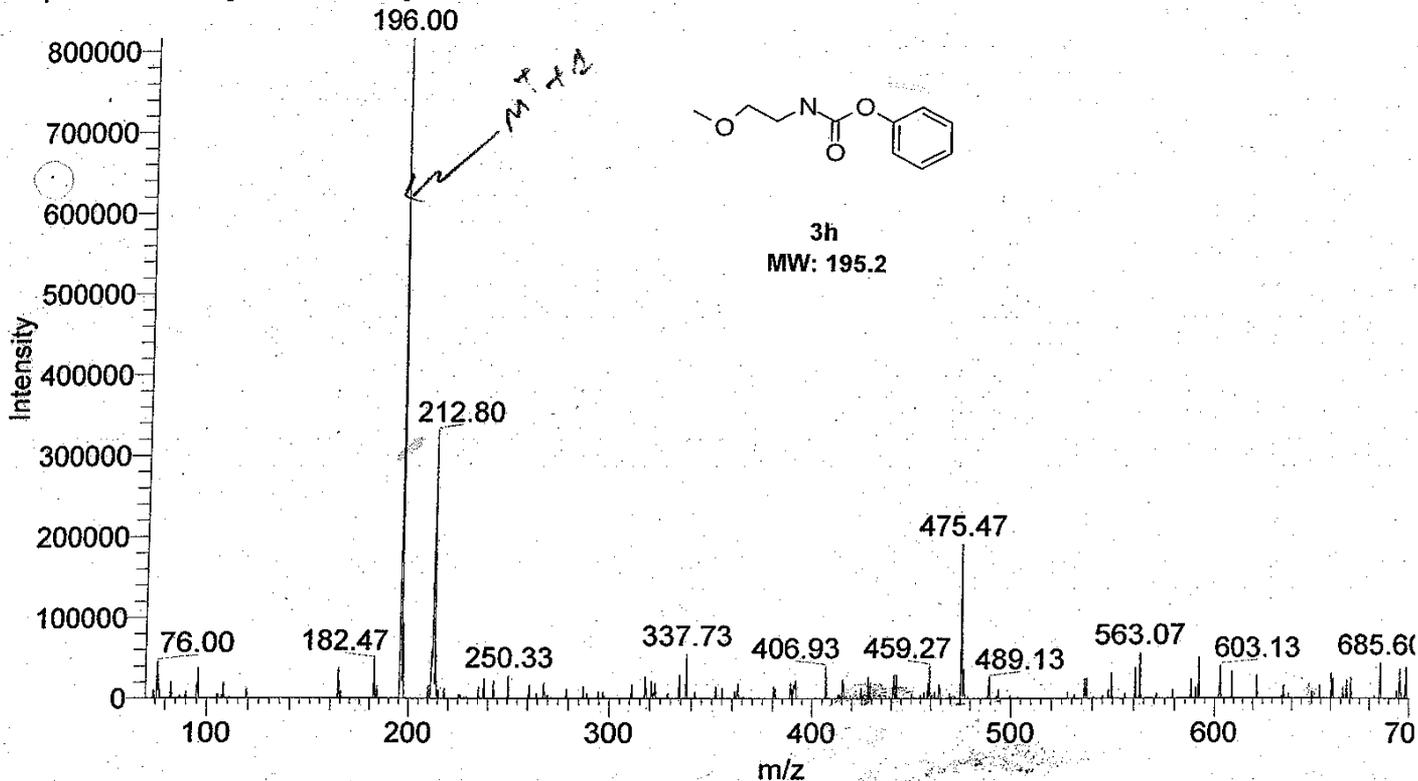
195.50-196.50+

212.50-213.50 F: + p ESI

Full ms [70.00-700.00] MS

11266MUKJP134101_AI_208_26

11266MUKJP134101_AI_270208_26 #180 RT: 1.71 AV: 1 SB: 99 1.26-1.50, 1.54-2.12 SM: 11G NL: T: + p ESI Full ms [70.00-700.00]



3h

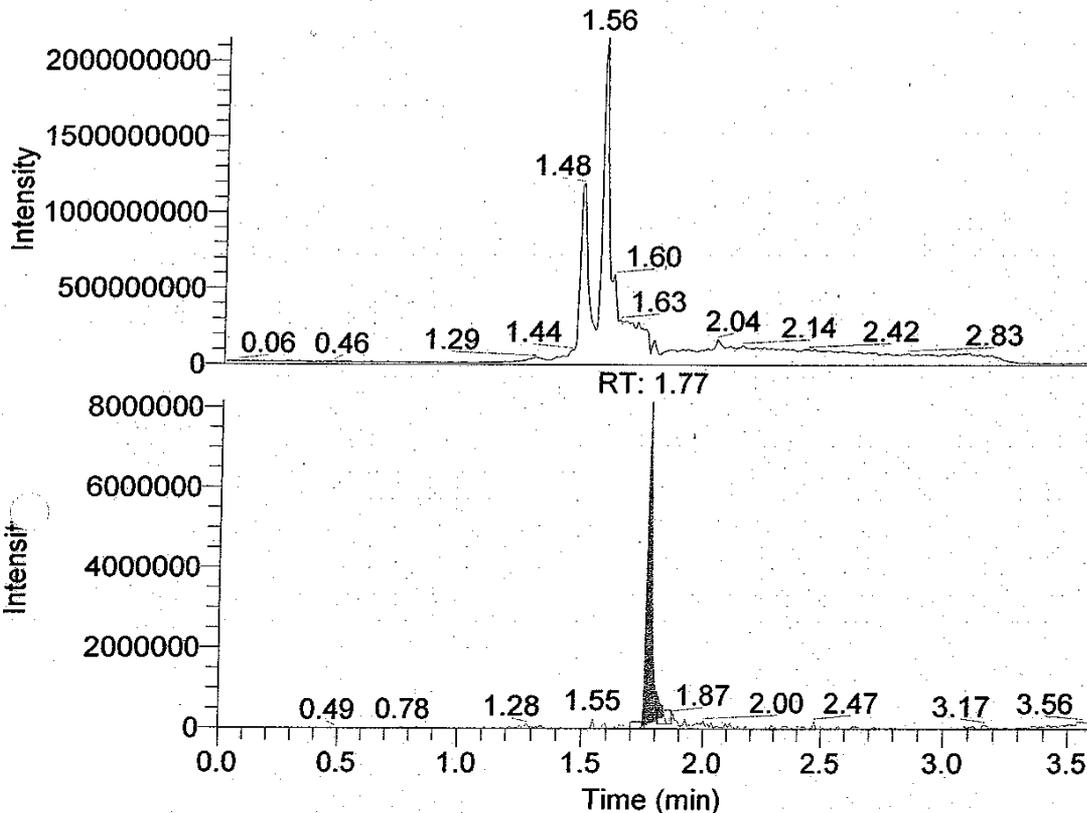
MW: 195.2

266MUKJP135101_AI_270208_25
266/MUKJP/135/101
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

2/27/2008 3:01:01 PM
Initial composition: 100:0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

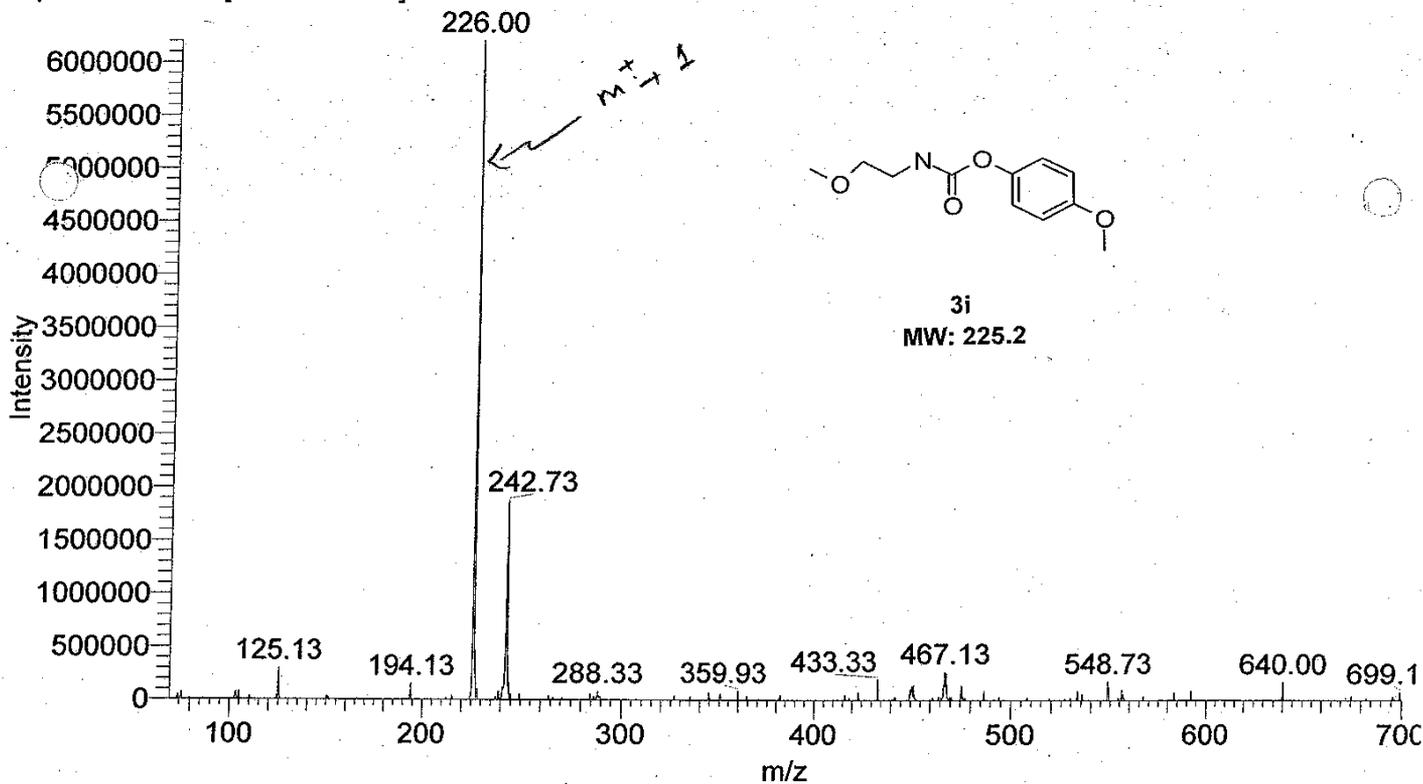
T: 0.00 - 3.59



NL: 2.15E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11266MUKJP135101_270208_25

NL: 8.16E6
Base Peak m/z=
225.50-226.50 F: + p E
Full ms [70.00-700.00]
MS
11266MUKJP135101_270208_25

266MUKJP135101_AI_270208_25 #188 RT: 1.77 AV: 1 SB: 99 1.26-1.50, 1.54-2.12 SM: 11G NL: + p ESI Full ms [70.00-700.00]

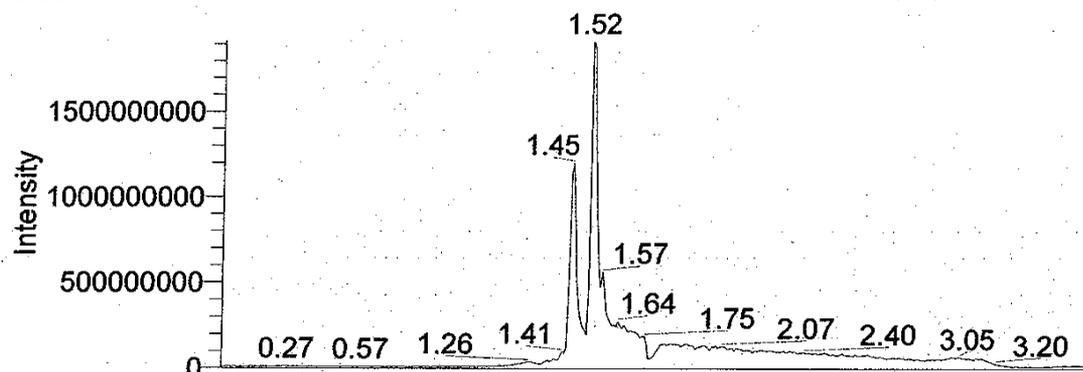


266MUKJP136101_AI_270208_21
266/MUKJP/136/101
Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

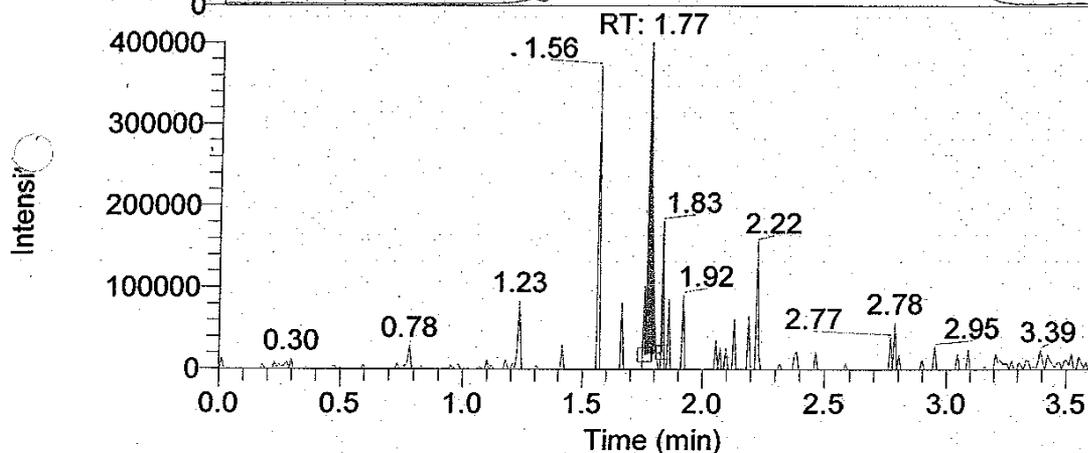
2/27/2008 1:24:22 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins - 100% A

T: 0.00 - 3.60

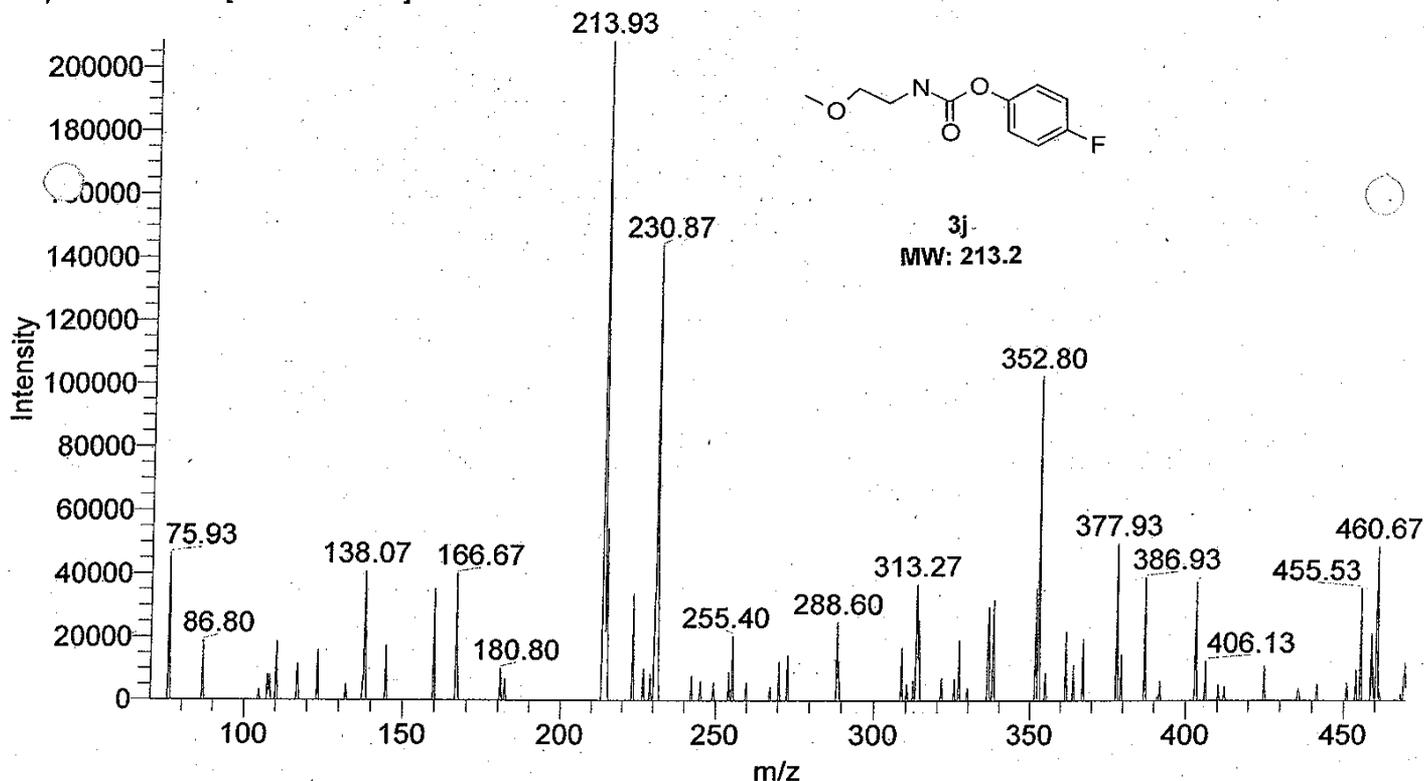


NL: 1.92E9
TIC F: + p ESI Full ms
[70.00-700.00] MS
11266MUKJP136101_
270208_21



NL: 4.02E5
Base Peak m/z=
213.50-214.50 F: + p E
Full ms [70.00-700.00]
MS
11266MUKJP136101_
270208_21

266MUKJP136101_AI_270208_21 #189 RT: 1.77 AV: 1 SB: 393 0.00-1.76, 1.79-3.60 SM: 11G NL:
+ p ESI Full ms [70.00-700.00]



10733MUKJP219101_AI_210108_06

10733/MUKJP/219/101

Mobile Phase:

Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid

Mobile Phase B: 90% ACN with 5 mM AA buffer

Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

1/21/2008 10:44:14 AM

Initial composition: 100: 0

Run time: 3.6 mins

Flow rate: 613 ul/min

Gradient conditions:

0 mins - 100% A

0.2 mins - 100% B

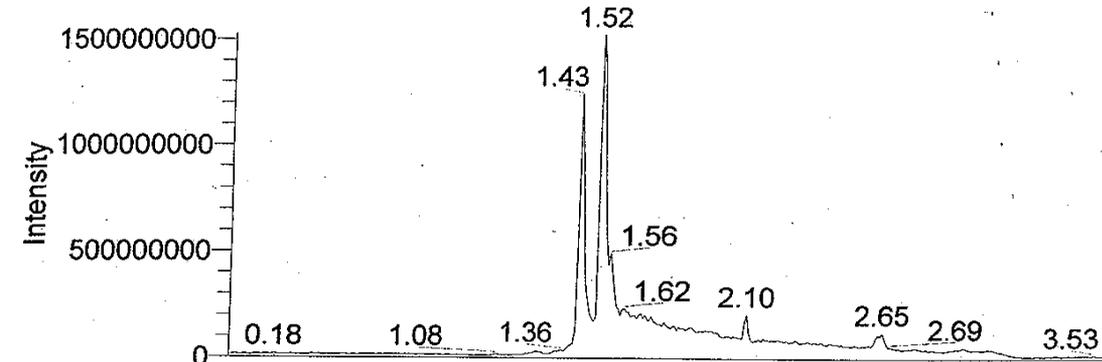
2.25 mins - 100% B

2.50 mins - 100% B

2.6 mins - 100% A

3.6 mins-100%A

RT: 0.00 - 3.60



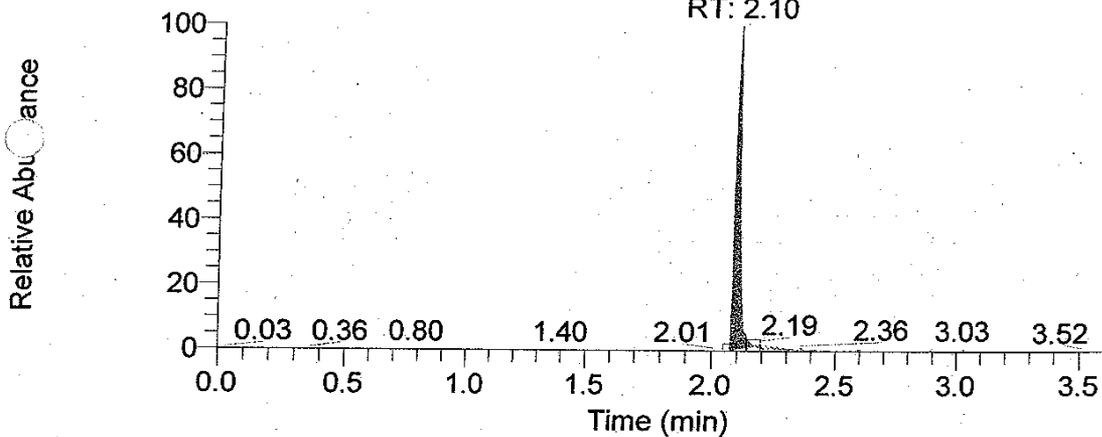
NL: 1.53E9

TIC F: + p ESI Full m

[70.00-700.00] MS

10733MUKJP219101

_210108_06



NL: 1.81E7

Base Peak m/z=

260.50-261.50 F: + p

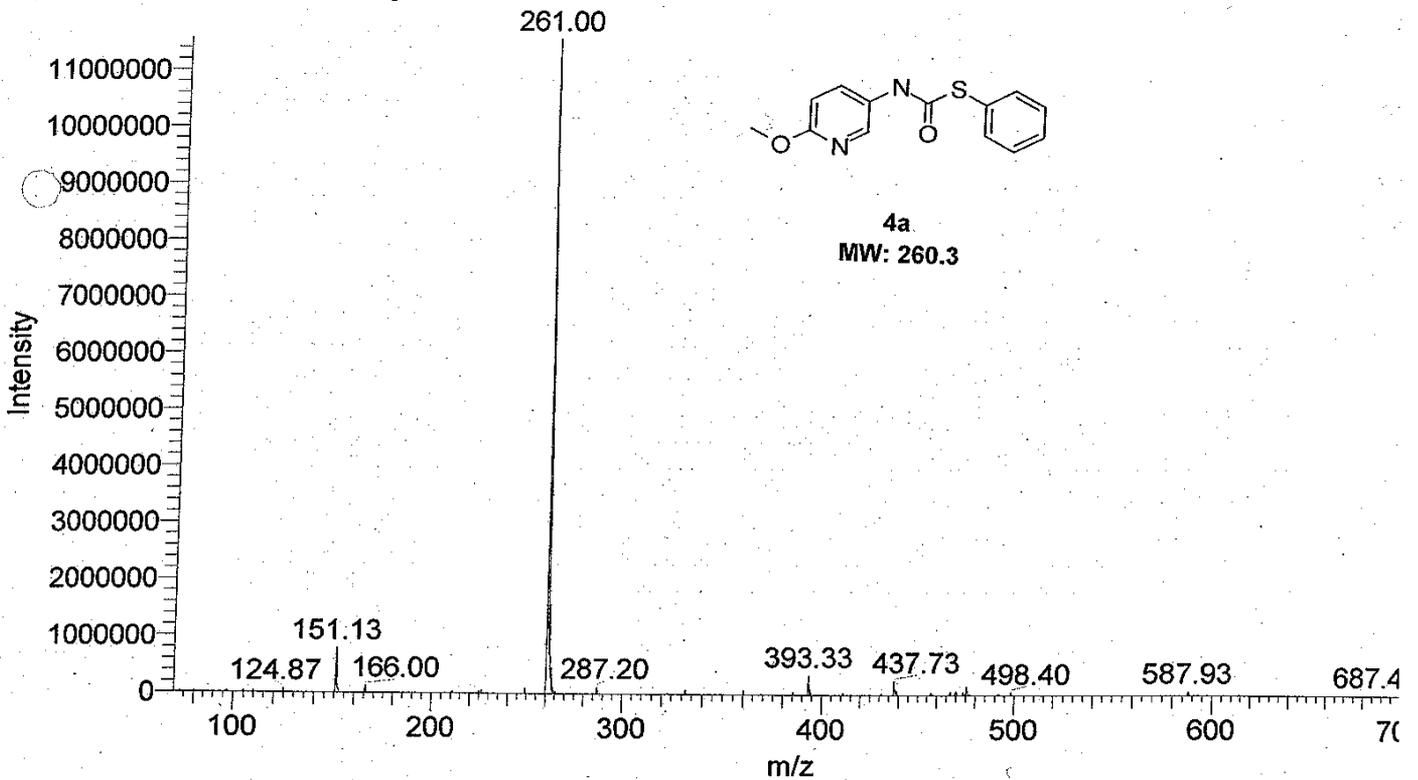
Full ms [70.00-700.00]

MS

10733MUKJP219101

_210108_06

10733MUKJP219101_AI_210108_06 #225 RT: 2.09 AV: 1 SB: 218 0.11-2.12 SM: 11G NL: 1.16E7
F: + p ESI Full ms [70.00-700.00]



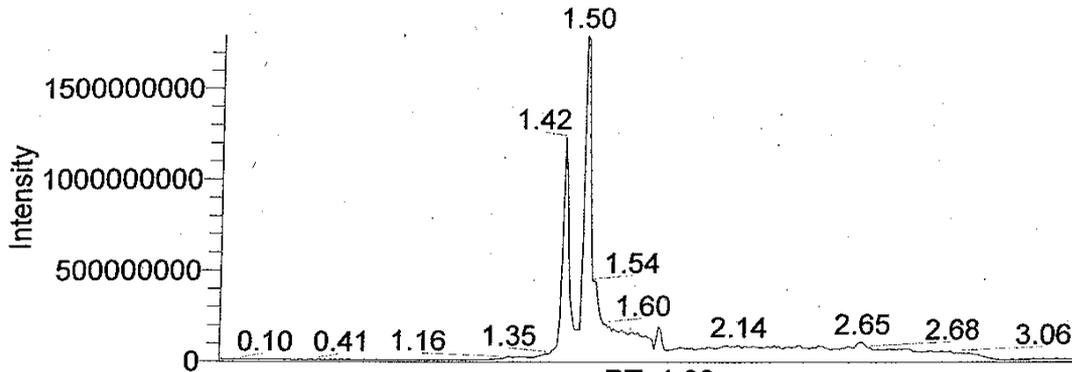
11266MUKJP147001_AI_130308_33
11266/MUKJP/147/001

Mobile Phase:
Mobile Phase A: 5 mM Amm. Acetate, pH: 4.0 with formic acid
Mobile Phase B: 90% ACN with 5 mM AA buffer
Column: Waters Acquity BEH C18 (50 x 2.1 mm x 1.7 microns)

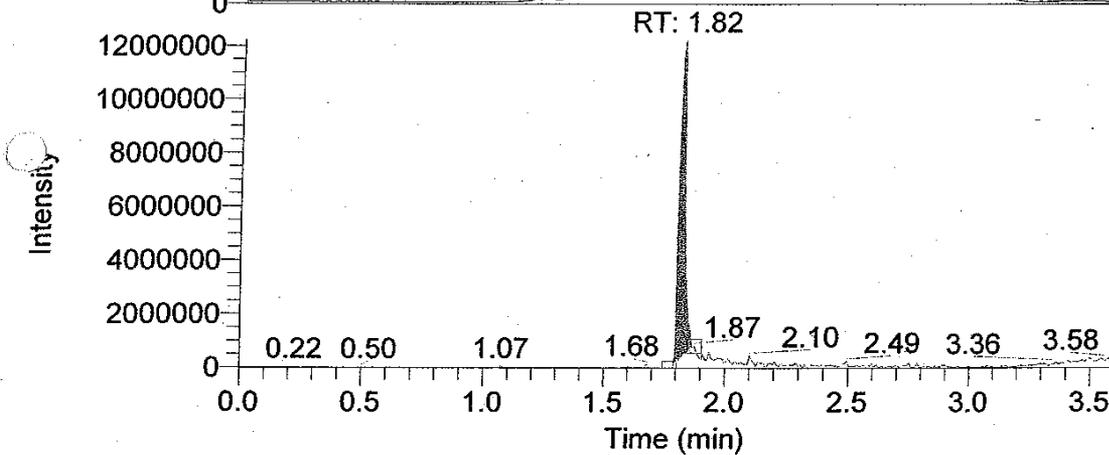
3/13/2008 3:23:16 PM
Initial composition: 100: 0
Run time: 3.6 mins
Flow rate: 613 ul/min

Gradient conditions:
0 mins - 100% A
0.2 mins - 100% A
2.25 mins - 100% B
2.50 mins - 100% B
2.6 mins - 100% A
3.6 mins-100%A

RT: 0.00 - 3.60



NL: 1.80E9
TIC F: + p ESI Full m
[70.00-700.00] MS
11266MUKJP147001
130308_33



NL: 1.22E7
Base Peak m/z=
211.50-212.50 F: + p
Full ms [70.00-700.00]
MS
11266MUKJP147001
130308_33

11266MUKJP147001_AI_130308_33 #192-194 RT: 1.81-1.82 AV: 3 SB: 392 0.01-1.80, 1.82-3.60 SM: 1
T: + p ESI Full ms [70.00-700.00]

