SUPPORTING INFORMATION

Oxadiazole-isopropylamides as Potent and Noncovalent Proteasome Inhibitors

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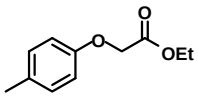
Contents **Page Number**

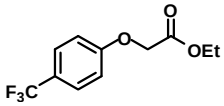
1. Synthetic protocols for **3a** to **3s (except for commercially available 3c, 3f, 3i and 3s).**

3a



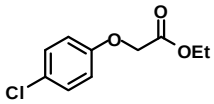
Ethyl 2-(*p*-tolyloxy)acetate (3a)[1]: To a solution of *p*-cresol (1.0 g, 9.24 mmol) in acetone (20 ml) was added potassium carbonate (6.39 g, 46.20 mmol) and ethyl bromoacetate (1.85 g, 11.10 mmol) and the mixture was refluxed for 14 h. Potassium carbonate was filtered and acetone was evaporated and the residue was purified by SiO_2 chromatography (EtOAc/hexane gradient elution) to obtain **3a** as a white solid (1.61 g, 90%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.5 Hz, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 4.59 (s, 2H), 4.26 (q, *J* = 7.1 Hz, 2H), 2.28 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H).

3b



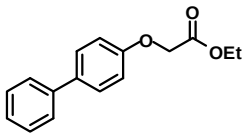
Ethyl 2-(4-trifluoromethyl)phenoxy)acetate (3b): This compound was synthesized using the same protocol described for **3a** except using 4-(trifluoromethyl)phenol (1.20 g, 7.40 mmol), ethyl bromoacetate (1.48 g, 8.88 mmol) and potassium carbonate (5.11 g, 37.00 mmol). The compound **3b** was isolated as a white solid. (1.78 g, 97%). ^{1}H NMR (400 MHz, DMSO) δ 7.63 (d, *J* = 8.4 Hz, 2H), 7.11 (d, *J* = 8.5 Hz, 2H), 4.83 (s, 2H), 4.29 (q, *J* = 7.1 Hz, 2H), 1.32 (q, *J* = 7.1 Hz, 3H).

3d



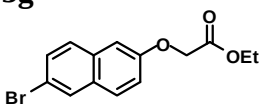
Ethyl 2-(4-chloromethyl)phenoxy)acetate (3d): This compound was synthesized using the same protocol described for **3a** except using 4-(chloromethyl)phenol (1.35 g, 10.50 mmol), ethyl bromoacetate (2.10 g, 12.60 mmol) and potassium carbonate (7.26 g, 52.50 mmol). The compound **3d** was isolated as a white solid (2.10 g, 93%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24 (d, *J* = 8.5 Hz, 2H), 6.84 (dd, *J* = 9.1, 0.5 Hz, 2H), 4.59 (s, 2H), 4.26 (q, *J* = 7.2 Hz, 2H), 1.29 (t, *J* = 7.2 Hz, 3H).

3e



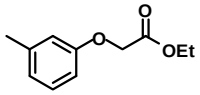
Ethyl 2-(biphenyl-4-yloxy)acetate (3e)[2]: To a solution of biphenyl-4-ol (1.00 g, 5.88 mmol), in DMF (10 ml) was added ethyl bromoacetate (1.18 g, 7.06 mmol) and potassium carbonate (4.06 g, 29.40 mmol) and stirred at rt 14 h. The solution was diluted with DCM (10 ml) and washed with water (5 x 10 ml). Organic layer was dried and purified by SiO_2 chromatography (EtOAc/hexane gradient elution) to obtain **3e** as a white solid (2.76 g, 90%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.58 – 7.47 (m, 4H), 7.41 (t, *J* = 7.6 Hz, 2H), 7.31 (t, *J* = 7.3 Hz, 1H), 6.99 (d, *J* = 8.8 Hz, 2H), 4.65 (s, 2H), 4.28 (q, *J* = 7.1 Hz, 2H), 1.31 (t, *J* = 7.1 Hz, 3H).

3g



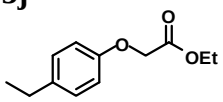
Ethyl 2-(6-bromonapthalen-2-yloxy)acetate (3g): This compound was synthesized using the same protocol described for **3e** except using 6-bromonapthalen-2-ol (1.06 g, 4.75 mmol), ethyl bromoacetate (0.95 g, 5.70 mmol) and potassium carbonate (3.28 g, 23.75 mmol). The compound **3g** was isolated as a white solid (1.27 g, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 1.7 Hz, 1H), 7.67 (d, *J* = 9.0 Hz, 1H), 7.58 (d, *J* = 8.8 Hz, 1H), 7.50 (dd, *J* = 8.7, 1.9 Hz, 1H), 7.34 – 7.14 (m, 1H), 7.03 (d, *J* = 2.4 Hz, 1H), 4.72 (s, 2H), 4.29 (q, *J* = 7.1 Hz, 2H), 1.30 (t, *J* = 7.1 Hz, 3H).

3h



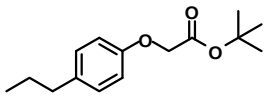
Ethyl 2-(*m*-tolyloxy)acetate (3h): This compound was synthesized using the same protocol described for **3e** except using *m*-cresol (1.00 g, 9.25 mmol), ethyl bromoacetate (1.85 g, 11.10 mmol) and potassium carbonate (8.11 g, 46.25 mmol). The compound **3h** was isolated as a yellow-brown solid (1.67 g, 93%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.16 (t, *J* = 7.9 Hz, 1H), 6.81 (m, 1H), 6.75 – 6.58 (m, 2H), 4.60 (s, 2H), 4.27 (q, *J* = 7.1 Hz, 2H), 2.32 (s, 3H), 1.29 (t, *J* = 7.1 Hz, 3H).

3j



Ethyl 2-(4-ethylphenoxy)acetate (3j): This compound was synthesized using the same protocol described for **3a** except using 4-ethylphenol (0.75 g, 6.14 mmol), ethyl bromoacetate (1.23 g, 7.37 mmol) and potassium carbonate (4.24 g, 30.70 mmol). The compound **3j** was isolated as a viscous yellow liquid (1.06 g, 85%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.12 (dd, *J* = 8.2, 0.6 Hz, 2H), 6.84 (d, *J* = 8.7 Hz, 2H), 4.60 (s, 2H), 4.27 (q, *J* = 7.1 Hz, 2H), 2.58 (q, *J* = 7.6 Hz, 3H), 1.30 (t, *J* = 7.1 Hz, 3H), 1.20 (t, *J* = 7.6 Hz, 3H).

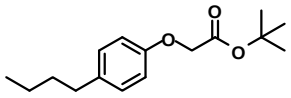
3k



***tert*-Butyl 2-(4-propylphenoxy)acetate (3k)[3]:** A solution of 4-propylphenol (500 mg, 3.67 mmol) , *tert*-butyl 2-bromoacetate (716 mg, 3.67 mmol) and potassium carbonate (2.55 g, 18.5 mmol) in DMF (10 ml) were

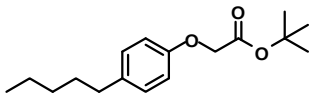
heated at 80 ^{o}C for 14 h. The solution was diluted with water (20 ml) and extracted with dichloromethane (2x 20 ml). Organic phase was washed with water (5 x 20 ml), dried ($MgSO_4$) and evaporated. The residue was purified by SiO_2 chromatography (EtOAc/hexane gradient elution) to obtain **3k** as a viscous liquid (753 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.7 Hz, 2H), 6.81 (d, *J* = 8.7 Hz, 2H), 4.48 (s, 2H), 2.51 (t, *J* = 7.4 Hz, 2H), 1.66 – 1.55 (m, 2H), 1.48 (s, 9H), 0.91 (t, *J* = 7.3 Hz, 3H).

3l



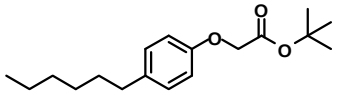
***Tert*-butyl 2-(4-butylphenoxy)acetate (3l):** This compound was synthesized using the same protocol described for **3k** except using 4-butylphenol (515 mg, 3.43 mmol), *tert*-butyl 2-bromoacetate (669 mg, 3.43 mmol) and potassium carbonate (2.37 g, 17.15 mmol). The compound **3l** was isolated as a yellow viscous liquid (698 mg, 77%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.5 Hz, 2H), 6.80 (d, *J* = 8.7 Hz, 2H), 4.48 (s, 2H), 2.54 (t, *J* = 7.7 Hz, 2H), 1.61 – 1.50 (m, 2H), 1.48 (s, 9H), 1.38 – 1.25 (m, 2H), 0.91 (t, *J* = 7.3 Hz, 3H).

3m



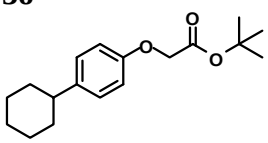
***Tert*-butyl 2-(4-pentylphenoxy)acetate (3m):** This compound was synthesized using the same protocol described for **3k** except using 4-pentylphenol (500 mg, 3.04 mmol) , *tert*-butyl 2-bromoacetate (593 mg, 3.04 mmol) and potassium carbonate (2.10 g, 15.2 mmol). The compound **3m** was isolated as a yellow viscous liquid (584 mg, 69%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.6 Hz, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 4.48 (s, 2H), 2.53 (t, *J* = 7.7 Hz, 2H), 1.62 – 1.50 (m, 2H), 1.48 (s, 9H), 1.35 – 1.26 (m, 4H), 0.88 (t, *J* = 6.9 Hz, 3H).

3n



***Tert*-butyl 2-(4-pentylphenoxy)acetate (3n):** This compound was synthesized using the same protocol described for **3k** except using 4-hexylphenol (500 mg, 2.81 mmol), *tert*-butyl 2-bromoacetate (548 mg, 2.81 mmol) and potassium carbonate (1.94 g, 14.10 mmol). The compound **3n** was isolated as a colorless viscous liquid (608 mg, 74%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.6 Hz, 2H), 6.80 (d, *J* = 8.7 Hz, 2H), 4.48 (s, 2H), 2.53 (t, *J* = 7.7 Hz, 2H), 1.62 – 1.52 (m, 2H), 1.48 (s, 9H), 1.28-1.17 (m, 6H), 0.87 (m, 3H).

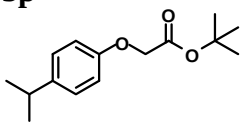
3o



***Tert*-butyl 2-(4-cyclohexylphenoxy)acetate (3o):** This compound was synthesized using the same protocol described for **3k** except using 4-cyclohexylphenol (1.67 g, 9.47 mmol), *tert*-butyl 2-bromoacetate (1.85 g, 9.47 mmol) and potassium carbonate (6.53 g, 47.4 mmol). The compound **3o** was isolated as a colorless viscous

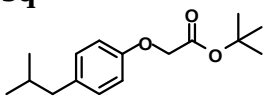
liquid (1.95 g, 71%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.10 (d, *J* = 8.6 Hz, 2H), 6.80 (d, *J* = 8.7 Hz, 2H), 4.47 (s, 2H), 2.48 – 2.37 (m, 1H), 1.86 – 1.76 (m, 6H), 1.47 (s, 9H), 1.41 – 1.29 (m, 4H).

3p



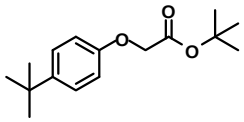
***Tert*-butyl 2-(4-isopropylphenoxy)acetate (3p):** This compound was synthesized using the same protocol described for **3k** except using 4-cyclohexylphenol (1.20 g, 8.81 mmol), *tert*-butyl 2-bromoacetate (1.72 g, 8.81 mmol) and potassium carbonate (6.08 g, 44.05 mmol). The compound **3p** was isolated as a colorless viscous liquid (1.50 g, 68%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.13 (d, *J* = 8.8 Hz, 2H), 6.82 (d, *J* = 8.8 Hz, 2H), 4.48 (s, 2H), 2.94 – 2.80 (m, 1H), 1.49 (s, 9H), 1.22 (d, *J* = 6.9 Hz, 6H).

3q



***Tert*-butyl 2-(4-isobutylphenoxy)acetate (3q):** This compound was synthesized using the same protocol described for **3k** except using 4-isobutylphenol (660 mg, 4.39 mmol), *tert*-butyl 2-bromoacetate (857 mg, 4.39 mmol) and potassium carbonate (3.03 g, 21.95 mmol). The compound **3q** was isolated as a colorless viscous liquid (836 mg, 72%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.04 (d, *J* = 8.6 Hz, 2H), 6.81 (d, *J* = 8.7 Hz, 2H), 4.49 (s, 2H), 2.40 (d, *J* = 7.2 Hz, 2H), 1.89 – 1.74 (m, 1H), 1.48 (s, 9H), 0.88 (d, *J* = 6.6 Hz, 6H).

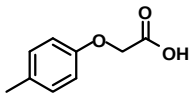
3r



***Tert*-butyl 2-(4-*tert*-butylphenoxy)acetate (3r):** This compound was synthesized using the same protocol described for **3k** except using 4-*tert*-butylphenol (1.63 g, 10.85 mmol), *tert*-butyl 2-bromoacetate (2.12 g, 10.85 mmol) and potassium carbonate (7.49 g, 54.25 mmol). The compound **3r** was isolated as a colorless viscous liquid (2.07 g, 72%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (d, *J* = 8.9 Hz, 2H), 6.84 (d, *J* = 8.9 Hz, 2H), 4.50 (s, 2H), 1.50 (s, 9H), 1.30 (s, 9H).

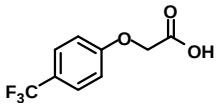
2. Synthetic Protocols for **4a** to **4s (except for commercially available 4c, 4f , 4i and 4s).**

4a



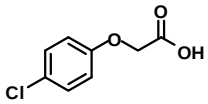
***p*-Tolyloxy-acetic acid (4a)[2] :** A solution of **3a** (800 mg, 4.12 mmol) and NaOH (1M, 10 ml) and ethanol (10 ml) was refluxed for 2 h. Ethanol was evaporated and aqueous solution was acidified (pH= 1) with conc. HCl. The precipitated product was filtered and washed with water and dried under vacuum to give the pure compound **4a** as a white solid (644 mg, 94%). ^{1}H NMR (400 MHz, DMSO) δ 12.94 (s, 1H), 7.05 (d, *J* = 8.6 Hz, 2H), 6.76 (d, *J* = 8.6 Hz, 2H), 4.59 (s, 2H), 2.20 (s, 3H).

4b



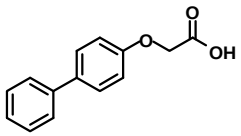
2-(4-Trifluoromethyl)phenoxy)acetic acid (4b): This compound was synthesized using the same protocol described for **4a** except using **3b** (1.05 g, 4.23 mmol), NaOH (1 M) (10 ml) and THF (10 ml). The compound **4b** was isolated as a white solid (913 mg, 98%). ^{1}H NMR (400 MHz, DMSO) δ 13.14 (s, 1H), 7.64 (d, *J* = 9.0 Hz, 2H), 7.08 (d, *J* = 8.5 Hz, 2H), 4.78 (s, 2H).

4d



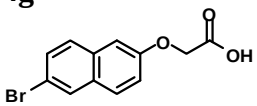
2-(4-Chlorophenoxy)acetic acid (4d): This compound was synthesized using the same protocol described for **4a** except using **3d** (900 mg, 4.19 mmol), NaOH (1 M) (10 ml) and THF (10 ml). The compound **4d** was isolated as a white solid (711 mg, 91%). ^{1}H NMR (400 MHz, DMSO) δ 13.03 (s, 1H), 7.31 (d, *J* = 9.1 Hz, 2H), 6.92 (d, *J* = 9.1 Hz, 2H), 4.67 (s, 2H).

4e



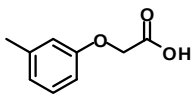
2-(Biphenyl-4-yloxy)acetic acid (4e): This compound was synthesized using the same protocol described for **4a** except using **3e** (500 mg, 1.95 mmol), NaOH (1 M) (5 ml) and THF (5 ml). The compound **4e** was isolated as a white solid (410 mg, 92%). ^{1}H NMR (400 MHz, DMSO) δ 7.62-7.53 (m, 4H), 7.41 (t, *J* = 7.7 Hz, 2H), 7.29 (t, *J* = 7.4 Hz, 1H), 6.98 (d, *J* = 8.8 Hz, 2H), 4.70 (s, 2H).

4g



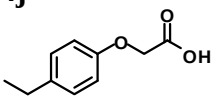
2-(6-Bromonapthalen-2-yloxy)acetic acid (4g): This compound was synthesized using the same protocol described for **4a** except using **3g** (650 mg, 2.10 mmol), NaOH (1 M) (5 ml) and THF (5 ml). The compound **4g** was isolated as a white solid (519 mg, 88%). ^{1}H NMR (400 MHz, DMSO) δ 8.09 (brs, 1H), 7.82 (d, *J* = 9.0 Hz, 1H), 7.74 (d, *J* = 8.8 Hz, 1H), 7.54 (dd, *J* = 8.7, 1.4 Hz, 1H), 7.28 (brs, 1H), 7.23 (dd, *J* = 8.9, 2.3 Hz, 1H), 4.78 (s, 2H).

4h



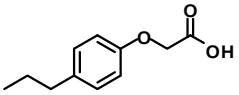
2-(*m*-Tolyloxy)acetic acid (4h): This compound was synthesized using the same protocol described for **4a** except using **3h** (400 mg, 2.06 mmol), NaOH (1 M) (5 ml) and THF (5 ml). The compound **4h** was isolated as a white solid (308 mg, 90%). ^{1}H NMR (400 MHz, DMSO) δ 7.13 (t, *J* = 7.8 Hz, 1H), 6.76 – 6.65 (m, 3H), 4.61 (s, 2H), 2.24 (s, 3H).

4j



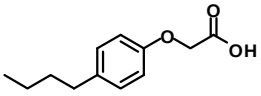
2-(4-Ethylphenoxy)acetic acid (4j): This compound was synthesized using the same protocol described for **4a** except using **3j** (450 mg, 2.16 mmol), NaOH (1 M) (5 ml) and THF (5 ml). The compound **4j** was isolated as a white solid (354 mg, 91%). ^{1}H NMR (400 MHz, DMSO) δ 7.09 (d, *J* = 8.7 Hz, 2H), 6.79 (d, *J* = 8.7 Hz, 2H), 2.50 (q, *J* = 7.6 Hz, 2H), 1.12 (t, *J* = 7.6 Hz, 3H).

4k



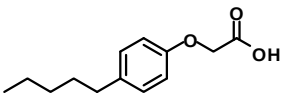
2-(4-Propylphenoxy)acetic acid (4k)[4]: A solution of **3k** (600 mg, 2.40 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml) was stirred at rt for 2 h. Acetone (10 ml) was added to the reaction mixture. Excess trifluoroacetic acid and dichloromethane were evaporated to provide the pure acid **4k** as a pale yellow solid (419 mg, 90%). ^{1}H NMR (400 MHz, DMSO) δ 7.06 (d, *J* = 8.5 Hz, 2H), 6.78 (d, *J* = 8.6 Hz, 2H), 4.59 (s, 2H), 2.45 (t, *J* = 7.7 Hz, 2H), 1.56-1.47 (m, 2H), 0.84 (t, *J* = 7.3 Hz, 3H).

4l



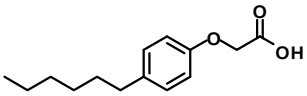
2-(4-Butylphenoxy)acetic acid (4l): This compound was synthesized using the same protocol described for **4k** except using **3l** (600 mg, 2.27 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4l** was isolated as a white solid (425 mg, 90%). ^{1}H NMR (400 MHz, DMSO) δ 7.03 (d, *J* = 8.4 Hz, 2H), 6.74 (d, *J* = 8.4 Hz, 2H), 4.47 (s, 2H), 2.53 – 2.39 (m, 2H), 1.55 – 1.38 (m, 2H), 1.24 (m, 2H), 0.85 (t, *J* = 7.3 Hz, 3H).

4m



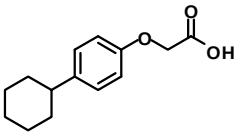
2-(4-Pentylphenoxy)acetic acid (4m): This compound was synthesized using the same protocol described for **4k** except using **3m** (668 mg, 2.39 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4m** was isolated as a white solid (493 mg, 93%). ^{1}H NMR (400 MHz, DMSO) δ 7.05 (d, *J* = 8.5 Hz, 2H), 6.76 (d, *J* = 8.5 Hz, 2H), 4.56 (s, 2H), 2.57 – 2.28 (m, 4H), 1.61 – 1.34 (m, 2H), 1.34 – 1.07 (m, 2H), 0.82 (t, *J* = 7.0 Hz, 3H).

4n



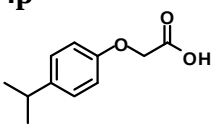
2-(4-Hexylphenoxy)acetic acid (4n): This compound was synthesized using the same protocol described for **4**k except using **3n** (650 mg, 2.22 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4n** was isolated as a white solid (515 mg, 98%). ^{1}H NMR (400 MHz, DMSO) δ 7.05 (d, *J* = 8.6 Hz, 2H), 6.76 (d, *J* = 8.6 Hz, 2H), 4.56 (s, 2H), 2.53–2.35 (m, 2H), 1.57 – 1.39 (m, 2H), 1.28-1.17 (m, 6H), 0.82 (t, *J* = 6.7 Hz, 3H).

4o



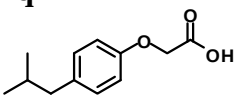
2-(4-Cyclohexylphenoxy)acetic acid (4o): This compound was synthesized using the same protocol described for **4k** except using **3o** (650 mg, 2.24 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4o** was isolated as a white solid (493 mg, 94%). ^{1}H NMR (400 MHz, CD_3OD) δ 7.11 (d, *J* = 8.5 Hz, 2H), 6.83 (d, *J* = 8.8 Hz, 2H), 4.60 (s, 2H), 2.49-2.37 (m, 1H), 1.87 – 1.69 (m, 6H), 1.49 – 1.22 (m, 4H).

4p



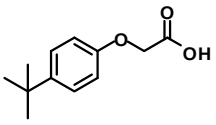
2-(4-Isopropylphenoxy)acetic acid (4p): This compound was synthesized using the same protocol described for **4k** except using **3p** (600 mg, 2.40 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4p** was isolated as a pale yellow solid (434 mg, 93%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.17 (d, *J* = 8.4 Hz, 2H), 6.86 (d, *J* = 8.8 Hz, 2H), 4.67 (s, 2H), 2.92 – 2.81 (m, 1H), 1.22 (d, *J* = 6.9 Hz, 6H).

4q



2-(4- Isobutylphenoxy)acetic acid (4q): This compound was synthesized using the same protocol described for **4k** except using **3q** (650 mg, 2.46 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4q** was isolated as a white solid (487 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.02 (d, *J* = 8.4 Hz, 2H), 6.79 (d, *J* = 8.5 Hz, 2H), 5.69 (s, 2H), 2.42 (d, *J* = 7.2 Hz, 2H), 1.98 – 1.69 (m, 1H), 0.91 (d, *J* = 6.6 Hz, 6H).

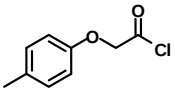
4r



2-(4-*Tert*-butylphenoxy)acetic acid (4r): This compound was synthesized using the same protocol described for **4k** except using **3r** (650 mg, 2.46 mmol) in dichloromethane (10 ml) and trifluoroacetic acid (10 ml). The compound **4r** was isolated as a pale brown solid (466 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.68 (s, 1H), 7.33 (d, *J* = 8.8 Hz, 2H), 6.87 (d, *J* = 8.8 Hz, 2H), 4.68 (s, 2H), 1.30 (s, 9H).

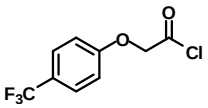
3. Synthetic protocols for **5a** to **5s (except for commercially available 5c)**.

5a



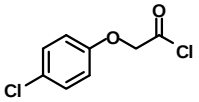
***p*-Tolyloxy-acetyl chloride (SO1-140) (5a)[5]:** To a solution of **4a** (300 mg, 1.81 mmol) in benzene (10 ml), thionyl chloride (5 mL) was added and the mixture was refluxed for 3 h until a clear solution was formed. Excess thionyl chloride and benzene were evaporated to give the pure compound **5a** as colorless liquid (313 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.11 (dd, *J* = 8.7, 0.6 Hz, 2H), 6.80 (d, *J* = 8.7 Hz, 2H), 4.92 (s, 2H), 2.30 (s, 3H).

5b



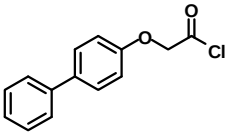
2-(4-Trifluoromethyl)phenoxy)acetyl chloride (5b): This compound was synthesized using the same protocol described for **5a** except using **4b** (410 mg, 1.86 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5b** was isolated as a colorless liquid (409 mg, 92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.59 (d, *J* = 8.8 Hz, 2H), 6.97 (d, *J* = 8.7 Hz, 2H), 5.00 (s, 2H).

5d



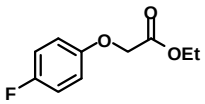
2-(4-Chlorophenoxy)acetyl chloride (5d): This compound was synthesized using the same protocol described for **5a** except using **4d** (340 mg, 1.83 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5d** was isolated as yellow solid (341 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28 (d, *J* = 8.8 Hz, 2H), 6.84 (d, *J* = 8.9 Hz, 2H), 4.93 (s, 2H).

5e



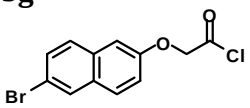
2-(Biphenyl-4-yloxy)acetyl chloride (5e): This compound was synthesized using the same protocol described for **5a** except using **4e** (410 mg, 1.80 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5e** was isolated as yellow liquid (417 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.57 – 7.52 (m, 4H), 7.43 (dd, *J* = 8.2, 7.0 Hz, 2H), 7.33 (t, *J* = 7.4 Hz, 1H), 6.97 (d, *J* = 8.9 Hz, 2H), 4.99 (s, 2H).

5f



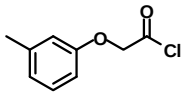
2-(4-Fluoro-phenoxy)acetyl chloride (5f): This compound was synthesized using the same protocol described for **5a** except using (4-fluoro-phenoxy)-acetic acid (315 mg, 1.85 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5f** was isolated as yellow solid (429 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.02 – 6.98 (m, 2H), 6.91 – 6.83 (m, 2H), 4.92 (s, 2H).

5g



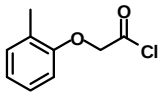
2-(6-Bromonapthalen-2-yloxy)acetyl chloride (5g): This compound was synthesized using the same protocol described for **5a** except using **4g** (500 mg, 1.78 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5g** was isolated as yellow liquid (506 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93 (d, J = 1.7 Hz, 1H), 7.69 (d, J = 9.0 Hz, 1H), 7.59 (d, J = 8.7 Hz, 1H), 7.53 (dd, J = 8.7, 1.9 Hz, 1H), 7.21 (dd, J = 9.0, 2.4 Hz, 1H), 7.03 (d, J = 2.3 Hz, 1H), 5.05 (s, 2H).

5h



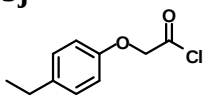
2-(*m*-Tolyloxy)acetyl chloride (5h): This compound was synthesized using the same protocol described for **5a** except using **4h** (300 mg, 1.81 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5h** was isolated as a yellow liquid (303 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.20 (t, J = 7.9 Hz, 1H), 6.88 (d, J = 7.5 Hz, 1H), 6.74 – 6.65 (m, 2H), 4.93 (s, 2H), 2.35 (s, 3H).

5i



2-(*o*-Tolyloxy)acetyl chloride (5i): This compound was synthesized using the same protocol described for **5a** except using ethyl 2-(*o*-tolyloxy)acetic acid (300 mg, 1.81 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5i** was isolated as yellow liquid (307 mg, 92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.26 (t, J = 2.8 Hz, 1H), 7.10 (d, J = 8.3 Hz, 1H), 6.83 (d, J = 8.5 Hz, 2H), 4.64 (s, 2H), 2.29 (s, 3H).

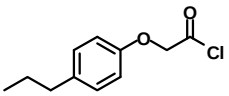
5j



2-(4-Ethylphenoxy)acetyl chloride (5j): This compound was synthesized using the same protocol described for **5a** except using **4j** (330 mg, 1.83 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5j**

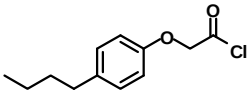
was isolated as yellow liquid (346 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.15 (d, *J* = 8.7 Hz, 2H), 6.84 (d, *J* = 8.7 Hz, 2H), 4.92 (s, 2H), 2.62 (q, *J* = 7.6 Hz, 2H), 1.23 (t, *J* = 7.6 Hz, 3H).

5k



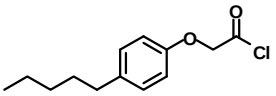
(4-Propylphenoxy)-acetyl chloride (5k): This compound was synthesized using the same protocol described for **5a** except using **4k** (360 mg, 1.85 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5k** was isolated as a viscous yellow liquid (374 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.13 (d, *J* = 8.3 Hz, 2H), 6.83 (d, *J* = 8.3 Hz, 2H), 4.93 (s, 2H), 2.55 (t, *J* = 7.6 Hz, 2H), 1.70 – 1.55 (m, 2H), 0.94 (t, *J* = 7.3Hz, 3H).

5l



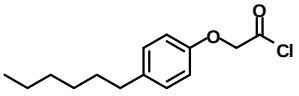
2-(4-Butylphenoxy)acetyl chloride (5l): This compound was synthesized using the same protocol described for **5a** except using **4l** (380 mg, 1.82 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5l** was isolated as a viscous yellow liquid (393 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.12 (d, *J* = 8.0 Hz, 2H), 6.82 (d, *J* = 8.1 Hz, 2H), 4.92 (s, 2H), 2.56 (t, *J* = 7.6 Hz, 2H), 1.60 – 1.51 (m, 2H), 1.34 (m, 2H), 0.93 (t, *J* = 7.3 Hz, 3H).

5m



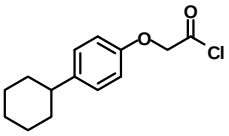
2-(4-Pentylphenoxy)acetyl chloride (5m): This compound was synthesized using the same protocol described for **5a** except using **4m** (400 mg, 1.80 mmol), thionyl chloride (5 ml) and benzene (5 ml). The compound **5m** was isolated as a viscous yellow liquid (399 mg, 92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.12 (d, *J* = 8.6 Hz, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 4.92 (s, 2H), 2.55 (t, *J* = 7.7 Hz, 2H),1.63 – 1.51 (m, 2H), 1.39 – 1.23 (m, 4H), 0.89 (t, *J* = 6.9 Hz, 3H).

5n



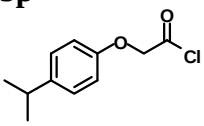
2-(4-Hexylphenoxy)acetyl chloride (5n): This compound was synthesized using the same protocol described for **5a** except using **4n** (420 mg, 1.78 mmol) thionyl chloride (5 ml) and benzene (10 ml). The compound **5n** was isolated as a viscous yellow liquid (435 mg, 96%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.10 (d, *J* = 8.5 Hz, 2H), 6.80 (dd, *J* = 8.6, 2.6 Hz, 2H), 4.91 (s, 2H), 2.53 (t, *J* = 7.7 Hz, 2H), 1.61-1.49 (m, 2H), 1.36-1.20 (m, 6H), 0.91-0.81 (m, 3H).

5o



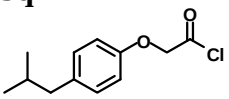
2-(4-Cyclohexylphenoxy)acetyl chloride (5o): This compound was synthesized using the same protocol described for **5a** except using **4o** (420 mg, 1.79 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5o** was isolated as a viscous yellow liquid (417 mg, 92%). ^{1}H NMR (400 MHz, CDC_3) δ 7.15 (d, *J* = 8.7 Hz, 2H), 6.82 (d, *J* = 8.8 Hz, 2H), 4.92 (s, 2H), 2.51-2.40 (m, 1H), 1.88 – 1.68 (m, 6H), 1.43 – 1.20 (m, 4H).

5p



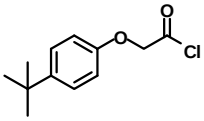
2-(4-Isopropylphenoxy)acetyl chloride (5p): This compound was synthesized using the same protocol described for **5a** except using **4p** (360 mg, 1.85 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5p** was isolated as a viscous yellow liquid (371 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.18 (d, *J* = 8.5 Hz, 2H), 6.84 (d, *J* = 8.7 Hz, 2H), 4.93 (s, 2H), 2.94 – 2.86 (m, 1H), 1.24 (d, *J* = 6.9 Hz, 6H).

5q



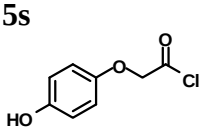
2-(4-Isobutylphenoxy)acetyl chloride (5q): This compound was synthesized using the same protocol described for **5a** except using **4q** (381 mg, 1.83 mmol), thionyl chloride (5 ml) and benzene (10ml). The compound **5q** was isolated as a viscous yellow liquid (394 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.08 (d, *J* = 8.6 Hz, 2H), 6.81 (d, *J* = 8.6 Hz, 2H), 4.93 (s, 2H), 2.42 (d, *J* = 7.2 Hz, 2H), 1.89 – 1.69 (m, 1H), 0.89 (d, *J* = 6.6 Hz, 6H).

5r



2-(4-*Tert*-butylphenoxy)acetyl chloride (5r): This compound was synthesized using the same protocol described for **5a** except using **4r** (380 mg, 1.82 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5r** was isolated as a viscous yellow liquid (393 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34 (d, *J* = 9.0 Hz, 2H), 6.84 (d, *J* = 9.0 Hz, 2H), 4.94 (s, 2H), 1.31 (s, 9H).

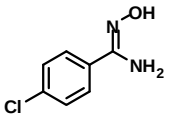
5s



2-(4-Hydroxyphenoxy)acetyl chloride (5s): This compound was synthesized using the same protocol described for **5a** except using **4s** (300 mg, 1.78 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **5s** was isolated as a viscous yellow liquid (303 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24 (d, *J* = 8.6 Hz, 2H), 6.95 (d, *J* = 8.6 Hz, 2H), 4.95 (s, 2H).

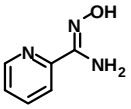
4. Synthetic protocols for **7c, 7e, 7f, 7g, 7h, 7i and 7j.**

7c



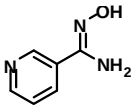
4-Chloro-*N*-hydroxy-benzamidine (7c)[6]: 4-chlorobenzonitrile (1.00 g, 7.27 mmol) and hydroxylamine hydrochloride (1.01 g, 14.54 mmol) were dissolved in water (7 ml). A solution of sodium carbonate (1.54 g, 14.54 mmol) in water (5.0 ml) was cautiously added, and the resulting solution was stirred and heated at 70 ^{o}C for 14 h. The solution was cooled to rt, added saturated sodium chloride (15 mL) and extracted with EtOAc (4 x 15 ml). The organic phase was dried ($MgSO_4$) and evaporated to give the pure compound **7c** as a white solid (1.02 g, 82%). ^{1}H NMR (400 MHz, CD_3OD) δ 7.62 (d, *J* = 8.6 Hz, 2H), 7.39 (d, *J* = 8.5 Hz, 2H). LC-MS (ESI+) *m/z* 171.04 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_9H_9Cl_2N_2O_2$ $(M+H)^+$ 171.0320, found 171.0321.

7e



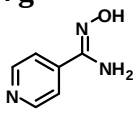
***N*-Hydroxy-pyridin-2-carboxamidine (7e):** This compound was synthesized using the same protocol described for **7c** except using 2-cyanopyridine (1.24 g, 12 mmol), hydroxylamine hydrochloride (1.66 g, 24 mmol) in water (12 ml) and a solution of sodium carbonate (2.54 g, 24 mmol) in water (9 ml). The compound **7e** was isolated as a white solid (1.53 g, 93%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.55 (ddd, *J* = 4.9, 1.6, 1.0 Hz, 1H), 7.86 (dd, *J* = 8.04, 1.08, 1H), 7.77 (ddd, *J* = 8.0, 7.5, 1.7 Hz, 1H), 7.37 (ddd, *J* = 7.4, 4.9, 1.2 Hz, 1H).

7f



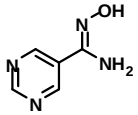
***N*-Hydroxy-nicotinamidine (7f):** This compound was synthesized using the same protocol described for **7c** except using 3-cyanopyridine (0.62 g, 6.0 mmol), hydroxylamine hydrochloride (0.83 g, 12 mmol) in water (6.0 ml) and solution of a solution of sodium carbonate (1.27 g, 12 mmol) in water (4.5 ml). The compound **7f** was isolated as a white solid (510 mg, 62%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.80 (dd, *J* = 2.2, 0.7 Hz, 1H), 8.55 (dd, *J* = 4.9, 1.6 Hz, 1H), 8.09 – 8.04 (m, 1H), 7.45 (ddd, *J* = 8.0, 4.9, 0.7 Hz, 1H). ^{1}H NMR (400 MHz, DMSO) δ 9.82 (s, 1H), 8.84 (dd, *J* = 2.2, 0.8 Hz, 1H), 8.54 (dd, *J* = 4.8, 1.6 Hz, 1H), 8.01 – 7.97 (m, 1H), 7.39 (ddd, *J* = 8.0, 4.8, 0.8 Hz, 1H). LC-MS (ESI+) *m/z* 138.06 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_6H_8N_3O$ $(M+H)^+$ 138.0662, found 138.0659.

7g



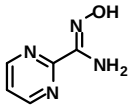
***N*-Hydroxy-isonicotinamidine (7g):** This compound was synthesized using the same protocol described for **7c** except using 4-cyanopyridine (1.24 g, 12 mmol), hydroxylamine hydrochloride (1.66 g, 24 mmol) in water (12 ml) and a solution of sodium carbonate (2.54 g, 24 mmol) in water (9 ml). The compound **7g** was isolated as a white solid (1.43 g, 87%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.55 (dd, J = 4.6, 1.7 Hz, 2H), 7.68 (dd, J = 4.6, 1.7 Hz, 2H).

7h



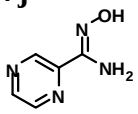
***N*-Hydroxy-pyrimidine-5-carboxamidine (7h):** This compound was synthesized using the same protocol described for **7c** except using pyrimidine-5-carbonitrile (167 mg, 1.60 mmol), hydroxylamine hydrochloride (222 mg, 3.20 mmol in water (1.6 ml) and a solution of sodium carbonate (339 mg, 3.20 mmol) in water (1.2 ml). The compound **7h** was isolated as a white solid (122 mg, 55%). ^{1}H NMR (400 MHz, CD_3OD) δ 9.16 (s, 1H), 9.03-9.01 (m, 2H).

7i



***N*-Hydroxy-pyrimidine-2-carboxamidine (7i):** This compound was synthesized using the same protocol described for **7c** except using pyrimidine-2-carbonitrile (1.67 g, 16 mmol), hydroxylamine hydrochloride (2.22 g, 32 mmol) in water (16 ml) and a solution of sodium carbonate (3.39 g, 32 mmol) in water (12 ml). The compound **7i** was isolated as a white solid (1.70 g, 77%). ^{1}H NMR (400 MHz, DMSO) δ 10.16 (s, 1H), 8.82 (d, J = 4.9 Hz, 2H), 7.48 (m, 1H), 5.82 (s, 2H).

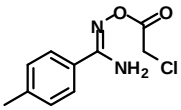
7j



***N*-Hydroxy-pyrazine-2-carboxamidine (7j):** This compound was synthesized using the same protocol described for **7c** except using pyrazine-2-carbonitrile (500 mg, 4.78 mmol), hydroxylamine hydrochloride (664 mg, 9.56 mmol) in water (4.8 ml) and a solution of sodium carbonate (1.01 g, 9.56 mmol) in water (3.6 ml). The compound **7j** was isolated as a white solid (541 mg, 82%). ^{1}H NMR (400 MHz, DMSO) δ 10.22 (s, 1H), 9.03 (d, J = 1.4 Hz, 1H), 8.64 – 8.58 (m, 2H), 5.94 (s, 2H).

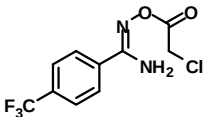
5. Synthetic Protocols for **8a** to **8j.**

8a



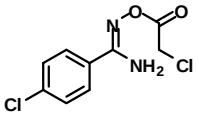
(*Z*)-*N*'-(2-chloroacetoxy)-4-methylbenzimidamide (8a)[7]: To a solution of *N*-hydroxy-4-methylbenzamidine (500 mg, 3.33 mmol) in acetone (20 ml), chloroacetyl chloride (376 mg, 3.33 mmol) was added slowly and the mixture was stirred at rt for 30 min. Acetone was evaporated and the residue was washed with sat. sodium bicarbonate solution (5 ml) and water (10 ml). The compound **8a** was dried under vacuum and obtained as a white solid (664 mg, 88%). ^{1}H NMR (400 MHz, DMSO) δ 7.05 (d, *J* = 8.6 Hz, 2H), 6.76 (d, *J* = 8.6 Hz, 2H), 4.58 (s, 2H), 2.20 (s, 3H).

8b



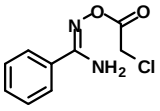
(*Z*)-*N*'-(2-chloroacetoxy)-4-(trifluoromethyl)benzimidamide (8b): This compound was synthesized using the same protocol described for **8a** except using 4-trifluoromethyl-*N*-hydroxy-benzamidine (200 mg, 9.80 mmol) and chloroacetyl chloride (111 mg, 9.80 mmol). The compound **8b** was isolated as a yellow solid (242 mg, 88%). ^{1}H NMR (400 MHz, CD_3OD) δ 7.92 (d, *J* = 8.2 Hz, 2H), 7.76 (d, *J* = 8.2 Hz, 2H), 4.40 (s, 2H). LC-MS (ESI+) *m/z* 281.03 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{10}H_9ClF_3N_2O_2$ $(M+Na)^+$ 303.0119, found 303.0117.

8c



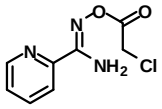
(*Z*)-*N*'-(2-chloroacetoxy)-4-chlorobenzimidamide (8c): This compound was synthesized using the same protocol described for **8a** except using **7c** (220 mg, 1.29 mmol) and chloroacetyl chloride (146 mg, 1.29 mmol). The compound **8c** was isolated as a yellow solid (258 mg, 81%). ^{1}H NMR (400 MHz, CD_3OD) δ 7.71 (d, *J* = 7.6 Hz, 2H), 7.45 (d, *J* = 7.8 Hz, 2H), 4.38 (s, 2H). LC-MS (ESI+) *m/z* 246.99 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_9H_8Cl_2N_2O_2Na$ $(M+Na)^+$ 268.9855, found 268.99855.

8d



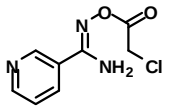
(*Z*)-*N*'-(2-chloroacetoxy)benzimidamide (8d): This compound was synthesized using the same protocol described for **8a** except using *N*-hydroxy-benzamidine (300 mg, 2.19 mmol) and chloroacetyl chloride (247 mg, 2.19 mmol). The compound **8d** was isolated as a white solid (405 mg, 87%). ^{1}H NMR (400 MHz, CD_3OD) δ 7.76 – 7.69 (m, 2H), 7.56-7.40 (m, 3H), 4.39 (s, 2H).

8e



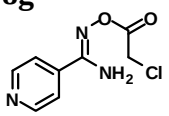
(*Z*)-*N*'-(2-chloroacetoxy)picolinimidamide (8e): This compound was synthesized using the same protocol described for **8a** except using **7e** (260 mg, 1.90 mmol) and chloroacetyl chloride (215 mg, 1.90 mmol). The compound **8e** was isolated as a white solid (370 mg, 91%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.63 (d, *J* = 4.3 Hz, 1H), 8.08 (d, *J* = 8.0 Hz, 1H), 7.87 (td, *J* = 7.8, 1.7 Hz, 1H), 7.49 (ddd, *J* = 7.5, 4.8, 1.0 Hz, 1H), 4.43 (s, 2H).

8f



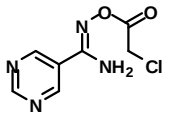
(*Z*)-*N*'-(2-chloroacetoxy)nicotinimidamide (8f): This compound was synthesized using the same protocol described for **8a** except using **7f** (125 mg, 0.91 mmol) and chloroacetyl chloride (103 mg, 0.91 mmol). The compound **8f** was isolated as a yellow solid (161 mg, 83%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.91 (dd, *J* = 2.2, 0.8 Hz, 1H), 8.67 (dd, *J* = 5.0, 1.6 Hz, 1H), 8.20 (ddd, *J* = 8.0, 2.2, 1.6 Hz, 1H), 7.60 – 7.44 (m, 1H), 4.40 (s, 2H). LC-MS (ESI+) *m/z* 214.03 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_8H_9ClN_3O_2$ $(M+H)^+$ 214.0378, found 214.0389.

8g



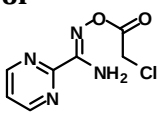
(*Z*)-*N*'-(2-chloroacetoxy)isonicotinimidamide (8g): This compound was synthesized using the same protocol described for **8a** except using **7g** (200 mg, 1.46 mmol) and chloroacetyl chloride (165 mg, 1.46 mmol). The compound **8g** was isolated as a yellow solid (274 mg, 88%). ^{1}H NMR (400 MHz, CD_3OD) δ 8.55 (d, *J* = 4.9 Hz, 2H), 7.68 (d, *J* = 4.9 Hz, 2H), 4.19 (s, 2H). LC-MS (ESI+) *m/z* 214.04 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_8H_9ClN_3O_2(M+Na)^+$ 236.0197, found 236.0186.

8h



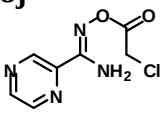
(*Z*)-*N*'-(2-chloroacetoxy)pyrimidine-5-carboximidamide (8h): This compound was synthesized using the same protocol described for **8a** except using **7h** (110 mg, 0.80 mmol) and chloroacetyl chloride (90 mg, 0.80 mmol). The compound **8h** was isolated as a white solid (158 mg, 92%). ^{1}H NMR (400 MHz, CD_3OD) δ 9.26 (s, 1H), 9.11 (brs, 2H), 4.41 (s, 2H).

8i



(*Z*)-*N*'-(2-chloroacetoxy)pyrimidine-2-carboximidamide (8i): This compound was synthesized using the same protocol described for **8a** except using **7i** (160 mg, 1.16 mmol) and chloroacetyl chloride (131 mg, 1.16 mmol). The compound **8i** was isolated as a white solid (224 mg, 90%). ^{1}H NMR (400 MHz, CD_3OD) δ 9.03 (d, *J* = 4.9 Hz, 2H), 7.78 (d, *J* = 4.9 Hz, 1H), 4.19 (s, 2H).

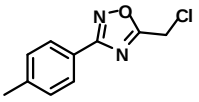
8j



(*Z*)-*N*'-(2-chloroacetoxy)pyrazine-2-carboximidamide (8j): This compound was synthesized using the same protocol described for **8a** except using **7j** (540 mg, 3.91 mmol) and chloroacetyl chloride (442 mg, 3.91 mmol). The compound **8j** was isolated as a brown solid (713 mg, 85%). ^{1}H NMR (400 MHz, CD_3OD) δ 9.27 (d, *J* = 1.2 Hz, 1H), 8.73-8.66 (m, 2H), 4.44 (s, 2H). LC-MS (ESI+) *m/z* 232.04 $(M+NH4)^+$; HRMS (ESI+ve) *m/z* calculated for $C_7H_7ClN_4O_2$ $(M+Na)^+$ 237.0150, found 237.01401.

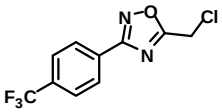
6. Synthetic Protocols for **9a** to **9j.**

9a



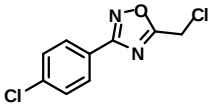
5-Chloromethyl-3-*p*-tolyl-[1,2,4]oxadiazole (9a)[7]: The compound **8a** (400 mg, 1.77 mmol) was refluxed in toluene (10 ml) along with activated 4Å molecular sieves for 2 h. The reaction mixture was concentrated under vacuum to provide a crude residue. The crude residue was triturated with diethyl ether to afford **9a** as a pale yellow solid (303 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.95 (d, *J* = 8.2 Hz, 2H), 7.27 (dd, *J* = 7.9, 0.5 Hz, 2H), 4.72 (s, 2H), 2.40 (s, 3H).

9b



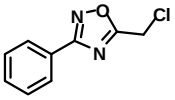
5-Chloromethyl-3-(4-trifluoromethylphenyl)-[1,2,4]oxadiazole (9b): This compound was synthesized using the same protocol described for **9a** except using **8b** (150 mg, 0.53 mmol). The compound **9b** was isolated as a white solid (128 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (dd, *J* = 8.1, 0.6 Hz, 2H), 7.76 (dd, *J* = 8.2, 0.5 Hz, 2H), 4.78 (s, 2H).

9c



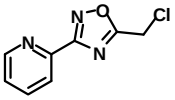
5-Chloromethyl-3-(4-chloro-phenyl)-[1,2,4]oxadiazole (9c): This compound was synthesized using the same protocol described for **9a** except using **8c** (200 mg, 0.81mmol). The compound **9c** was isolated as a white solid (154 mg, 83%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (d, *J* = 8.7 Hz, 2H), 7.47 (d, *J* = 8.7 Hz, 2H), 4.75 (s, 2H).

9d



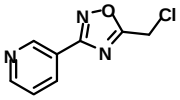
5-Chloromethyl-3-phenyl-[1,2,4]oxadiazole (9d): This compound was synthesized using the same protocol described for **9a** except using **8d** (300 mg, 1.41 mmol) and refluxed in toluene (10 ml). The compound **9d** was isolated as a yellow solid (252 mg, 92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.06 (d, *J* = 8.0 Hz, 2H), 7.52 – 7.40 (m, 3H), 4.74 (s, 2H).

9e



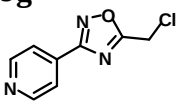
5-(Chloromethyl)-3-(pyridin-2-yl)-1,2,4-oxadiazole (9e): This compound was synthesized using the same protocol described for **9a** except using **8e** (200 mg, 0.94 mmol). The compound **9e** was isolated as a white solid (172 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.81 (ddd, *J* = 4.8, 1.6, 1.0 Hz, 1H), 8.14 (dt, *J* = 7.9, 1.1 Hz, 1H), 7.87 (td, *J* = 7.8, 1.8 Hz, 1H), 7.46 (ddd, *J* = 7.7, 4.8, 1.2 Hz, 1H), 4.79 (s, 2H). LC-MS (ESI+) *m/z* 196.03 $(M+H)^+$; HRMS (ESI+ve) *m*/*z* calculated for $C_8H_7ClN_3O$ $(M+H)^+$ 196.0272, found 196.0264.

9f



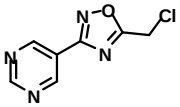
5-(Chloromethyl)-3-(pyridin-3-yl)-1,2,4-oxadiazole (9f): This compound was synthesized using the same protocol described for **9a** except using **8f** (150 mg, 0.70 mmol). The compound **9f** was isolated as a yellow solid (123 mg, 90%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.25 (dd, *J* = 2.2, 0.9 Hz, 1H), 8.70 (dd, *J* = 4.9, 1.7 Hz, 1H), 8.38 – 8.24 (m, 1H), 7.38 (ddd, *J* = 8.0, 4.9, 0.9 Hz, 1H), 4.71 (s, 2H). LC-MS (ESI+) *m/z* 196.03 $(M+H)^+$; HRMS (ESI+ve) *m*/*z* calculated for $C_8H_7ClN_3O$ $(M+H)^+$ 196.0272, found 196.0269.

9g



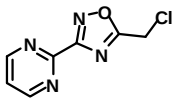
5-(Chloromethyl)-3-(pyridin-4-yl)-1,2,4-oxadiazole (9g): This compound was synthesized using the same protocol described for **9a** except using **8g** (200 mg, 0.94 mmol). The compound **9g** was isolated as a yellow solid (154 mg, 84%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.83-8.76 (m, 2H), 7.96-7.91 (m, 2H), 4.77 (s, 2H).

9h



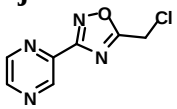
5-(Chloromethyl)-3-(pyrimidin-5-yl)-1,2,4-oxadiazole (9h)[7]: This compound was synthesized using the same protocol described for **9a** except using **8h** (140 mg, 0.65 mmol). The compound **9h** was isolated as a yellow solid (112 mg, 87%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.61 – 9.17 (m, 3H), 4.78 (s, 2H).

9i



5-(Chloromethyl)-3-(pyrimidin-2-yl)-1,2,4-oxadiazole (9i): This compound was synthesized using the same protocol described for **9a** except using **8i** (200 mg, 0.93 mmol). The compound **9i** was isolated as a white solid (155 mg, 85%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.96 (d, J = 4.9 Hz, 2H), 7.47 (t, J = 4.9 Hz, 1H), 4.80 (s, 2H). LC-MS (ESI+) *m/z* 197.03 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_7H_6ClN_4O$ $(M+H)^+$ 197.0225, found 197.0224.

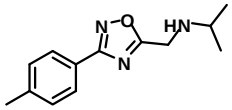
9j



5-(Chloromethyl)-3-(pyrazin-2-yl)-1,2,4-oxadiazole (9j): This compound was synthesized using the same protocol described for **9a** except using **8j** (300 mg, 1.40 mmol). The compound **9j** was isolated as a white solid (226 mg, 82%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.32 (d, J = 1.5 Hz, 1H), 8.72 (m, 1H), 8.70 (m, 1H), 4.75 (s, 2H). LC-MS (ESI+) *m/z* 197.02 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_7H_6ClN_4O$ $(M+H)^+$ 197.0225, found 197.0223.

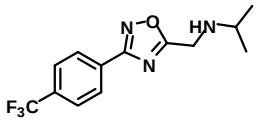
7. Synthetic Protocols for **10a** to **10q**.

10a



Isopropyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10a)[9] (10a): To a solution of **9a** (100 mg, 0.48 mmol) in acetonitrile (10 mL) was added isopropyl amine (57 mg, 0.96 mmol) and potassium carbonate (199 mg, 1.44 mmol) and the mixture was refluxed for 30 min. Acetonitrile was evaporated and the residue was dissolved in ethyl acetate and washed with water. Organic solvent was dried ($MgSO_4$) and evaporated to give the pure compound **10a** as a white solid (101 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94 (d, J = 8.2 Hz, 2H), 7.25 (dd, J = 7.8, 0.7 Hz, 2H), 4.08 (s, 2H), 2.92 (hept, J = 6.2 Hz , 1H), 2.38 (s, 3H), 1.10 (d, J = 6.2 Hz, 6H).

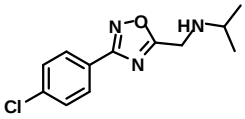
10b



Isopropyl-(3-(4-trifluoromethyl-phenyl)-[1,2,4]oxadiazol-5-ylmethyl)-amine (10b): This compound was synthesized using the same protocol described for **10a** except using **9b** (100 mg, 0.38 mmol), isopropyl amine

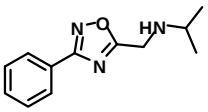
(45 mg, 0.76 mmol) and potassium carbonate (263 mg, 1.90 mmol). The compound **10b** was isolated as a viscous yellow liquid (99.7 mg, 92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.21 (dd, *J* = 8.8, 0.7 Hz, 2H), 7.74 (dd, *J* = 8.7, 0.6 Hz, 2H), 4.14 (s, 2H), 2.93 (hept., *J* = 6.2 Hz , 1H), 1.13 (d, *J* = 6.2 Hz, 6H).

10c



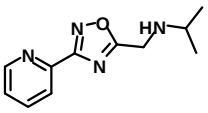
[3-(4-Chloro-phenyl)-[1,2,4]oxadiazol-5-yl)methyl]isopropyl-amine (10c): This compound was synthesized using the same protocol described for **10a** except using **9c** (145 mg, 0.63 mmol), isopropyl amine (75 mg, 1.26 mmol) and potassium carbonate (435 mg, 3.15 mmol). The pure compound **10c** was isolated as a pale yellow solid (133 mg, 84%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.99 (d, *J* = 8.6 Hz, 2H), 7.42 (d, *J* = 8.5 Hz, 2H), 4.09 (s, 2H), 2.89 (hept, *J* = 6.2 Hz , 1H), 1.10 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 252.08 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{12}H_{15}ClN_3O$ $(M+H)^+$ 252.0898, found 252.0887.

10d



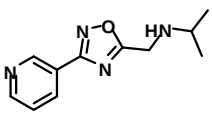
Isopropyl-(3-phenyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10d): This compound was synthesized using the same protocol described for **10a** except using **9d** (100 mg, 0.51 mmol), isopropyl amine (61 mg, 1.02 mmol) and potassium carbonate (352 mg, 2.55 mmol). The compound **10d** was isolated as a white solid (109 mg, 98%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.15 – 8.00 (m, 2H), 7.59 – 7.32 (m, 3H), 4.10 (s, 2H), 2.90 (hept, *J* = 6.2 Hz, 1H), 1.10 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 218.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{12}H_{16}N_3O$ $(M+H)^+$ 218.1288, found 218.1286.

10e



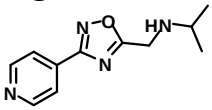
***N*-((3-(pyridin-2-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10e):** This compound was synthesized using the same protocol described for **10a** except using **9e** (74 mg, 0.38 mmol), isopropyl amine (45 mg, 0.77 mmol) and potassium carbonate (263 mg, 1.90 mmol). The compound **10e** was isolated as a yellow solid (75 mg, 89%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.80 (ddd, *J* = 4.8, 1.7, 0.9 Hz, 1H), 8.13 (d, *J* = 7.9 Hz, 1H), 7.85 (td, *J* = 7.8, 1.8 Hz, 1H), 7.43 (ddd, *J* = 7.6, 4.8, 1.2 Hz, 1H), 4.15 (s, 2H), 2.91 (hept, *J* = 6.2 Hz , 1H), 1.11 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 219.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{11}H_{15}N_4O$ $(M+H)^+$ 219.1240, found 219.1244.

10f



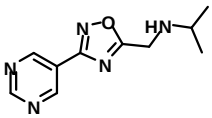
***N*-((3-(pyridin-3-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10f):** This compound was synthesized using the same protocol described for **10a** except using **9f** (80 mg, 0.41 mmol), isopropyl amine (48 mg, 0.82 mmol) and potassium carbonate (283 mg, 2.05 mmol). The pure compound **10f** was isolated as a pale yellow solid (75 mg, 84%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.33 – 9.25 (m, 1H), 8.73 (dd, *J* = 4.9, 1.7 Hz, 1H), 8.34 (dt, *J* = 8.0, 1.9 Hz, 1H), 7.41 (ddd, *J* = 8.0, 4.9, 0.8 Hz, 1H), 4.13 (s, 2H), 2.91 (hept, *J* = 6.2 Hz , 1H), 1.12 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 219.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{11}H_{15}N_4O$ $(M+H)^+$ 219.1240, found 219.1241.

10g



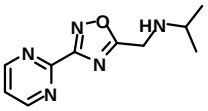
***N*-((3-(pyridin-4-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10g):** This compound was synthesized using the same protocol described for **10a** except using **9g** (104 mg, 0.53 mmol), isopropyl amine (63 mg, 1.06 mmol) and potassium carbonate (366 mg, 2.65 mmol). The compound **10g** was isolated as a pale yellow solid (94 mg, 81%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.76-8.67 (m, 2H), 7.89 (dd, *J* = 4.6, 1.4 Hz, 2H), 4.12 (s, 2H), 2.91 (hept, *J* = 6.2 Hz , 1H), 1.10 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 219.12 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{11}H_{15}N_4O$ $(M+H)^+$ 219.1240, found 219.1251.

10h



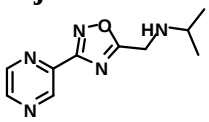
***N*-((3-(pyrimidin-5-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10h):** This compound was synthesized using the same protocol described for **10a** except using **9h** (80 mg, 0.41 mmol), isopropyl amine (48 mg, 0.82 mmol) and potassium carbonate (283 mg, 2.05 mmol). The compound **10h** was isolated as a yellow solid (79 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.33 (d, *J* = 0.7 Hz, 2H), 9.29 (s, 1H), 4.10 (d, *J* = 0.6 Hz, 2H), 2.86 (hept, *J* = 6.2 Hz , 1H), 1.07 (dd, *J* = 6.2, 0.7 Hz, 6H). LC-MS (ESI+) *m/z* 220.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{10}H_{14}N_5O$ $(M+H)^+$ 220.1193, found 220.1213.

10i



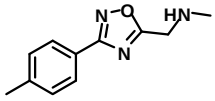
***N*-((3-(pyrimidin-2-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10i):** This compound was synthesized using the same protocol described for **10a** except using **9i** (100 mg, 0.51 mmol), isopropyl amine (60 mg, 1.02 mmol) and potassium carbonate (352 mg, 2.55 mmol). The compound **10i** was isolated as a yellow solid (96 mg, 86%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.89 (d, *J* = 4.9 Hz, 2H), 7.40 (t, *J* = 4.9 Hz, 1H), 4.12 (s, 2H), 2.81 (hept, *J* = 6.2 Hz, 1H), 1.03 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 220.11 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{10}H_{14}N_5O$ $(M+H)^+$ 220.1193, found 220.1193.

10j



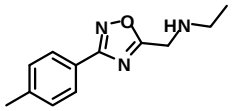
***N*-((3-(pyrazin-2-yl)-1,2,4-oxadiazol-5-yl)methyl)propan-2-amine (10j):** This compound was synthesized using the same protocol for described **10a** except using **9j** (100 mg, 0.51 mmol), isopropyl amine (60 mg, 1.02 mmol) and potassium carbonate (352 mg, 2.55 mmol). The compound **10j** was isolated as a yellow viscous liquid (101 mg, 90%). ^{1}H NMR (400 MHz, $CDCl_3$) δ ^{1}H NMR (400 MHz, $CDCl_3$) δ 9.37 (d, *J* = 1.4 Hz, 1H), 8.76 (dd, *J* = 2.4, 1.5 Hz, 1H), 8.73 (d, *J* = 2.5 Hz, 1H), 4.18 (s, 2H), 2.91 (hept, *J* = 6.2 Hz , 1H), 1.12 (d, *J* = 6.2 Hz, 6H). LC-MS (ESI+) *m/z* 220.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{10}H_{14}N_5O$ $(M+H)^+$ 220.1193, found 220.1198.

10k



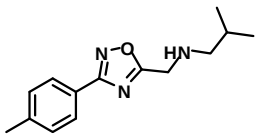
Methyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10k): This compound was synthesized using the same protocol described for **10a** except using **9a** (85 mg, 0.41 mmol) and methylamine (1 mL from 40% solution in water) and potassium carbonate (283 mg, 2.05 mmol). The compound **10k** was obtained as a yellow viscous liquid (79 mg, 95%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 8.2 Hz, 2H), 7.29 (d, *J* = 7.9 Hz, 2H), 4.07 (s, 2H), 2.55 (s, 3H), 2.41 (s, 3H). LC-MS (ESI+) *m/z* 204.12 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{11}H_{14}N_3O$ $(M+H)^+$ 204.1131, found 204.1141.

10l



Ethyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10l): This compound was synthesized using the same protocol described for **10a** except using **9a** (80 mg, 0.38 mmol) and ethylamine (1mL from 40% solution in water) and potassium carbonate (263 mg, 1.90 mmol). The compound **10l** was obtained as a yellow viscous liquid (73 mg, 88%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (d, *J* = 8.2 Hz, 2H), 7.28 (d, *J* = 8.2 Hz, 2H), 4.11 (s, 2H), 2.77 (q, *J* = 7.1 Hz, 2H), 2.41 (s, 3H), 1.16 (t, *J* = 7.1 Hz, 3H). LC-MS (ESI+) *m/z* 218.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{12}H_{16}N_3O$ $(M+H)^+$ 218.1288, found 218.1290.

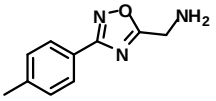
10m



Isobutyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10m): This compound was synthesized using the same protocol described for **10a** except using **9a** (100 mg, 0.48 mmol) and isobutylamine (70 mg, 0.96 mmol) and potassium carbonate (332 mg, 2.40 mmol). The compound **10m** was obtained as a white solid (108 mg,

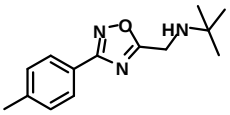
92%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96 (d, *J* = 8.1 Hz, 2H), 7.27 (d, *J* = 7.8 Hz, 2H), 4.08 (s, 2H), 2.50 (d, *J* = 6.8 Hz, 2H), 2.39 (s, 3H), 1.83 – 1.66 (m, 1H), 0.92 (d, *J* = 6.7 Hz, 6H).

10n



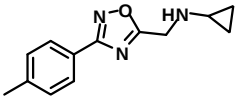
C-(3-*p*-Tolyl-[1,2,4]oxadiazol-5-yl)-methylamine (10n)[10]: A solution of **26** (120 mg, 0.38 mmol) and hydrazine monohydrate (23 mg, 0.46 mmol) were refluxed in 20 mL ethanol. The reaction was monitored by TLC (EtOAc/hexane [1:1], R_f= 0.5) and the reaction was completed in 30 min. Ethanol was evaporated and the residue was dissolved in EtOAc, washed with NaOH (1M, 5 x 10 ml) and water (2 x 10 ml). The organic phase was dried ($MgSO_4$) and evaporated to give the pure compound **10n** as a yellow solid (55 mg, 77%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 8.2 Hz, 2H), 7.21 (dd, *J* = 8.0, 0.4 Hz, 2H), 4.07 (s, 2H), 2.34 (s, 3H).

10o



***Tert*-butyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10o):** This compound was synthesized using the same protocol described for **10a** except using **9a** (88 mg, 0.42 mmol) and *tert*-buylamine (61 mg, 0.84 mmol) and potassium carbonate (290 mg, 2.10 mmol). The compound **10o** was obtained as a yellow viscous liquid (81 mg, 79%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 8.2 Hz, 2H), 7.28 (dd, *J* = 8.5, 0.5 Hz, 2H), 4.07 (s, 2H), 2.41 (s, 3H), 1.19 (s, 9H). LC-MS (ESI+) *m/z* 246.15 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{14}H_{19}N_3O$ $(M+H)^+$ 246.1601, found 246.1593.

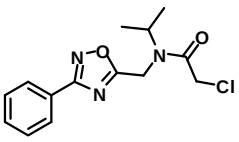
10p



Cyclopropyl-(3-*p*-tolyl-[1,2,4]oxadiazol-5-ylmethyl)-amine (10p): This compound was synthesized using the same protocol described for **10a** except using **9a** (100 mg, 0.48 mmol) and cyclopropylamine (55 mg, 0.96 mmol) and potassium carbonate (332 mg, 2.40 mmol). The compound **10p** was obtained as a yellow viscous liquid (102 mg, 93%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.97 (d, *J* = 8.2 Hz, 2H), 7.28 (dd, *J* = 7.9, 0.6 Hz, 2H), 4.14 (s, 2H), 2.41 (s, 3H), 2.33 – 2.17 (m, 1H), 0.61 – 0.33 (m, 4H). LC-MS (ESI+) *m/z* 230.13 $(M+H)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{13}H_{16}ClN_3O$ $(M+H)^+$ 230.1288, found 230.1285.

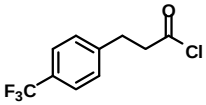
8. Synthetic Protocols for **15, 18a, 18b, 20, 21, 22, 24, 25, 26 and 27.**

15



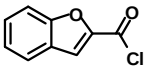
***N*-Isopropyl-2-chloro-*N*-((3-phenyl-1,2,4-oxadiazol-5-yl)methyl)acetamide (15):** To a solution of **10d** (80 mg, 0.37 mmol) and triethylamine (75 mg, 0.74 mmol) in THF (4 ml) was added chloroacetyl chloride (50 mg, 0.44 mmol) in THF (1ml) in drop-wise. The reaction was monitored by TLC (EtOAc/hexane [7:3], R_f= 0.7) and the reaction went to completion in 15 min. THF was evaporated and the residue was dissolved in EtOAc (15 ml) and washed with 4M HCl (2 x 15 ml) and water (2 x 15 ml). The organic phase was dried ($MgSO_4$) and evaporated. The compound was purified by SiO_2 chromatography (EtOAc/hexane gradient elution) to obtain **15** as a viscous colorless liquid (87 mg, 80%). HPLC 100% (R_t = 5.54 min , 60% CH_3CN in 0.1% TFA water 30 min); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 – 8.00 (m, 2H), 7.53 – 7.41 (m, 3H), 4.79 (s, 2H), 4.70 (s, 2H) [δ 4.79 minor isomer shown]), 4.33 – 4.24 (m, 1H) [δ 4.90 – 4.79 minor isomer shown]), 4.20 (s, 2H), 1.34 (d, *J* = 6.6 Hz, 6H), [δ 1.15 minor isomer shown]). LC-MS (ESI+) *m/z* 294.10 $(M+H)^+$ 316.09 $(M+Na)^+$; HRMS (ESI+ve) *m/z* calculated for $C_{14}H_{17}N_3O_3$ $(M+H)^+$ 294.1004, found 294.1005.

18a



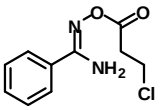
3-(4-(Trifluoromethyl)phenyl)propanoyl chloride (18a): This compound was synthesized using the same protocol described for **5a** except using 3-(4-(trifluoromethyl)phenyl)propanoic acid (400 mg, 1.83 mmol) , $SOCl_2$ (5 ml) and benzene (10 ml). The compound **18a** was isolated as yellow liquid (408 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.58 (d, *J* = 8.1 Hz, 2H), 7.33 (d, *J* = 8.0 Hz, 2H), 3.24 (t, *J* = 7.3 Hz, 2H), 3.08 (t, *J* = 7.3 Hz, 2H).

18b



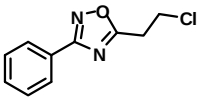
Benzofuran-2-carbonyl chloride (18b): This compound was synthesized using the same protocol described for **5a** except using benzofuran-2-carbonic acid (300 mg, 1.85 mmol), thionyl chloride (5 ml) and benzene (10 ml). The compound **18b** was isolated as a yellow liquid (314 mg, 94%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.85 (d, *J* = 0.9 Hz, 1H), 7.76 (d, *J* = 8.0 Hz, 1H), 7.65 – 7.51 (m, 2H), 7.37 (ddd, *J* = 8.1, 6.8, 1.3 Hz, 1H).

20



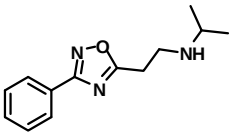
***(Z)*-*N*'-(2-chloropropanoyloxy)benzimidamide (20):** To a solution of *N*-hydroxy-benzamidine (300 mg, 2.20 mmol) in dichloromethane (15 ml) at 0 ^oC was added 3-chloropropionyl chloride (279 mg, 2.20 mmol) dropwise and the mixture was warmed up to rt and stirred for 14 h. The mixture was extracted with saturated sodium bicarbonate (2 x 15 ml), water (15 ml), dried ($MgSO_4$) and evaporated to give the colorless viscous compound **20** (379 mg, 76%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.69 (dd, *J* = 8.3, 1.3 Hz, 2H), 7.49-7.46 (m, 1H), 7.45 – 7.37 (m, 2H), 3.85 (t, *J* = 6.7 Hz, 2H), 3.01 (t, *J* = 6.7 Hz, 2H).

21



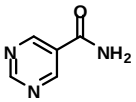
5-(2-Chloro-ethyl)-3-phenyl)-[1,2,4]oxadiazole (21): This compound was synthesized using the same protocol described for **9a** except using **20** (300 mg, 1.32 mmol). The compound **21** was isolated as a viscous colorless liquid (224 mg, 81%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08 (dd, *J* = 7.9, 1.8 Hz, 2H), 7.54 – 7.45 (m, 3H), 3.99 (t, *J* = 6.9 Hz, 2H), 3.43 (t, *J* = 6.9 Hz, 2H).

22



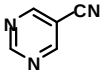
Isopropyl-[2-(3-phenyl)-[1,2,4]oxadiazol5-yl)-ethyl]-amine (22): This compound was synthesized using the same protocol described for **10a** except using **21** (100 mg, 0.48 mmol), isopropyl amine (57 mg, 0.96 mmol) and potassium carbonate (332 mg, 2.40 mmol). The compound **22** was isolated as a brown viscous liquid (955 mg, 86%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (dd, *J* = 8.0, 1.8 Hz, 2H), 7.55 – 7.34 (m, 3H), 3.09-3.07 (m, 4H), 2.84 (hept, *J* = 6.2 Hz, 1H), 1.03 (d, *J* = 6.3 Hz, 6H).

24



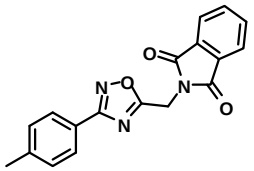
Pyrimidine-5-carboxamide (24)[8]: A mixture of pyrimidine-5-carboxylic acid ethyl ester (1.57 g, 10.32 mmol) and ammonium hydroxide (1.2 ml) were heated in a sealed tube at 50 ^{o}C for 14 h. The solid precipitated was filtered (300 mg) and the filtrate was concentrated. The residue obtained was stirred in ethanol/ethyl acetate (1:4, 13 ml) at rt for 2 h. The white precipitate was collected by filtration and dried under vacuum to give the final compound **24** as a white solid (826 mg, 65%). ^{1}H NMR (400 MHz, DMSO) δ 9.29 (s, 1H), 9.15 (s, 2H), 8.31 (brs, 1H), 7.82 (brs, 1H).

25



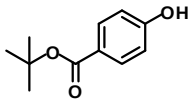
Pyrimidine-5-carbonitrile (25)[8]: To a suspension of **24** (262 mg, 2.13 mmol) and triethyl amine (431 mg, 4.26 mmol) in anhydrous dichloromethane (15 ml) was slowly added a solution of trifuoroacetic anhydride (0.36 ml in 4 ml dichloromethane) at 0 ^{o}C. The reaction mixture was stirred at 0 ^{o}C to rt for 2 h, quenched with water (2 ml) , washed with NaOH (1 N, 5 ml) and brine (2 x 5 ml). The organic phase was dried ($MgSO_4$) and evaporated below 30 ^{0}C using a rotary evaporator to provide **25** as a pale yellow solid (175 mg, 78%). ^{1}H NMR (400 MHz, DMSO) δ 9.44 (s, 1H), 9.31 (s, 2H).

26



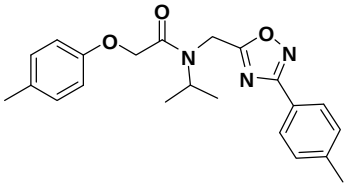
2-(3-*p*-Tolyl-)-[1,2,4]oxadiazol-5-ylmethyl)-isoindole-1,3-dione (26)[10]: A solution of **9a** (100 mg, 0.48 mmol), phthalimide (71 mg, 0.48 mmol) and potassium carbonate (332 mg, 2.4 mmol) were refluxed in acetonitrile (15 ml) for 1 h. Acetonitrile was evaporated and the residue was dissolved in ethyl acetate (15 mL) and washed with water (2 x 15 mL). The organic phase was dried ($MgSO_4$) and evaporated to give the pure compound **26** as a white solid (140 mg, 91%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.96-7.90 (m, 2H), 7.89 (d, *J* = 8.2 Hz, 2H), 7.81-7.77 (m, 2H), 7.23 (d, *J* = 8.0 Hz, 2H), 5.16 (s, 2H), 2.38 (s, 3H). LC-MS (ESI+) *m/z* 320.10 $(M+H)^+$; HRMS (ESI+ve) *m*/*z* calculated for $C_{18}H_{14}N_3O3$ $(M+H)^+$ 320.1030, found 320.1041.

27

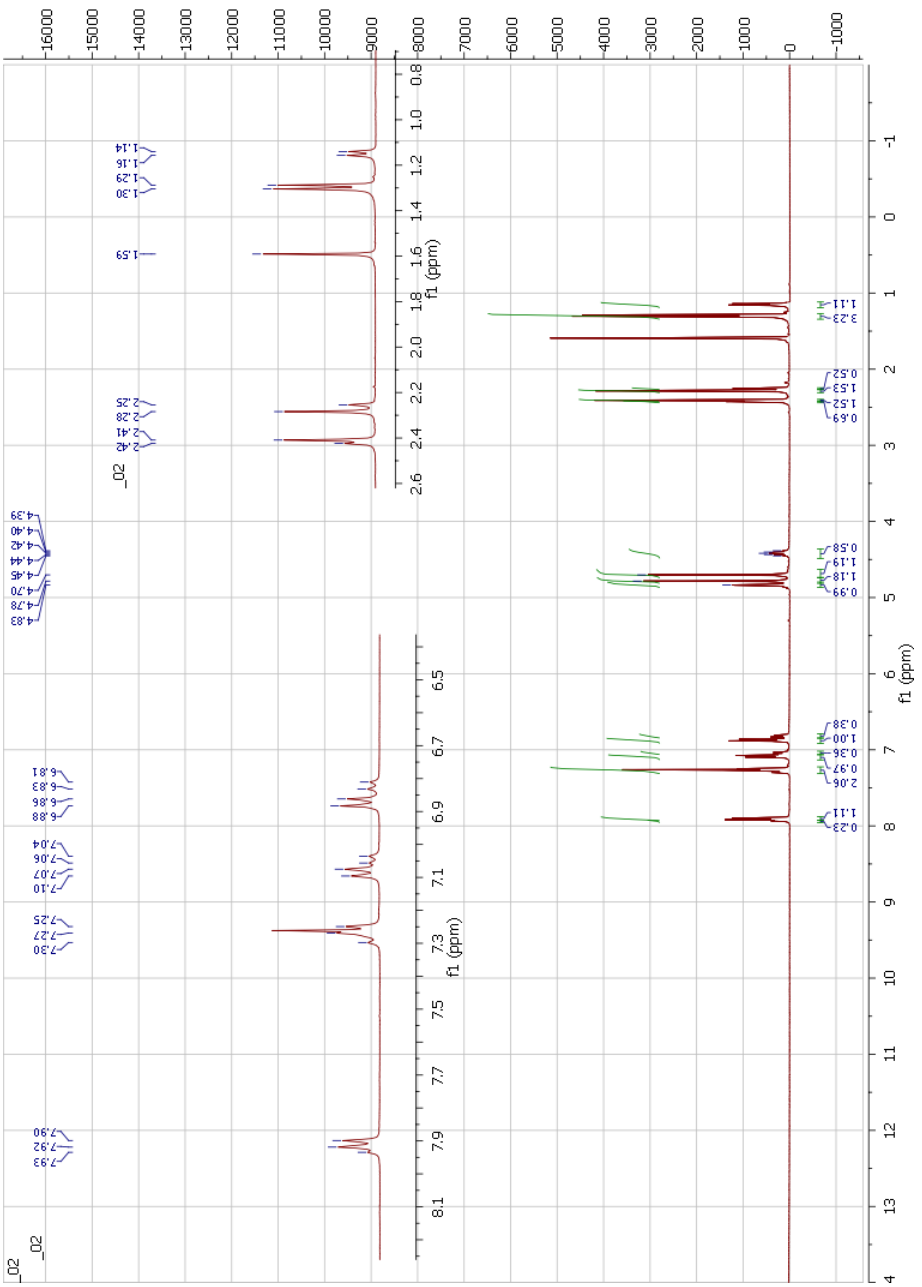


***tert*-Butyl 4-hydroxybenzoate (27)[11]:** According to literature procedure[11], hydroxy benzoic acid (1.50 g, 10.86 mmol), *tert*-butanol (12.90 g, 17.40 mmol), DBU (183 mg, 1.20 mmol) and DCC (2.46 g, 11.95 mmol) were mixed in DCM (40 ml) and vigorously stirred for 18 h. After evaporation of the mixture to dryness, DCM (50 ml) was added to the residue and the resulting heterogeneous mixture was filtered. The filtrate was washed with sat. K_2CO_3 (2 x 50 ml) and sat. NaCl (50 ml). The organic phase was dried ($MgSO_4$) and evaporated and purified by SiO_2 chromatography (EtOAc/hexane gradient elution) to obtain **27** as a crystalline white compound (1.22 g, 58%). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89 (d, *J* = 8.8 Hz, 2H), 6.84 (d, *J* = 8.9 Hz, 2H), 5.29 (s, 1H), 1.57 (s, 9H).

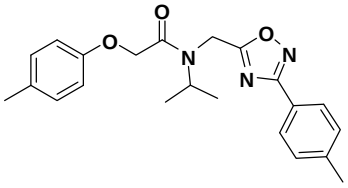
9. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS, HPLC and elemental analysis for compound **1.**

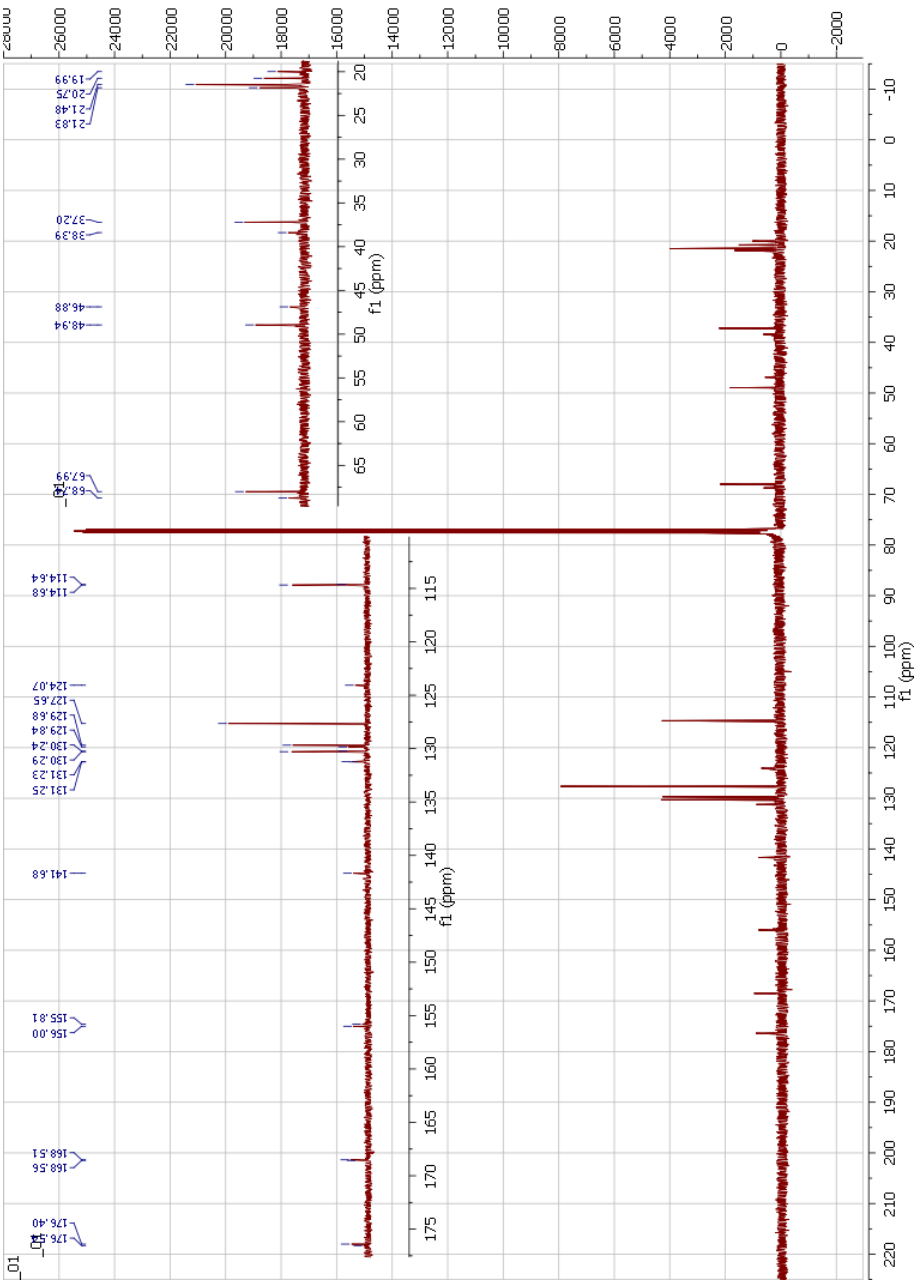


^{1}H NMR spectrum (400 MHz) of **1** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **1** in $CDCl_3$





LC-MS of **1**

Mass List Report

Page 1 of 1

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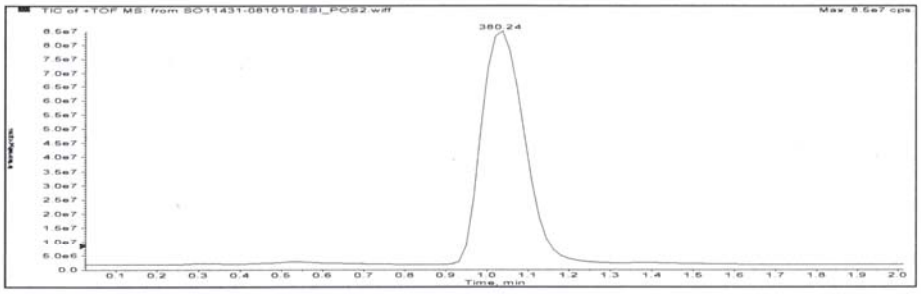

Period# : Average of all periods **Experiment# : Average of all experiments**

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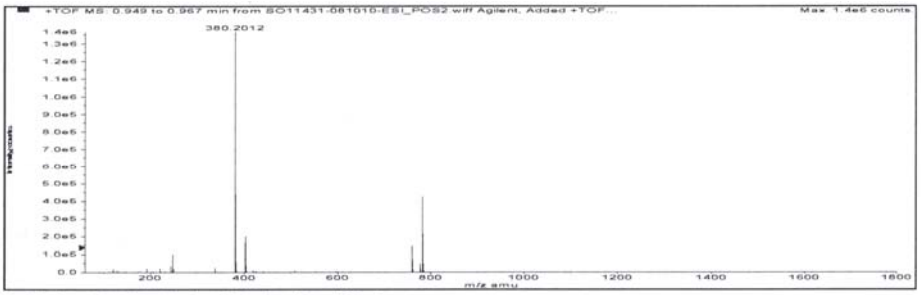

Peak# : 1 Experiment# : 1 Retention Time : 1.03 min

Friday, October 08, 2010

13:35:25 PM

HRMS of **1**

Empirical Formula Confirmation Report

Sample Name: so1143 Sample Location: P1-D-09 Sample Id: so1143 Operator: EasyAccess
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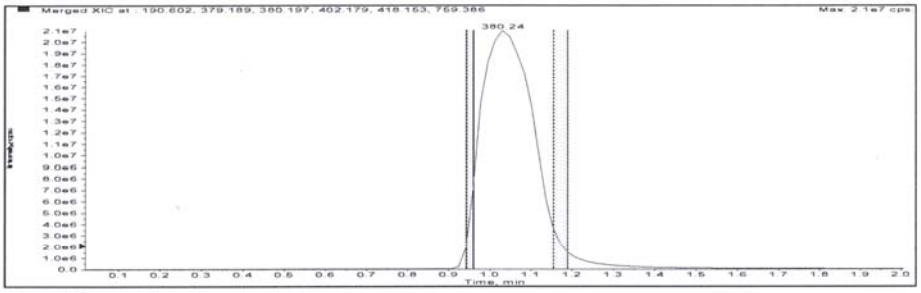
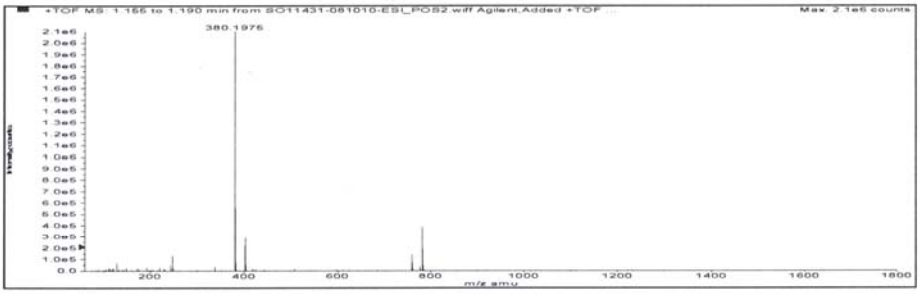
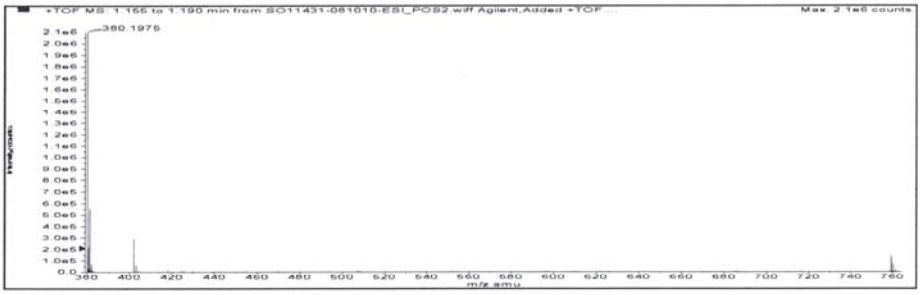


Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C22H25N3O3	--	379.18959	1.03	1.90478 E8	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	2147285.70	380.19687	380.19752	0.65588	1.73	--
[M+Na]+	297300.96	402.17881	402.17777	-1.04025	-2.59	--
[2M+H]+	138953.49	759.38646	759.38503	-1.42621	-1.88	--

Friday, October 08, 2010 13:42:25 PM

HPLC of **1**

Area % Report

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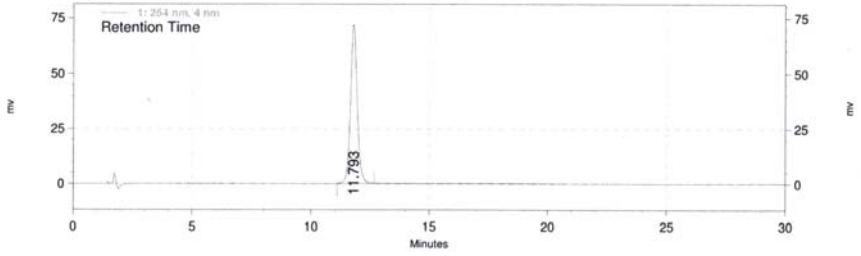
Printed: 10/28/2010 7:38:42 PM



1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
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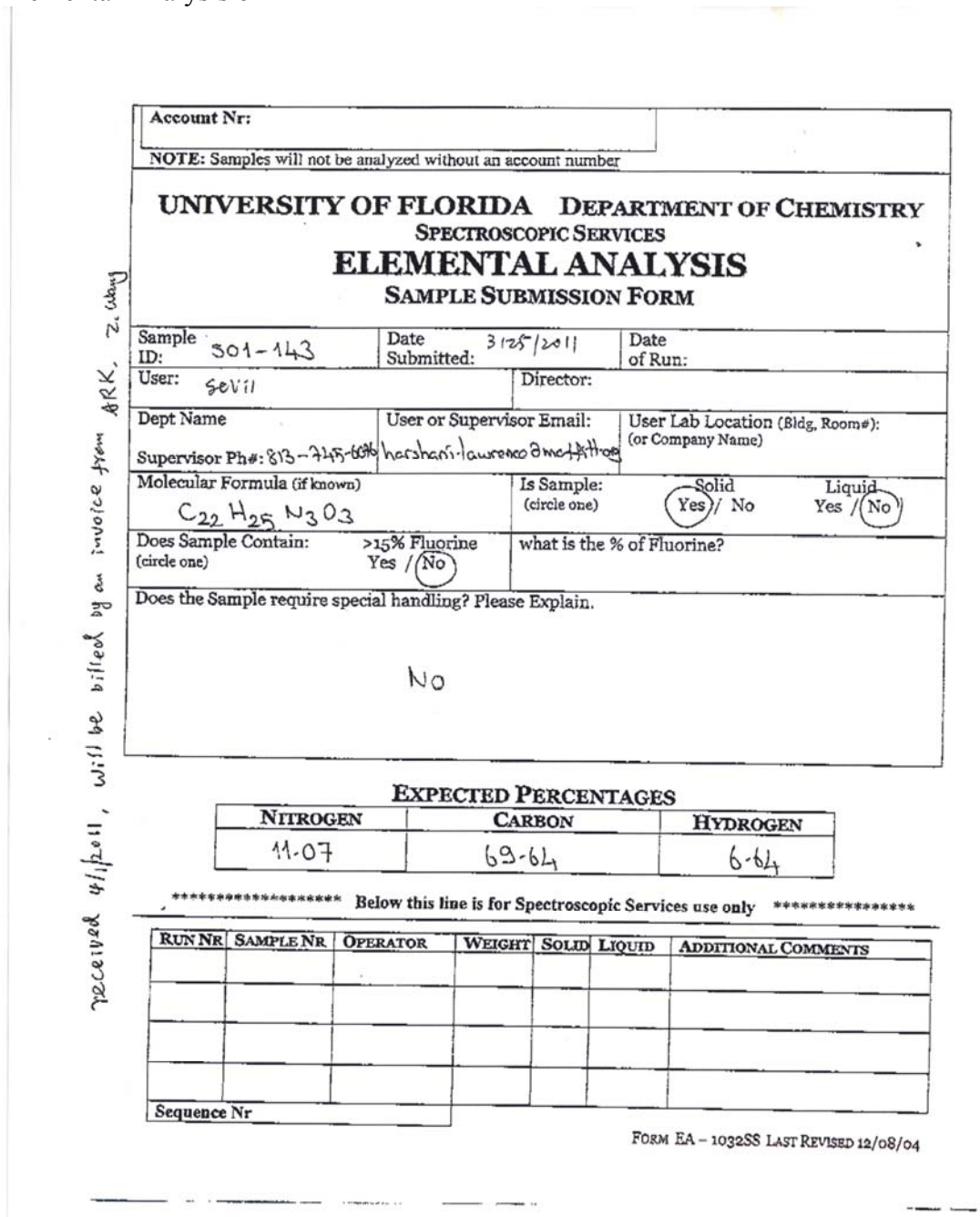
Totals	1416405	100.00	72028	100.00

Elemental Analysis of **1**



Account Nr:

NOTE: Samples will not be analyzed without an account number

UNIVERSITY OF FLORIDA DEPARTMENT OF CHEMISTRY
SPECTROSCOPIC SERVICES
ELEMENTAL ANALYSIS
SAMPLE SUBMISSION FORM

Sample ID: 501-143	Date Submitted: 3/25/2011	Date of Run:
User: Sevil	Director:	
Dept Name Supervisor Ph#: 813-745-6976	User or Supervisor Email: harshani.lawrence@methodist.edu	User Lab Location (Bldg, Room#): (or Company Name)
Molecular Formula (if known) $C_{22}H_{25}N_3O_3$	Is Sample: (circle one) Solid Yes / No; Liquid Yes / (No)	
Does Sample Contain: (circle one) >15% Fluorine Yes / (No)	what is the % of Fluorine?	
Does the Sample require special handling? Please Explain. No		

received 4/1/2011, will be billed by an invoice from ARK, 2 weeks

EXPECTED PERCENTAGES

NITROGEN	CARBON	HYDROGEN
11.07	69.64	6.64

********** Below this line is for Spectroscopic Services use only **********

RUN NR	SAMPLE NR	OPERATOR	WEIGHT	SOLID	LIQUID	ADDITIONAL COMMENTS

Sequence Nr

FORM EA – 1032SS LAST REVISED 12/08/04

EAGER 200 Stripchart

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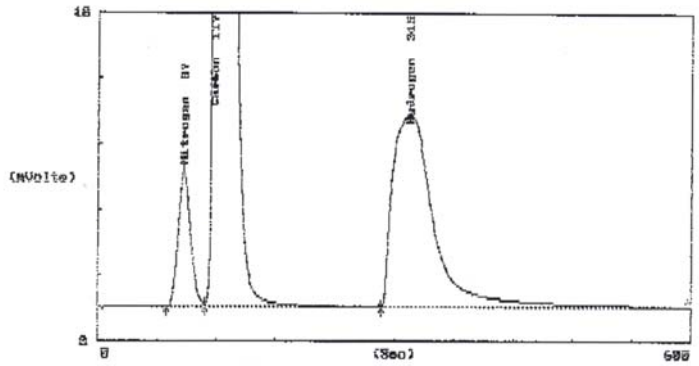
Analysed : 04-04-11 08:53:40 Printed :04-04-2011 09:03:42



EAGER 200 Peak Integration Report

Instrument name : Instrument #1 Bline drift (fV): 9.7
Company Name : U of Florida Operator Ident. : KOU
Analysed : 04-04-11 08:53:40 Printed : 04-04-2011 09:03:43
Sample Ident. : 25 S01-143 Filename : 255925
Sample Weight : 2.149 Calc.method: using 'K. Factors'

No. (#)	Type (#)	Start (Sec)	End (Sec)	Ret Time (Sec)	Height (fV)	Area (fV*Sec)	Area % (%)	Name
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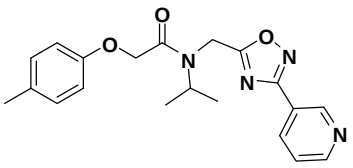
2	FU	108	286	117	62271.3	1003574	74.72	Carbon
3	RS	286	597	315	5825.9	281770	20.98	Hydrogen
						1343063	100.00	

EAGER 200 Unk Report

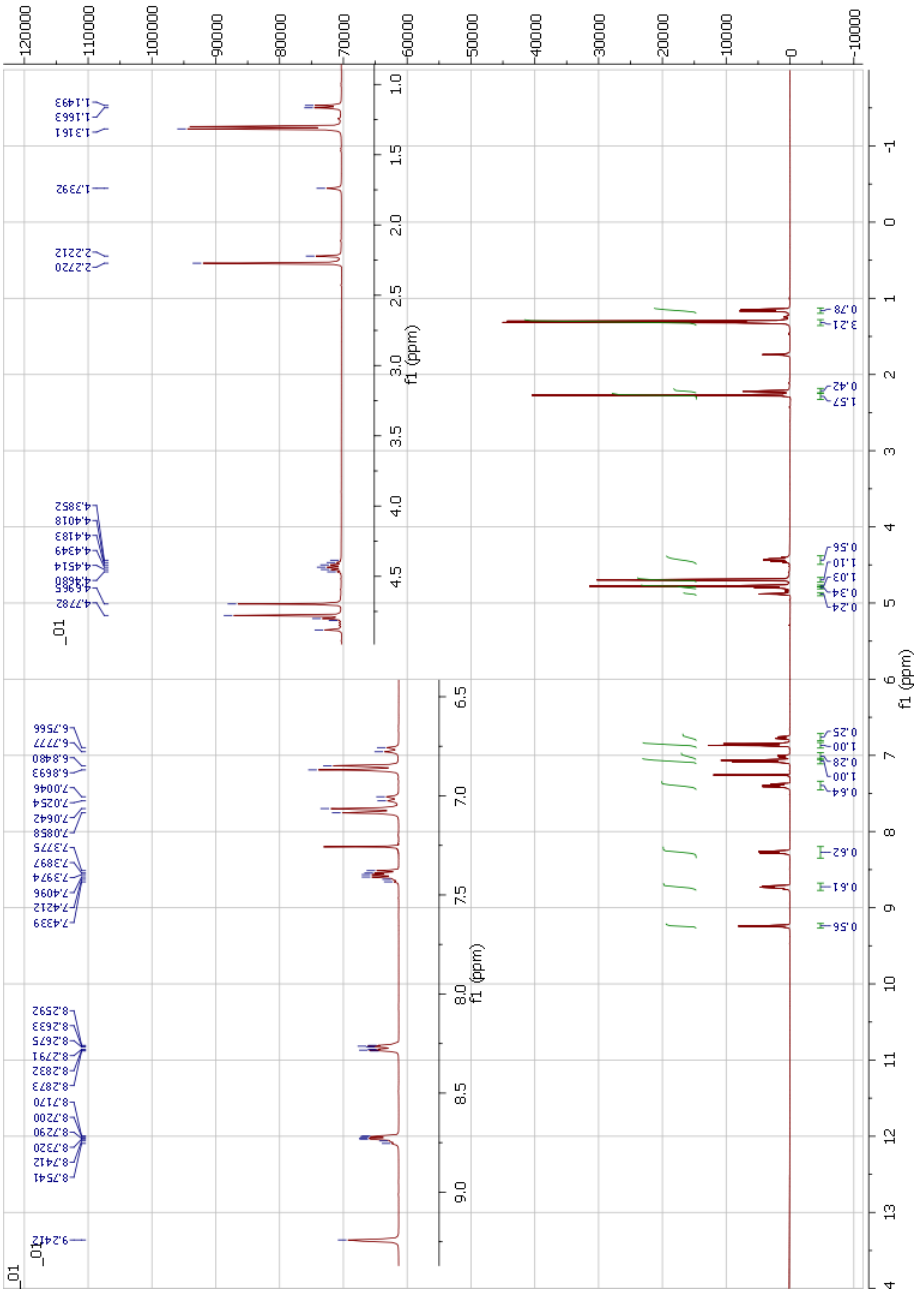
Instrument name : Instrument #1 Bline drift (fV): 9.7
Company Name : U of Florida Operator Ident. : KOU
Analysed : 04-04-11 08:53:40 Printed : 04-04-2011 09:03:43
Sample Ident. : 25 S01-143 Filename : 255925
Sample Weight : 2.149 Calc.method: using 'K. Factors'

Pk. (#)	Ret Time (Sec)	Area (fV*Sec)	Element % (%)	Area Ratio	Name
1	87	57719	11.130	.173874E+02	Nitrogen
2	117	1003574	69.511	.100000E+01	Carbon
3	315	281770	6.737	.356168E+01	Hydrogen

10. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11x**.



^{1}H NMR spectrum (400 MHz) of **11x** in $CDCl_3$



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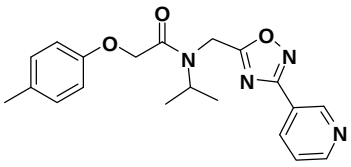

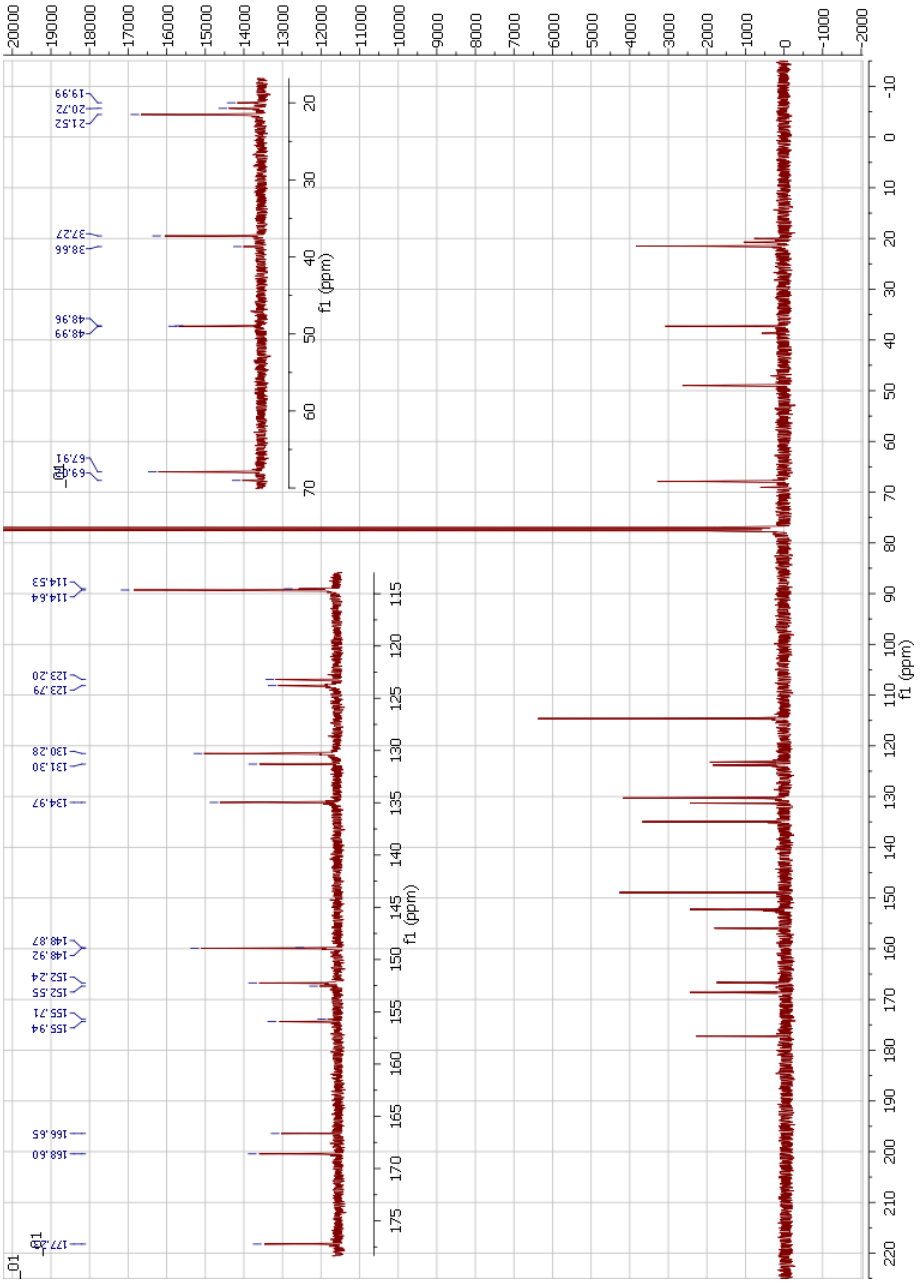

LC-MS of **11x**

Mass List Report

Page 1 of 1

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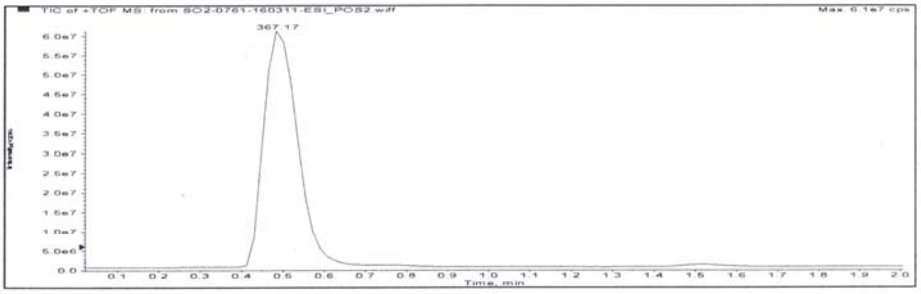

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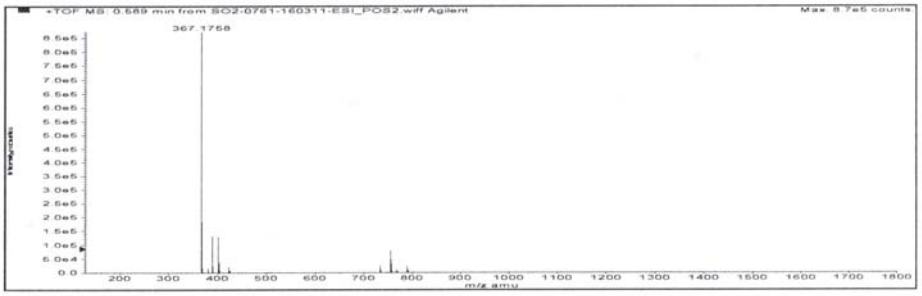
Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.49	3.40206 E8	367.17582



Peak# : 1 Experiment# : 1 Retention Time : 0.49 min

Wednesday, March 16, 2011

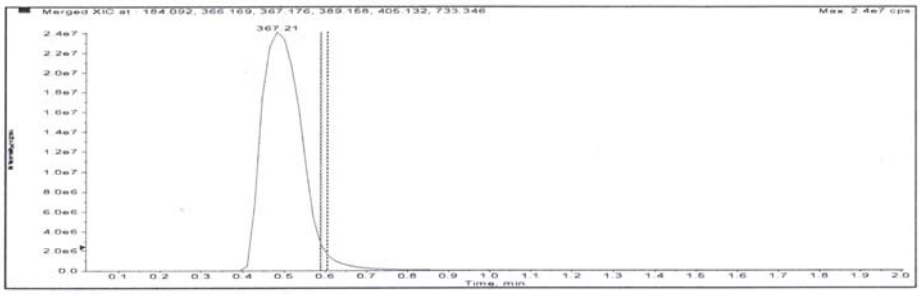
16:31:27 PM

HRMS of **11x**

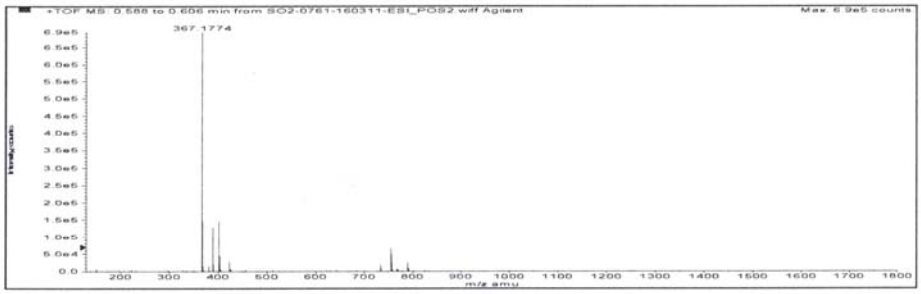
Empirical Formula Confirmation Report

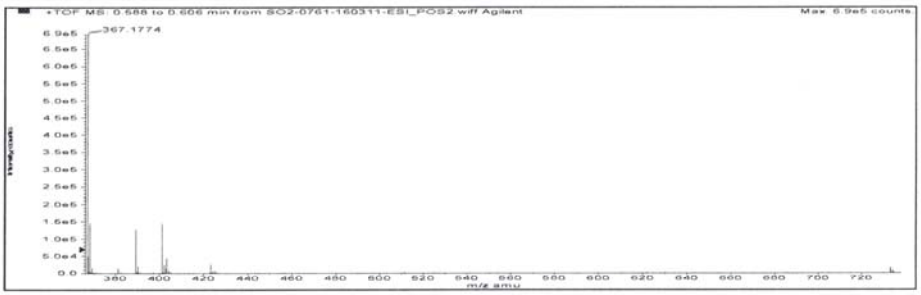
Sample Name: so2-076 Sample Location: P1-E-09 Sample Id: so2-076 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\03-11\Data\SO2-0761-160311-ESI_POS2.wiff Acq Time: March 16 2011, 07:14:26 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C20H22N4O3	--	366.16919	0.48	1.63561 E8	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	713177.20	367.17647	367.17742	0.95187	2.59	--
[M+Na]+	127254.25	389.15841	389.15918	0.76731	1.97	--
[2M+H]+	17614.32	733.34566	733.34581	0.15247	0.21	--

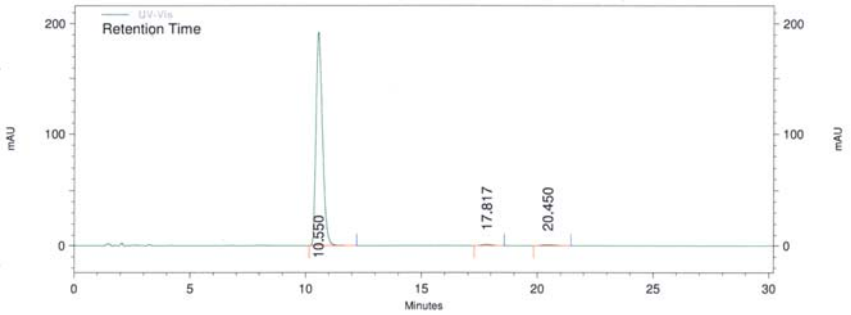
Wednesday, March 16, 2011 19:16:45 PM

HPLC of **11x**

Area Percent Report

Data File: C:\HPLC data\Yunting\so2-076CH3CN35H2O65 0.1TFA 1mL 30min.met12-21-2011 5-49-24 PM.dat
Acquired: 12/21/2011 5:49:45 PM
Printed: 12/21/2011 6:21:47 PM

Analyst: System
Sample ID: so2-076 **Vial:** N/A **Injection Volume:** 0

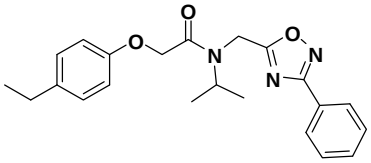


UV-Vis Results

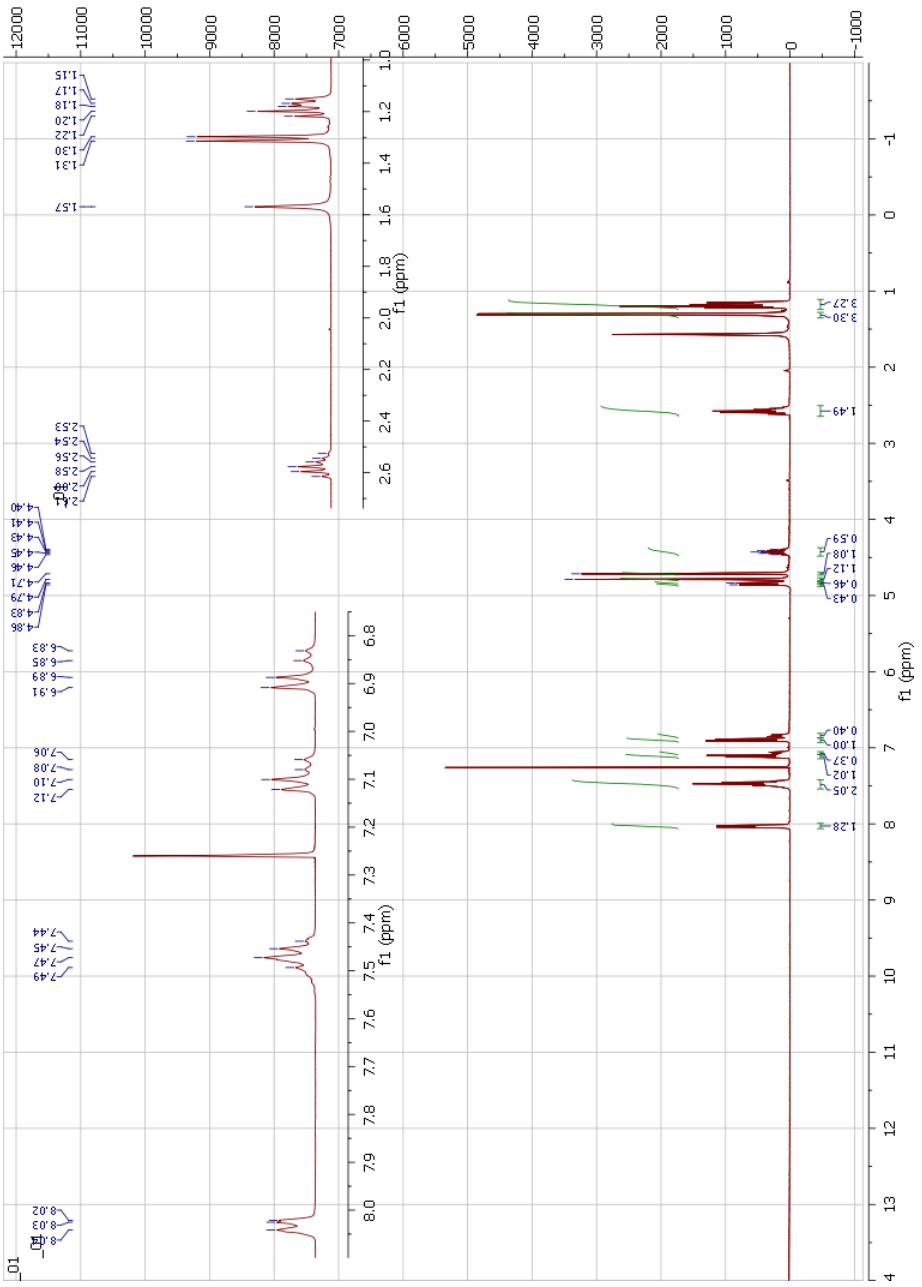
Name	Retention Time	Area	Area Percent	Integration Codes
	10.550	3712982	98.342	BB
	17.817	31518	0.835	BB
	20.450	31090	0.823	BB
Totals		3775590	100.000	

Instrument Name: HPLC **Software Version:** Version 3.1.7
Acquisition Method: C:\EZStart\Projects\Default\Method\xin\CH3CN35H2O65 0.1TFA 1mL 30min.met
Sequence: C:\HPLC data\Dan\abc.seq

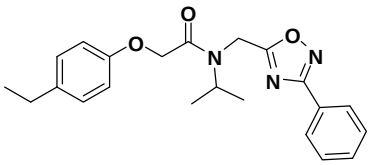
11. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11aa**.

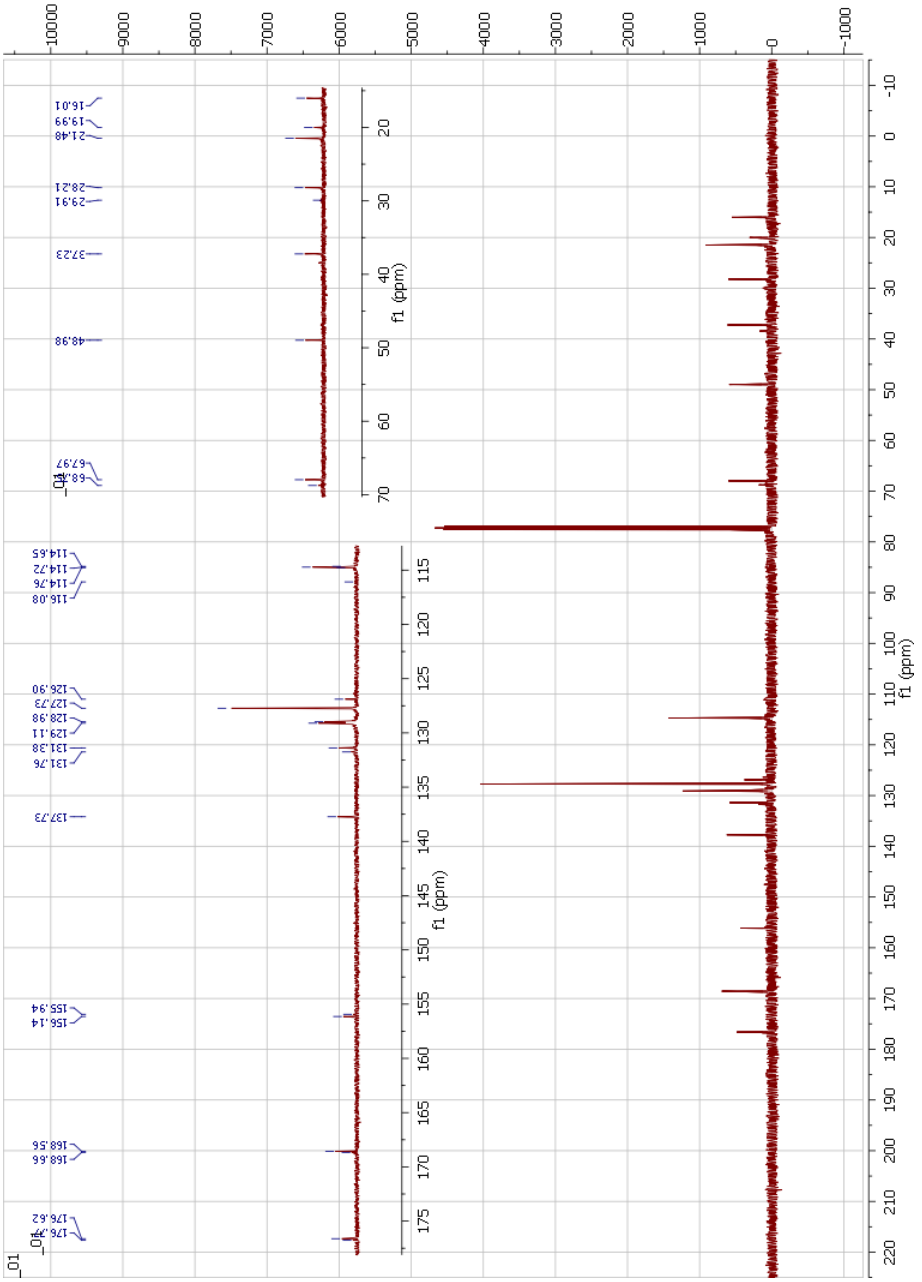


^{1}H NMR spectrum (400 MHz) of **11aa** in $CDCl_3$



^{13}C NMR spectrum (400 MHz) of **11aa** in $CDCl_3$

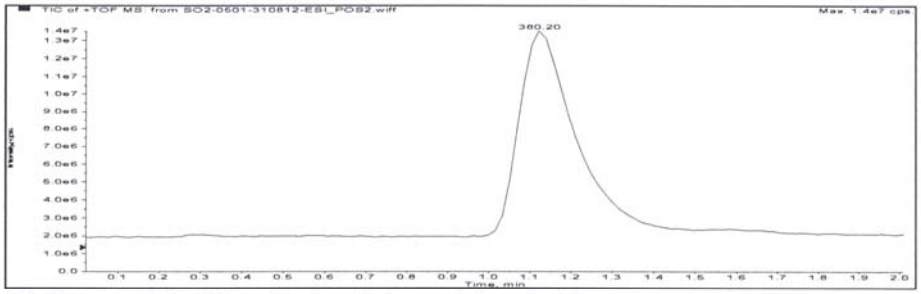




LC-MS of **11aa**

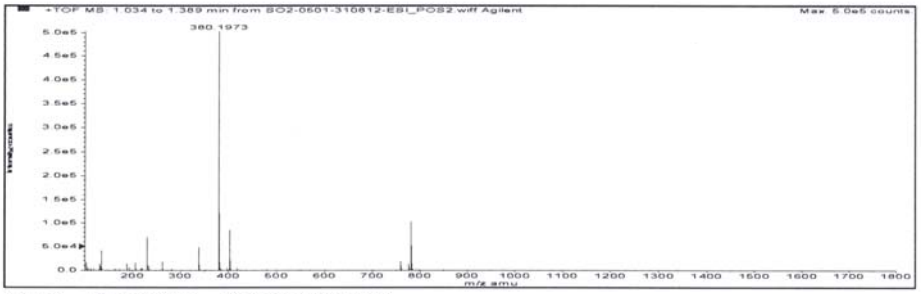
Mass List Report

Sample#: so2-050 Sample Location: P1-C-01 Sample Id: so2-050 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO2-0501-310812-ESI_POS2.wiff Acq Time: August 31 2012, 04:14:55 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	1.13	1.15238 E8	380.19732



Peak# : 1 **Experiment# : 1** **Retention Time : 1.13 min**

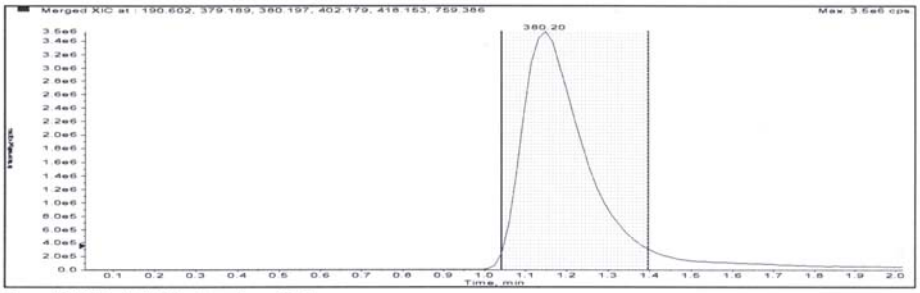
Friday, August 31, 2012 16:17:07 PM

HRMS of **11aa**

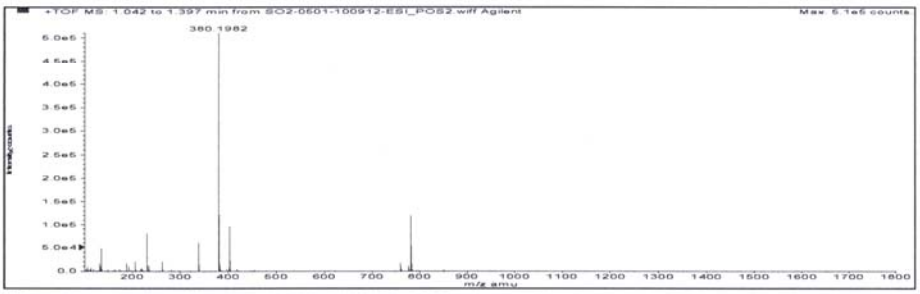
Empirical Formula Confirmation Report

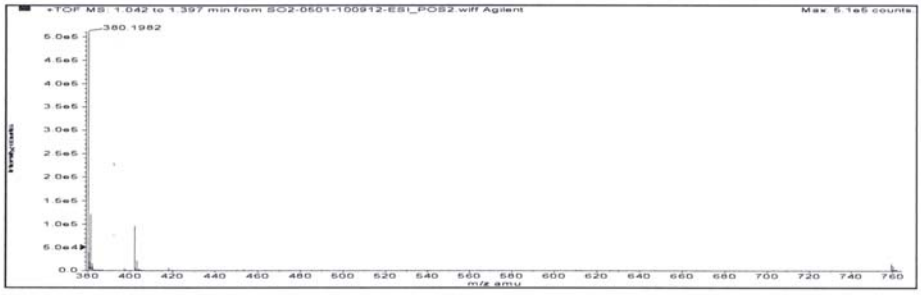
Sample Name: SO2-050 Sample Location: P1-C-07 Sample Id: SO2-050 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-12\Data\SO2-0501-100912-ESI_POS2.wiff Acq Time: September 10 2012, 06:15:44 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C22H25N3O3	--	379.18959	1.15	3.63127 E7	--

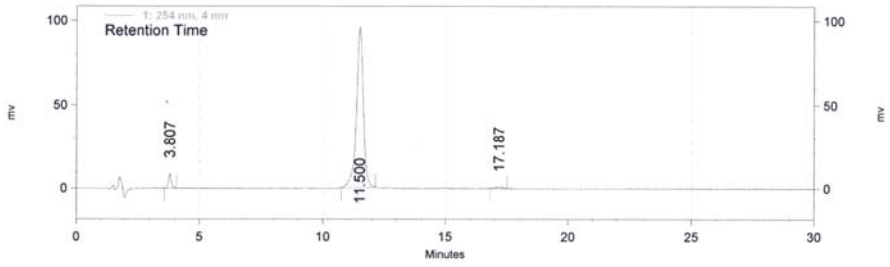
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	524170.19	380.19687	380.19824	1.37274	3.61	--
[M+Na]+	97405.64	402.17881	402.18008	1.26996	3.16	--
[M+K]+	5470.87	418.15275	418.15405	1.30294	3.12	--
[2M+H]+	17652.04	759.38646	759.38738	0.91935	1.21	--

Monday, September 10, 2012 18:18:06 PM

HPLC of **11aa**

Area % Report

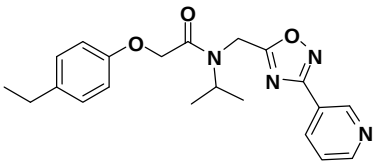
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so2-050 60% ACN 40% H2O 0.1TFA 1ml 30 min.met 2-21-2011 4-17-17 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\60% ACN 40% H2O 0.1TFA 1ml 30 min.met
Acquired: 2/21/2011 4:19:35 PM
Printed: 4/9/2012 2:42:10 PM



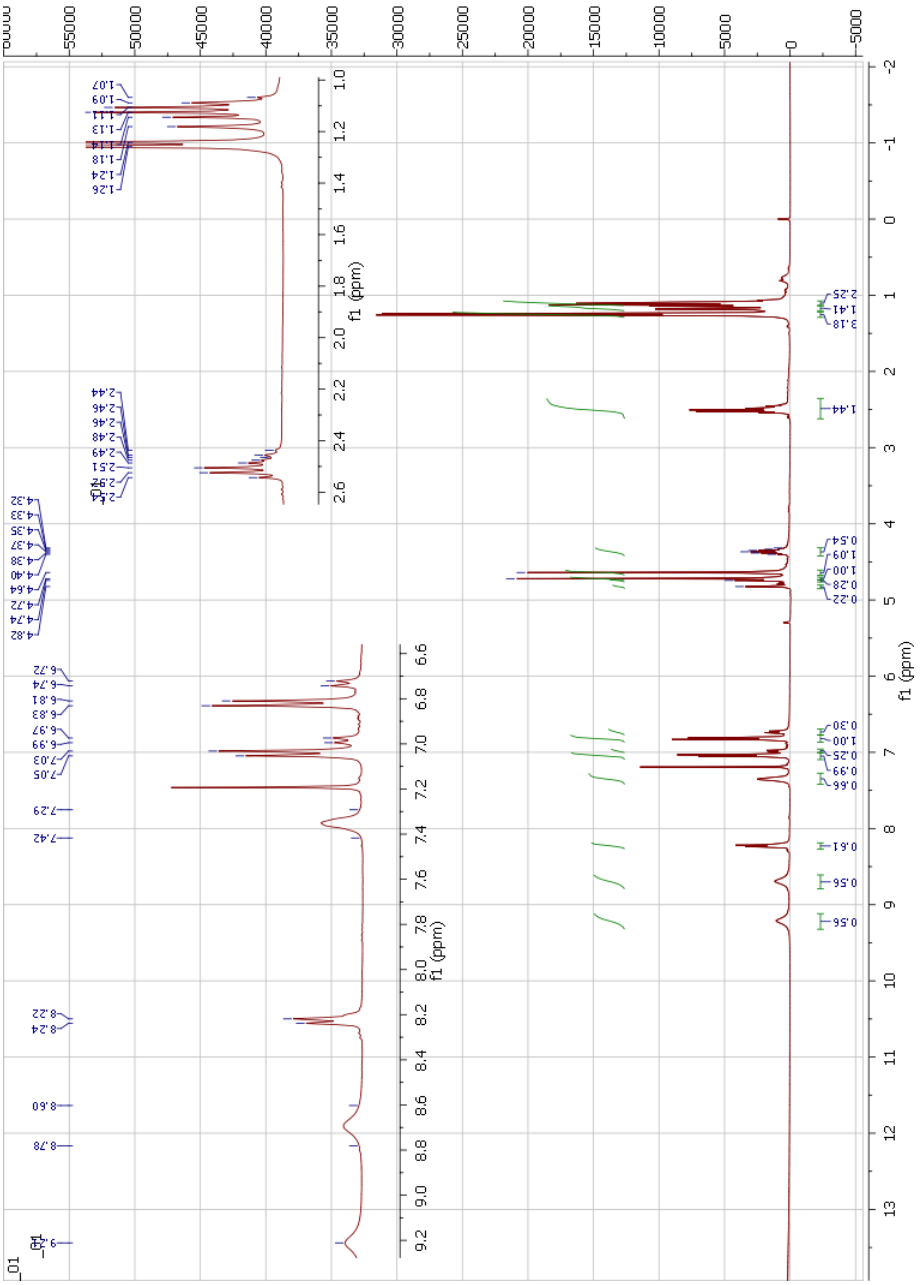
1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
3.807	71857	3.64	8960	8.50
11.500	1887656	95.49	95633	90.74
17.187	17218	0.87	804	0.76
Totals	1976731	100.00	105397	100.00

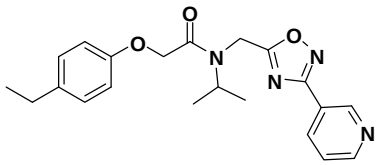
12. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ab**.

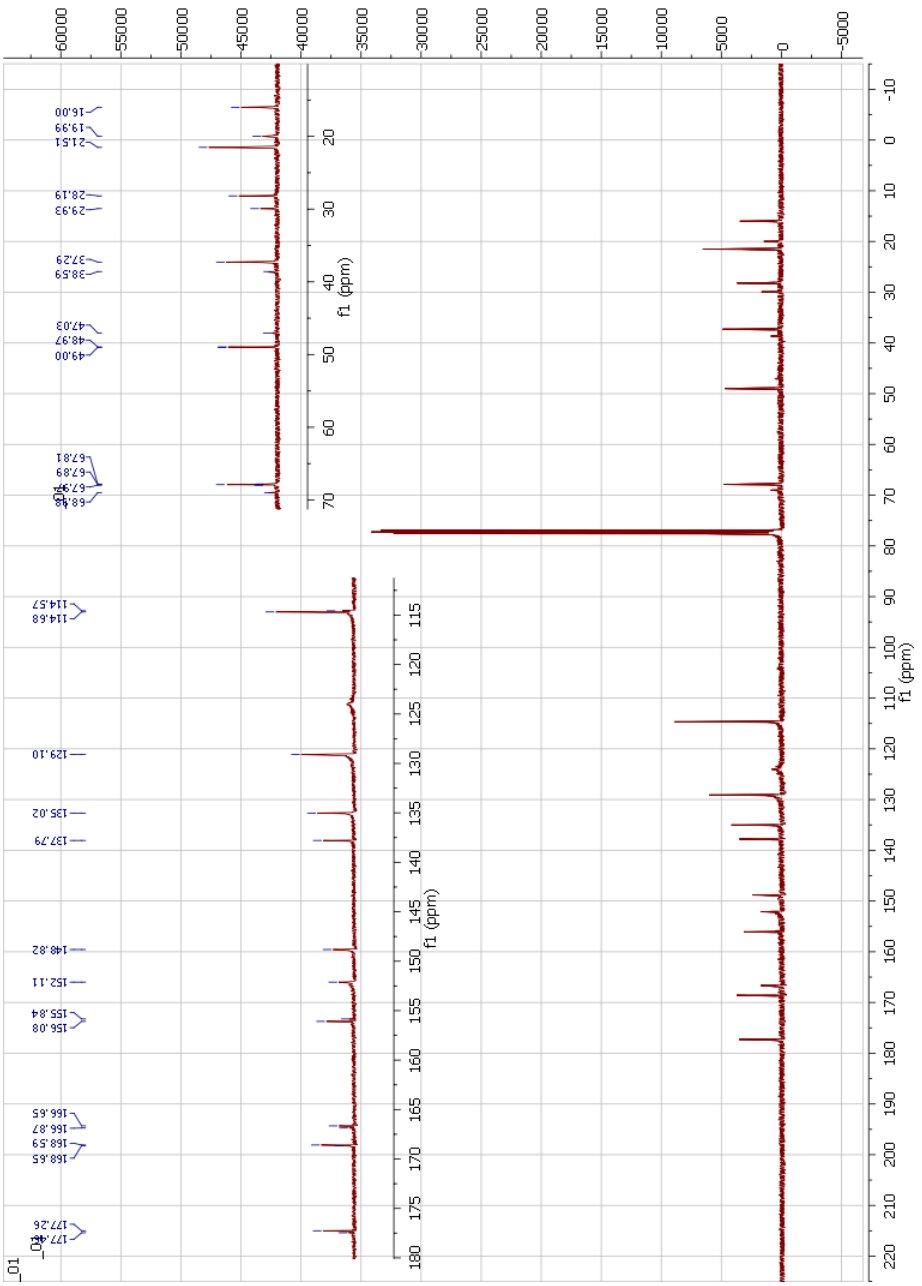


^{1}H NMR spectrum (400 MHz) of **11ab** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11ab** in CDCl3



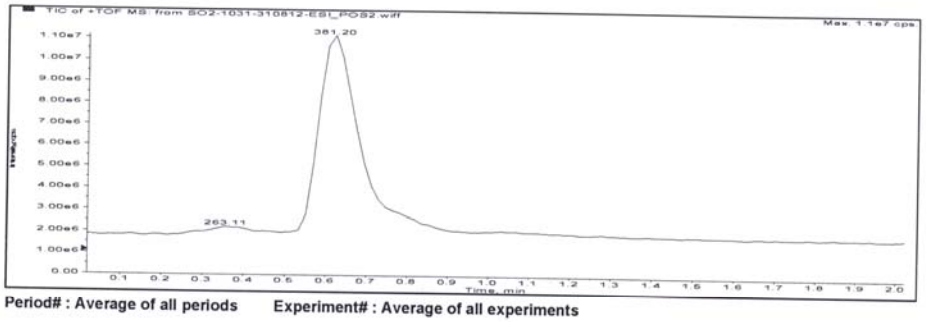


LC-MS of **11ab**

Mass List Report

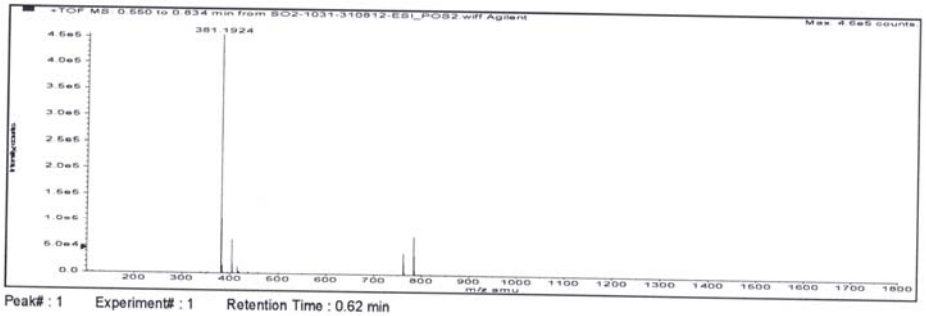
Page 1 of 1

Sample#: so2-103 Sample Location: P1-B-02 Sample Id: so2-103 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO2-1031-310812-ESI_POS2.wiff Acq Time: August 31 2012, 06:37:58 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.62	6.43903 E7	381.19239



Peak# : 1 **Experiment# : 1** **Retention Time : 0.62 min**

Friday, August 31, 2012

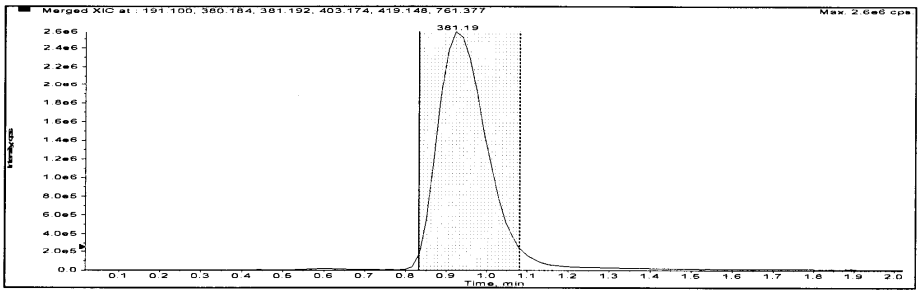
18:40:10 PM

HRMS of **11ab**

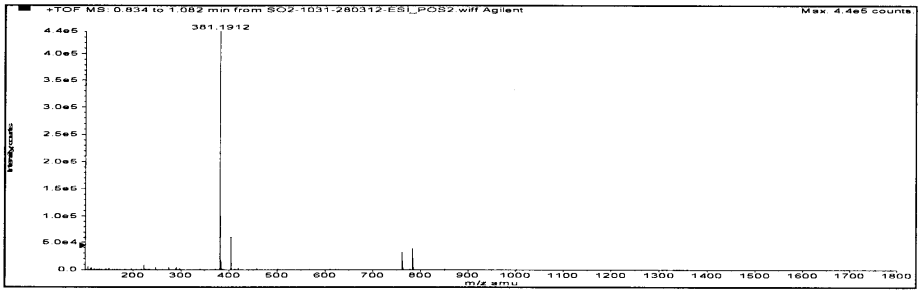
Empirical Formula Confirmation Report

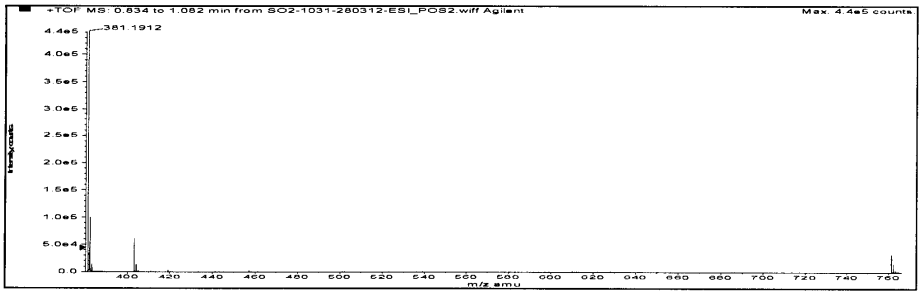
Sample Name: so2-103 Sample Location: P1-C-09 Sample Id: so2-103 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\03-12\Data\SO2-1031-280312-ESI_POS2.wiff Acq Time: March 28 2012, 03:19:04 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C21H24N4O3	--	380.18484	0.93	2.14365 E7	--

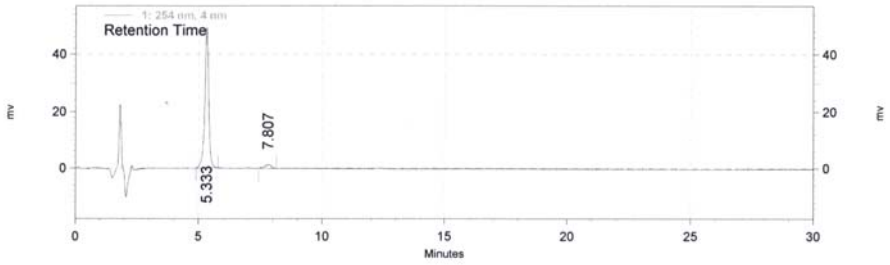
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	442267.13	381.19212	381.19116	-0.95534	-2.51	--
[M+Na]+	61169.29	403.17406	403.17318	-0.87826	-2.18	--
[2M+H]+	32437.53	761.37696	761.37481	-2.15262	-2.83	--

Wednesday, March 28, 2012 15:21:27 PM

HPLC of **11ab**

Area % Report

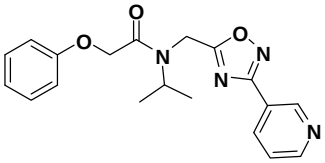
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so2103b 50ACN50H2O TFA 0.1 1ml 30 min.met 4-22-2011 11-40-13 AM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\50%ACN 50% H2O 0.1 TFA 1ml 30 min.met
Acquired: 4/22/2011 11:42:31 AM
Printed: 3/30/2012 5:33:21 PM



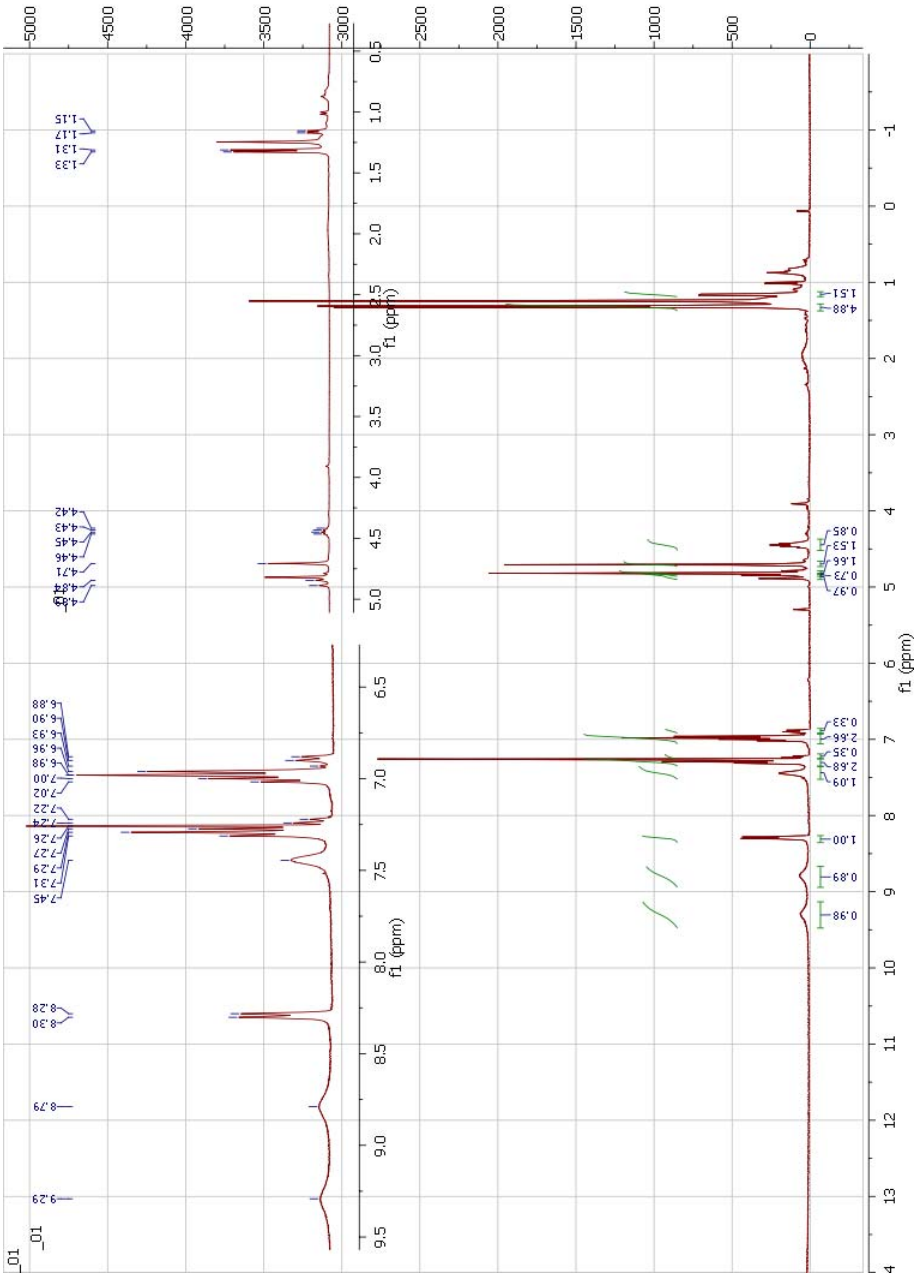
1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
5.333	546001	95.67	49458	97.38
7.807	24686	4.33	1330	2.62
Totals	570687	100.00	50788	100.00

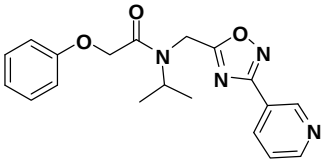
13. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ac.**

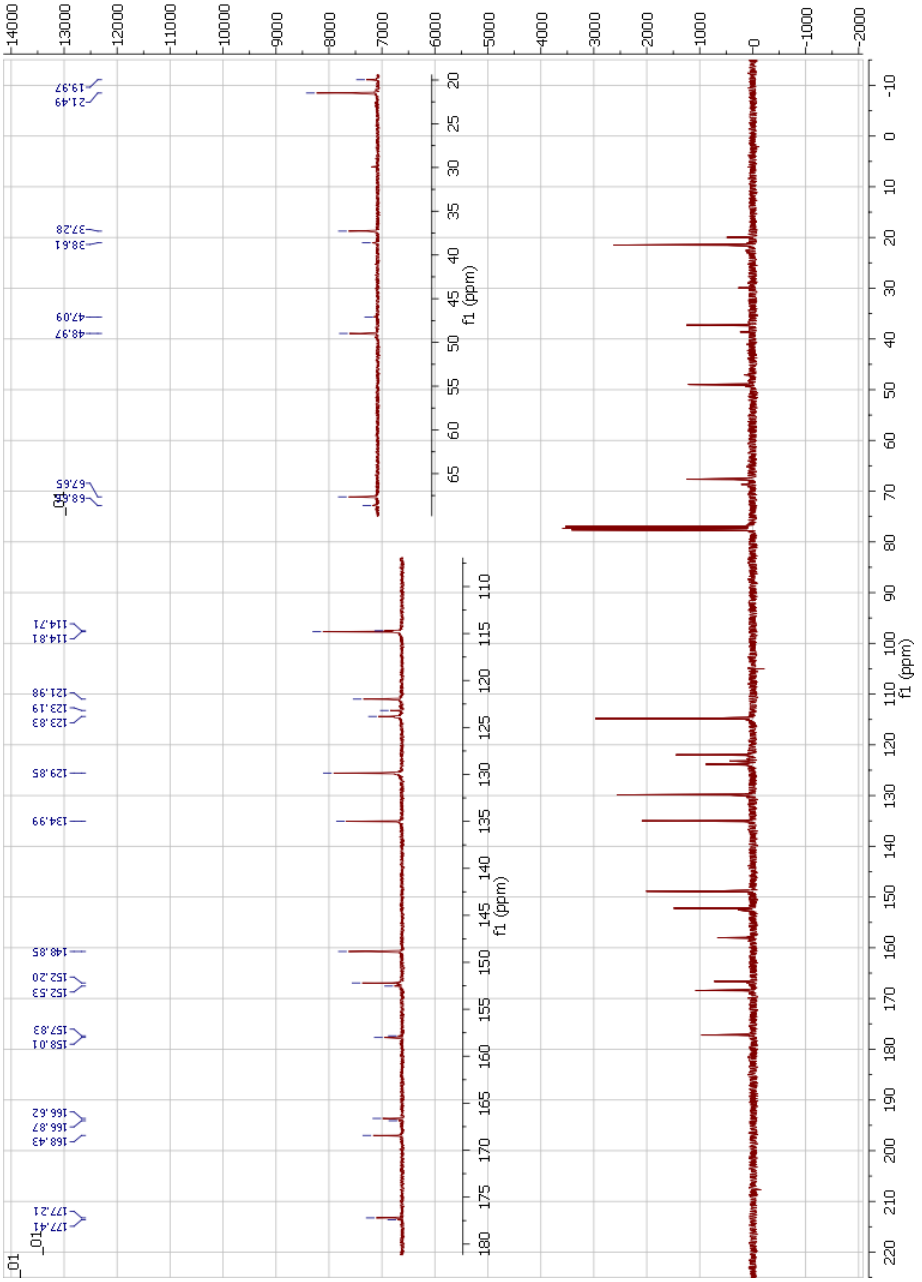


^{1}H NMR spectrum (400 MHz) of **11ac** in $CDCl_3$



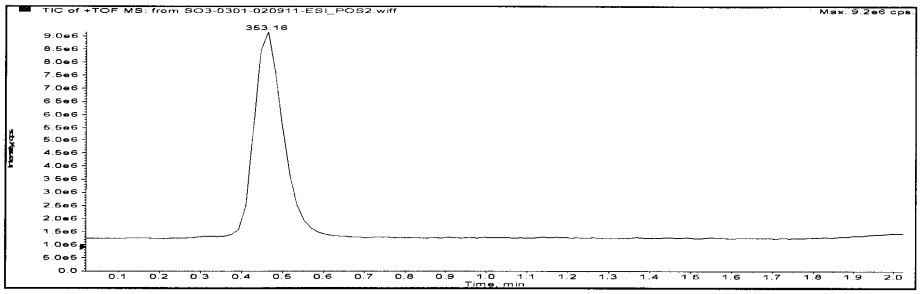
^{13}C NMR spectrum (100 MHz) spectrum of **11ac** in $CDCl_3$





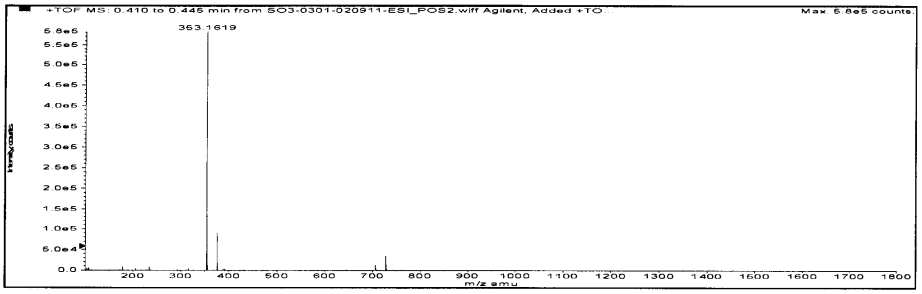
LC-MS of **11ac**

Sample#: so3-030 Sample Location: P1-A-07 Sample Id: so3-030 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-11\Data\SO3-0301-020911-ESI_POS2.wiff Acq Time: September 02 2011, 10:16:58 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.46	3.91688 E7	353.16185



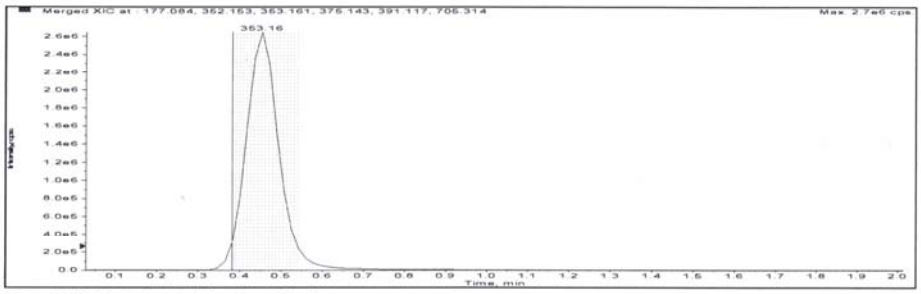
Peak# : 1 Experiment# : 1 Retention Time : 0.46 min

HRMS of **11ac**

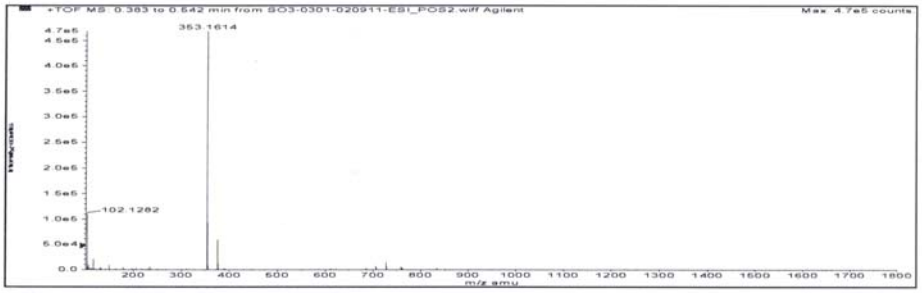
Empirical Formula Confirmation Report

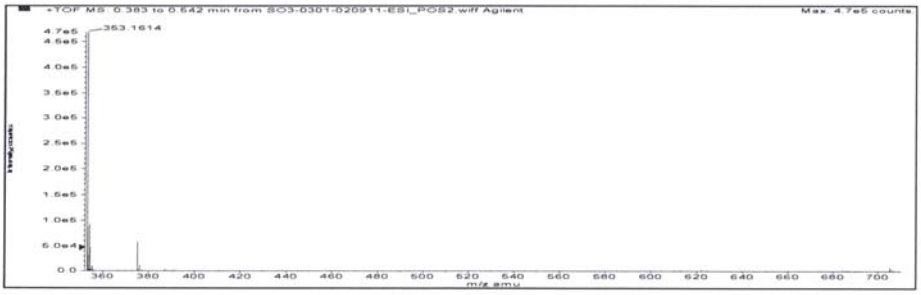
Sample Name: so3-030 Sample Location: P1-A-09 Sample Id: so3-030 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-11\Data\SO3-0301-020911-ESI_POS2.wiff Acq Time: September 02 2011, 10:30:14 AM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C19H20N4O3	--	352.15354	0.45	1.42941 E7	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	475087.22	353.16082	353.16140	0.58139	1.65	--
[M+Na]+	58477.95	375.14276	375.14330	0.53814	1.43	--
[2M+H]+	7120.16	705.31436	705.31428	-0.08123	-0.12	--

375.1428 375.1433

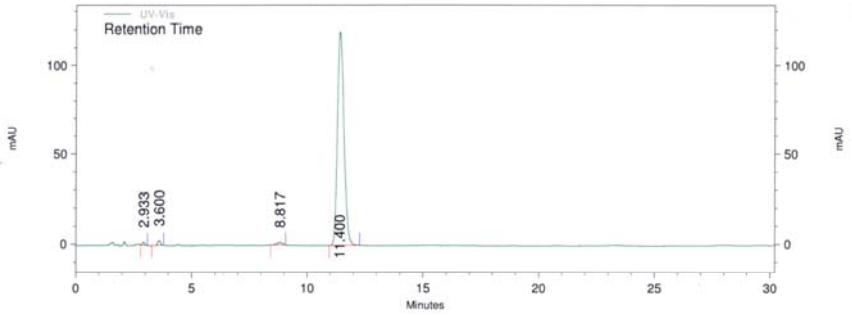
Friday, September 02, 2011 10:32:33 AM

HPLC of **11ac**

Area Percent Report

Data File: C:\HPLC data\Sevil\so3-030CH3CN;water 30;701ml 30 min.met2-1-2012 6-28-59 PM.dat
Acquired: 2/1/2012 6:29:30 PM **Printed:** 2/1/2012 7:03:33 PM

Analyst: System
Sample ID: so3-030 **Vial:** N/A **Injection Volume:** 0

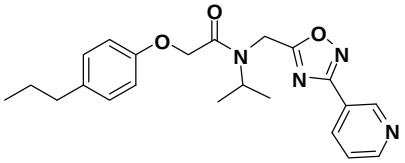


UV-Vis Results

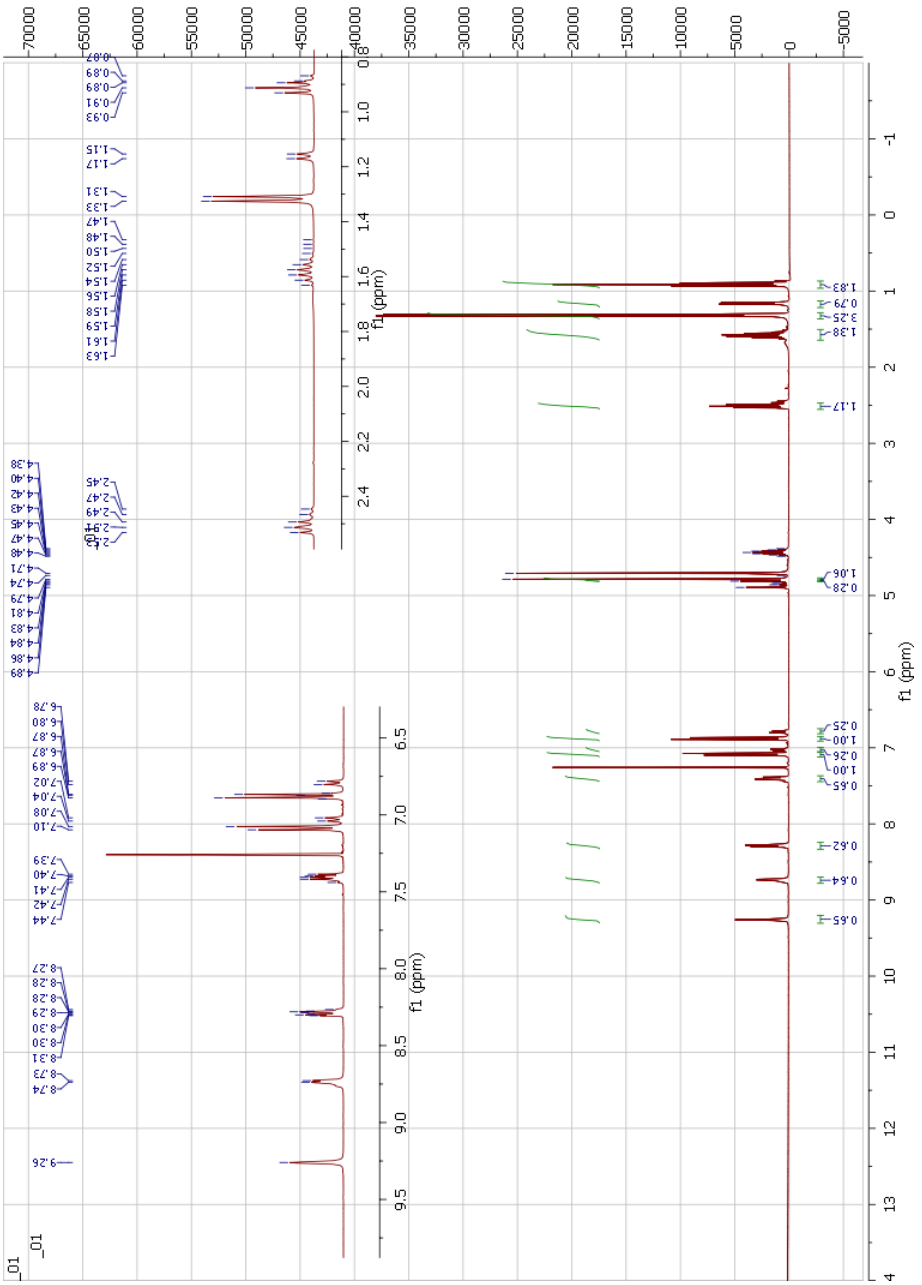
Name	Retention Time	Area	Area Percent	Integration Codes
	2.933	12287	0.516	BB
	3.600	23071	0.968	BI
	8.817	24291	1.020	II
	11.400	2322490	97.496	II
Totals		2382139	100.000	

Instrument Name: HPLC **Software Version:** Version 3.1.7
Acquisition Method: C:\EZStart\Projects\Default\Method\SEVIL\CH3CN;water 30;701ml 30 min.met
Sequence: C:\HPLC data\Dan\abc.seq

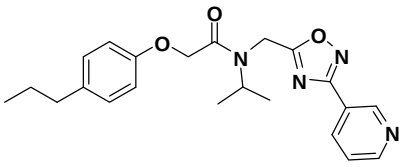
14. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ad**.

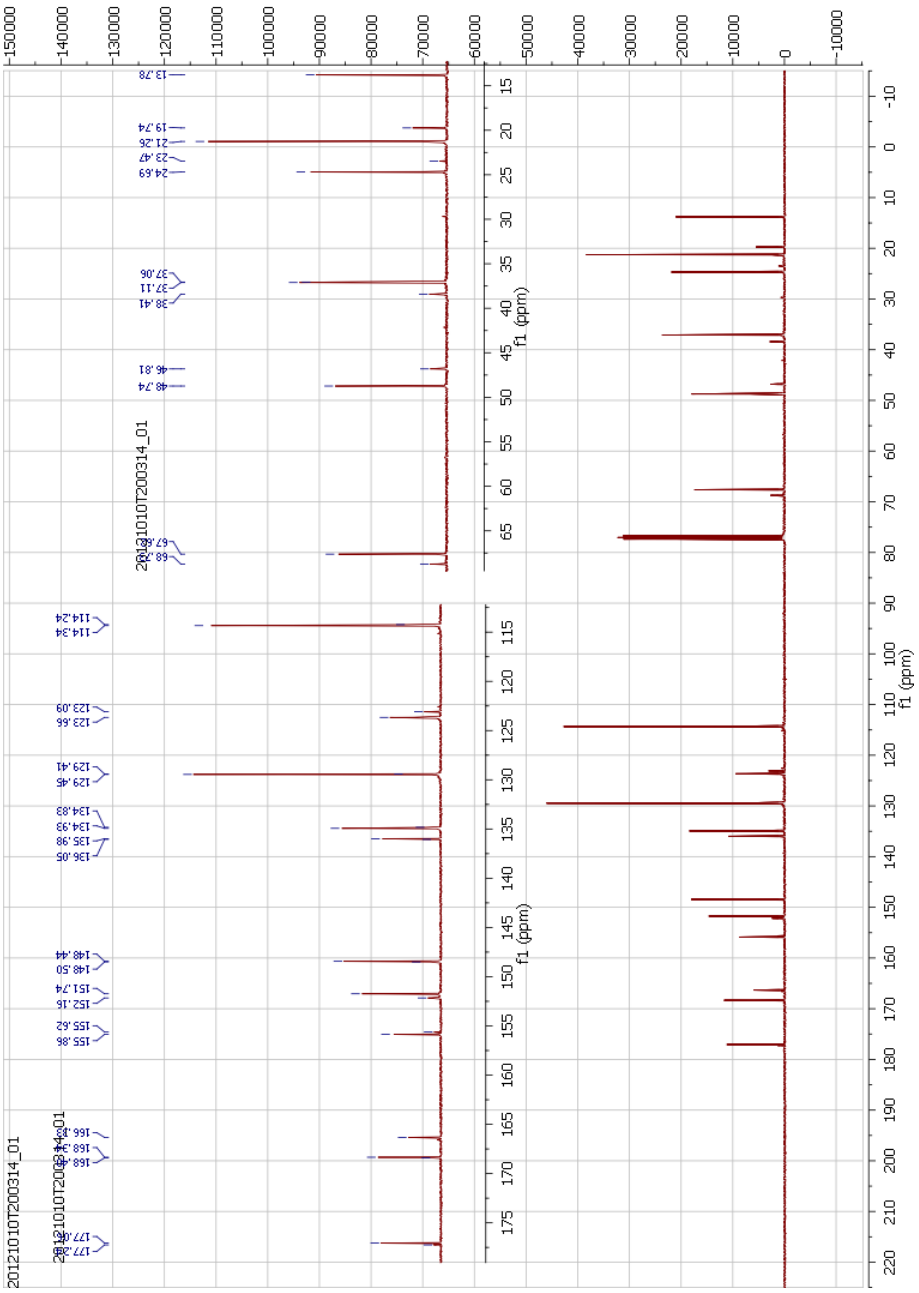


^{1}H NMR spectrum (400 MHz) of **11ad** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11ad** in $CDCl_3$



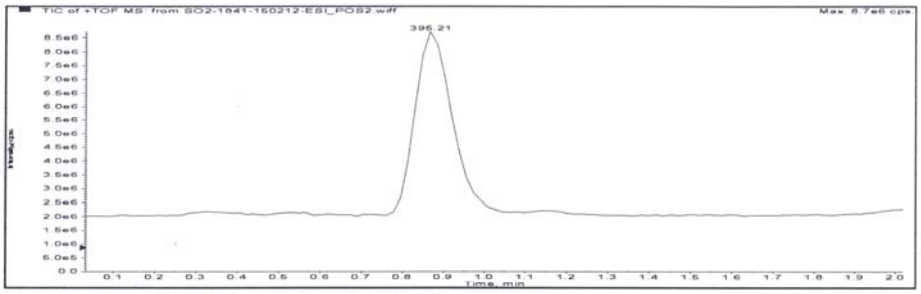


LC-MS of **11ad**

Mass List Report

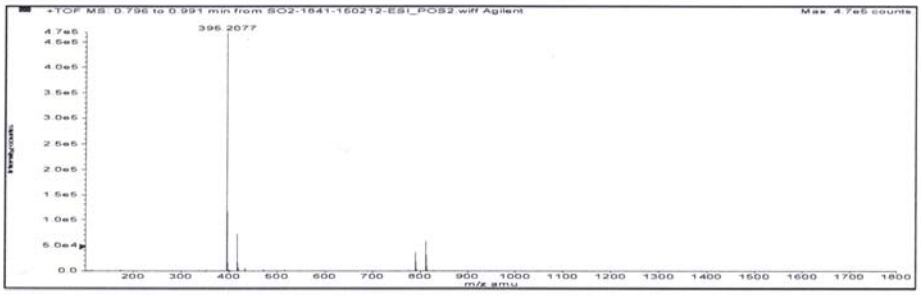
Page 1 of 1

Sample#: so2-184 Sample Location: P1-D-04 Sample Id: so2-184 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\02-12\Data\SO2-1841-150212-ESI_POS2.wiff Acq Time: February 15 2012, 11:28:50 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods Experiment# : Average of all experiments

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.87	4.19451 E7	395.20774



Peak# : 1 Experiment# : 1 Retention Time : 0.87 min

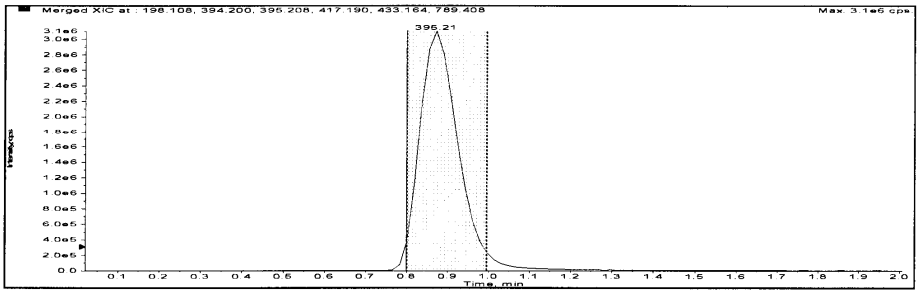
Wednesday, February 15, 2012

11:31:01 AM

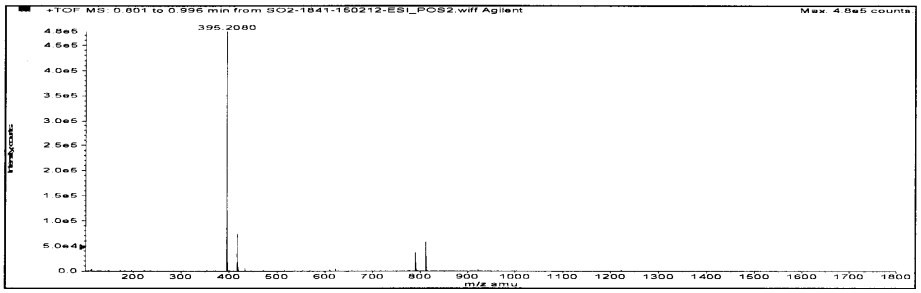
HRMS of **11ad**

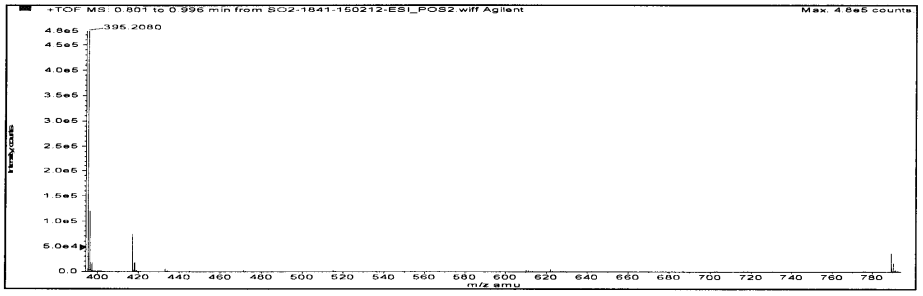
Empirical Formula Confirmation Report Page 1 of 1

Sample Name: so2-184 Sample Location: P1-C-05 Sample Id: so2-184 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\02-12\Data\SO2-1841-150212-ESI_POS2.wiff Acq Time: February 15 2012, 11:01:57 AM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C22H26N4O3	--	394.20049	0.87	2.01124 E7	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	490446.74	395.20777	395.20803	0.26001	0.66	--
[M+Na]+	76835.38	417.18971	417.18982	0.11125	0.27	--
[M+K]+	5235.66	433.16365	433.16381	0.16129	0.37	--
[2M+H]+	36674.50	789.40826	789.40741	-0.85286	-1.08	--

Wednesday, February 15, 2012 11:04:20 AM

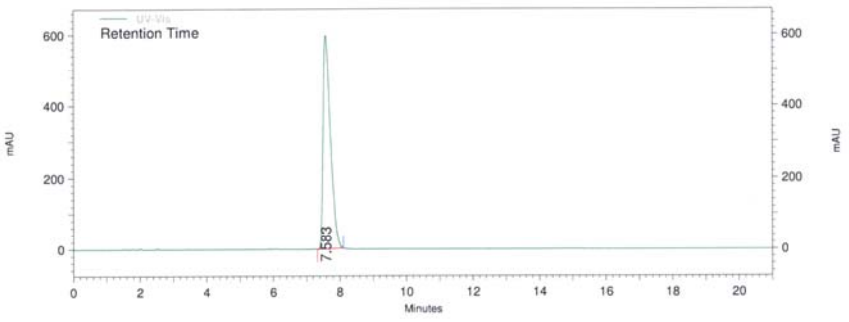
HPLC of **11ad**

Area Percent Report

Data File: C:\HPLC data\Sevil\so2-184-b5 (2)CH3CN;water 50;50 1ml 20min.met7-26-2012 6-06-23 PM.dat

Acquired: 7/26/2012 6:06:55 PM
Printed: 7/26/2012 6:29:23 PM

Analyst: System
Sample ID: so2-184-b5 (2)
Vial: N/A
Injection Volume: 0

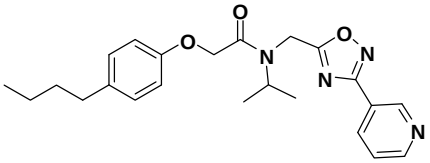


UV-Vis Results

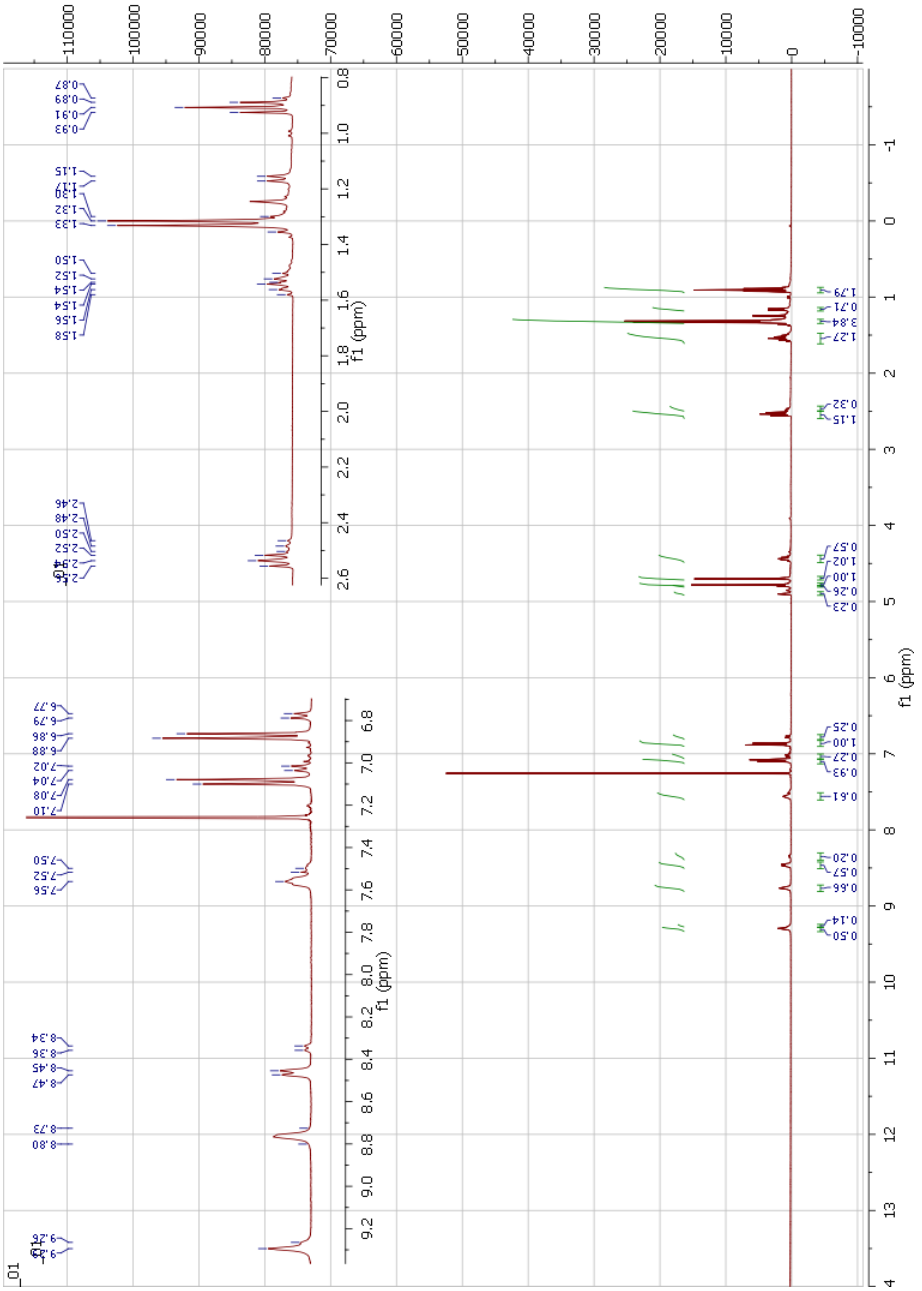
Name	Retention Time	Area	Area Percent	Integration Codes
	7.583	9105570	100.000	II
Totals		9105570	100.000	

Instrument Name: HPLC
Software Version: Version 3.1.7
Acquisition Method: C:\EZStart\Projects\Default\Method\SEVIL\CH3CN;water 50;50 1ml 20min.met
Sequence: C:\HPLC data\Dan\abc.seq

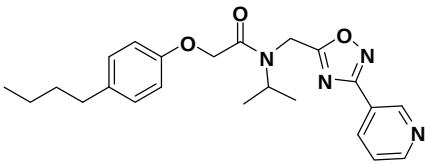
15. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ae**.

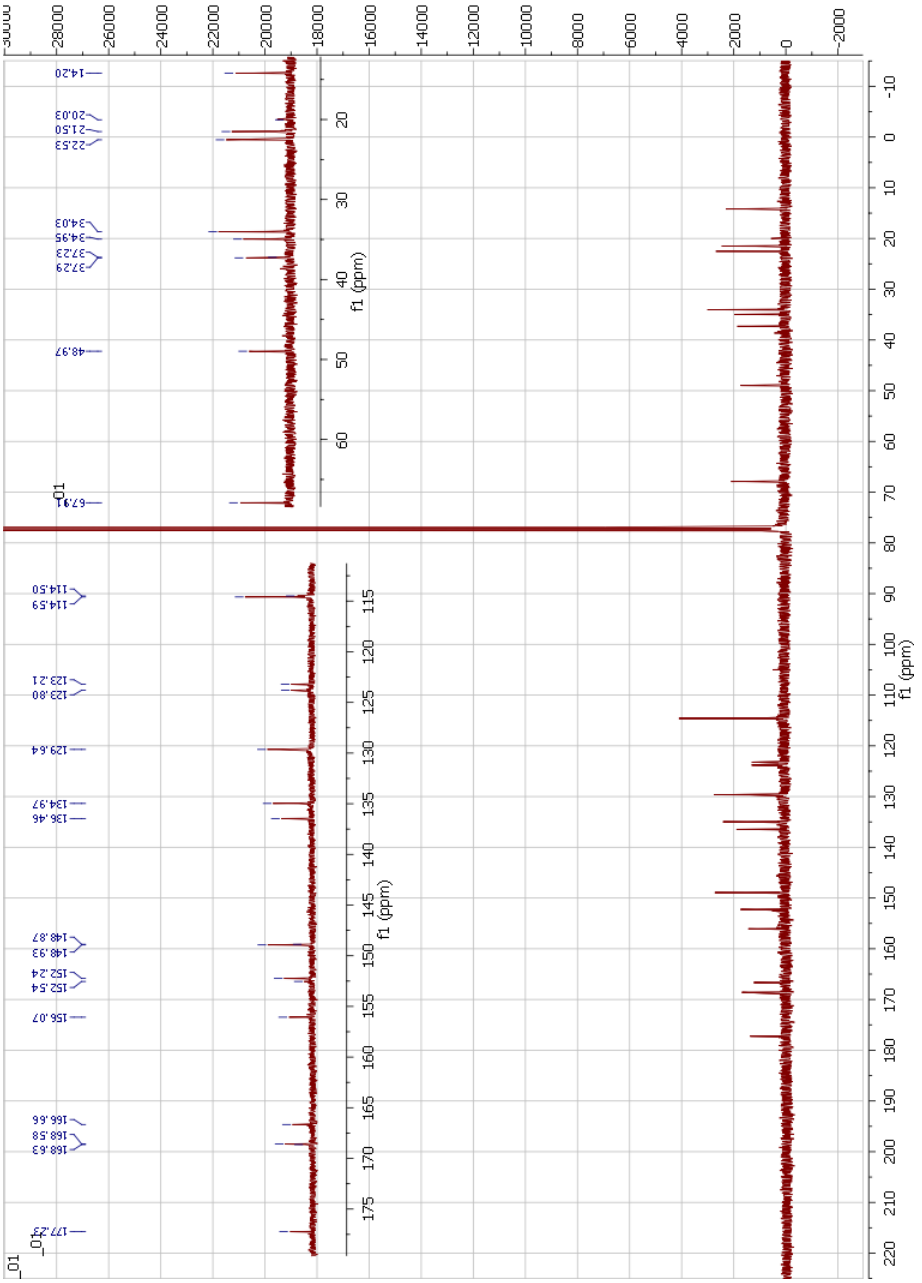


^{1}H NMR spectrum (400 MHz) of **11ae** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11ae** in $CDCl_3$



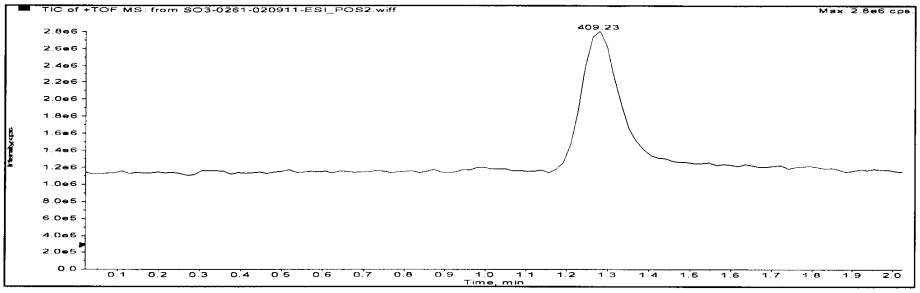


LC-MS of **11ae**

Mass List Report

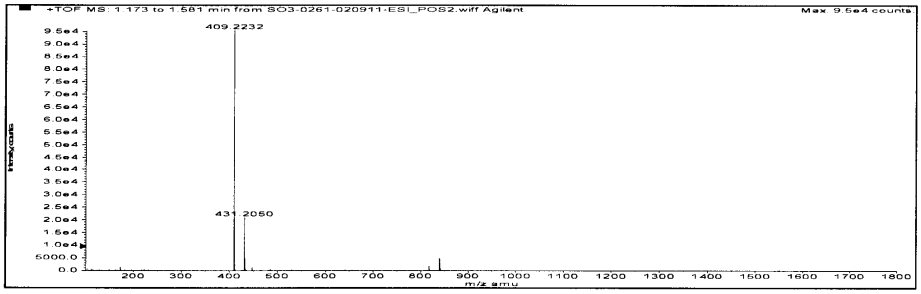
Sample#: so3-026 Sample Location: P1-C-06 Sample Id: so3-026 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-11\Data\SO3-0261-020911-ESI_POS2.wiff Acq Time: September 02 2011, 02:03:47 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml

One or more scans have failed IRM. Review the data file for details.



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	1.28	1.16238 E7	409.22315



Peak# : 1 **Experiment# : 1** **Retention Time : 1.28 min**

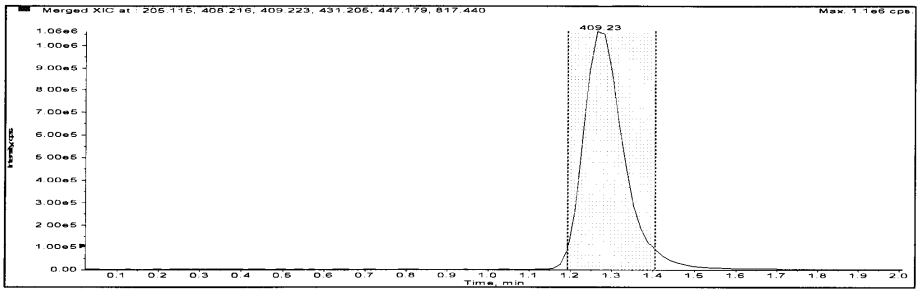
Friday, September 02, 2011 14:05:57 PM

HRMS of **11ae**

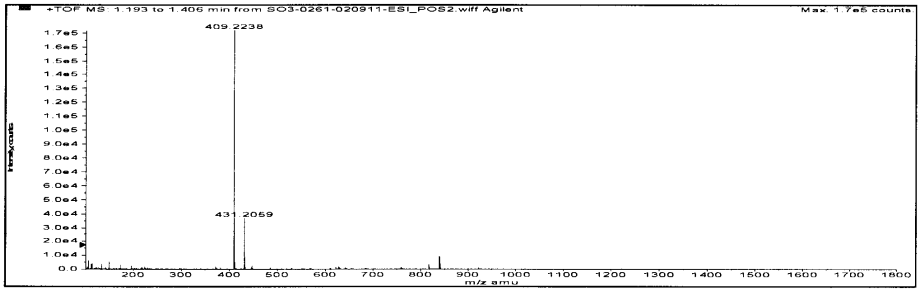
Empirical Formula Confirmation Report

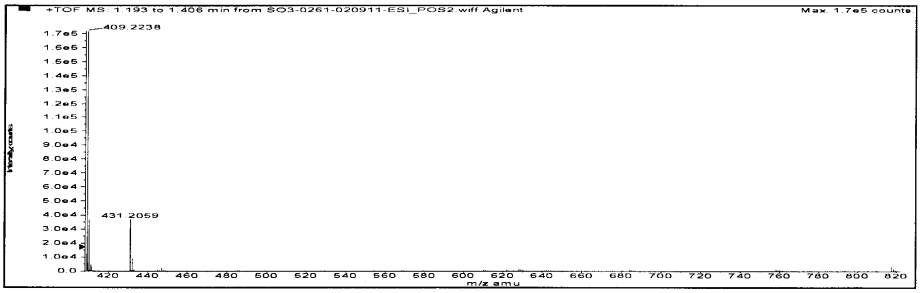
Sample Name: so3-026 Sample Location: P1-D-01 Sample Id: so3-026 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-11\Data\SO3-0261-020911-ESI_POS2.wiff Acq Time: September 02 2011, 02:17:24 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C23H28N4O3	--	408.21614	1.27	7.14738 E6	--

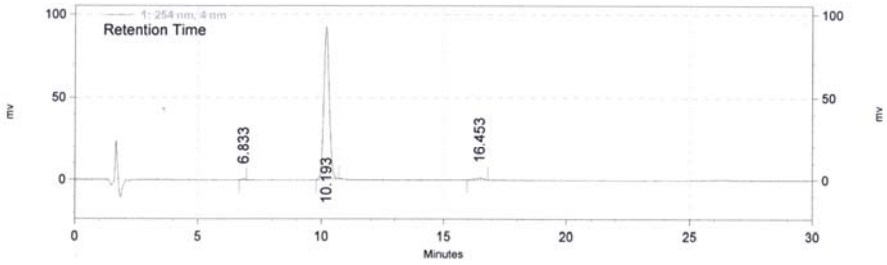
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	172012.19	409.22342	409.22378	0.36672	0.90	--
[M+Na]+	37176.55	431.20536	431.20589	0.52500	1.22	--
[M+K]+	2263.33	447.17930	447.17867	-0.62866	-1.41	--
[2M+H]+	3238.26	817.43956	817.43886	-0.69495	-0.85	--

Friday, September 02, 2011 14:19:43 PM

HPLC of **11ae**

Area % Report

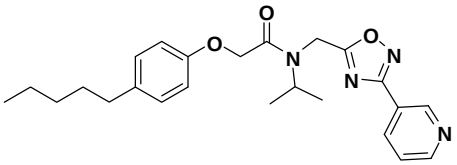
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so3-026 50ACN50H2O TFA 0.1 1ml 30 min.met 8-26-2011 6-43-13 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\50%ACN 50% H2O 0.1 TFA 1ml 30 min.met
Acquired: 8/26/2011 6:45:31 PM
Printed: 4/2/2012 11:32:32 AM



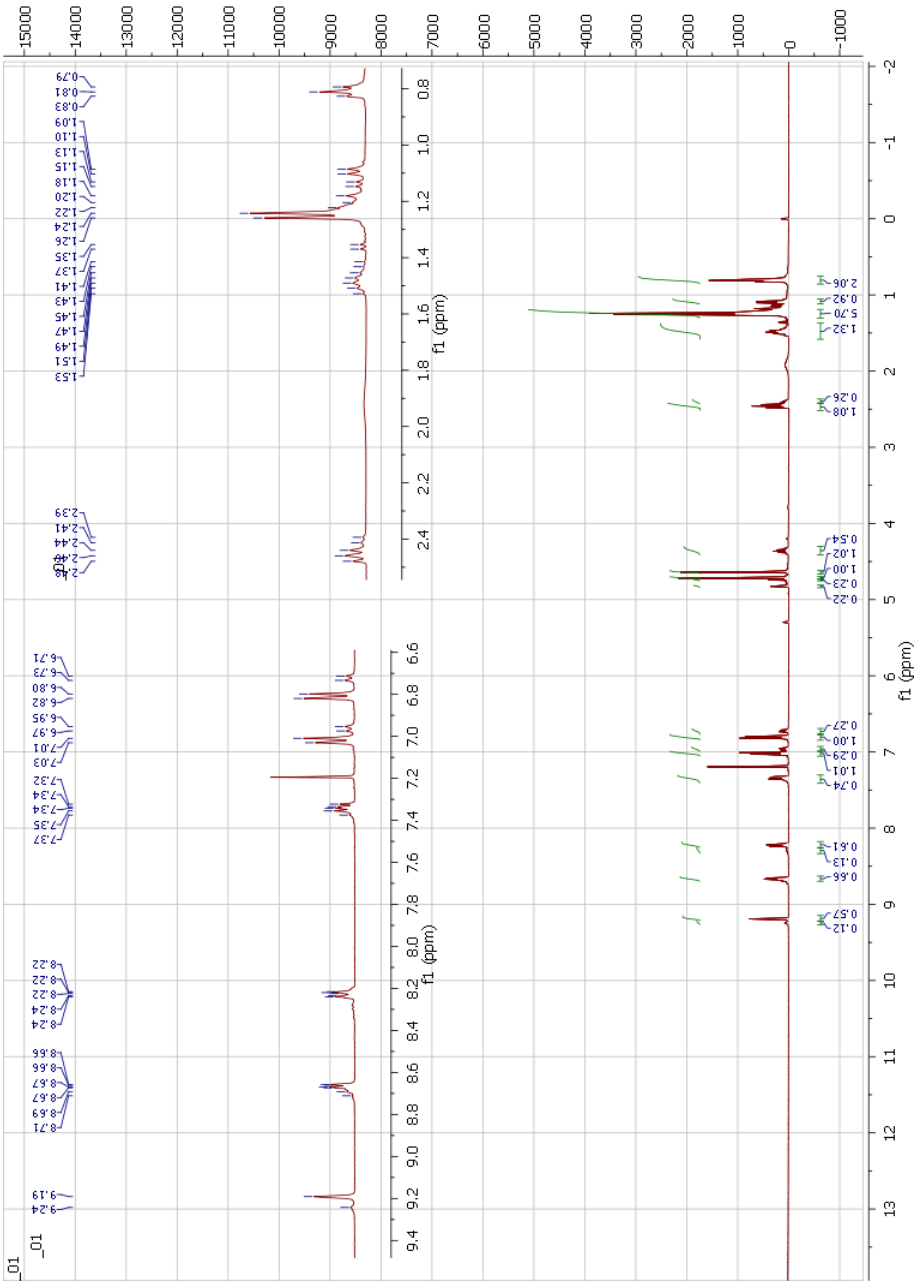
1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
6.833	5280	0.36	552	0.59
10.193	1426053	97.51	92299	98.13
16.453	31096	2.13	1210	1.29
Totals	1462429	100.00	94061	100.00

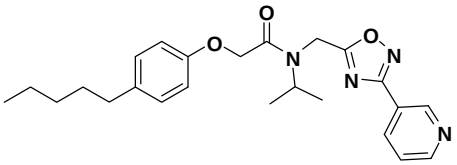
16. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11af**.

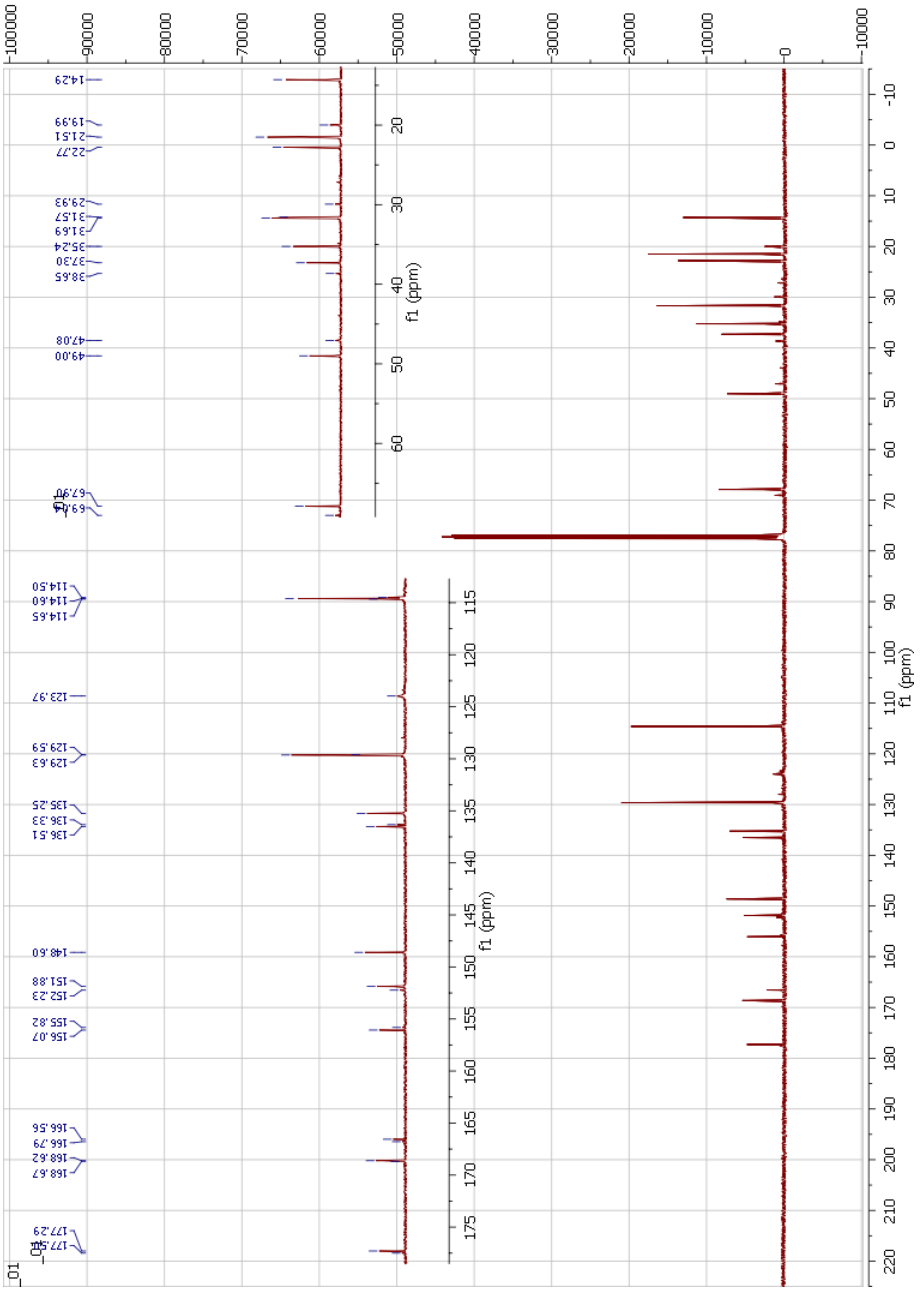


^{1}H NMR spectrum (400 MHz) of **11af** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11af** in $CDCl_3$

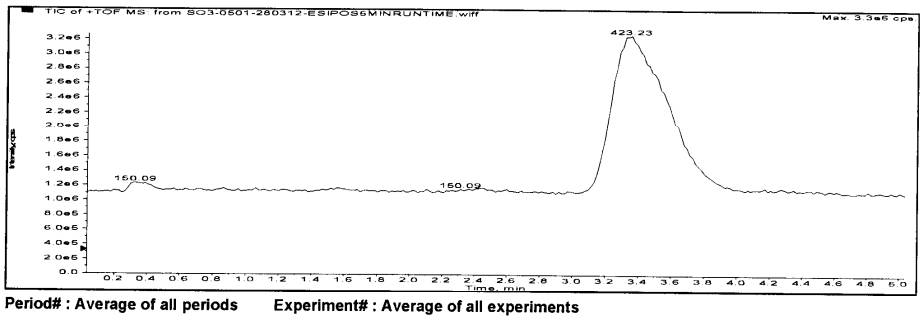




LC-MS of **11af**

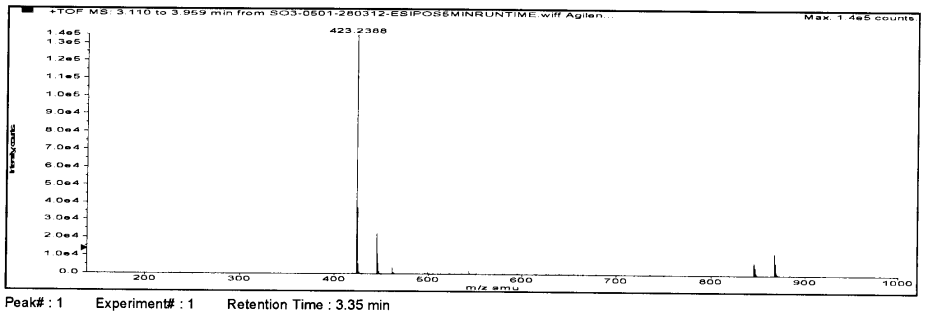
Mass List Report

Sample#: so3-050 Sample Location: P1-E-05 Sample Id: so3-050 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\03-12\Data\SO3-0501-280312-ESIPOS5MINRUNTIME.wiff Acq Time: March 28 2012, 10:18:22 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	3.35	5.04412 E7	423.23875



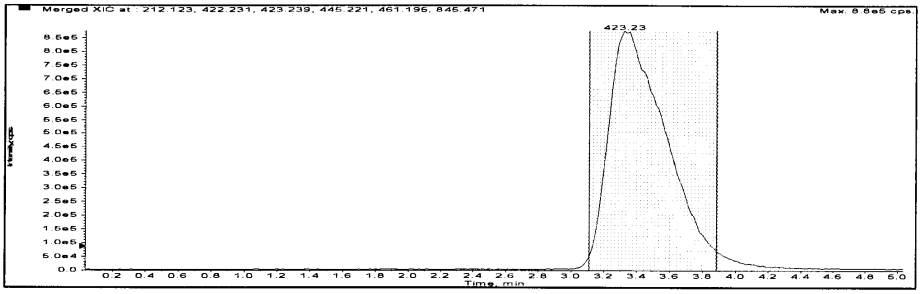
Peak# : 1 Experiment# : 1 Retention Time : 3.35 min

Wednesday, March 28, 2012 10:23:35 AM

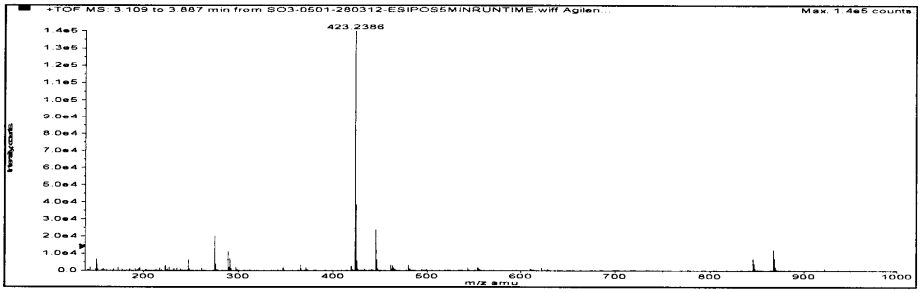
HRMS of **11af**

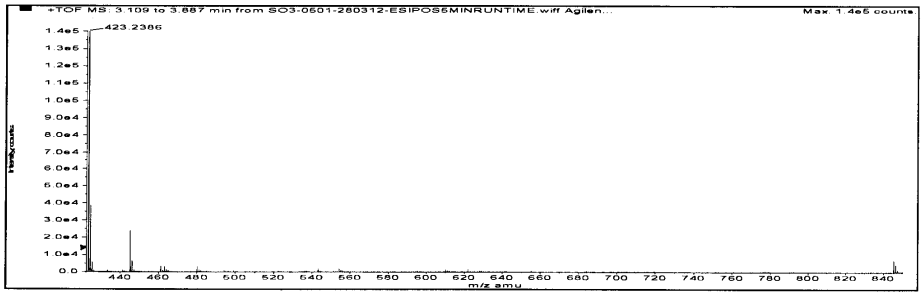
Empirical Formula Confirmation Report

Sample Name: so3-050 Sample Location: P1-D-02 Sample Id: so3-050 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\03-12\Data\SO3-0501-280312-ESIPOS5MINRUNTIME.wiff Acq Time: March 28 2012, 03:26:27 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C24H30N4O3	--	422.23179	3.33	2.08823 E7	--

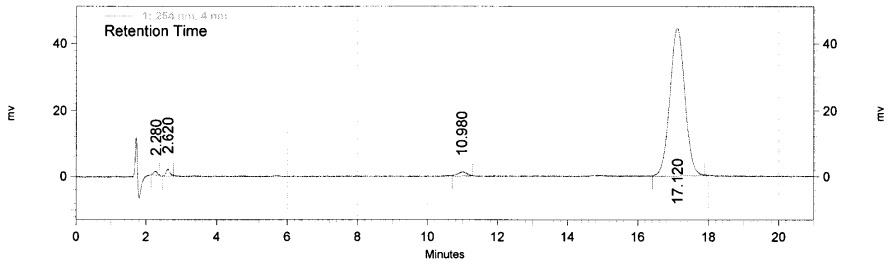
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	142191.60	423.23907	423.23859	-0.47686	-1.13	--
[M+Na]+	23985.12	445.22101	445.22117	0.15398	0.35	--
[M+K]+	3501.79	461.19495	461.19541	0.45913	1.00	--
[2M+H]+	7314.28	845.47086	845.47017	-0.68603	-0.81	--

Wednesday, March 28, 2012 15:32:01 PM

HPLC of **11af**

Area % Report

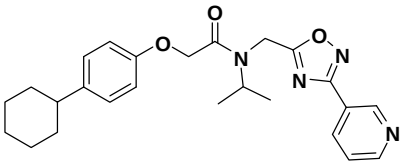
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so3-050 MeOH 70% TFA 0.1 in H2O 30% 1ml 20 min TEMPL.met 10-18-2011 11-05-19 AM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\50ACN50H2O TFA 0.1 1ml 30 min.met
Acquired: 10/18/2011 11:07:36 AM
Printed: 10/18/2011 3:09:10 PM



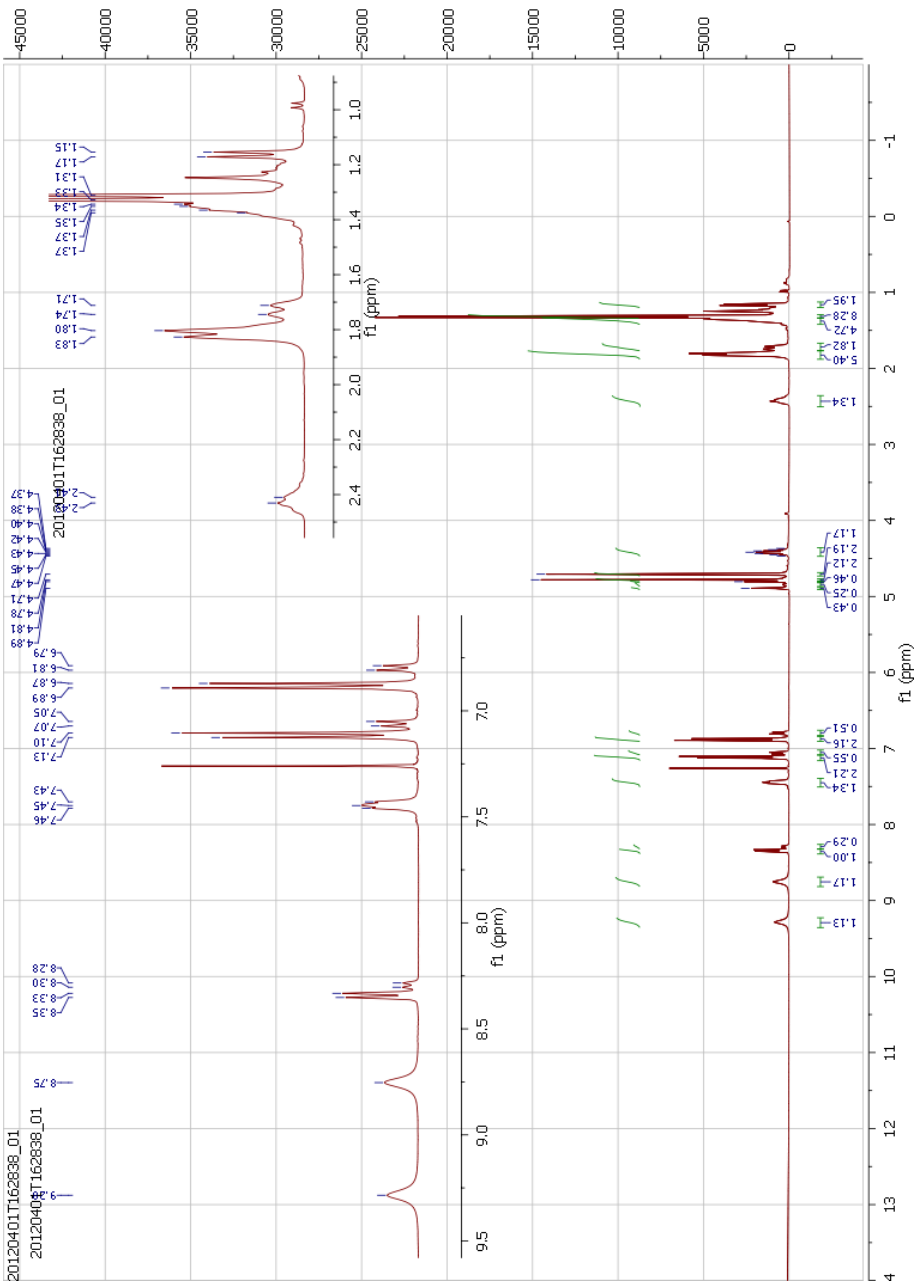
1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
2.280	8546	0.63	1261	2.56
2.620	16390	1.20	2217	4.49
10.980	22730	1.67	1400	2.84
17.120	1316798	96.51	44462	90.11
Totals	1364464	100.00	49340	100.00

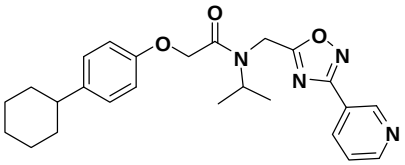
17. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ah**.

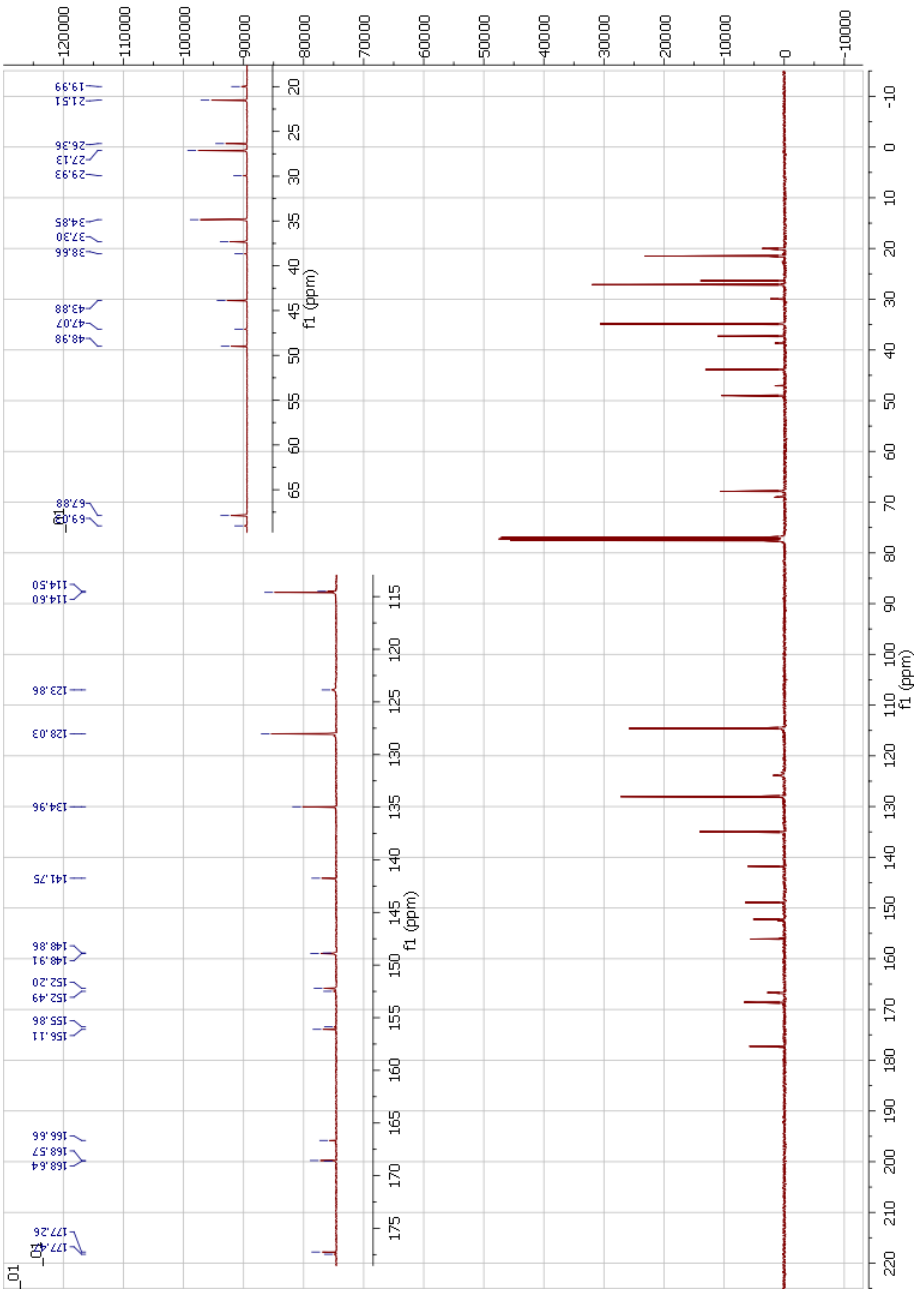


^{1}H NMR spectrum (400 MHz) of **11ah** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11ah** in $CDCl_3$



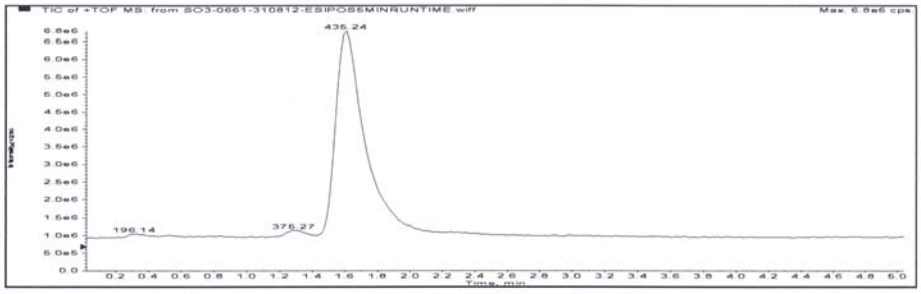


LC-MS of **11ah**

Mass List Report

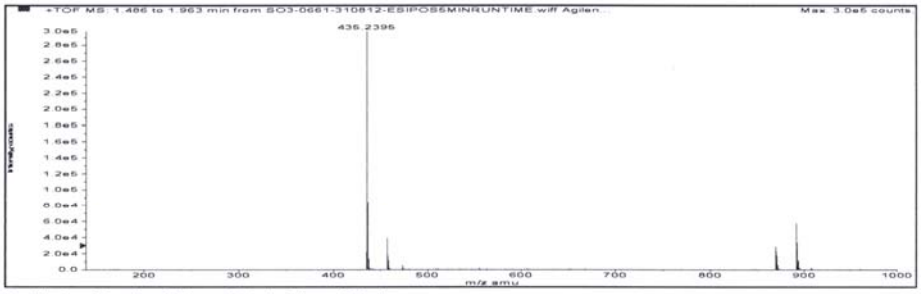
Page 1 of 1

Sample#: so3-066 Sample Location: P1-C-03 Sample Id: so3-066 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO3-0661-310812-ESIPOS5MINRUNTIME.wiff Acq Time: August 31 2012, 07:25:29 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods Experiment# : Average of all experiments

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	1.61	7.16131 E7	435.23947



Peak# : 1 Experiment# : 1 Retention Time : 1.61 min

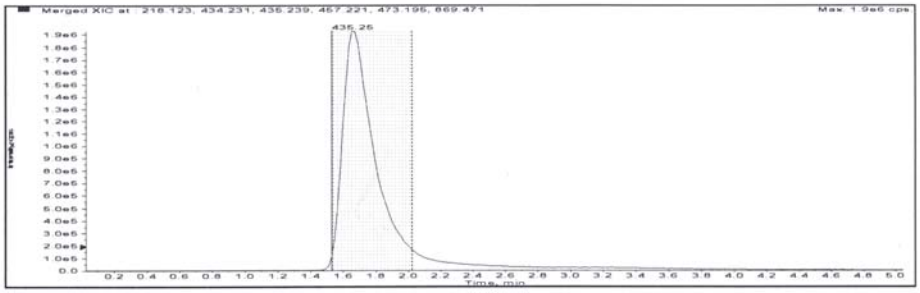
Friday, August 31, 2012

19:30:42 PM

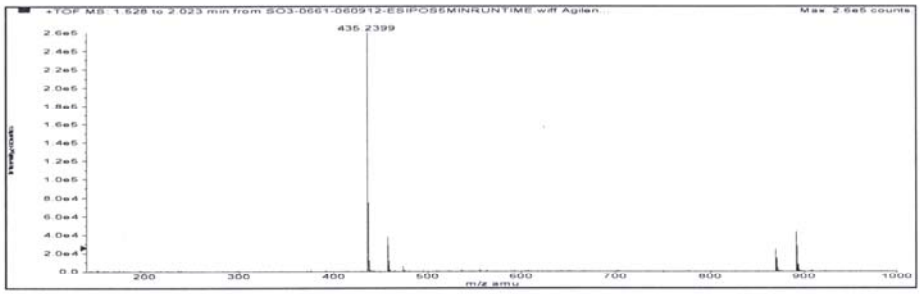
HRMS of **11ah**

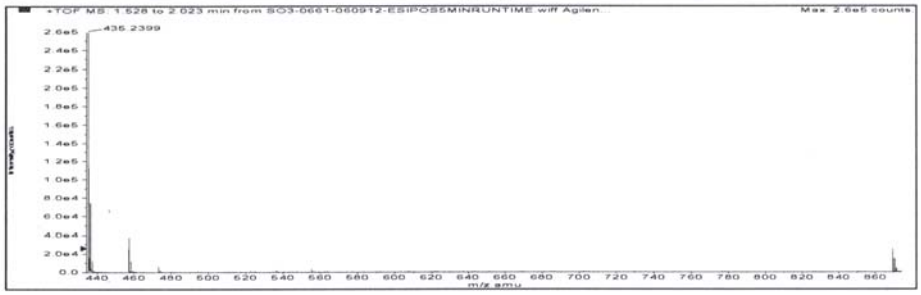
Empirical Formula Confirmation Report

Sample Name: so3-066 Sample Location: P1-B-09 Sample Id: so3-066 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-12\Data\SO3-0661-060912-ESIPOS5MINRUNTIME.wiff Acq Time: September 06 2012, 01:37:58 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C25H30N4O3	--	434.23179	1.66	2.60098 E7	--

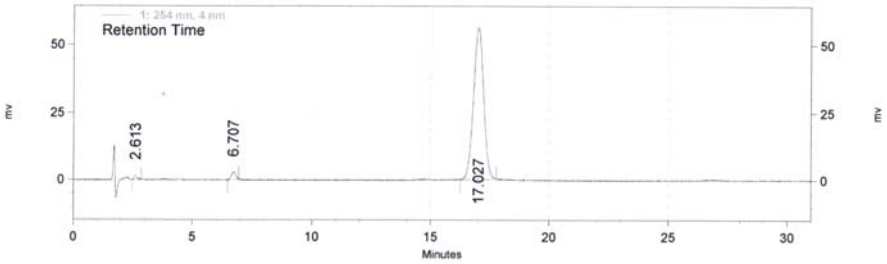
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	265996.60	435.23907	435.23995	0.88014	2.02	--
[M+Na]+	37789.24	457.22101	457.22216	1.15205	2.52	--
[M+K]+	6170.22	473.19495	473.19569	0.74154	1.57	--
[2M+H]+	24637.53	869.47086	869.47146	0.59891	0.69	--

Thursday, September 06, 2012 13:43:29 PM

HPLC of **11ah**

Area % Report

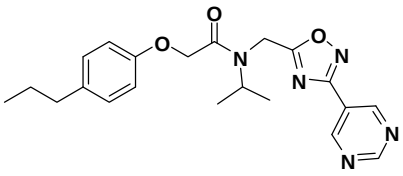
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so3-066a MeOH 70% TFA 0.1 in H2O 30% 1ml 30 min.met 10-18-2011 3-10-18 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Dan\MeOH 70% TFA 0.1 in H2O 30% 1ml 30 min.met
Acquired: 10/18/2011 3:12:35 PM
Printed: 4/2/2012 11:34:23 AM



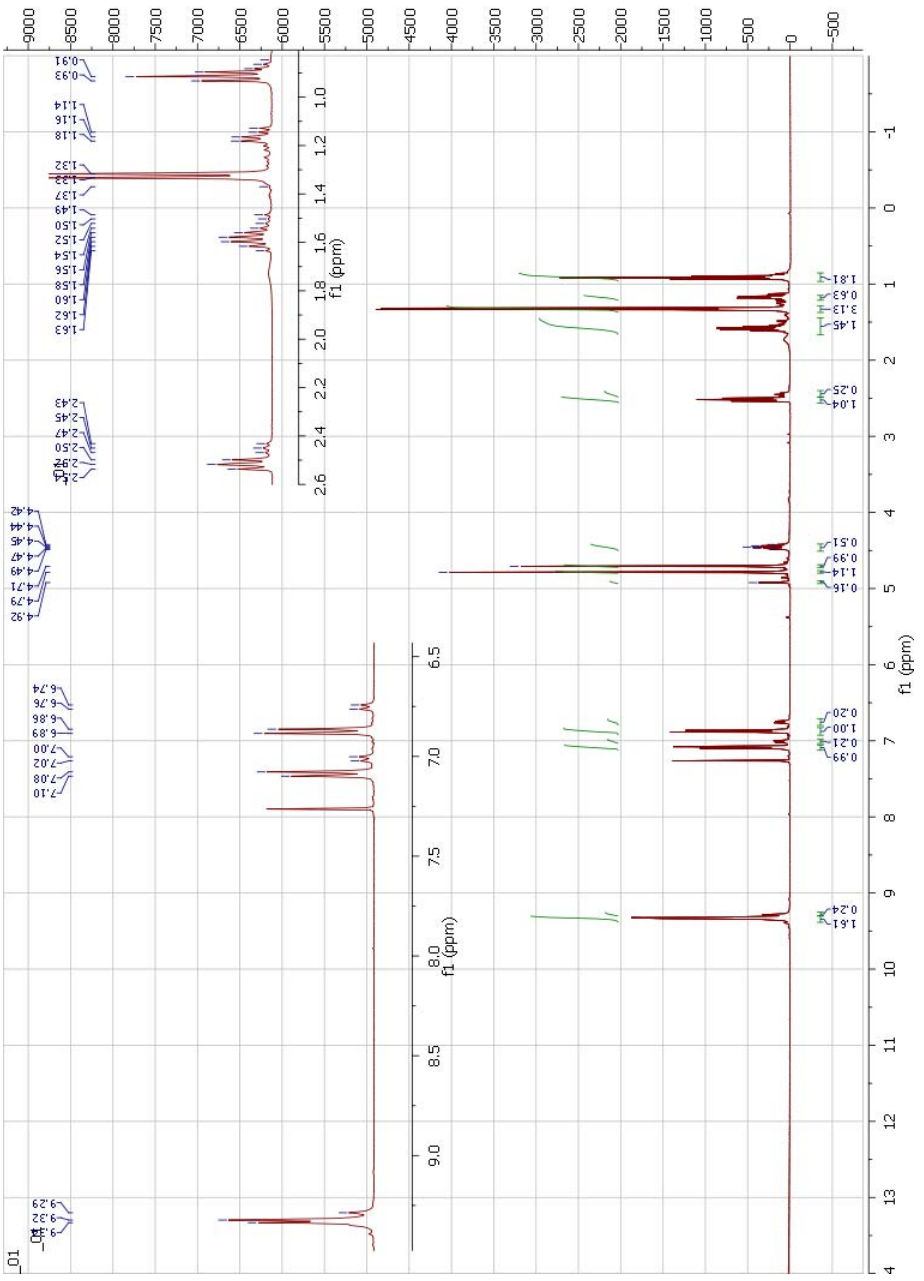
1: 254 nm, 4 nm Results

Retention Time	Area	Area %
2.613	14793	0.85
6.707	37243	2.15
17.027	1680191	97.00
Totals	1732227	100.00

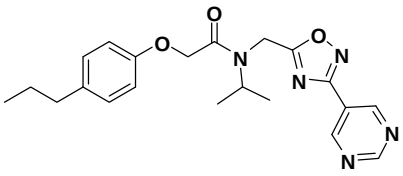
18. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11al**.

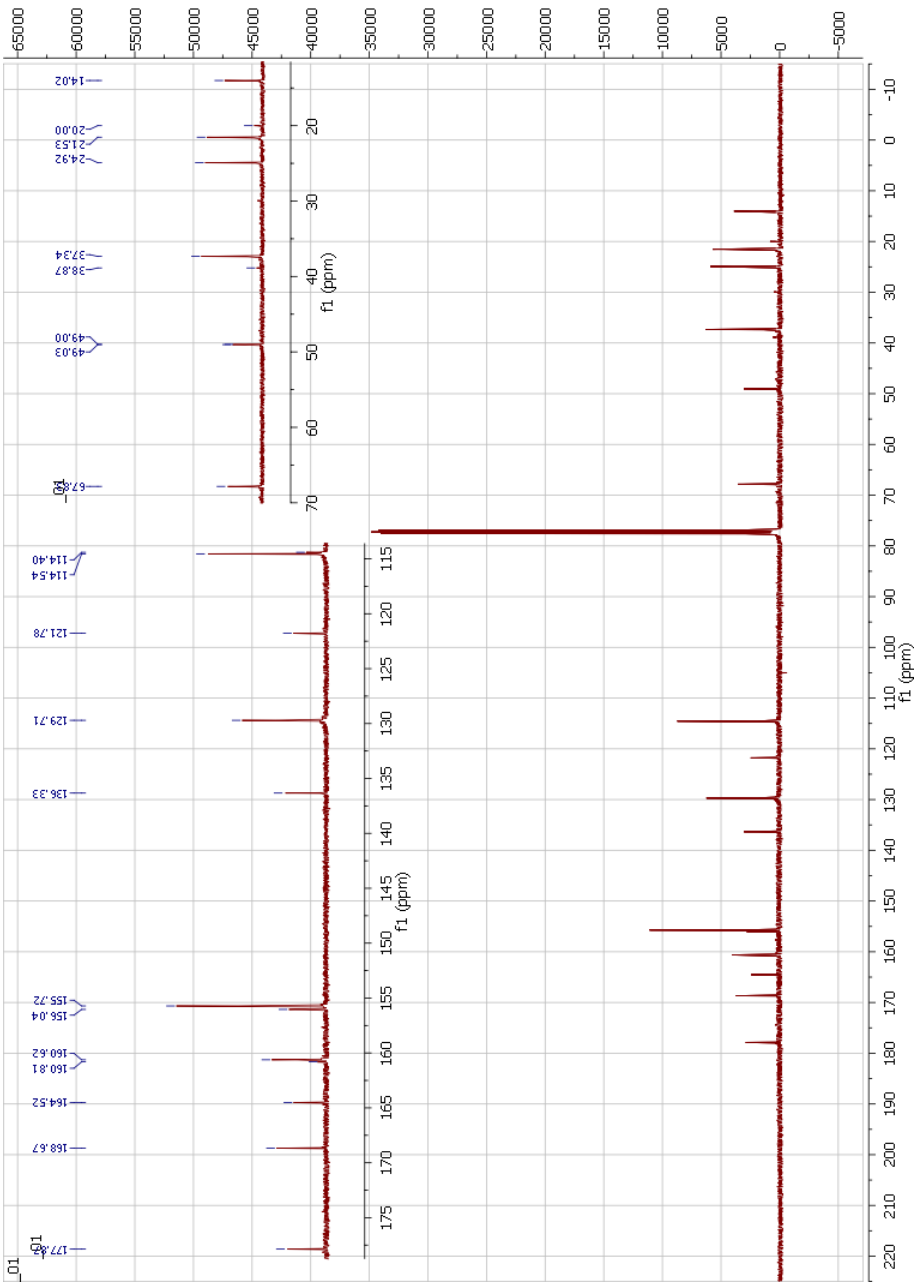


^{1}H NMR spectrum (400 MHz) of **11al** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11al** in $CDCl_3$

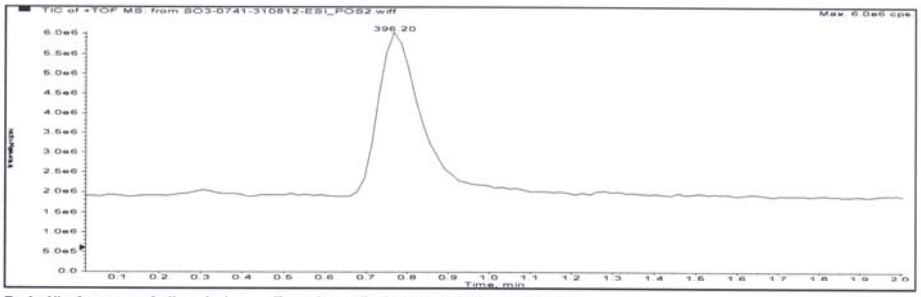




LC-MS of **11al**

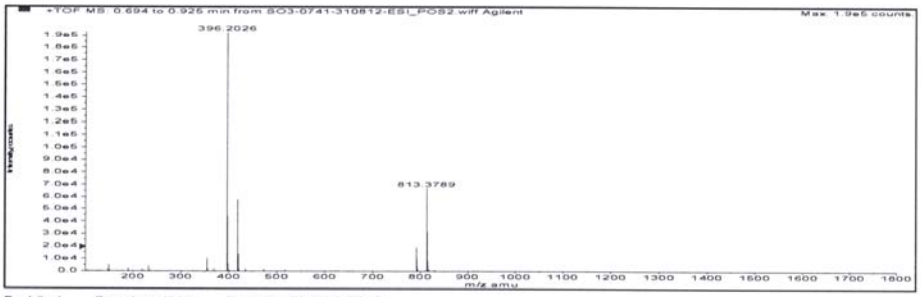
Mass List Report

Sample#: so3-074 Sample Location: P1-A-09 Sample Id: so3-074 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO3-0741-310812-ESI_POS2.wiff Acq Time: August 31 2012, 06:31:06 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.77	2.78446 E7	396.20257



Peak# : 1 Experiment# : 1 Retention Time : 0.77 min

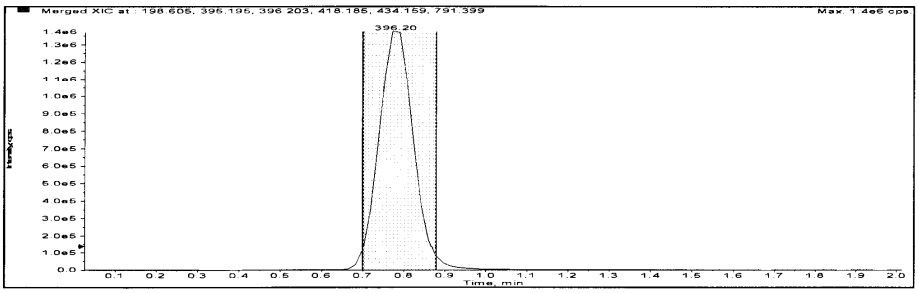
Friday, August 31, 2012 18:33:19 PM

HRMS of **11al**

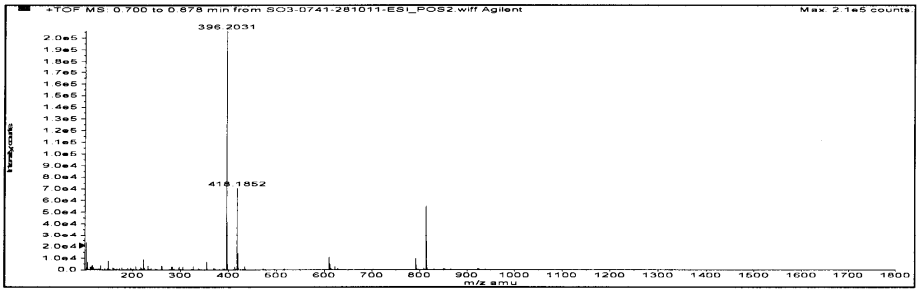
Empirical Formula Confirmation Report

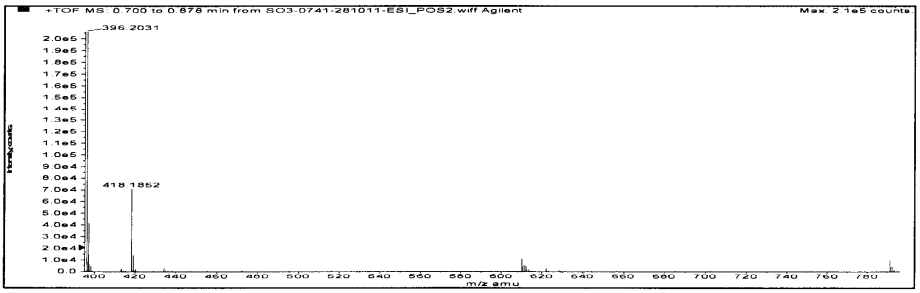
Sample Name: so3-074 Sample Location: P1-C-03 Sample Id: so3-074 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\10-11\Data\SO3-0741-281011-ESI_POS2.wiff Acq Time: October 28 2011, 03:44:11 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C21H25N5O3	--	395.19574	0.78	8.05859 E6	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	206654.18	396.20302	396.20311	0.09681	0.24	--
[M+Na]+	70935.19	418.18496	418.18522	0.26002	0.62	--
[M+K]+	3123.14	434.15890	434.15875	-0.14529	-0.33	--
[2M+H]+	9593.56	791.39876	791.39750	-1.25512	-1.59	--

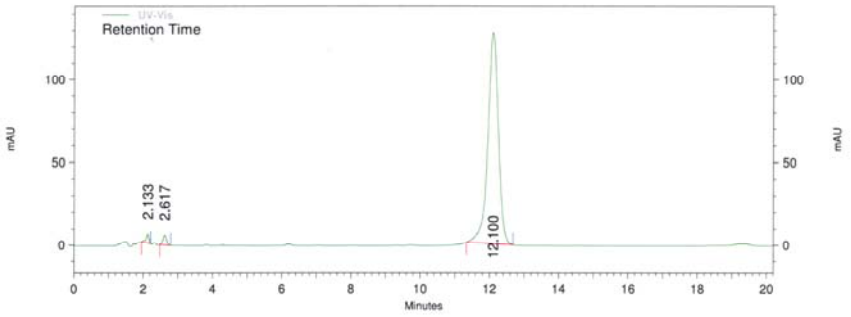
Friday, October 28, 2011 15:46:31 PM

HPLC of **11al**

Area Percent Report

Data File: C:\HPLC data\Roberta\so3-074CH3CN50 H2O50 0.1TFA 1mL 20min.met10-28-2011 1-47-15 PM.dat
Acquired: 10/28/2011 1:47:42 PM **Printed:** 10/31/2011 1:16:16 PM

Analyst: System
Sample ID: so3-074 **Vial:** N/A **Injection Volume:** 0

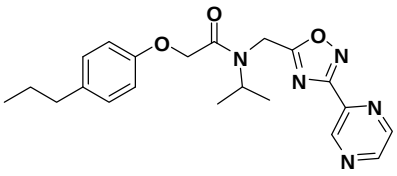


UV-Vis Results

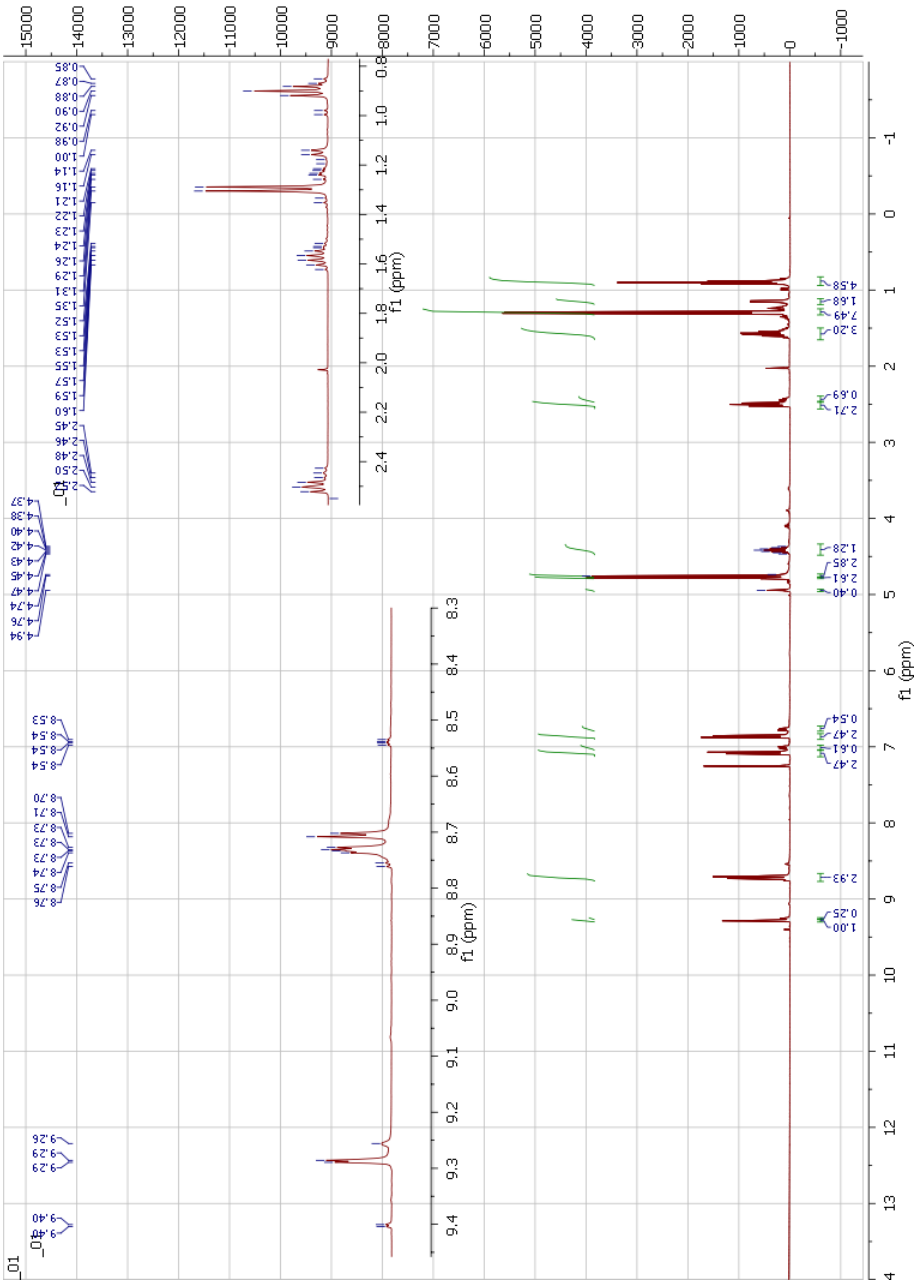
Name	Retention Time	Area	Area Percent	Integration Codes
	2.133	35123	1.269	RI
	2.617	42945	1.552	II
	12.100	2689715	97.179	II
Totals		2767783	100.000	

Instrument Name: HPLC **Software Version:** Version 3.1.7
Acquisition Method: C:\EZStart\Projects\Default\Method\xin\CH3CN50 H2O50 0.1TFA 1mL 20min.met
Sequence: C:\HPLC data\Dan\abc.seq

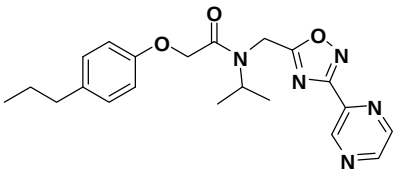
19. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11am**.

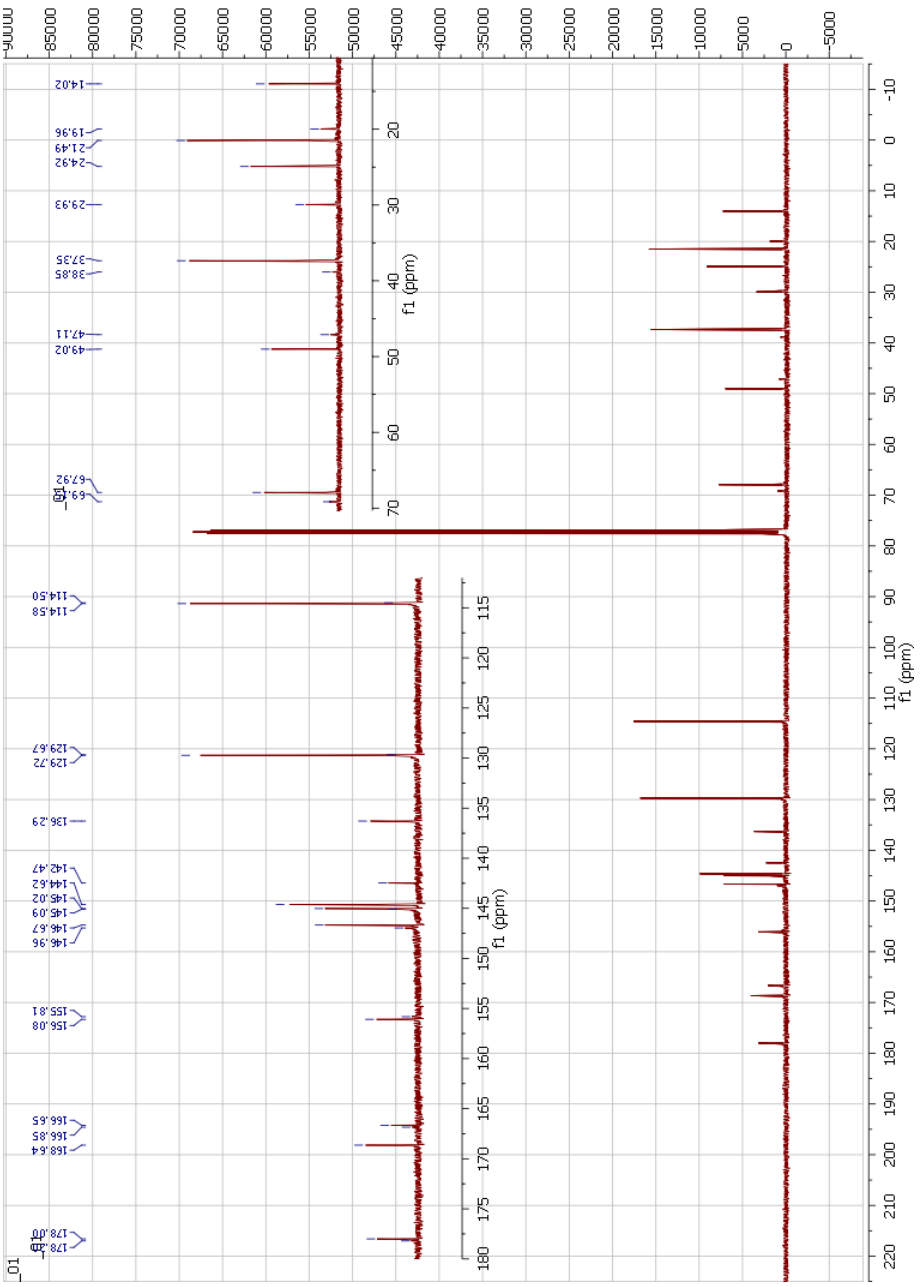


^{1}H NMR spectrum (400 MHz) of **11am** in $CDCl_3$



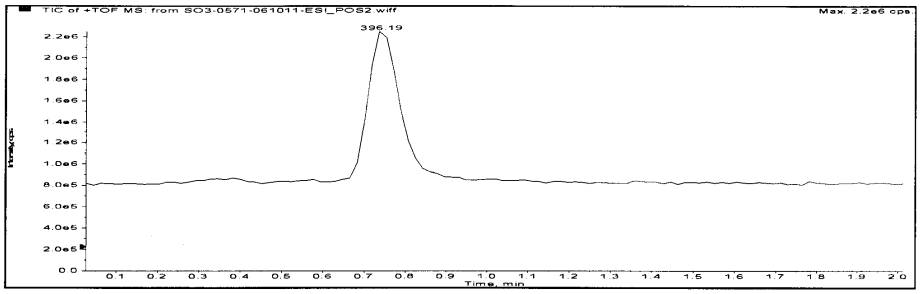
^{13}C NMR spectrum (100 MHz) spectrum of **11am** in $CDCl_3$





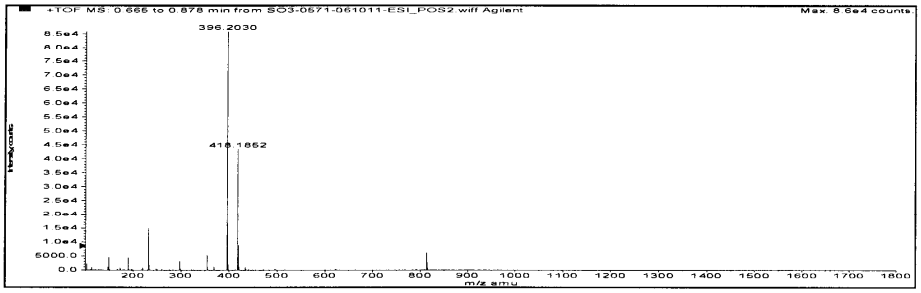
LC-MS of **11am**

Sample#: so3-057 Sample Location: P1-B-04 Sample Id: so3-057 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\10-11\Data\SO3-0571-061011-ESI_POS2.wiff Acq Time: October 06 2011, 10:21:20 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.74	7.52014 E6	396.20302

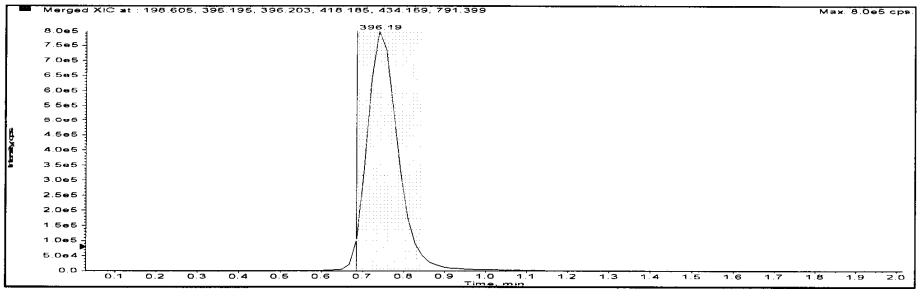


Peak# : 1 **Experiment# : 1** **Retention Time : 0.74 min**

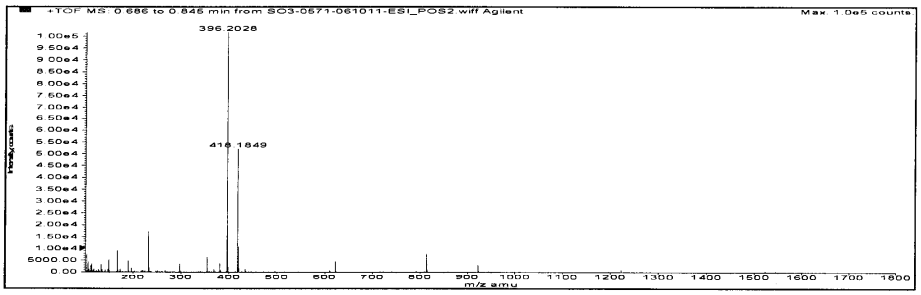
HRMS of **11am**

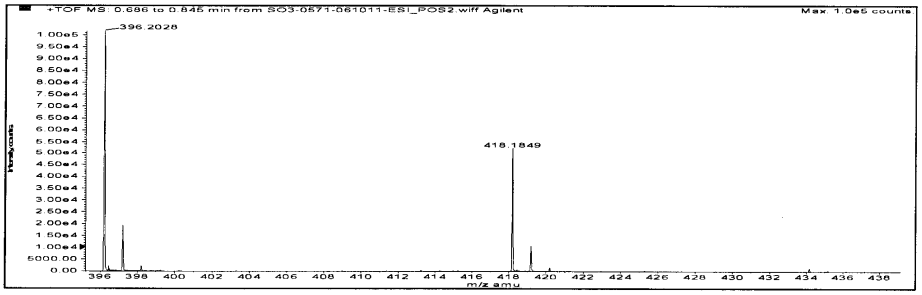
Empirical Formula Confirmation Report

Sample Name: so3-057 Sample Location: P1-B-02 Sample Id: so3-057 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\10-11\Data\SO3-0571-061011-ESI_POS2.wiff Acq Time: October 06 2011, 10:12:12 AM
Method: D:\TOF Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C21H25N5O3	--	395.19574	0.74	4.09164 E6	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	106840.32	396.20302	396.20284	-0.17427	-0.44	--
[M+Na]+	53059.41	418.18496	418.18485	-0.10690	-0.26	--
[M+K]+	1447.97	434.15890	434.15905	0.15400	0.35	--

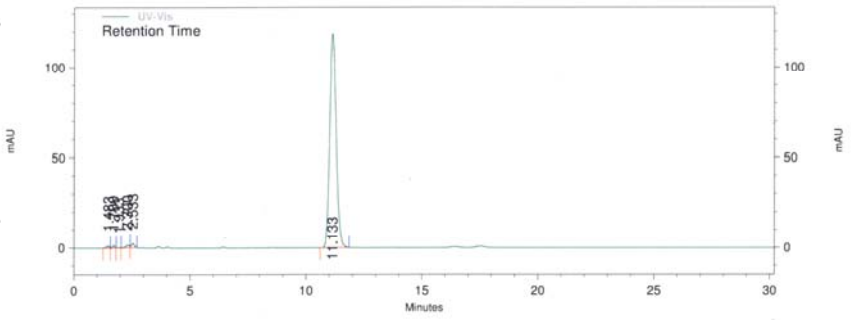
Thursday, October 06, 2011 10:14:31 AM

HPLC of **11am**

Area Percent Report

Data File: C:\HPLC data\Yunting\SO3-057CH3CN50 H2O50 0.1TFA 1mL 30min.met12-12-2011 2-55-04 PM.dat
Acquired: 12/12/2011 2:55:25 PM **Printed: 12/12/2011 3:32:59 PM**

Analyst: System
Sample ID: SO3-057 **Vial: N/A** **Injection Volume: 0**

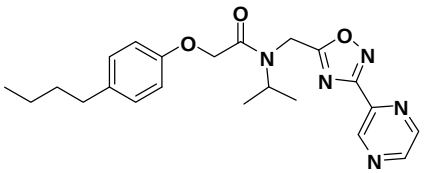


UV-Vis Results

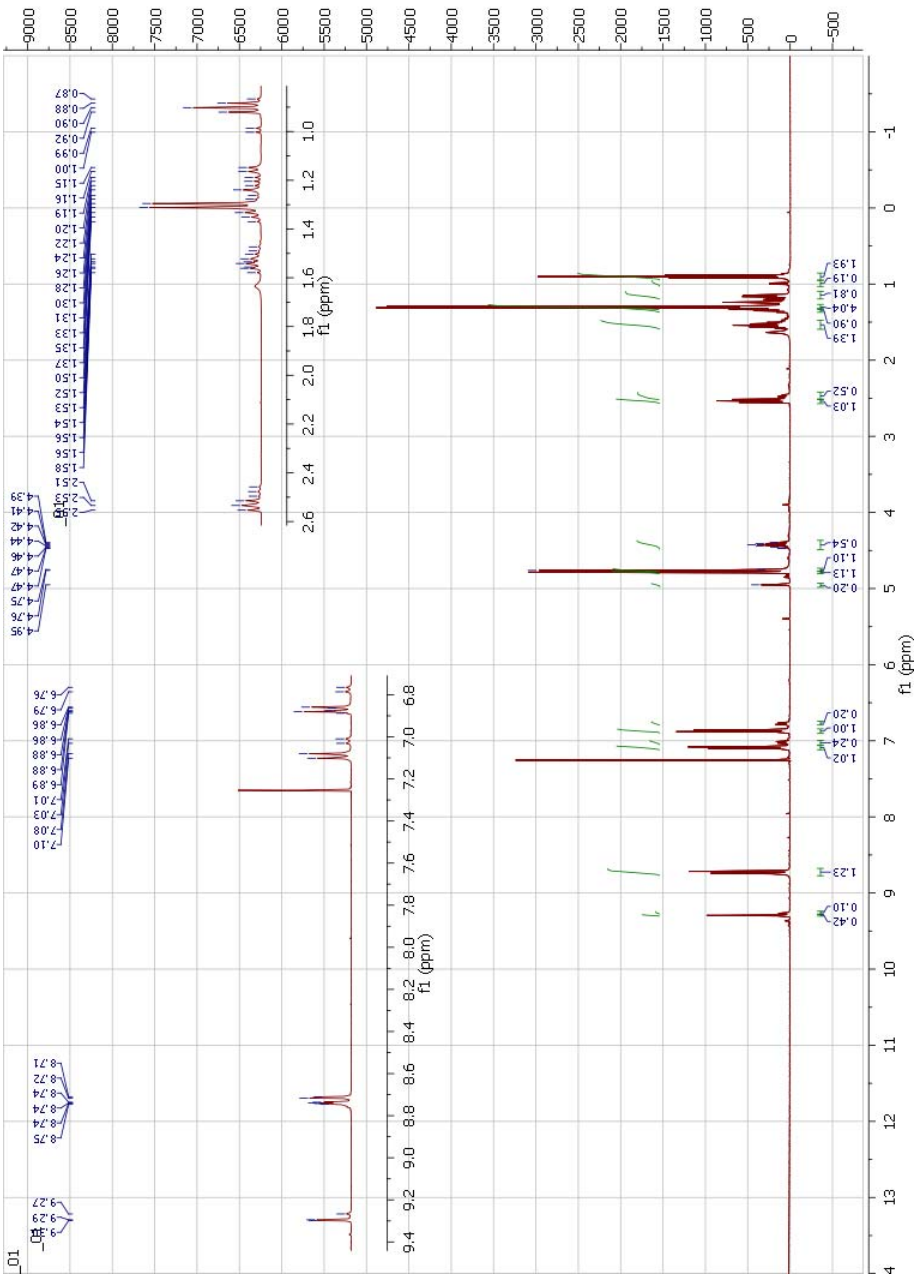
Name	Retention Time	Area	Area Percent	Integration Codes
	1.483	11379	0.479	RB
	1.700	10165	0.428	BV
	1.933	1931	0.081	VV
	2.300	18584	0.782	VV
	2.533	23407	0.985	VI
	11.133	2310978	97.245	BI
Totals		2376444	100.000	

Instrument Name: **HPLC** **Software Version: Version 3.1.7**
Acquisition Method: **C:\EZStart\Projects\Default\Method\xin\CH3CN50 H2O50 0.1TFA 1mL 30min.met**
Sequence: **C:\HPLC data\Dan\abc.seq**

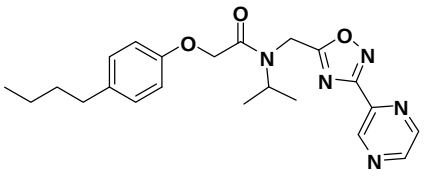
20. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11an.**

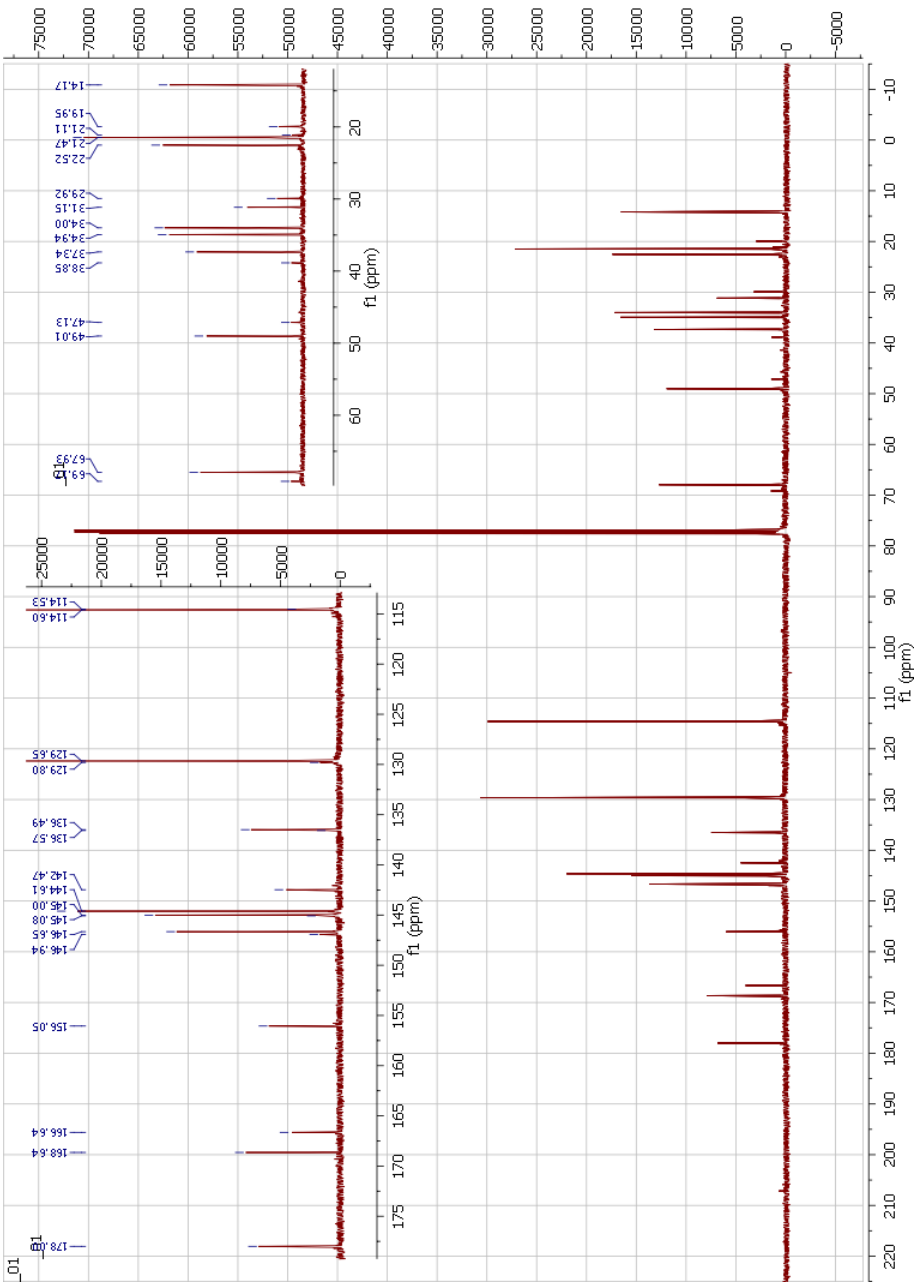


^{1}H NMR spectrum (400 MHz) of **11an** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11an** in $CDCl_3$



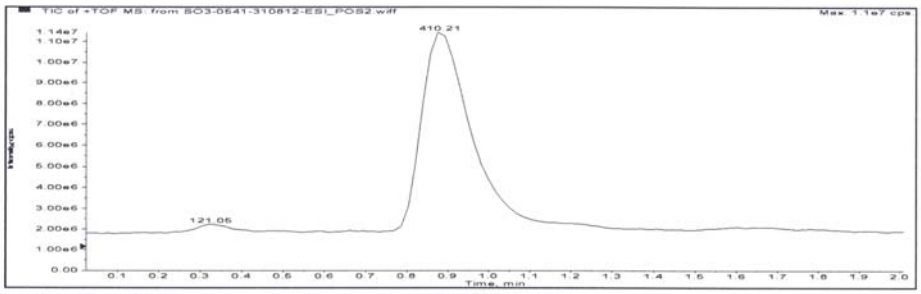


LC-MS of **11an**

Mass List Report

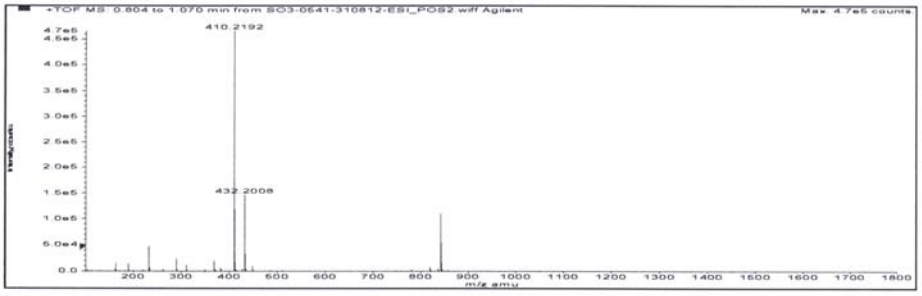
Sample#: so3-054 Sample Location: P1-B-06 Sample Id: so3-054 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO3-0541-310812-ESI_POS2.wiff Acq Time: August 31 2012, 06:58:37 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml

One or more scans have failed IRM. Review the data file for details.



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.88	7.85601 E7	410.21919



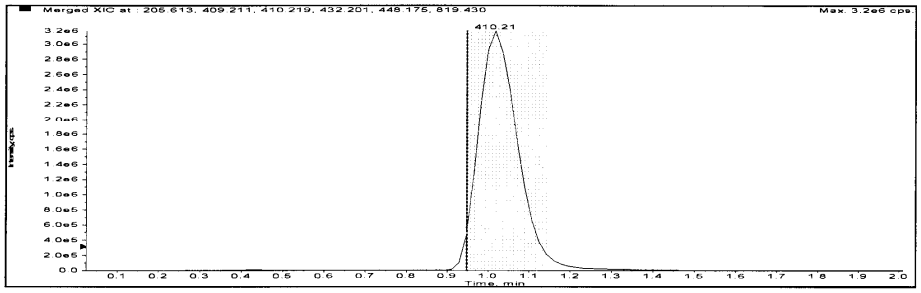
Peak# : 1 **Experiment# : 1** **Retention Time : 0.88 min**

Friday, August 31, 2012 19:00:48 PM

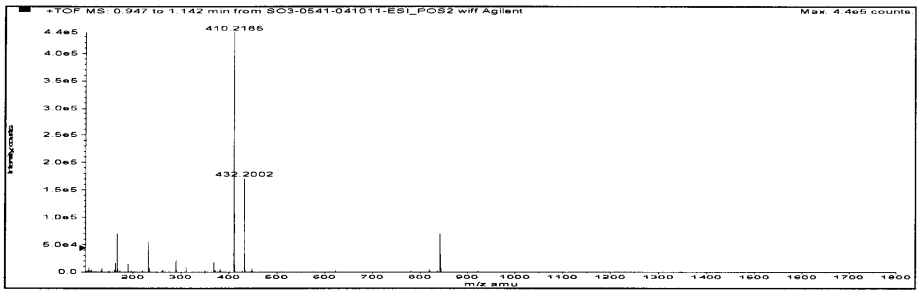
HRMS of **11an**

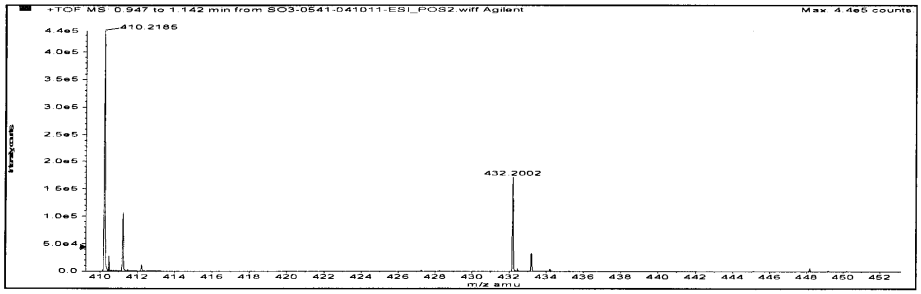
Empirical Formula Confirmation Report

Sample Name: SO3-054 Sample Location: P2-D-01 Sample Id: SO3-054 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\10-11\Data\SO3-0541-041011-ESI_POS2.wiff Acq Time: October 04 2011, 03:35:21 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C22H27N5O3	--	409.21139	1.02	2.08656 E7	--

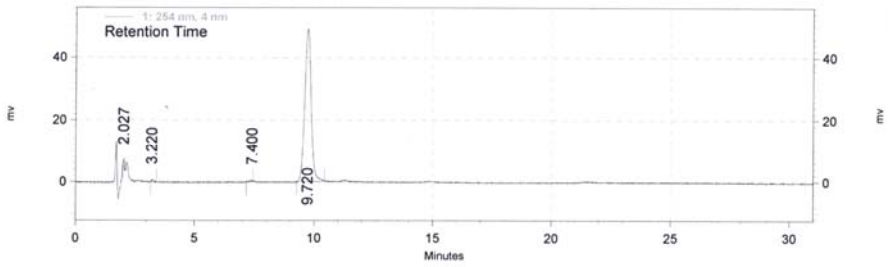
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	462384.16	410.21867	410.21848	-0.18167	-0.44	--
[M+Na]+	173849.57	432.20061	432.20019	-0.42333	-0.98	--
[M+K]+	6233.32	448.17455	448.17425	-0.29950	-0.67	--

Tuesday, October 04, 2011 15:37:40 PM

HPLC of **11an**

Area % Report

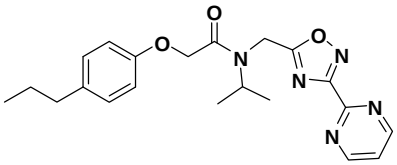
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so3-054 MeOH 70% TFA 0.1 in H2O 30% 1ml 30 min.met 10-18-2011 4-25-19 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Dan\MeOH 70% TFA 0.1 in H2O 30% 1ml 30 min.met
Acquired: 10/18/2011 4:27:36 PM
Printed: 4/2/2012 11:35:10 AM



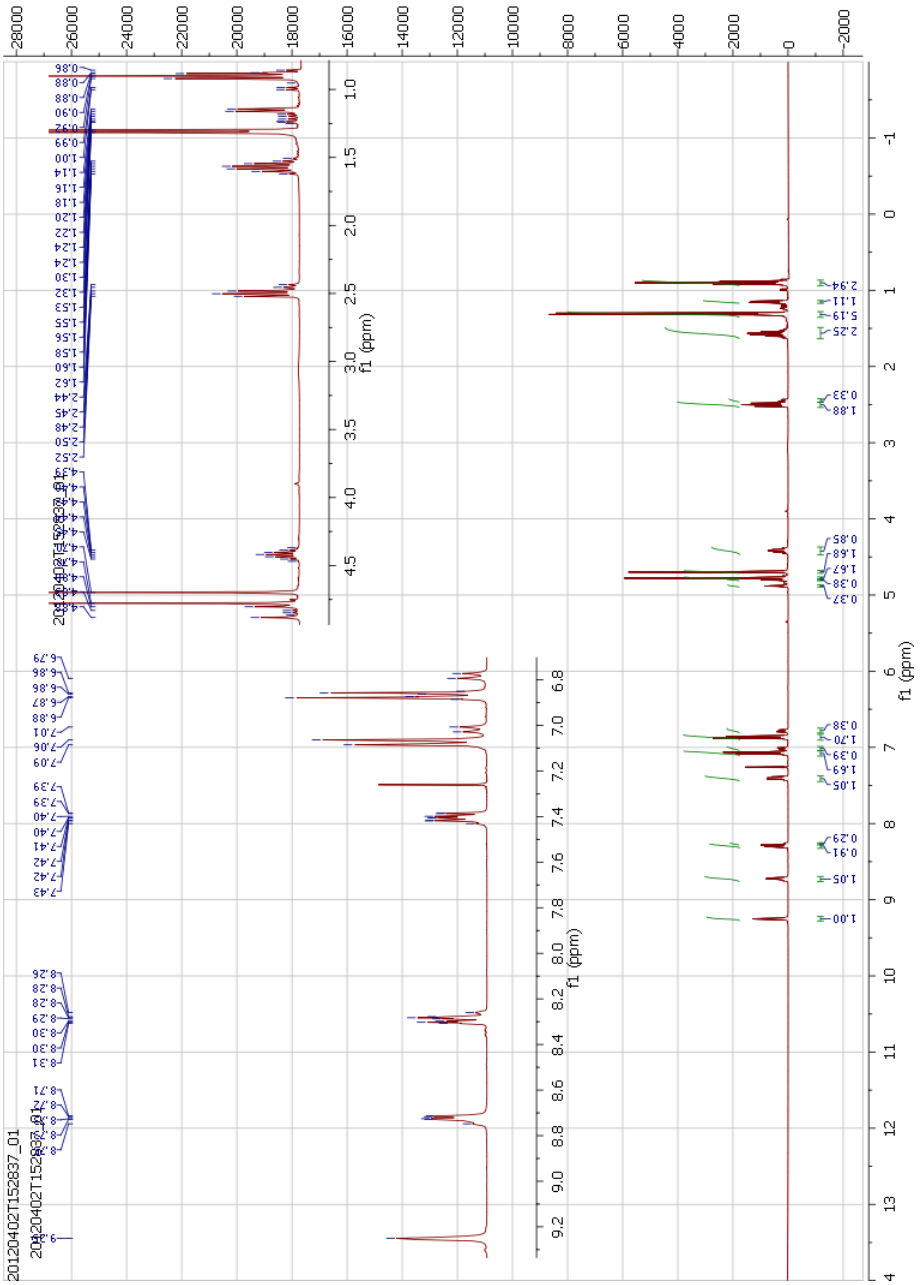
1: 254 nm, 4 nm Results

Retention Time	Area	Area %
2.027	9055	0.96
3.220	6066	0.65
7.400	3935	0.42
9.720	920137	97.97
Totals	939193	100.00

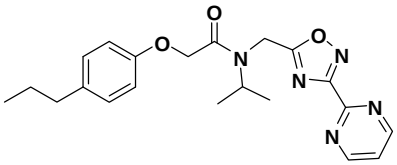
21. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ao.**

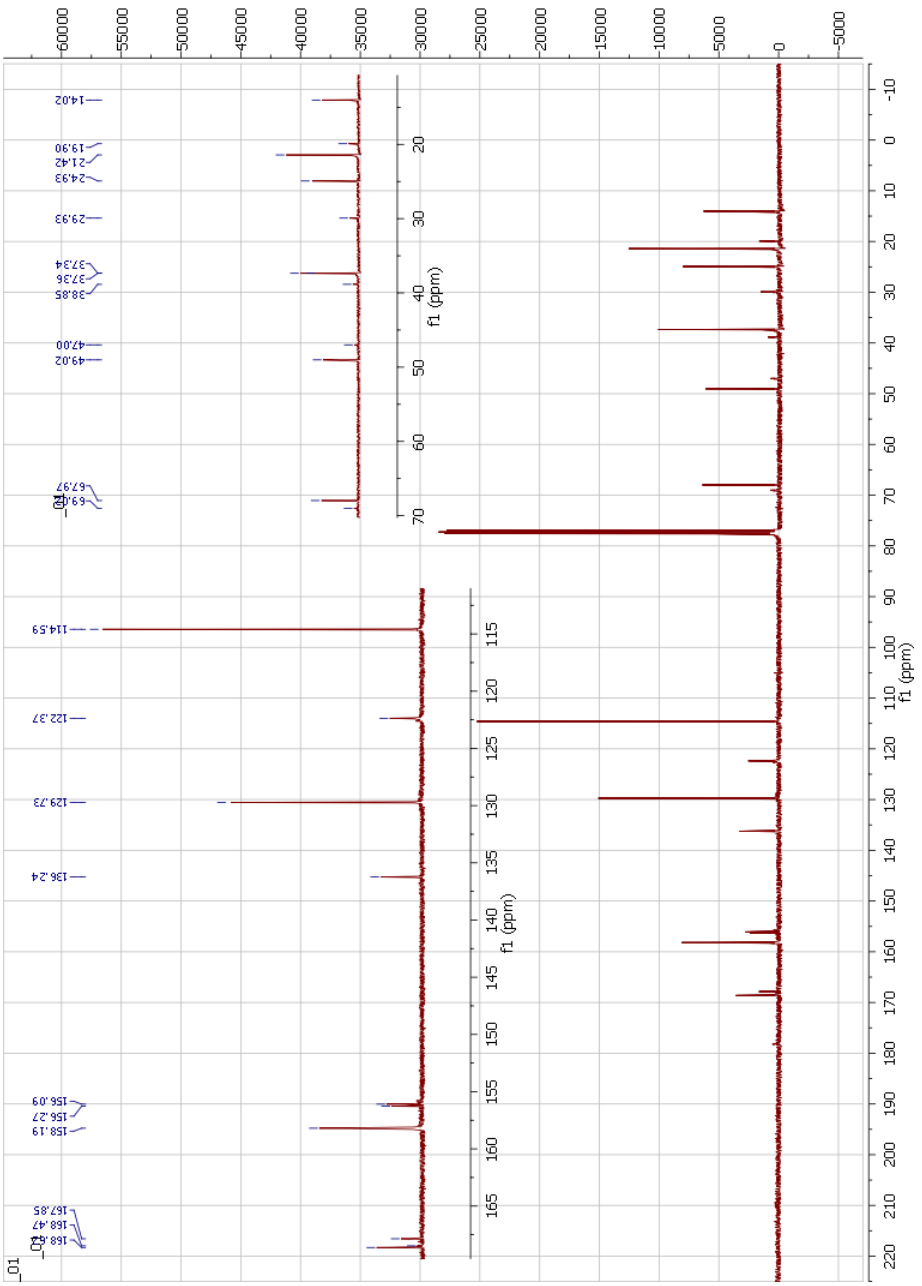


^{1}H NMR spectrum (400 MHz) of **11ao** in $CDCl_3$



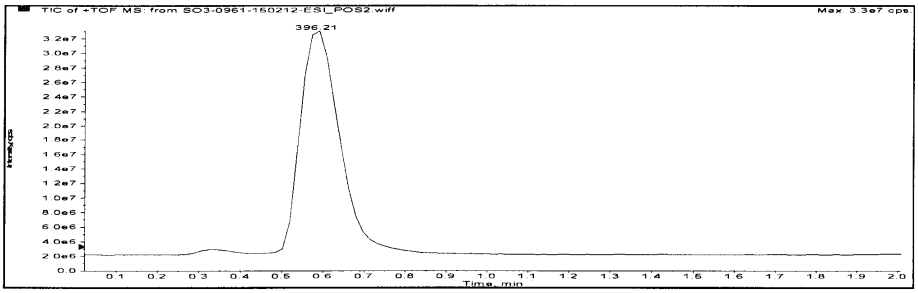
^{13}C NMR spectrum (100 MHz) spectrum of **11ao** in $CDCl_3$





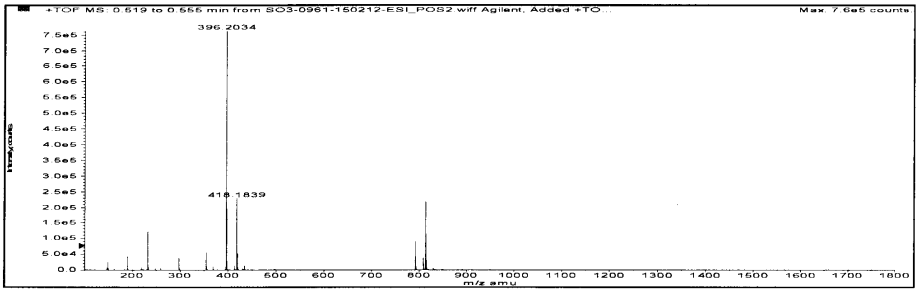
LC-MS of **11ao**

Sample#: so3-096 Sample Location: P1-B-02 Sample Id: so3-096 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\02-12\Data\SO3-0961-150212-ESI_POS2.wiff Acq Time: February 15 2012, 10:20:10 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.58	2.03437 E8	396.20343



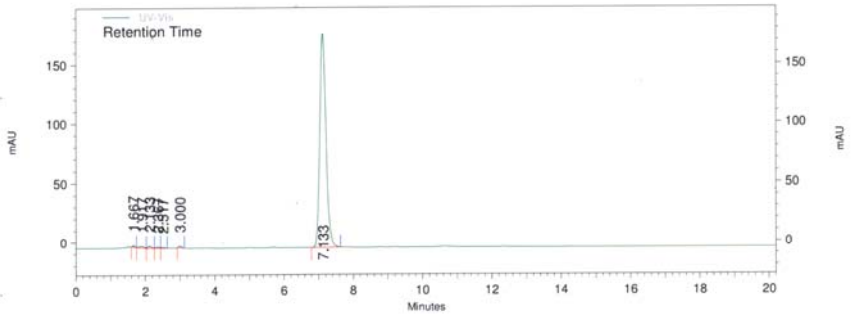
Peak# : 1 Experiment# : 1 Retention Time : 0.58 min

HPLC of **11ao**

Area Percent Report

Data File: C:\HPLC data\Roberta\so3096CH3CN50 H2O50 0.1TFA 1mL 20min.met11-21-2011 1-22-14 PM.dat
Acquired: 11/21/2011 1:22:33 PM
Printed: 11/21/2011 1:44:23 PM

Analyst: System
Sample ID: so3096 **Vial: N/A** **Injection Volume: 0**

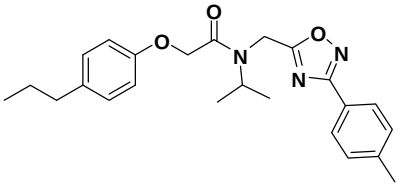


UV-Vis Results

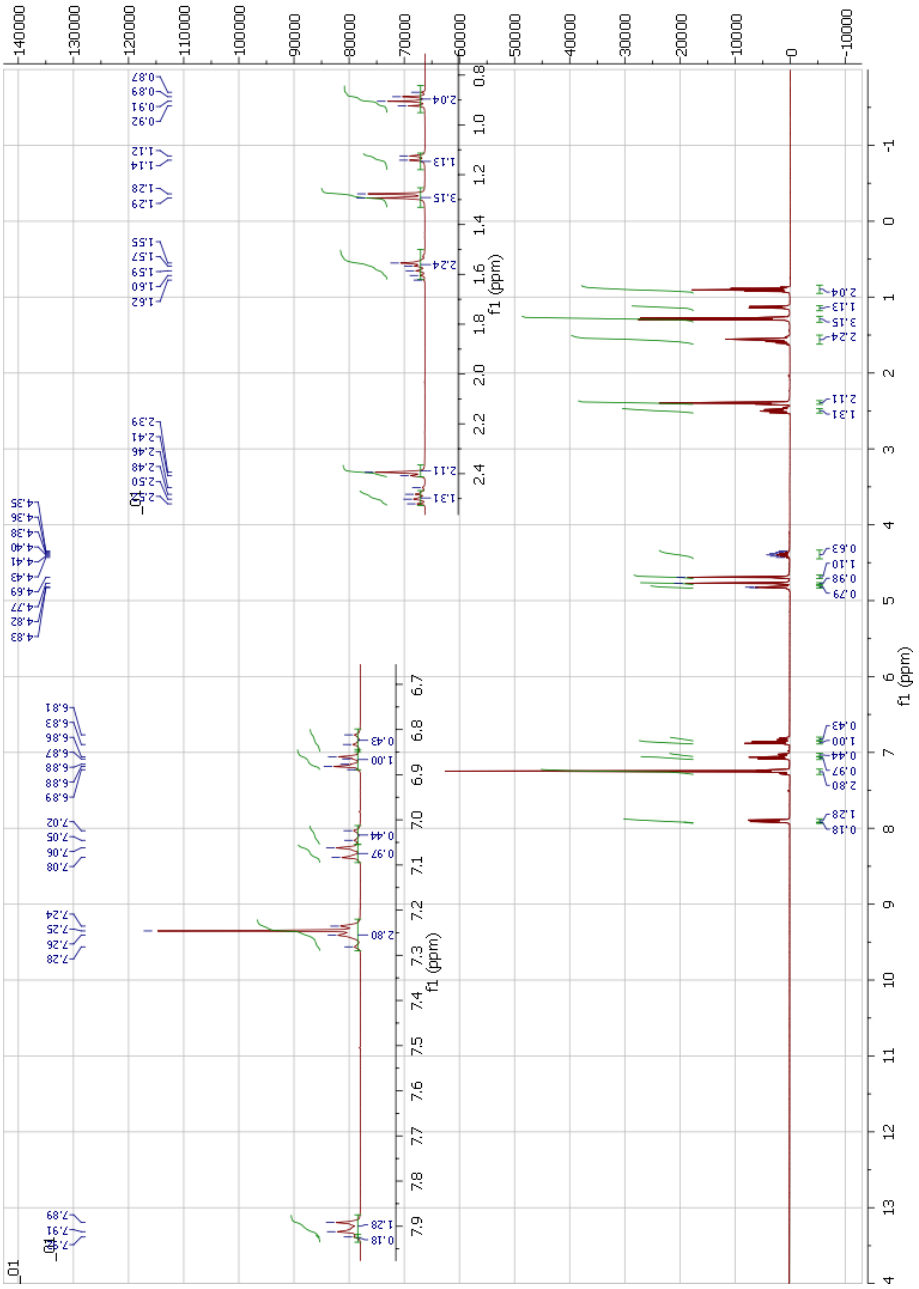
Name	Retention Time	Area	Area Percent	Integration Codes
	1.667	6345	0.275	RB
	1.917	11717	0.507	BB
	2.133	10840	0.469	BV
	2.367	6462	0.280	VV
	2.517	4272	0.185	VI
	3.000	8411	0.364	II
	7.133	2261029	97.919	BI
Totals		2309076	100.000	

Instrument Name: HPLC **Software Version:** Version 3.1.7
Acquisition Method: C:\EZStart\Projects\Default\Method\xin\CH3CN50 H2O50 0.1TFA 1mL 20min.met
Sequence: C:\HPLC data\Dan\abc.seq

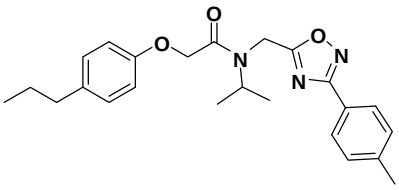
22. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **11ap**.

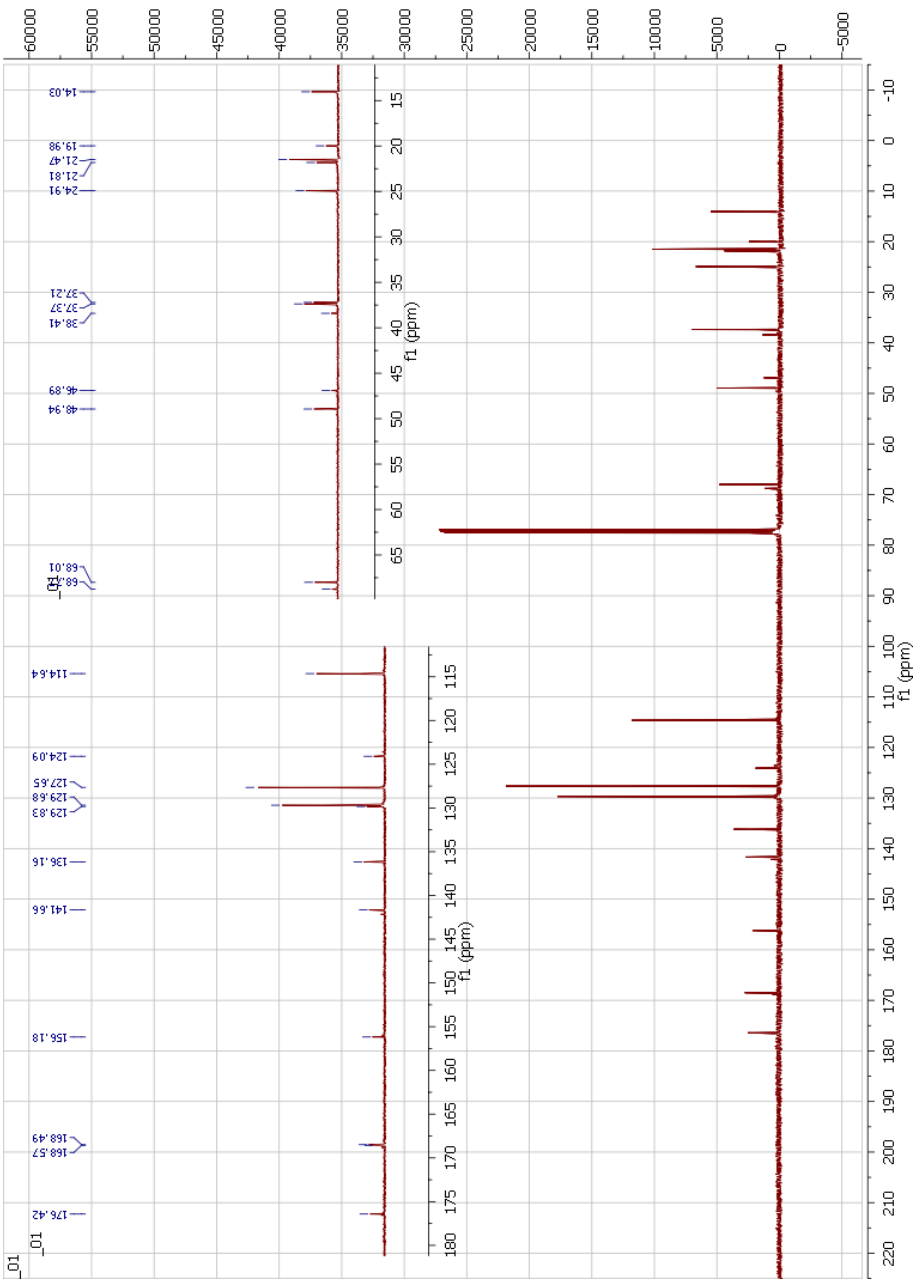


^{1}H NMR spectrum (400 MHz) of **11ap** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **11ap** in $CDCl_3$

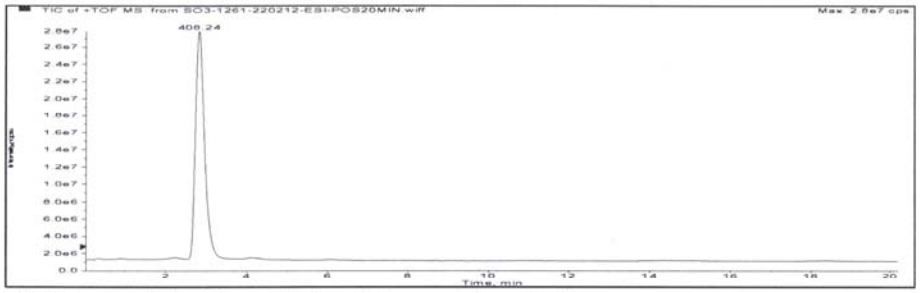




LC-MS of **11ap**

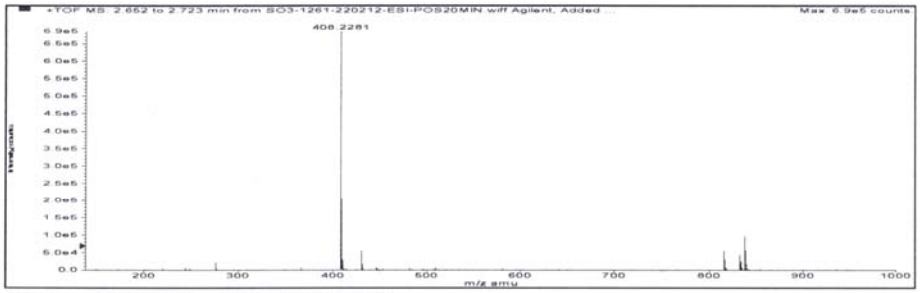
Mass List Report Page 1 of 1

Sample#: so3-126 Sample Location: P1-B-09 Sample Id: so3-126 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\02-12\Data\SO3-1261-220212-ESI-POS20MIN.wiff Acq Time: February 22 2012, 11:04:17 AM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods Experiment# : Average of all experiments

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	2.83	4.10195 E8	408.22811



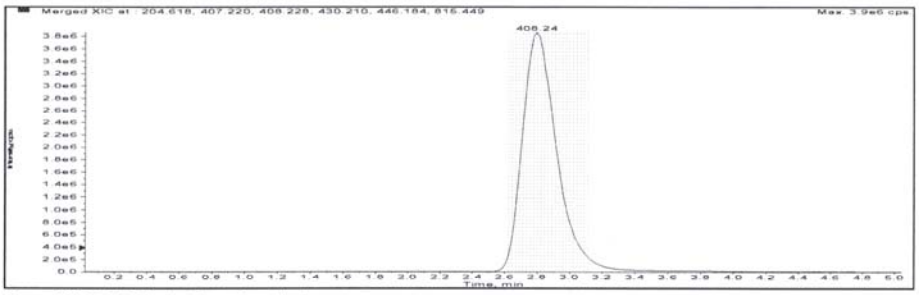
Peak# : 1 Experiment# : 1 Retention Time : 2.83 min

Wednesday, February 22, 2012 11:24:31 AM

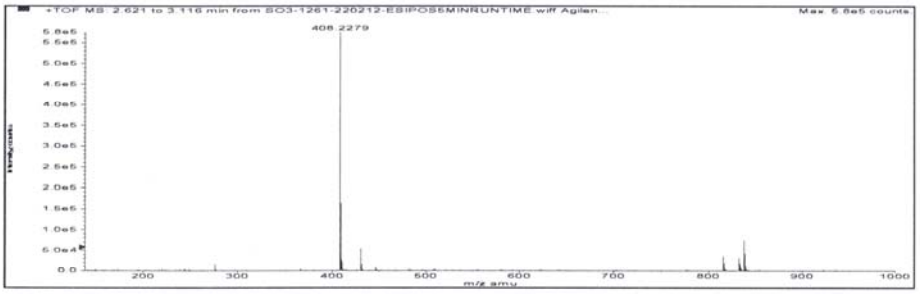
HRMS of **11ap**

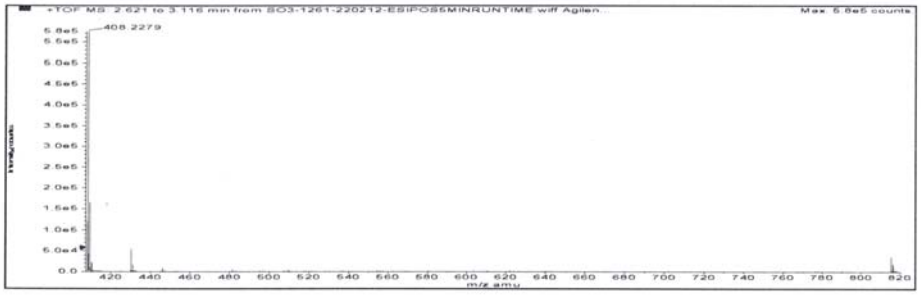
Empirical Formula Confirmation Report

Sample Name: SO3-126 Sample Location: P1-A-05 Sample Id: SO3-126 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\02-12\Data\SO3-1261-220212-ESIPOS5MINRUNTIME.wiff Acq Time: February 22 2012, 12:54:11 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C24H29N3O3	--	407.22089	2.80	5.57577 E7	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	598990.78	408.22817	408.22792	-0.24891	-0.61	--
[M+Na]+	55732.20	430.21011	430.20935	-0.76202	-1.77	--
[M+K]+	8379.08	446.18405	446.18376	-0.29063	-0.65	--
[2M+H]+	35634.15	815.44906	815.44598	-3.07984	-3.78	--

Wednesday, February 22, 2012 12:59:43 PM

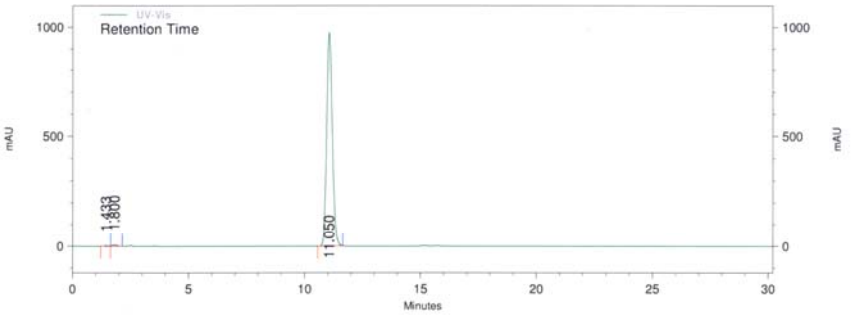
HPLC of **11ap**

Area Percent Report

Data File: C:\HPLC data\Sevil\so3-126CH3OH70 H2O30 0.1TFA 1mL 30min.met2-22-2012 2-36-40 PM.dat

Acquired: 2/22/2012 2:37:03 PM **Printed: 2/22/2012 3:19:40 PM**

Analyst: System
Sample ID: so3-126 **Vial: N/A** **Injection Volume: 0**

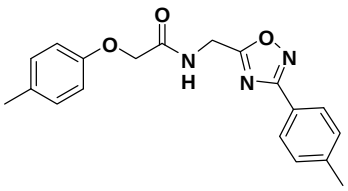


UV-Vis Results

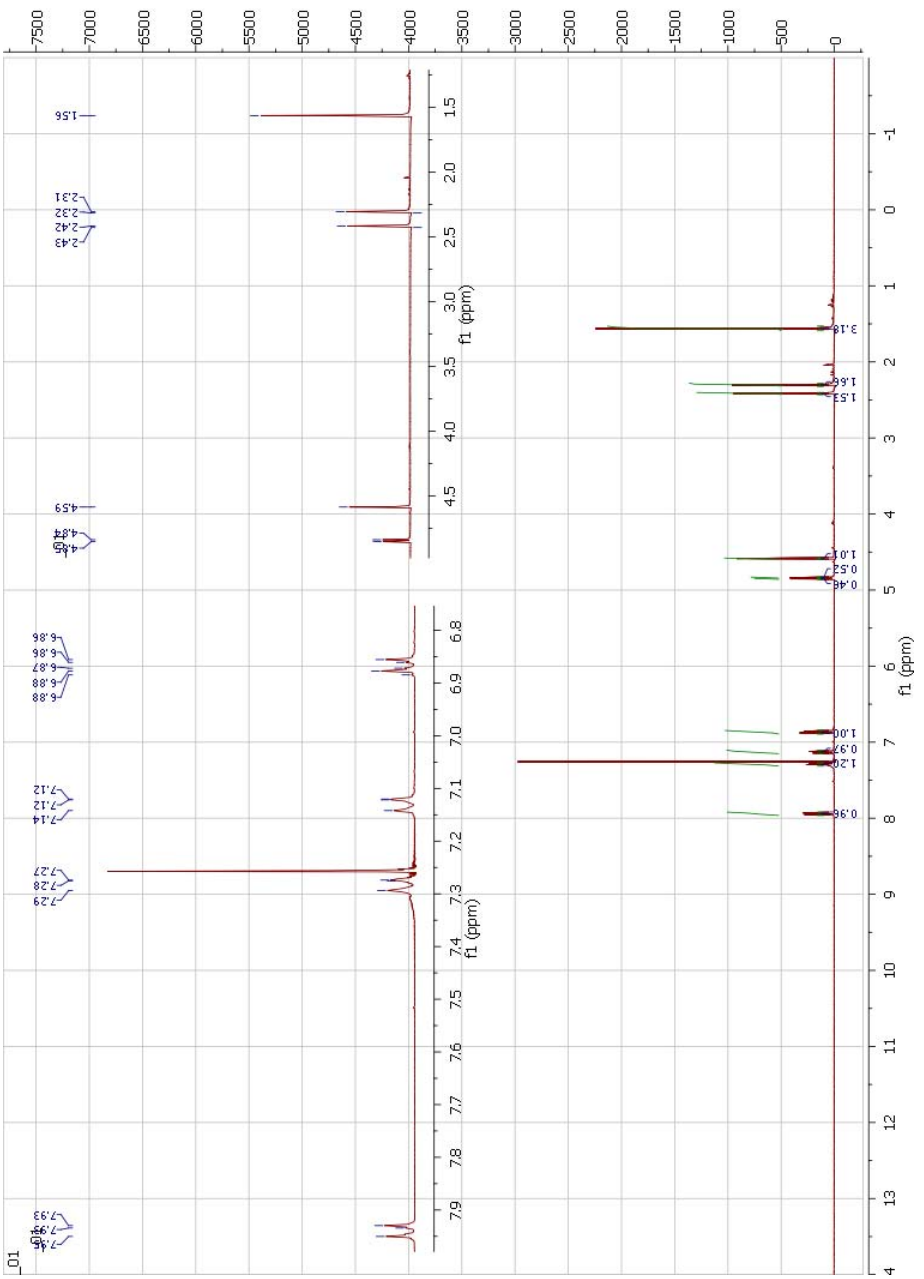
Name	Retention Time	Area	Area Percent	Integration Codes
	1.433	29902	0.180	BV
	1.800	81700	0.491	VI
	11.050	16512161	99.329	BI
Totals		16623763	100.000	

Instrument Name: HPLC **Software Version: Version 3.1.7**
Acquisition Method: C:\EZStart\Projects\Default\Method\xin\CH3OH70 H2O30 0.1TFA 1mL 30min.met
Sequence: C:\HPLC data\Dan\abc.seq

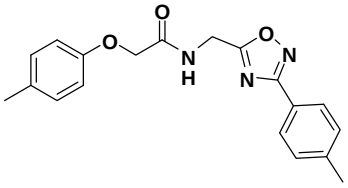
23. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **12d**

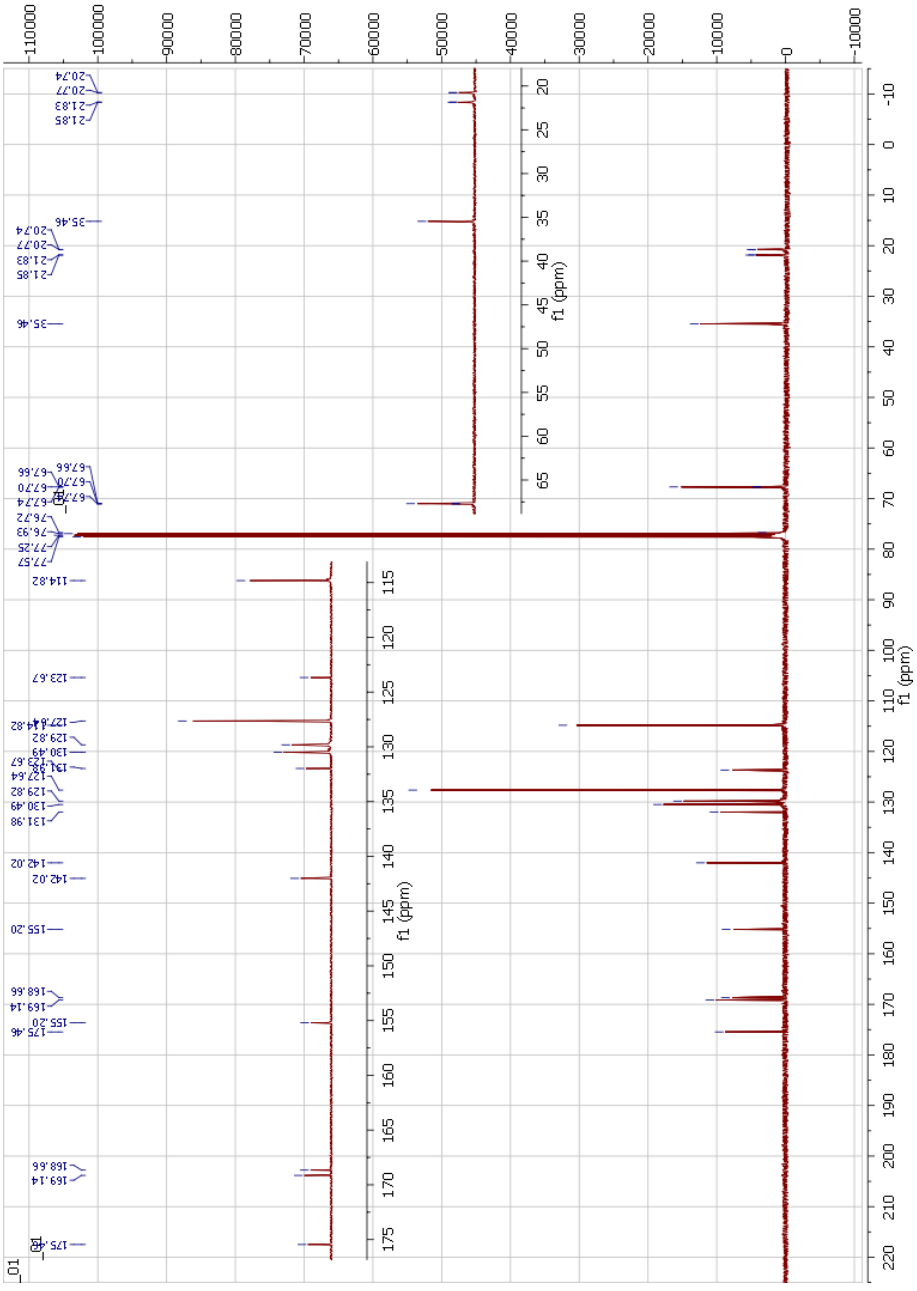


^{1}H NMR spectrum (400 MHz) of **12d** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **12d** in $CDCl_3$

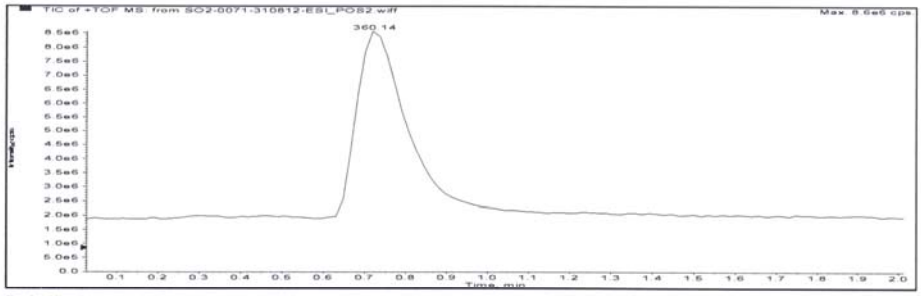




LC-MS of **12d**

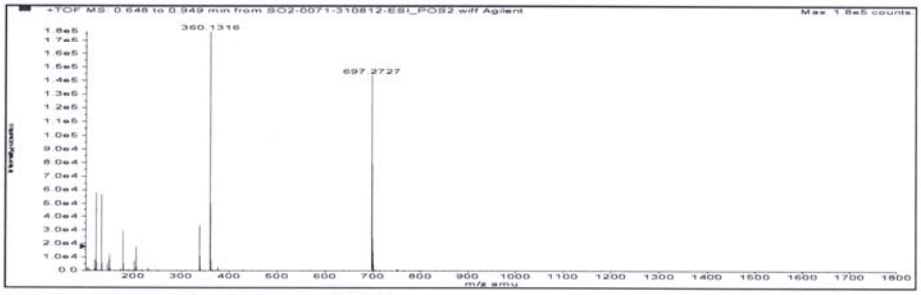
Mass List Report

Sample#: so2-007 Sample Location: P1-B-02 Sample Id: so2-007 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO2-0071-310812-ESI_POS2.wiff Acq Time: August 31 2012, 03:40:05 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	0.72	5.57540 E7	360.13156



Peak# : 1 **Experiment# : 1** **Retention Time : 0.72 min**

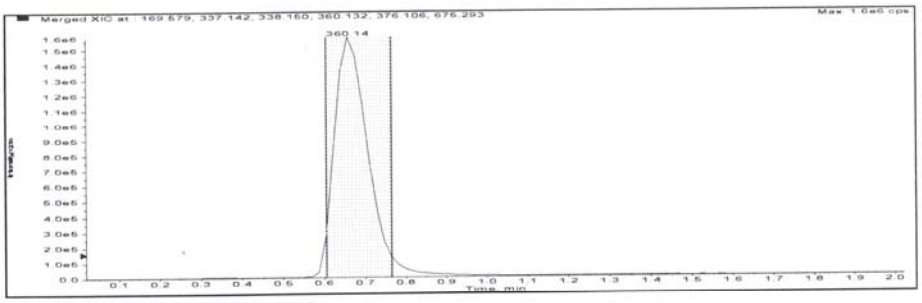
Friday, August 31, 2012 15:42:17 PM

HRMS of **12d**

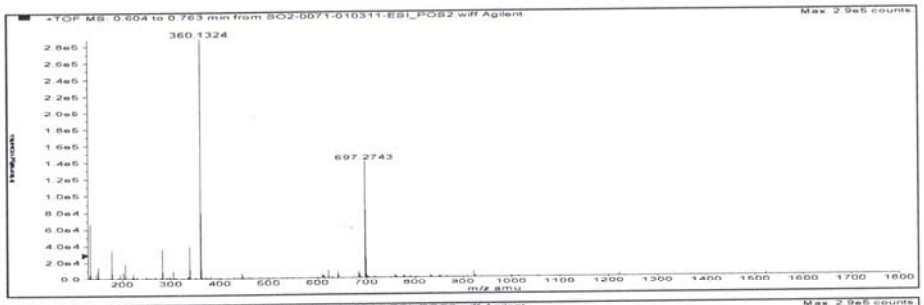
Empirical Formula Confirmation Report

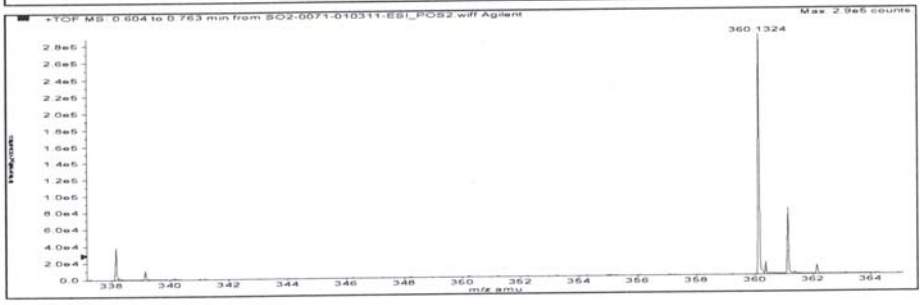
Page 1 of 1

Sample Name: SO2-007 Sample Location: P1-A-09 Sample Id: SO2-007 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Yunting Luo\03-11\Data\SO2-0071-010311-ESI_POS2.wiff Acq Time: March 01 2011, 01:53:16 PM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C19H19N3O3	--	337.14264	0.66	8.94410 E6	--

Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	39156.95	338.14992	338.15046	0.53868	1.59	--
[M+Na]+	294902.40	360.13186	360.13243	0.56400	1.57	--

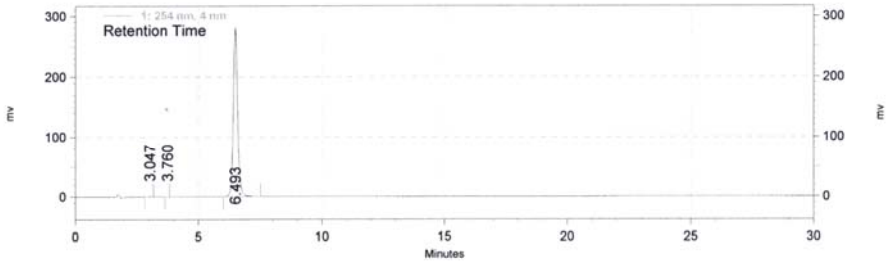
Tuesday, March 01, 2011

13:55:30 PM

HPLC of **12d**

Area % Report

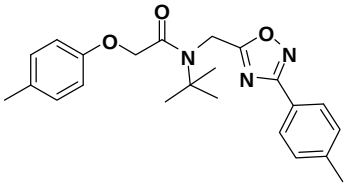
Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so2-007 60% ACN 40% H2O 0.1TFA 1ml 30 min.met 11-18-2010 6-30-22 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\60% ACN 40% H2O 0.1TFA 1ml 30 min.met
Acquired: 11/18/2010 6:32:39 PM
Printed: 12/17/2010 5:35:50 PM



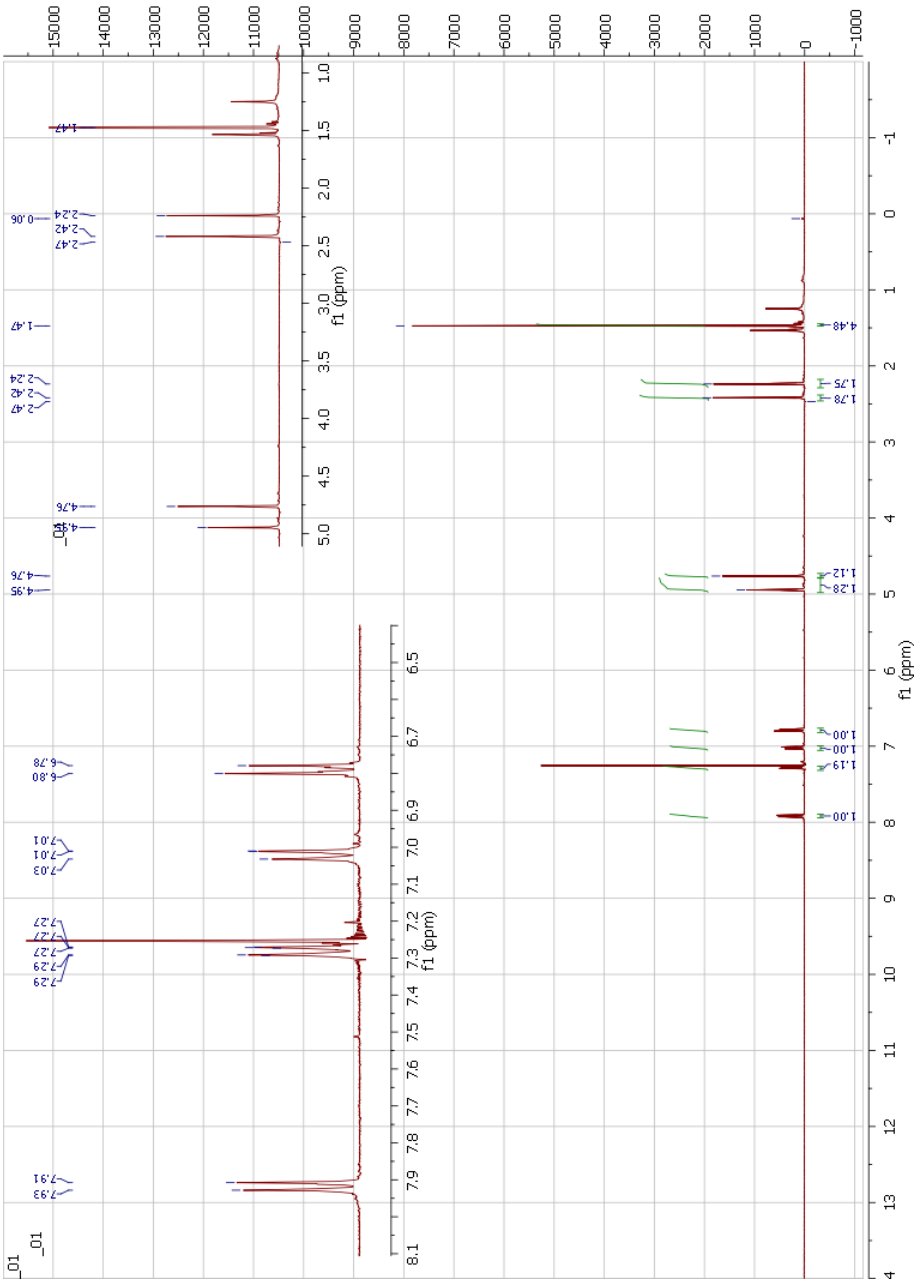
1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
3.047	4099	0.12	387	0.14
3.760	932	0.03	180	0.06
6.493	3368552	99.85	280929	99.80
Totals	3373583	100.00	281496	100.00

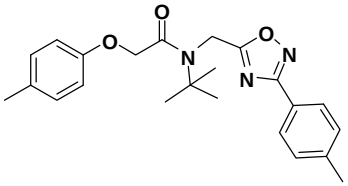
24. ^{1}H NMR, ^{13}C NMR, LC-MS, HRMS and HPLC for compound **12e**.

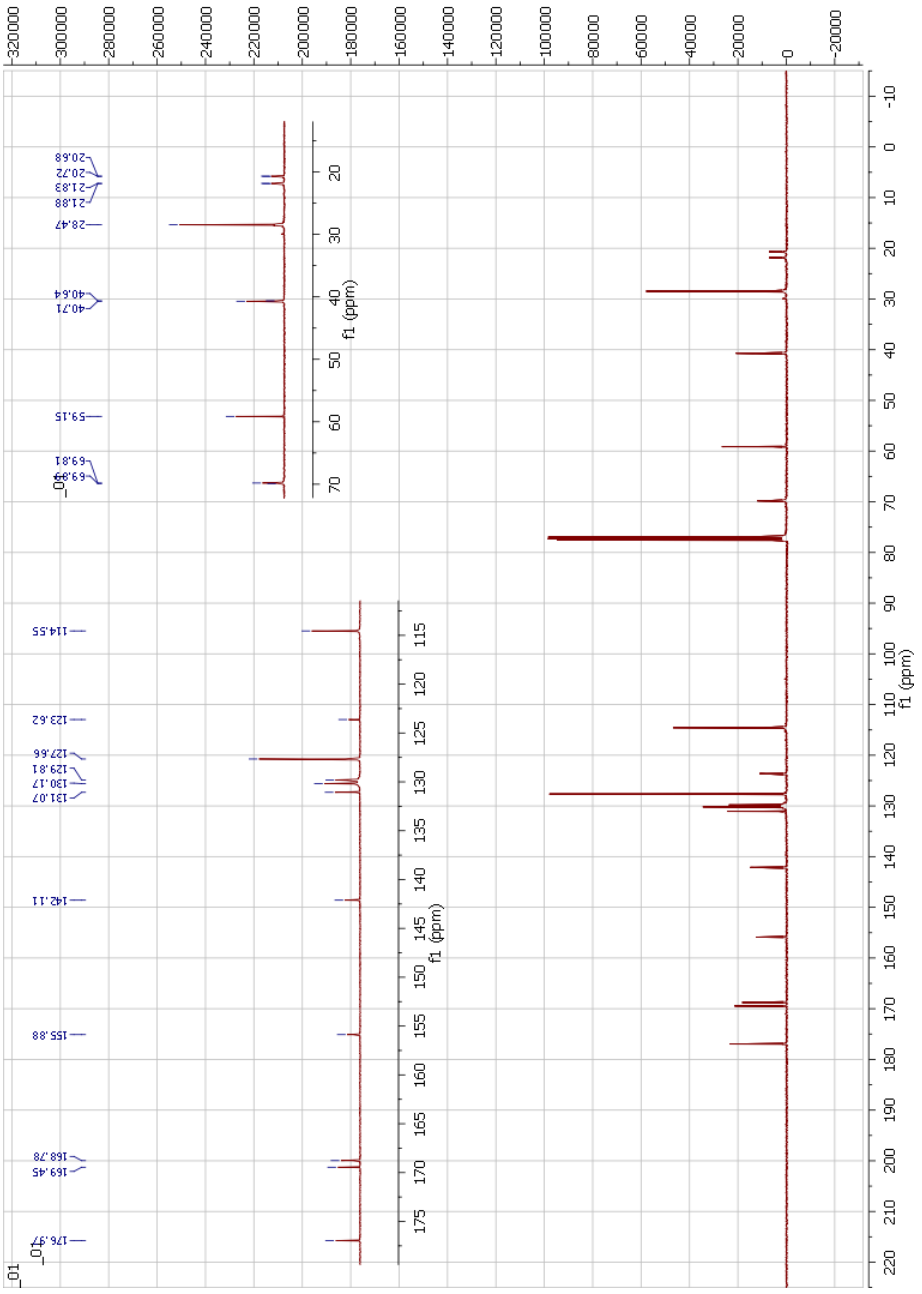


^{1}H NMR spectrum (400 MHz) of **12e** in $CDCl_3$



^{13}C NMR spectrum (100 MHz) spectrum of **12e** in $CDCl_3$



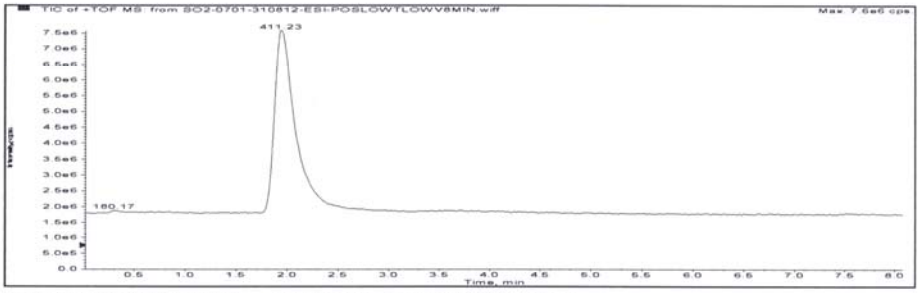


LC-MS of **12e**

Mass List Report

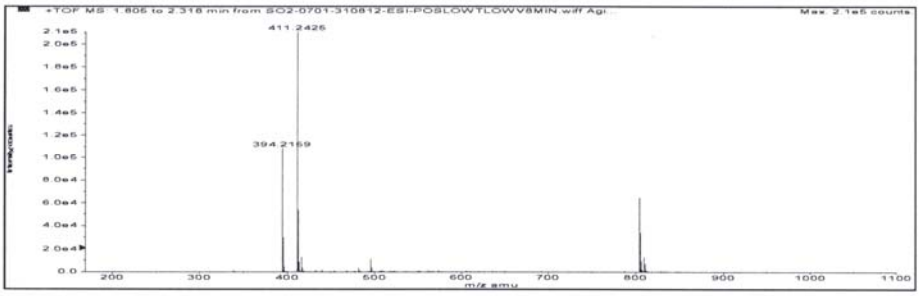
Sample#: so2-070 Sample Location: P1-A-02 Sample Id: so2-070 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\08-12\Data\SO2-0701-310812-ESI-POSLOWTLOWV8MIN.wiff Acq Time: August 31 2012, 05:43:17 PM
Method: D:\TOF_Data\damethods\EASY ACESS1.ANM\mass_list.xml

One or more scans have failed IRM. Review the data file for details.



Period# : Average of all periods **Experiment# : Average of all experiments**

Peak#	Experiment#	Time	Area	Most Abundant Masses/scan
1	1	1.94	7.69269 E7	411.24251



Peak# : 1 **Experiment# : 1** **Retention Time : 1.94 min**

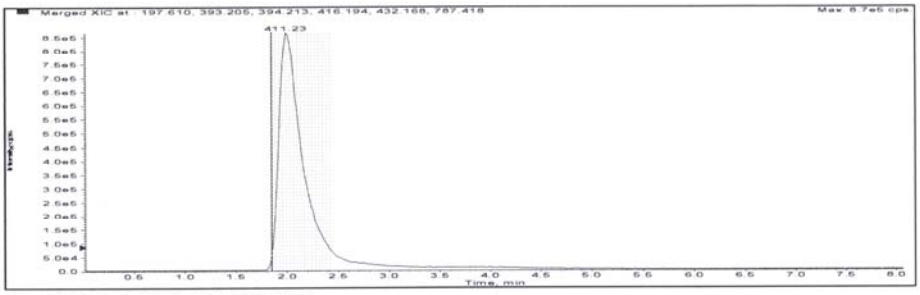
Friday, August 31, 2012 17:51:46 PM

HRMS of **12e**

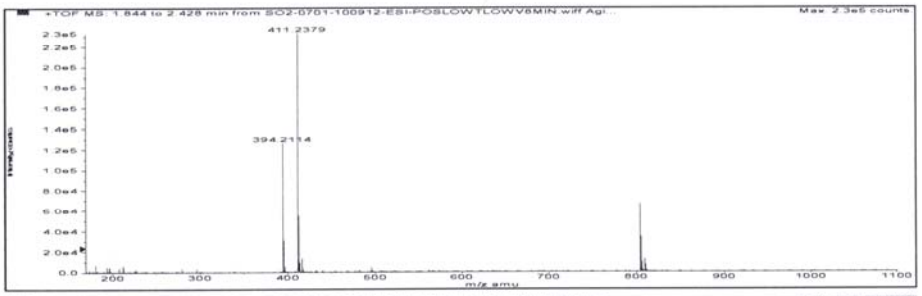
Empirical Formula Confirmation Report

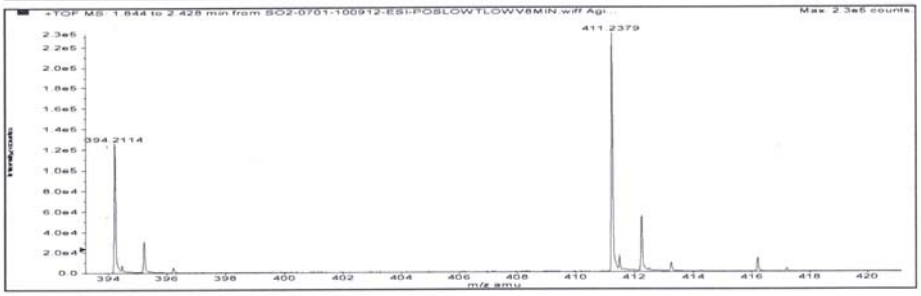
Sample Name: so2-070 Sample Location: P1-A-03 Sample Id: so2-070 Operator: EasyAccess
Data File Name: D:\PE Sciex Data\Projects\Sevil Ozcan\09-12\Data\SO2-0701-100912-ESI-POSLOWTLOWV8MIN.wiff Acq Time: September 10 2012, 10:06:42 AM
Method: D:\TOF_Data\damethods\EASY ACESS2.ANM\efc.xml

One or more scans have failed IRM. Review the data file for details.



Merged XIC, Period# : 1 Experiment# : 1





Formula	Compound name	Mass	Peak RT (min)	Peak area	Description
C23H27N3O3	--	393.20524	1.99	1.35953 E7	--

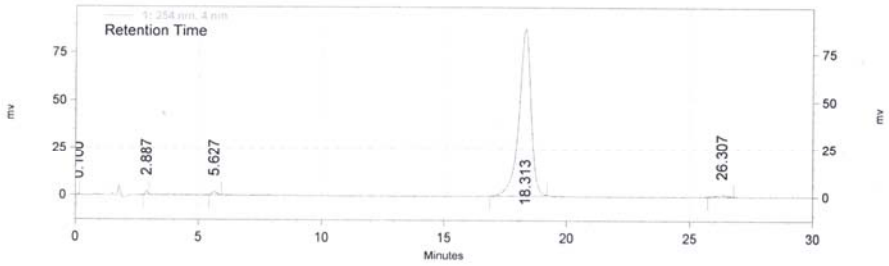
Species	Abundance (counts)	Ion Mass	Measured Mass	Error (mDa)	Error (ppm)	Ret. Time Error (min)
[M+H]+	132445.34	394.21252	394.21143	-1.09289	-2.77	--
[M+Na]+	13646.46	416.19446	416.19370	-0.76143	-1.83	--

Monday, September 10, 2012 10:15:25 AM

HPLC of **12e**

Area % Report

Data File: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Data\Sevil\so2070 60% ACN 40% H2O 0.1TFA 1ml 30 min.met 4-25-2011 4-22-37 PM.dat
Method: C:\EZChrom Elite\Enterprise\Projects\HTS Chemistry\Method\Sevil\40% ACN 60% H2O 0.1TFA 1ml 30 min.met
Acquired: 4/25/2011 4:24:54 PM
Printed: 4/27/2011 10:25:10 AM



1: 254 nm, 4 nm
Results

Retention Time	Area	Area %	Height	Height %
0.100	1565	0.05	371	0.40
2.887	11959	0.39	2033	2.19
5.627	23321	0.76	1764	1.90
18.313	2995382	97.73	87886	94.51
26.307	32658	1.07	937	1.01
Totals	3064885	100.00	92991	100.00

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