Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.


# Borrowing Hydrogen *C*-alkylation with secondary saturated heterocyclic alcohols

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# Supporting information

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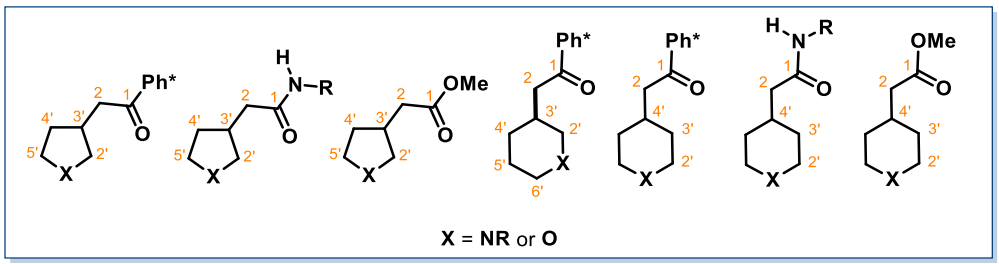
# General information

Reagents and solvents were supplied by Aldrich, Alfa Aesar and TCI Chemicals. NMR spectra were recorded on a Bruker 300 ($^1$H: 300 MHz), Bruker 400 ($^1$H: 400 MHz; $^{13}$C: 100 MHz) spectrometers at 298 K, using $CDCl_3$ as solvent. The chemical shifts (δ, ppm) are referenced to the residual solvent peak and coupling constants (*J*) are reported in the standard fashion. The following abbreviations are used to explain the multiplicities: s = singlet, d = doublet, t = triplet, dd = doublet of doublets, dt = doublet of triplets, m = multiplet. NMR peak assignments were performed for each compound using classic 1D and 2D NMR (COSY, HSQC and HMBC). As defined by P. J. Stevenson: "an apparent multiplet may be defined as a multiplet which looks like a first order multiplet but is not […] Therefore a double doublet with two similar, but not identical coupling constants, can be described as an apparent triplet".[1] Also, for a better clarity, a mean of close measured coupling constants for correlated protons is displayed in NMR assignments. The high-resolution mass spectrometry (HRMS) analyses were performed using a hybrid Quadrupole - Time-of-Flight (QTOF) mass spectrometer (Impact II, Bruker) equipped with an electrospray ion source (ESI) operated in positive or negative ion mode. Analytical thin-layer chromatography was run on silica gel Merck 60 D254 (0.25 mm) plates. Column chromatography was performed on Merck Si 60 silica gel (40–63 µm). Iridium catalysts **Ir-1**[2] and **Ir-2**[3] were prepared as previously reported procedures. *N*-substituted pyrrolidinols and piperidinols were synthetized according to our reported triol annulation procedure.[3]

### IUPAC Nomenclature for synthetized *O* and *N*- saturated heterocycles

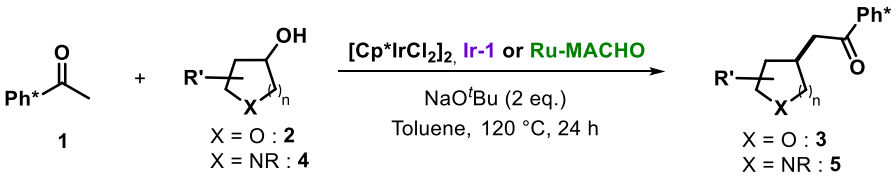



# General procedures

### General procedure A for the synthesis of 4-alkylated 3-hydroxyTHF

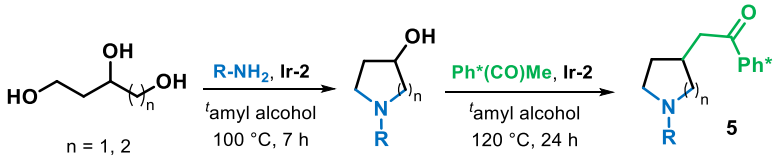
**Grignard reagent (1.5 to 2.0 eq.)** was added to a solution of CuI (20 mol%) at **X °C** under Ar. After 30 minutes, 3,6-dioxabicyclo[3.1.0]hexane (1.0 eq.) was added and the mixture was then allowed to warm up to rt and stirred for 18 h. The mixture obtained was quenched with an aqueous saturated $NH_4Cl$ solution (15 mL). Then, diluted with water (15 mL) and extracted with diethyl ether (5 x 30 mL). The organic layers were combined, dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. Purification by flash column chromatography packed with silica afforded the title compound.

### General procedure B for the metal catalyzed BH C-C coupling



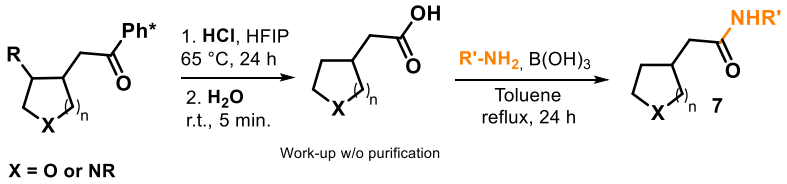

To a 10 mL Biotage® microwave vial equipped with a stirrer bar were introduced **alcohol** (1.0 eq.), pentamethylacetophenone (1.1 eq.), base (2.0 eq.), **catalyst** (5 mol% of Metal) and 1,3,5-trimethoxybenzene as standard in the open vessel. The vial was placed under inert atmosphere by performing 3 cycles vacuum/$N_2$. Then, toluene [1.0 M] was introduced and the vial was sealed with a microwave vial cap. The vial was heated at 120 °C for 24 h in a preheated tray. The mixture was cooled down to room temperature and few drops of water (100 µL) were added. The reaction vessel was washed with DCM (10 mL) and concentrated under reduced pressure. Purification by flash column chromatography packed with silica afforded the title compound **3** or **5**.

## General procedure C for the sequential C-N / C-C coupling



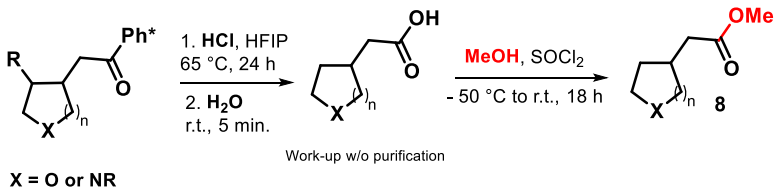

To a 10 mL Biotage® microwave vial equipped with a stirrer bar were introduced **the triol** (1.2 eq.), KO$^t$Bu (2 mol%), **Ir-2** (2 mol%) and 1,3,5-trimethoxybenzene (0.33 eq.) as standard in the open vessel. The vial was placed under inert atmosphere by performing 3 cycles vac/$N_2$. Then, *tert*-amyl alcohol [1M] followed by the corresponding amine (1.0 eq.) were added to the reaction mixture and the vial was sealed with a microwave vial cap. The vial was heated at 100 °C for 7 h in a preheated metal tray. The crude mixture was cooled down to rt and water (20 mL) was added. The product was extracted thrice with EtOAc (3 x 15 mL) and once with DCM (15 mL). The organic layer was then dried over $Na_2SO_4$ and concentrated under reduced pressure. Catalyst **Ir-2** (5 mol%), pentamethylacetophenone (1.1 eq.) and KO$^t$Bu (2.0 eq.) were introduced with the crude mixture in a 10 mL Biotage® microwave vial equipped with a stirrer bar. The vial was placed under inert atmosphere by performing 3 cycles vac/$N_2$. Then, *tert*-amyl alcohol [1M] followed by **the amine** (1.0 eq.) were added to the reaction mixture and the vial was sealed with a microwave vial cap. The vial was heated at 120 °C for 24 h in a preheated metal tray. The crude mixture was cooled down to rt, concentrated under reduced pressure and purification by flash column chromatography packed with silica afforded the title compound **5**.

## General procedure D for sequence Ph* cleave / amidation




To a solution of **the alkylated ketone 3** or **5** (1.0 eq.) in HFIP (0.1 M) in a MW vial, 37% aqueous HCl (12 M, 150 µL per mL of HFIP) was added dropwise to the solution and the vial was rapidly sealed with a cap. The reaction mixture was then heated at 65 °C in a preheated tray and stirred for 24 h. After complete conversion, the mixture was cooled to rt and $H_2O$ (5 mL) was added. The solution obtained was further stirred for 5 min. The product was extracted with DCM (3 x 5 mL). The organic phases were combined and washed with brine (10 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure.
The obtained residue was dissolved in toluene (0.5 M). Boric acid (0.3 eq.) and **the amine** (1.0 eq.) were introduced sequentially in the open vessel. Then, the mixture was refluxed using a Dean-Stark apparatus. for 24 h. After cooling down to rt, water (10 mL) and EtOAc (10 mL) were added. The aqueous phase was extracted with EtOAc (3 x 10 mL). The organic phases were combined, washed with an aqueous saturated solution of $NaHCO_3$ (20 mL), brine (20 mL), dried over $Na_2SO_4$ and concentrated *in vacuo.* Purification by flash column chromatography packed with silica afforded the title compound **7**.

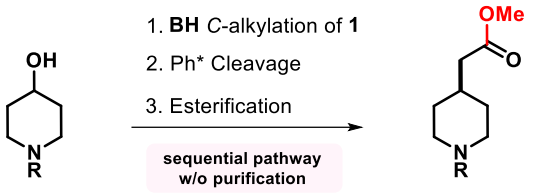
## General procedure E for the Ph* cleavage / esterification




To a solution of the **alkylated ketone 3** or **5** (1.0 eq.) in HFIP (0.1 M) in a MW vial, 37% aqueous HCl (12 M, 150 µL per mL of HFIP) was added dropwise to the solution and the vial was rapidly sealed with a cap. The reaction mixture was then heated at 65 °C in a preheated tray and stirred for 24 h. After complete conversion, the mixture was cooled to rt and $H_2O$ (5 mL) was added. The solution obtained was further stirred for 5 min. The product was extracted with DCM (3 x 5 mL). The organic phases were combined and washed with brine (10 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure.
The obtained residue was dissolved in **MeOH** (0.5 M) and cooled to – 50 °C. Thionyl chloride (1.1 eq.) was added dropwise to the mixture and stirred for 18 h at rt Then, the solution was treated with an aqueous saturated $NaHCO_3$ solution (10 mL) and

the aqueous layer was extracted with DCM (3 x 10 mL). The organic phases were combined, washed with brine (20 mL), dried over $Na_2SO_4$ and concentrated under reduced pressure. Filtration on a silica/celite® pad afforded the title compound **8**.

### General procedure F for the sequential BH *C-C* coupling / Ph* cleavage / esterification



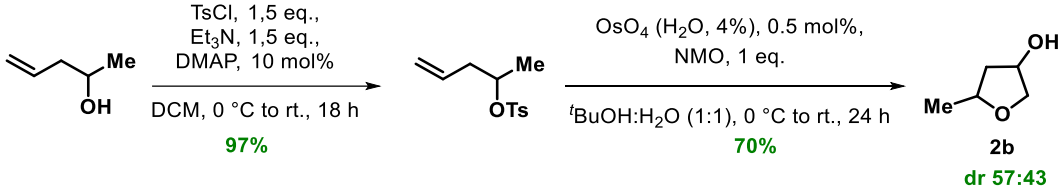

To a 10 mL Biotage® microwave vial equipped with a stirrer bar were introduced **piperidinol derivative** (1.0 eq.), pentamethylacetophenone **1** (1.1 eq.), base (2.0 eq.), **Ir-1** (5 mol%) and 1,3,5-trimethoxybenzene as standard in the open vessel. The vial was placed under inert atmosphere by performing 3 cycles vacuum/$N_2$. Then, toluene [1.0 M] was introduced and the vial was sealed with a microwave vial cap. The vial was heated at 120 °C for 24 h in a preheated tray. The mixture was cooled down to room temperature and few drops of water (100 µL) were added. The reaction vessel was washed with DCM (10 mL) and concentrated under reduced pressure.

The crude ketone was then transferred into a MW vials, dissolved in HFIP (0.1 M) and 37% aqueous HCl (30-40 eq.) was added dropwise. The vial was rapidly sealed and the reaction mixture was heated at 65 °C in a preheated tray for 24 h. After complete conversion, the mixture was cooled to rt and $H_2O$ (5 mL) was added. The solution obtained was further stirred for 5 min. The product was extracted with DCM (3 x 5 mL). The organic phases were combined and washed with brine (10 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure.

The obtained residue was dissolved in **MeOH** (0.5 M) and cooled to – 50 °C. Thionyl chloride (1.1 eq.) was added dropwise to the mixture and stirred for 18 h at rt Then, the solution was treated with an aqueous saturated $NaHCO_3$ solution (10 mL) and the aqueous layer was extracted with DCM (3 x 10 mL). The organic phases were combined, washed with brine (20 mL), dried over $Na_2SO_4$ and concentrated under reduced pressure. Filtration on a silica/celite® pad afforded the title compound **8**.

## ***Preparation of the starting materials***

### 5-Methyltetrahydrofuran-3-ol 2b [29848-43-9]




In a 50 mL round-bottom flask, under $N_2$, was introduced 4-penten-2-ol (0.50 g, 5.81 mmol, 1.0 eq.) and $Et_3N$ (2.30 mL, 8.72 mmol, 1.5 eq.) in anhydrous DCM (15 mL) at 0 °C. Then, *p*-toluenesulfonyl chloride (1.66 g, 8.72 mmol, 1.5 eq.) and DMAP (0.07 g, 0.58 mmol, 10 mol%) were added sequentially and the reaction mixture was allowed to warm up to rt and stirred overnight. After completion of the reaction, an aqueous saturated solution of $NH_4Cl$ (30 mL) was added and the aqueous phase was extracted with DCM (3 x 10 mL). The organic phases were washed with a brine solution (50 mL), dried over $Na_2SO_4$, filtrated and concentrated under reduced pressure. Filtration through $SiO_2$ with DCM gave 4-penten-2-tosylate as a colorless oil (1.36 g, 97%). CAS: 52753-86-3. NMR spectra were consistent with the literature.[4]

To a stirred solution of $OsO_4$ (0.05 mL, 4%wt/$H_2O$, 0.5 mol%) and NMO (194 mg, 1.66 mmol, 1.0 eq.) in *t*-BuOH/$H_2O$ (15 mL, 1:1) at 0 °C was added 4-penten-2-tosylate (400 mg, 1.66 mmol, 1.0 eq.). The resulting solution was allowed to warm up to rt and was stirred for 24 h. After the addition of sodium sulfite (800 mg), the reaction mixture was stirred for an additional 1 h. The mixture was extracted with EtOAc (3 x 10 mL) and the organic layers were dried over $Na_2SO_4$, filtrated and concentrated. The crude mixture was purified by flash column chromatography ($SiO_2$, Pentane/EtOAc, 1:1) and gave 5-methyltetrahydrofuran-3-ol **2b** as a mixture of two diastereoisomers (117 mg, 70%, dr 57:43 determined by $^1H$ NMR).

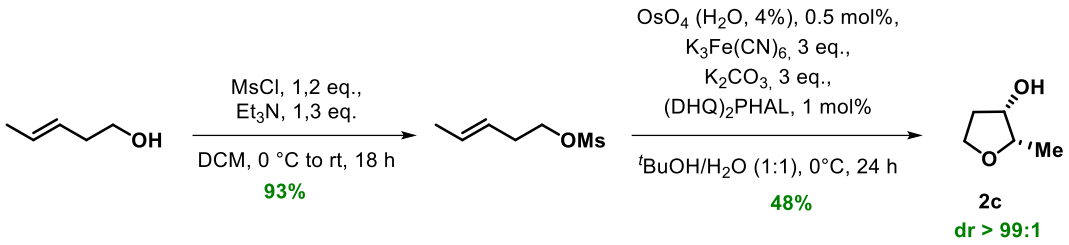
$^1H$ NMR (400 MHz, $CDCl_3$) δ 1.26 (d, *J* = 6.1, 3H, $CH_3$, dia 1), 1.35 (d, *J* = 6.1, 3H, $CH_3$, dia 2), 1.48 (dddd, *J* = 13.4, 7.5, 3.0, 1.3, 1H, $H_4$, dia 2), 1.60 (ddd, *J* = 13.3, 9.7, 5.6, 1H, $H_4$, dia 1), 1.77 (bd, *J* = 4.4, 1H, OH, dia 1), 1.81 (bd, *J* = 6.4, 1H, OH, dia 2), 2.00 (app ddt, *J* = 13.3, 5.5, 1.2, 1H, $H_4$, dia 1), 2.37 (ddd, *J* = 13.4, 7.5, 6.7, 1H, $H_4$, dia 2), 3.63–3.72 (m, 2H, 2 $H_2$, dia 1 and 2), 3.85

(app. dt, *J* = 10.0, 1.6, 1H, $H_2$, dia 2), 3.95 (app tq, *J* = 7.5, 6.2, 1H, $H_5$, dia 2), 4.06 (dd, *J* = 9.9, 4.6, 1H, $H_2$, dia 1), 4.18–4.31 (m, 1H, $H_4$, dia 1), 4.45 (bs, 1H, $H_1$, dia 2), 4.51 (bs, 1H, $H_1$, dia 1).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 20.7 ($\underline{C}H_3$, dia 1), 21.8 ($\underline{C}H_3$, dia 2), 43.2 ($C_5$, dia 2), 43.6 ($C_5$, dia 1), 73.1 ($C_1$, dia 1), 73.2 ($C_1$, dia 2), 74.1 ($C_4$, dia 1), 75.2 ($C_4$, dia 2), 75.6 ($C_2$, dia 1), 75.8 ($C_2$, dia 2).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_5H_{10}NaO_2$: 125.0573, found 125.0575.

## 2-Methyltetrahydrofuran-3-ol 2c [1643965-13-2]




(*E*)-3-Pentenol (0.70 g, 8.1 mmol, 1.0 eq.) and $Et_3N$ (1.5 mL, 10.6 mmol 1.3 eq.) were dissolved in anhydrous DCM (15 mL) and cooled to 0 °C under Ar. The solution was stirred for 10 min and methanesulfuonyl chloride (0.8 mL, 9.8 mmol, 1.2 eq.) was added dropwise. The reaction mixture was allowed to warm up to rt and stirred for 18 h. After complete reaction (TLC monitoring), the solution was cooled to 0 °C and HCl (2N, 20 mL) was added carefully. The aqueous layer was then extracted with DCM (3 x 50 mL). The organic layers were combined, washed with brine, dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. The product (*E*)-pent-3-en-1-yl mesylate, obtained as a yellow oil (1.25g, 93%), was used for the next step without further purification.

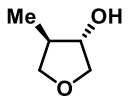
To a well-stirred solution of $K_3Fe(CN)_6$ (2.08 g, 6.32 mmol, 3.0 eq.), $K_2CO_3$ (0.87 g, 6.32 mmol, 3.0 eq.), and $(DHQ)_2PHAL$ (16 mg, 0.02 mmol, 1 mol%) in *t*-BuOH/$H_2O$ (20 mL 1:1 v/v) at 0 °C was added $OsO_4$ (64 µL, 4wt%/$H_2O$, 0.011 mmol, 0.5 mol%). (*E*)-Pent-3-en-1-yl mesylate (0.35 g, 2.11 mmol, 1.0 eq.) was added dropwise and the reaction mixture stirred at 0 °C for 24 h. Next, solid sodium sulfite (1 g) was added, and the mixture was stirred for an additional hour at 0 °C. The solution obtained was diluted with DCM (15 mL) and after separation of layers, the aqueous phase was extracted with DCM (3 x 10 mL). The organic layers were combined, washed with brine (20 mL), dried over $MgSO_4$ and concentrated under reduced pressure. The crude obtained was purified by flash column chromatography on silica gel (solid load, pentane/EtOAc, 1/1) to provide 2-methyltetrahydrofuran-3-ol **2c** as a colorless oil (103 mg, 48%, dr >99:1 determined by $^1$H NMR).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.27 (d, *J* = 6.4, 3H, Me), 1.94 (dddd, *J* = 13.5, 8.0, 5.1, 1.6, 1H, $H_4$), 2.22 (dddd, *J* = 13.5, 9.3, 7.3, 5.4, 1H, $H_4$), 3.67–3.80 (m, 2H, $H_2$, $H_5$), 3.97–4.09 (m, 1H, $H_5$), 4.17 (ddd, *J* = 5.4, 3.2, 1.6, 1H, $H_3$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 14.0 ($C_{Me}$), 35.9 ($C_4$), 65.8 ($C_5$), 73.5 ($C_3$), 78.7 ($C_2$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_5H_{10}O_2Na$: 125.0573, found, 125.0571.

## (±)-(3*R*,4*S*)-4-Methyltetrahydrofuran-3-ol 2d [387357-58-6]



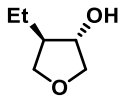

**Methyl magnesium bromide** (3 M in THF, 4.8 mL, 14.3 mmol, 2.0 eq.) was subjected to Procedure **A** at **-78 °C**. Purification by flash chromatography ($SiO_2$, DCM/MeOH, 10/1) afforded (±)-(3*R*,4*S*)-4-methyltetrahydrofuran-3-ol **2d** (105 mg, 14%) as a slight yellow oil.

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.03 (d, *J* = 7.1, 3H, Me), 2.16–2.24 (m, 1H, $H_4$), 3.41 (dd, *J* = 8.5, 4.6, 1H, $H_5$), 3.70 (dd, *J* = 9.8, 2.3, 1H, $H_2$), 3.91 (dd, *J* = 9.8, 4.7, 1H, $H_2$), 4.02 (app dt, *J* = 4.7, 2.3, 1H, $H_3$), 4.11 (dd, *J* = 8.5, 6.5, 1H, $H_5$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.7 ($C_{Me}$), 42.9 ($C_4$), 73.9 ($C_5$), 74.5 ($C_2$), 78.8 ($C_3$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_5H_{10}O_2Na$: 125.0573, found 125.0574.

### (±)-(3*R*,4*S*)-4-Ethyltetrahydrofuran-3-ol 2e [387357-51-9]



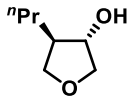

**Ethyl magnesium bromide** (2.2 mL, 6.47 mmol, 3 M in $Et_2O$, 1.5 eq.) was subjected to Procedure **A** at **-20 °C**. Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 1/1) afforded (±)-(3*R*,4*S*)-4-ethyltetrahydrofuran-3-ol **2e** as a pale yellow liquid (230 mg, 46%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.96 (t, *J* = 7.4, 3H, C$H_3$), 1.26–1.39 (m, 1H, C$H_2$), 1.40–1.54 (m, 1H, C$H_2$), 1.94–2.06 (m, 1H, $H_4$), 3.45 (dd, *J* = 8.7, 5.1, 1H, $H_5$), 3.71 (dd, *J* = 9.8, 2.3, 1H, $H_2$), 3.85 (dd, *J* = 9.8, 4.6, 1H, $H_2$), 4.06–4.14 (m, 2H, $H_3$, $H_5$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 12.6 (C$H_3$), 24.8 (C$H_2$), 50.6 ($C_4$), 72.4 ($C_5$), 74.8 ($C_2$), 77.5 ($C_3$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_6H_{12}O_2Na$: 139.0730, found 139.0728.

### (±)-(3*R*,4*S*)-4-Propyltetrahydrofuran-3-ol 2f [2956413-65-1] [1999335-59-9]



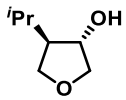

***n*-Propyl magnesium chloride** (1.6 mL, 3.23 mmol, 2 M in $Et_2O$, 1.5 eq.) was subjected to Procedure **A** at **-30 °C**. Purification by flash chromatography ($SiO_2$, EtOAc, 100%) afforded (±)-(3*R*,4*S*)-4-propyltetrahydrofuran-3-ol **2f** (254 mg, 90% yield) as a pale yellow liquid.

$^1$H NMR (300 MHz, $CDCl_3$) δ 0.95 (t, *J* = 7.0, 3H, $CH_3$), 1.21–1.52 (m, 4H, 2 $CH_2$), 2.10 (m, 1H, $H_4$), 3.46 (dd, *J* = 8.7, 5.3, 1H, $H_5$), 3.72 (dd, *J* = 9.8, 2.4, 1H, $H_2$), 3.87 (dd, *J* = 9.8, 4.6, 1H, $H_2$), 4.04–4.18 (m, 2H, $H_3$, $H_5$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 14.1 (C$H_3$), 21.2 (C$H_2$), 34.0 (C$H_2$), 48.5 ($C_4$), 72.5 ($C_5$), 74.6 ($C_2$), 77.6 ($C_3$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_7H_{14}O_2Na$: 153.0886, found: 153.0888.

### (±)-(3*R*,4*S*)-4-Isopropyltetrahydrofuran-3-ol 2g [321903-37-1]



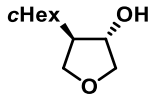

***i*-Propyl magnesium chloride** (3.2 mL, 6.47 mmol, 2 M in THF, 1.5 eq.) was subjected to Procedure **A** at **-30 °C**. The reagents were introduced at – 30 °C, the reaction mixture was allowed to warm up to rt and stirred for 18 h. Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 4/6) afforded (±)-(3*R*,4*S*)-4-isopropyltetrahydrofuran-3-ol as a pale-yellow liquid (221 mg, 39%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.90 (d, *J* = 6.7, 3H, Me), 1.03 (d, *J* = 6.7, 3H, Me), 1.58 (dhept, *J* = 9.0, 6.7, 1H, C$H$(Me)$_2$), 1.81 (app dtd, *J* = 9.0, 7.4, 3.0, 1H, $H_4$), 3.44 (dd, *J* = 9.0, 7.4, 1H, $H_5$), 3.72 (dd, *J* = 9.9, 3.0, 1H, $H_2$), 3.78 (dd, *J* = 9.9, 5.1, 1H, $H_2$), 4.10 (dd, *J* = 9.0, 7.4, 1H, $H_5$), 4.17 (app dt, *J* = 5.1, 3.0, 1H, $H_3$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 21.0 ($C_{Me}$), 21.3 ($C_{Me}$), 29.9 (C$H$(Me)$_2$), 56.5 ($C_4$), 71.6 ($C_5$), 75.6 ($C_2$), 76.3 ($C_3$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_7H_{15}O_2$: 131.1067, found 131.1063. $[M + Na]^+$: calcd. for $C_7H_{15}O_2Na$: 153.0886, found 153.0880.

### (±)-(3*R*,4*S*)-4-Cyclohexyltetrahydrofuran-3-ol 2h [1996554-90-5]



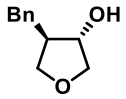
**Cyclohexylmagnesium chloride** (6.5 mL, 6.47 mmol, 1 M in 2-MeTHF, 1.5 eq.) was subjected to Procedure **A** at **- 30 °C**. Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 7/3) afforded (±)-(3*R*,4*S*)-4-cyclohexyltetrahydrofuran-3-ol **2h** as a slight yellow oil (439 mg, 60%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.92–1.12 (m, 2H, 2 $H_{cHex}$), 1.14–1.30 (m, 4H, $H_4$, 3 $H_{cHex}$), 1.55–1.63 (m, 1H, $H_{cHex}$), 1.64–1.78 (m, 3H, 3 $H_{cHex}$), 1.80–1.92 (m, 2H, 2 $H_{cHex}$), 3.45 (dd, *J* = 9.0, 7.4, 1H, $H_5$), 3.71 (dd, *J* = 9.9, 3.1, 1H, $H_2$), 3.77 (dd, *J* = 9.9, 5.0, 1H, $H_2$), 4.09 (dd, *J* = 9.0, 7.7, 1H, $H_5$), 4.20 (app dt, *J* = 5.0, 3.1, 1H, $H_3$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 26.27 ($CH_{2cHex}$), 26.32 ($CH_{2cHex}$), 26.5 ($CH_{2cHex}$), 31.5 ($CH_{2cHex}$), 31.9 ($CH_{2cHex}$), 39.7 ($CH_{cHex}$), 55.4 ($C_4$), 71.4 ($C_5$), 75.6 ($C_2$), 76.0 ($C_3$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{10}H_{18}O_2Na$: 193.1199, found: 193.1200.

## (±)-(3*R*,4*S*)-4-Benzyltetrahydrofuran-3-ol 2i [321903-36-0]



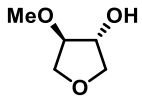

**Benzyl magnesium chloride** (3.23 mL, mmol, 1 M in THF, 1.5 eq.) was subjected to Procedure **A** at **-78 °C**. Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 7/3) afforded (±)-(3*R*,4*S*)-4-benzyltetrahydrofuran-3-ol **2i** as a colourless oil (200 mg, 52%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 2.39 (m, 1H, $H_4$), 2.58 (dd, *J* = 13.9, 8.3, 1H, C$\underline{H}_2$Ph), 2.68 (dd, *J* = 13.9, 7.9, 1H, C$\underline{H}_2$Ph), 3.51 (dd, *J* = 8.8, 4.6, 1H, $H_5$), 3.67 (dd, *J* = 9.9, 2.6, 1H, $H_2$), 3.94 (dd, *J* = 9.9, 4.9, 1H, $H_2$), 3.99 (dd, *J* = 8.8, 6.5, 1H, $H_5$), 4.13 (dt, *J* =4.9, 2.6, 1H, $H_3$), 7.13–7.20 (m, 3H, 3 $H_{Ph}$), 7.23–7.29 (m, 2H, 2 $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 37.7 ($\underline{C}H_2$Ph), 50.1 ($C_4$), 72.0 ($C_5$), 74.7 ($C_2$), 76.8 ($C_3$), 126.5 ($\underline{C}H_{Ph}$), 128.8 (2 $\underline{C}H_{Ph}$), 128.9 (2 $\underline{C}H_{Ph}$), 139.8 ($\underline{C}_{qPh}$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{11}H_{14}O_2Na$: 201.0886, found 201.0886.

## (±)-(3*S*,4*S*)-4-Methoxytetrahydrofuran-3-ol 2k [876026-49-2]



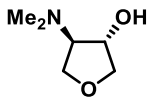

Sodium (830 mg, 36 mmol, 13 eq.) was carefully introduced in a flask containing freshly distilled MeOH (7 mL) at 0 °C under Ar. After vigorous stirring and complete dissolution of solid sodium, 3,6-dioxabicyclo[3.1.0]hexane (243 mg, 2.82 mmol, 1.0 eq.) in MeOH (1M, 2.8 mL) was added dropwise. The mixture obtained was heated at 45 °C for 14 h. Then, the solution was cooled down to 0 °C and acetic acid was added until pH 7. The reaction mixture was concentrated and the solid obtained was taken in EtOAc. The organic phase was washed with $NaHCO_3$ (15 mL), dried over $Na_2SO_4$ and concentrated *in vacuo*. The purification was performed by flash column chromatography on silica gel using EtOAc as eluent affording (±)-(3*S*,4*S*)-4-methoxytetrahydrofuran-3-ol **2k** as a colorless syrup (245 mg, 74%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 3.38 (s, 3H, OMe), 3.69–3.82 (m, 3H, $H_2$, $H_4$, $H_5$), 3.93 (dd, *J* = 10.0, 3.9, 1H, $H_2$), 4.05 (dd, *J* = 9.7, 4.4, 1H, $H_5$), 4.29 (ddd, *J* = 3.9, 1.8, 1.3, 1H, $H_3$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 57.3 (O$\underline{Me}$), 71.3 ($C_5$), 74.0 ($C_2$), 75.1 ($C_3$), 87.0 ($C_4$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_5H_{11}O_3$: 119.0703, found 119.0703, $[M + Na]^+$: calcd. for $C_5H_{10}O_3Na$: 141.0522, found 141.0522.

## (±)-(3*R*,4*S*)-4-(Dimethylamino)tetrahydrofuran-3-ol 2l [30197-51-4]



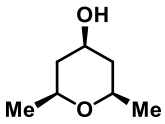
Dimethylamine (1.41 mL, 9.39 mmol, 2.0 eq., 33% in EtOH) was stirred at 50 °C under Ar and 3,6-dioxabicyclo[3.1.0]hexane (500 µL, 4.69 mmol, 1.0 eq.) was added dropwise to the heated solution. The mixture obtained was stirred at 50 °C for 24 h. Then, the solution was cooled down to rt and concentrated *in vacuo*. The residue obtained was filtered on a silica pad and washed with DCM (150 mL). The filtrate was concentrated under reduced pressure affording (±)-(3*R*,4*S*)-4-(dimethylamino)tetrahydrofuran-3-ol **2l** as a yellow to orange syrup (610 mg, 99 %).

$^1$H NMR (400 MHz, $CDCl_3$) δ 2.29 (s, 6H, 2 Me), 2.74 (ddd, *J* = 6.8, 6.3, 3.1, 1H, $H_4$), 3.64 (dd, *J* = 9.4, 6.3, 1H, $H_5$), 3.70 (dd, *J* = 10.0, 3.1, 1H, $H_2$), 3.94 (dd, *J* = 10.0, 5.8, 1H, $H_2$), 4.03 (dd, *J* = 9.4, 6.8, 1H, $H_5$), 4.32 (app dt, *J* = 5.8, 3.1, 1H, $H_3$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 43.8 (2 $C_{Me}$), 70.4 ($C_5$), 75.2 ($C_3$), 75.3 ($C_2$), 75.5 ($C_4$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_6H_{14}NO_2$: 132.1019, found 132.1018.

## (2*R*,4*r*,6*S*)-2,6-Dimethyltetrahydro-*2H*-pyran-4-ol 2n [33747-09-0]




2,6-Dimethyl-*4H*-pyran-4-one (500 mg, 4.03 mmol, 1.0 eq.) was dissolved in abs. ethanol (15 mL) and 20% $Pd(OH)_2$/C (141 mg, 0.20 mmol, 5 mol%) was added. The mixture was hydrogenated in a reactor apparatus under $H_2$ (10 bar) at rt for 72 h. The reaction mixture was filtered through Celite and washed with ethanol (150 mL). The filtrate was concentrated under reduced pressure and the residue was purified by flash column chromatography using gradient pentane/EtOAc (9/1 to 7/3) as eluent which afforded (2*R*,4*r*,6*S*)-2,6-dimethyltetrahydro-*2H*-pyran-4-ol **2n** as a mixture of two diastereoisomers (162 mg, 31%, dr > 82:18).

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.07–1.18 (m, 2H, 2 $H_3$), 1.23 (d, *J* = 6.2, 6H, 2 Me), 1.88–1.97 (m, 2H, 2 $H_3$), 3.46 (dqd, *J* = 10.9, 6.2, 1.8, 2H, 2 $H_2$), 3.79 (tt, *J* = 11.1, 4.7, 1H, $H_4$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 21.9 (2 $C_{Me}$), 42.9 (2 $C_3$), 68.3 ($C_4$), 71.6 (2 $C_2$).

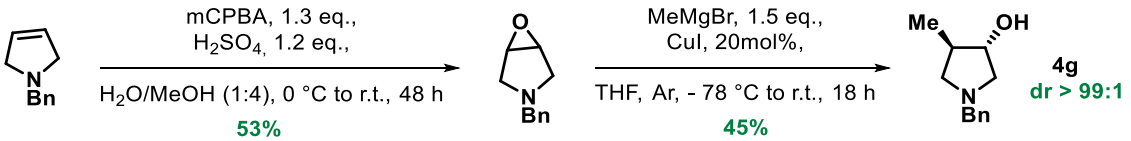
Minor isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.17 (d, *J* = 6.3, 6H, 2 Me), 1.40–1.48 (m, 2H, 2 $H_3$), 1.61–1.67 (m, 2H, 2 $H_3$), 3.91 (dqd, *J* = 12.4, 6.3, 1.9, 2H, 2 $H_2$), 4.22 (quin, *J* = 3.0, 1H, $H_4$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 22.1 (2 $C_{Me}$), 40.3 (2 $C_3$), 65.1 ($C_4$), 67.7 (2 $C_2$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_7H_{14}O_2Na$: 153.0886, found, 153.0887.

## (+/-)-(3*R*,4*S*)-1-Benzyl-4-methylpyrrolidin-3-ol 4g




Sulphuric acid (93%, 227 µL, 3.96 mmol, 1.2 eq.) was added dropwise to a solution of 1-Benzyl-2,5-dihydro-1*H*-pyrrole (526 mg, 3.30 mmol, 1.0 eq.) in $H_2O$/MeOH (1:4, wv%, 5 mL) at 0 °C. After vigorous stirring for 5 min, *m*CPBA (70%, 1.06 g, 4.30 mmol, 1.3 eq.) was added in one portion and the resulting mixture was allowed to warm up to rt and stirred for 48 h. After complete conversion (monitored by TLC), the mixture was concentrated under reduced pressure. Sodium hydroxide (1M, 15 mL) was added until neutralization of the media (pH 7) and the product was extracted with DCM (3 x 50 mL). The organic phases were combined and washed with water (60 mL) followed by brine (60 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. The purification was performed by flash column chromatography on silica gel using DCM/EtOAc/MeOH (7.5:2:0.5) as eluent affording 3-benzyl-6-oxa-3-azabicyclo[3.1.0]hexane (305 mg, 53%) as a brownish syrup.

Methyl magnesium bromide (870 µL, 2.61 mmol, 3 M in $Et_2O$, 1.5 eq.) was added to a solution of CuI (66mg, 0.35 mmol, 20 mol%) at -78 °C under Ar. After 30 minutes, crude 3-benzyl-6-oxa-3-azabicyclo[3.1.0]hexane (305 mg, 1.74 mmol, 1.0 eq.) was added and the mixture was then allowed to warm up to rt and stirred for 18 h. The mixture was quenched with an aqueous saturated $NH_4Cl$ solution (15 mL). Then, diluted with water (15 mL) and extracted with diethyl ether (5 x 30 mL). The organic layers were combined, dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. Purification by flash column chromatography ($SiO_2$, DCM/MeOH, 10:1) afforded the title compound **4g** as a brown to yellow oil (145 mg, 45%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.06 (d, *J* = 7.3, 3H, Me), 1.94 (dd, *J* = 9.5, 7.3, 1H, $H_5$), 2.17 (app hd, *J* = 7.3, 2.8, 1H, $H_4$), 2.60 (dd, *J* = 10.4, 5.5, 1H, $H_2$), 2.85 (dd, *J* = 10.4, 2.8, 1H, $H_2$), 3.14–3.19 (m, 1H, $H_5$), 3.65 (d, *J* = 13.6, 1H, $CH_2$Ph), 3.68 (d, *J* = 13.6, 1H, $CH_2$Ph), 3.84 (app dt, *J* = 5.5, 2.8, 1H, $H_3$), 7.27–7.38 (m, 5H, $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 18.1 ($C_{Me}$), 42.8 ($C_4$), 60.2 ($CH_2$Ph), 60.7 ($C_5$), 61.8 ($C_2$), 78.6 ($C_3$), 127.5 ($C_{HPh}$), 128.5 (2 $C_{HPh}$), 129.1 (2 $C_{HPh}$), 137.7 ($C_{qPh}$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{12}H_{18}NO$: 192.1383, found, 192.1384, $[M + Na]^+$: calcd. for $C_{12}H_{17}NONa$: 214.1202, found, 214.1203.

## 1-Benzylpiperidin-3-ol 4i [14813-01-5]

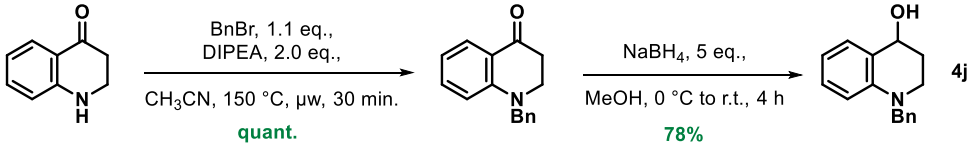

$Cs_2CO_3$ (3.2 g, 9.9 mmol, 1.0 eq.) and benzyl bromide (1.2 mL, 9.9 mmol, 1.0 eq.) were added to a solution of 3-hydroxypiperidine (1.0 g, 9.9 mmol, 1.0 eq.) in dry acetone (50 mL) and the resulting mixture was stirred at rt for 24 h. After filtration, the filtrate was concentrated under *vacuo*. The purification was performed by flash column chromatography on silica gel using DCM/MeOH (15:1) as eluent affording the title compound **4i** as an orange oil (1.9 g, quant.)

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.44–1.72 and 1.80–1.97 (m, 4H, 2 $H_4$, 2 $H_5$), 2.27–2.40 (m, 1H, $H_6$), 2.48–2.67 (m, 3H, 2 $H_2$, $H_6$), 3.61 (bs, 2H, $CH_2$Ph), 3.84–3.92 (m, 1H, $H_3$), 7.25–7.36 (m, 5H, $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 21.6 and 31.7 ($C_4$ and $C_5$), 53.6 ($C_6$), 60.2 ($C_2$), 63.0 ($CH_2$Ph), 66.2 ($C_3$), 127.4 ($C_{Ph}$), 128.4 (2 $C_{Ph}$), 129.3 (2 $C_{Ph}$), 137.7 ($C_{qPh}$).

MS (ESI/MS) $[M + H]^+$: calcd. for $C_{12}H_{18}NO$: 192.1, found 192.1.

## 1-Benzyl-1,2,3,4-tetrahydroquinolin-4-ol 4j [3954-48-1]




In a sealed tube was introduced 2,3-dihydroquinolin-4(1*H*)-one (106 mg, 0.72 mmol, 1.0 eq.), DIPEA (250 µL, 1.44 mmol, 2.0 eq.) and benzyl bromide (100 µL, 0.79 mmol, 1.1 eq.) in anhydrous acetonitrile (1 mL). The solution was then stirred at 150 °C for 30 min under microwave irradiation. The mixture was then cool down to rt, diluted with water (10 mL) and extracted with EtOAc (4 x 10 mL). The organic phases were combined and washed with brine (20 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. The yellow solid obtained as 1-benzyl-4(1*H*)-quinolinone was used for the next step without further purification.
Crude 1-benzyl-4(1*H*)-quinolinone (1.0 eq.) was then dissolved in 4 mL of dry MeOH under Ar and $NaBH_4$ (136 mg, 3.60 mmol, 5.0 eq.) was added portionwise (over 30 min) at 0 °C. After 1 h at 0 °C, the reaction mixture was allowed to warm up to rt and was stirred for 3 h. Then, saturated aqueous $NaHCO_3$ solution (20 mL) was added and the product was extracted with EtOAc (4 x 15 mL). The organic layers were combined, dried over $Na_2SO_4$, filtered and concentrated in *vacuo.* The residue was purified by flash column chromatography ($SiO_2$, pentane/EtOAc, 9/1 to 6/4) to give the title compound **4j** as a brown to pink solid (137 mg, 78% overall yield).

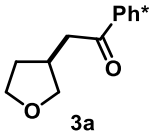
$^1$H NMR (300 MHz, $CDCl_3$) δ 1.94–2.14 (m, 2H, $H_3$), 3.29 (dtd, *J* = 11.6, 4.5, 0.9, 1H, $H_2$), 3.59 (td, *J* = 11.6, 4.5, 1H, $H_2$), 4.53 (s, 2H, $CH_2$Ph), 4.81 (t, *J* = 3.7, 1H, $H_4$), 6.53–6.60 (m, 1H, $H_{Ar}$), 6.65 (td, *J* = 7.4, 1.1, 1H, $H_{Ar}$), 7.09 (ddd, *J* = 8.8, 7.4, 1.7, 1H, $H_{Ar}$), 7.19–7.38 (m, 6H, 5 $H_{Ph}$, $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 29.9 ($C_3$), 44.5 ($C_2$), 55.2 ($\underline{C}H_2Ph$), 66.2 ($C_4$), 111.7 ($C_{Ar}$), 116.1 ($C_{Ar}$), 123.5 ($C_{qAr}$), 126.7 (2 $C_{Ph}$), 127.1 ($C_{Ph}$), 128.8 (2 $C_{Ph}$), 129.8 ($C_{Ar}$), 129.9 ($C_{Ar}$), 138.6 ($C_{qAr}$), 145.2 ($C_{qPh}$).

MS (ESI/HR) $[M + Na]^+$: calcd. for $C_{16}H_{17}NONa$: 262.1202, found 262.1203. $[M + H]^+$: calcd. for $C_{16}H_{18}NO$: 240.1383, found 240.1382.

# ***BH C-C coupling with secondary O- and N-heterocyclic alcohols***

## 1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone 3a [2956413-69-5]




**3a**

Tetrahydrofuran-3-ol (22 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/$Et_2O$, 8/2) afforded the title compound **3a** (47 mg, 71%) as a yellow solid.

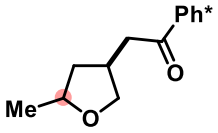
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.50–1.64 (m, 1H, $H_{4'}$), 2.08–2.12 (m, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.20–2.31 (m, 1H, $H_{4'}$), 2.70–2.91 (m, 3H, 2 $H_2$, $H_{3'}$), 3.40–3.49 (m, 1H, $H_{2'}$), 3.78 (app dt, *J* = 8.4, 7.4, 1H, $H_{5'}$), 3.86 (app td, *J* = 8.4, 4.9, 1H, $H_{5'}$), 4.04–4.12 (m, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.3 (2 $\underline{C}H_3$), 32.5 ($C_{4'}$), 34.1 ($C_{3'}$), 49.7 ($C_2$), 67.8 ($C_{5'}$), 73.3 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.3 ($C_{qAr}$), 210.9 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{17}H_{24}O_2Na$: 283.1669, found 283.1664, $[M + H]^+$: calcd. for $C_{17}H_{25}O_2$: 261.1849, found 261.1846.

m.p. = 72-79 °C

## 2-(5-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3b [2956413-71-9/2956413-70-8]




**3b**

69 (64) dr 60:40
75 (58) dr 71:28
65 (50) dr 72:28

5-Methyltetrahydrofuran-3-ol (26 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **$[Cp^*IrCl_2]_2$**. Purification by flash chromatography ($SiO_2$, solid load, Pentane/EtOAc, 95/5 to 80/20) afforded the title compound **3b** (44 mg, 64%, dr 61:39 - *measured after purification*) as a yellow solid.

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.12 (ddd, *J* = 12.3, 9.4, 8.3, 1H, $H_{4'}$), 1.27 (d, *J* = 5.9, 3H, Me), 2.10 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.37 (ddd, *J* = 12.3, 6.9, 5.8, 1H, $H_{4'}$), 2.71–2.93 (m, 3H, 2 $H_2$, $H_{3'}$), 3.57 (dd, *J* = 8.7, 6.2, 1H, $H_{2'}$), 3.99 (dqd, *J* = 9.4, 5.9, 5.8, 1H, $H_{5'}$), 4.04–4.12 (m, 1H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.3 (2 $\underline{C}H_3$), 21.1 ($C_{Me}$), 35.0 ($C_{3'}$), 40.6 ($C_{4'}$), 50.4 ($C_2$), 72.9 ($C_{2'}$), 75.7 ($C_{5'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.3 ($C_{qAr}$), 211.0 ($C_1$).

Minor isomer:

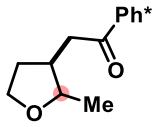
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.25 (d, *J* = 6.1, 3H, Me), 1.73 (ddd, *J* = 12.6, 7.0, 5.6, 1H, $H_{4'}$), 1.84 (ddd, *J* = 12.6, 8.3, 6.9, 1H, $H_{4'}$), 2.10 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.71–2.93 (m, 3H, 2 $H_2$, $H_{3'}$), 3.40 (dd, *J* = 8.8, 6.6, 1H, $H_{2'}$), 4.04–4.12 (m, 3H, $H_{5'}$), 4.23 (dd, *J* = 8.8, 6.8, 1H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.3 (2 $\underline{C}H_3$), 21.4 ($C_{Me}$), 34.0 ($C_{3'}$), 39.4 ($C_{4'}$), 49.7 ($C_2$), 73.3 ($C_{2'}$), 74.6 ($C_{5'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.3 ($C_{qAr}$), 210.9 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{18}H_{26}O_2Na$: 297.1825, found 297.1823, $[M + H]^+$: calcd. for $C_{18}H_{27}O_2$: 275.2006, found 275.2008.

m.p. = 95-98 °C

## 2-(2-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3c




3c

43 (42) dr 39:61
69 (39) dr 70:30
33 (30) dr 99:1

(2*S*,3*S*)-2-Methyltetrahydrofuran-3-ol (11 mg, 0.11 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ru-MACHO**. Purification by flash chromatography ($SiO_2$, solid load, gradient pentane/EtOAc, 95/5 to 9/1) afforded the title compound **3c** as a yellow solid, (9 mg, 30%, dr 99:1 - *measured after purification*).

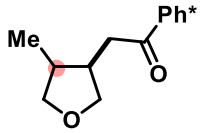
Major isomer:
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.09 (d, *J* = 6.5, 3H, Me), 1.66–1.78 (m, 1H, $H_{4'}$), 2.11 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.25–2.41 (m, 1H, $H_{4'}$), 2.63–2.82 (m, 3H, 2 $H_2$, $H_{3'}$), 3.75 (app q, *J* = 8.1, 1H, $H_{5'}$), 3.94 (app td, *J* = 8.1, 4.4, 1H, $H_{5'}$), 4.12-4.21 (m, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.7 ($\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.3 (2 $\underline{C}H_3$), 31.9 ($C_{4'}$), 36.7 ($C_{3'}$),45.7 ($C_2$), 66.4 ($C_{5'}$), 76.4 ($C_{2'}$), 127.4 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.0 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{18}H_{26}O_2Na$: 297.1825, found 297.1829, $[M + H]^+$: calcd. for $C_{18}H_{27}O_2$: 275.2006, found 275.2010.

m.p. = 67-69 °C

## 2-(4-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3d [2956413-73-1/2956413-72-0]




3d

26 dr 48:52
67 (65) dr 75:25
64 (62) dr 95:5

(3*R*,4*S*)-4-Methyltetrahydrofuran-3-ol (20 mg, 0.20 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ru-MACHO**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 9/1) afforded the title compound **3d** as a yellow solid, (34 mg, 62%, dr 95:5 - *measured after purification*).

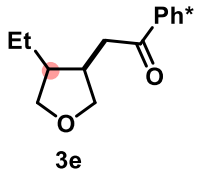
Major isomer:
$^1$H NMR (400 MHz, $CDCl_3$) δ 0.94 (d, *J* = 7.1, 3H, Me), 2.10 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.41–2.51 (m, 1H, $H_{4'}$), 2.59–2.72 (m, 1H, $H_2$), 2.75–2.88 (m, 2H, $H_2$, $H_{3'}$), 3.44 (dd, *J* = 8.3, 5.1, 1H, $H_{5'}$), 3.56 (dd, *J* = 8.5, 7.0, 1H, $H_{2'}$), 3.95 (dd, *J* = 8.3, 6.4, 1H, $H_{5'}$), 4.16 (dd, *J* = 8.5, 7.2, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 13.5 ($C_{Me}$), 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.3 (2 $\underline{C}H_3$), 35.7 ($C_{4'}$), 37.2 ($C_{3'}$), 44.2 ($C_2$), 72.6 ($C_{2'}$), 74.8 ($C_{5'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.0 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{18}H_{26}O_2Na$: 275.2006, found 275.2001, $[M + H]^+$: calcd. for $C_{18}H_{27}O_2$: 297.1825, found 297.1819.

m.p. = 91-93 °C

## 2-(4-Ethyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3e [2956413-75-3] [2956413-74-2]




3e

47 (28) dr 24:76
58 (58) dr 77:23
63 (51) dr >90:10

(3*R*,4*S*)-4-Ethyltetrahydrofuran-3-ol (29 mg, 0.25 mmol, 1.0 eq) was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 95/5) afforded the title compound **3e** as a yellow solid, (42 mg, 58%, dr 81:19 - *measured after purification*).

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.92 (t, *J* = 7.4, 3H, $H_{7'}$), 1.20–1.48 (m, 2H, $H_{6'}$), 2.10 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.22-2.26 (m, 1H, $H_{4'}$), 2.65 (dd, *J* = 19.2, 10.8, 1H, $H_2$), 2.72–2.89 (m, 2H, $H_{3'}$, $H_2$), 3.44 (app t, *J* = 8.1, 1H, $H_{5'}$), 3.67 (dd, *J* = 8.6, 4.6, 1H, $H_{2'}$), 3.93 (dd, *J* = 8.1, 7.2, 1H, $H_{5'}$), 4.10 (m, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 13.0 ($C_{7'}$), 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 20.8 ($C_{6'}$), 36.4 ($C_{3'}$), 43.6 ($C_{4'}$), 43.7 ($C_2$), 72.0 ($C_{5'}$), 73.5 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.1 ($C_1$).

Minor isomer:

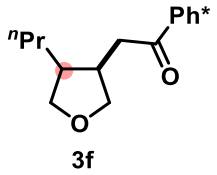
$^1$H NMR (400 MHz, $CDCl_3$) δ 0.93 (t, *J* = 7.5, 3H, $H_{7'}$), 1.20–1.48 (m, 1H, $H_{6'}$), 1.54–1.63 (m, 1H, $H_{6'}$), 1.69–1.80 (m, 1H, $H_{4'}$), 2.09 (s, 6H, 3 $CH_3$), 2.19 (s, 6H, 3 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.37–2.45 (m, 1H, $H_{3'}$), 2.59–2.73 (m, 1H, $H_2$), 2.96 (dd, *J* = 19.0, 3.9, 1H, $H_2$), 3.41 (dd, *J* = 8.6, 7.3, 1H, $H_{5'}$), 3.52 (dd, *J* = 8.9, 6.4, 1H, $H_{2'}$), 3.98 (dd, *J* = 8.6, 7.2, 1H, $H_{5'}$), 4.23 (dd, *J* = 8.9, 7.3, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 12.8 ($C_{7'}$), 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 25.8 ($C_{6'}$), 40.2 ($C_{3'}$), 47.1 ($C_{4'}$), 50.0 ($C_2$), 73.0 ($C_{5'}$), 73.9 ($C_{2'}$), 127.3 (2 $C_{qAr}$), (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.1 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{19}H_{28}O_2Na$: 311.1982, found 311.1985, $[M + H]^+$: calcd. for $C_{19}H_{29}O_2$: 289.2162, found 289.2166.

m.p. = 67 °C

## 1-(2,3,4,5,6-Pentamethylphenyl)-2-(4-propyltetrahydrofuran-3-yl)ethenone 3f [2956413-75-3/2956413-74-2]




3f

88 dr 49:51
99 (70) dr 52:48
68 (68) dr 95:5

(3*R*,4*S*)-4-Propyltetrahydrofuran-3-ol (33 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 95:5 to 80:20) afforded the title compound **3f** as a brown oil (53 mg, 70%, dr 50:50 - *measured after purification*). The diastereoisomers were assigned when it was possible due to the overlap signals (dia 2 = major diastereoisomer using Ru-MACHO).

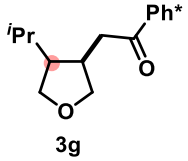
$^1$H NMR (400 MHz, $CDCl_3$) δ 0.91 (m, 6H, 2 $CH_2CH_2\underline{CH_3}$, dia 1 and 2), 1.18–1.41 (m, 7H, 2 $CH_2\underline{CH_2}CH_3$, $\underline{CH_2}CH_2CH_3$, dia 1 and 2), 1.53–1.81 (m, 2H, $\underline{CH_2}CH_2CH_3$, $H_{4'}$), 2.10 (s, 6H, 2 $CH_3$), 2.11 (s, 6H, 2 $CH_3$), 2.19 (2 s, 12H, 4 $CH_3$), 2.24 (2 s, 6H, 2 $CH_3$), 2.28–2.46 (m, 2H, $H_{3'}$, $H_{4'}$), 2.66 (m, 2H, 2 $H_2$), 2.75–2.87 (m, 2H, $H_{3'}$, $H_2$), 2.97 (dd, *J* = 18.9, 3.8, 1H, $H_2$), 3.35–3.47 (m, 2H, 2 $H_{5'}$), 3.52 (dd, *J* = 8.8, 6.5, 1H, $H_{2'}$, dia 1), 3.67 (dd, *J* = 8.7, 4.4, 1H, $H_{2'}$, dia 2), 3.95 (m, 2H, 2 $H_{5'}$), 4.11 (ddd, *J* = 8.7, 6.0, 1.0, 1H, $H_{2'}$, dia 2), 4.24 (dd, *J* = 8.8, 7.3, 1H, $H_{2'}$, dia 1).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 14.38 and 14.40 ($CH_2CH_2\underline{CH_3}$, dia 1 and 2), 16.1 (4 $CH_3$), 16.8 (2 $CH_3$), 17.22 and 17. 24 (4 $CH_3$), 21.66 and 21.75 ($CH_2\underline{CH_2}CH_3$, dia 1 and 2), 30.2 ($\underline{CH_2}CH_2CH_3$, dia 1), 35.1 ($\underline{CH_2}CH_2CH_3$, dia 2), 36.5 and 40.5 ($C_{3'}$), 41.6 ($C_{4'}$), 43.8 ($C_2$, dia 2), 45.1 ($C_{4'}$), 49.8 ($C_2$, dia 1), 72.3; 73.3; 73.5; 73.8 (2 $C_{2'}$, 2 $C_{5'}$), 127.28 and 127.33 (4 $C_{qAr}$), 133.26 and 133.31 (4 $C_{qAr}$), 135.66 and 135.69 (2 $C_{qAr}$), 140.3 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.1 (2 $C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{20}H_{30}O_2Na$: 325.2138, found 325.2138, $[M + H]^+$: calcd. for $C_{20}H_{31}O_2$: 303.2319, found 303.2321.

m.p. = 88-91 °C

## 2-(5-2-(4-Isopropyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3g




3g

31 (20) dr 23:77
80 (61) dr 67:33
21 dr >99:1

(3*R*,4*S*)-4-Isopropyltetrahydrofuran-3-ol (33 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 95/5) afforded the title compound **3g** as a brown oil (46 mg, 61%, dr 70:30 - *measured after purification*).

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.87 (d, *J* = 6.5, 3H, Me), 0.96 (d, *J* = 6.5, 3H, Me), 1.48 (dhept, *J* = 10.7, 6.5, 1H, C<u>H</u>(Me)$_2$), 2.01 (app tdd, *J* = 10.7, 8.3, 6.3, 1H, $H_{4'}$), 2.12 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.63-2.86 (m, 3H, 2 $H_2$, $H_{3'}$), 3.37 (dd, *J* = 10.7, 8.1, 1H, $H_{5'}$), 3.87–4.03 (m, 3H, 2 $H_{2'}$, $H_{5'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.0 (2 <u>C</u>$H_3$), 16.8 (<u>C</u>$H_3$), 17.2 (2 <u>C</u>$H_3$), 21.8 ($C_{Me}$), 22.1 ($C_{Me}$), 27.4 (<u>C</u>H(Me)$_2$), 35.5 ($C_{3'}$), 42.7 ($C_2$), 50.3 ($C_{4'}$), 70.9 ($C_{5'}$), 74.4 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$),135.6 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.2 ($C_1$).

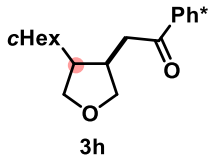
Minor isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.90 (d, *J* = 6.6, 3H, Me), 0.97 (d, *J* = 6.6, 3H, Me), 1.55–1 .63 (m, 1H, $H_{4'}$), 1.63–1.74 (m, 1H, C<u>H</u>(Me)$_2$), 2.10 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.50–2.60 (m, 1H, $H_{3'}$), 2.62–2.80 (m, 1H, $H_2$), 2.96 (dd, *J* = 19.2, 3.1, 1H, $H_2$), 3.46 (dd, *J* = 8.9, 7.4, 1H, $H_{5'}$), 3.59 (dd, *J* = 9.1, 5.2, 1H, $H_{2'}$), 3.87–4.03 (m, 1H, $H_{5'}$), 4.17 (dd, *J* = 9.1, 7.3, 1H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.0 (2 <u>C</u>$H_3$), 16.8 (<u>C</u>$H_3$), 17.2 (2 <u>C</u>$H_3$), 20.6 ($C_{Me}$), 21.5 ($C_{Me}$), 31.1 (<u>C</u>H(Me)$_2$), 37.9 ($C_{3'}$), 51.5 ($C_2$), 52.2 ($C_{4'}$), 71.6 ($C_{5'}$), 74.5 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.2 ($C_{qAr}$), 211.2 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for: $C_{20}H_{30}O_2Na$: 325.2138, found 325.2138, $[M + H]^+$: calcd. For $C_{20}H_{29}O_2$: 303.2319, found 303.2320.

## 2-(4-Cyclohexyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3h




3h

n.r.
(45) dr 65:35
36 dr >99:1

(3*R*,4*S*)-4-Cyclohexyltetrahydrofuran-3-ol (43 mg, 0.25 mmol, 1.0 eq.), pentamethylacetophenone was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/$Et_2O$, 90:10) afforded the title compound **3h** as a pinkish solid (39 mg, 45%, dr 65:35 - *measured after purification*).

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.93–1.81 (m, 11H, $H_{6'}$, 10 $H_{cHex}$), 2.00–2.08 (m, 1H, $H_{4'}$), 2.11 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.62–2.78 (m, 2H, 2 $H_2$), 2.82 (m, 1H, $H_{3'}$), 3.37 (dd, *J* = 10.7, 8.0, 1H, $H_{5'}$), 3.89 (dd, *J* = 8.8, 1.3, 1H, $H_{2'}$), 3.92–3.99 (m, 2H, $H_{2'}$, $H_{5'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 <u>C</u>$H_3$), 16.8 (<u>C</u>$H_3$), 17.1 (2 <u>C</u>$H_3$), 26.1 ($C_{cHex}$), 26.2 ($C_{cHex}$), 26.5 ($C_{cHex}$), 32.3 ($C_{cHex}$), 32.6 ($C_{cHex}$), 34.8 ($C_{3'}$), 37.1 ($C_{6'}$), 42.9 ($C_2$), 48.6 ($C_{4'}$), 70.7 ($C_{5'}$), 74.3 ($C_{2'}$), 127.4 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.2 ($C_1$).

Minor isomer:

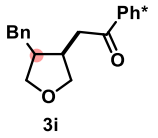
$^1$H NMR (400 MHz, $CDCl_3$) δ 0.90–1.83 (m, 12H, $H_{4'}$, $H_{6'}$, 10 $H_{cHex}$), 2.09 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.52–2.62 (m, 1H, $H_{3'}$), 2.62–2.78 (m, 1H, $H_2$), 2.93 (dd, *J* = 19.1, 3.0, 1H, $H_2$), 3.45 (dd, *J* = 8.8, 7.7, 1H, $H_{5'}$), 3.58 (dd, *J* = 9.1, 5.0, 1H, $H_{2'}$), 3.91–3.98 (m, 1H, $H_{5'}$), 4.12 (dd, *J* = 9.1, 7.3, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.2 (2 $\underline{C}H_3$), 26.4 ($C_{cHex}$), 26.5 ($C_{cHex}$), 26.6 ($C_{cHex}$), 31.3 ($C_{cHex}$), 32.1 ($C_{cHex}$), 37.5 ($C_{3'}$), 41.2 ($C_{6'}$), 51.2 ($C_{4'}$), 51.7 ($C_2$), 71.7 ($C_{5'}$), 74.4 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 140.3 ($C_{qAr}$), 211.3 ($C_1$).

MS (ESI/HR) $[M + H]^+$: calcd. for $C_{23}H_{35}O_2$: 343.2632, found 343.2631, $[M + Na]^+$: calcd. for $C_{23}H_{34}O_2Na$: 365.2451, found 365.2449.

m.p. = 119-122 °C

## 2-(4-Benzyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3i




3i

99 dr 64:36
98 (79) dr 66:34
62 (62) dr >89:11

(3R,4S)-4-Benzyltetrahydrofuran-3-ol (45 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/EtOAc, 92/8) afforded the title compound **3i** as a yellow solid (69 mg, 79%, dr 66:34 - *measured after purification*).

Major isomer:
$^1$H NMR (400 MHz, $CDCl_3$) δ 2.09 (s, 6H, 2 $CH_3$), 2.20 (s, 6H, 2 $CH_3$), 2.25 (s, 3H, $CH_3$), 2.47–2.84 (m, 4H, $C\underline{H}_2$Ph, $H_2$, $H_{4'}$), 2.84–2.98 (m, 2H, $H_{3'}$, $H_2$), 3.47–3.57 (m, 1H, $H_{5'}$), 3.72 (dd, *J* = 8.7, 5.4, 1H, $H_{2'}$), 3.78–3.83 (m, 1H, $H_{5'}$), 4.15–4.20 (m, 1H, $H_{2'}$), 7.13–7.23 (m, 3H, $H_{Ph}$), 7.24–7.32 (m, 2H, $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 33.9 ($\underline{C}H_2$Ph), 36.7 ($C_{3'}$), 43.0 ($C_{4'}$), 44.0 ($C_2$), 71.9 ($C_{5'}$), 73.3 ($C_{2'}$), 126.3 ($C_{HAr}$), 127.3 (2 $C_{qAr}$), 128.7 (2 $C_{HAr}$), 128.8 (2 $C_{HAr}$), 133.4 (2 $C_{qAr}$), 135.8 ($C_{qAr}$), 140.2 ($C_{qAr}$), 140.4 ($C_{qAr}$), 210.8 ($C_1$).

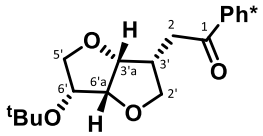
Minor isomer:
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.99 (s, 6H, 2 $CH_3$), 2.11–2.18 (masked m, 1H, $H_{4'}$), 2.16 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.47–2.84 (m, 5H, $H_2$, $H_{3'}$, $C\underline{H}_2$Ph), 3.47–3.57 (m, 2H, $H_{2'}$, $H_{5'}$), 3.90 (dd, *J* = 8.8, 7.2, 1H, $H_{5'}$), 4.32 (dd, *J* = 9.0, 7.2, 1H, $H_{2'}$), 7.13–7.23 (m, 3H, $H_{Ar}$), 7.24–7.32 (m, 2H, $H_{Ar}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.0 (2 $CH_3$), 16.8 ($CH_3$), 17.2 (2 $CH_3$), 39.2 ($\underline{C}H_2$Ph), 40.0 ($C_{3'}$), 46.8 ($C_{4'}$), 50.1 ($C_2$), 73.1 ($C_{5'}$), 74.2 ($C_{2'}$), 126.4 ($C_{HAr}$), 127.3 (2 $C_{qAr}$), 128.7 (2 $C_{HAr}$), 128.8 (2 $C_{HAr}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.1 ($C_{qAr}$), 140.3 ($C_{qAr}$), 211.0 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{24}H_{30}O_2Na$: 373.2138, found 373.2137. $[M + H]^+$: calcd. for $C_{24}H_{31}O_2$: 351.2319, found 351.2317.

m.p. = 94-98 °C

## 2-((3*R*,6*S*)-6-(*Tert*-butoxy)hexahydrofuro[3,2-*b*]furan-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3j[5]




(3*R*,6*S*)-6-(*Tert*-Butoxy)hexahydrofuro[3,2-*b*]furan-3-ol (91 mg, 0.45 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 95:5 to 90:10) afforded the title compound **3j** as a yellow solid (79 mg, 47%, dr >99:1).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.22 (s, 9H, $^t$Bu-$C\underline{H}_3$), 2.10 (s, 6H, 2 $CH_3$), 2.17 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.64–2.87 (m, 2H, $H_2$, $H_{3'}$), 3.09 (dd, *J* = 21.0, 8.7, 1H, $H_2$), 3.37 (dd, *J* = 10.3, 7.9, 1H, $H_{2'}$), 3.61 (dd, *J* = 9.4, 3.5, 1H, $H_{5'}$), 3.86 (dd, *J* = 9.4, 5.0, 1H, $H_{5'}$), 4.07 (ddd, *J* = 5.0, 3.5, 1.6, 1H, $H_{6'}$), 4.15 (app t, *J* = 7.9, 1H, $H_{2'}$), 4.43 (dd, *J* = 4.0, 1.6, 1H, $H_{6'a}$), 4.74 (app t, *J* = 4.0, 1H, $H_{3'a}$).

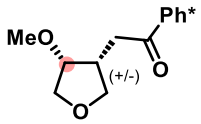
$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 (2 $\underline{C}H_3$), 17.3 ($\underline{C}H_3$), 28.4 (3 $\underline{C}H_3$), 40.0 ($C_{3'}$), 42.4 ($C_2$), 71.6 ($C_{2'}$), 74.5 ($\underline{C}(CH_3)_3$), 74.9 ($C_{5'}$), 77.3 ($C_{6'}$), 83.3 ($C_{3'a}$), 89.7 ($C_{6'a}$), 127.4 (2 $C_{qAr}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.4 ($C_{qAr}$), 210.7 ($C_1$).

$[\alpha]_{21}^{D}$= + 72.7° (*c* 0.47 $CHCl_3$)

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{23}H_{34}O_4Na$: 397.2349, found 397.2330, $[M + H]^+$: calcd. for $C_{23}H_{35}O_4$: 375.2530, found 375.2512.

m.p. = 118-121 °C

### (±)-2-((3*R*,4*R*)-4-Methoxytetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3k [2956413-76-4]




**3k**

(3*S*,4*S*)-4-Methoxytetrahydrofuran-3-ol **2k** (32 mg, 0.27 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, pentane/EtOAc, 9/1) afforded the title compound **3k** as a yellowish solid, (23 mg, 29%, dr >99:1, determined by $^1H$ NMR). After recrystallization from $Et_2O$/pentane at rt colourless needle crystals suitable for X-ray crystallography were obtained.

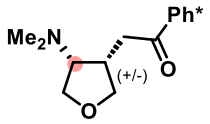
$^1H$ NMR (400 MHz, $CDCl_3$) δ 2.12 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.72 (dd, *J* = 19.0, 5.7, 1H, $H_2$), 2.80 (m, 1H, $H_{3'}$), 3.10 (dd, *J* = 19.0, 7.7, 1H, $H_2$), 3.30 (s, 3H, $OCH_3$), 3.52 (dd, *J* = 9.7, 7.9, 1H, $H_{2'}$), 3.86 (dd, *J* = 10.0, 3.7, 1H, $H_{5'}$), 3.97 (dd, *J* = 10.0, 1.4, 1H, $H_{5'}$), 4.05–4.12 (m, 2H, $H_{2'}$, $H_{4'}$).

$^{13}C$ NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.1 (2 $\underline{C}H_3$), 38.8 ($C_{3'}$), 42.1 ($C_2$), 57.0 ($C_{Me}$), 71.4 ($C_{2'}$), 71.7 ($C_{5'}$), 81.2 ($C_{4'}$), 127.4 (2 $C_{qAr}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.0 ($C_1$).

IR (ATR) ν 648, 713, 754, 838, 898, 937, 966, 1043, 1081, 1100, 1114, 1167, 1190, 1221, 1310, 1374, 1398, 1450, 1697, 1732, 2857, 2887, 2920.

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{18}H_{26}O_3Na$: 313.1774, found 313.1772, $[M + H]^+$: calcd. for $C_{18}H_{27}O_3$: 291.1955, found 291.1954.

### 2-(4-(Dimethylamino)tetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3l




**3l**

(3*R*,4*S*)-4-(Dimethylamino)tetrahydrofuran-3-ol (33 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, gradient pentane/EtOAc, 9/1 to 1/1) afforded the title compound **3l** as a yellow solid (22 mg, 29%, dr >99:1 determined by $^1H$ NMR).

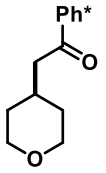
$^1H$ NMR (400 MHz, $CDCl_3$) δ 2.11 (s, 6H, 2 $CH_3$), 2.17 (s, 12H, 2 $CH_3$, 2 Me), 2.22 (s, 3H, $CH_3$), 2.70 (dd, *J* = 19.7, 10.3, 1H, $H_2$), 2.75-2.82 (m, 1H, $H_{4'}$), 2.86–2.96 (m, 1H, $H_{3'}$), 3.16 (app dt, *J* = 19.7, 1.4, 1H, $H_2$), 3.53 (app t, *J* = 8.6, 1H, $H_{5'}$), 3.82–3.92 (m, 2H, $H_{2'}$, $H_{5'}$), 4.04 (ddd, *J* = 8.9, 4.9, 1.4, 1H, $H_{2'}$).

$^{13}C$ NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.2 (2 $\underline{C}H_3$), 36.1 ($C_{3'}$), 42.9 ($C_2$), 45.0 (2 $C_{Me}$), 68.6 ($C_{4'}$), 69.8 ($C_{5'}$), 73.7 ($C_{2'}$), 127.2 (2 $C_{qAr}$), 133.1 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.7 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{19}H_{30}NO_2$: 304.2271, found 304.2275.

m.p. = 66-67 °C

### 1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydro-2H-pyran-4-yl)ethanone 3m




**3m**

Tetrahydro-*2H*-pyran-4-ol (27 mg, 0.26 mmol, 1.0 eq) was subjected to procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/EtOAc, gradient 95/5 to 8/2) afforded the title compound **3m** as a yellow solid (16 mg, 22%).

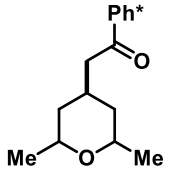
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.29–1.41 (m, 2H, $H_{3'}$), 1.78 (app ddt, *J* = 12.9, 4.1, 2.1, 2H, $H_{3'}$), 2.10 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.20–2.36 (m, 1H, $H_{4'}$), 2.62 (d, *J* = 6.5, 2H, $H_2$), 3.49 (ddd, *J* = 11.8, 11.5, 2.1, 2H, $H_{2'}$), 3.96 (app ddt, *J* = 11.5, 4.1, 1.6, 2H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.1 (2 $\underline{C}H_3$), 30.0 ($C_{4'}$), 33.1 ($C_{3'}$), 52.5 ($C_2$), 68.0 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.6 ($C_{qAr}$), 210.6 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{18}H_{26}O_2Na$: 297.1825, found 297.1823, $[M + H]^+$: calcd. for $C_{18}H_{27}O_2$: 275.2006, found 275.2007.

m.p. = 61-64 °C

### 2-((2*R*,4*r*,6*S*)-2,6-dimethyltetrahydro-*2H*-pyran-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3n




**3n**

2,6-Dimethyltetrahydro-*2H*-pyran-4-ol (33 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/$Et_2O$, gradient 9/1 to 8/2) afforded the title compound **3n** as a yellow solid (34 mg, 45%, dr 80:20 - *measured after purification*).

Major isomer:

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.16 (d, *J* = 6.1, 6H, 2 Me), 1.47–1.62 (m, 4H, $H_{3'}$), 2.10 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.67–2.74 (m, 1H, $H_{4'}$), 2.88 (d, *J* = 6.9, 2H, $H_2$), 3.51–3.68 (m, 2H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.1 (2 $\underline{C}H_3$), 22.4 (2 $C_{Me}$), 26.2 ($C_{4'}$), 37.4 ($C_{3'}$), 48.3 ($C_2$), 68.7 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.7 ($C_{qAr}$), 210.7 ($C_1$).

Minor isomer:

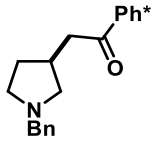
$^1$H NMR (400 MHz, $CDCl_3$) δ 0.83–0.97 (m, 2H, $H_{3'}$), 1.21 (d, *J* = 6.2, 6H, 2 Me), 1.79–1.84 (m, 2H, $H_{3'}$), 2.10 (s, 6H, 2 $CH_3$), 2.19 (s, 6H, 2 $CH_3$), 2.24 (s, 3H, $CH_3$), 2.27–2.43 (m, 1H, $H_{4'}$), 2.59 (d, *J* = 6.5, 2H, $H_2$), 3.51–3.68 (m, 2H, $H_{2'}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $\underline{C}H_3$), 16.8 ($\underline{C}H_3$), 17.1 (2 $\underline{C}H_3$), 22.2 (2 $C_{Me}$), 30.3 ($C_{4'}$), 39.7 ($C_{3'}$), 52.5 ($C_2$), 73.2 ($C_{2'}$), 127.3 (2 $C_{qAr}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.6 ($C_{qAr}$), 210.7 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{20}H_{30}O_2Na$: 325.2138, found 325.2137, $[M + H]^+$: calcd. for $C_{20}H_{29}O_2$: 303.2319, found 303.2317.

m.p. = 110-111 °C

## 2-(1-Benzylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5a




**5a**

1-Benzylpyrrolidin-3-ol (177 mg, 1.0 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/EtOAc, 8/2) afforded the title compound **5a** as a brownish solid (229 mg, 60%).

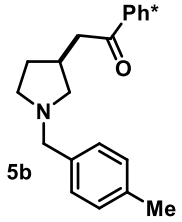
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.48 (app dq, *J* = 13.3, 7.0, 1H, $H_{4'}$), 2.08 (s, 6H, 2 $CH_3$), 2.13–2.21 (m, 1H $H_{4'}$), 2.17 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.24–2.32 (app t, *J* = 7.3, 1H, $H_{2'}$), 2.60 (t, *J* = 7.0, 2H, $H_{5'}$), 2.70–2.88 (m, 3H, $H_{3'}$, $H_2$), 2.89 (dd, *J* = 9.3, 7.3, 1H, $H_{2'}$), 3.59 (d, *J* = 12.9, 1H, C$H_2$Ph), 3.68 (d, *J* = 12.9, 1H, C$H_2$Ph), 7.20–7.40 (m, 5H, $H_{Ar}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 31.0 ($C_{4'}$), 32.3 ($C_{3'}$), 51.9 ($C_2$), 53.9 ($C_{5'}$), 60.1 ($C_{2'}$), 60.6 ($CH_2$Ph), 127.1 ($CH_{Ar}$), 127.4 (2 $C_{qAr}$), 128.4 (2 $CH_{Ar}$), 128.9 (2 $CH_{Ar}$),133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.4 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{24}H_{32}NO$: 350.2478, found 350.2467.

m.p. = 58-61 °C

## 2-(1-(4-Methylbenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5b




**5b**

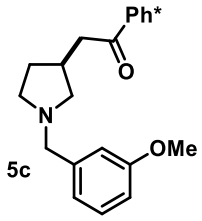
1-(4-Methylbenzyl)pyrrolidin-3-ol (48 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, pentane/EtOAc, 85/15) afforded the title compound **5a** as a brown oil (32 mg, 35%).

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.47 (ddt, *J* = 12.5, 7.8, 6.2, 1H, $H_{4'}$), 2.08 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.11–2.30 (2 masked m, 2H, $H_{2'}$, $H_{4'}$), 2.23 (s, 3H, $CH_3$), 2.34 (s, 3H, NBnC$H_3$), 2.50–2.65 (m, 2H, 2 $H_{5'}$) 2.66–2.84 (m, 3H, 2 $H_2$, $H_{3'}$), 2.89 (dd, *J* = 9.3, 7.3, 1H, $H_{2'}$), 3.59 (AB system, *J* = 12.8, 2H, C$H_2$Ar), 7.09–7.16 (d, *J* = 8.0, 2H, 2 $H_{Ar}$), 7.18–7.24 (d, *J* = 8.0, 2H, 2 $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.2 (2 $CH_3$), 21.2 (NBnC$H_3$), 31.0 ($C_{4'}$), 32.3 ($C_{3'}$), 51.9 ($C_2$), 53.8 ($C_{5'}$), 60.1 ($C_{2'}$), 60.3 ($CH_2$Ar), 127.4 (2 $C_{qAr}$), 128.9 (2 $C_{HAr}$), 129.0 (2 $C_{HAr}$), 133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 136.1 ($C_{qAr}$), 136.6 ($C_{qAr}$), 140.6 ($C_{qAr}$), 211.4 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{25}H_{34}NO$: 364.2635, found 364.2634.

## 2-(1-(3-Methoxybenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5c




**5c**

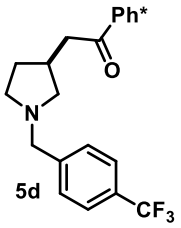
1-(3-Methoxybenzyl)pyrrolidin-3-ol (52 mg, 0.25 mmol, 1.0 eq.) was subjected to procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 98:2) afforded the title compound **5c** as a brown oil (41 mg, 43%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.41 (app dq, *J* = 13.2, 7.0, 1H, $H_{4'}$), 2.00 (s, 6H, 2 $CH_3$), 2.06–2.13 (m, 7H, 2 $CH_3$, $H_{4'}$), 2.14 (s, 3H, $CH_3$), 2.19–2.32 (m, 1H, $H_{2'}$), 2.54 (app t, *J* = 7.0, 2H, 2 $H_{5'}$), 2.62–2.71 (m, 1H, $H_{3'}$), 2.71–2.76 (m, 2 H, $H_2$), 2.77–2.88 (m, 1H, $H_{2'}$), 3.54 (AB system, *J* = 13.0, 2H, C$H_2$Ar), 3.73 (s, 3H, OMe), 6.68–6.75 (m, 1H, $H_{Ar}$), 6.81–6.86 (m, 2H, 2 $H_{Ar}$), 7.10–7.20 (m, 1H, $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 31.0 ($C_{4'}$), 32.3 ($C_{3'}$), 51.8 ($C_2$),53.9 ($C_{5'}$), 55.3 ($C_{OMe}$), 60.0 ($C_{2'}$), 60.5 ($\underline{C}H_2Ar$), 112.7 ($CH_{ArOMe}$), 114.4 ($CH_{ArOMe}$), 121.3 ($CH_{ArOMe}$), 127.4 (2 $C_{qAr}$), 129.3 ($CH_{ArOMe}$), 133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.5 ($C_{qArOMe}$ and $C_{qAr}$), 159.7 ($C_{qArOMe}$), 211.4 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{25}H_{33}NO_2Na$: 402.2404, found 402.2397. $[M + H]^+$: calcd. for $C_{25}H_{34}NO_2$: 380.2584 found 380.2581.

### 1-(2,3,4,5,6-Pentamethylphenyl)-2-(1-(4-(trifluoromethyl)benzyl)pyrrolidin-3-yl)ethanone 5d




1-(4-(Trifluoromethyl)benzyl)pyrrolidin-3-ol (61 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 98:2) afforded the title compound **5d** as a brown oil (55 mg, 53%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.48 (app dq, *J* = 13.0, 7.0, 1H, $H_{4'}$), 2.07 (s, 6H, 2 $CH_3$), 2.17 (s, 6H, 2 $CH_3$), 2.15–2.21 (masked m, 1H, $H_{4'}$), 2.22 (s, 3H, $CH_3$), 2.25–2.29 (m, 1H, $H_{2'}$), 2.58 (app t, *J* = 7.0, 2H, $H_{5'}$), 2.68–2.83 (m, 3H, 2 $H_2$, $H_{3'}$), 2.86 (dd, *J* = 9.2, 7.3, 1H, $H_{2'}$), 3.62 (d, *J* = 13.4, 1H, $C\underline{H}_2Ar$), 3.71 (d, *J* = 13.4, 1H, $C\underline{H}_2Ar$), 7.44 (d, *J* = 7.9, 2H, $H_{Ar}$), 7.56 (d, *J* =7.9, 2H, $H_{Ar}$).

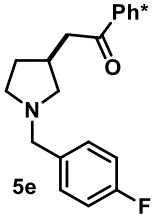
$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 31.0 ($C_{4'}$), 32.4 ($C_{3'}$), 51.9 ($C_2$), 53.9 ($C_{5'}$), 60.0 and 60.1 ($\underline{C}H_2Ar$ and $C_{2'}$), 124.4 (q, *J* = 272, $CF_3$), 125.3 (q, *J* = 4, 2 $C_{HAr}$), 127.4 (2 $C_{qAr}$), 129.0 (2 $C_{HAr}$), 129.3 (q, *J* = 32, $C_{qAr}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.5 ($C_{qAr}$), 143.4 ($C_{qAr}$), 211.4 ($C_1$).

$^{19}$F NMR (282 MHz, $CDCl_3$) δ -62.4.

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{25}H_{31}F_3NO$: 418.2352, found 418.2358. $[M + Na]^+$: calcd. for $C_{25}H_{30}F_3NONa$: 440.2172, found 440.2174.

m.p. = 61-65 °C

### 2-(1-(4-Fluorobenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5e




1-(4-Fluorobenzyl)pyrrolidin-3-ol (49 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, DCM/MeOH, 96/4) afforded the title compound **5e** as a brownish oil (43 mg, 47%).

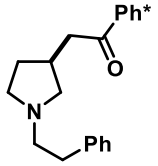
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.44 (dtd, *J* = 13.1, 7.2, 5.9, 1H, $H_{4'}$), 2.04 (s, 6H, 2 $CH_3$), 2.13 (s, 6H, 2 $CH_3$), 2.10–2.19 (m masked, 1H, $H_{4'}$), 2.19 (s, 3H, $CH_3$), 2.23 (dd, *J* = 9.4, 6.0, 1H, $H_{2'}$), 2.55 (app t, *J* = 7.2, 2H, $H_{5'}$), 2.64–2.79 (m, 3H, 2 $H_2$, $H_{3'}$), 2.84 (dd, *J* = 9.4, 7.5, 1H, $H_{2'}$), 3.51 (d, *J* = 12.9, 1H, $C\underline{H}_2Ph$), 3.60 (d, *J* = 12.9, 1H, $C\underline{H}_2Ph$), 6.91–6.98 (m, 2H, 2 $H_{Ar}$), 7.21–7.28 (m, 2H, 2 $H_{Ar}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.0 (2 $CH_3$), 16.8 ($CH_3$), 17.2 (2 $CH_3$), 30.9 ($C_{4'}$), 32.3 ($C_{3'}$), 51.8 ($C_2$), 53.8 ($C_{5'}$), 59.7 ($\underline{C}H_2Ar$), 60.0 ($C_{2'}$), 115.1 (d, *J* = 21.2, 2 $C_{HAr}$), 127.4 (2 $C_{qAr}$), 130.4 (d, *J* = 7.9, 2 $C_{HAr}$), 133.2 (2 $C_{qAr}$), 134.7 ($C_{qAr}$), 135.5 ($C_{qAr}$), 140.5 ($C_{qAr}$), 162.0 (d, *J* = 245, $C_{qAr}$), 211.4 ($C_1$).

$^{19}$F NMR (282 MHz, $CDCl_3$) δ -116.1.

MS (ESI/HR) [M + Na]$^+$: calcd. for $C_{24}H_{30}FNONa$: 390.2204, found 390.2205. [M + H]$^+$: calcd. for $C_{24}H_{31}FNO$: 368.2384, found 368.2386.

## 1-(2,3,4,5,6-pentamethylphenyl)-2-(1-phenethylpyrrolidin-3-yl)ethanone 5f




**5f**

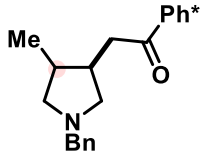
1-Phenethylpyrrolidin-3-ol (47 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 98:2) afforded the title compound **5f** as a brown oil (42 mg, 46%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.51–1.67 (m, 1H, $H_{4'}$), 2.10 (s, 6H, 2 $CH_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.14–2.29 (masked m, 1H, $H_{4'}$) 2.50–2.64 (m, 1H, $H_{2'}$), 2.70–3.01 (m, 9H, $H_2$, $H_{3'}$, $H_{5'}$, $CH_2CH_2Ph$, $CH_2CH_2Ph$), 3.13 (app t, *J* = 8.8, 1H, $H_{2'}$), 7.17–7.25 (m, 3H, $H_{Ph}$), 7.25–7.34 (m, 2H, $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 30.8 ($C_{4'}$), 32.3 ($C_{3'}$), 34.8 ($CH_2CH_2Ph$), 51.2 ($C_2$), 54.1 ($CH_2CH_2Ph$), 58.2 ($C_{5'}$), 59.7 ($C_{2'}$), 126.5 ($C_{HPh}$), 127.4 (2 $C_{qAr}$), 128.7 (2 $C_{HPh}$), 128.8 (2 $C_{HPh}$), 133.3 (2 $C_{qAr}$), 135.7 ($C_{qAr}$), 139.5 ($C_{qPh}$), 140.2 ($C_{qAr}$), 211.2 ($C_1$).

MS (ESI/HRMS) [M + H]$^+$: calcd. for $C_{25}H_{34}NO$: 364.2635, found 364.2636. [M + Na]$^+$: calcd. for $C_{25}H_{33}NONa$: 386.2454, found 386.2456.

## 2-(1-Benzyl-4-methylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5g




**5g**

64 (36) dr 40:60
84 (33) dr 37:63
28 (21) dr 90:10

(3*R*,4*S*)-1-Benzyl-4-methylpyrrolidin-3-ol (22 mg, 0.12 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ru-MACHO**. Purification by flash column chromatography ($SiO_2$, solid load, DCM/MeOH, 98/2) afforded the title compound **5g** as a brownish oil (9 mg, 21%, dr 90:10 - *measured after purification*).

Major isomer:

$^1$H NMR (300 MHz, $CDCl_3$) δ 0.92 (d, *J* = 7.1, 3H, Me), 2.08 (s, 6H, 2 $CH_3$), 2.08–2.18 (masked m, 1H, $H_{5'}$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.25–2.35 (m, 1H, $H_{2'}$), 2.40–2.53 (m, 1H, $H_{4'}$), 2.58–2.87 (m, 3H, $H_{3'}$, 2 $H_2$), 2.97 (dd, *J* = 9.3, 7.2, 1H, $H_{5'}$), 3.21 (dd, *J* = 9.6, 6.6, 1H, $H_{2'}$), 3.57–3.78 (m, 2H, $CH_2Ph$), 7.20–7.38 (m, 5H, 5 $H_{Ph}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 15.4 ($C_{Me}$), 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 34.1 ($C_{4'}$), 35.4 ($C_{3'}$), 46.0 ($C_2$), 59.9 ($C_{2'}$), 60.7 ($CH_2Ph$), 61.6 ($C_{5'}$), 127.2 ($CH_{Ph}$), 127.4 (2 $C_{qAr}$), 128.4 (2 $CH_{Ph}$), 129.0 (2 $CH_{Ph}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.8 ($C_{qAr}$), 211.4 ($C_1$).

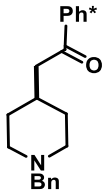
Minor isomer:

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.03 (d, *J* = 6.7, 3H, Me), 1.80–1.96 (m, 1H, $H_{4'}$), 2.03 (s, 6H, 2 $CH_3$), 2.13 (s, 6H, 2 $CH_3$), 2.18 (s, 3H, $CH_3$), 2.07–2.29 (masked m, 2H, $H_{3'}$, $H_{5'}$), 2.52–3.00 (m, 5H, 2 $H_2$, 2 $H_{2'}$, $H_{5'}$), 3.55–3.77 (m, 2H, $CH_2Ph$), 7.17–7.35 (m, 5H, $H_{Ph}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 18.5 ($C_{Me}$), 38.8 ($C_{4'}$), 40.7 ($C_{3'}$), 50.7 ($C_2$), 59.9 ($C_{2'}$), 60.4 ($CH_2Ph$), 61.5 ($C_{5'}$), 127.2 ($CH_{Ph}$), 127.4 (2 $C_{qAr}$), 128.5 (2 $CH_{Ph}$), 129.1 (2 $CH_{Ph}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr\ or\ Ph}$), 140.5 ($C_{qAr\ or\ Ph}$), 211.6 ($C_1$).

MS (ESI/HRMS) [M + Na]$^+$: calcd. for $C_{25}H_{33}NONa$: 386.2454, found 386.2460. [M + H]$^+$: calcd. for $C_{25}H_{34}NO$: 364.2635, found 364.2641.

## 2-(1-Benzylpiperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5h [2075811-80-0]




**5h**

1-Benzylpiperidin-4-ol (191 mg, 1.0 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, gradient pentane/$Et_2O$, 8/2 to 7/3) afforded the title compound **5h** as a yellow solid (270 mg, 74%).

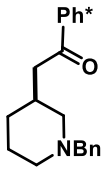
$^1$H NMR (400 MHz, $CDCl_3$) δ 1.24–1.41 (m, 2H, $H_{3'}$), 1.80–1.88 (m, 2H, $H_{3'}$), 2.09 (s, 6H, 2 $CH_3$), 2.01–2.14 (masked m, 3H, $H_{2'}$, $H_{4'}$), 2.17 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.61 (d, *J* = 6.5, 1H, $H_2$),2.89 (app dt, *J* = 12.0, 3.3, 1H, $H_{2'}$), 3.52 (s, 2H, C*H*$_2$Ph), 7.20–7.36 (m, 5H, $H_{Ph}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.1 (2 $CH_3$), 30.6 ($C_{4'}$), 32.3 ($C_{3'}$), 52.3 ($C_2$), 53.8 ($C_{2'}$), 63.6 ($\underline{C}H_2$Ph), 127.1 ($\underline{C}H_{Ph}$), 127.4 (2 $C_{qPh}$), 128.3 (2 $\underline{C}H_{Ph}$), 129.4 (2 $\underline{C}H_{Ph}$), 133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.7 ($C_{qAr}$), 211.0 ($C_1$). NMR spctra were consistent with the literature.[6]

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{25}H_{34}NO$: 364.2635, found 364.2632.

m.p. = 104-106 °C

## 2-(1-Benzylpiperidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethenone 5i




**5i**

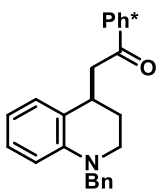
1-Benzylpiperidin-3-ol (48 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash column chromatography ($SiO_2$, solid load, gradient pentane/EtOAc, 95/5 to 8/2) afforded the title compound **5i** as a yellow solid (30 mg, 33%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.01–1.16 (m, 1H, $H_{4'}$), 1.60–1.70 (m, 2H, 2 $H_{5'}$), 1.83–2.03 (m, 2H, $H_{4'}$, $H_{2'}$), 2.07 (s, 6H, 2 $CH_3$), 2.05–2.15 (masked m, 1H, $H_{6'}$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.35–2.47 (m, 1H, $H_{3'}$), 2.58 (dd, *J* = 18.7, 6.6, 1H, $H_2$), 2.62–2.74 (m, 2H, $H_{6'}$, $H_2$), 2.83 (bd, *J* = 10.9, 1H, $H_{2'}$), 3.49–3.58 (d, *J* = 13.3, 1H, C$\underline{H}_2$Ph), 3.54 (d, *J* = 13.3, 1H, C$\underline{H}_2$Ph), 7.19–7.37 (m, 5H, $\underline{H}_{Ph}$).

$^{13}$C NMR (101 M, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.2 (2 $CH_3$), 24.7 ($C_{5'}$), 30.9 ($C_{3'}$ and $C_{4'}$), 50.0 ($C_2$), 54.0 ($C_{6'}$), 59.7 ($C_{2'}$), 63.5 ($\underline{C}H_2$Ph), 127.0 ($CH_{Ph}$), 127.4 (2 $C_{qAr}$), 128.3 (2 $CH_{Ph}$), 129.2 (2 $CH_{Ph}$), 133.2 (2 $C_{qAr}$), 135.4 ($C_{qAr}$), 138.6 ($C_{qPh}$), 140.8 ($C_{qAr}$), 210.8 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{25}H_{33}NONa$: 386.2454 found: 386.2457.

## 2-(1-Benzyl-1,2,3,4-tetrahydroquinolin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5j




**5j**

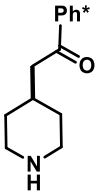
1-Benzyl-1,2,3,4-tetrahydroquinolin-4-ol (34 mg, 0.14 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1.** Purification by flash column chromatography ($SiO_2$, solid load, pentane/EtOAc, 96:4) afforded the title compound **5j** as a brown oil (12 mg, 21%).

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.92 (m, 1H, $H_{3'}$), 2.00 (s, 6H, 2 $CH_3$), 2.10 (s, 6H, 2 $CH_3$), 2.15 (s, 3H, $CH_3$), 2.13–2.26 (m, 1H, $H_{3'}$), 2.87 (dd, *J* = 19.1, 8.7, 1H, $H_2$), 3.01 (dd, *J* = 19.1, 4.6, 1H, $H_2$), 3.22–3.41 (m, 2H, 2 $H_{2'}$), 3.60 (m, 1H, $H_{4'}$), 4.36–4.45 (AB system, *J* = 17.3, 2H, $C\underline{H}_2Ph$), 6.44 (dd, *J* = 8.3, 1.1, 1H, $H_{Ar}$), 6.51 (td, *J* = 7.4, 1.1, 1H, $H_{Ar}$), 6.90 (ddd, *J* = 8.6, 7.4, 1.7, 1H, $H_{Ar}$), 7.04 (dd, *J* = 7.4, 1.7, 1H, $H_{Ar}$), 7.11–7.26 (m, 5H, 5 $H_{Ph}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.1 (2 $CH_3$), 27.0 ($C_{3'}$), 31.2 ($C_{4'}$), 46.1 ($C_{2'}$), 52.3 ($C_2$), 55.1 ($\underline{C}H_2Ph$), 111.3 ($\underline{C}H_{Ar}$), 116.2 ($\underline{C}H_{Ar}$), 125.1 ($C_{qAr}$), 126.7 (2 $\underline{C}H_{Ph}$), 127.0 ($\underline{C}H_{Ar}$), 127.5 (2 $C_{qAr}$), 127.7 ($\underline{C}H_{Ph}$), 128.7 ($\underline{C}H_{Ar}$), 128.8 (2 $\underline{C}H_{Ph}$), 133.3 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 138.8 ($C_{qPh}$), 140.5 ($C_{qAr}$), 145.1 ($C_{qAr}$), 210.3 ($C_1$).

MS (ESI/HRMS) $[M + Na]^+$: calcd. for $C_{29}H_{33}NONa$: 434.2454, found 434.2459, $[M + H]^+$: calcd. for $C_{29}H_{34}NO$: 412.2635, found 412.2636.

### 1-(2,3,4,5,6-pentamethylphenyl)-2-(piperidin-4-yl)ethanone 5k




**5k**

Piperidin-4-ol (25 mg, 0.25 mmol, 1.0 eq.) was subjected to Procedure **B** using **Ir-1**. Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 10/1 + 1% $Et_3N$) afforded the title compound **5k** as a yellow solid (57 mg, 83%).

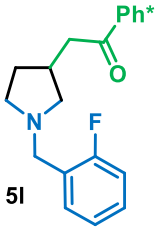
$^1$H NMR (400 MHz, $CD_3OD$) δ 1.25 (m, 2H, $H_4$), 1.88 (m, 2H, $H_4$), 2.07 (s, 6H, 2 $CH_3$), 2.09–2.20 (m, 1H, $H_3$), 2.18 (s, 6H, 2 $CH_3$), 2.23 (s, 3H, $CH_3$), 2.66 (m, 2H, $H_2$), 2.73 (m, 2H, $H_5$), 3.10 (dt, *J* = 12.7, 3.3, 2H, $H_5$).

$^{13}$C NMR (101 MHz, $CD_3OD$) δ 16.0 (2 $CH_3$), 16.7 ($CH_3$), 17.2 (2 $CH_3$), 31.9 ($C_3$), 32.8 ($C_4$), 46.6 ($C_5$), 53.2 ($C_2$), 128.1 ($C_{qAr}$), 134.1 ($C_{qAr}$), 136.4 ($C_{qAr}$), 141.5 ($C_{qAr}$), 213.3 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{18}H_{28}NO$: 274.2165, found 274.2165.

m.p. = 173-177 °C

### 2-(1-(2-Fluorobenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5l




**5l**

1,2,4-Butanetriol (133 mg, 1.2 mmol, 1.2 eq.) was subjected to the Procedure **C** using (2-fluorophenyl)methanamine (114 µL, 1.0 mmol, 1.0 eq.) Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 96:4) afforded the title compound **5l** as a brown oil (73 mg, 20%).

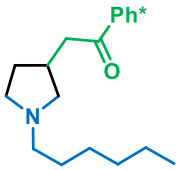
$^1$H NMR (300 MHz, $CDCl_3$) δ 1.38–1.62 (m, 1H, $H_{4'}$), 2.07 (s, 6H, 2 $CH_3$), 2.13–2.21 (m masked, 1H, $H_{4'}$), 2.17 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.28–2.40 (m, 1H, $H_{2'}$), 2.59–2.84 (m, 5H, 2 $H_2$, $H_{3'}$, 2 $H_{5'}$), 2.91–3.01 (m, 1H, $H_{2'}$), 3.72 (bs, 2H, $C\underline{H}_2Ar$), 7.02 (ddd, *J* = 9.6, 8.1, 1.3, 1H, $H_{Ar}$), 7.10 (td, *J* = 7.4, 1.3, 1H, $H_{Ar}$), 7.22 (m, 1H, $H_{Ar}$), 7.41 (t, *J* = 7.4, 1H, $H_{Ar}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 16.0 (2 $CH_3$), 16.7 ($CH_3$), 17.2 (2 $CH_3$), 30.9 ($C_{4'}$), 32.3 ($C_{3'}$), 51.7 ($C_2$), 52.5 ($\underline{C}H_2Ar$), 53.6 ($C_{5'}$), 59.8 ($C_{2'}$), 115.3 (d, *J* = 22.2, $\underline{C}H_{Ar}$), 124.1 (d, *J* = 3.8, $\underline{C}H_{Ar}$), 124.9 (d, *J* = 15.3, $C_{qAr}$), 127.4 (2 $C_{qAr}$), 128.8 (d, *J* = 8.3, $\underline{C}H_{Ar}$), 131.5 (d, *J* = 4.0, $\underline{C}H_{Ar}$), 133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.4 ($C_{qAr}$), 161.2 (d, *J* = 246, $C_{qAr}$), 211.4 ($C_1$).

$^{19}$F NMR (282 MHz, $CDCl_3$) δ -118.3.

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{24}H_{31}FNO$: 368.2384, found, 368.2383.

## 2-(1-Hexylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5m




**5m**

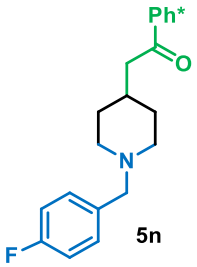
1,2,4-Butanetriol (133 mg, 1.2 mmol, 1.2 eq.) was subjected to the Procedure **C** using *n*-hexylamine (132 µL, 1.0 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, DCM/MeOH, 96:4) afforded the title compound **5m** as a brown oil (137 mg, 40%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 0.84–0.93 (m, 3H, Me), 1.22–1.37 (m, 6H, 3 $CH_2$), 1.43–1.57 (m, 3H, $H_{4'}$, $CH_2$),2.09 (s, 6H, 2 $CH_3$), 2.17 (s, 6H, 2 $CH_3$), 2.13–2.21 (masked m, 1H, $H_{4'}$), 2.22 (s, 3H, $CH_3$), 2.27–2.37 (m, 1H, $H_{2'}$), 2.37–2.57 (m, 2H, $CH_2$), 2.58–2.65 (m, 2H, $H_{5'}$), 2.66–2.79 (m, 1H, $H_{3'}$), 2.81–2.86 (m, 2H, $H_2$), 2.96 (dd, *J* = 9.5, 7.8, 1H, $H_{2'}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 14.2 ($C_{Me}$), 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.3 (2 $CH_3$), 22.8 ($CH_2$), 27.5 ($CH_2$), 28.7 ($CH_2$), 31.0 ($C_{4'}$), 31.9 ($CH_2$), 32.3 ($C_{3'}$), 51.8 ($C_2$), 54.2 ($C_{5'}$), 56.8 ($CH_2$), 60.1 ($C_{2'}$), 127.4 (2 $C_{qAr}$), 133.2 (2 $C_{qAr}$), 135.6 ($C_{qAr}$), 140.5 ($C_{qAr}$), 211.4 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{23}H_{38}NO$: 344.2948, found, 344.2949.

## 2-(1-(4-Fluorobenzyl)piperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5n




**5n**

1,3,5-Pentanetriol (144 mg, 1.2 mmol, 1.2 eq.) was subjected to the Procedure **C** using (4-fluorophenyl)methanamine (115 µL, 1.0 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, solid load, DCM/MeOH, 96:4) afforded the title compound **5n** as a brown solid (243 mg, 64%).

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.31 (app qd, *J* = 12.1, 4.4, 2H, 2 $H_{3'}$), 1.79–1.89 (m, 2H, 2 $H_{3'}$), 2.02 (dd, *J* = 11.8, 2.5, 2H, 2 $H_{2'}$), 2.06–2.14 (m, 1H, $H_{4'}$), 2.08 (s, 6H, 2 $CH_3$), 2.17 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.61 (d, *J* = 6.5, 2H, $H_2$), 2.85 (m, 2H, 2 $H_{2'}$), 3.45 (s, 2H, $CH_2Ar$), 6.92–7.07 (app t, *J* = 8.8, 2H, 2 $H_{Ar}$), 7.22–7.32 (m, 2H, 2 $H_{Ar}$).

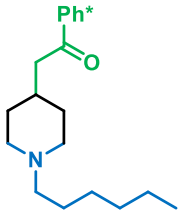
$^{13}$C NMR (75 MHz, $CDCl_3$) δ 16.1 (2 $CH_3$), 16.8 ($CH_3$), 17.1 (2 $CH_3$), 30.7 ($C_{4'}$), 32.4 (2 $C_{3'}$), 52.3 ($C_2$), 53.7 (2 $C_{2'}$), 62.8 ($CH_2Ar$), 115.1 (d, $^2J_{CF}$ = 21, 2 $CH_{Ar}$), 127.4 (2 $C_{qAr}$), 130.8 (d, $^3J_{CF}$ = 8, 2 $CH_{Ar}$), 133.2 (2 $C_{qAr}$), 134.4 ($C_{qAr}$), 135.5 ($C_{qAr}$), 140.8 ($C_{qAr}$), 162.1 (d, $^1J_{CF}$ = 245, $C_{qAr}$), 210.9 ($C_1$).

$^{19}$F NMR (282 MHz, $CDCl_3$) δ -116.2

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{25}H_{33}FNO$: 382.2541, found, 382.2538.

m.p. = 107-110 °C

### 2-(1-Hexylpiperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5o




**5o**

1,3,5-Pentanetriol (144 mg, 1.2 mmol, 1.2 eq.) was subjected to the Procedure **C** using *n*-Hexylamine (131 µL, 1.0 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, petroleum ether/EtOAc, 6/4 to 4/6) afforded the title compound **5o** as a brown oil (102 mg, 29%).

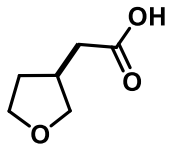
$^1$H NMR (300 MHz, $CDCl_3$) δ 0.86-0.90 (m, 3H, $CH_3$), 1.20–1.41 (m, 8H, 2 $H_{3'}$, 3 $CH_2$), 1.43–1.55 (m, 2H, $CH_2$), 1.82–1.90 (m, 2H, 2 $H_{3'}$), 1.95–2.07 (m, 3H, 2 $H_{2'}$, $H_{4'}$), 2.09 (s, 6H, 2 $CH_3$), 2.17 (s, 6H, 2 $CH_3$), 2.22 (s, 3H, $CH_3$), 2.30–2.35 (m, 2H, $CH_2$), 2.61 (d, *J* = 6.5, 2H, $H_2$), 2.94 (dt, *J* = 12.0, 3.4, 2H, 2 $H_{2'}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 14.2 ($CH_3$), 16.0 (2 $CH_3$), 16.8 ($CH_3$), 17.1 (2 $CH_3$), 22.7 ($CH_2$), 27.1 ($CH_2$), 27.5 ($CH_2$), 30.7 ($C_{4'}$), 31.9 (2 $C_{3'}$), 32.3 ($CH_2$), 52.4 ($C_2$), 53.9 (2 $C_{2'}$), 59.3 ($CH_2$), 127.4 (2 $C_{qAr}$), 133.2 (2 $C_{qAr}$), 135.5 ($C_{qAr}$), 140.7 ($C_{qAr}$), 210.9 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{24}H_{40}NO$: 358.3104, found, 358.3102.

## ***Ph* Cleavage and post-functionalization***

### 2-(Tetrahydrofuran-3-yl)acetic acid 6a [138498-97-2]




**6a**

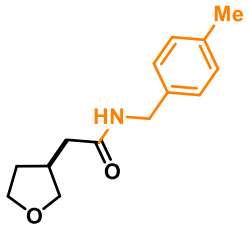
To a solution of 1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone **3a** (65 mg, 0.25 mmol, 1.0 eq.) in HFIP (2.5 mL) in a MW vial, 200 µL of 37% aqueous HCl was added dropwise to the solution and the vial was rapidly sealed with a cap. The reaction mixture was then heated at 65 °C in a preheated tray and stirred for 24 h. After complete conversion, the mixture was cooled to rt and $H_2O$ (5 mL) was added. The solution obtained was further stirred for 5 min. The product was extracted with DCM (3 x 5 mL). The organic phases were combined and washed with brine (10 mL), dried over $Na_2SO_4$, filtered and concentrated under reduced pressure. Purification by flash column chromatography on silica gel ($SiO_2$, pentane/$Et_2O$, 2/8) afforded the title compound **6a** as a colourless oil (22 mg, 69%).

$^1$H NMR (500 MHz, $CDCl_3$) δ 1.70–1.82 (m, 2H, $H_{4'}$), 2.25 (dd, *J* = 17.1, 8.3, 1H, $H_2$), 2.67 (dd, *J* = 17.1, 8.4, 1H, $H_2$), 2.69–2.81 (m, 1H, $H_{3'}$), 3.67–3.80 (m, 2H, $H_{5'}$), 4.00 (dd, *J* = 9.1, 7.4, 1H, $H_{2'}$), 4.48 (dd, *J* = 9.1, 7.3, 1H, $H_{2'}$).

$^{13}$C NMR (126 MHz, $CDCl_3$) δ 33.3 ($C_{3'}$), 34.5 ($C_2$), 35.5 ($C_{4'}$), 60.8 ($C_{5'}$), 73.4 ($C_{2'}$), 176.7 ($C_1$).

MS (ESI/HR) $[M + H]^+$: calcd. for $C_6H_{11}O_3$: 131.0703, found 131.0702, $[M + Na]^+$: calcd. for $C_6H_{10}O_3Na$: 153.0522, found 153.0520.

### *N*-(4-Methylbenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7a




**7a**

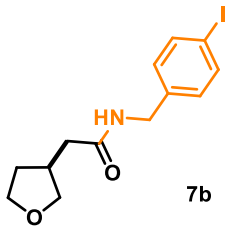
1-(2,3,4,5,6-pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone **3a** (260 mg, 1.0 mmol, 1.0 eq.) was subjected to procedure **D** using *p*-methylbenzylamine (133 µL, 1.0 mmol, 1.0 eq.). Purification by flash column chromatography ($SiO_2$, pentane/EtOAc, 6/4 to 100% acetone) afforded *N*-(4-methylbenzyl)-2-(tetrahydrofuran-3-yl)acetamide **7a** as a brown to orange sticky oil (96 mg, 42%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.48–1.63 (m, 1H, $H_{4'}$), 2.12 (m, 1H, $H_{4'}$), 2.27 (d, *J* = 7.3, 2H, $H_2$), 2.33 (s, 3H, Me), 2.69 (app hept, *J* = 7.3, 1H, $H_{3'}$), 3.43 (dd, *J* = 8.6, 6.1, 1H, $H_{2'}$), 3.69–3.87 (m, 2H, $H_{5'}$), 3.87–3.94 (m, 1H, $H_{2'}$), 4.38 (d, *J* = 5.6, 2H, $C\underline{H}_2Ar$), 5.80 (bs, 1H, NH), 7.08–7.20 (m, 4H, 4 $H_{Ar}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 21.2 ($\underline{C}H_3$), 32.2 ($C_{4'}$), 36.1 ($C_{3'}$), 40.3 ($C_2$), 43.5 ($\underline{C}H_2Ar$), 67.8 ($C_{5'}$), 73.1 ($C_{2'}$), 127.9 (2 $CH_{Ar}$), 129.5 (2 $CH_{Ar}$), 135.3 ($C_{qAr}$), 137.5 ($C_{qAr}$), 171.5 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{14}H_{20}NO_2$: 234.1489, found, 234.1490, $[M + Na]^+$: calcd. for $C_{14}H_{19}NO_2Na$: 256.1308, found, 256.1310.

### *N*-(4-Iodobenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7b




**7b**

1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone **3a** (78 mg, 0.30 mmol, 1.0 eq.) was subjected to procedure **D** using 4-iodobenzylamine (40 µL, 0.30 mmol, 1.0 eq.). Purification by flash ($SiO_2$, pentane/EtOAc, 4/6) afforded *N*-(4-iodobenzyl)-2-(tetrahydrofuran-3-yl)acetamide **7b** as yellowish crystals (30 mg, 29% overall yield).

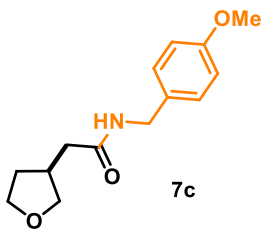
$^1$H NMR (300 MHz, $CDCl_3$) δ 1.46–1.64 (m, 1H, $H_{4'}$), 2.02–2.19 (m, 1H, $H_{4'}$), 2.28 (d, *J* = 7.1, 2H, $H_2$), 2.69 (app p, *J* = 7.1, 1H, $H_{3'}$), 3.42 (ddd, *J* = 7.8, 5.8, 1.6, 1H, $H_{2'}$), 3.74 (td, *J* = 8.7, 8.1, 7.1, 1H, $H_{5'}$), 3.79–3.94 (m, 2H, $H_{2'}$, $H_{5'}$), 4.35 (d, *J* = 5.8, 2H, $C\underline{H}_2Ar$), 5.92 (s, 1H, NH), 7.00 (d, *J* = 8.0, 2H, 2 $H_{Ar}$), 7.64 (d, *J* = 8.0, 2H, 2 $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 32.2 ($C_{4'}$), 36.1 ($C_{3'}$), 40.2 ($C_2$), 43.2 ($\underline{C}H_2Ar$), 67.8 ($C_{5'}$), 73.0 ($C_{2'}$), 93.0 ($C_{qAr}$), 129.8 (2 $CH_{Ar}$), 138.10 (2 $CH_{Ar}$), 138.12 ($C_{qAr}$), 171.6 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{13}H_{17}INO_2$: 346.0299, found, 346.0294, $[M + Na]^+$: calcd. for $C_{13}H_{16}INO_2Na$: 368.0118, found, 368.0112.

m.p. = 102-105 °C

### *N*-(4-Methoxybenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7c




**7c**

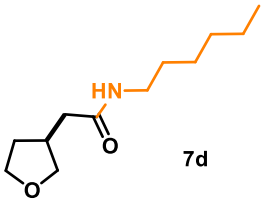
1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone **3a** (78 mg, 0.30 mmol, 1.0 eq.) was subjected to procedure **D** using 4-methoxybenzylamine (39 µL, 0.30 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 3/7) afforded the title compound **7c** as a brown oil (9 mg, 12% overall yield).

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.41–1.58 (m, 1H, $H_{4'}$), 2.05 (m, 1H, $H_{4'}$), 2.20 (d, *J* = 7.3, 2H, $H_2$), 2.63 (app hept, *J* = 7.3, 1H, $H_{3'}$), 3.36 (dd, *J* = 8.6, 6.0, 1H, $H_{2'}$), 3.73 (s, 3H, OMe), 3.61–3.81 (m, 2H, 2 $H_{5'}$), 3.85 (dd, *J* = 8.6, 7.0, 1H, $H_{2'}$), 4.29 (d, *J* = 5.6, 2H, $C\underline{H}_2Ar$), 5.67 (s, 1H, NH), 6.74–6.85 (d, *J* = 8.7, 2H, 2 $H_{Ar}$), 7.07–7.23 (d, *J* = 8.7, 2H, 2 $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 32.1 ($C_{4'}$), 36.0 ($C_{3'}$), 40.2 ($C_2$), 43.1 ($\underline{C}H_2Ar$), 55.3 ($O\underline{C}H_3$), 67.6 ($C_{5'}$), 72.9 ($C_{2'}$), 114.2 (2 $C_{HAr}$), 129.2 (2 $C_{HAr}$), 130.0 ($C_{qAr}$), 159.1 ($C_{qAr}$), 171.3 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{14}H_{20}NO_3$: 250.1438, found, 250.1436, $[M + Na]^+$: calcd. for $C_{14}H_{19}NO_3Na$: 272.1257, found, 272.1257.

### *N*-Hexyl-2-(tetrahydrofuran-3-yl)acetamide 7d



**7d**

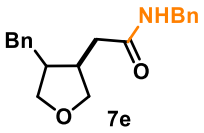
1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone **3a** (78 mg, 0.30 mmol, 1.0 eq.) was subjected to procedure **D** using *n*-hexylamine (40 µL, 0.30 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 3/7) afforded the title compound **7d** as a brown oil (15 mg, 23% overall yield).

$^1$H NMR (300 MHz, $CDCl_3$) δ 0.82–0.93 (m, 3H, $CH_3$), 1.20–1.36 (m, 6H, 3 ($(CH_2)$Hex), 1.41–1.52 (m, 2H, $CH_2$Hex), 1.51–1.62 (m, 1H, $H_{4'}$), 2.11 (m, 1H, $H_{4'}$), 2.23 (d, *J* = 7.5, 2H, $H_2$), 2.68 (app hept, *J* = 7.3, 1H, $H_{3'}$), 3.23 (td, *J* = 7.2, 5.8, 2H, $NHC\underline{H}_2(CH_2)_4CH_3$), 3.42 (dd, *J* = 8.6, 6.0, 1H, $H_{2'}$), 3.74 (dt, *J* = 8.5, 7.4, 1H, $H_{5'}$), 3.81–3.89 (m, 1H, $H_{5'}$), 3.90 (dd, *J* = 8.6, 6.9, 1H, $H_{2'}$), 5.52 (bs, 1H, NH).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 14.1 ($\underline{C}H_3$), 22.7 ($\underline{C}H_2$), 26.7 ($\underline{C}H_2$), 29.8 ($\underline{C}H_2$), 31.6 ($\underline{C}H_2$), 32.2 ($C_{4'}$), 36.2 ($C_{3'}$), 39.7 ($\underline{C}H_2$), 40.4 ($C_2$), 67.8 ($C_{5'}$), 73.1 ($C_{2'}$), 171.6 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{12}H_{24}NO_2$: 214.1802, found, 214.1802, $[M + Na]^+$: calcd. for $C_{12}H_{23}NO_2Na$: 236.1621, found, 236.1620.

### 2-(4-Benzyltetrahydrofuran-3-yl)-*N*-benzylacetamide 7e



**7e**

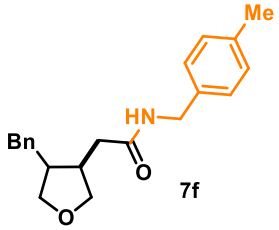
2-(4-Benzyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone **3l** (56 mg, 0.16 mmol, 1.0 eq. – **dr 59:41**) was subjected to procedure **D** using benzylamine (16 µL, 0.14 mmol, 1.0 eq.). Purification by flash column chromatography ($SiO_2$, petroleum ether/EtOAc, 6/4) afforded the title compound **7e** as a light orange sticky oil (26 mg, 53% overall yield, dr 53:47).

$^1$H NMR (300 MHz, $CDCl_3$) δ 2.09–2.29 (m, 2H, $H_{4'}$, $CH_2$Ph, dia 1 and 2), 2.35–2.51 (m, 2H, $H_{3'}$, $CH_2$Ph, dia 1 and 2), 2.57–2.73 (m, 2H, $H_{4'}$, $H_2$, dia 1 and 2), 2.74–2.93 (m, 3H, $H_{3'}$, $H_2$, dia 1 and 2), 3.46–3.58 (m, 3H, $H_{2'}$, $H_{5'}$, dia 1, $H_{5'}$, dia 2), 3.64 (dd, *J* = 8.6, 5.6, 1H, $H_{2'}$, dia 2), 3.76 (dd, *J* = 8.6, 6.6, 1H, $H_{5'}$, dia 2), 3.86 (dd, *J* = 8.9, 7.1, 1H, $H_{5'}$, dia 1), 3.98 (dd, *J* = 8.6, 6.6, 1H, $H_{2'}$, dia 2), 4.10 (dd, *J* = 8.9, 7.2, 1H, $H_{2'}$, dia 1), 4.39 (dd, *J* = 5.7, 3.9, 2H, $CH_2$Ph, dia 2), 4.44 (d, *J* = 5.7, 2H, $CH_2$Ph, dia 1), 5.62 (bs, 1H, dia 1), 5.77 (s, 1H, dia 2), 7.10–7.39 (m, 10H, $H_{Ph}$, dia 1 and 2).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 34.1 and 34.9 ($CH_2$Ph, dia 1 and 2), 39.0 ($C_{3'}$, dia 2), 39.3 and 40.2 ($CH_2$Ph, dia 1 and 2), 42.1 ($C_{3'}$, dia 1), 43.2 ($C_{4'}$, dia 2), 43.8 and 43.9 ($C_2$, dia 1 and 2), 46.9 ($C_{4'}$, dia 1), 72.1 and 72.7 ($C_{2'}$ and $C_{5'}$, dia 2), 73.1 and 73.5 ($C_{2'}$ and $C_{5'}$, dia 1), 126.4 ($CH_{Ar}$, dia 1 and 2), 127.8 ($CH_{Ar}$, dia 1 and 2), 128.0 (2 $CH_{Ar}$, dia 1 and 2), 128.7–128.9 (6 $CH_{Ar}$, dia 1 and 2), 138.3 and 140.3 ($C_{qAr}$, dia 1 and 2), 171.3 and 171.5 ($C_1$, dia 1 and 2).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{20}H_{24}NO_2$: 310.1802, found, 310.1801. $[M + Na]^+$: calcd. for $C_{20}H_{23}NO_2Na$: 332.1621, found, 332.1620.

### 2-(4-Benzyltetrahydrofuran-3-yl)-N-(4-methylbenzyl)acetamide 7f




2-(4-Benzyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone **3l** (48 mg, 0.14 mmol, 1.0 eq. – **dr 59:41**) was subjected to procedure **D** using 4-methylbenzylamine (18 µL, 0.14 mmol, 1.0 eq.). Purification by flash column chromatography ($SiO_2$, petroleum ether/EtOAc, 6/4) afforded the title compound **7f** as an orange solid (31 mg, 68% overall yield, dr 62:38).

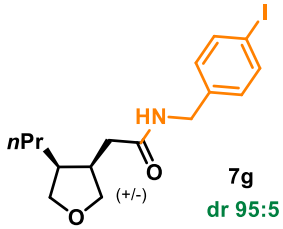
$^1H$ NMR (300 MHz, $CDCl_3$) δ 2.12–2.28 (m, 4H, $H_2$, dia 1, 2 $H_2$, $H_{4'}$, dia 2), 2.34 (s, 3H, $CH_3Ar$, dia 1 and 2), 2.38–2.53 (m, 2H, $H_2$, dia 1, $H_{3'}$, dia 2), 2.58–2.73 (m, 3H, $H_{4'}$, $CH_2Ph$, dia 1 and dia 2), 2.73–2.91 (m, 3H, $H_{3'}$, $CH_2Ph$, dia 1 and dia 2), 3.46–3.57 (m, 3H, $H_{5'}$, dia 1, $H_{2'}$, $H_{5'}$, dia 2), 3.64 (dd, *J* = 8.7, 5.6, 1H, $H_{2'}$, dia 1), 3.76 (dd, *J* = 8.5, 6.7, 1H, $H_{5'}$, dia 1), 3.86 (dd, *J* = 8.8, 7.2, 1H, $H_{5'}$, dia 2), 3.98 (dd, *J* = 8.7, 6.7, 1H, $H_{2'}$, dia 1), 4.06–4.15 (m, 1H, $H_{2'}$, dia 2), 4.35 (dd, *J* = 5.6, 4.2, 2H, $CH_2Ar$, dia 2), 4.40 (d, *J* = 5.6, 2H, $CH_2Ar$, dia 1), 5.51 (bs, 1H, NH, dia 2), 5.65 (bs, 1H, NH, dia 1), 7.08–7.35 (m, 18H, 8 $H_{Ar}$ and 10 $H_{Ph}$, dia 1 and 2).

$^{13}C$ NMR (75 MHz, $CDCl_3$) δ 21.2 ($CH_3$, dia 1 and 2), 34.0 ($CH_2Ph$, dia 1), 34.9 ($C_2$, dia 1), 39.0 ($C_{3'}$, dia 1), 39.2 ($CH_2Ph$, dia 2), 40.1 ($C_2$, dia 2), 42.1 ($C_{3'}$, dia 2), 43.2 ($C_{4'}$, dia 1), 43.5 ($CH_2Ar$, dia 2), 43.6 ($CH_2Ar$, dia 1), 46.8 ($C_{4'}$, dia 2), 72.0 ($C_{5'}$, dia 1), 72.7 ($C_{2'}$, dia 1), 73.1($C_{5'}$, dia 2), 73.5 ($C_{2'}$, dia 2), 126.3 and 126.4 (C, dia 1 and 2), 128.0 (2 $CH_{Ar}$, dia 1 and 2), 128.6 (2 $CH_{Ph}$, dia 2), 128.7 (2 $CH_{Ph}$, dia 1 and 2), 128.8 ($CH_{Ph}$, dia 1 and 2), 129.6 (2 $CH_{Ar}$, dia 1 and 2), 135.3 ($C_{qAr}$, dia 1 and 2), 137.5 ($C_{qAr}$, dia 1 and 2), 140.3 ($C_{qPh}$, dia 1 and 2), 171.2 ($C_1$, dia 2), 171.5 ($C_1$, dia 1).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{21}H_{26}NO_2$: 324.1958, found, 324.1959. $[M + Na]^+$: calcd. for $C_{21}H_{25}NO_2Na$: 346.1777, found, 346.1778.

m.p. = 104-107 °C

### (±)-*N*-(4-iodobenzyl)-2-((3*R*,4*S*)-4-propyltetrahydrofuran-3-yl)acetamide7g




1-(2,3,4,5,6-Pentamethylphenyl)-2-(4-propyltetrahydrofuran-3-yl)ethanone **3f** (91 mg, 0.30 mmol, 1.0 eq. – **dr 95:5**) was subjected to procedure **D** using 4-iodobenzylamine (70 mg, 0.30 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 6/4) afforded the title compound **7g** as yellow crystals (64 mg, 55% overall yield, dr 95:5).

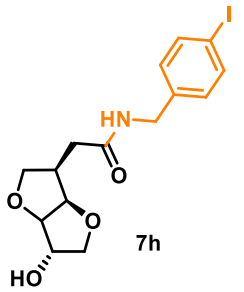
$^1H$ NMR (300 MHz, $CDCl_3$) δ 0.91 (t, *J* = 6.8, 3H, $CH_3$), 1.16–1.39 (m, 4H, 2 $CH_2$), 2.06 (dd, *J* = 14.7, 10.4, 1H, $H_2$), 2.24–2.38 (m, 2H, $H_2$, $H_{4'}$), 2.72 (app p, *J* = 5.5, 1H, $H_{3'}$), 3.42 (td, *J* = 8.1, 1.3, 1H, $H_{5'}$), 3.58 (ddd, *J* = 8.7, 3.9, 1.3, 1H, $H_{2'}$), 3.83–3.97 (m, 1H, $H_{2'}$, $H_{5'}$), 4.26–4.49 (m, 2H, $C\underline{H}_2Ar$), 5.85 (bs, 1H, NH), 7.02 (d, *J* = 7.9, 2H, 2 $H_{Ar}$), 7.65 (d, *J* = 7.9, 2H, 2 $H_{Ar}$).

$^{13}C$ NMR (75 MHz, $CDCl_3$) δ 14.4 ($\underline{C}H_3$), 21.8 ($\underline{C}H_2$), 30.1 ($\underline{C}H_2$), 34.6 ($C_2$), 38.7 ($C_{3'}$), 41.7 ($C_{4'}$), 43.3 ($\underline{C}H_2Ar$), 72.2 ($C_{5'}$), 73.0 ($C_{2'}$), 93.1 ($C_{qAr}$), 129.9 (2 $CH_{Ar}$), 138.0 (2 $CH_{Ar}$), 138.1 ($C_{qAr}$), 172.0 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{16}H_{23}INO_2$: 388.0768, found, 388.0770. $[M + Na]^+$: calcd. for $C_{16}H_{22}INO_2Na$: 410.0587, found, 410.0590.

m.p. = 98-100 °C

## 2-((3*R*,6*S*)-6-Hydroxyhexahydrofuro[3,2-*b*]furan-3-yl)-*N*-(4-iodobenzyl)acetamide 7h



7h

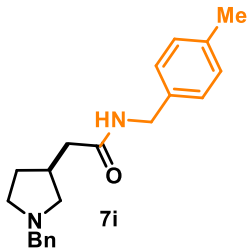
2-((3*R*,6*S*)-6-(*tert*-butoxy)hexahydrofuro[3,2-*b*]furan-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethenone **3j** (100 mg, 0.28 mmol, 1.0 eq.) was subjected to procedure **D** using 4-iodobenzylamine (70 mg, 0.30 mmol, 1.1 eq.). Purification by flash chromatography ($SiO_2$, pentane/EtOAc, 1/9) afforded the title compound **7h** as a brown oil (26 mg, 23% overall yield – dr > 99:1).

$^1$H NMR (300 MHz, $CDCl_3$) δ 2.31 (dd, *J* = 14.1, 6.2, 1H, $H_2$), 2.48 (dd, *J* = 14.1, 8.9, 1H, $H_2$), 2.57–2.74 (m, 1H, $H_{3'}$), 3.31 (dd, *J* = 10.7, 8.2, 1H, $H_{2'}$), 3.76–3.87 (m, 2H, 2 $H_{5'}$), 4.03 (app t, *J* = 8.2, 1H, $H_{2'}$), 4.26–4.31 (m, 1H, $H_{6'}$), 4.34 (d, *J* = 11.0, 1H, $CH_2Ar$), 4.36 (d, *J* = 11.0, 1H, $CH_2Ar$), 4.41–4.49 (m, 1H, $H_{6'a}$), 4.55–4.76 (m, 1H, $H_{3'a}$), 6.27 (bs, 1H, NH), 7.01 (d, *J* = 8.4, 2H, 2 $CH_{Ar}$), 7.64 (d, *J* = 8.4, 2H, 2 $CH_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 33.5 ($C_2$), 42.4 ($C_{3'}$), 43.2 ($\underline{C}H_2Ar$), 72.4 ($C_{2'}$), 75.5 ($C_{5'}$), 76.9 ($C_{6'}$), 83.1 ($C_{3'a}$), 89.2 ($C_{6'a}$), 93.0 ($C_{qAr}$), 129.8 (2 $C_{HAr}$), 137.9 (2 $C_{HAr}$), 138.1 ($C_{qAr}$), 171.7 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{15}H_{19}INO_4$: 404.0353, found, 404.0352. $[M + Na]^+$: calcd. for $C_{15}H_{18}INO_4Na$: 426.0173, found, 426.0171.

## 2-(1-Benzylpyrrolidin-3-yl)-*N*-(4-methylbenzyl)acetamide 7i



7i

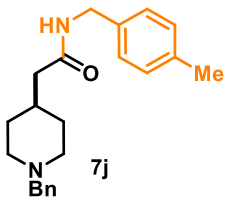
2-(1-benzylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone **5a** (61 mg, 0.17 mmol, 1.0 eq.) was subjected to procedure **D** using 4-methylbenzylamine (22 µL, 0.17 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, DCM/MeOH, 95/5) afforded the title compound **7i** as brown oil (22 mg, 40% overall yield).

$^1$H NMR (300 MHz, $CDCl_3$) δ 1.49 (ddd, *J* = 14.8, 10.3, 6.8, 1H, $H_{4'}$), 1.92–2.13 (m, 1H, $H_{4'}$), 2.25 (s, 3H, $CH_3$), 2.27–2.74 (m, 7H, $H_2$, $H_{3'}$, $H_{2'}$, $H_{5'}$), 3.57 (AB system, *J* = 12.9, 2H, $CH_2Ph$), 4.19–4.38 (m, 2H, $CH_2Ar$), 6.50 (bs, 1H, NH), 6.86–7.31 (m, 9H, $H_{Ar}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 21.2 ($CH_3$), 30.2 ($C_{4'}$), 34.0 ($C_{3'}$), 42.1 ($C_2$), 43.4 ($CH_2Ar$), 53.8 and 59.4 ($C_{2'}$ and $C_{5'}$), 60.2 ($CH_2Ph$), 127.6 ($CH_{Ar}$), 127.9 (2 $CH_{Ar}$), 128.5 (2 $CH_{Ar}$), 129.2 (2 $CH_{Ar}$), 129.5 (2 $CH_{Ar}$), 135.6 ($C_{qAr}$), 137.2 ($C_{qAr}$), 137.6 ($C_{qAr}$), 171.6 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{21}H_{27}N_2O$: 323.2118, found, 323.2118.

## 2-(1-Benzylpiperidin-4-yl)-*N*-(4-methylbenzyl)acetamide 7j



7j

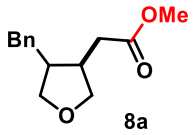
2-(1-Benzylpiperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone **5h** (85 mg, 0.23 mmol, 1.0 eq.) was subjected to procedure **D** using 4-methylbenzylamine (30 µL, 0.23 mmol, 1.0 eq.). Purification by flash chromatography ($SiO_2$, DCM/MeOH, 95/5) afforded the title compound **7j** as brown sticky oil (26 mg, 34% overall yield).

$^1$H NMR (500 MHz, $CDCl_3$) δ 1.28–1.39 (m, 2H, $H_{3'}$), 1.68–1.74 (m, 2H, $H_{3'}$), 1.84-1.98 (m, 1H, $H_{4'}$), 2.04 (app t, *J* = 11.5, 2H, $H_{2'}$), 2.10 (d, *J* = 7.3, 2H, $H_2$), 2.33 (s, 3H, $CH_3$), 2.91 (d, *J* = 11.5, 2H, $H_{2'}$), 3.54 (s, 2H, $CH_2Ph$), 4.36 (d, *J* = 18.7, 2H, $CH_2Ar$), 4.41 (d, *J* = 18.7, 1H, $CH_2Ar$), 5.67 (bs, 1H, NH), 7.09–7.20 (m, 5H, $H_{Ar}$), 7.26–7.35 (m, 4H, $H_{Ar}$).

$^{13}$C NMR (126 MHz, $CDCl_3$) δ 21.2 ($CH_3$), 32.0 (2 $C_{3'}$), 33.3 ($C_{4'}$), 43.5 ($CH_2Ar$), 43.9 ($C_2$), 53.6 (2 $C_{2'}$), 63.3 ($CH_2Ph$), 127.4 ($CH_{Ar}$), 128.0 (2 $CH_{Ar}$), 128.4 (2 $CH_{Ar}$), 129.4 ($C_{qAr}$), 129.5 (4 $CH_{Ar}$), 135.4 ($C_{qAr}$), 137.4 ($C_{qAr}$), 171.7 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{22}H_{29}N_2O$: 337.2274, found, 337.2275.

## Methyl 2-(4-benzyltetrahydrofuran-3-yl)acetate 8a



**8a**

2-(4-benzyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone **3l** (dr 89:11) (84 mg, 0.24 mmol, 1.0 eq.) was subjected to procedure **E** provided the title compound **8a** as a brown oil (24 mg, 43% overall yield, dr 87:13).

Major isomer:

$^1$H NMR (300 MHz, $CDCl_3$) δ 2.33–2.91 (m, 6H, $H_2$, $H_{3'}$, $H_{4'}$, $CH_2Ph$), 3.58–3.69 (m, 2H, $H_{2'}$, $H_{5'}$), 3.75 (s, 3H, OMe), 3.82 (dd, *J* = 8.6, 6.4, 1H, $H_{5'}$), 4.07 (dd, *J* = 8.5, 6.7, 1H, $H_{2'}$), 7.19–7.30 (m, 3H, $H_{Ph}$), 7.31–7.39 (m, 2H, $H_{Ph}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 32.8 ($C_2$), 33.8 ($CH_2Ph$), 38.5 ($C_{3'}$), 43.1 ($C_{4'}$), 51.9 ($C_{OMe}$), 72.0 ($C_{5'}$), 72.8 ($C_{2'}$), 126.3 ($CH_{Ph}$), 128.7 (2 $CH_{Ph}$), 128.8 (2 $CH_{Ph}$), 140.3 ($C_{qPh}$), 173.2 ($C_1$).

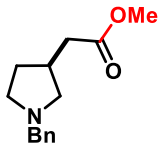
Minor isomer:

$^1$H NMR (300 MHz, $CDCl_3$) δ 2.33–2.91 (m, 6H), 3.48–3.63 (m, 2H), 3.70 (s, 3H), 3.91 (dd, *J* = 8.8, 7.1, 1H), 4.16 (dd, *J* = 8.8, 7.1, 1H), 7.19–7.30 (m, 3H), 7.31–7.39 (m, 2H).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 37.7 (1 C), 39.1 (1 C), 41.5 (1 C), 46.7 (1 C), 51.7 (COMe), 73.1 and 73.5 ($C_{5'}$/$C_{2'}$), 126.4 ($CH_{Ph}$), 128.7 (2 $CH_{Ph}$), 128.8 (2 $CH_{Ph}$), 140.2 ($C_{qPh}$), 172.8 ($C_1$).

MS (HRMS/ESI): $[M+H]^+$: calcd. for $C_{14}H_{19}O_3$: 235.1329 found 235.1328. $[M+Na]^+$: calcd. for $C_{14}H_{18}O_3Na$: 257.1148, found 257.1148.

## Methyl 2-(1-benzylpyrrolidin-3-yl)acetate 8b [95274-12-7]



**8b**

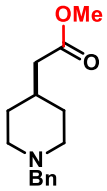
2-(1-Benzylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethenone **5a** (39 mg, 0.11 mmol, 1.0 eq.) was subjected to procedure **E** affording compound the title compound **8b** as a colorless oil (21 mg, 81%).

$^1$H NMR (400 MHz, $CDCl_3$) δ 1.50–1.59 (m, 1H, $H_{4'}$), 2.06–2.22 (m, 1H, $H_{4'}$), 2.39 (dd, *J* = 9.6, 6.7, 1H, $H_{2'}$), 2.41-2.47 (m, 2H, $H_2$), 2.58–2.69 (m, 1H, $H_{3'}$), 2.72 (t, *J* = 7.1, 2H, $H_{5'}$), 2.94 (dd, *J* = 9.6, 7.7, 1H, $H_{2'}$), 3.64 (s, 3H, OMe), 3.73 (s, 2H, $CH_2$Ph), 7.23–7.40 (m, 5H, $H_{Ph}$).

$^{13}$C NMR (101 MHz, $CDCl_3$) δ 30.3 ($C_{4'}$), 33.7 ($C_{3'}$), 39.3 ($C_2$), 51.7 ($C_{Me}$), 53.6 ($C_{5'}$), 59.3 ($C_{2'}$), 60.1 ($CH_2$Ph), 127.7 ($C_{Ph}$), 128.6 (2 $C_{Ph}$), 129.3 (2 $C_{Ph}$), 137.0 ($C_{qPh}$), 173.1 ($C_1$).

MS (HRMS/ESI): $[M+H]^+$: calcd. for $C_{14}H_{20}NO_2$: 234.1489, found 234.1487. $[M+H]^+$: calcd. for $C_{14}H_{19}NO_2Na$: 256.1308, found 256.1309.

### Methyl 2-(1-Benzylpiperidin-4-yl)acetate 8c




**8c**

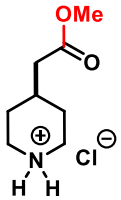
1-Benzylpiperidin-4-ol (57 mg, 0.30 mmol, 1.0 eq.) was subjected to procedure **F** affording compound **8c** as a brown to yellow oil (66 mg, 89% overall yield).

$^{1}$H NMR (300 MHz, $CDCl_3$) δ 1.21–1.41 (m, 2H, 2 $H_{3'}$), 1.61–1.86 (m, 3H, $H_{4'}$, 2 $H_{3'}$), 1.98 (td, *J* = 11.7, 2.5, 2H, 2 $H_{2'}$), 2.23 (d, *J* = 7.0, 2H, $H_2$), 2.81–2.91 (m, 2H, 2 $H_{2'}$), 3.48 (s, 2H, $CH_2Ph$), 3.66 (s, 3H, $OCH_3$), 7.17–7.40 (m, 5H, 5 $H_{Ph}$).

$^{13}$C NMR (75 MHz, $CDCl_3$) δ 32.2 (2 $C_{3'}$), 33.0 ($C_{4'}$), 41.1 ($C_2$), 51.5 ($OCH_3$), 53.6 (2 $C_{2'}$), 63.5 ($CH_2Ph$), 127.1 ($C_{HPh}$), 128.3 (2 $C_{HPh}$), 129.3 (2 $C_{HPh}$), 138.6 ($C_{qPh}$), 173.4 ($C_1$).

MS (ESI/HRMS) $[M + H]^+$: calcd. for $C_{15}H_{22}NO_2$: 248.1645, found, 248.1646.

### 4-(2-Methoxy-2-oxoethyl)piperidinium chloride 8d [81270-37-3]




**8d**

Piperidin-4-ol (30 mg, 0.30 mmol, 1.0 eq.) was subjected to procedure **F** affording compound **8d** as a yellow salt (44 mg, 76% overall yield).

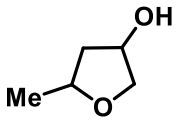
$^{1}$H NMR (400 MHz, MeOD-$d_4$) δ 1.49 (m, 2H, 2 $H_3$), 1.93 (m, 2H, 2 $H_3$), 2.01–2.13 (m, 1H, $H_4$), 2.33 (d, *J* = 6.8, 2H, $CH_2$), 2.98 (m, 1H, 2 $H_2$), 3.33–3.39 (m, 2H, 2 $H_2$), 3.64 (s, 3H, $OCH_3$).

$^{13}$C NMR (101 MHz, MeOD-$d_4$) δ 29.4 (2 $C_3$), 31.8 ($C_4$), 40.7 ($CH_2$), 45.0 (2 $C_2$), 52.1 ($CH_3$), 173.9 (CO).

MS (HRMS/ESI): $[M+H]^+$: calcd. for $C_8H_{16}NO_2$: 158.1176, found 158.1176.

## *$^{1}$H, $^{13}$C and $^{19}$F NMR spectra and Mass Analysis*

**5-Methyltetrahydrofuran-3-ol 2b** [29848-43-9]




**2b**

**dr 57:43**

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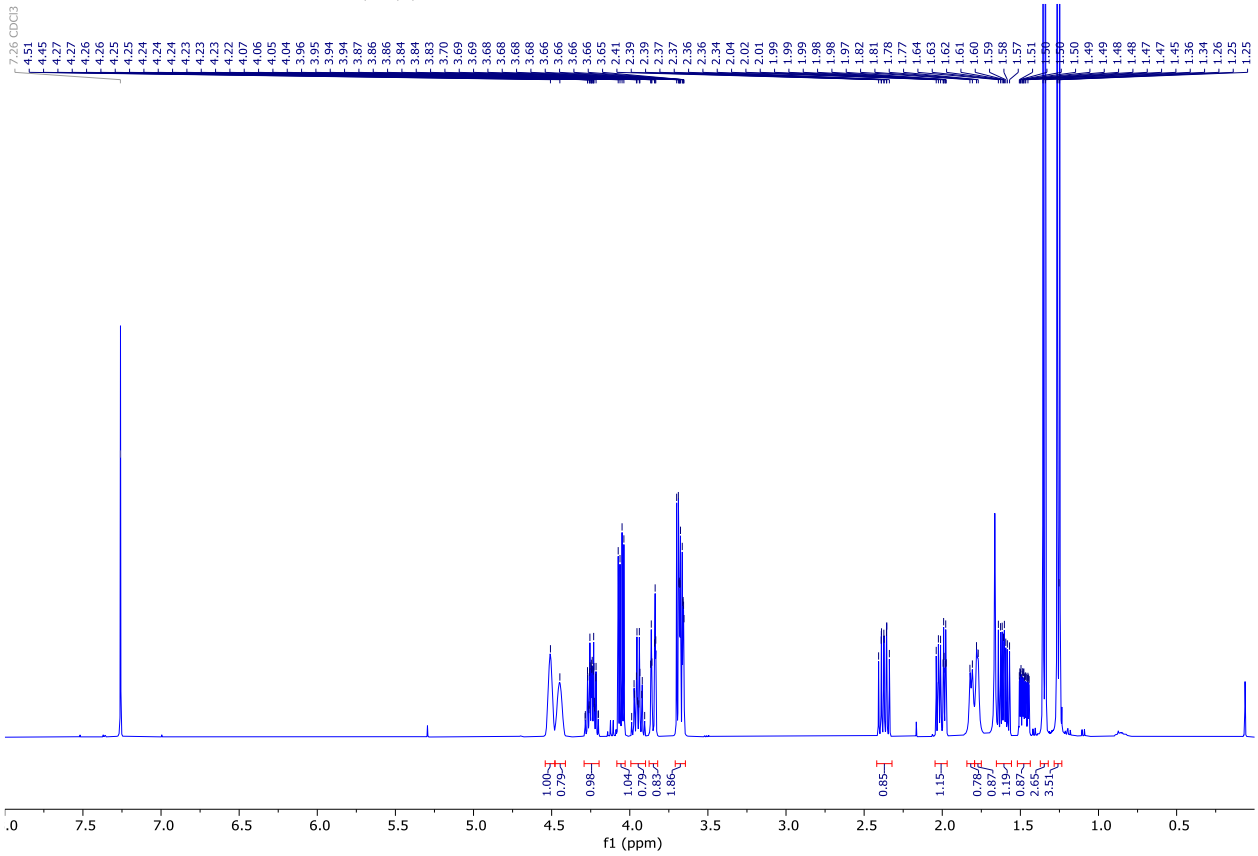


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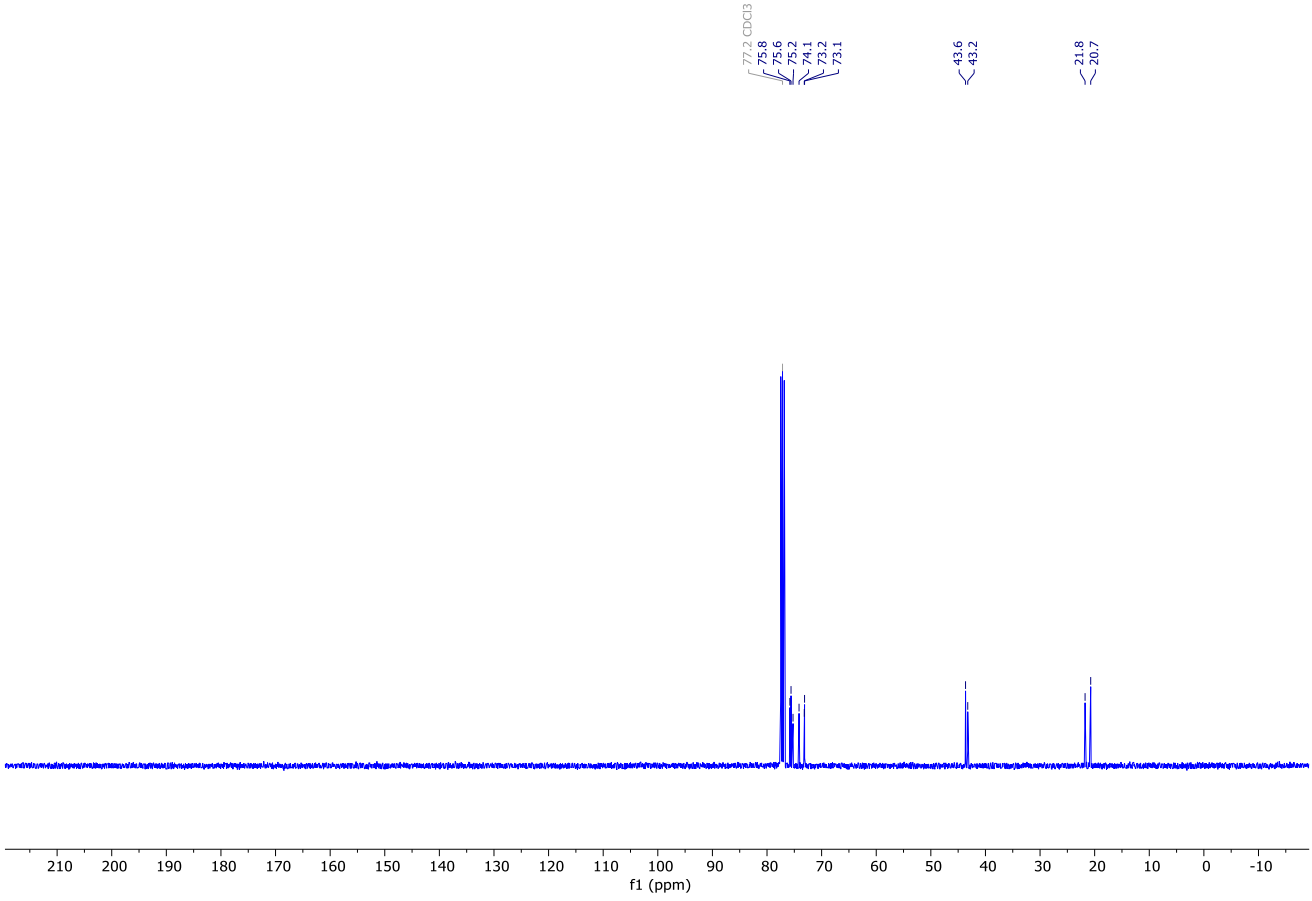

# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

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| Method | Tune_pos_Standard.m | Acquisition Date | 3/24/2021 2:03:32 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
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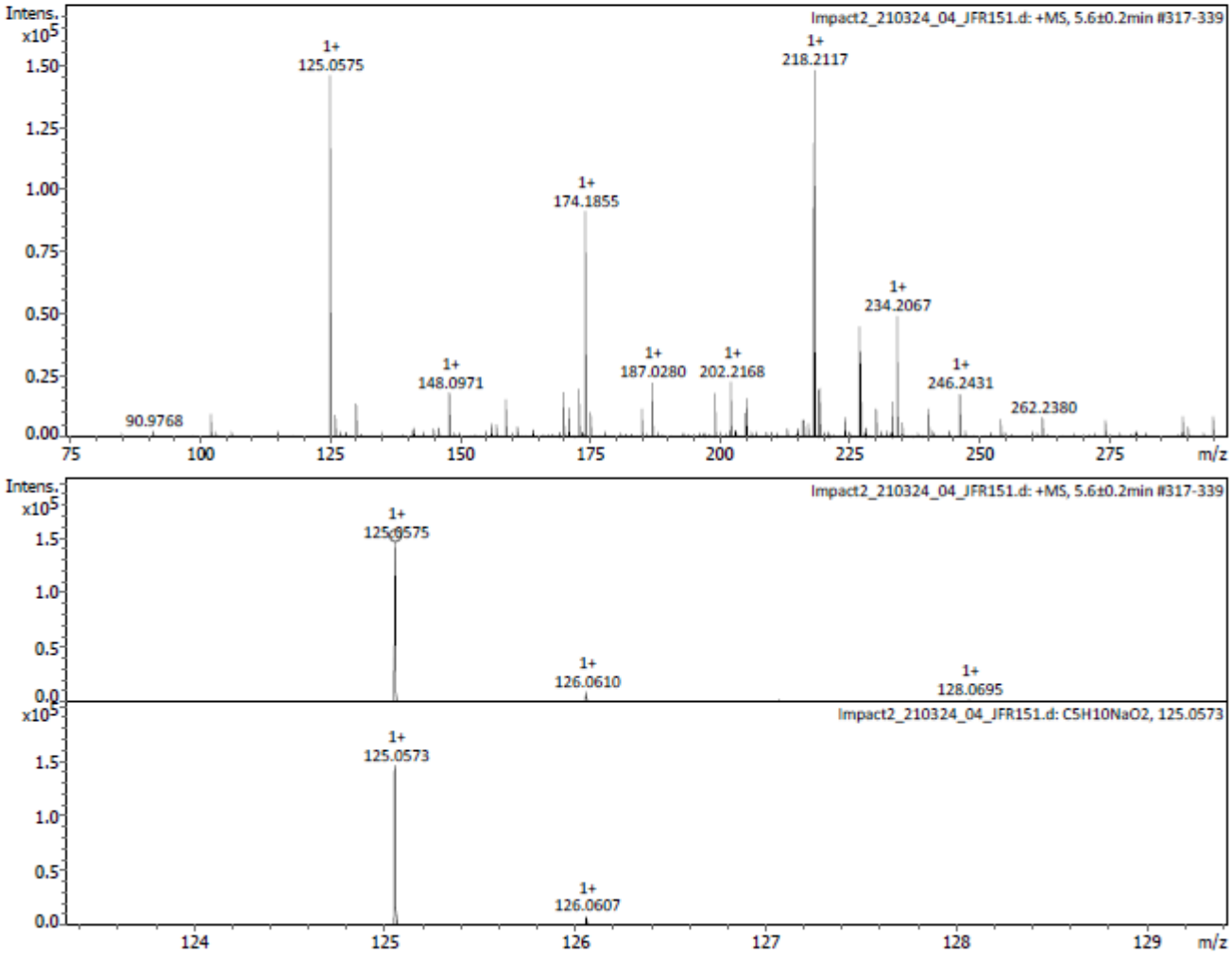
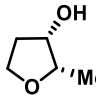
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 125.0575 | C5H10NaO2 | 125.0573 | C5H10O2 | -1.7 | 4.4 | M+Na | 1+ |

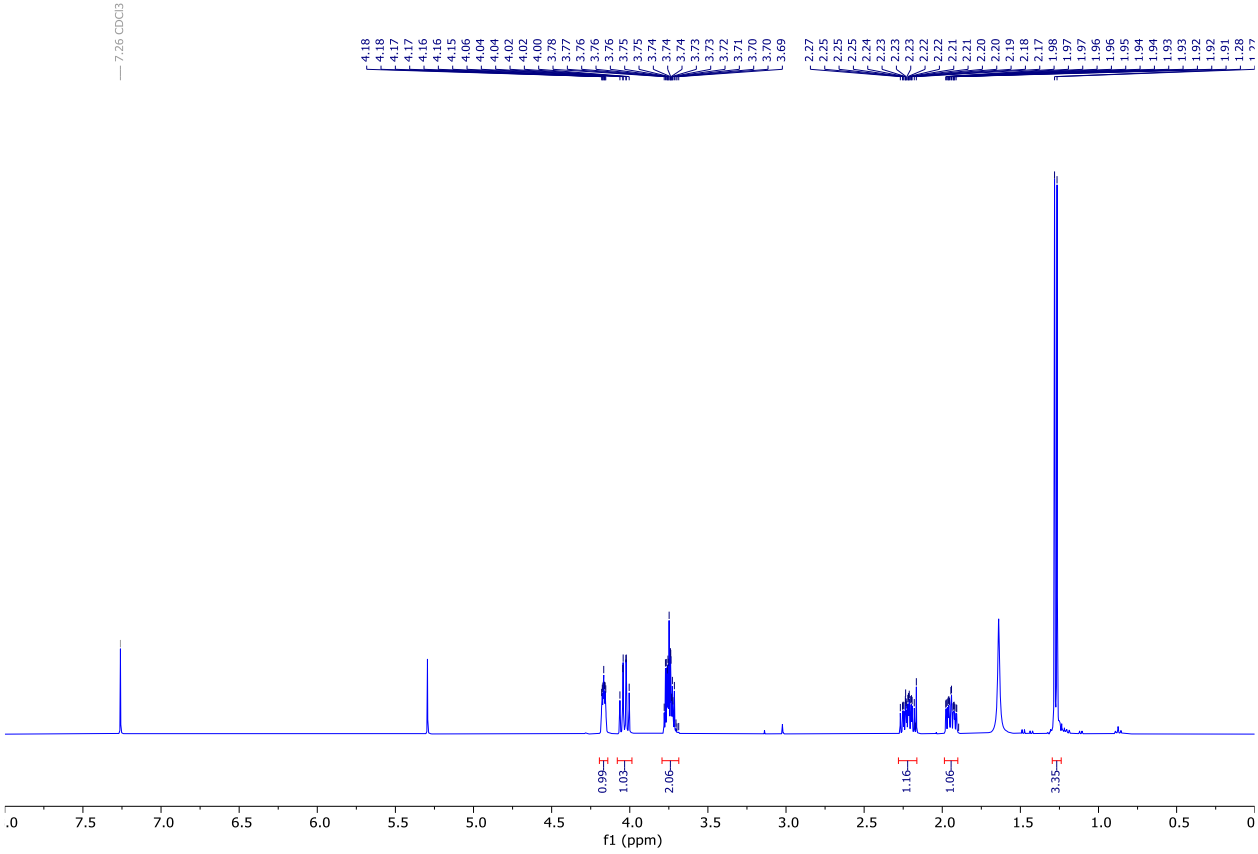
**2-Methyltetrahydrofuran-3-ol 2c** [1643965-13-2]



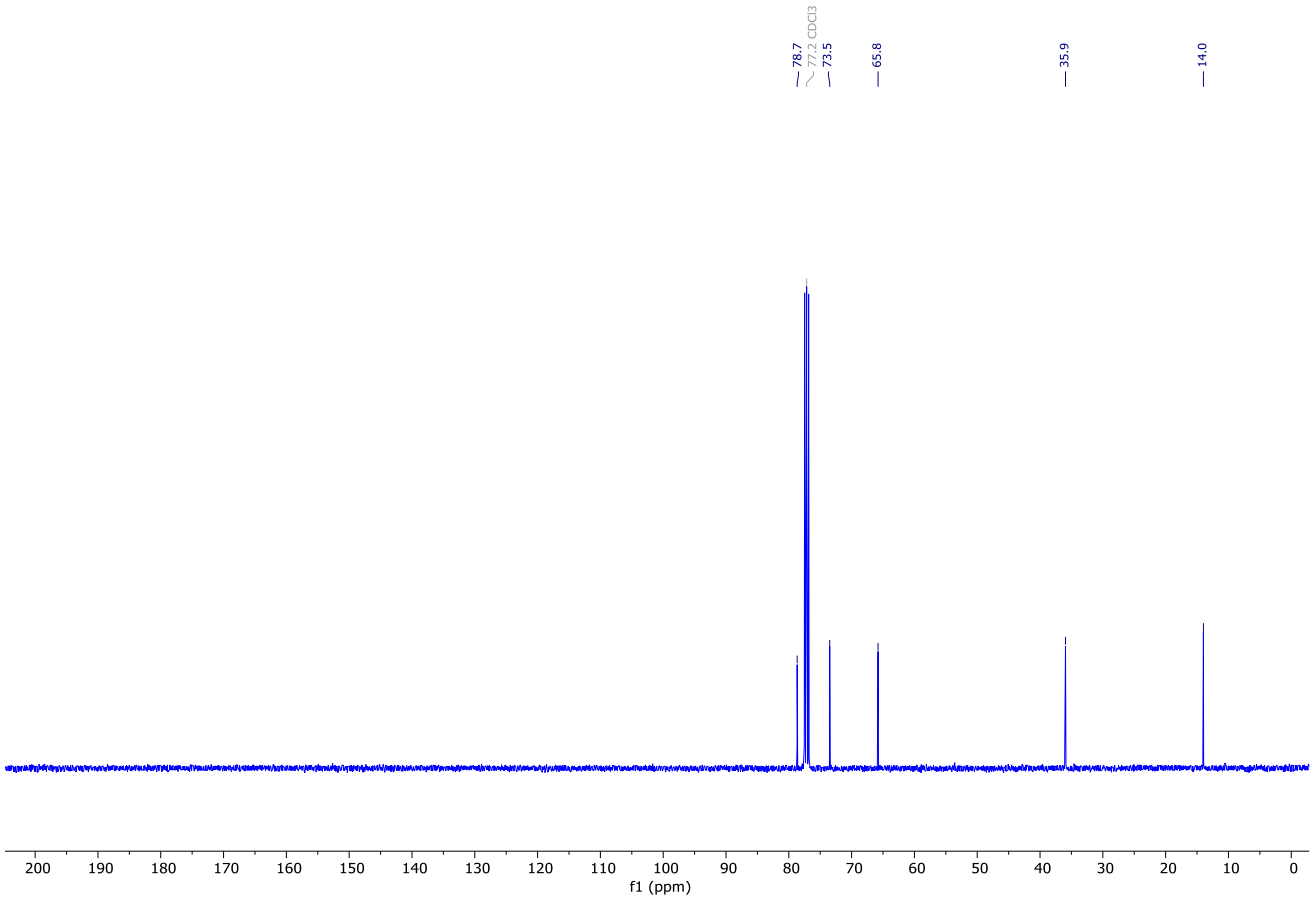

**2c**

**dr > 99:1**

JFR291-1F.100.fid — no_title




JFR291-1F.102.fid — no_title



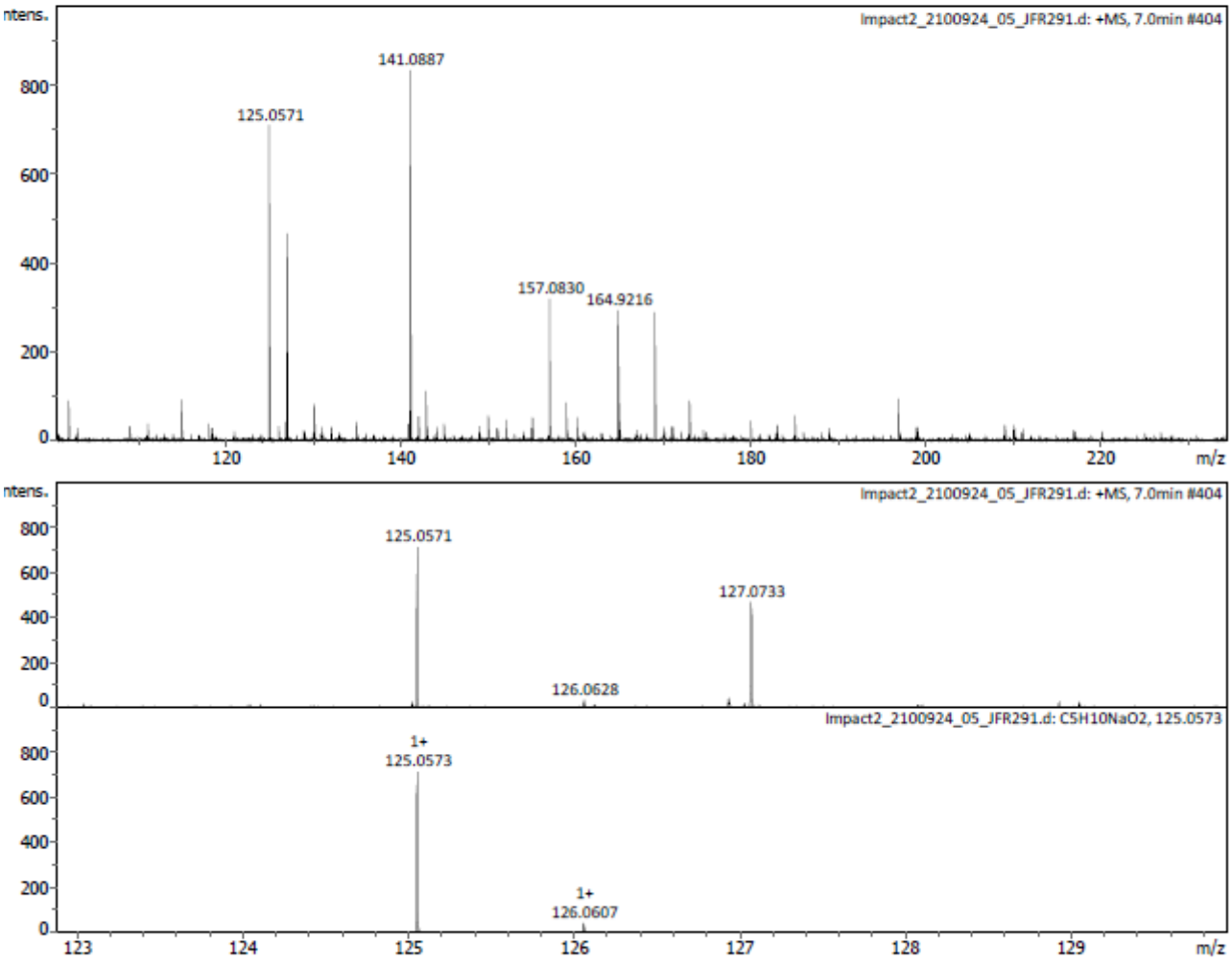
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_2100924_05_JFR291.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 9/24/2021 2:26:31 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

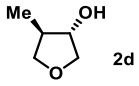
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



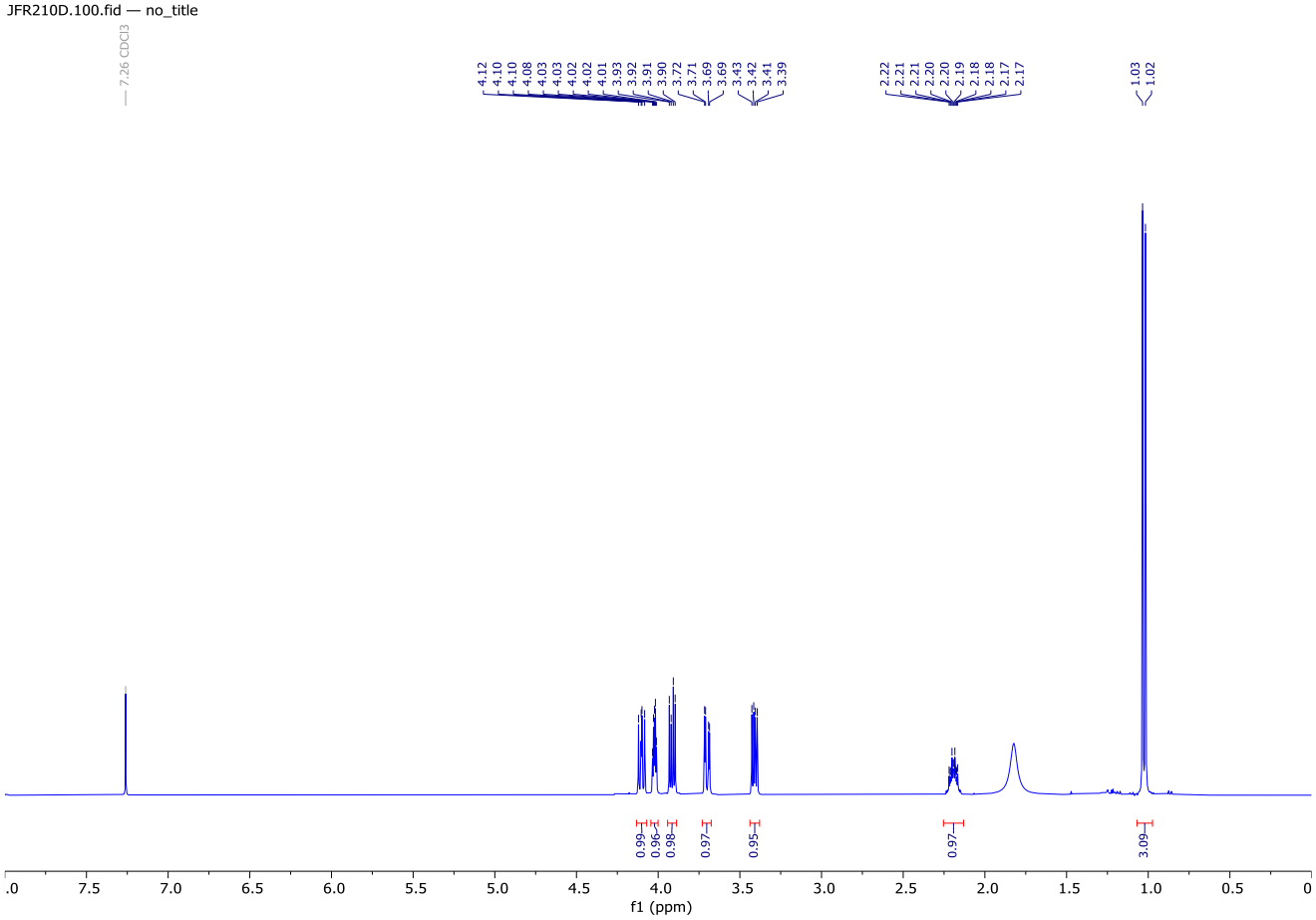

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 125.0571 | C5H10NaO2 | 125.0573 | C5H10O2 | 1.7 | 5.7 | M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-Methyltetrahydrofuran-3-ol 2d [387357-58-6]**

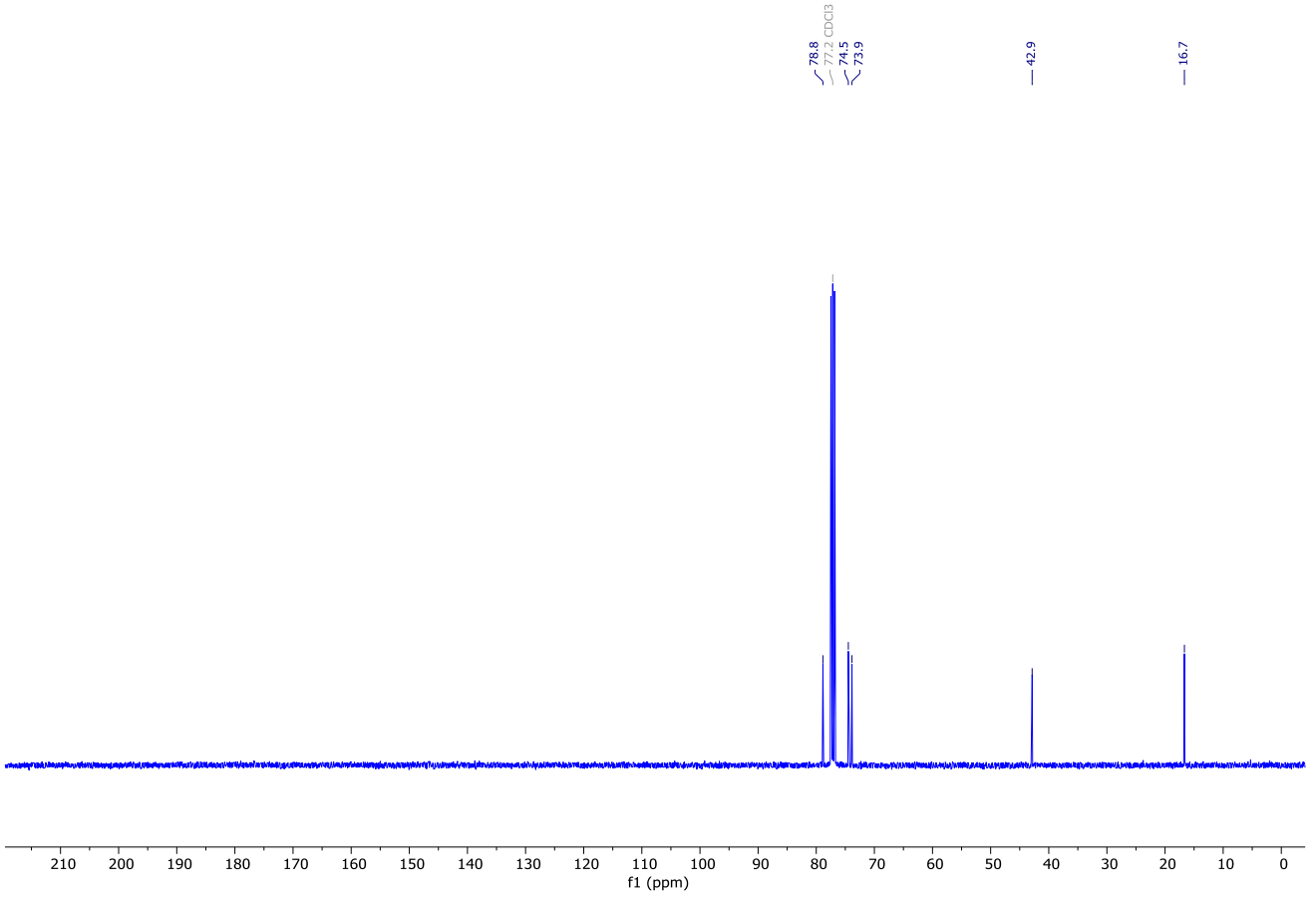



2d

JFR210D.100.fid — no_title




JFR210D.101.fid — no_title

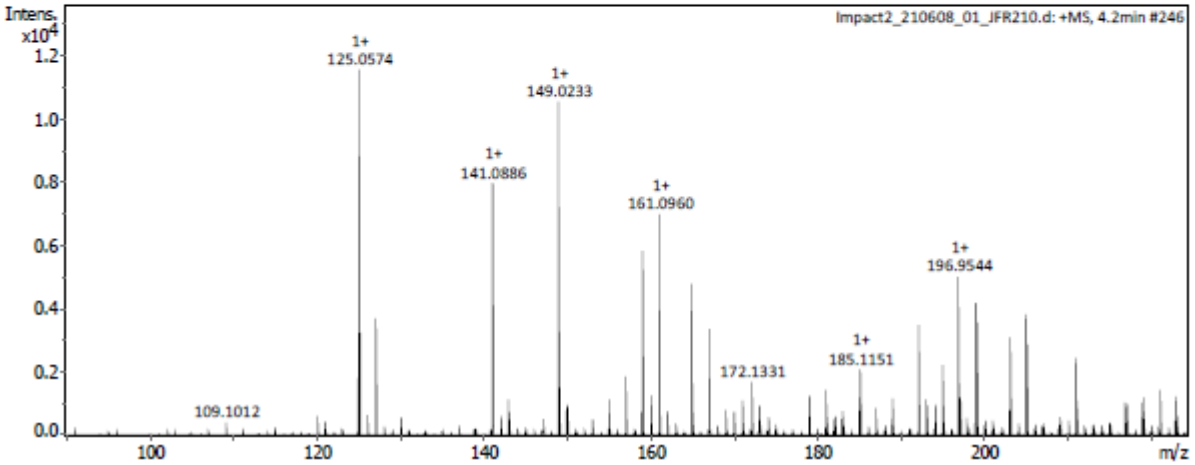


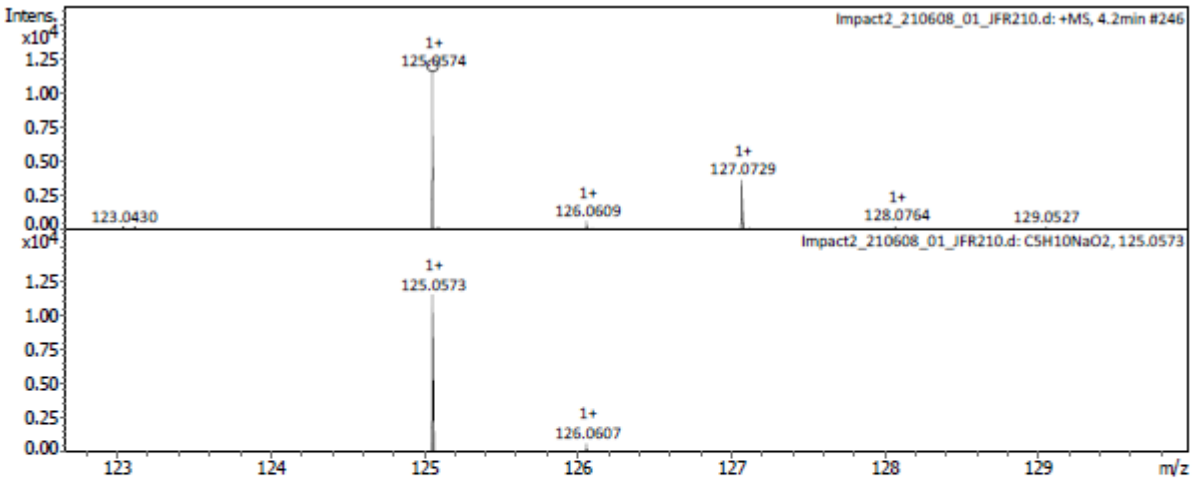
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210608_01_JFR210.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 6/8/2021 8:41:03 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

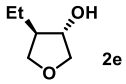
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 500 m/z | Set Collision Cell RF | 200.0 Vpp | Set Divert Valve | Source |



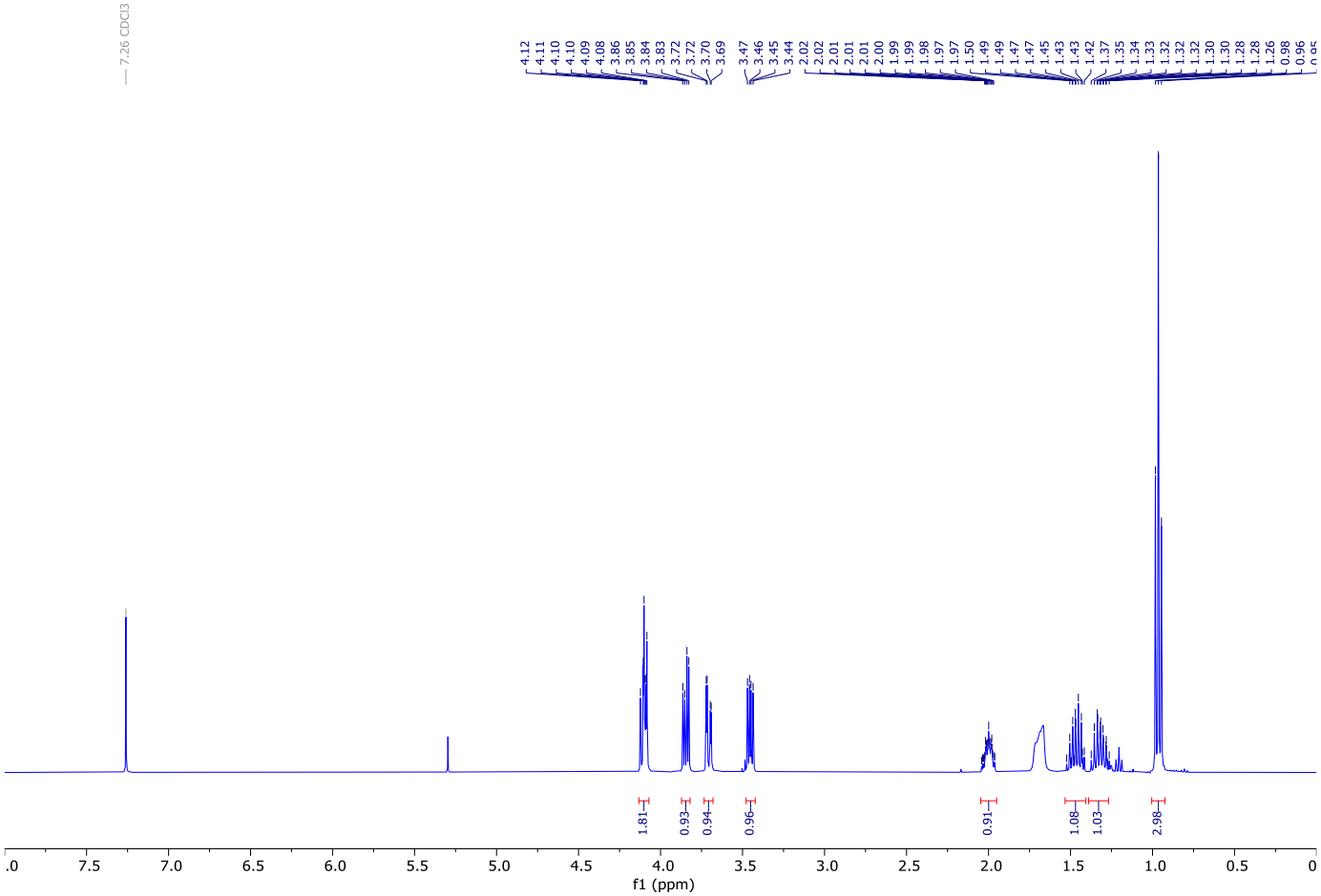

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 125.0574 | C5H10NaO2 | 125.0573 | C5H10O2 | -0.5 | 3.1 | M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-Ethyltetrahydrofuran-3-ol 2e [387357-51-9]**

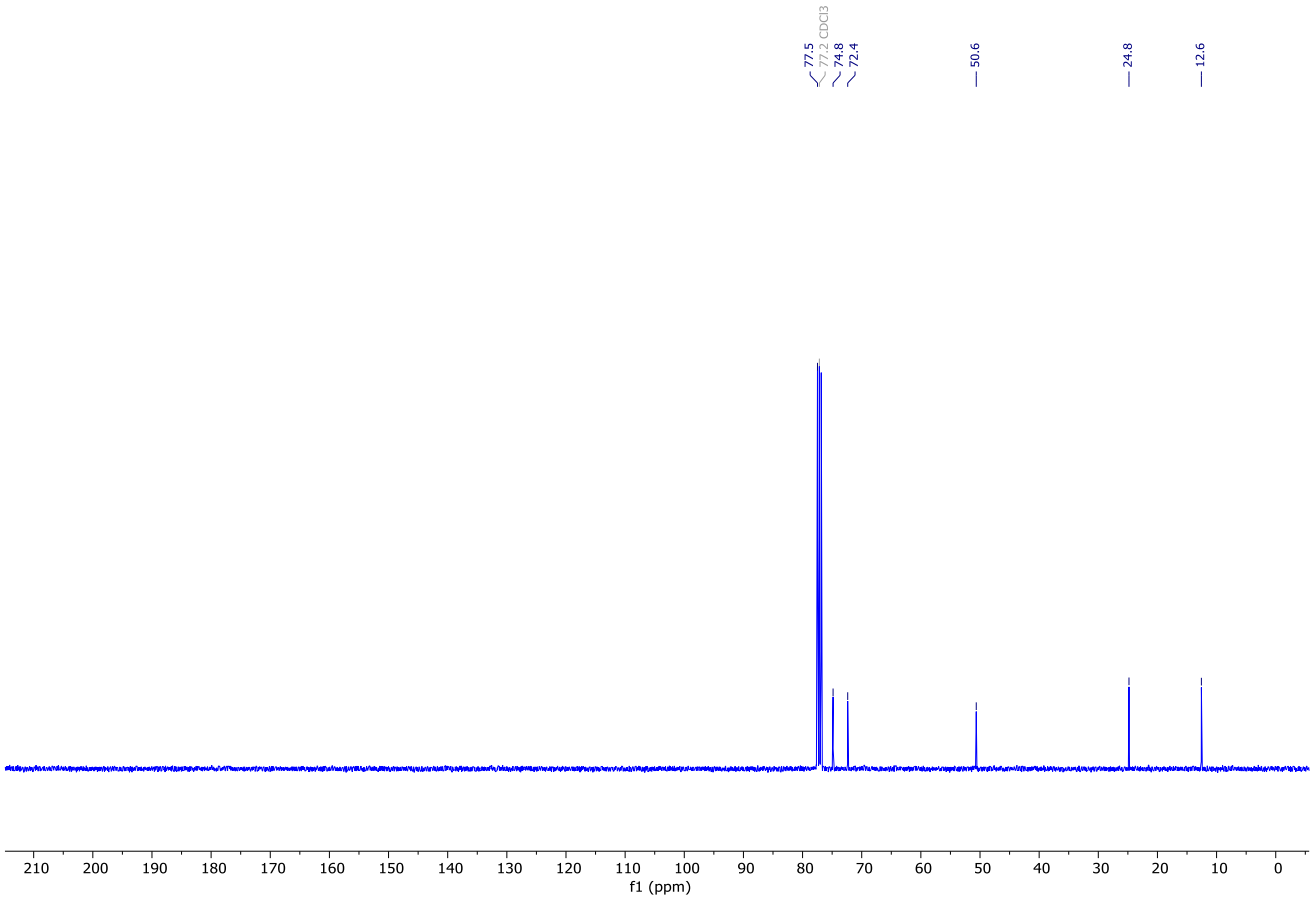



2e

JFR340F.100.fid — no_title




JFR340F.102.fid — no_title



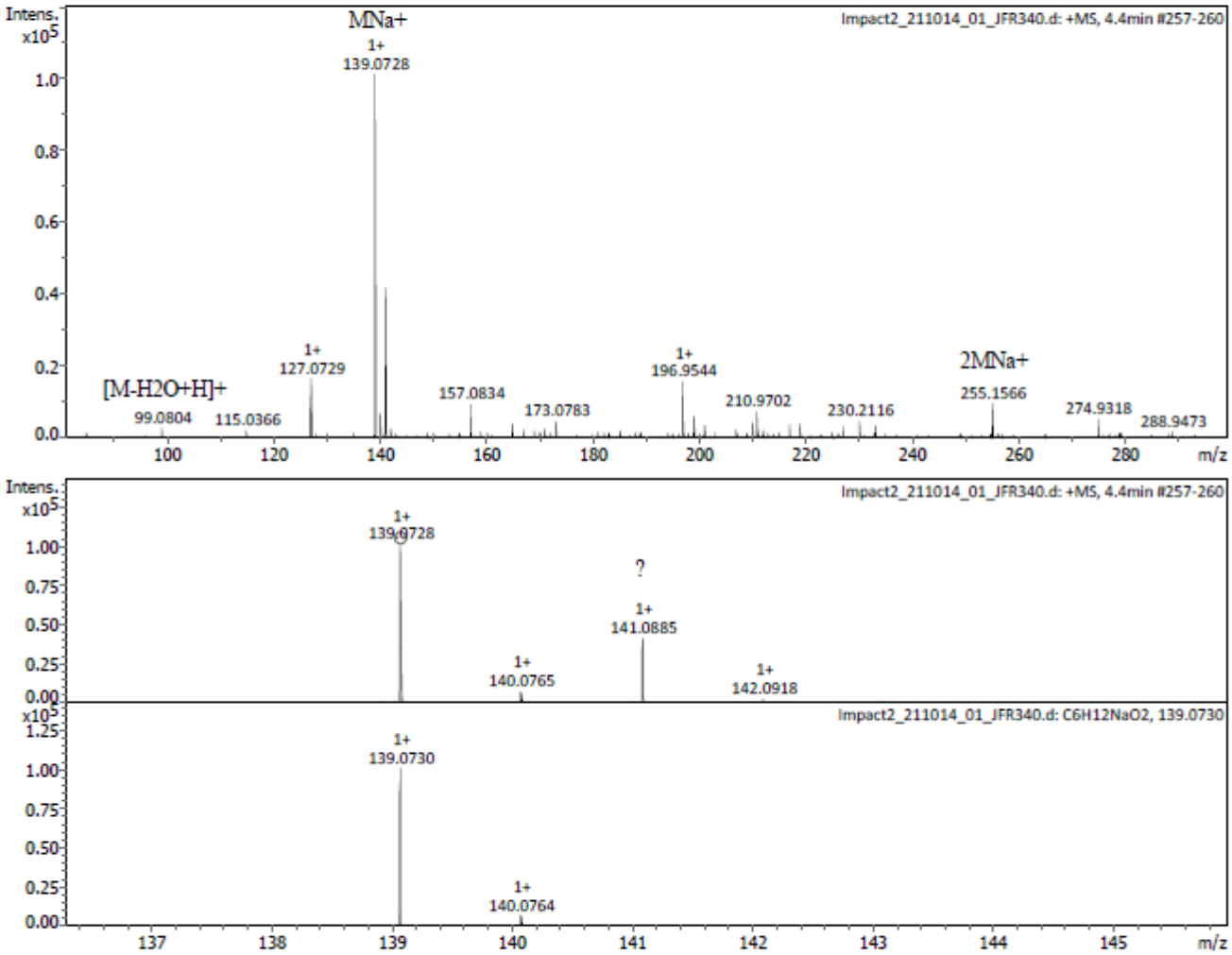
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211014_01_JFR340.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/14/2021 10:09:30 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

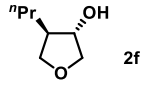
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 300.0 Vpp | Set Divert Valve | Source |



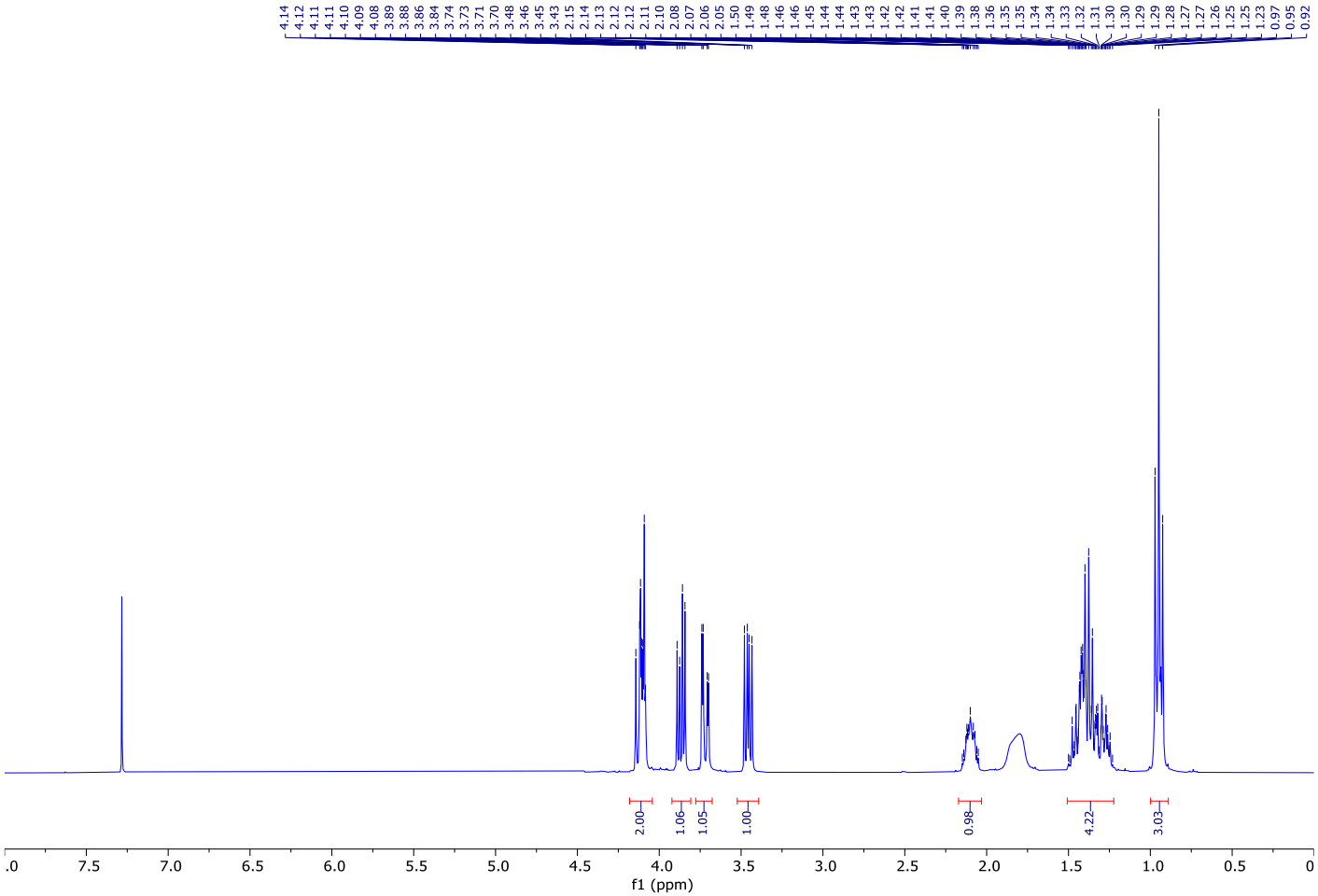

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 99.0804 | C6H11O | 99.0804 | C6H12O2 | 0.7 | 7.5 | M-H2O+H | 1+ |
| 139.0728 | C6H12NaO2 | 139.0730 | | 0.8 | 4.1 | M+Na | 1+ |
| 255.1566 | C12H24NaO4 | 255.1567 | | 0.2 | 26.2 | 2M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-Propyltetrahydrofuran-3-ol 2f [2956413-65-1] [1999335-59-9]**

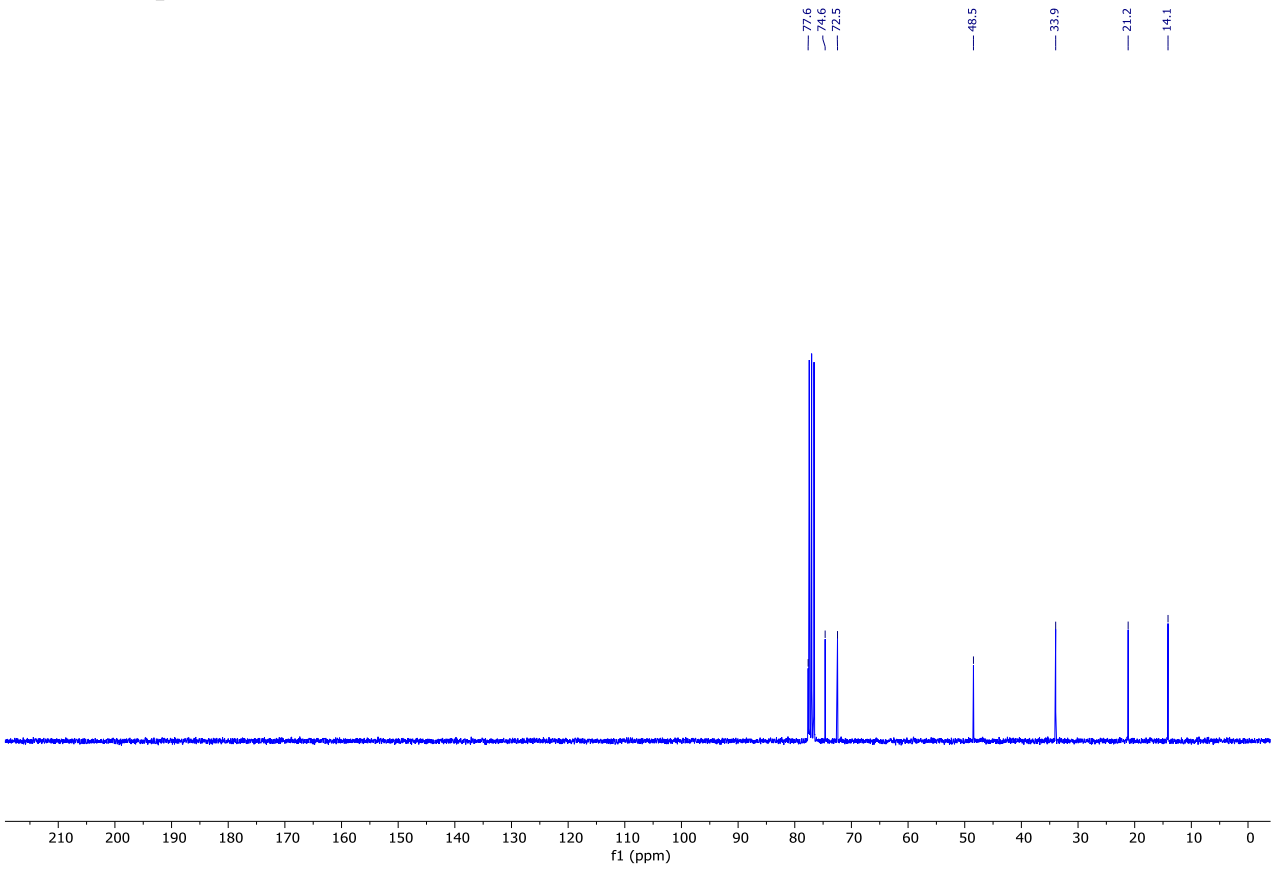



2f

JFR471F.100.fid — no_title




JFR471F.102.fid — no_title



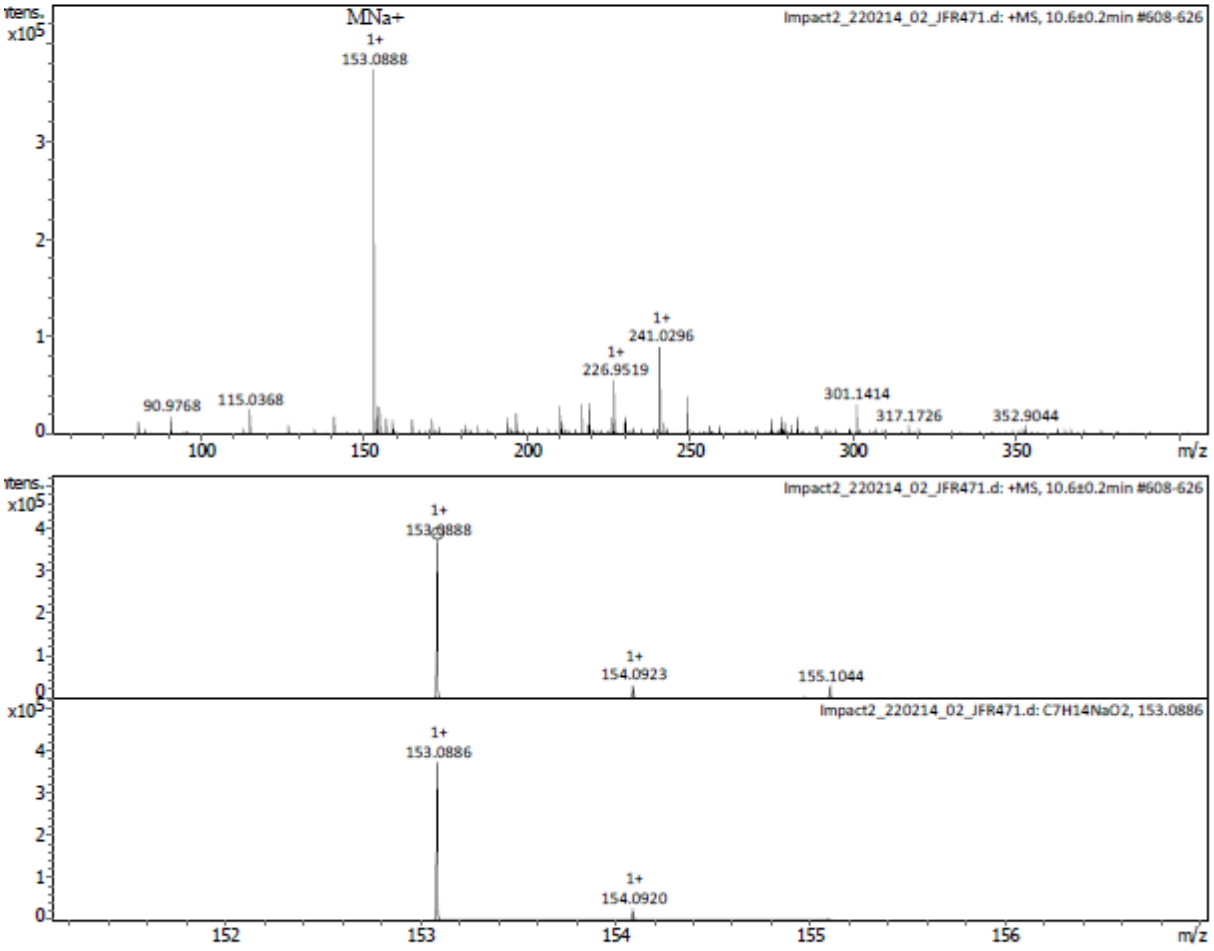
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220214_02_JFR471.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/14/2022 10:26:18 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

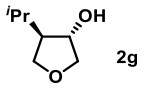
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 2500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



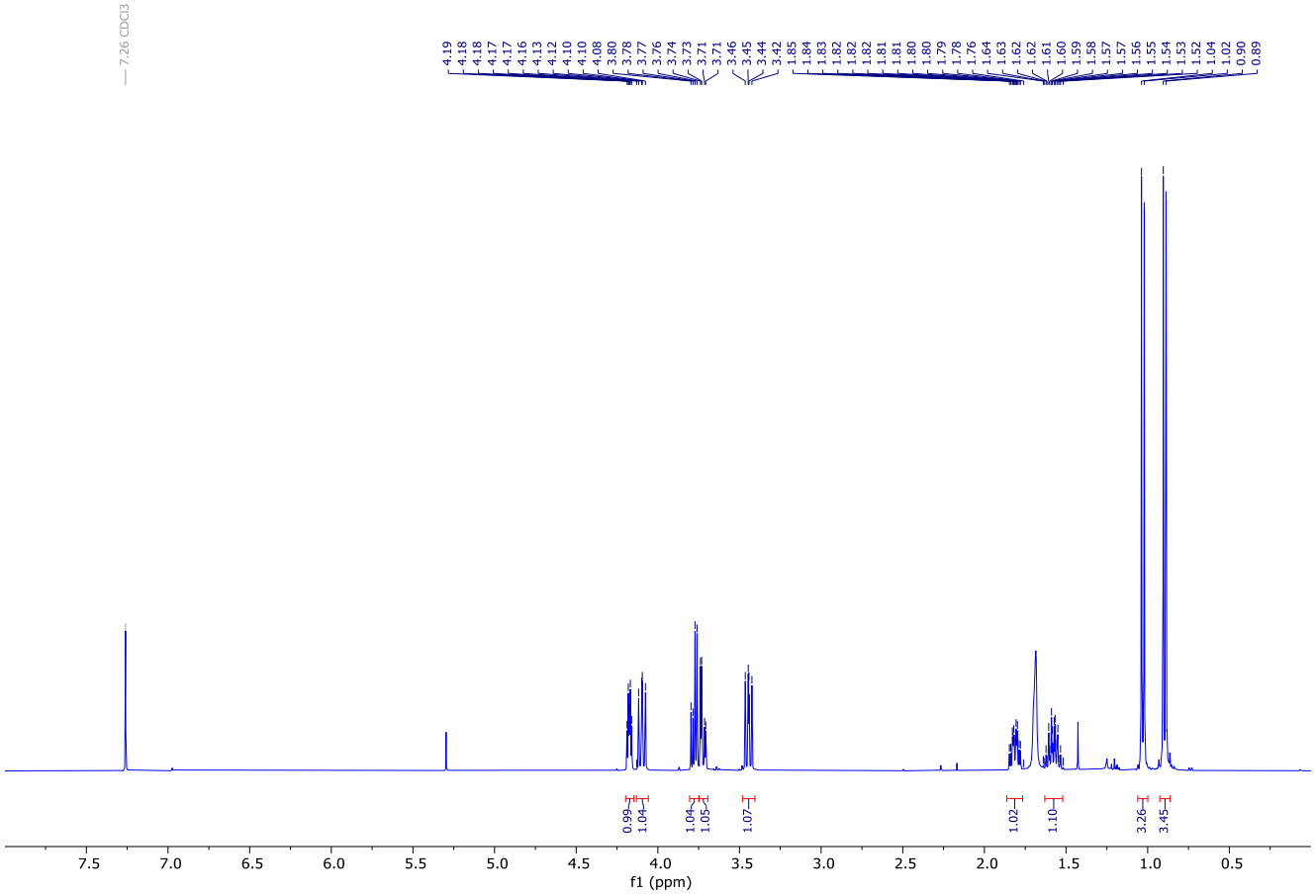

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 153.0888 | C7H14NaO2 | 153.0886 | C7H14O2 | -1.6 | 3.9 | M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-Isopropyltetrahydrofuran-3-ol 2g [321903-37-1]**

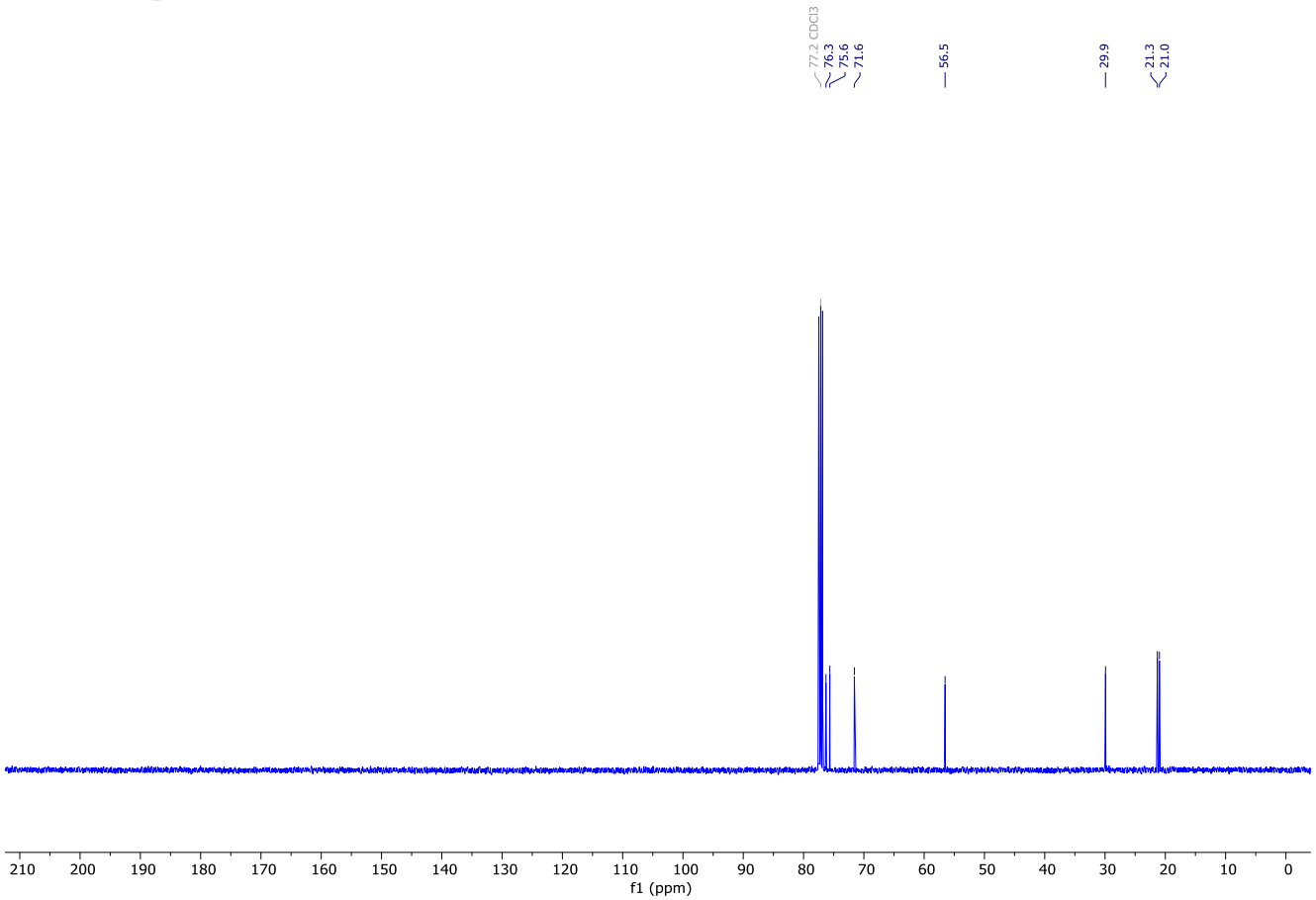



2g

JFR326.100.fid — no_title




JFR326.102.fid — no_title



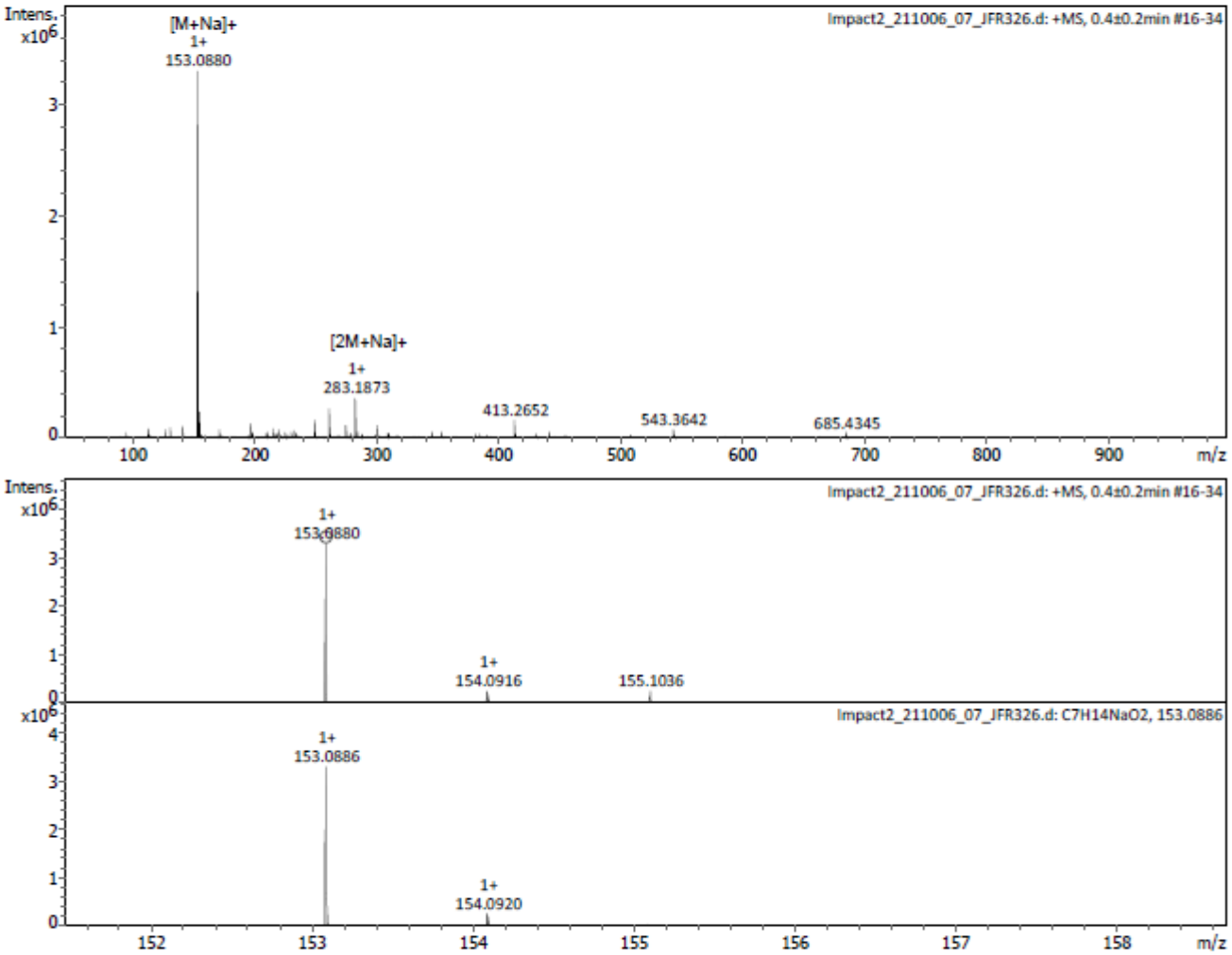
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211006_07_JFR326.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/6/2021 4:55:28 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

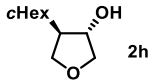
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



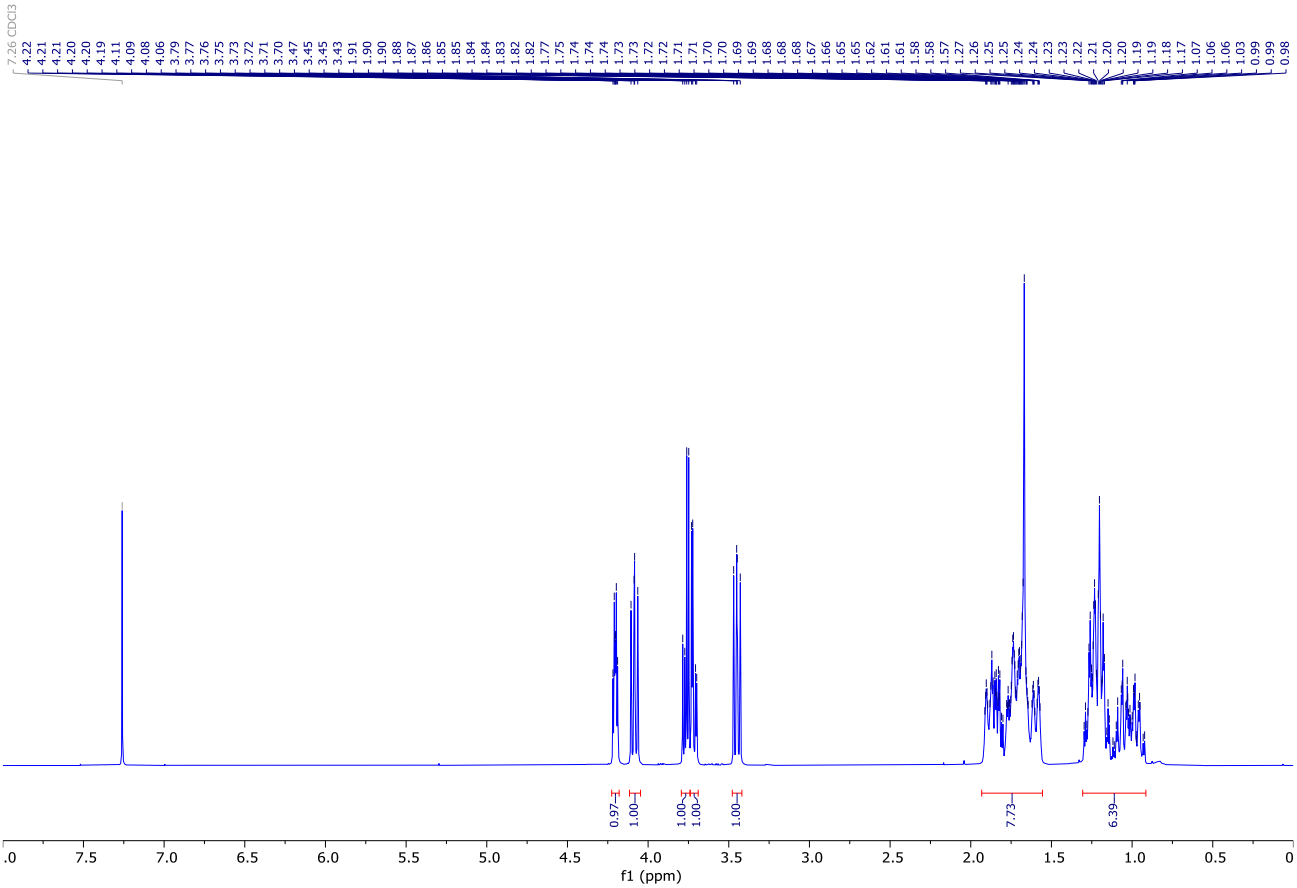

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 131.1063 | C7H15O2 | 131.1067 | C7H14O2 | 3.0 | 3.9 | M+H | 1+ |
| 153.0880 | C7H14NaO2 | 153.0886 | | 3.8 | 4.3 | M+Na | 1+ |
| 261.2054 | C14H29O4 | 261.2060 | | 2.3 | 0.8 | 2M+H | 1+ |

## (±)-(3*R*,4*S*)-4-Cyclohexyltetrahydrofuran-3-ol 2h [1996554-90-5]

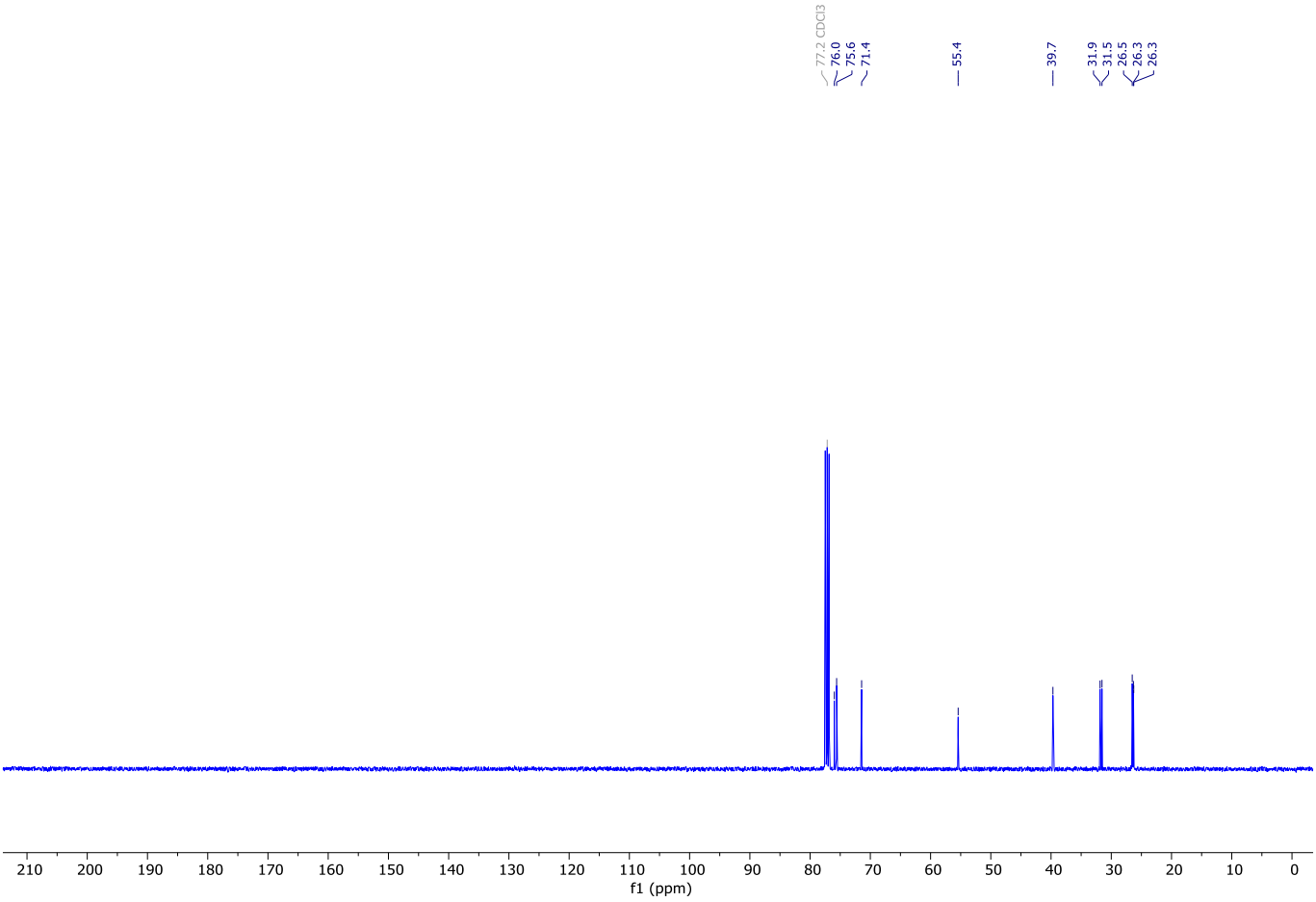



2h

JFR370F.100.fid — no_title




JFR370F.102.fid — no_title



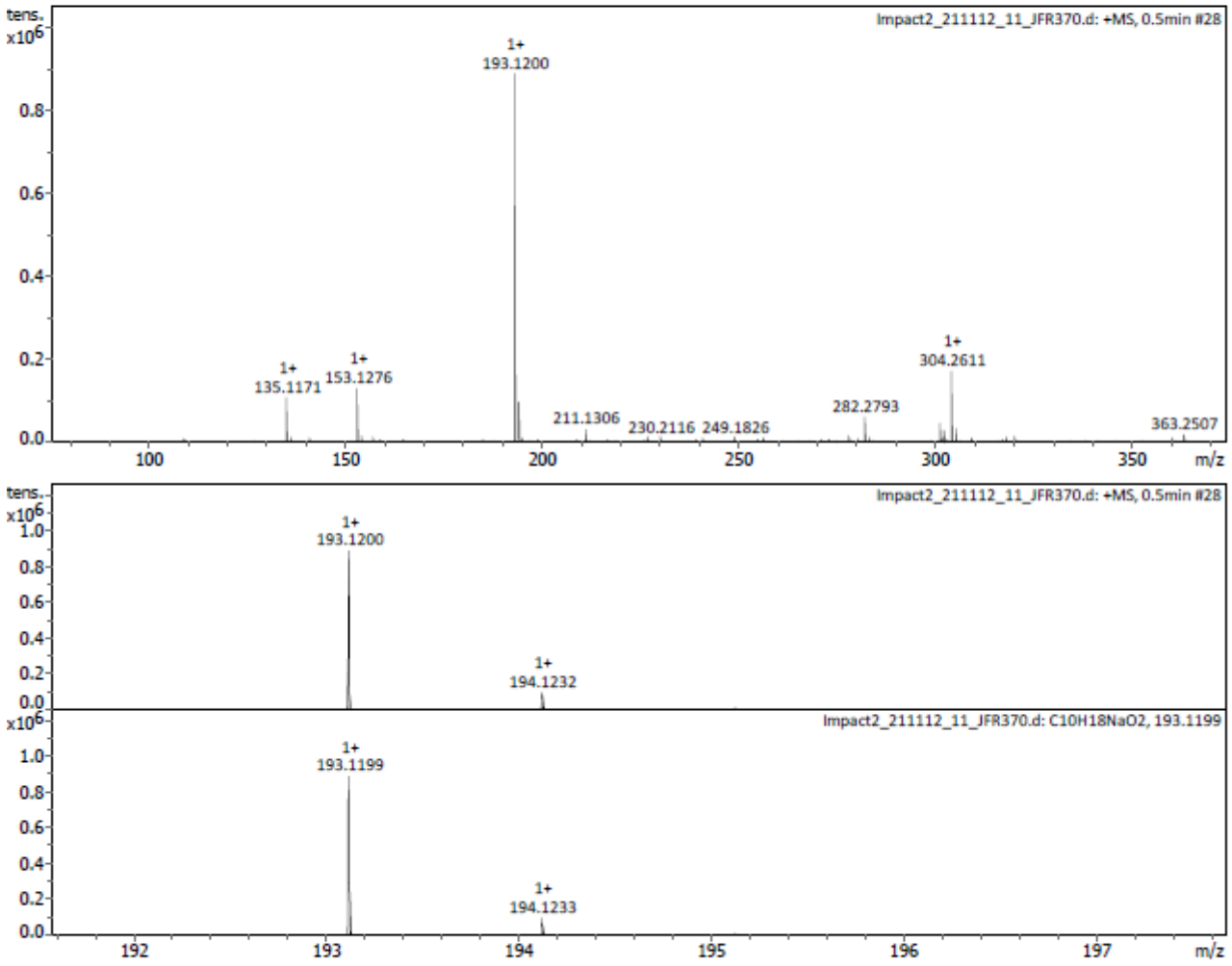
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211112_11_JFR370.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/12/2021 3:58:35 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

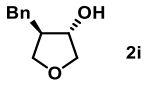
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



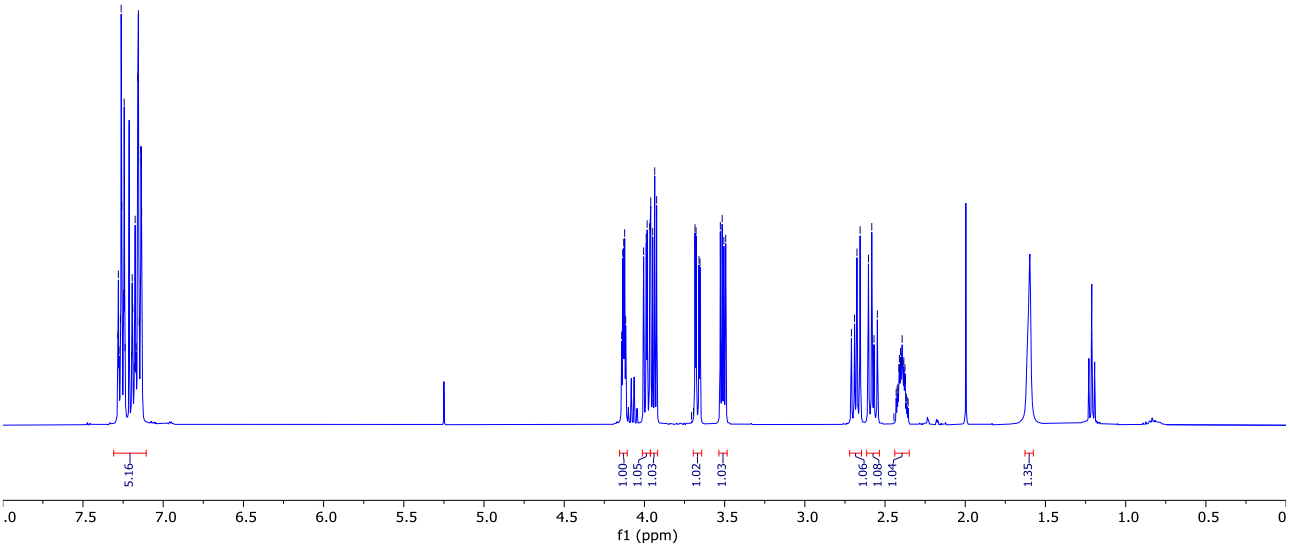

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 193.1200 | C10H18NaO2 | 193.1199 | C10H18O2 | -0.5 | 1.0 | M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-Benzyltetrahydrofuran-3-ol 2i [321903-36-0]**

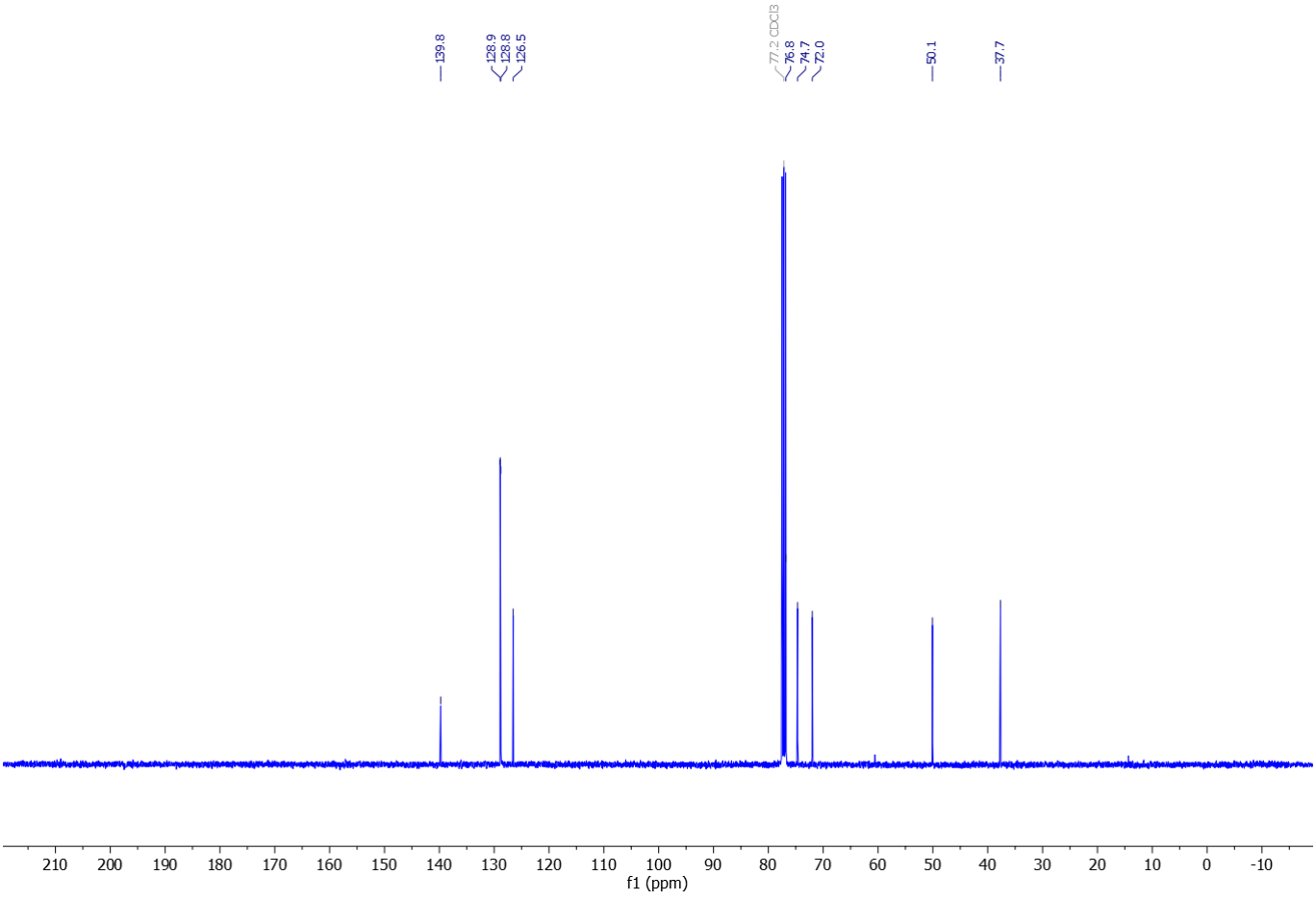



2i

JFR514-2F.100.fid — no_title


JFR514-2F.101.fid — no_title



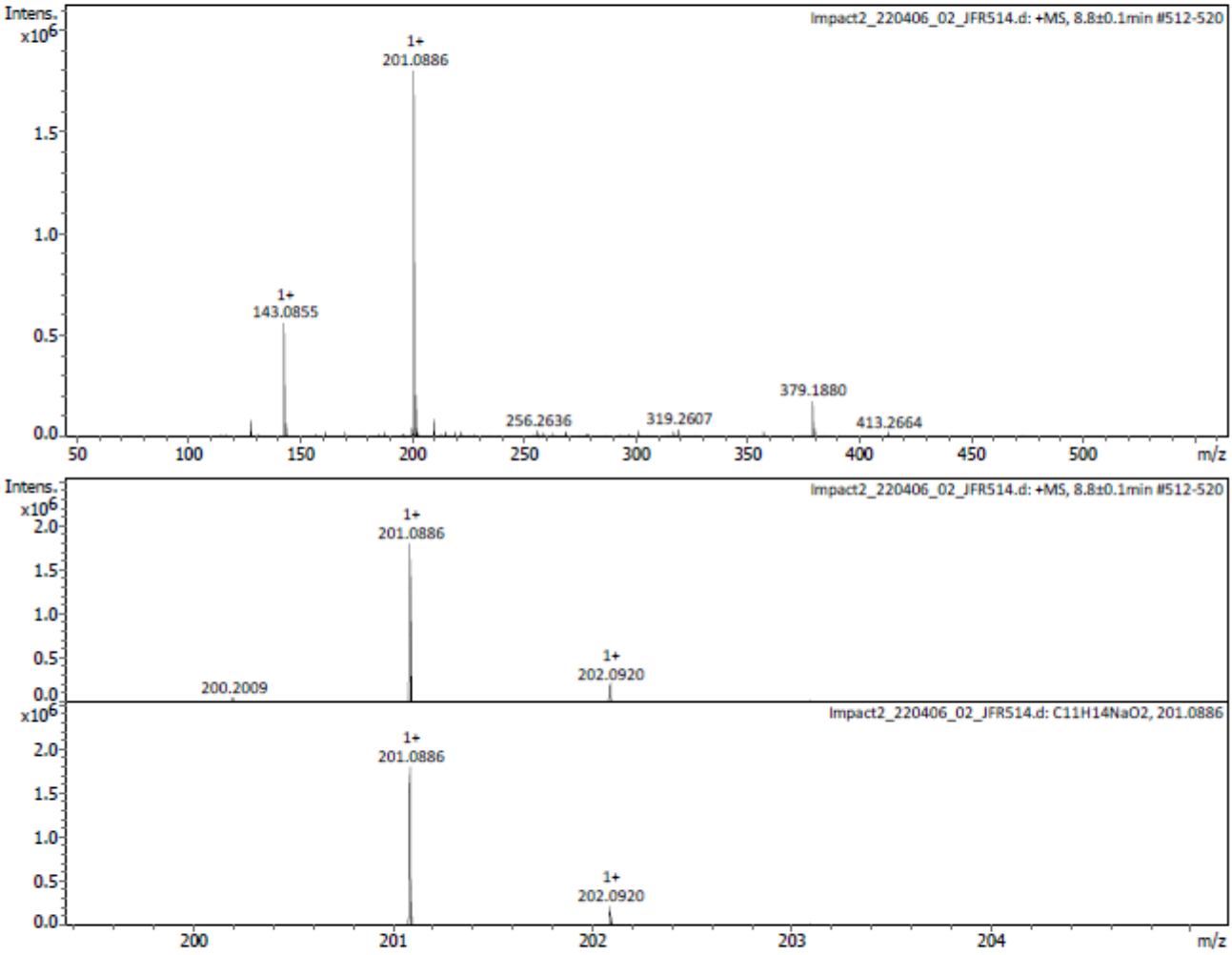
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220406_02_JFR514.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 4/6/2022 4:36:20 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10091 |

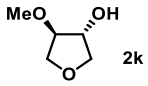
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



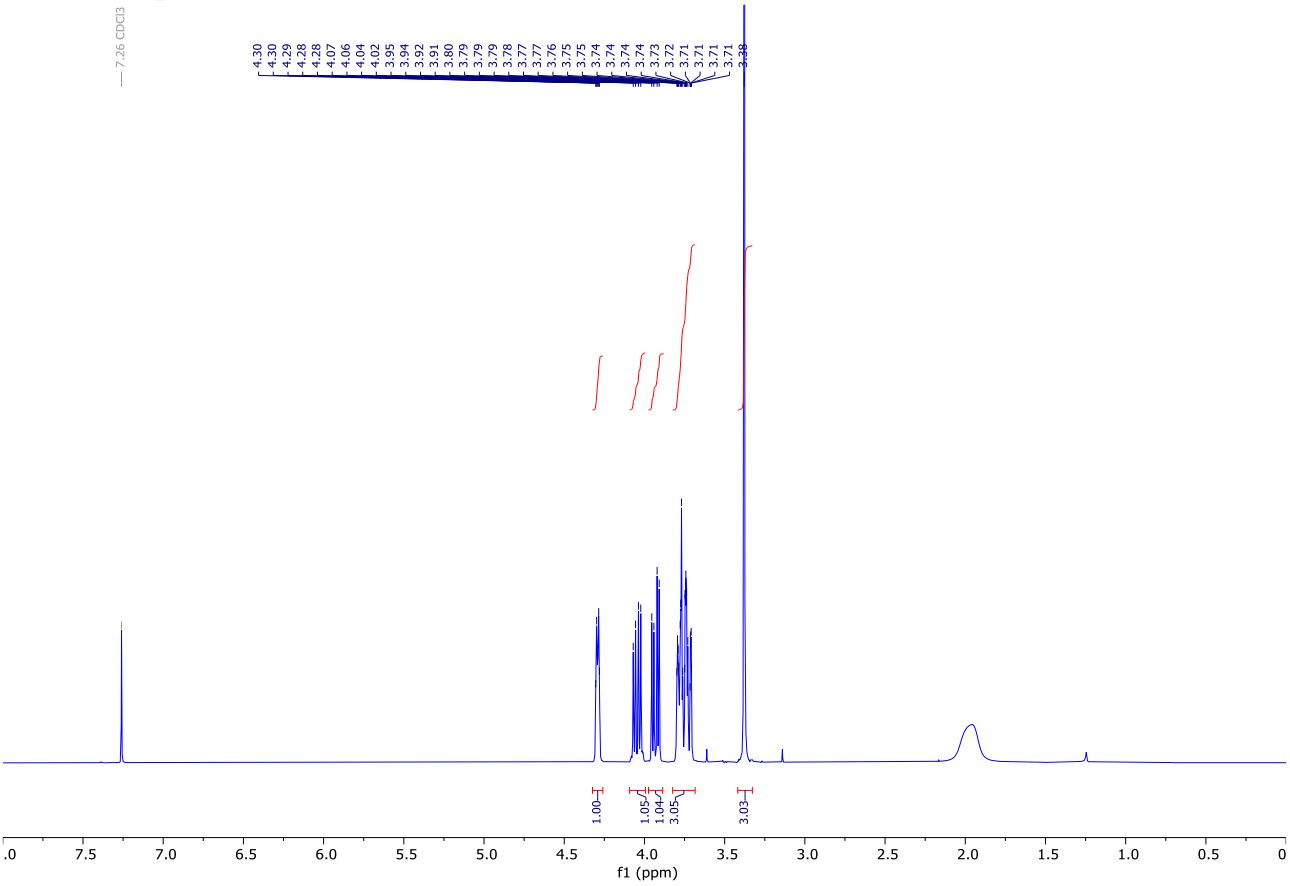

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 201.0886 | C11H14NaO2 | 201.0886 | C11H14O2 | 0.2 | 4.0 | M+Na | 1+ |
| 379.1880 | C22H28NaO4 | 379.1880 | | -0.1 | 6.0 | 2M+Na | 1+ |

## (±)-(3*S*,4*S*)-4-Methoxytetrahydrofuran-3-ol 2k [876026-49-2]

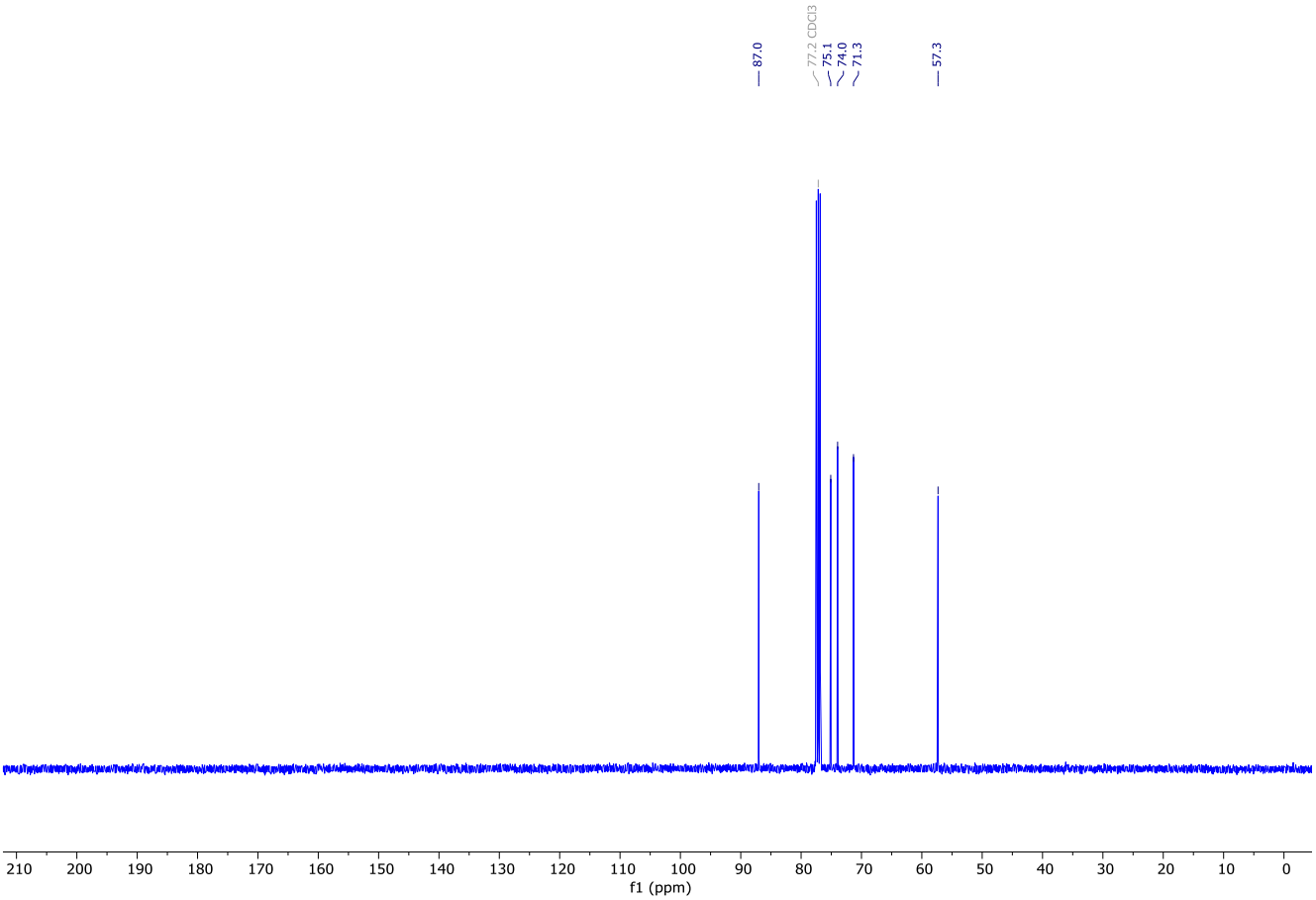



2k

JFR223F.100.fid — no_title




JFR223F.102.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 53



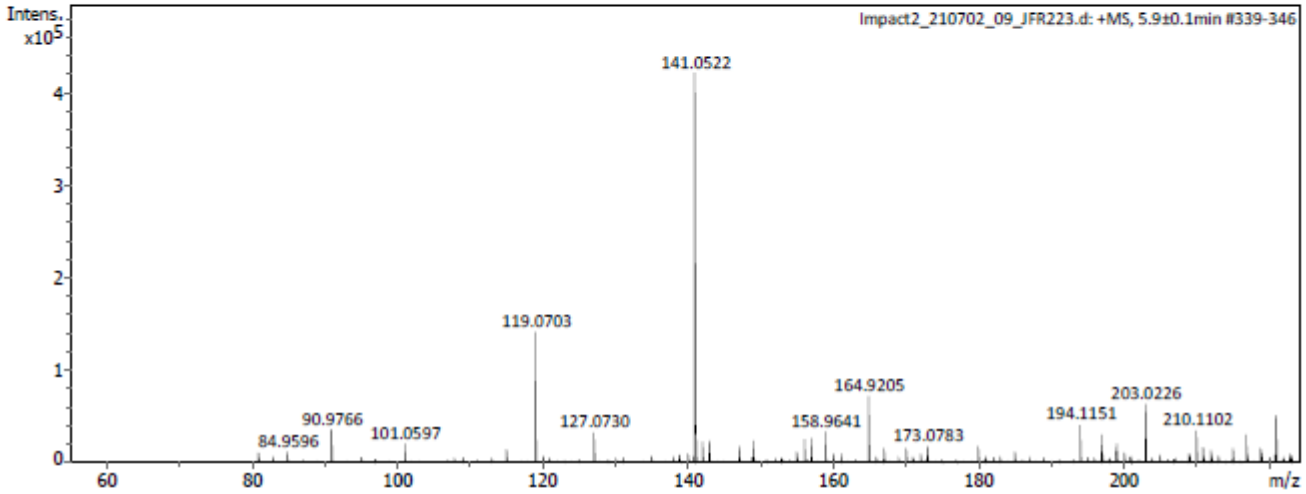
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

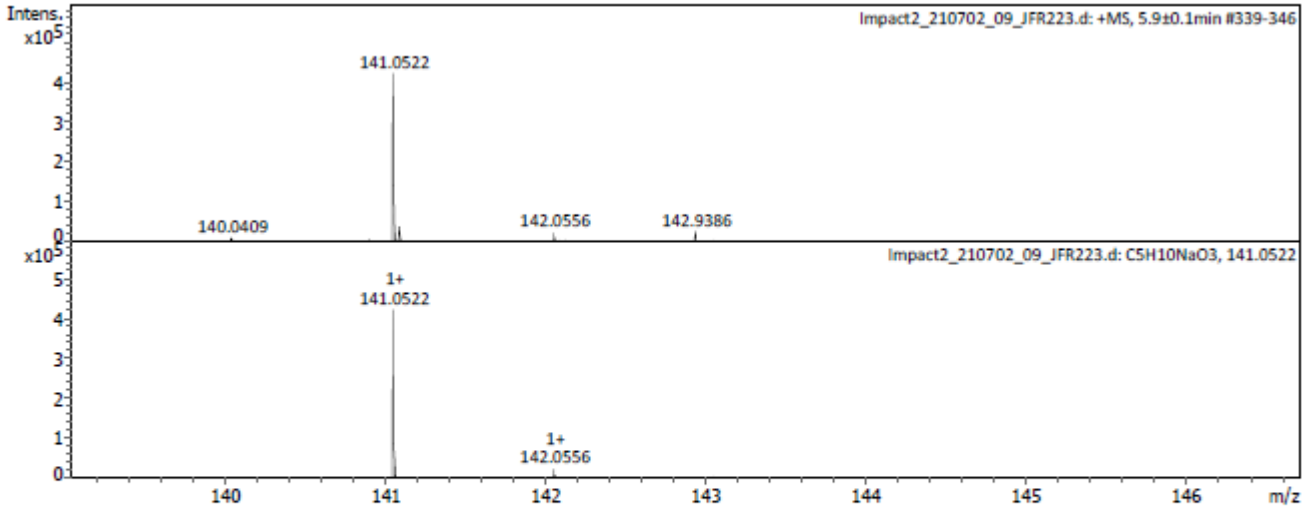
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210702_09_JFR223.d | | |
| Method | LHCEP_n5-.m | Acquisition Date | 7/2/2021 2:45:48 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

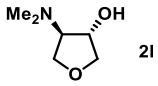
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



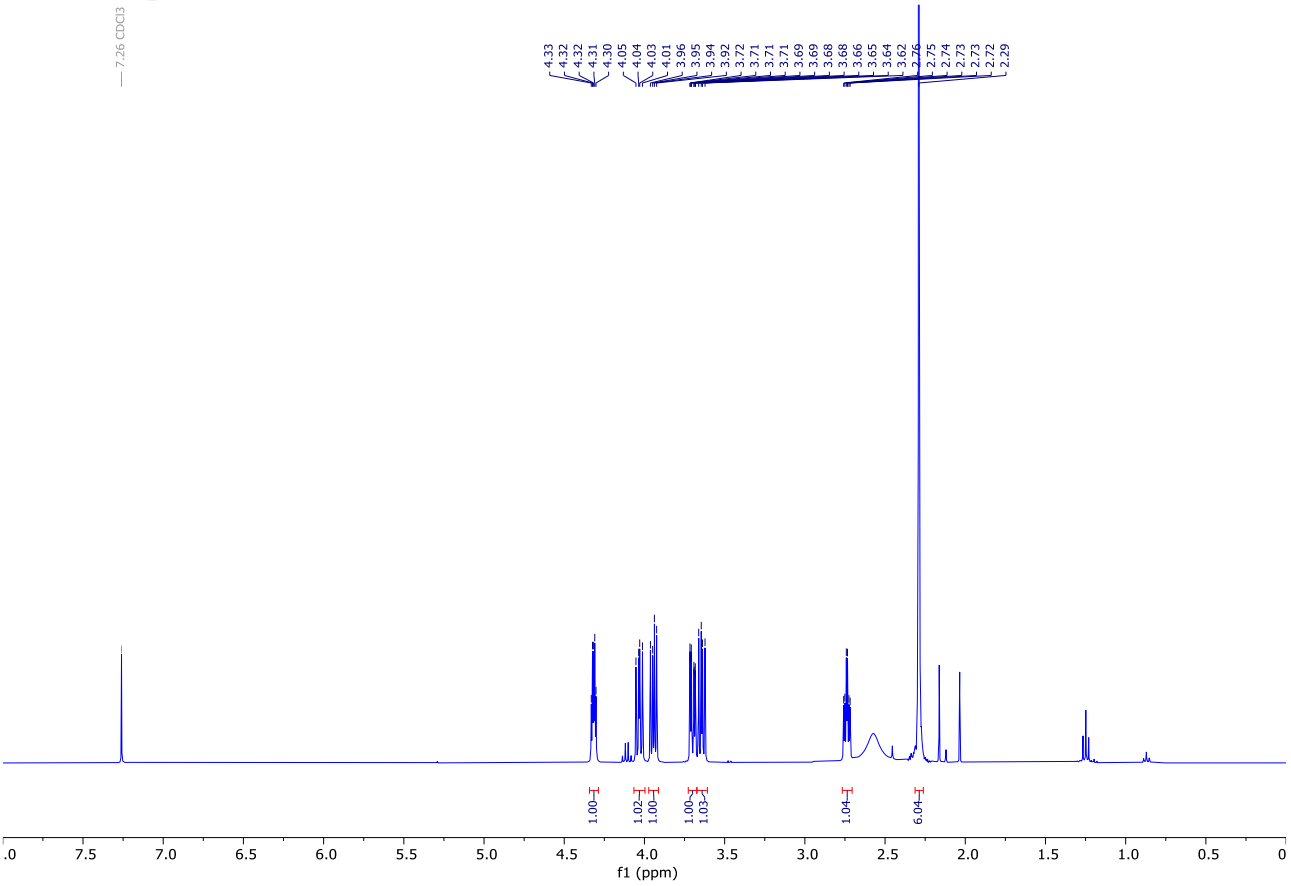

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 119.0703 | C5H11O3 | 119.0703 | C5H10O3 | 0.1 | 0.8 | M+H | 1+ |
| 141.0522 | C5H10NaO3 | 141.0522 | | 0.2 | 1.0 | M+Na | 1+ |

**(±)-(3*R*,4*S*)-4-(Dimethylamino)tetrahydrofuran-3-ol 2l [30197-51-4]**

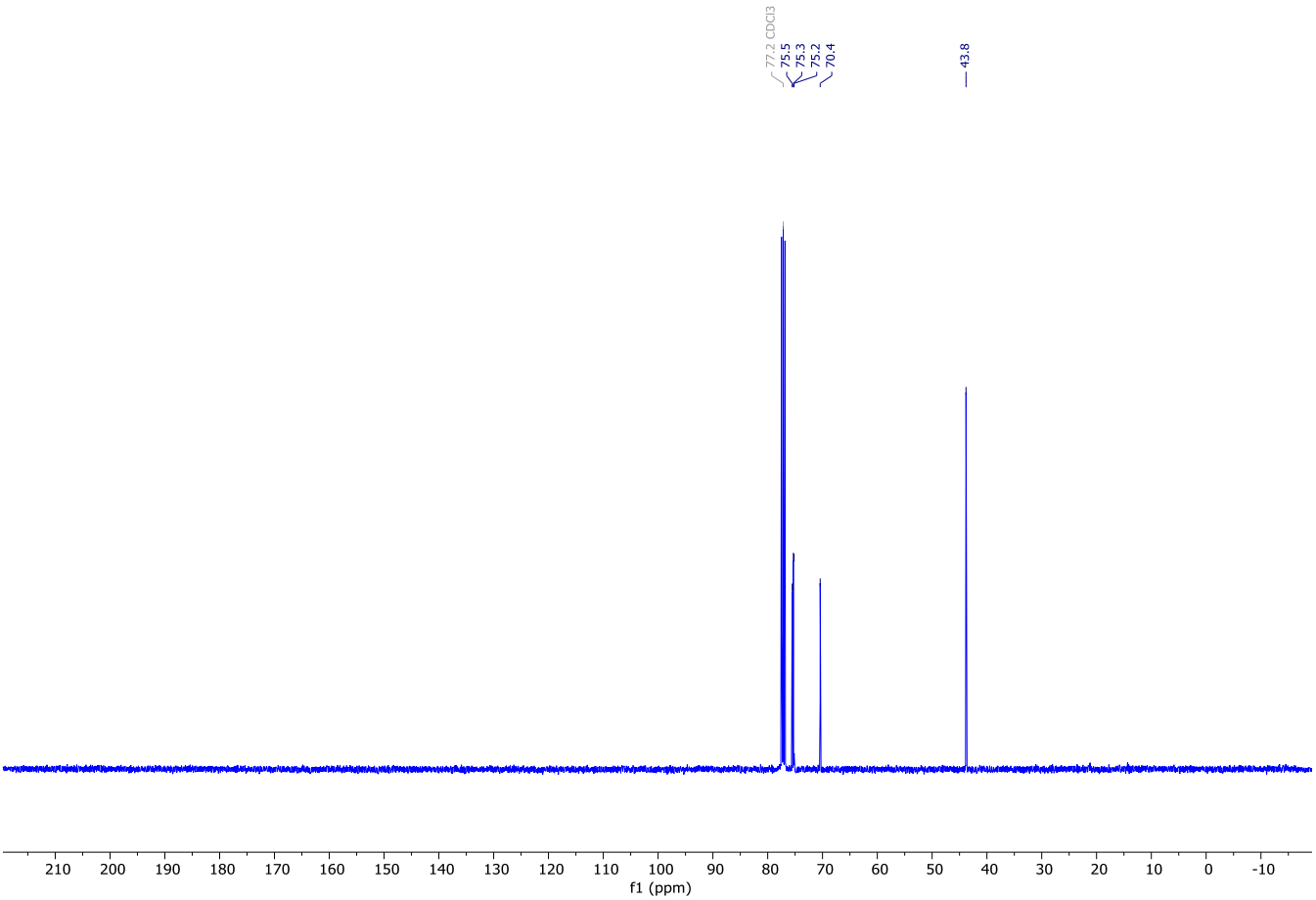



2l

JFR294.100.fid — no_title




JFR294.102.fid — no_title



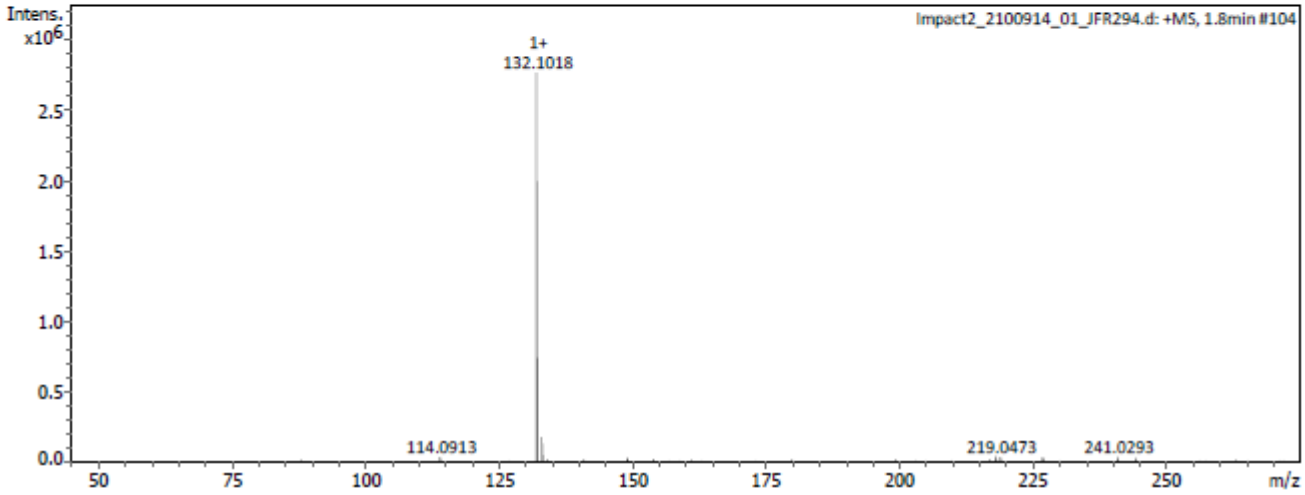
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

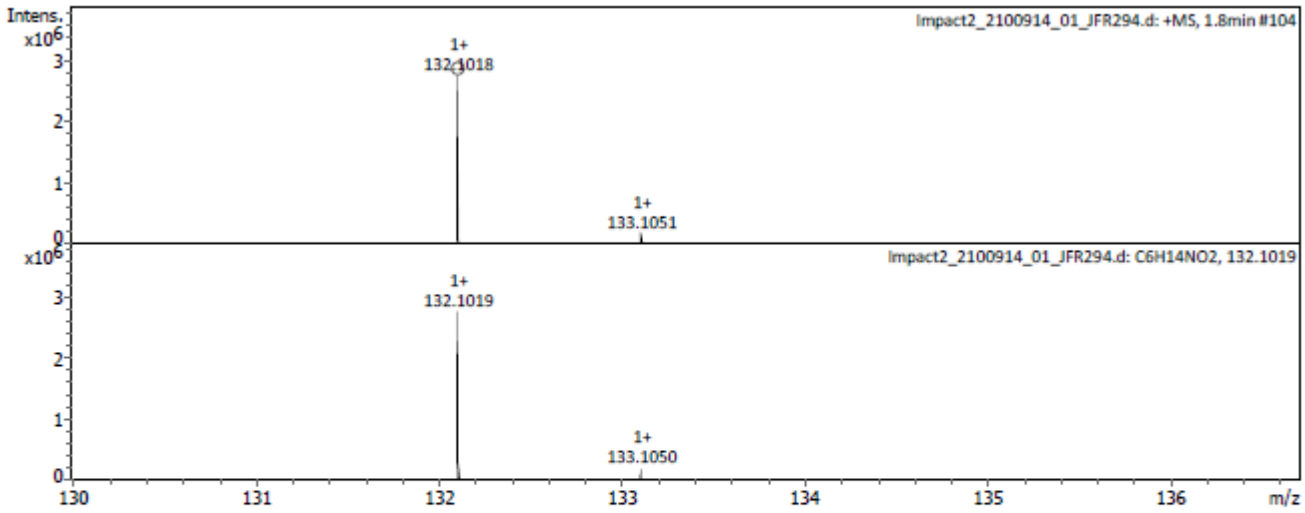
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_2100914_01_JFR294.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 9/14/2021 8:32:04 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

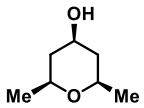
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 3500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



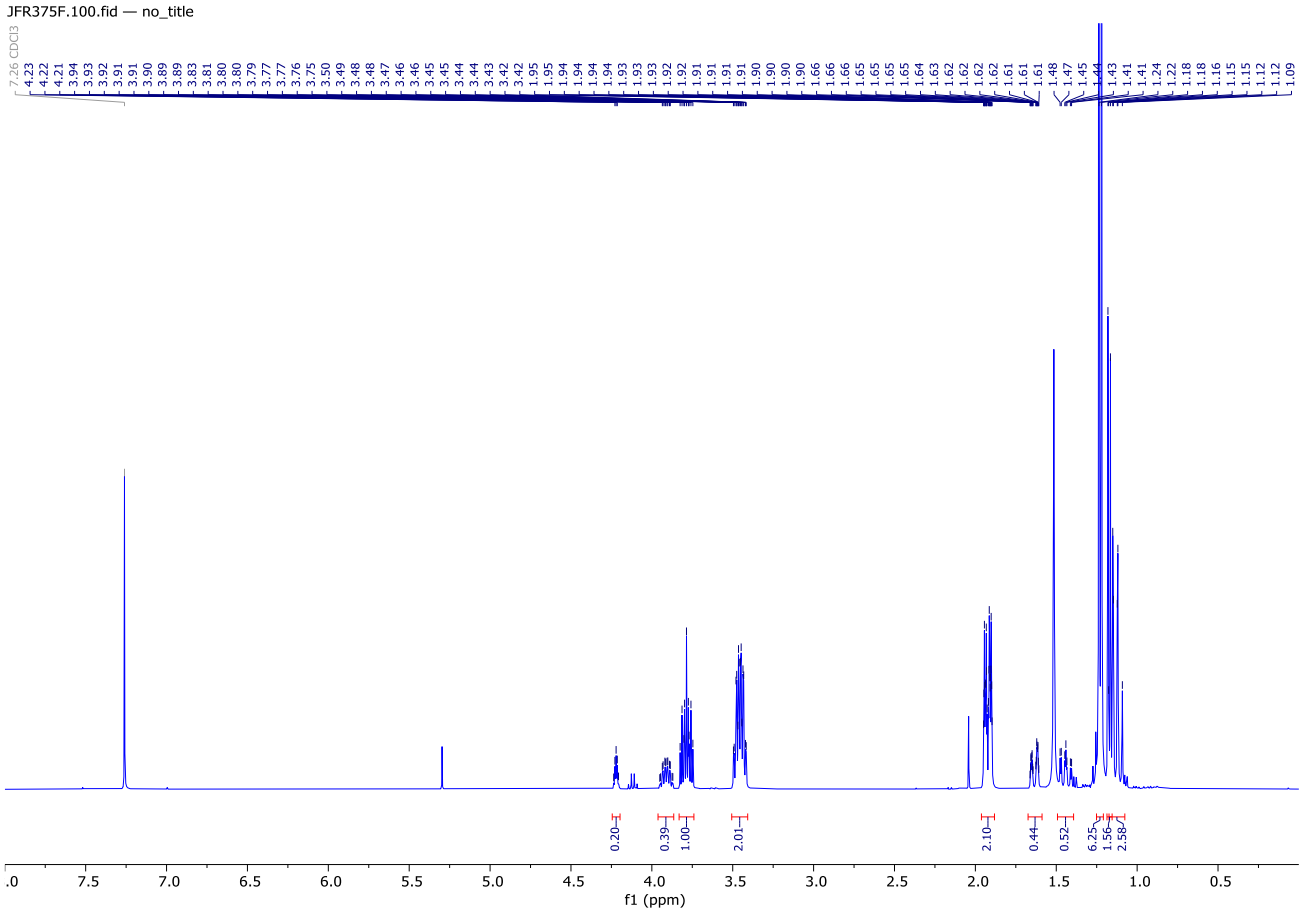



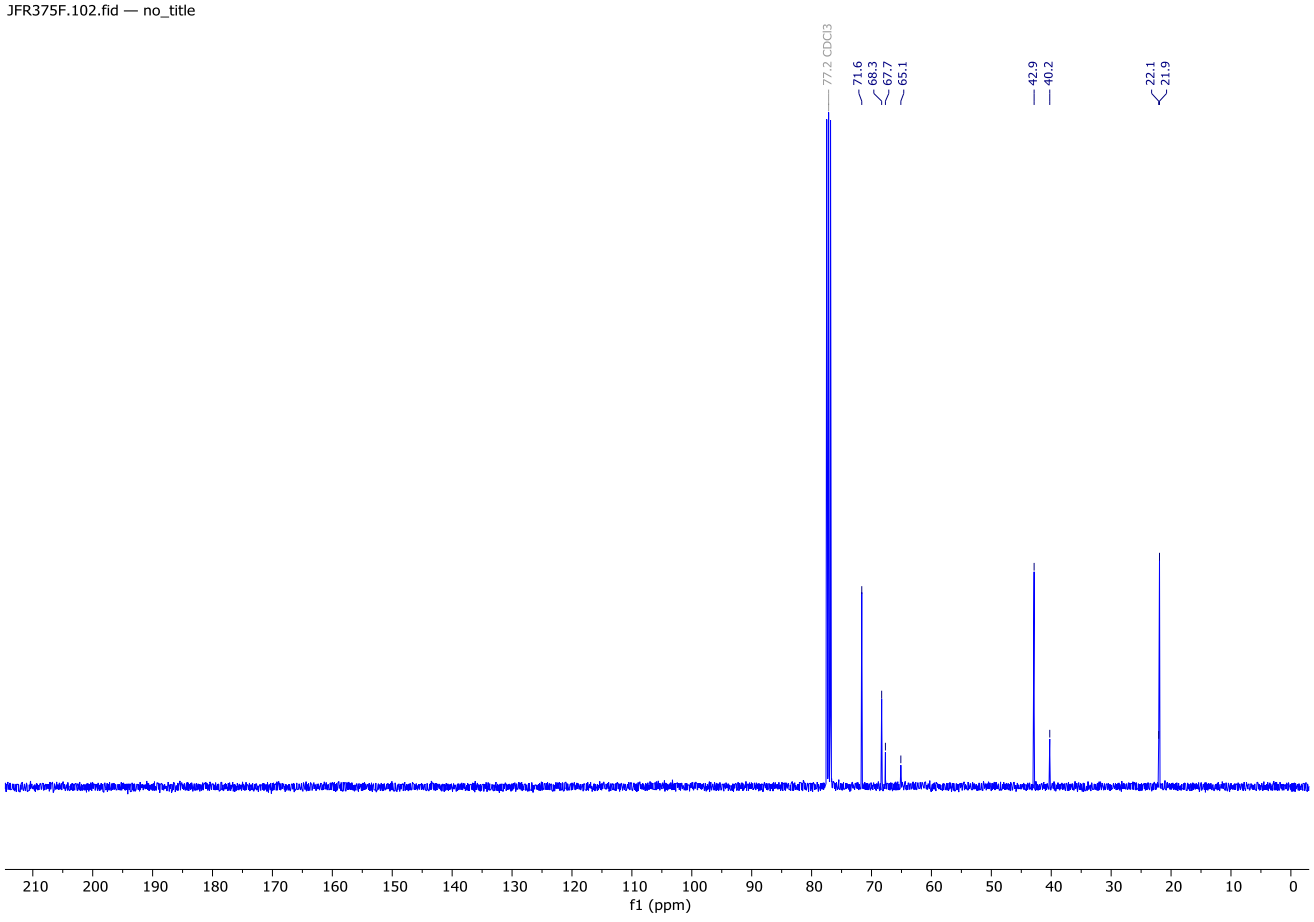

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 132.1018 | C6H14NO2 | 132.1019 | C6H13NO2 | 1.1 | 2.0 | M+H | 1+ |

**(2*R*,4*r*,6*S*)-2,6-Dimethyltetrahydro-*2H*-pyran-4-ol 2n [33747-09-0]**




2n



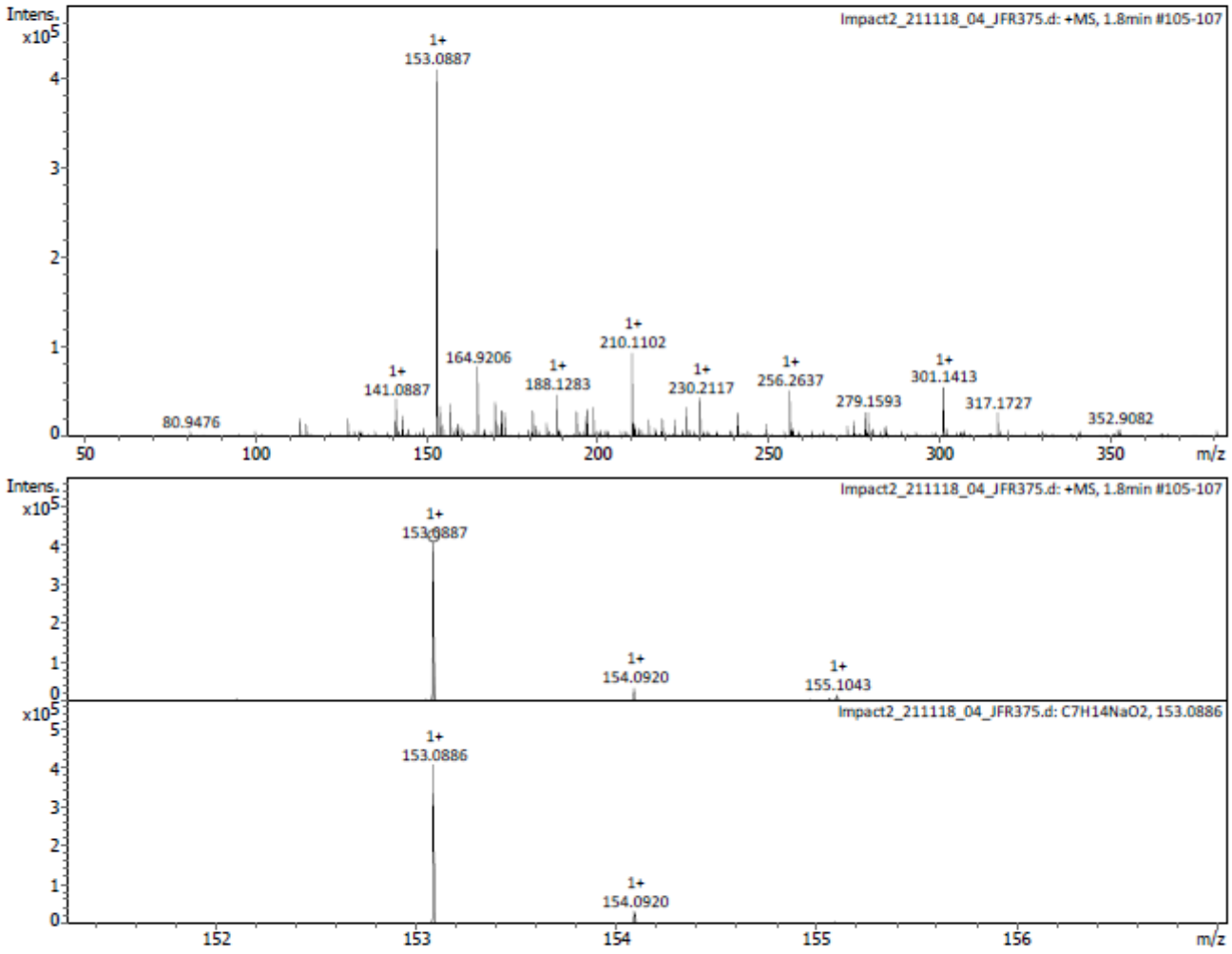
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211118_04_JFR375.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/18/2021 1:24:45 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

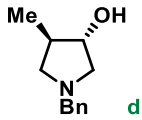
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 300.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 153.0887 | C7H14NaO2 | 153.0886 | C7H14O2 | -0.8 | 4.9 | M+Na | 1+ |

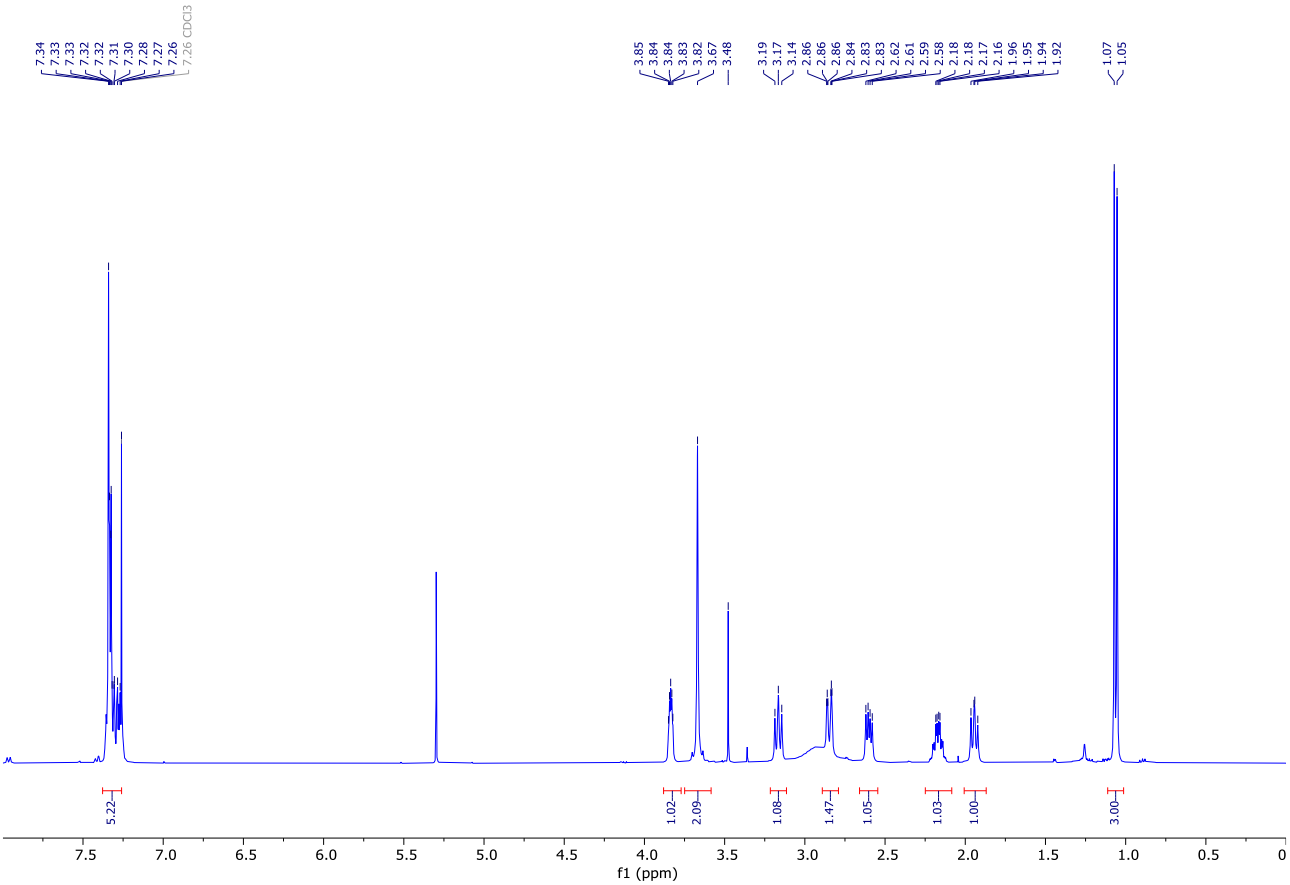
**(+/-)-(3*R*,4*S*)-1-Benzyl-4-methylpyrrolidin-3-ol 4g**



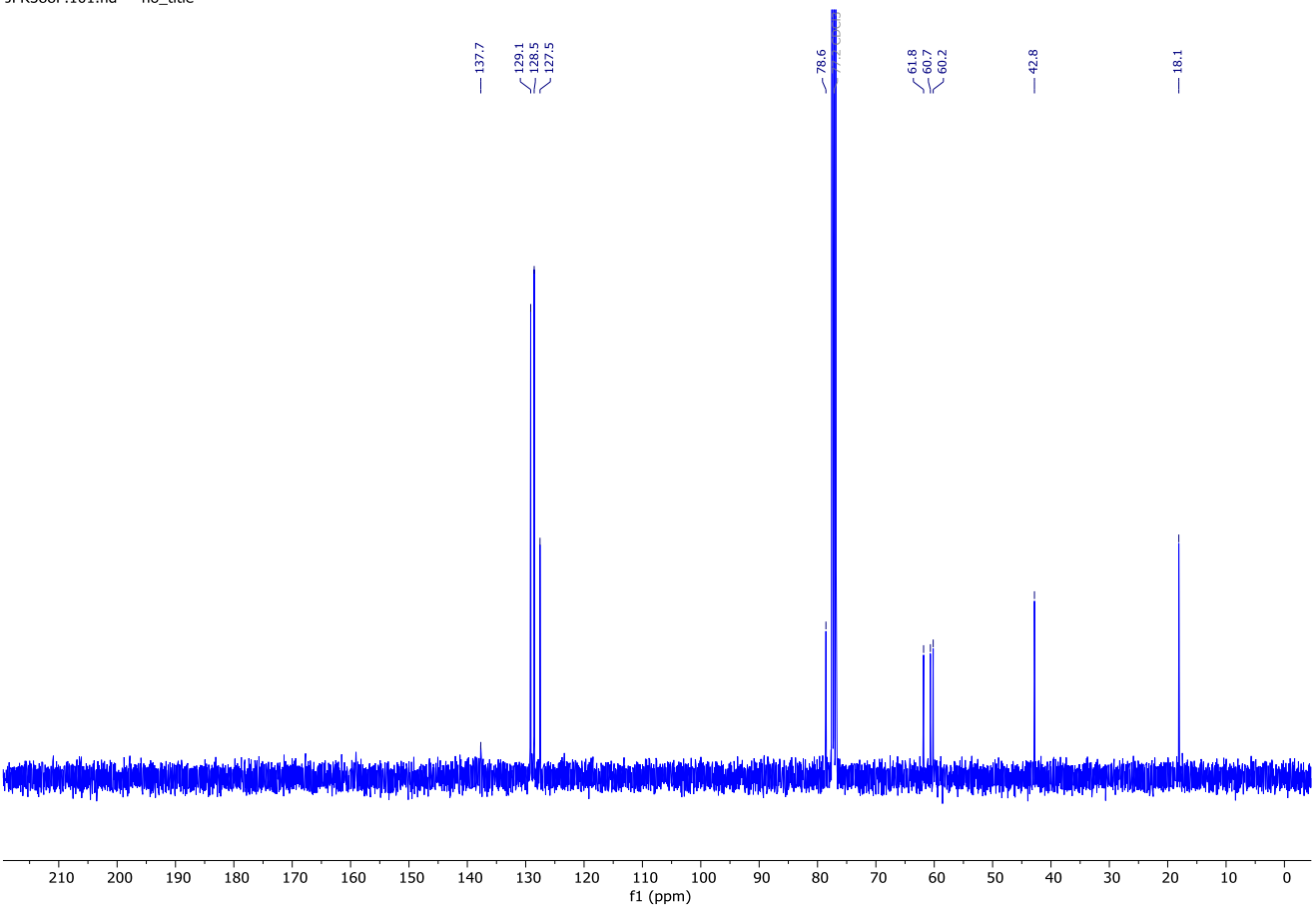

4g

dr > 99:1

JFR388F.100.fid — no_title




JFR388F.101.fid — no_title



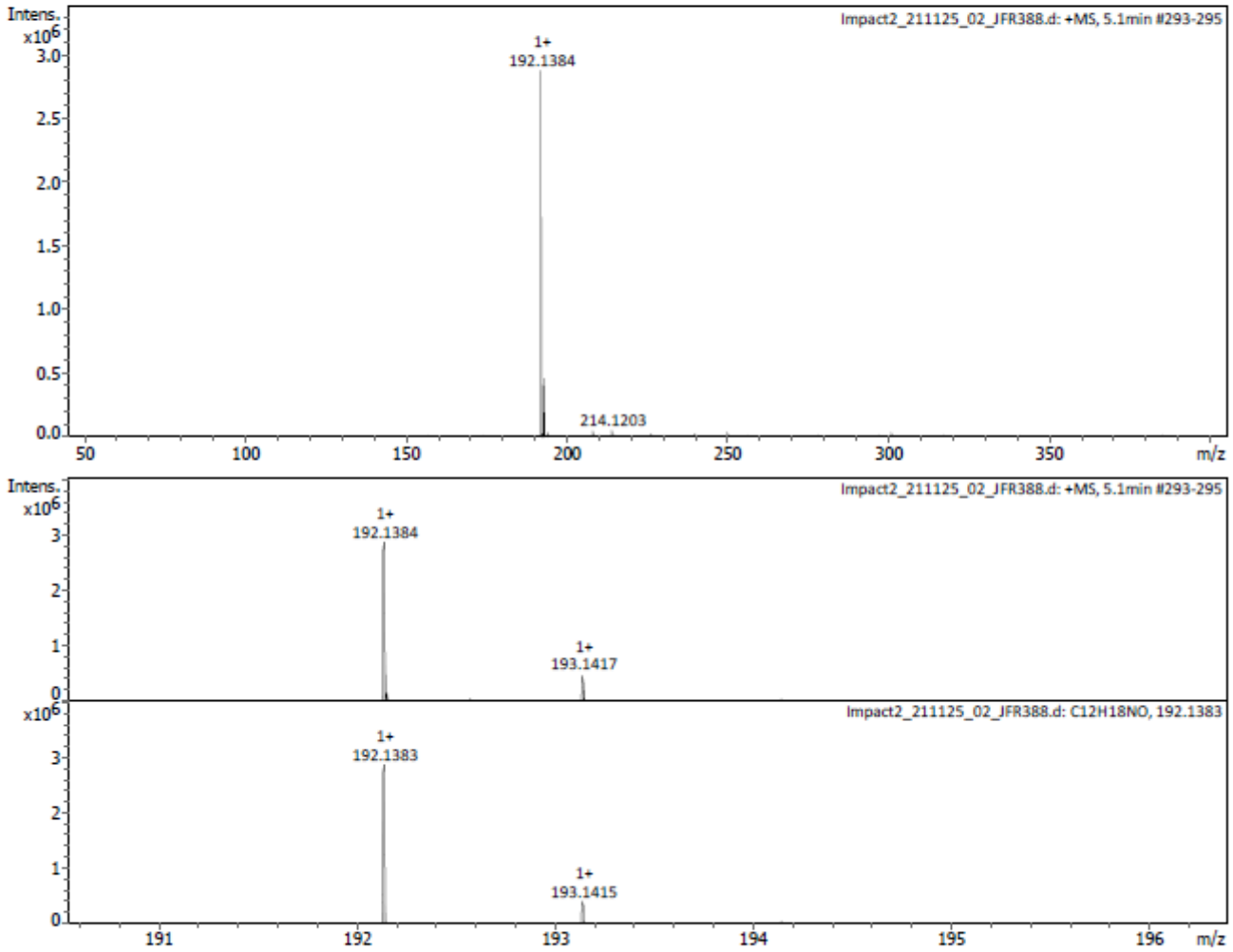
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211125_02_JFR388.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/25/2021 9:06:35 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

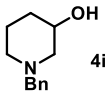
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



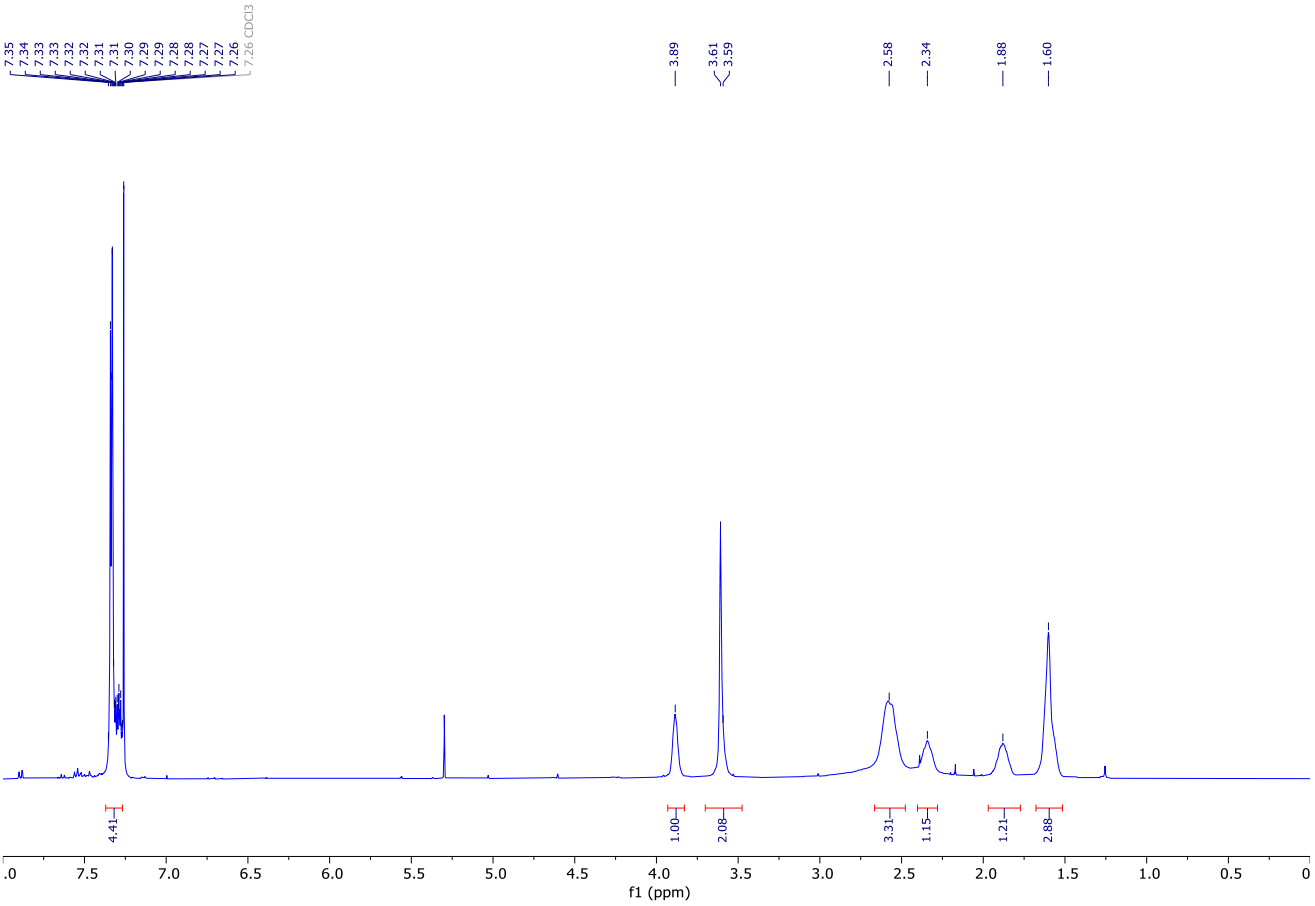

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 192.1384 | C12H18NO | 192.1383 | C12H17NO | -0.6 | 14.9 | M+H | 1+ |
| 214.1203 | C12H17NNaO | 214.1202 | | -0.4 | 19.2 | M+Na | 1+ |

## 1-Benzylpiperidin-3-ol 4i

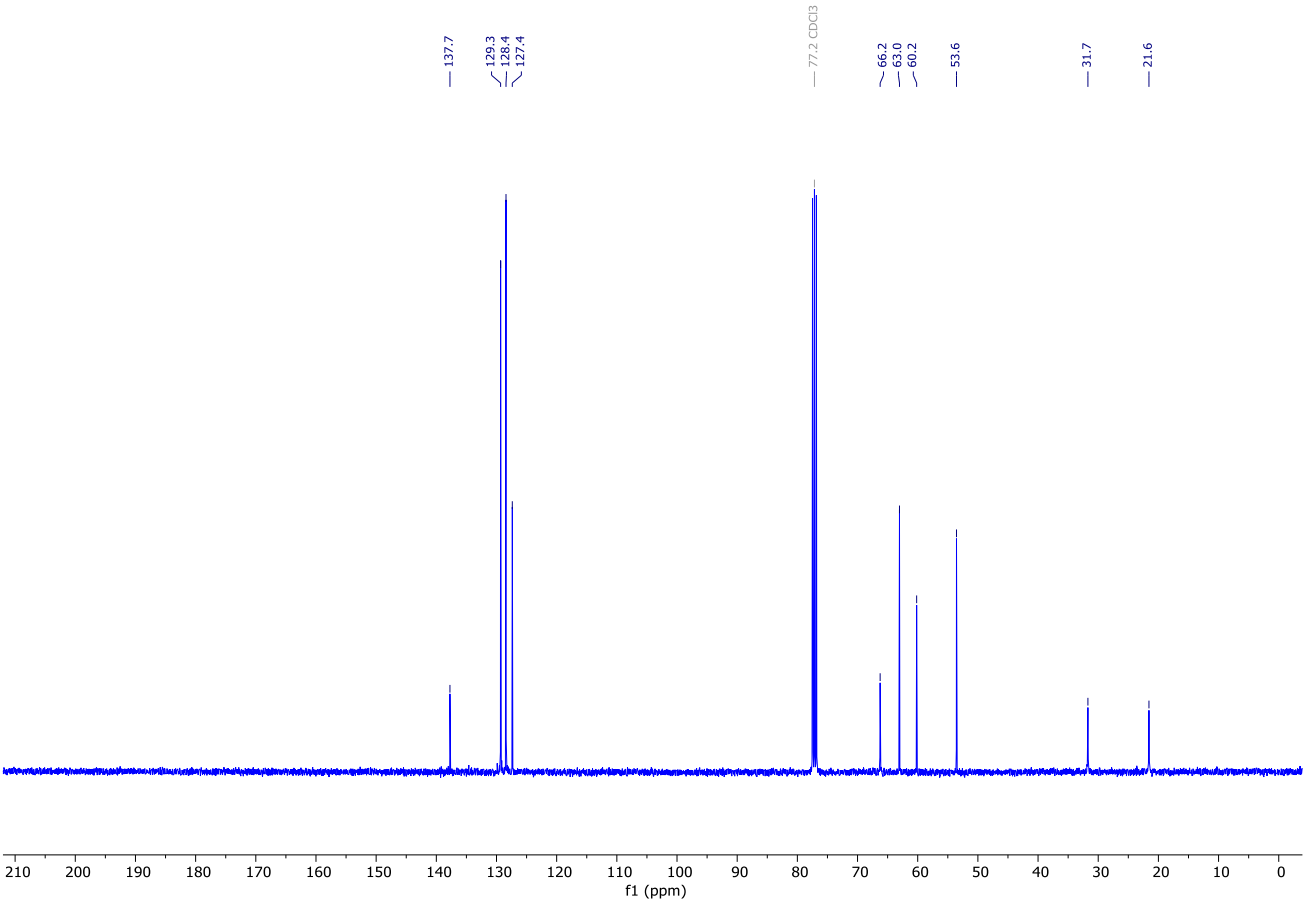



4i

JFR248-1F.100.fid — no_title




JFR248-C.100.fid — no_title



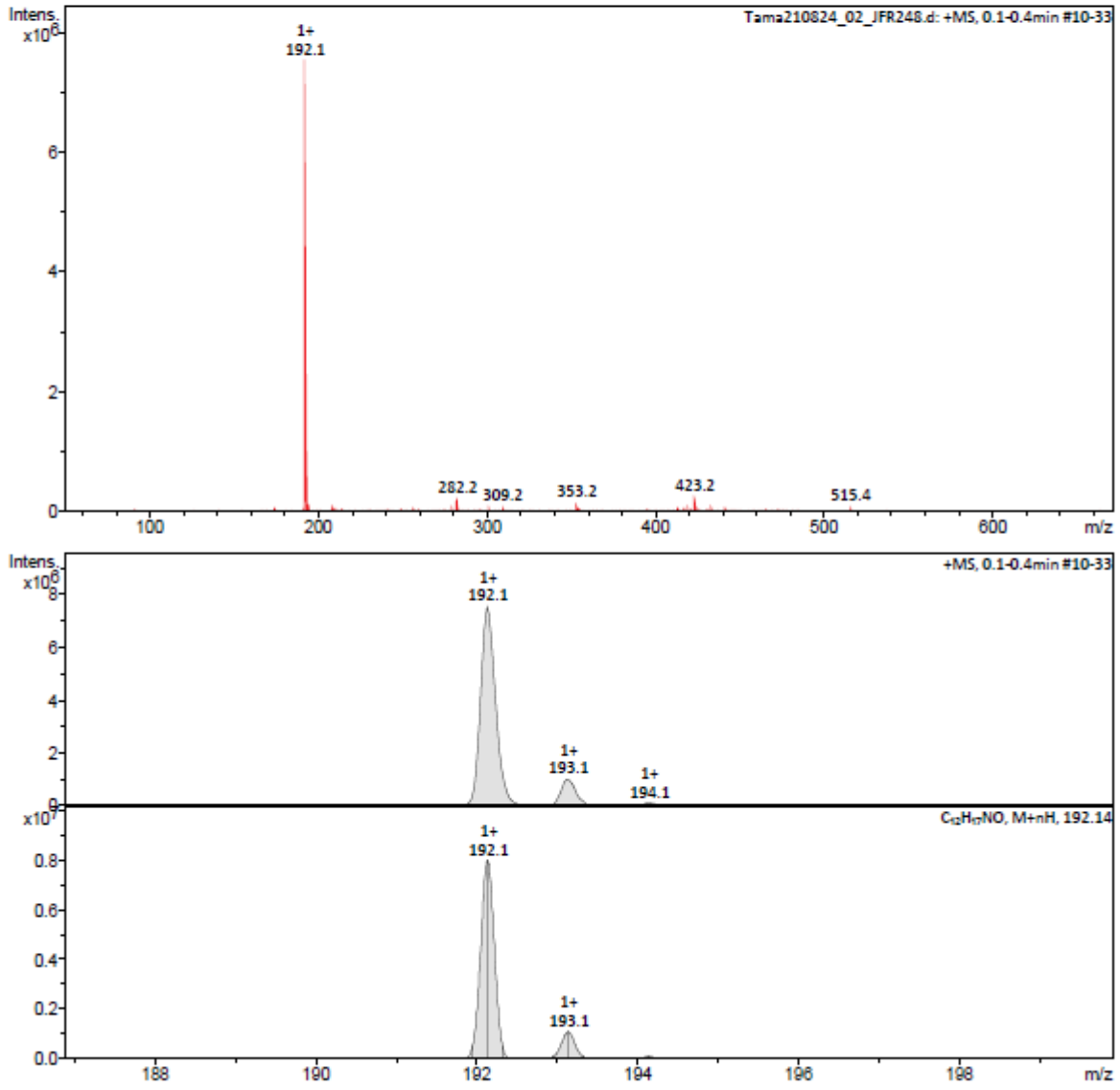
# Display Report

**Analysis Info**

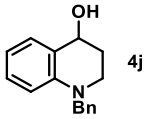
| | | | |
|---|---|---|---|
| Analysis Name | D:\Data\2021\2021_08\Tama210824_02_JFR248.d | Acquisition Date | 8/24/2021 4:24:33 PM |
| Method | tune_esi.m | Operator | BDAL@DE |
| Sample Name | Default | Instrument | amaZon SL |
| Comment | | | |

**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Ion Source Type | ESI | Ion Polarity | Positive | Alternating Ion Polarity | off |
| Mass Range Mode | Enhanced Resolution | Scan Begin | 50 m/z | Scan End | 1000 m/z |
| Accumulation Time | 131 µs | RF Level | 50 % | Trap Drive | 44.2 |
| SPS Target Mass | 250 m/z | Averages | 5 Spectra | n/a | n/a |

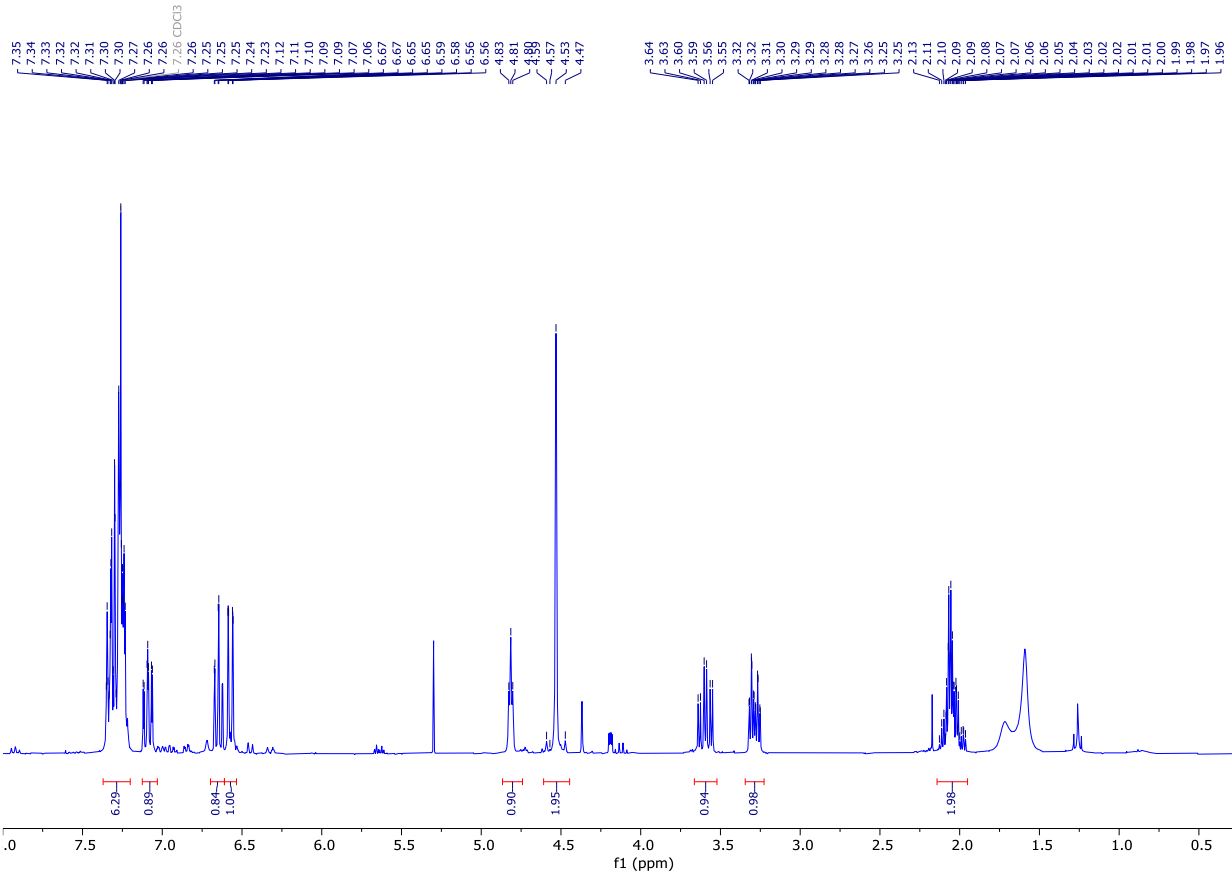


## 1-Benzyl-1,2,3,4-tetrahydroquinolin-4-ol 4j

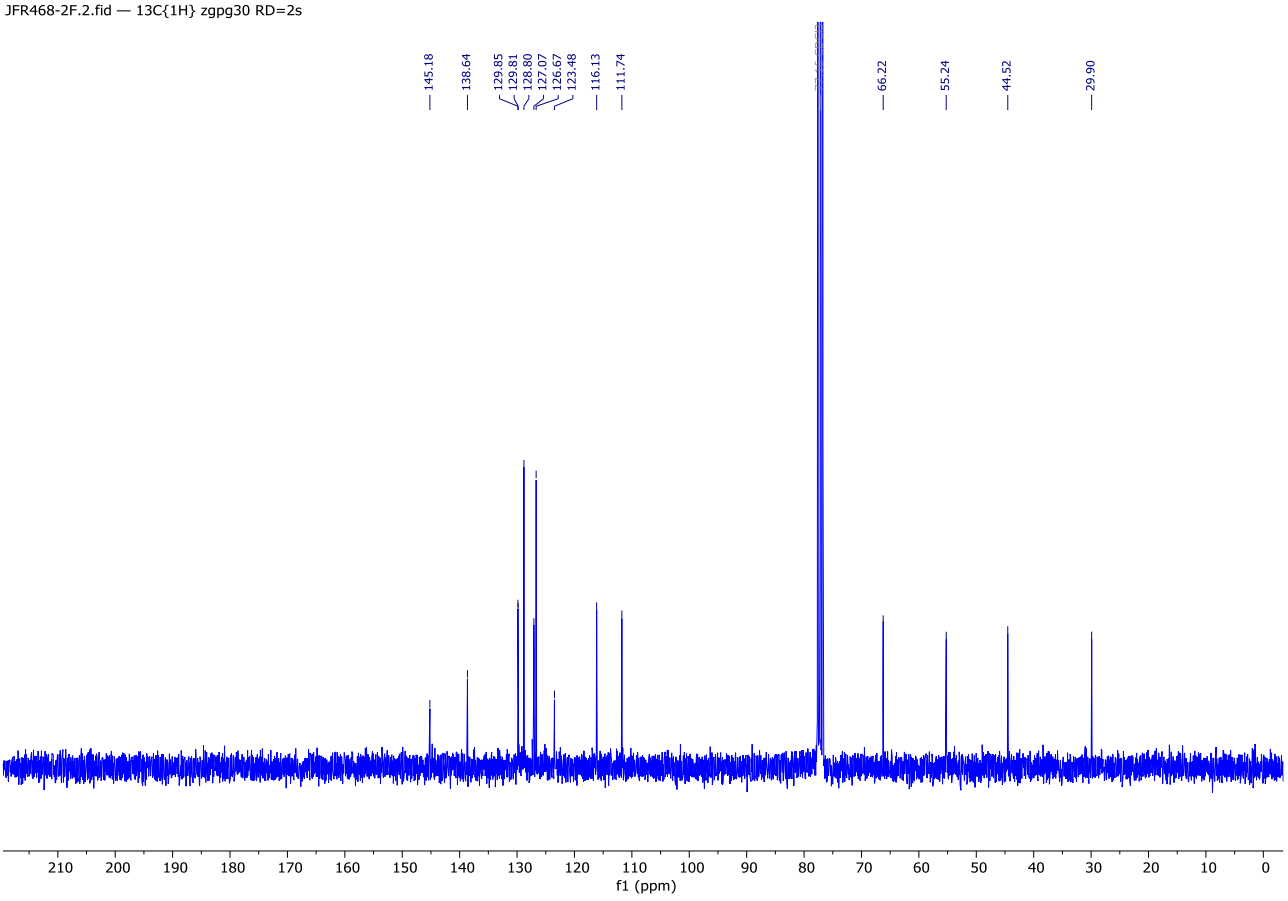



4j

JFR468-2F.1.fid — 1H zg30




JFR468-2F.2.fid — 13C{1H} zgpg30 RD=2s



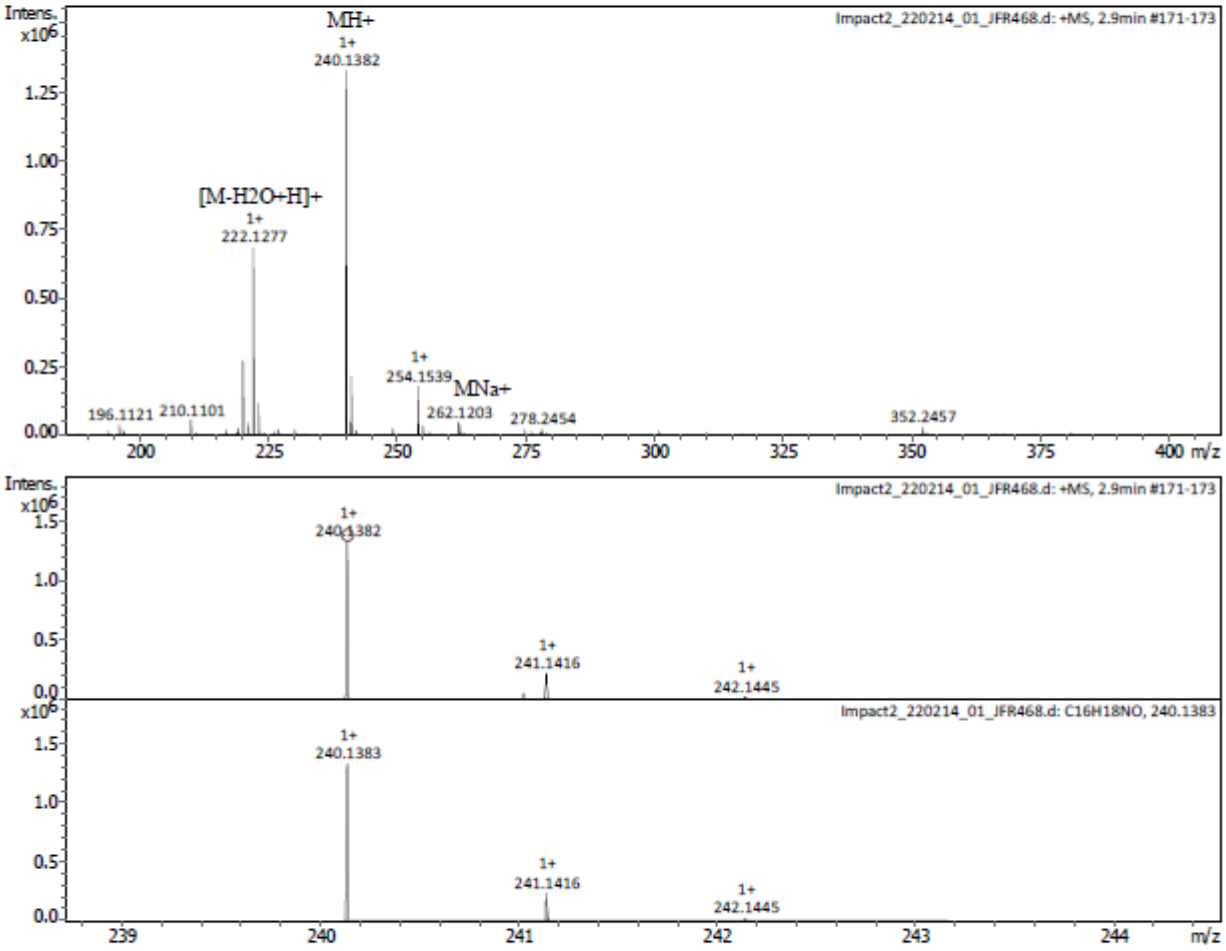
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220214_01_JFR468.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/14/2022 10:21:35 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

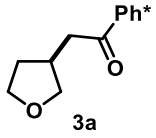
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



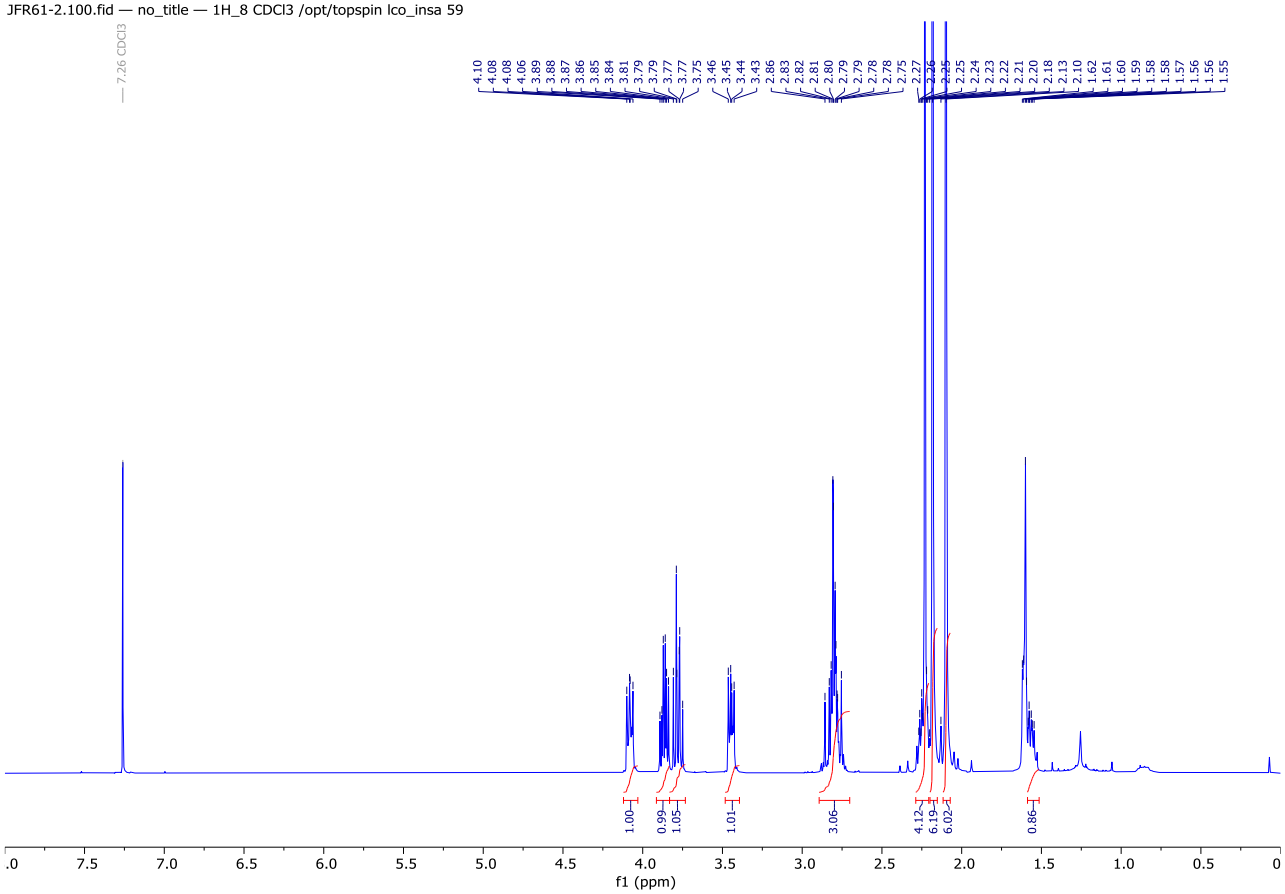

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 222.1277 | C16H16N | 222.1277 | C16H17NO | 0.3 | 2.6 | M-H2O+H | 1+ |
| 240.1382 | C16H18NO | 240.1383 | | 0.2 | 8.3 | M+H | 1+ |
| 262.1203 | C16H17NNaO | 262.1202 | | -0.3 | 20.4 | M+Na | 1+ |

## 1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydrofuran-3-yl)ethanone 3a [2956413-69-5]

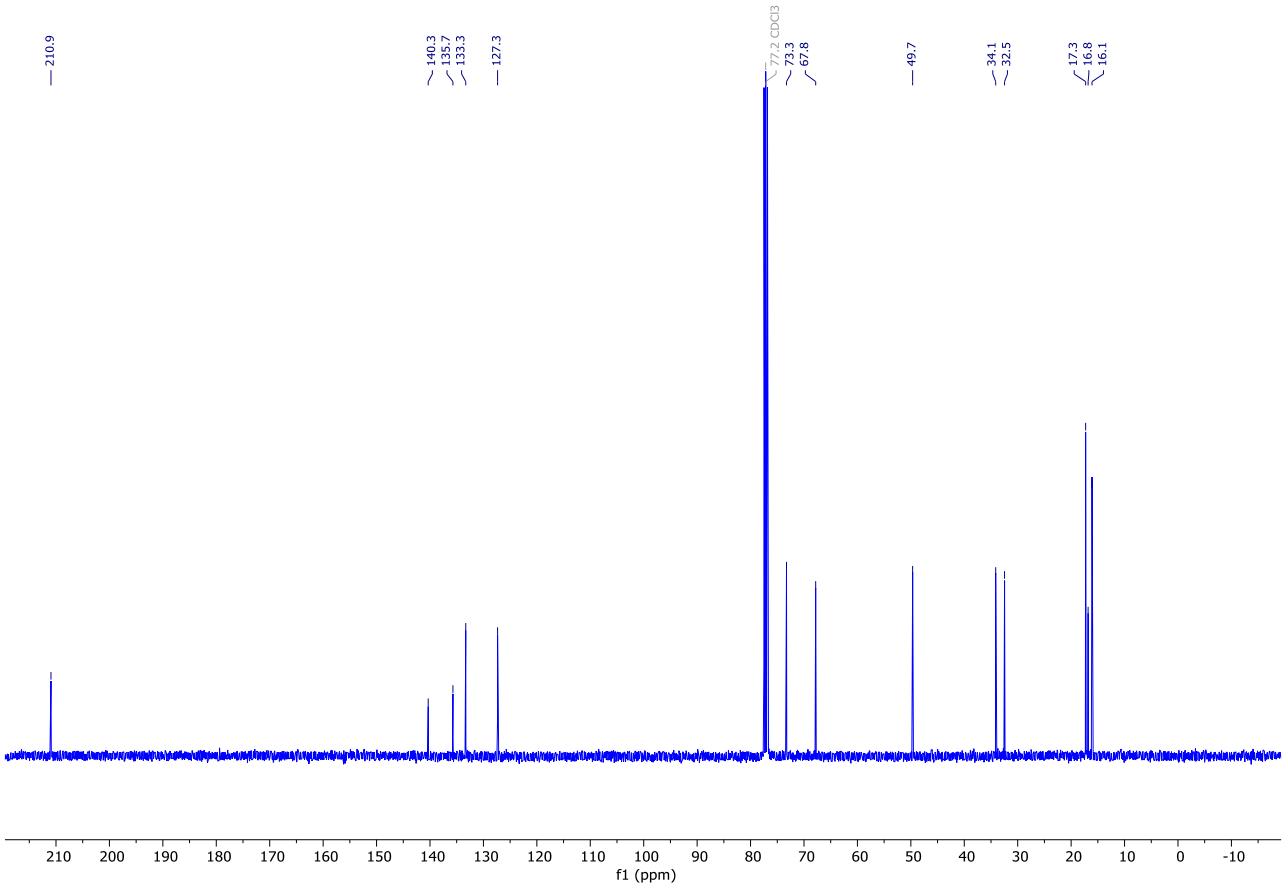



3a

JFR61-2.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 59




JFR061-2C.100.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 39



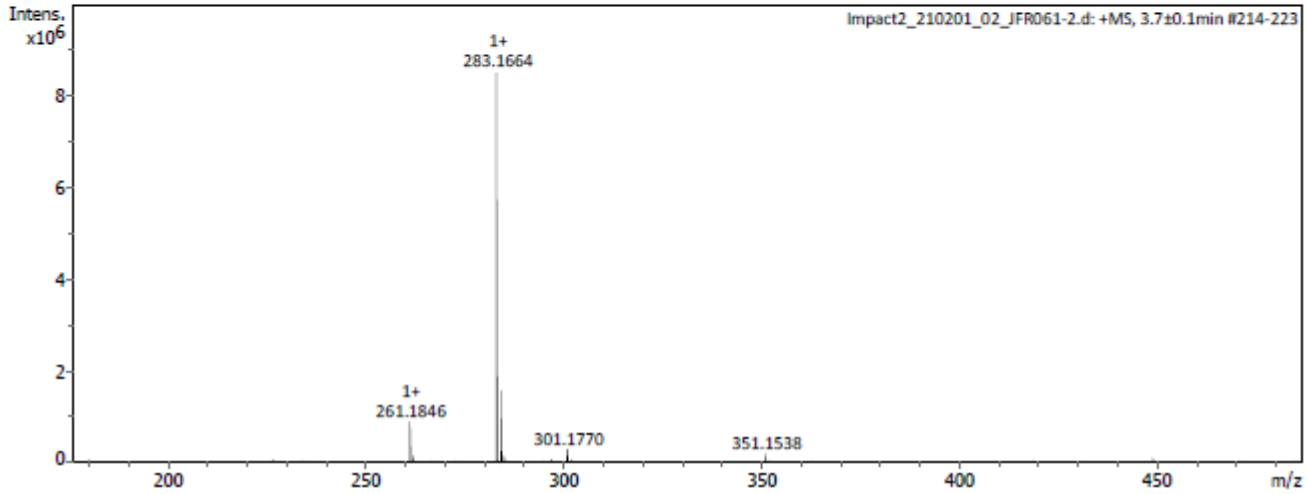
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

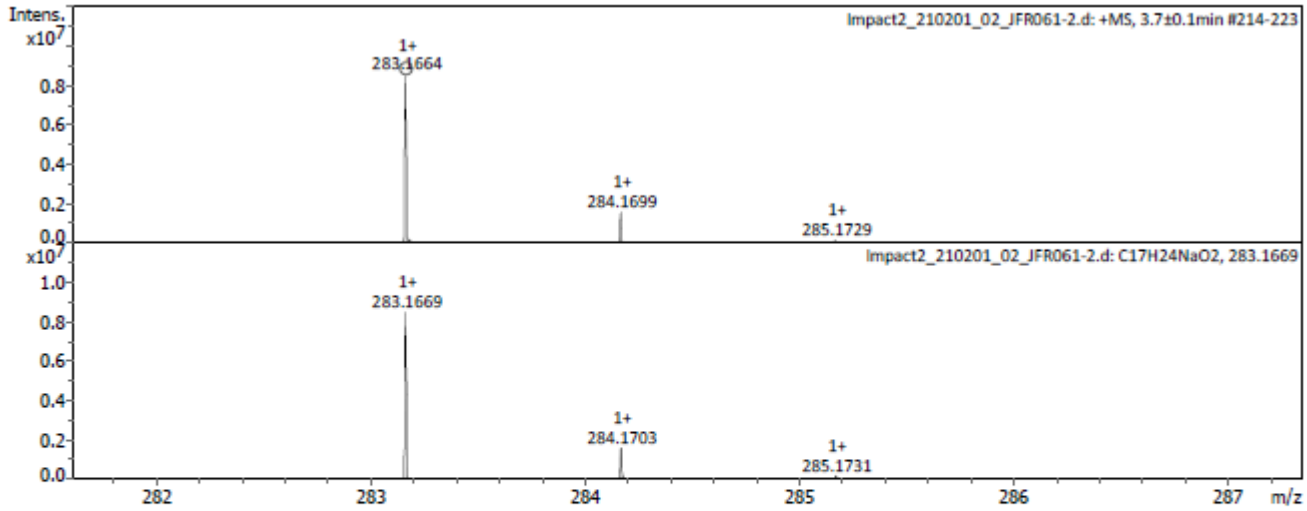
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210201_02_JFR061-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/1/2021 8:22:45 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

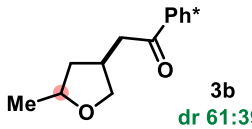
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 261.1846 | C17H25O2 | 261.1849 | C17H24O2 | 1.1 | 2.5 | M+H | 1+ |
| 283.1664 | C17H24NaO2 | 283.1669 | | 1.6 | 0.6 | M+Na | 1+ |

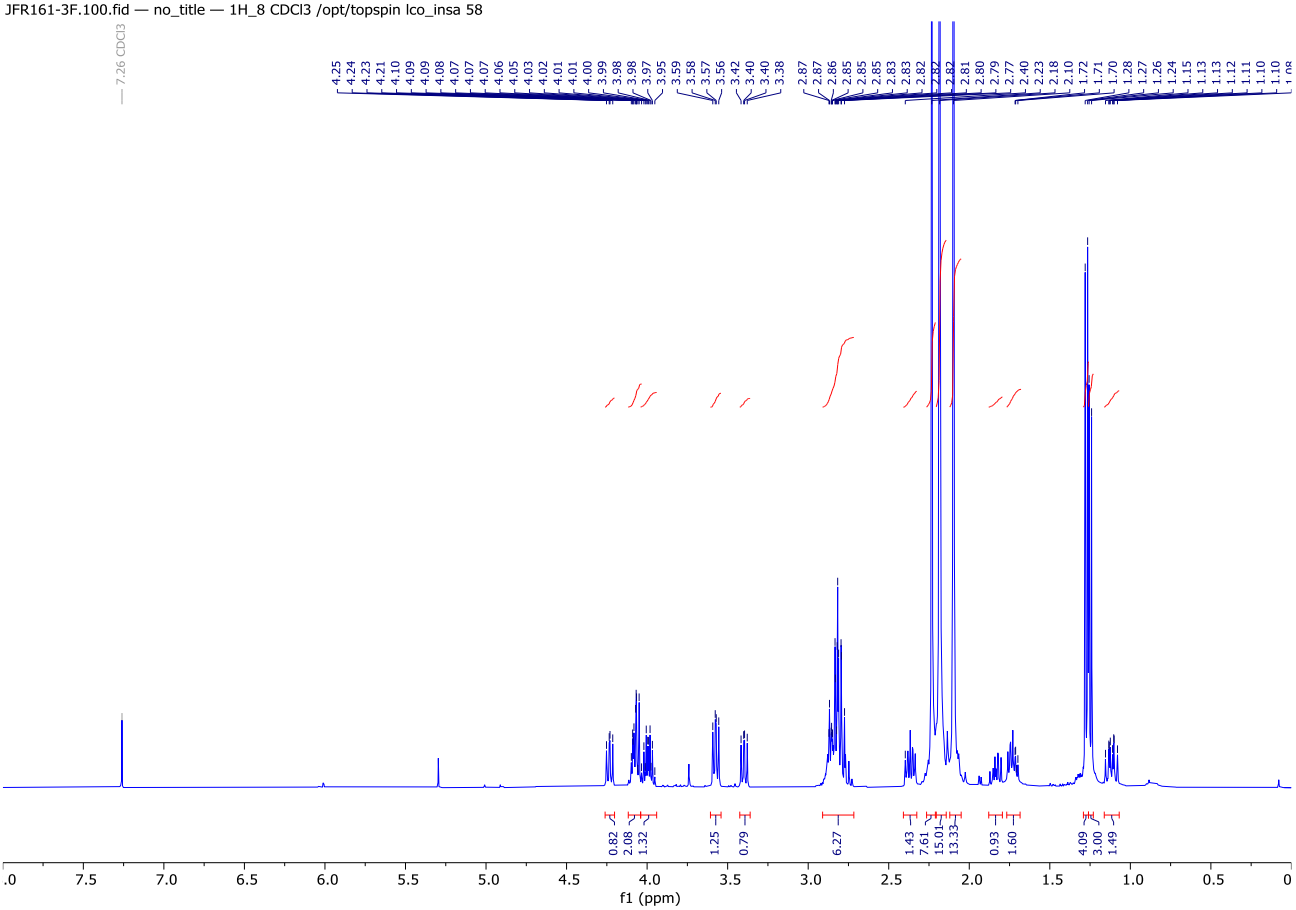
## 2-(5-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3b



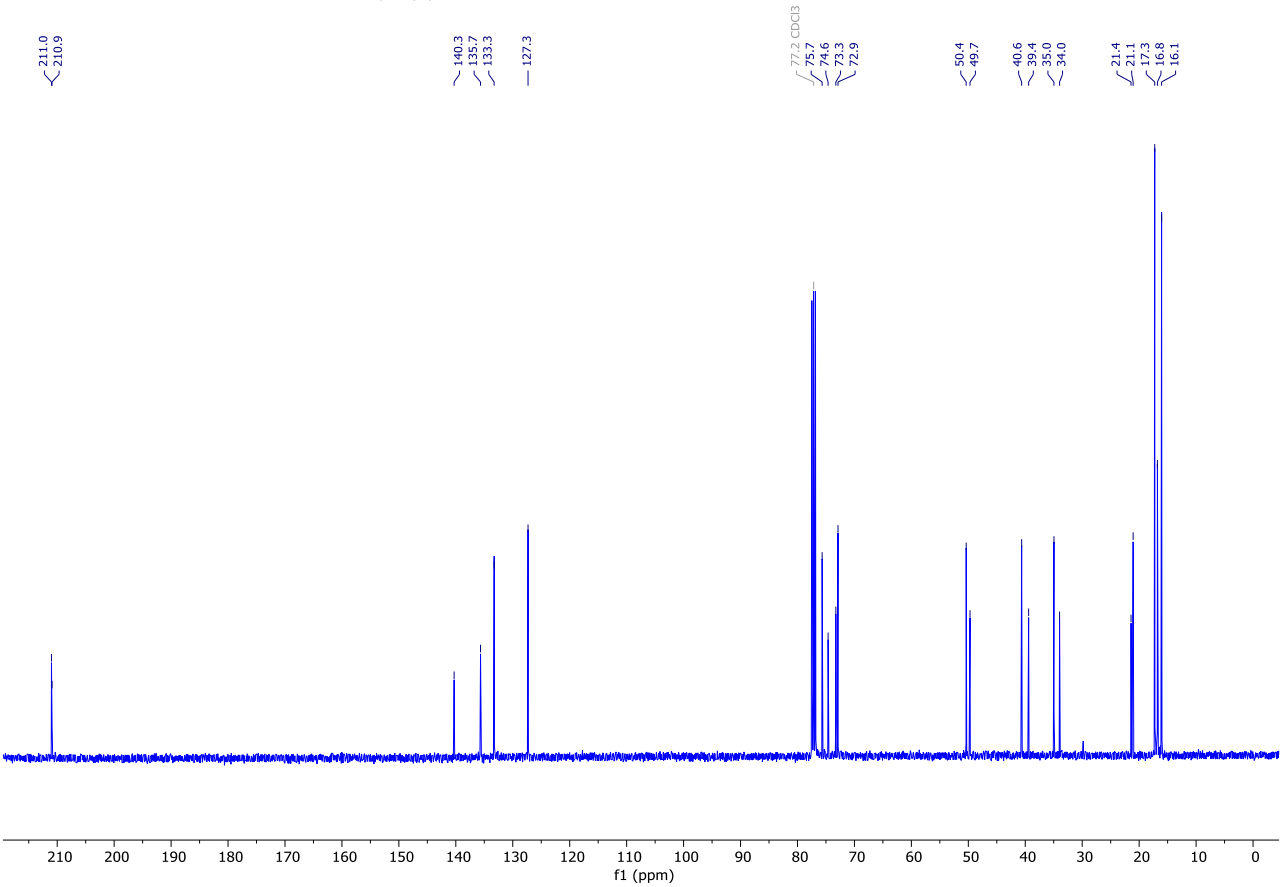

3b

dr 61:39

JFR161-3F.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 58




JFR161-3F.102.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 58



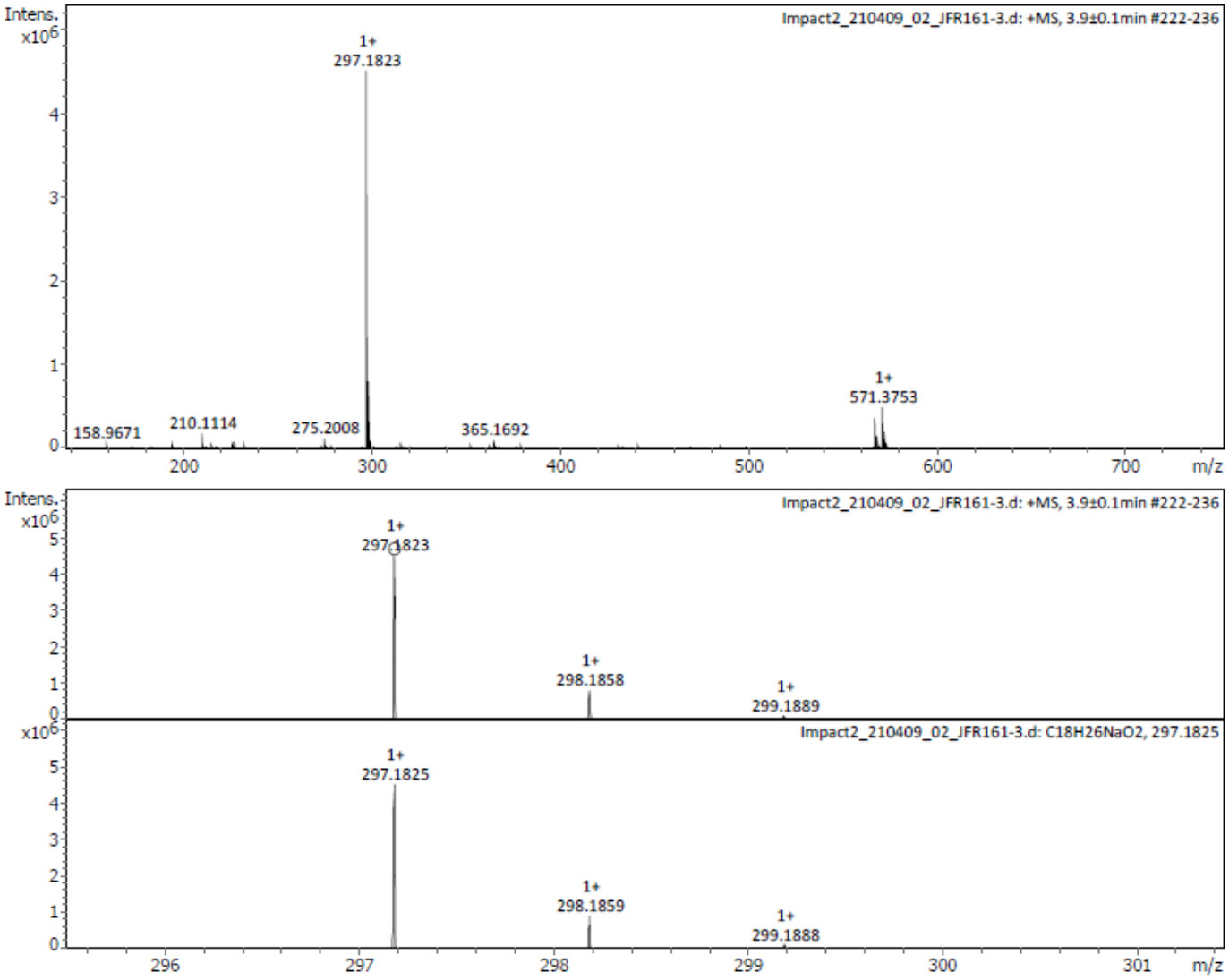
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210409_02_JFR161-3.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 4/9/2021 8:07:54 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

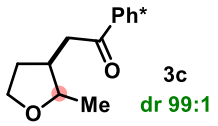
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 275.2008 | C18H27O2 | 275.2006 | C18H26O2 | -0.8 | 14.3 | M+H | 1+ |
| 297.1823 | C18H26NaO2 | 297.1825 | | 0.8 | 12.2 | M+Na | 1+ |
| 571.3753 | C36H52NaO4 | 571.3758 | | 0.8 | 1.1 | 2M+Na | 1+ |

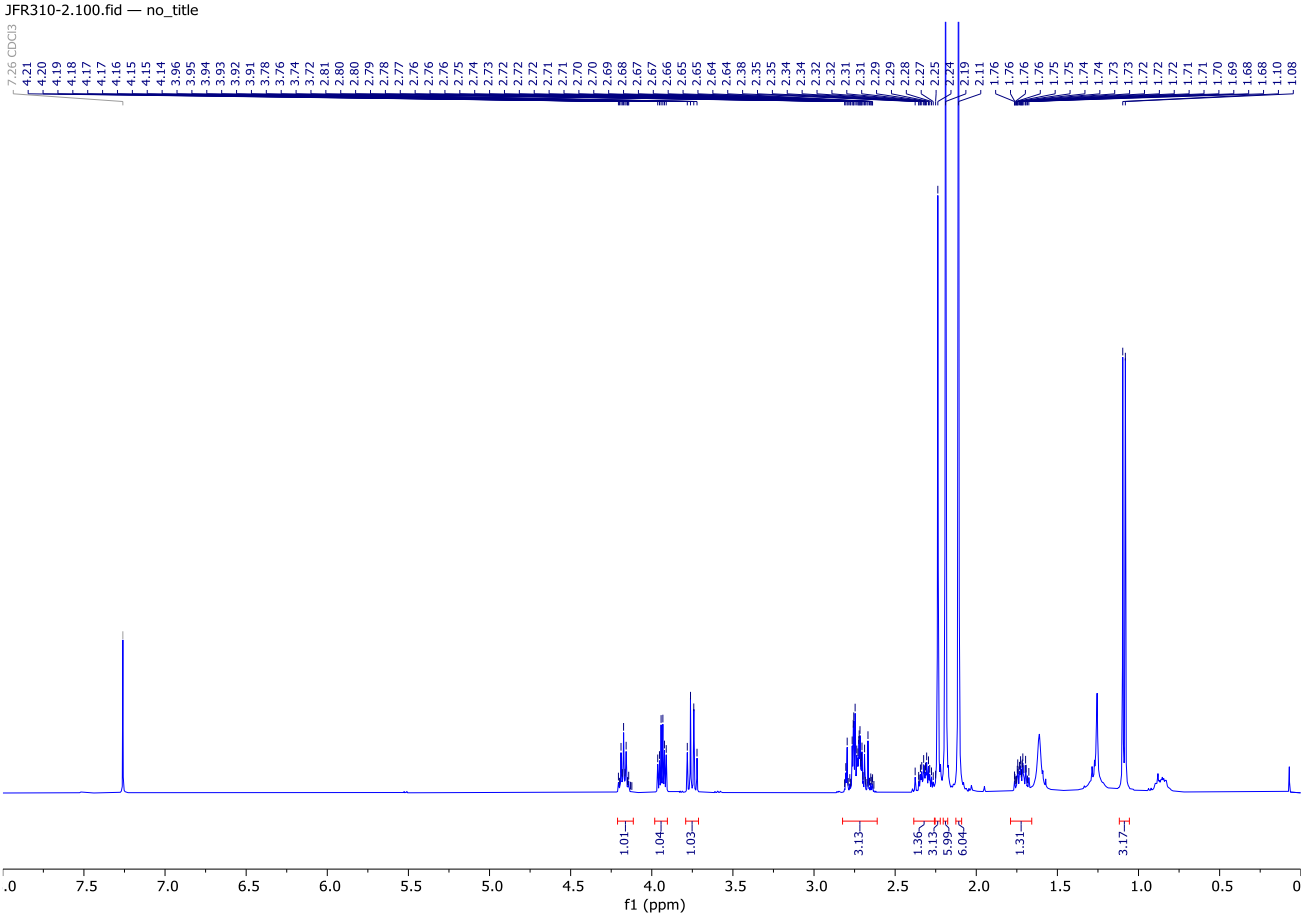
## 2-(2-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3c



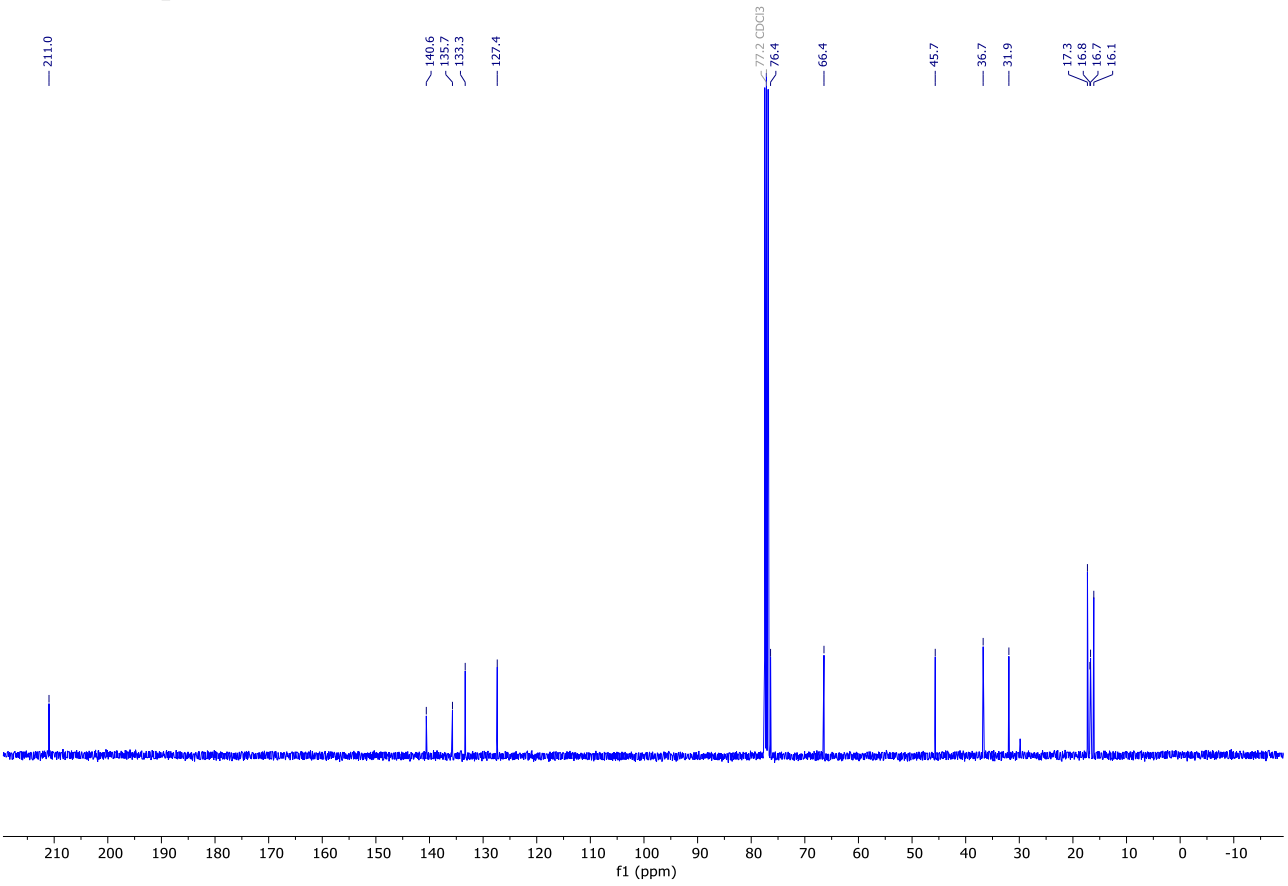

3c

dr 99:1

JFR310-2.100.fid — no_title




JFR310-2.102.fid — no_title



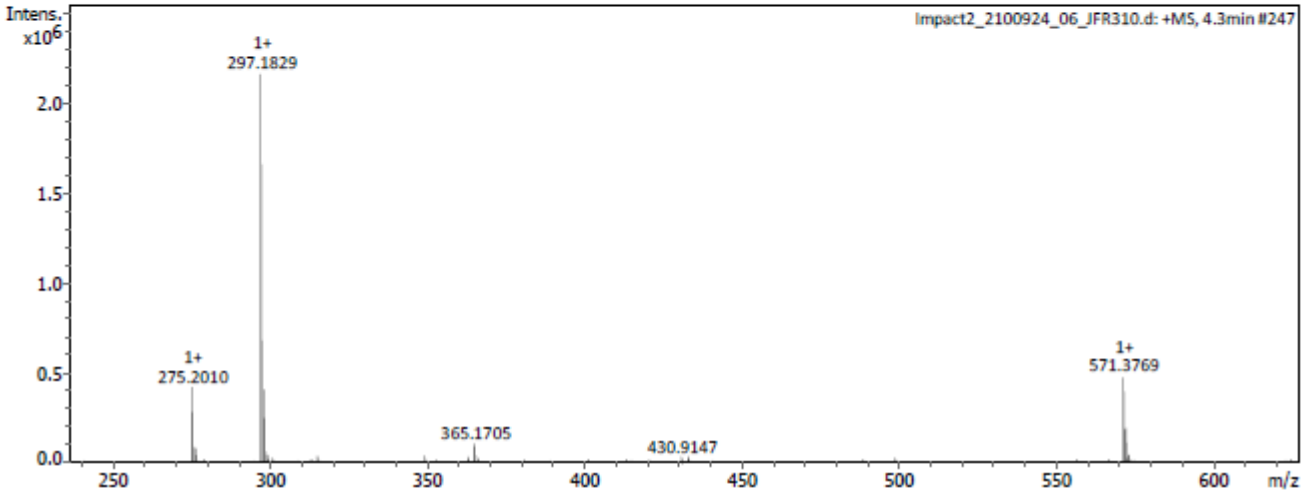
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

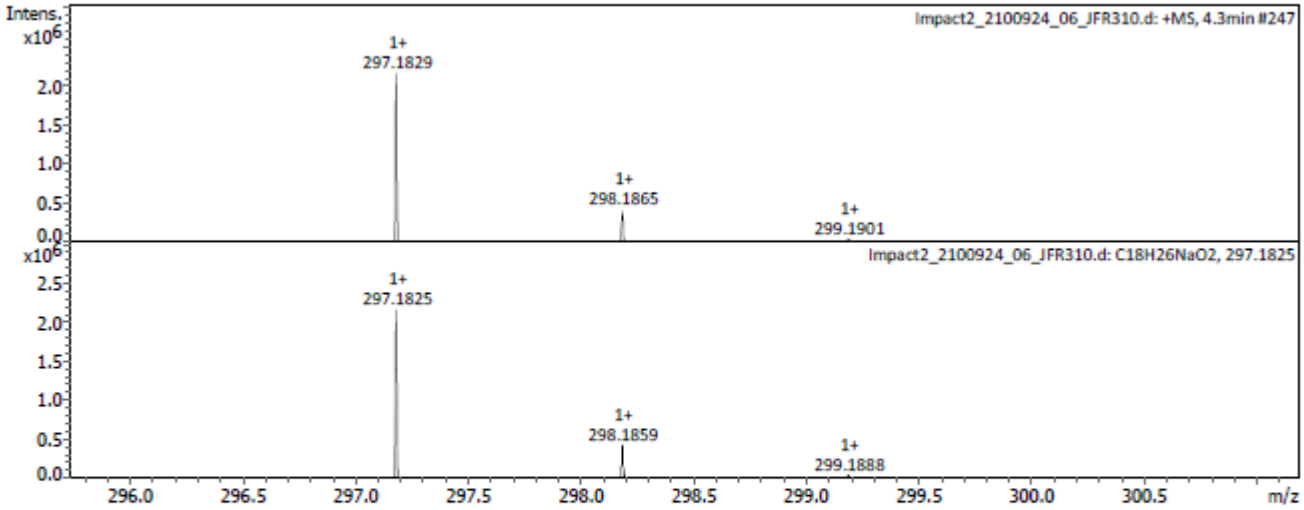
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_2100924_06_JFR310.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 9/24/2021 2:42:15 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

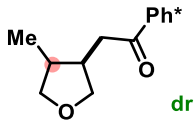
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 275.2010 | C18H27O2 | 275.2006 | C18H26O2 | -1.7 | 2.8 | M+H | 1+ |
| 297.1829 | C18H26NaO2 | 297.1825 | | -1.4 | 6.0 | M+Na | 1+ |
| 571.3769 | C36H52NaO4 | 571.3758 | | -1.9 | 7.9 | 2M+Na | 1+ |

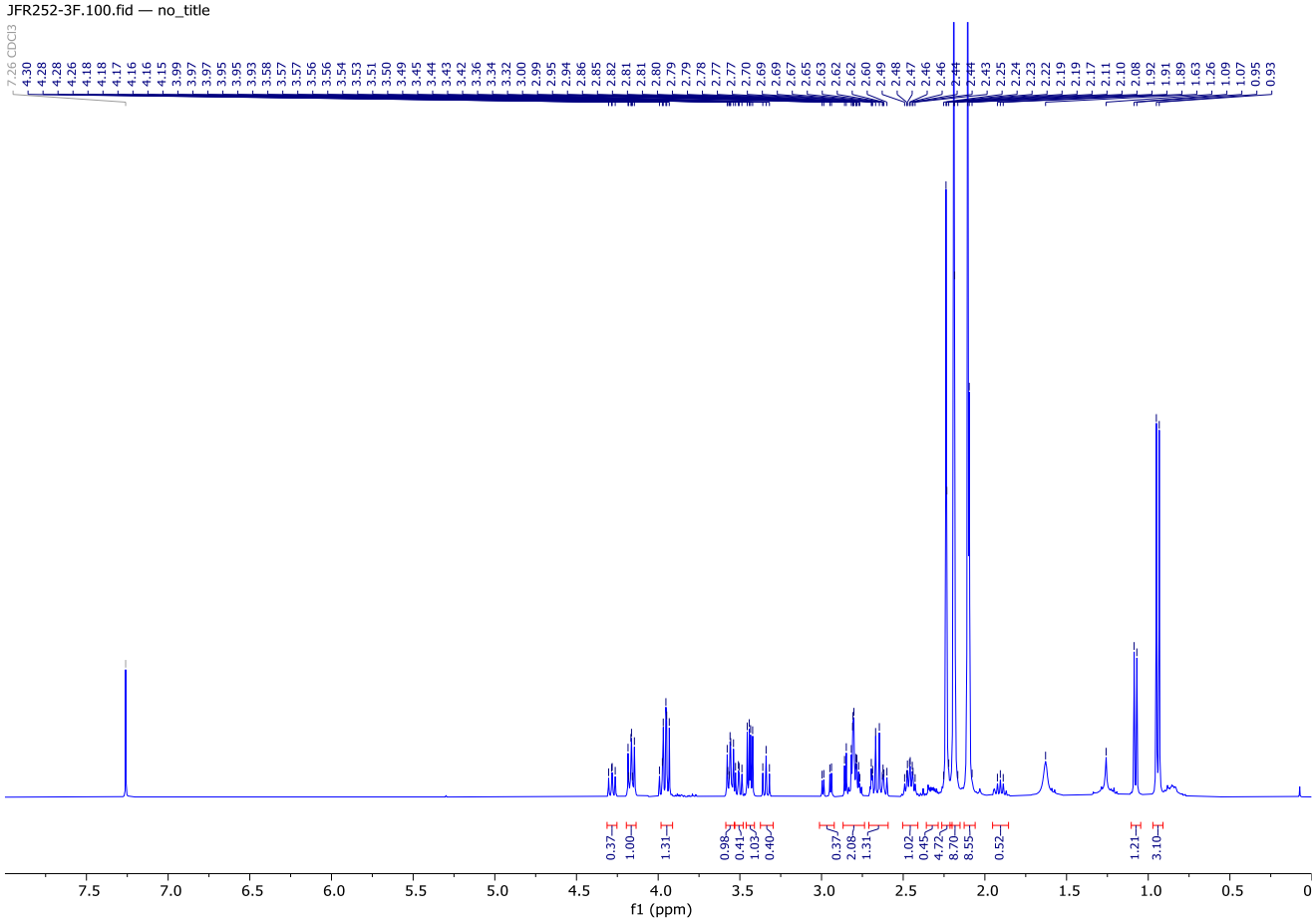
## 2-(4-Methyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3d



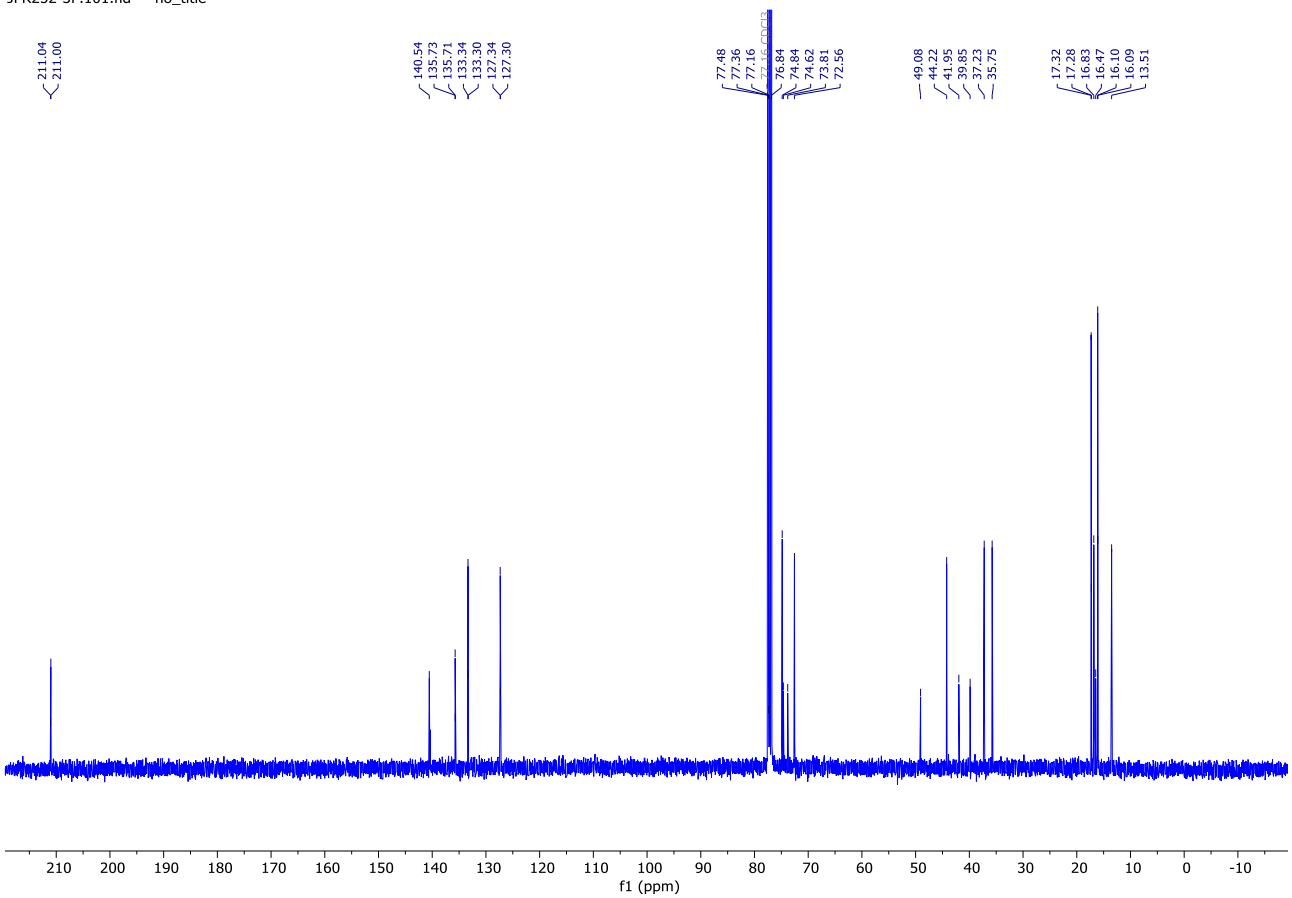

3d

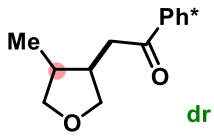
dr 70:30

JFR252-3F.100.fid — no_title




JFR252-3F.101.fid — no_title

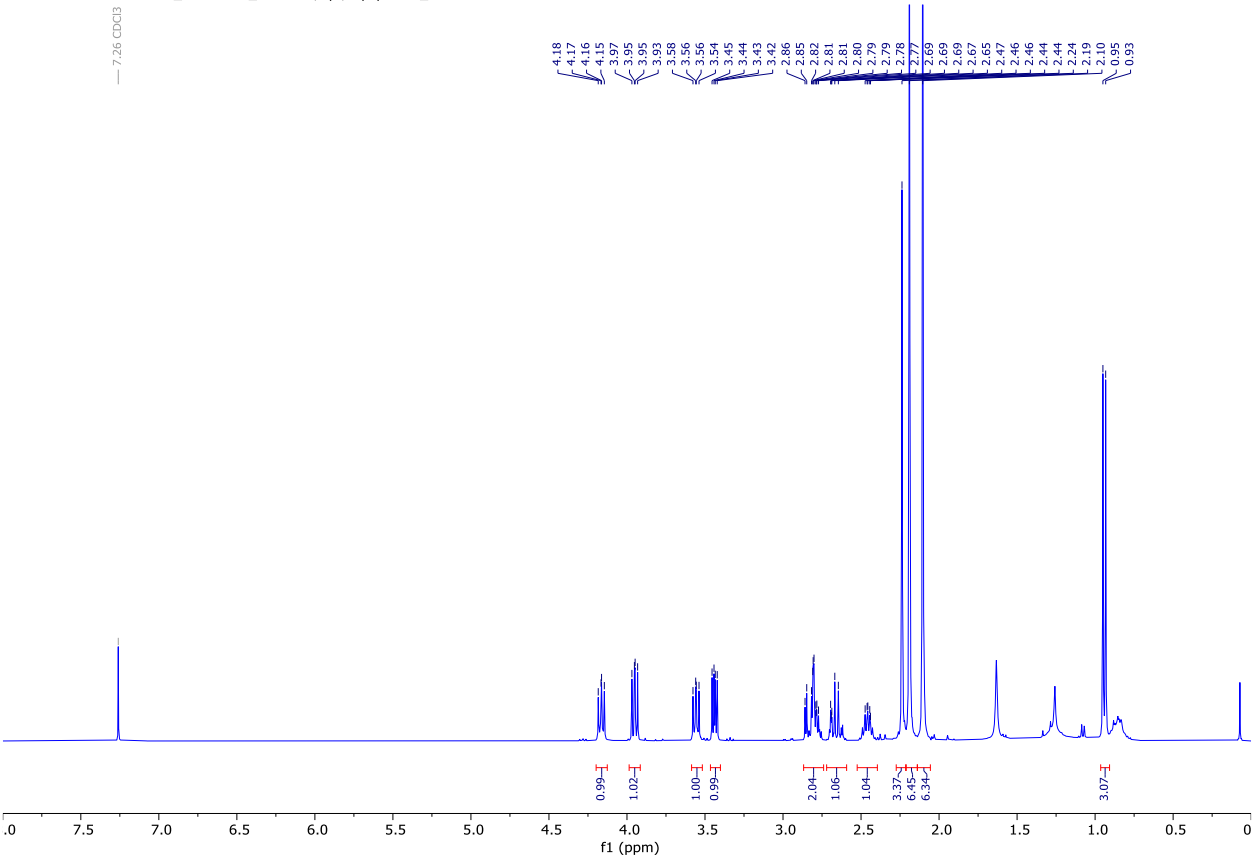




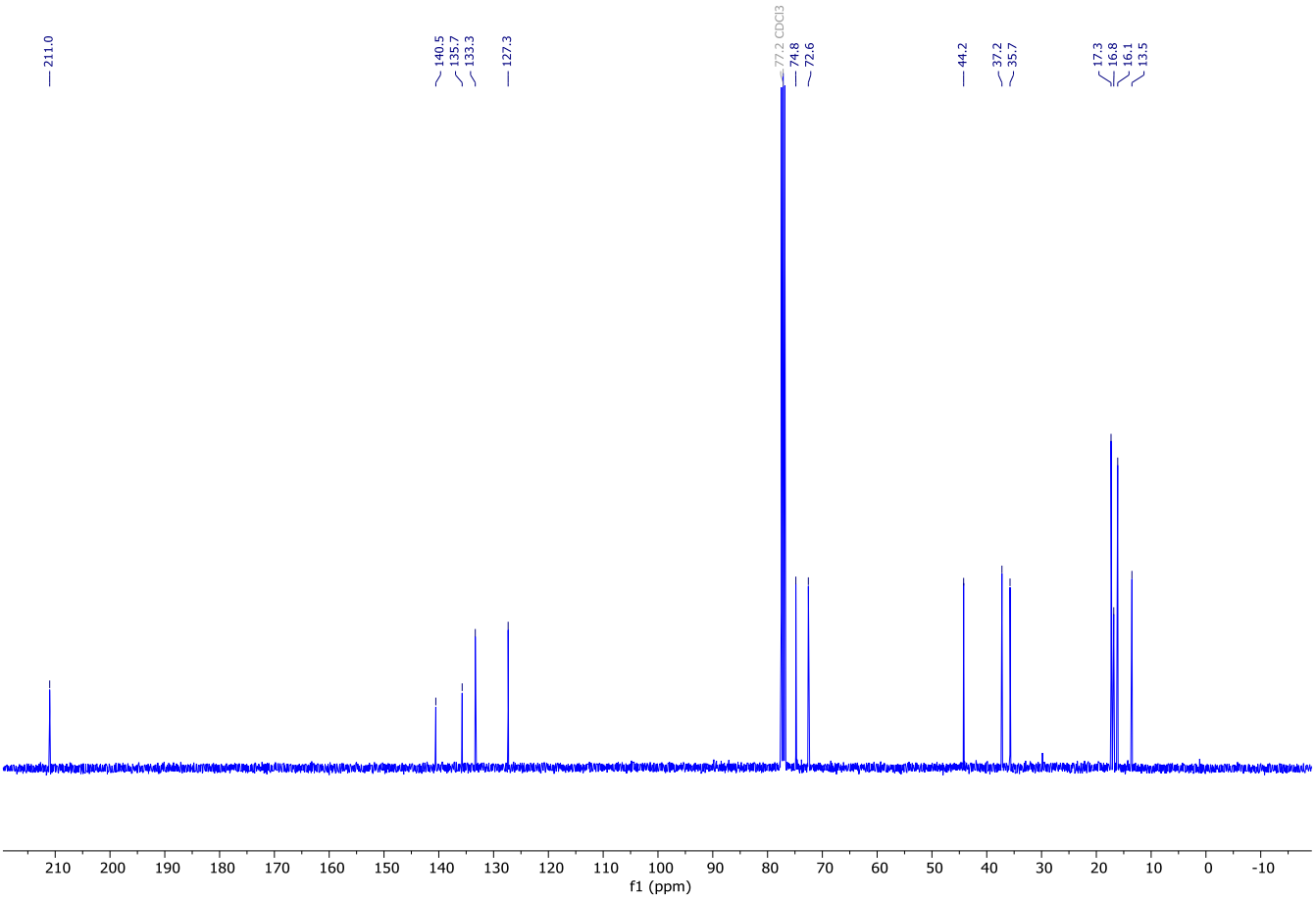

**3d**

**dr 95:5**

JFR253-2F2.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 29




JFR253-2F2.102.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 29



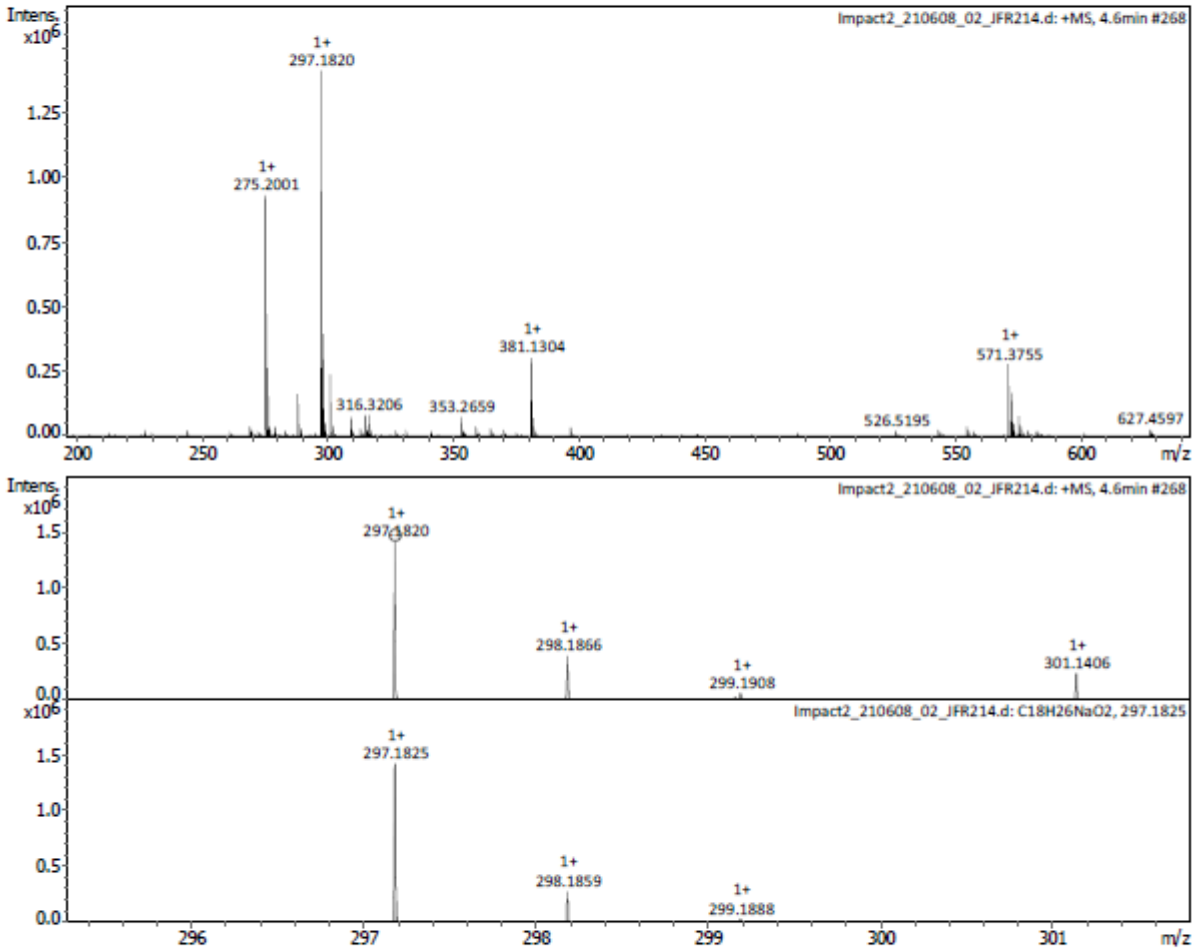
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210608_02_JFR214.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 6/8/2021 8:47:17 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

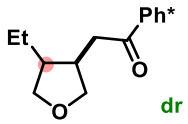
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 500 m/z | Set Collision Cell RF | 200.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 275.2001 | C18H27O2 | 275.2006 | C18H26O2 | 1.6 | 50.4 | M+H | 1+ |
| 297.1820 | C18H26NaO2 | 297.1825 | | 1.6 | 47.8 | M+Na | 1+ |
| 571.3755 | C36H52NaO4 | 571.3758 | | 0.5 | 107.9 | 2M+Na | 1+ |

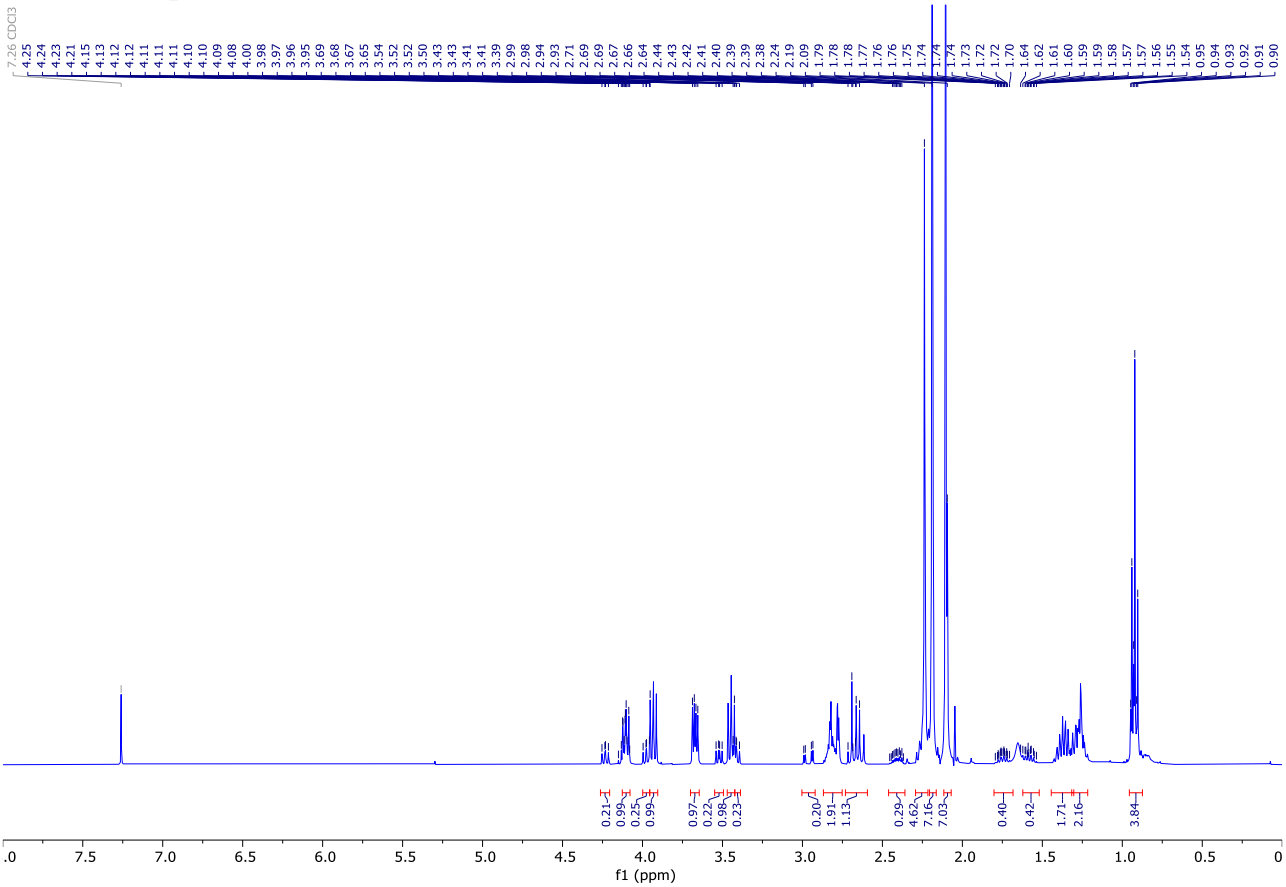
## 2-(4-Ethyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3e



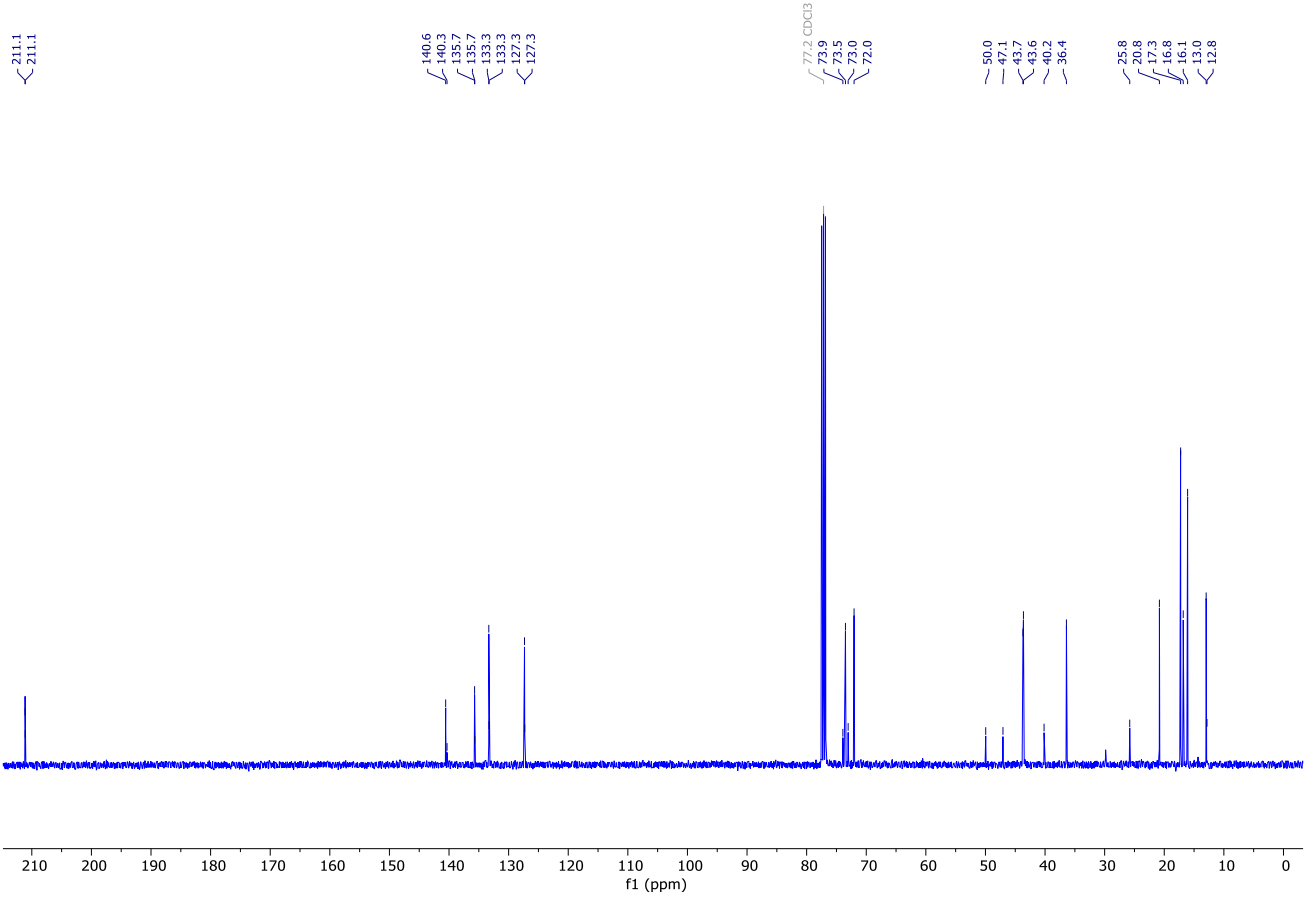

**3e**

**dr 81:19**

JFR346-2F.100.fid — no_title




JFR346-2F.102.fid — no_title



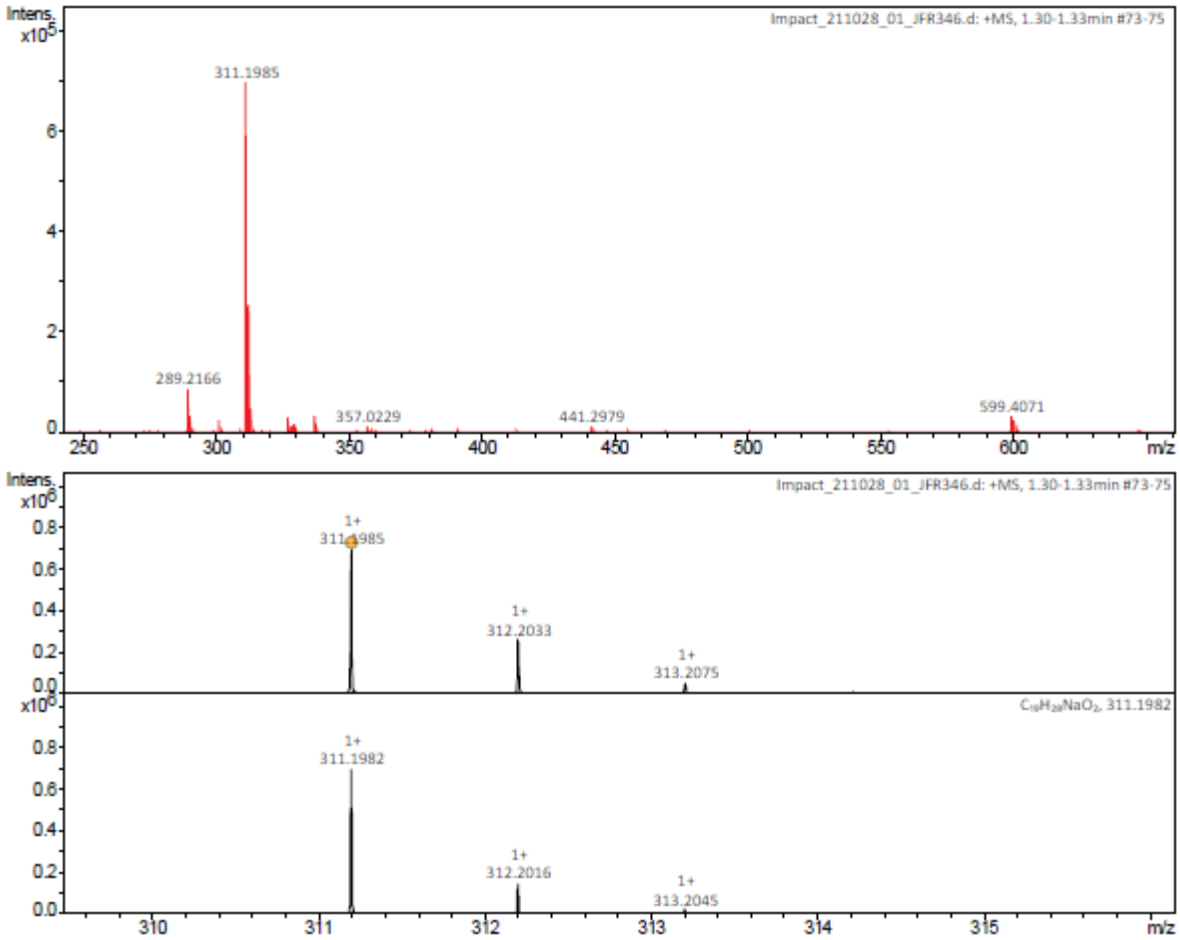
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact_211028_01_JFR346.d | | |
| Method | 210212 infusion cafeine 10 min.m | Acquisition Date | 28/10/2021 09:10:38 |
| Comment | | Instrument / Ser# | impact II 1825285.10099 |

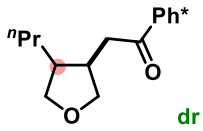
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1500 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | err [ppm] | mSigma |
|---|---|---|---|---|
| 289.2166 | C19H29O2 | 289.2162 | -1.3 | 104.1 |
| 311.1985 | C19H28NaO2 | 311.1982 | -1.0 | 94.4 |
| 599.4071 | C38H56NaO4 | 599.4071 | -0.1 | 202.3 |

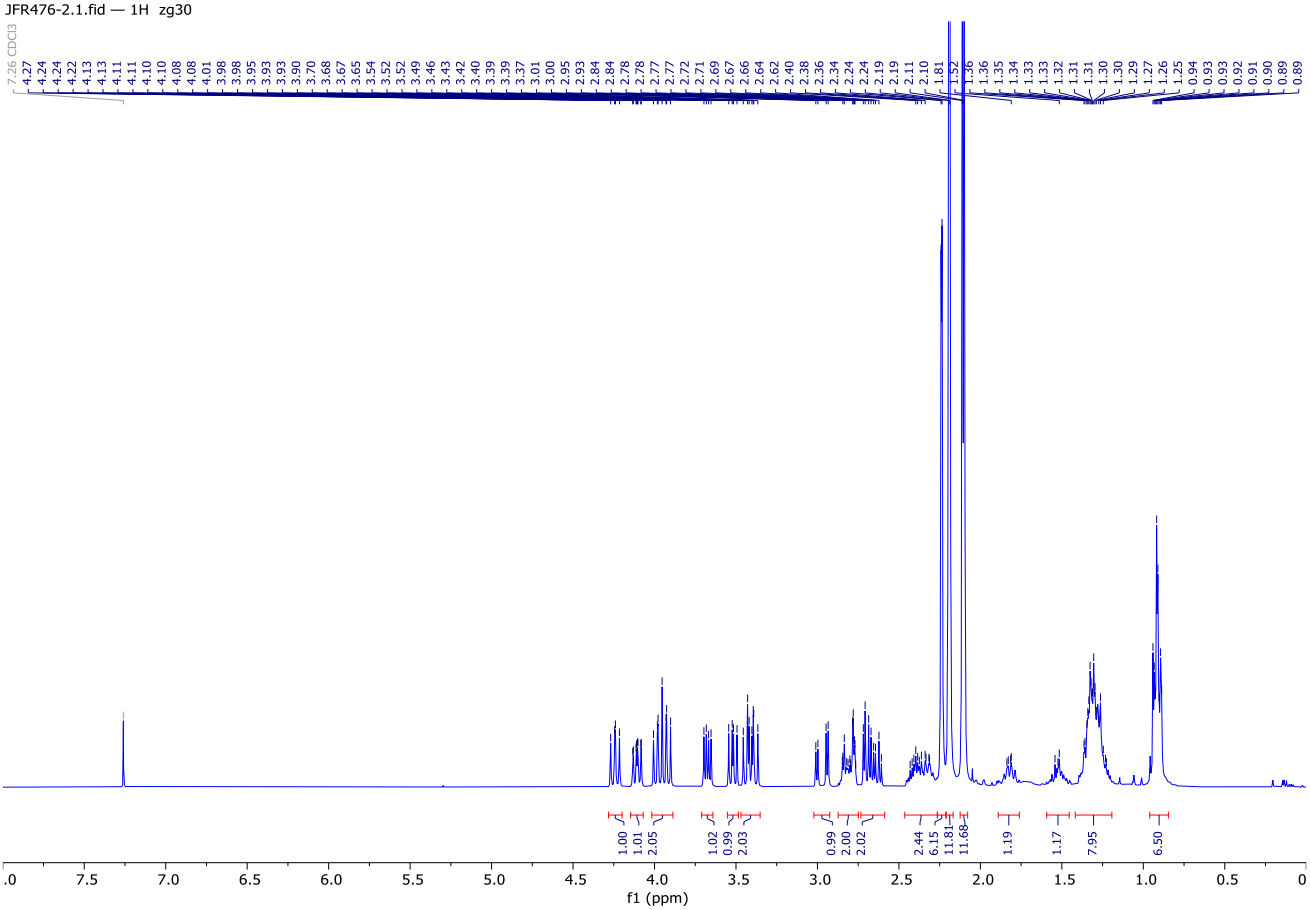
**1-(2,3,4,5,6-Pentamethylphenyl)-2-(4-propyltetrahydrofuran-3-yl)ethenone 3f [2956413-75-3/2956413-74-2]**



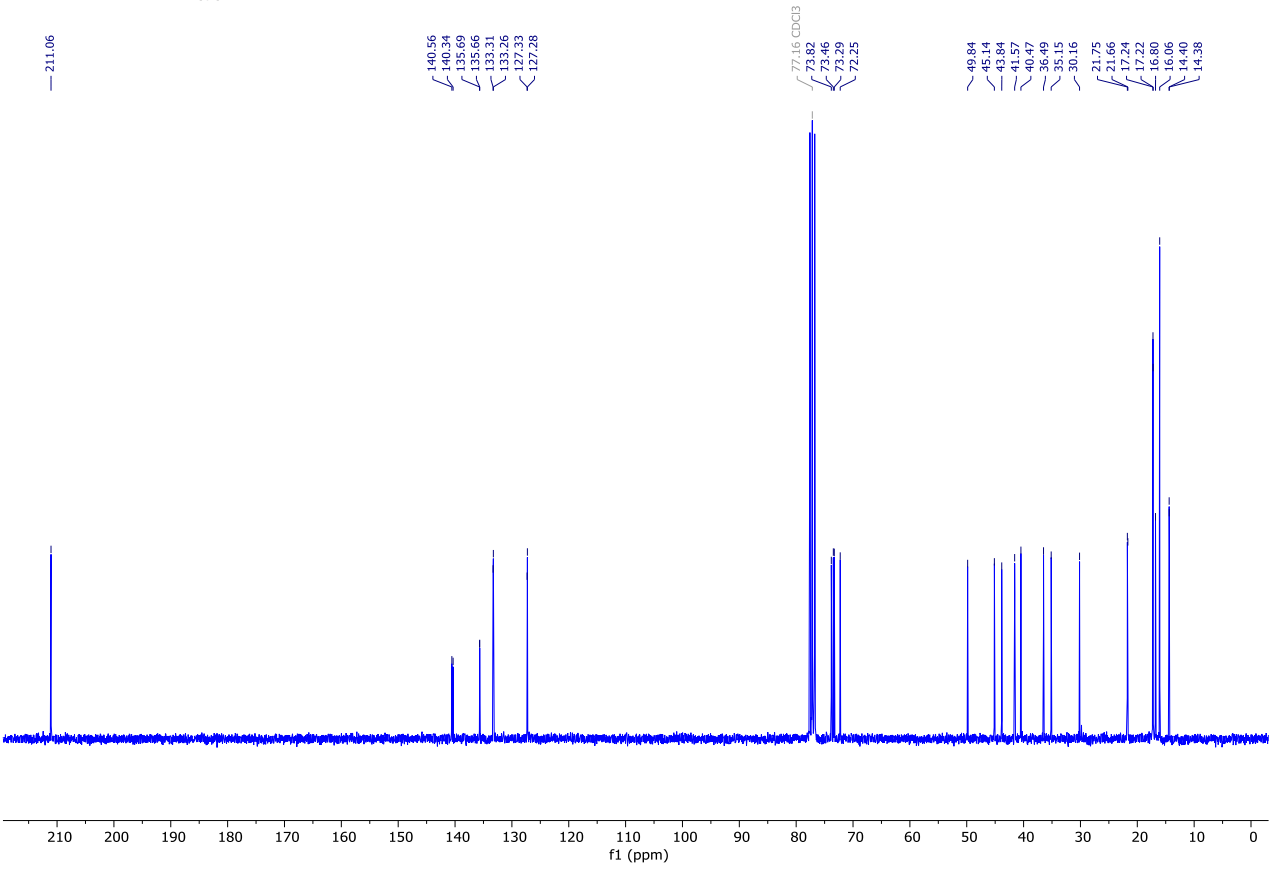

**3f**

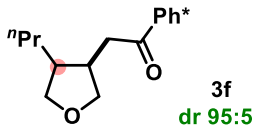
**dr 50:50**

JFR476-2.1.fid — 1H zg30




JFR476-2.2.fid — 13C{1H} zgpg30 RD=2s

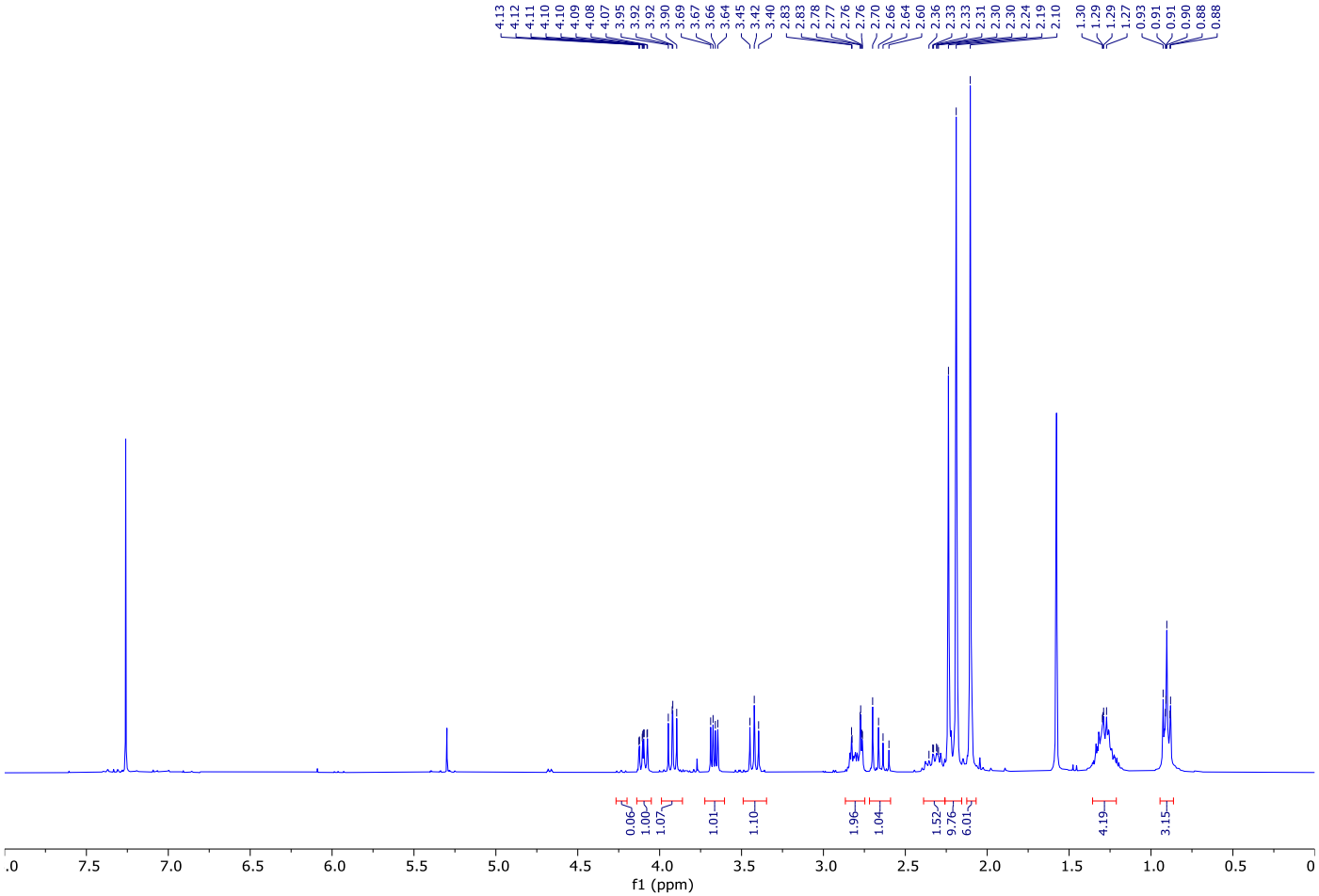





**3f**

**dr 95:5**

JFR650-2.1.fid — 1H zg30



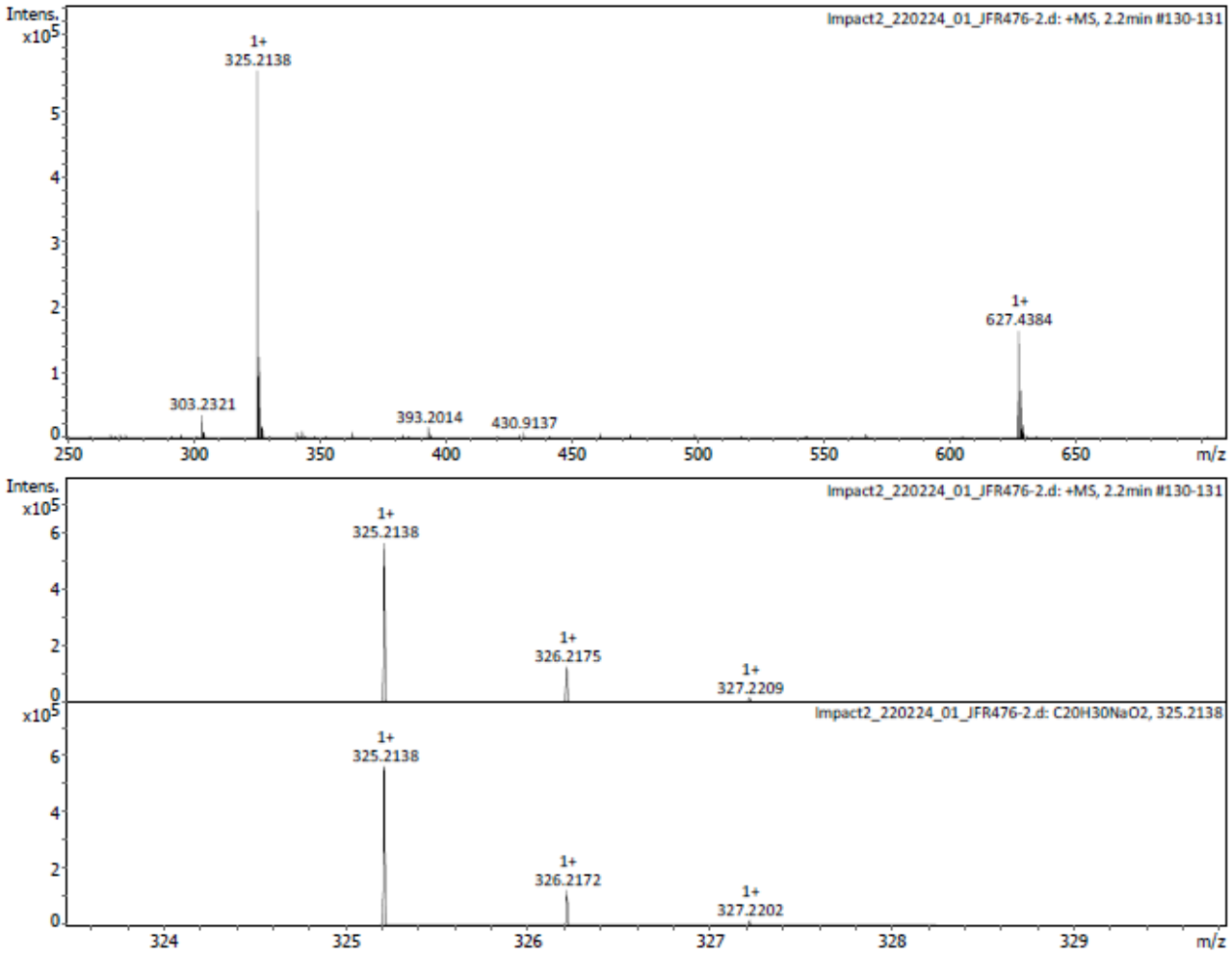
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220224_01_JFR476-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/24/2022 10:54:08 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10001 |

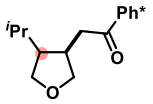
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 3000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 303.2321 | C20H31O2 | 303.2319 | C20H30O2 | -0.7 | 14.1 | M+H | 1+ |
| 325.2138 | C20H30NaO2 | 325.2138 | | 0.1 | 0.9 | M+Na | 1+ |
| 627.4384 | C40H60NaO4 | 627.4384 | | -0.0 | 7.6 | 2M+Na | 1+ |

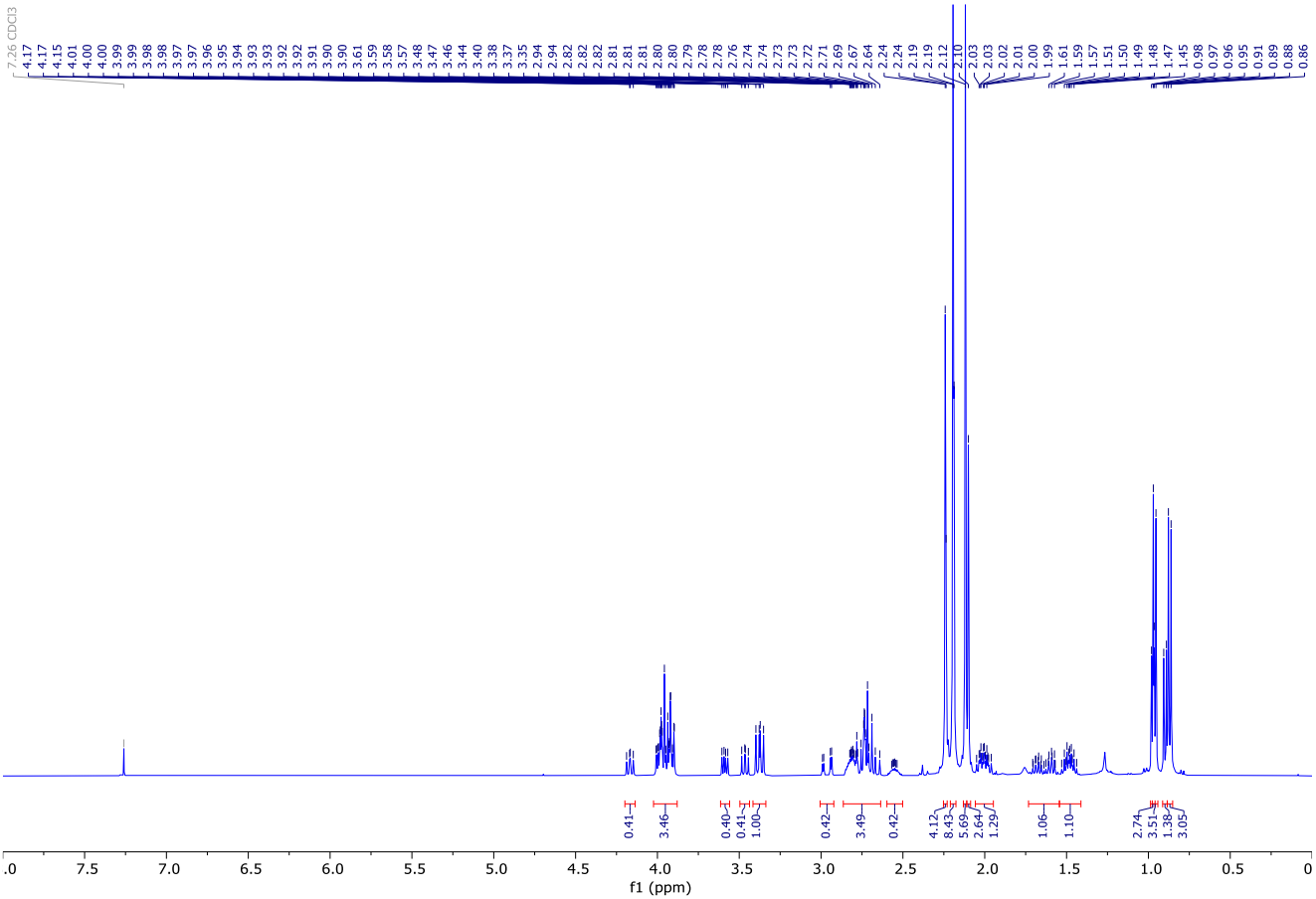
## 2-(5-2-(4-Isopropyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3g



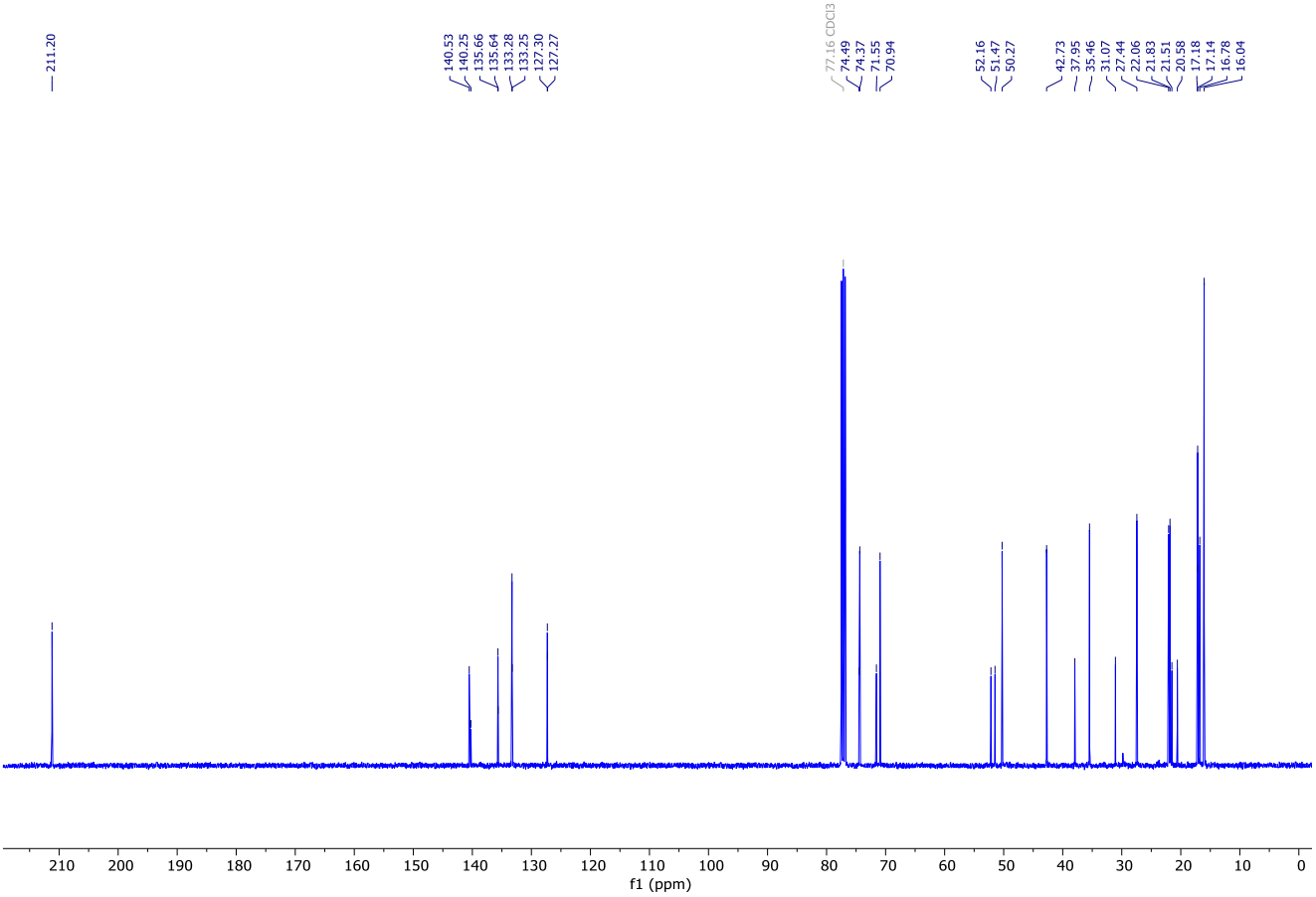

3g

dr 70:30

JFR328-2F.100.fid — no_title




JFR328-2F.102.fid — no_title



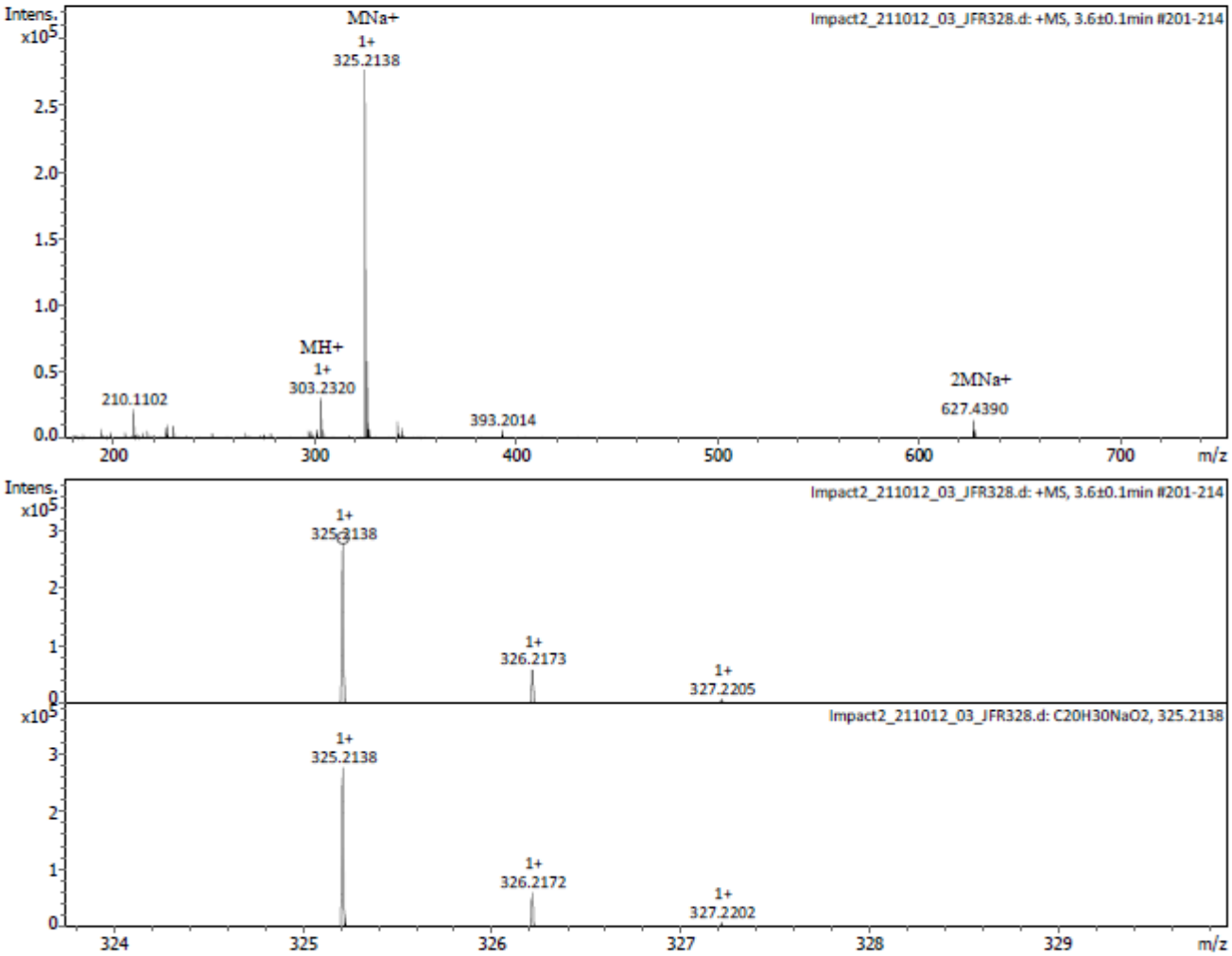
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211012_03_JFR328.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/12/2021 9:44:38 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

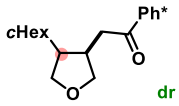
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 303.2320 | C20H31O2 | 303.2319 | C20H30O2 | -0.5 | 2.4 | M+H | 1+ |
| 325.2138 | C20H30NaO2 | 325.2138 | | -0.0 | 4.7 | M+Na | 1+ |
| 627.4390 | C40H60NaO4 | 627.4384 | | -1.1 | 8.5 | 2M+Na | 1+ |

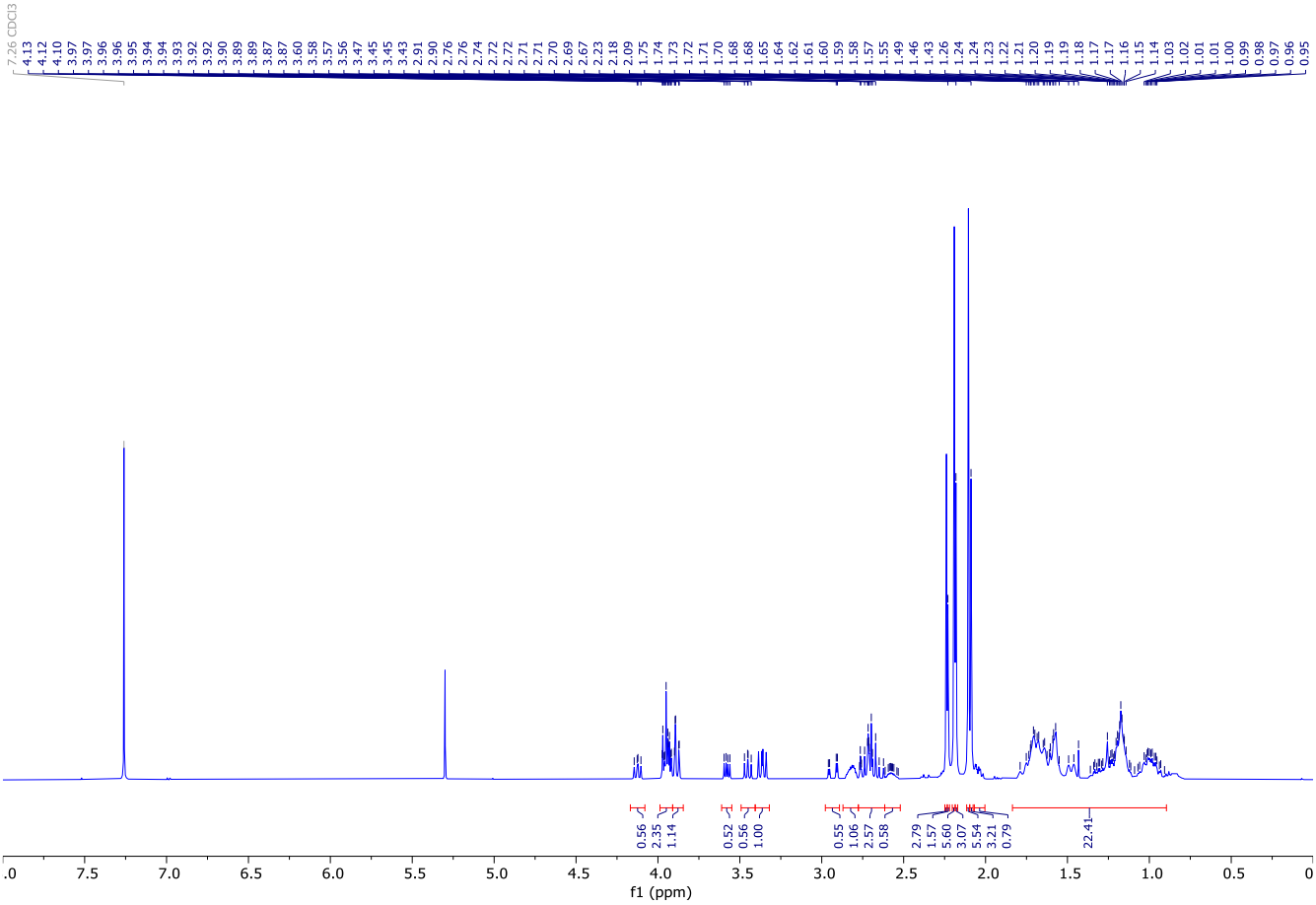
## 2-(4-Cyclohexyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3h



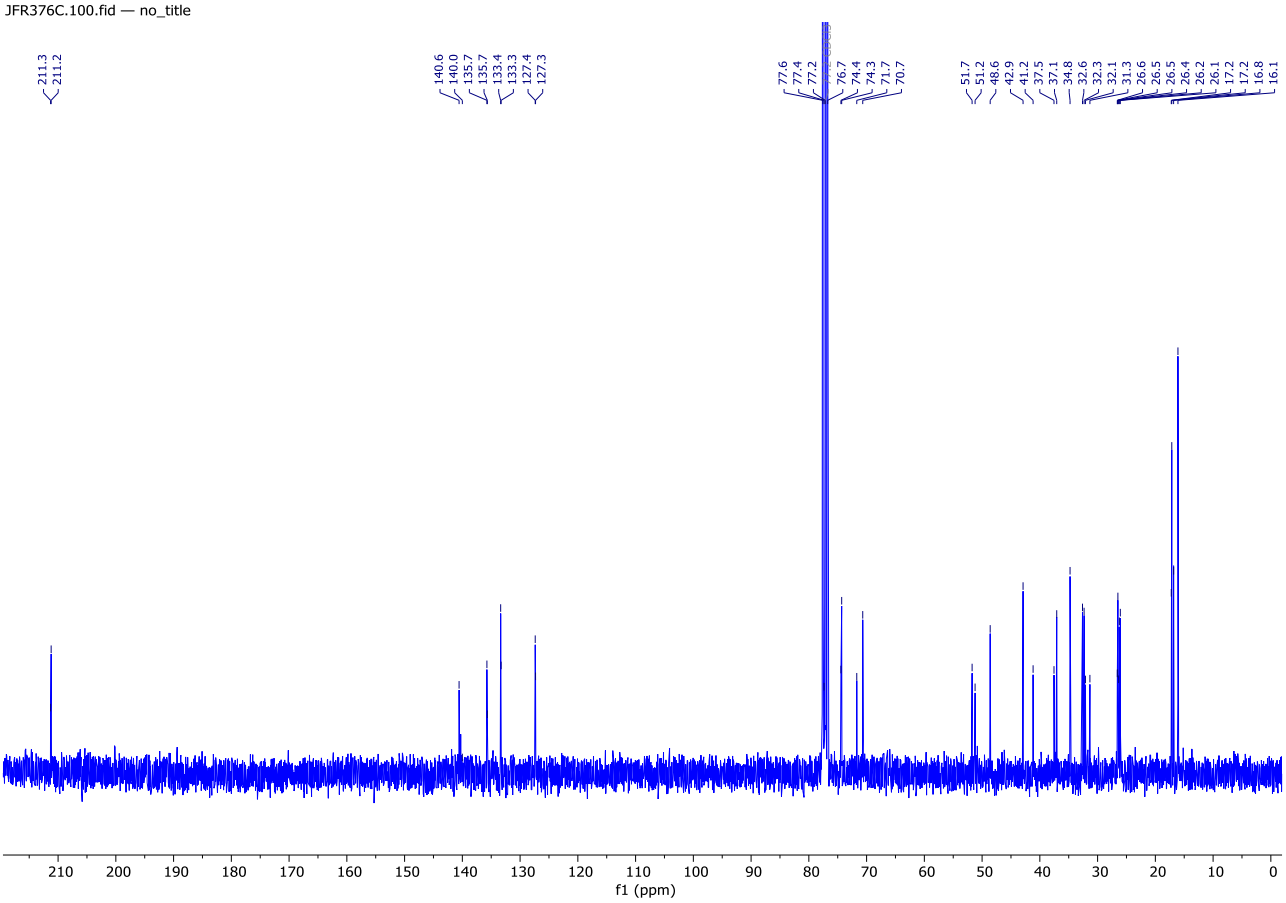

3h

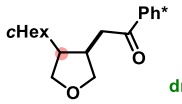
dr 65:35

JFR376-2F.100.fid — no_title




JFR376C.100.fid — no_title

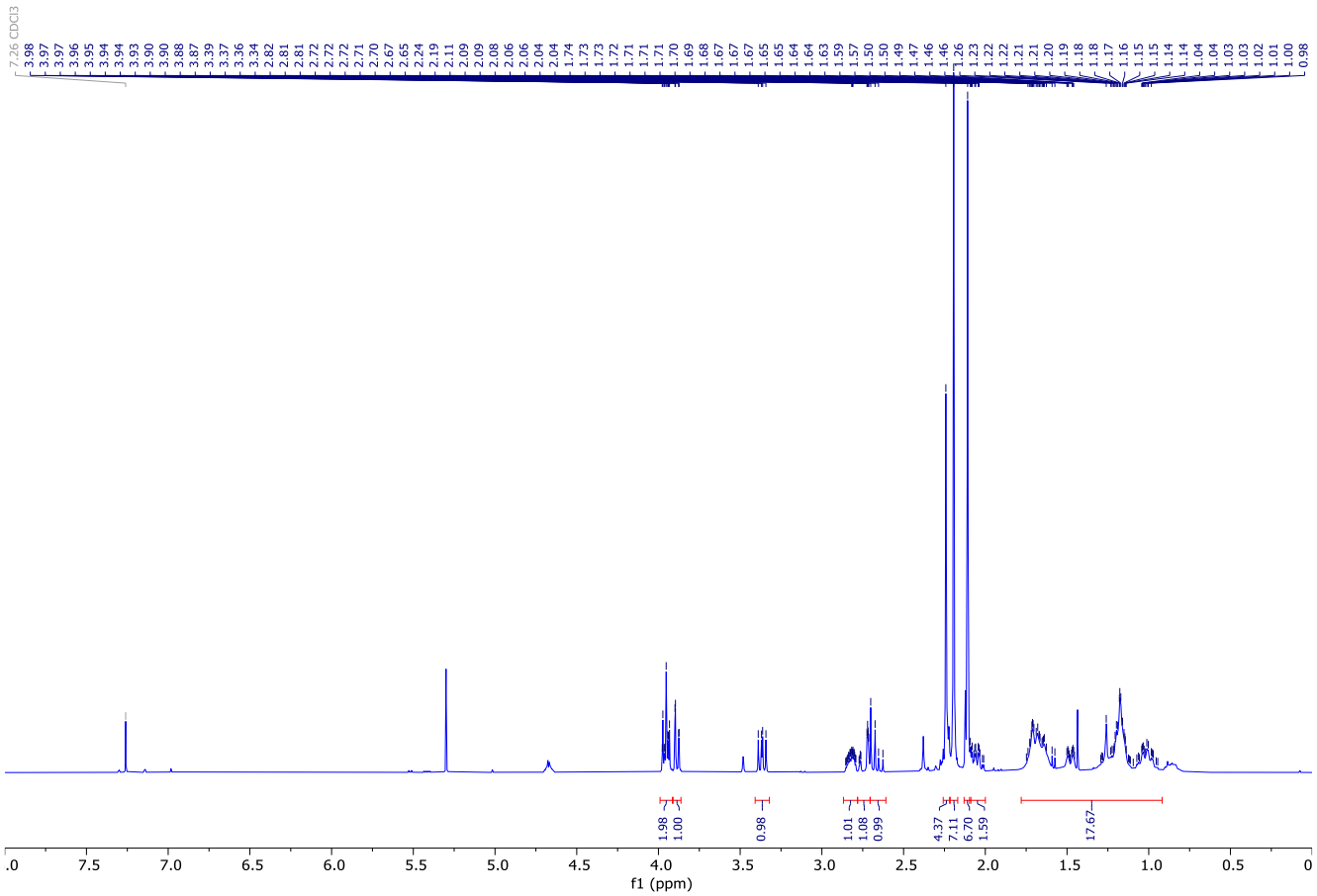




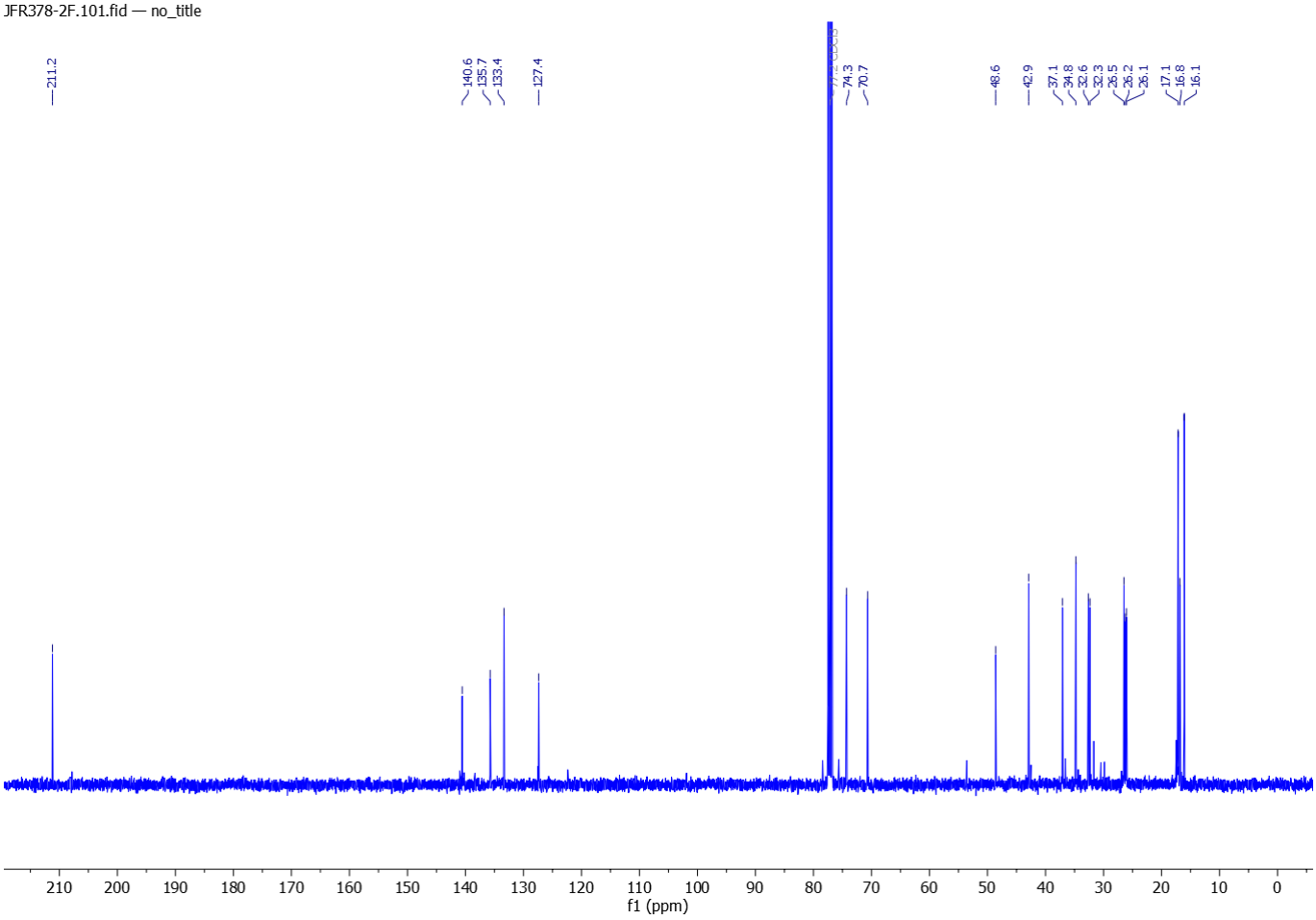

**3h**

**dr > 99:1**

JFR378-2F.100.fid — no_title




JFR378-2F.101.fid — no_title



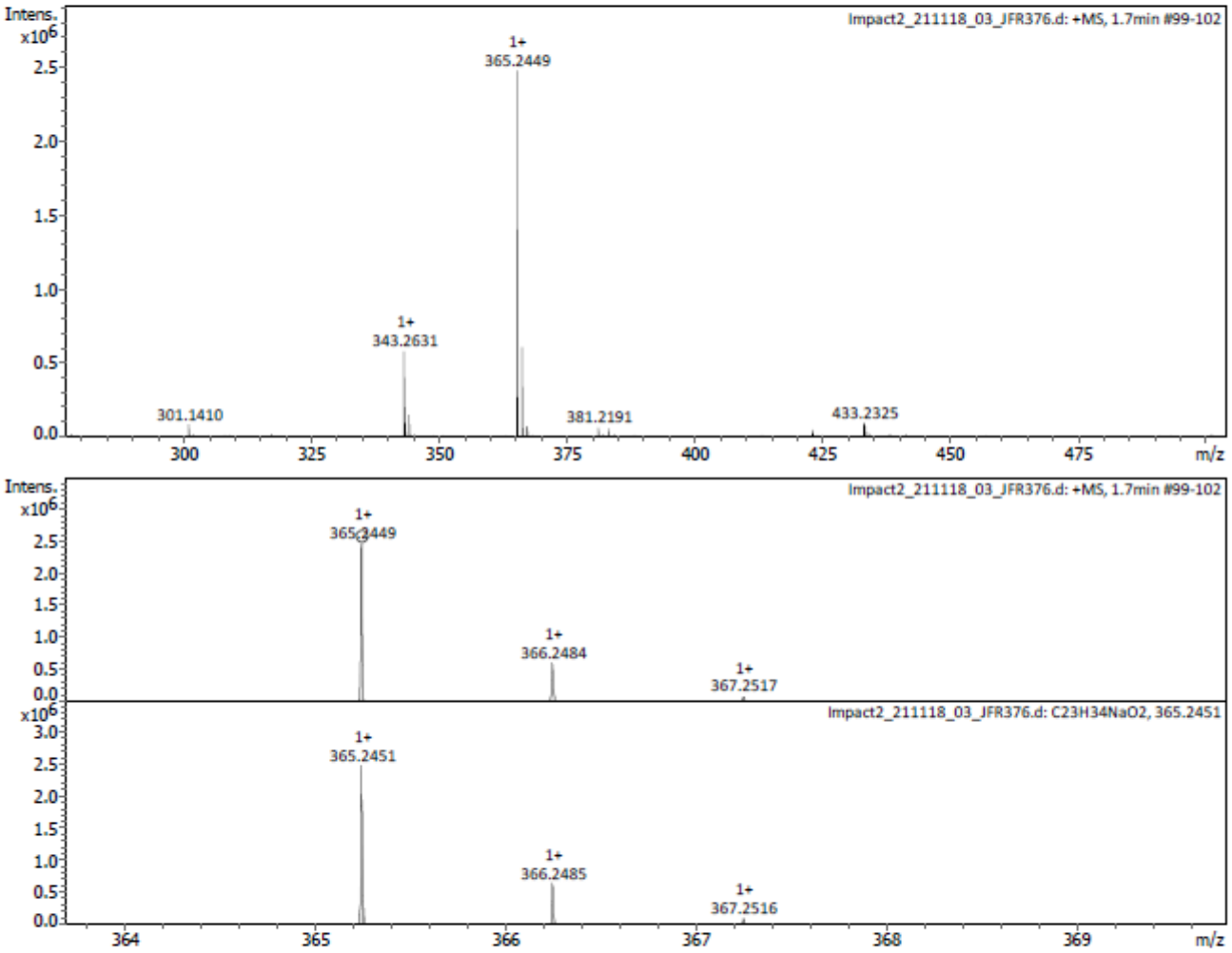
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211118_03_JFR376.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/18/2021 10:14:50 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10091 |

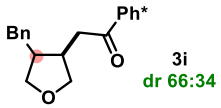
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 343.2631 | C23H35O2 | 343.2632 | C23H34O2 | 0.2 | 1.7 | M+H | 1+ |
| 365.2449 | C23H34NaO2 | 365.2451 | | 0.4 | 5.3 | M+Na | 1+ |

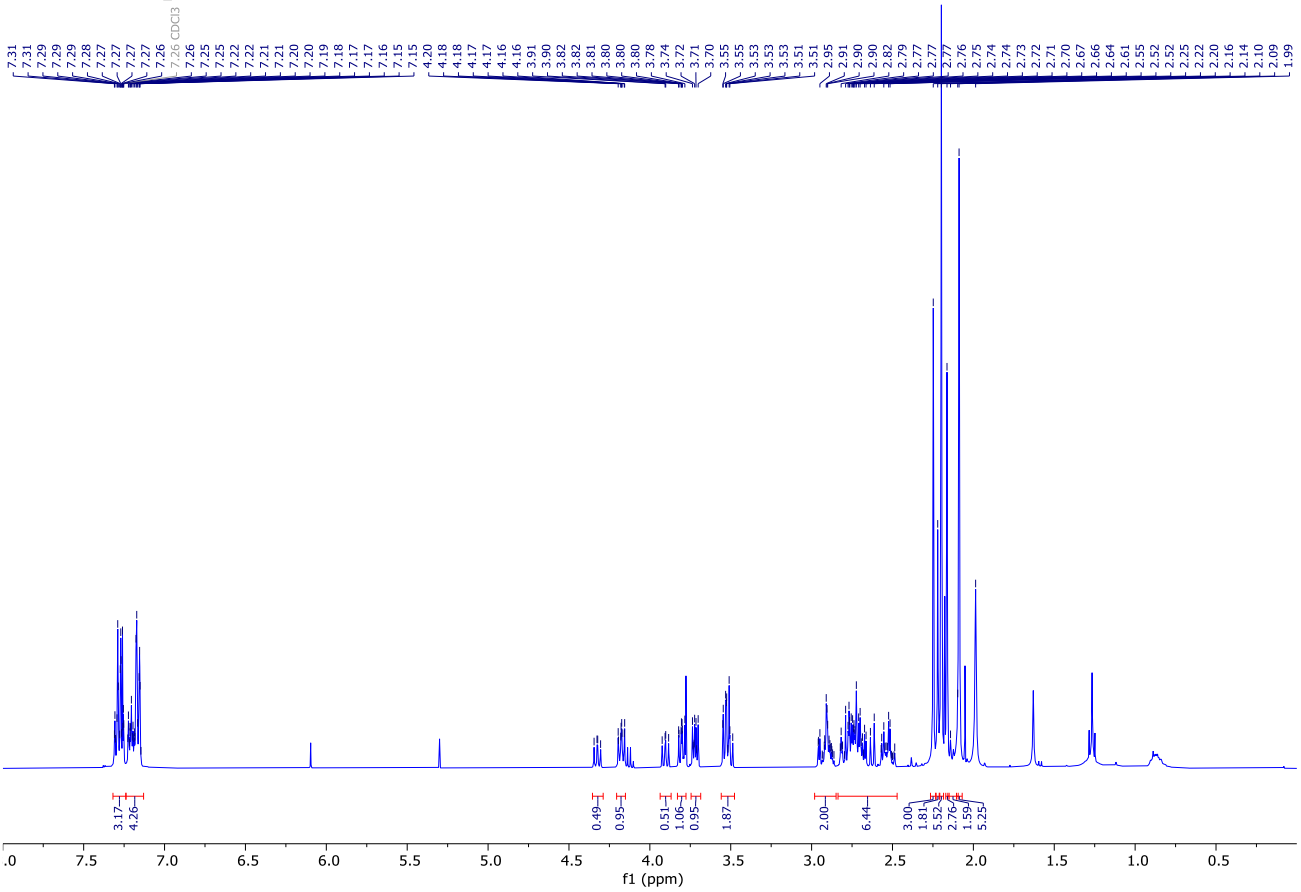
## 2-(4-Benzyltetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3i



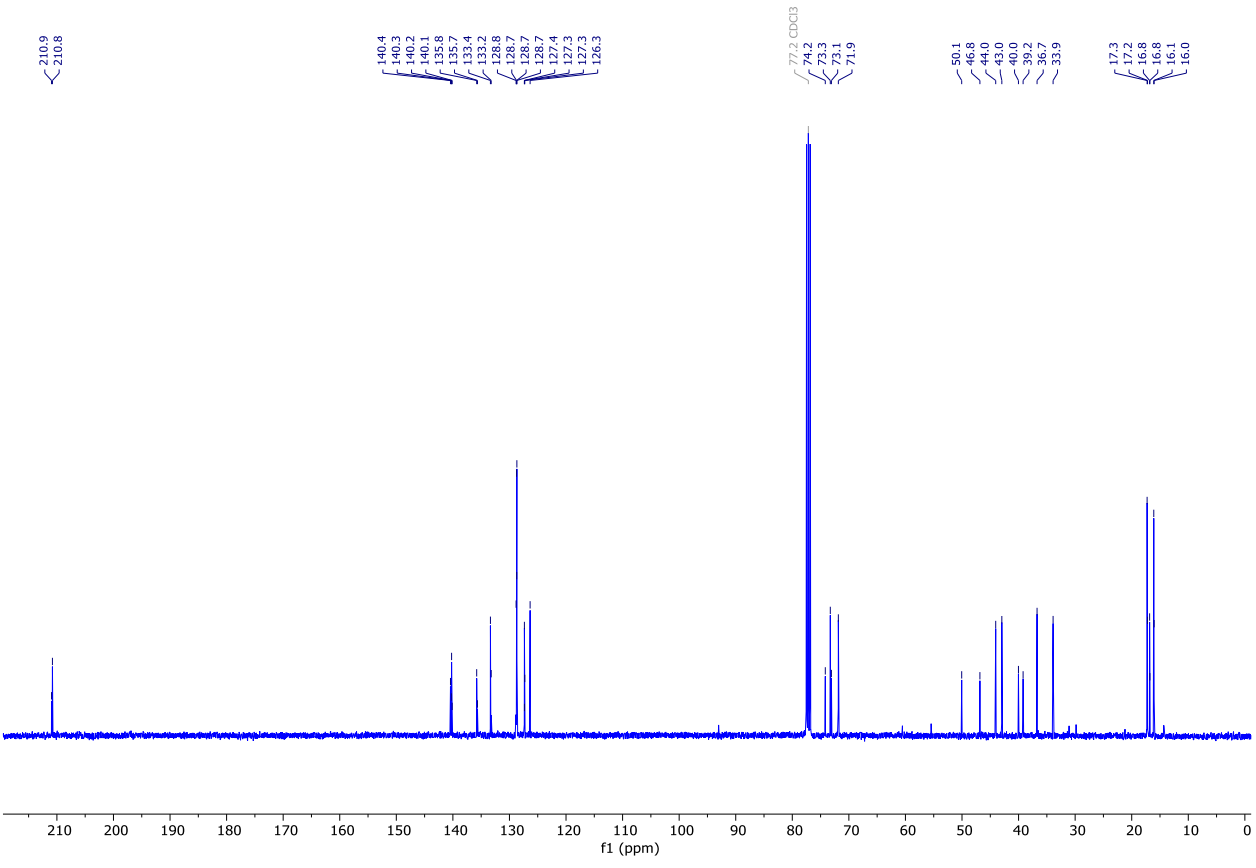

3i

dr 66:34

JFR520-2.100.fid — no_title




JFR520-2.102.fid — no_title



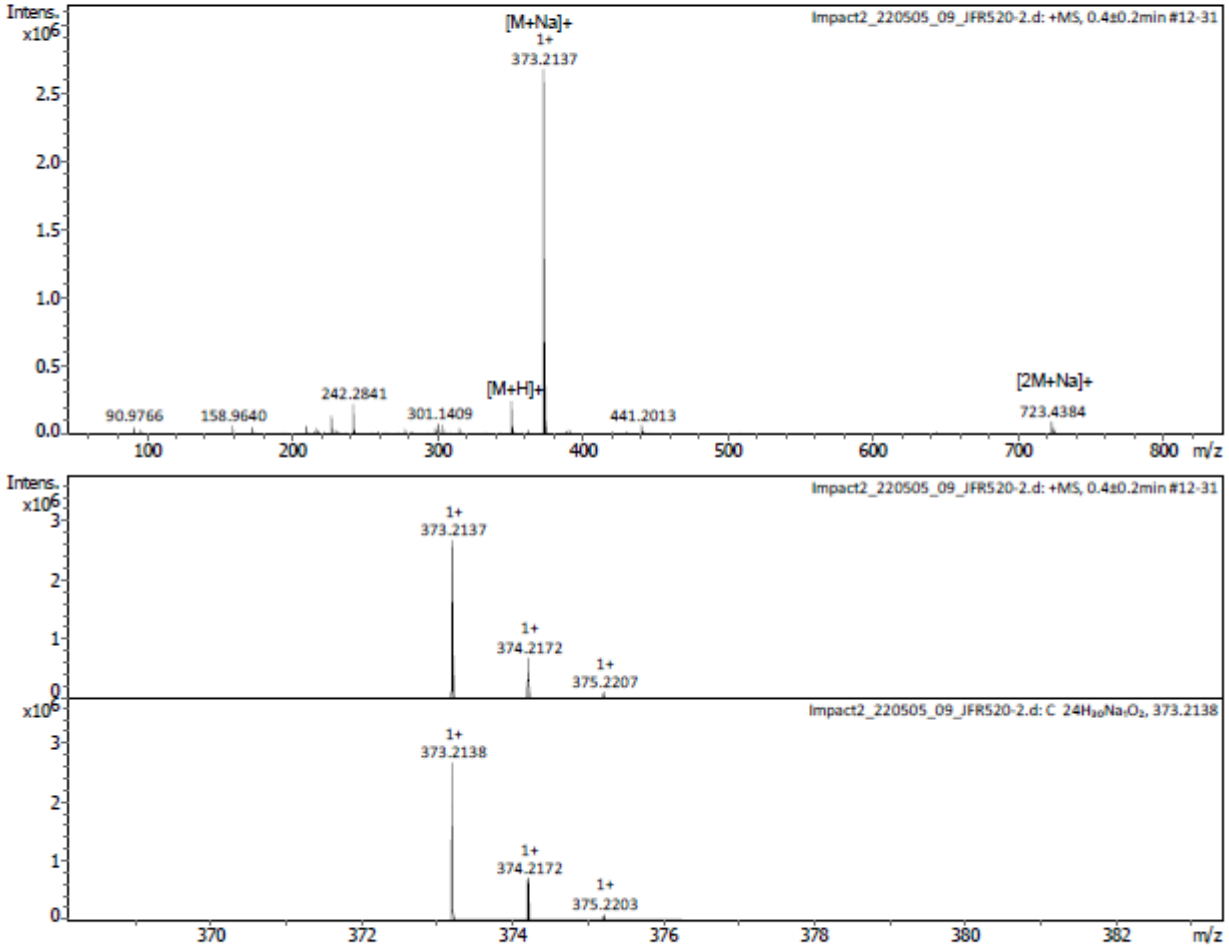
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220505_09_JFR520-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 5/5/2022 4:29:21 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

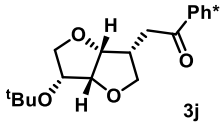
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1200 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



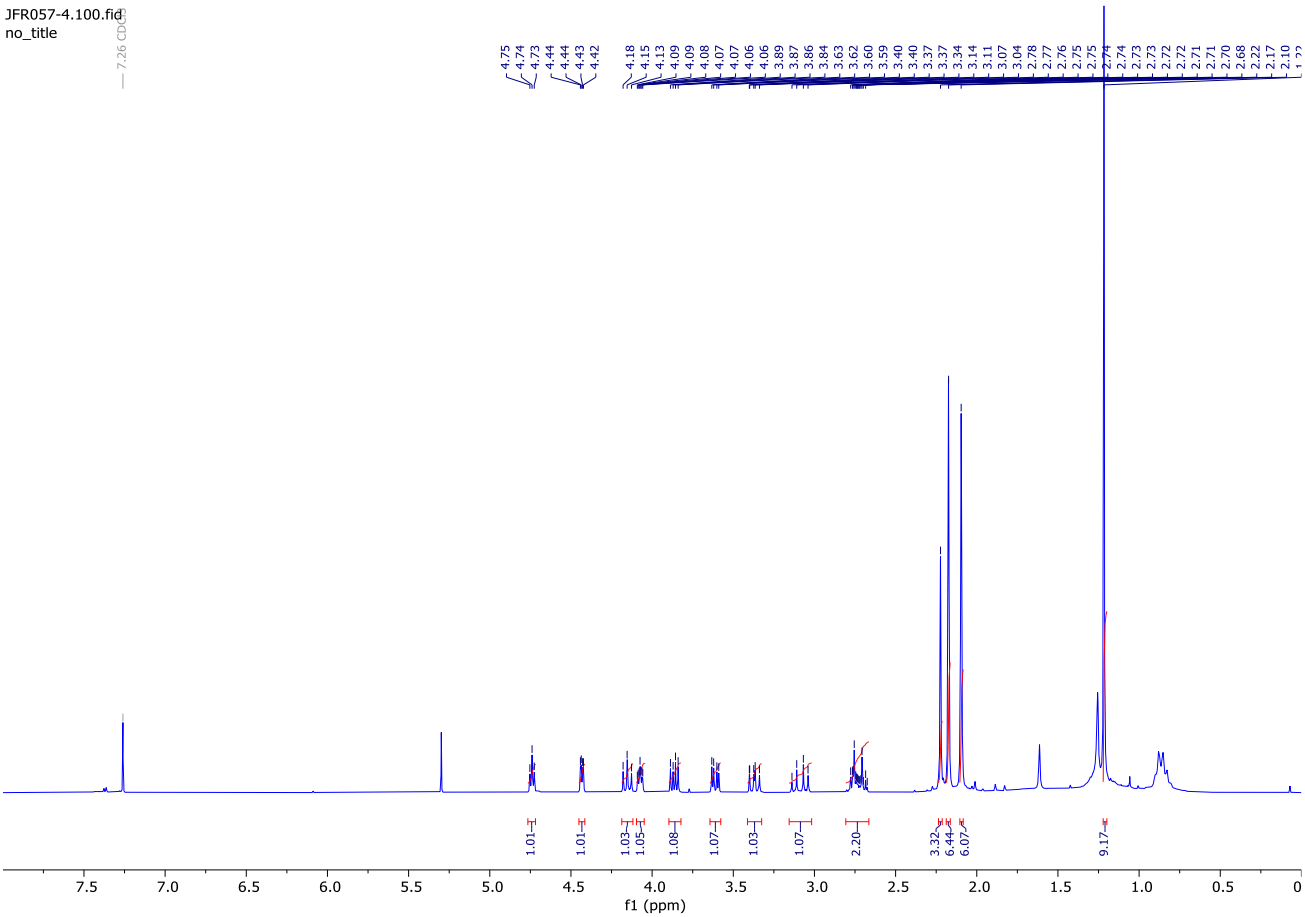

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 351.2317 | C24H31O2 | 351.2319 | C24H30O2 | 0.3 | 6.0 | M+H | 1+ |
| 373.2137 | C24H30NaO2 | 373.2138 | | 0.3 | 5.3 | M+Na | 1+ |
| 723.4384 | C48H60NaO4 | 723.4384 | | -0.0 | 17.0 | 2M+Na | 1+ |

## 2-((3R,6S)-6-(Tert-butoxy)hexahydrofuro[3,2-b]furan-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3j

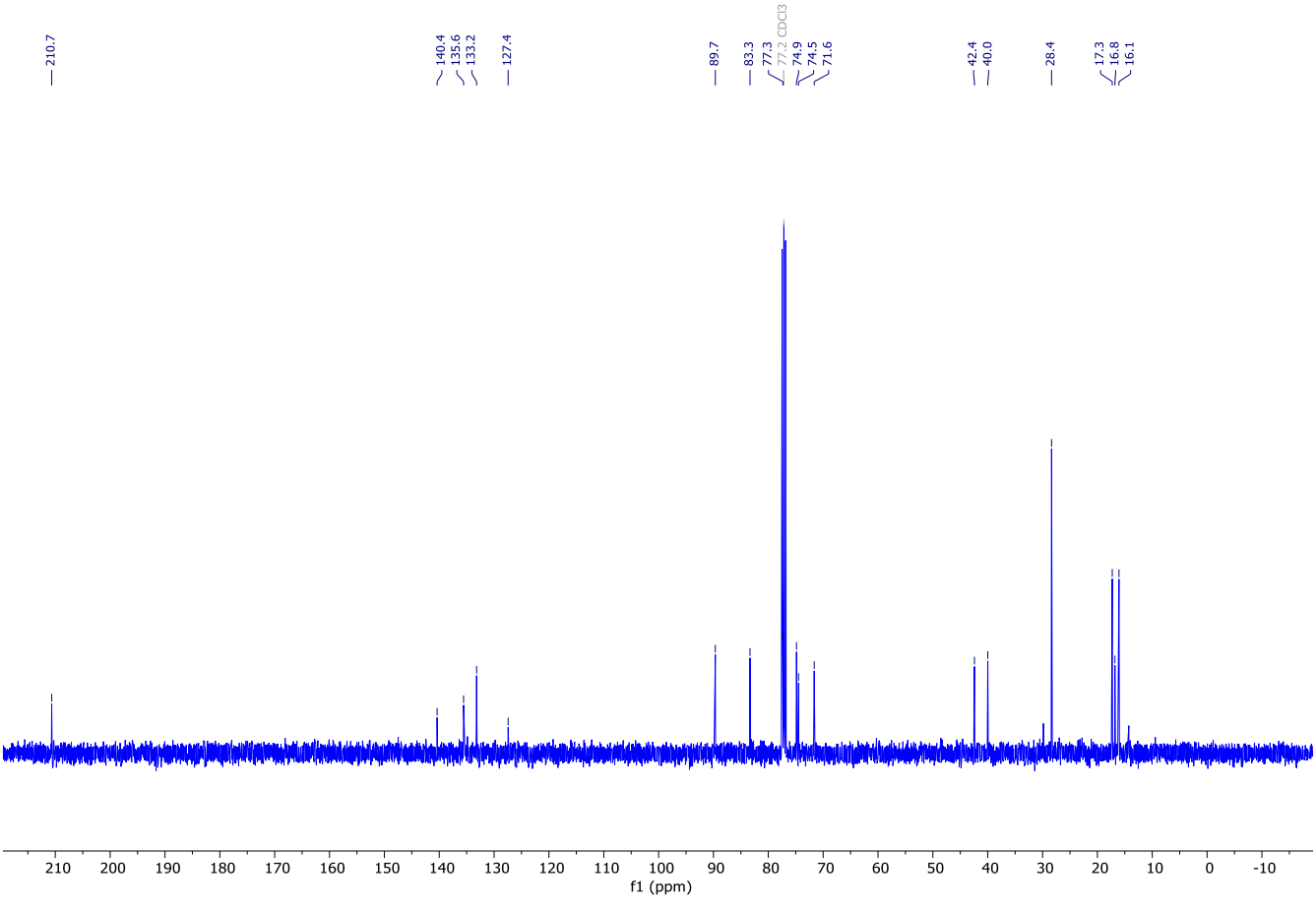



3j

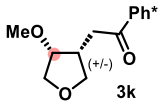
JFR057-4.100.fid
no_title



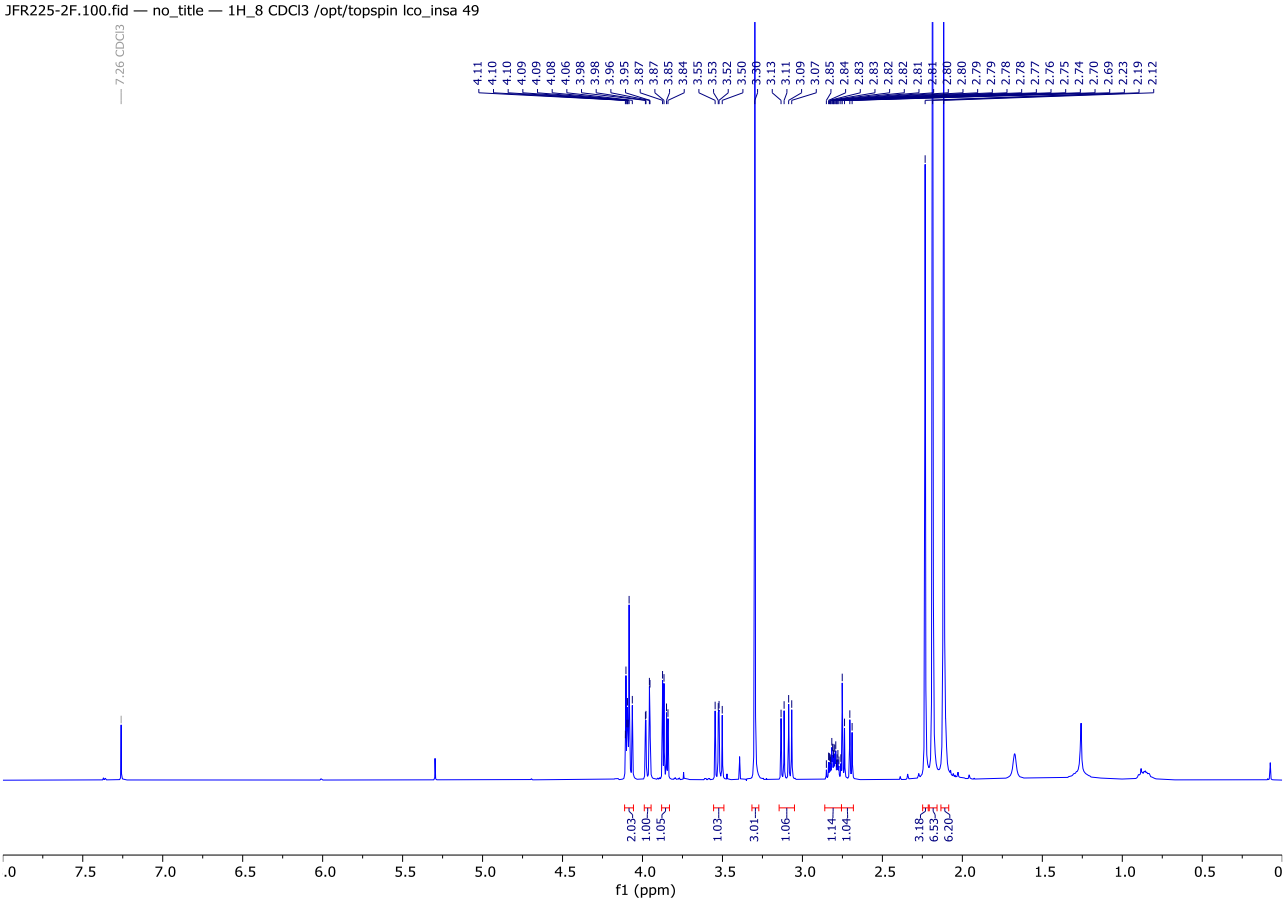

JFR057-4.102.fid — no_title — 13C_CPD_128 CDCl3 /opt/topspin lco_insa 56



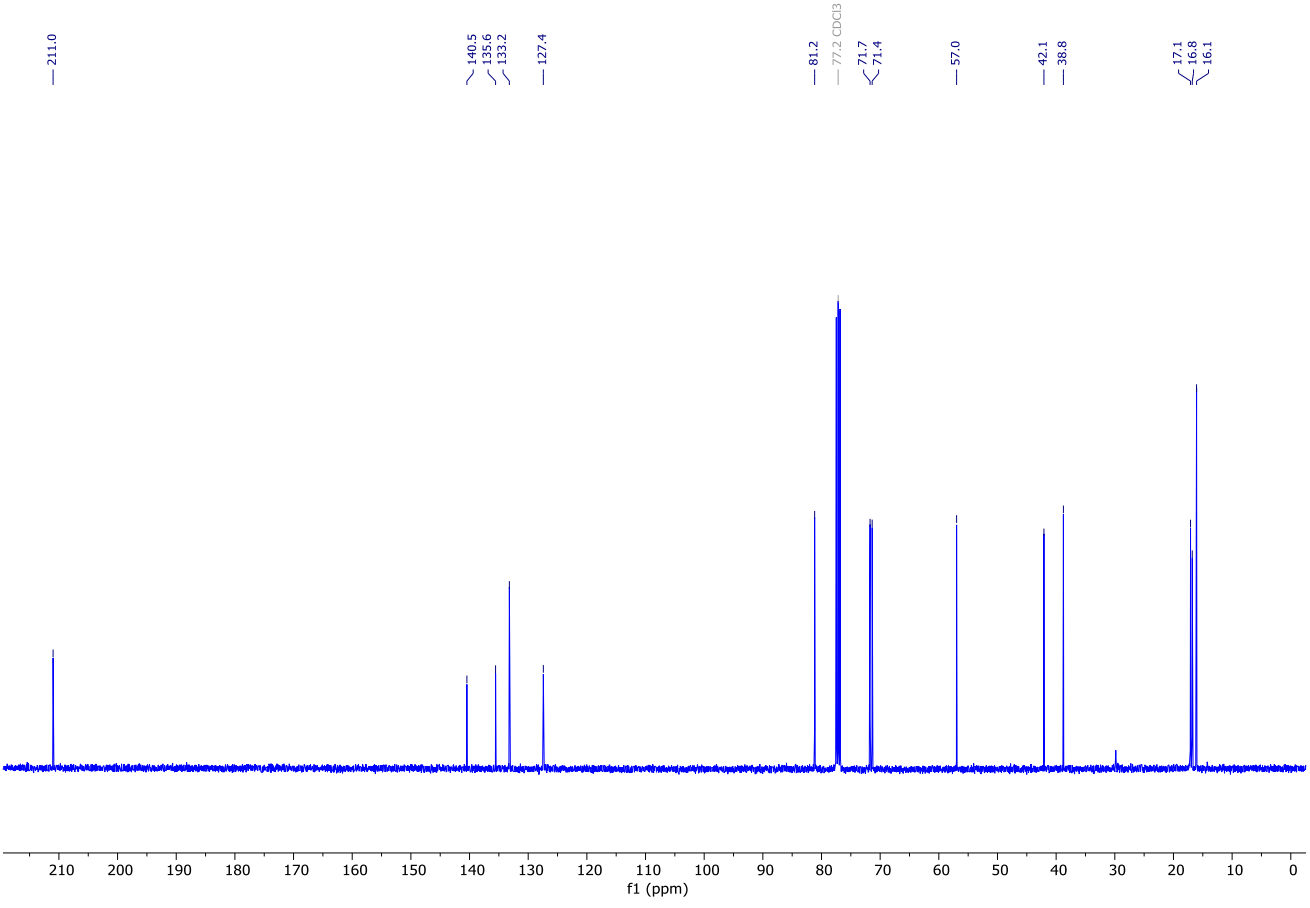
**(±)-2-((3*R*,4*R*)-4-Methoxytetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3k [2956413-76-4]**




JFR225-2F.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 49




JFR225-2F.103.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 49



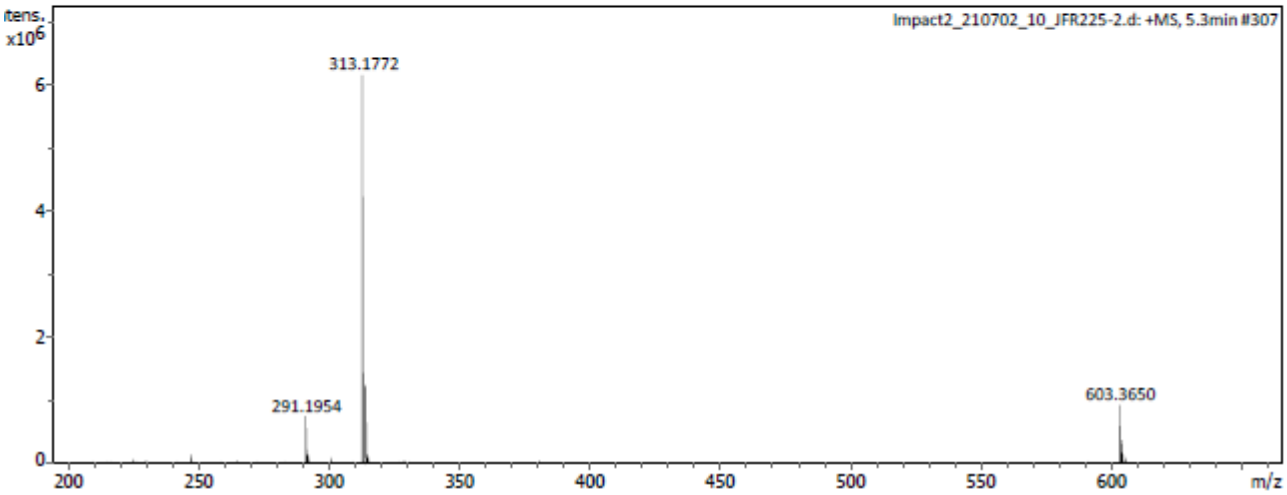
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

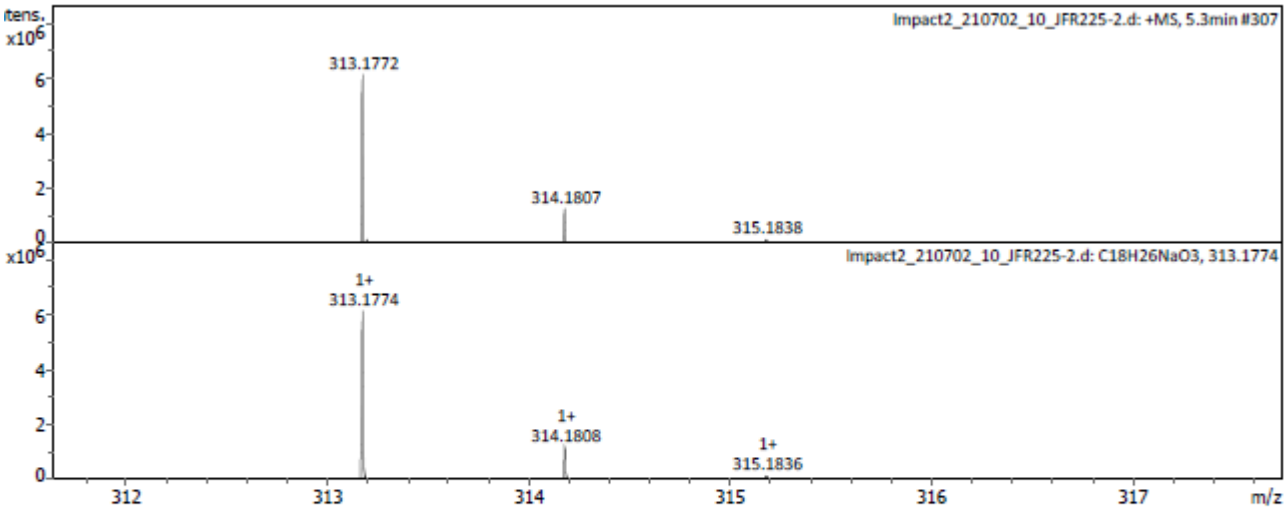
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210702_10_JFR225-2.d | | |
| Method | LHCEP_n5-.m | Acquisition Date | 7/2/2021 2:52:23 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

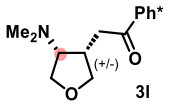
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



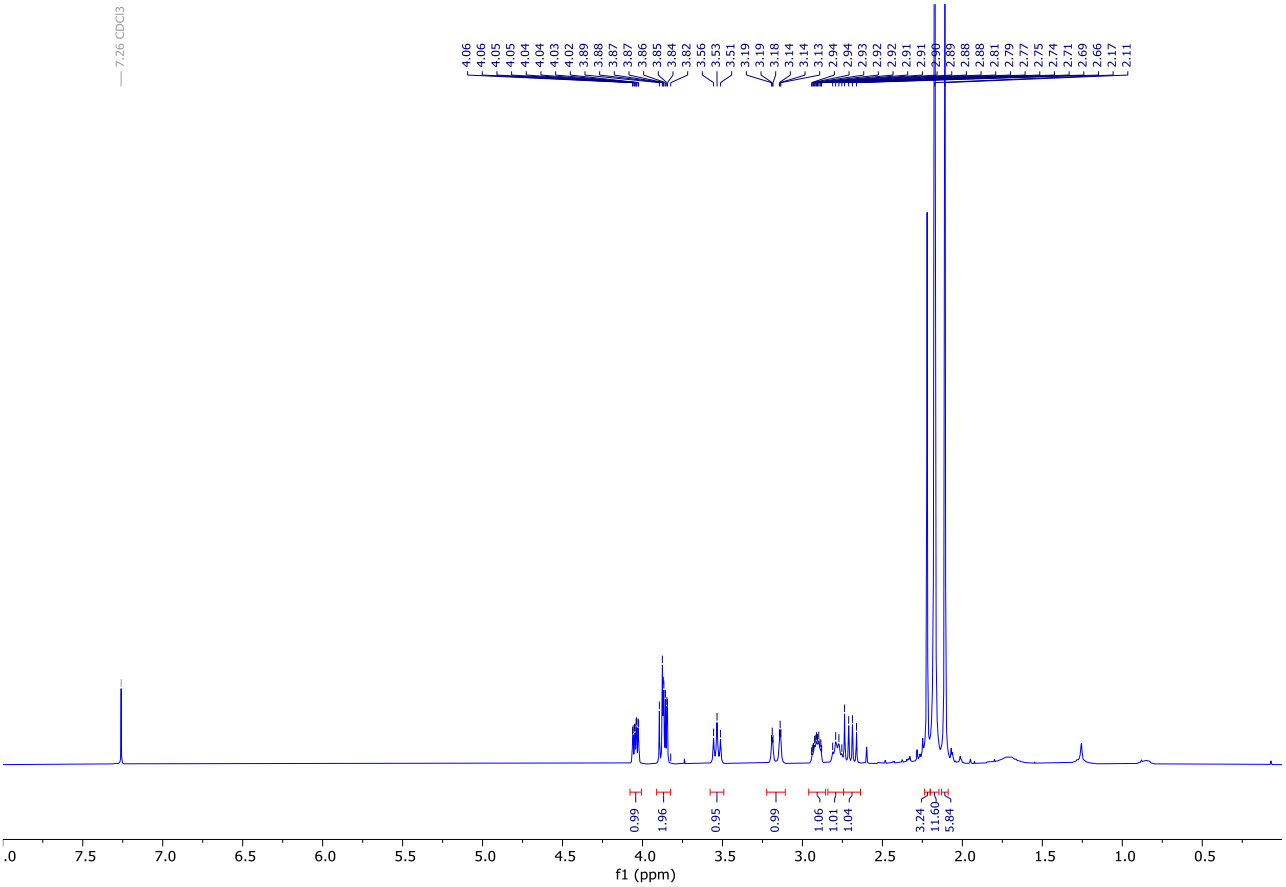

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 291.1954 | C18H27O3 | 291.1955 | C18H26O3 | 0.2 | 3.2 | M+H | 1+ |
| 313.1772 | C18H26NaO3 | 313.1774 | | 0.5 | 3.0 | M+Na | 1+ |
| 603.3650 | C36H52NaO6 | 603.3656 | | 0.9 | 4.2 | 2M+Na | 1+ |

## 2-(4-(Dimethylamino)tetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3l

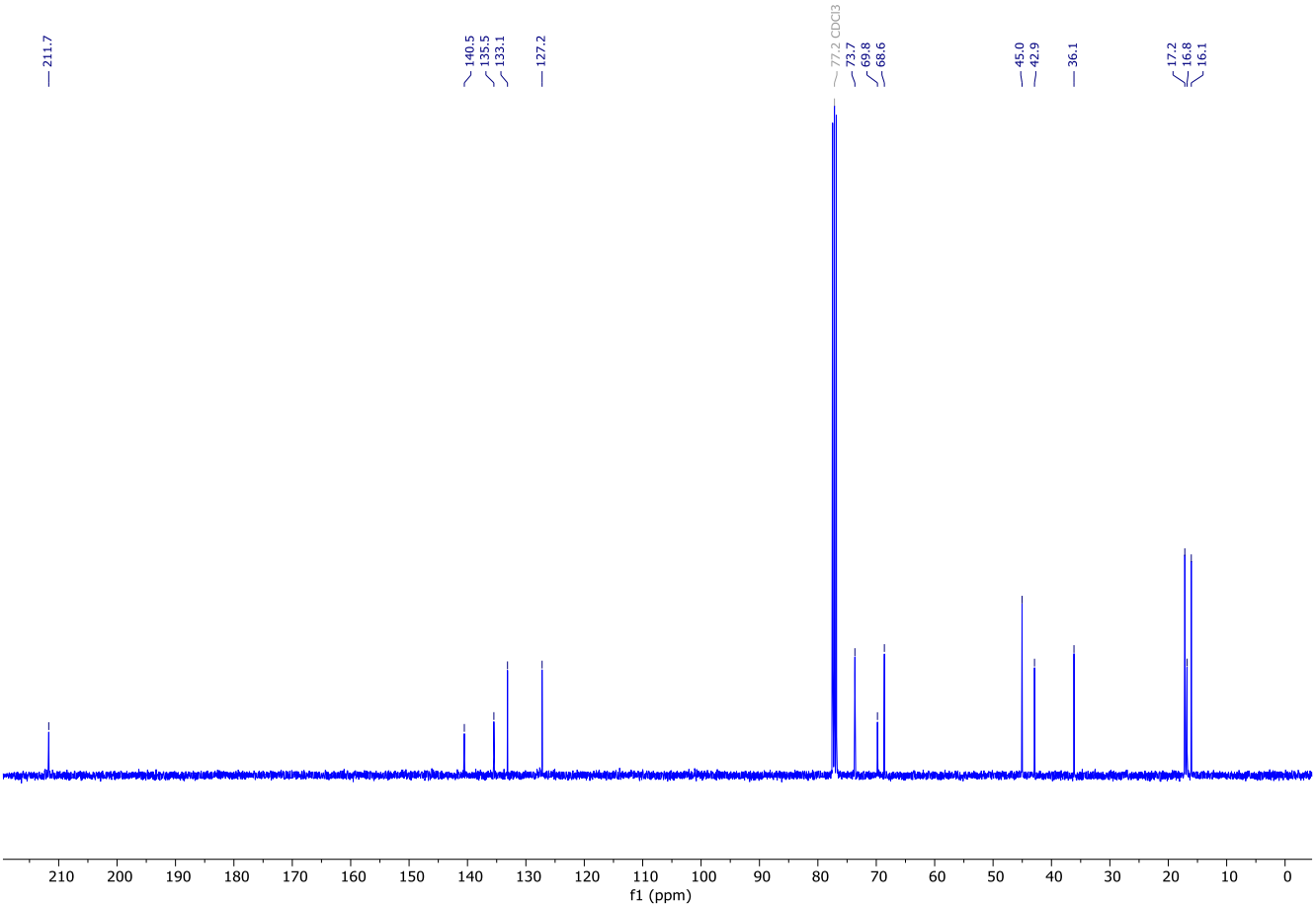



3l

JFR304-3.100.fid — no_title




JFR304-3.102.fid — no_title



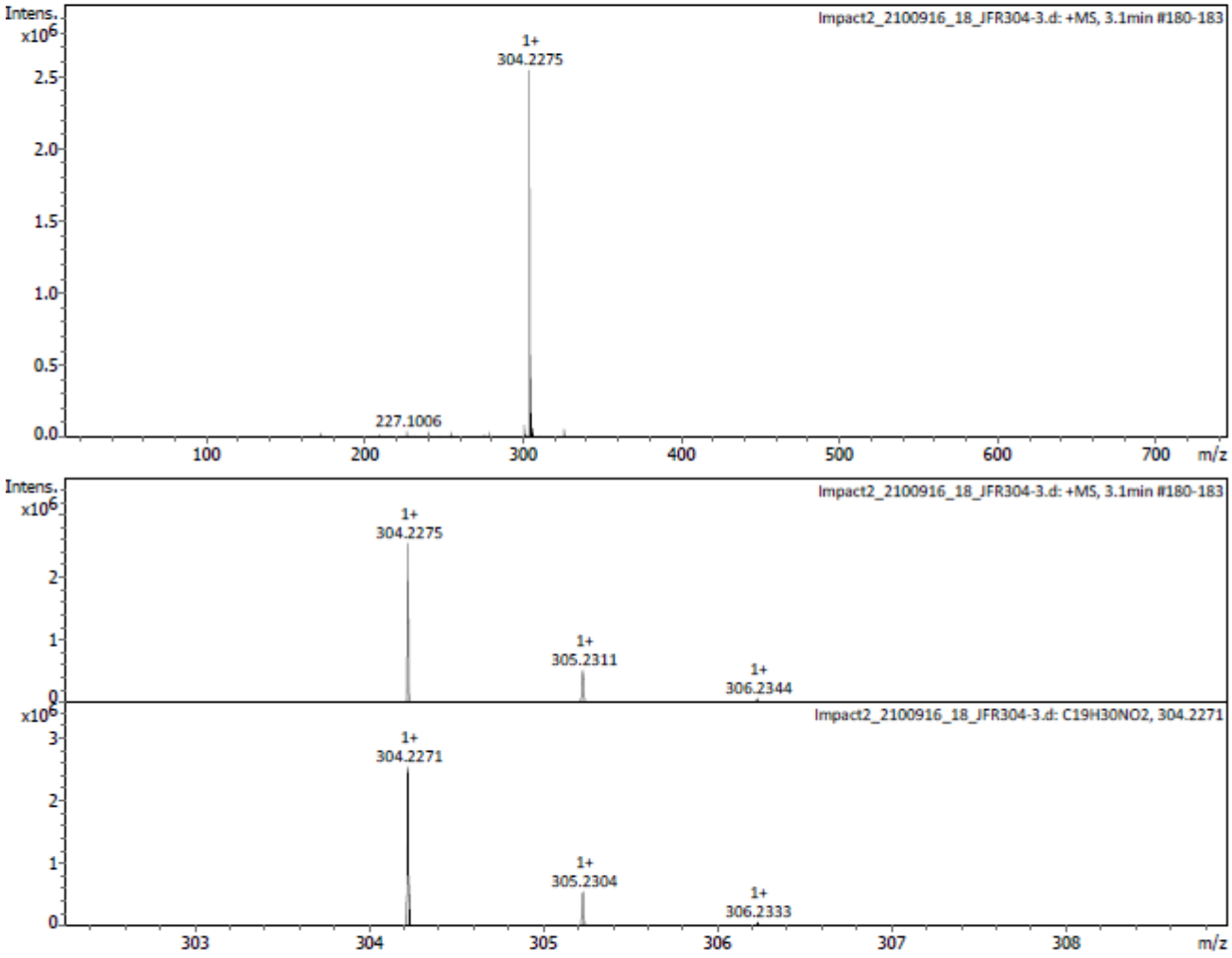
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_2100916_18_JFR304-3.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 9/16/2021 3:46:29 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

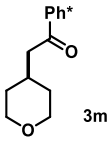
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



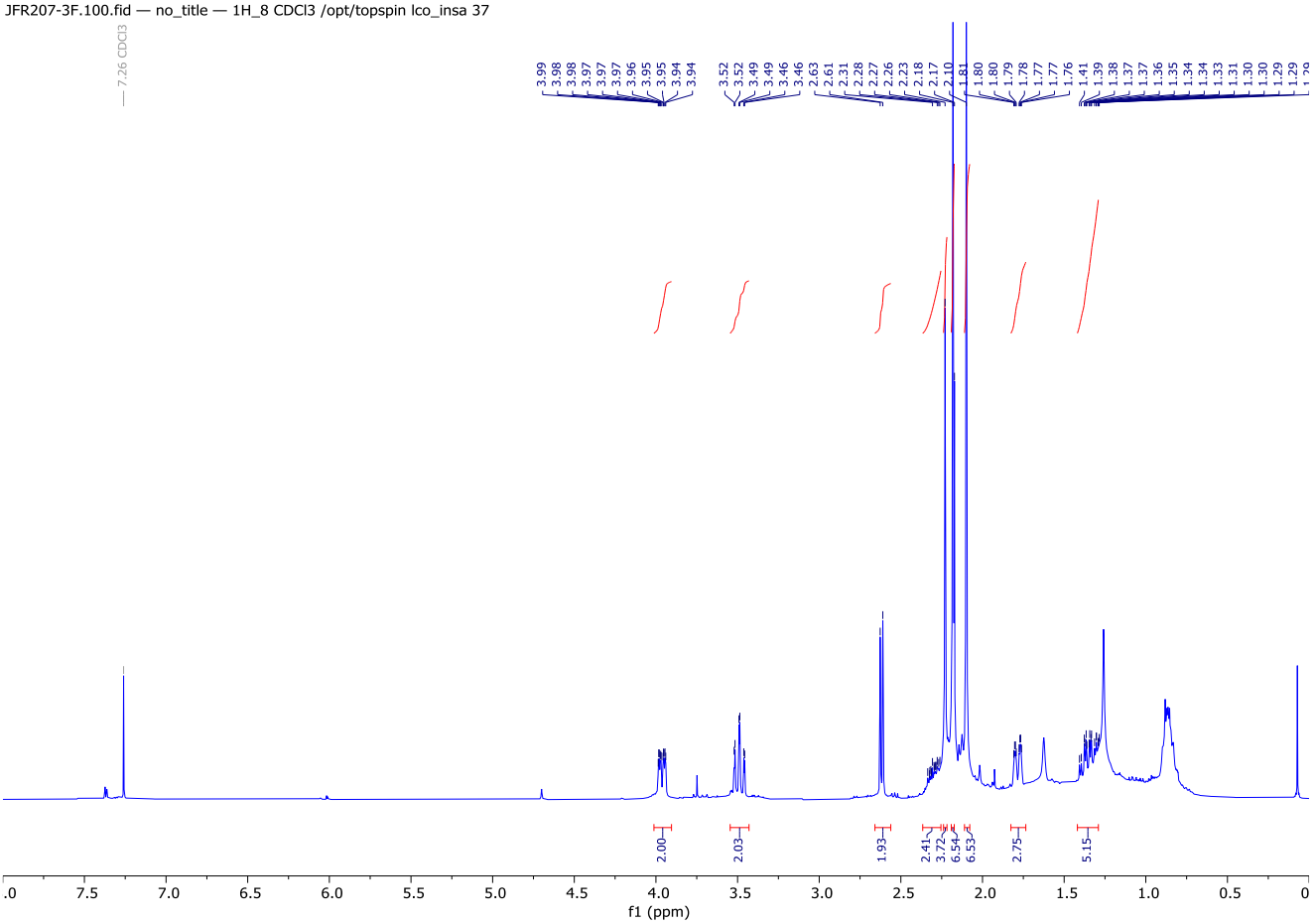

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 304.2275 | C19H30NO2 | 304.2271 | C19H29NO2 | -1.3 | 2.8 | M+H | 1+ |

## 1-(2,3,4,5,6-Pentamethylphenyl)-2-(tetrahydro-2H-pyran-4-yl)ethanone 3m

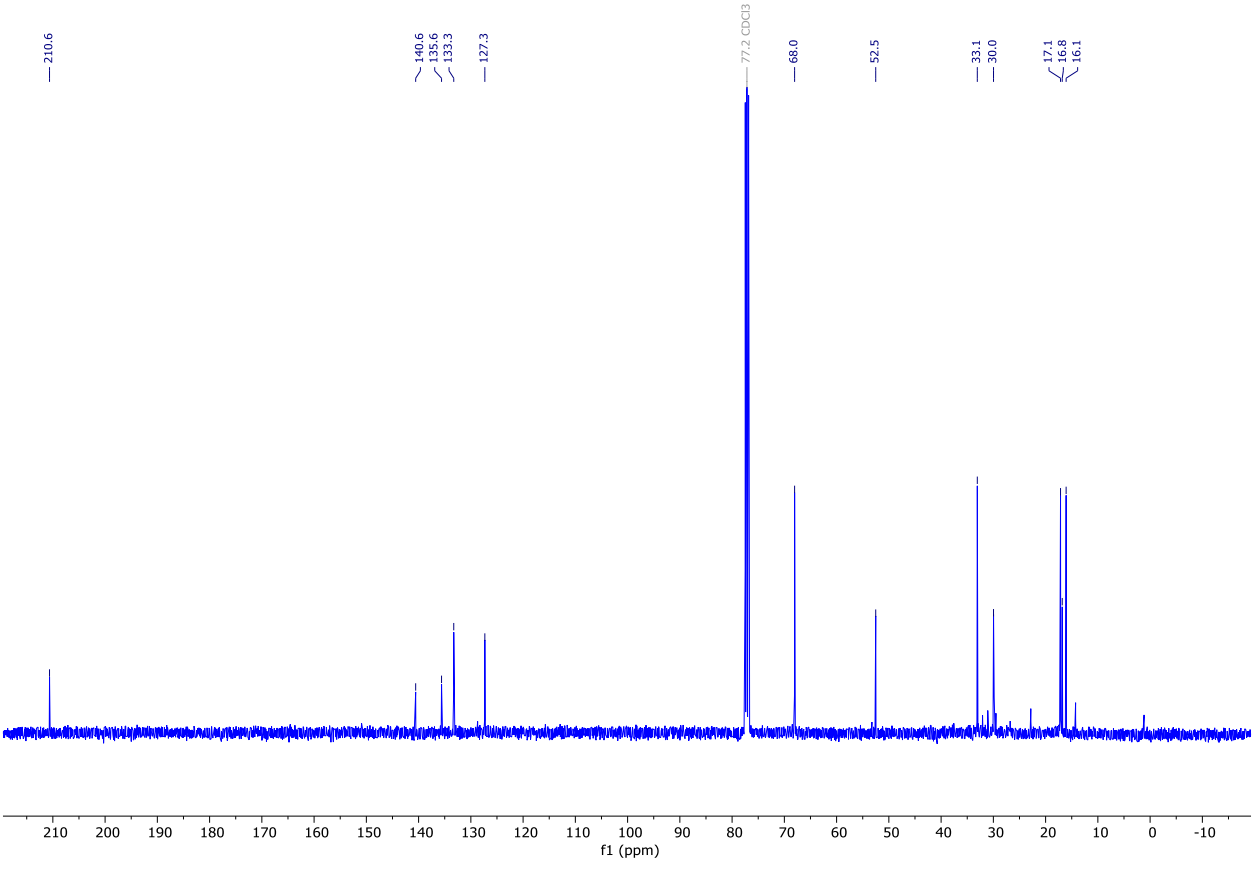



3m

JFR207-3F.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 37




JFR207-3F.101.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 37



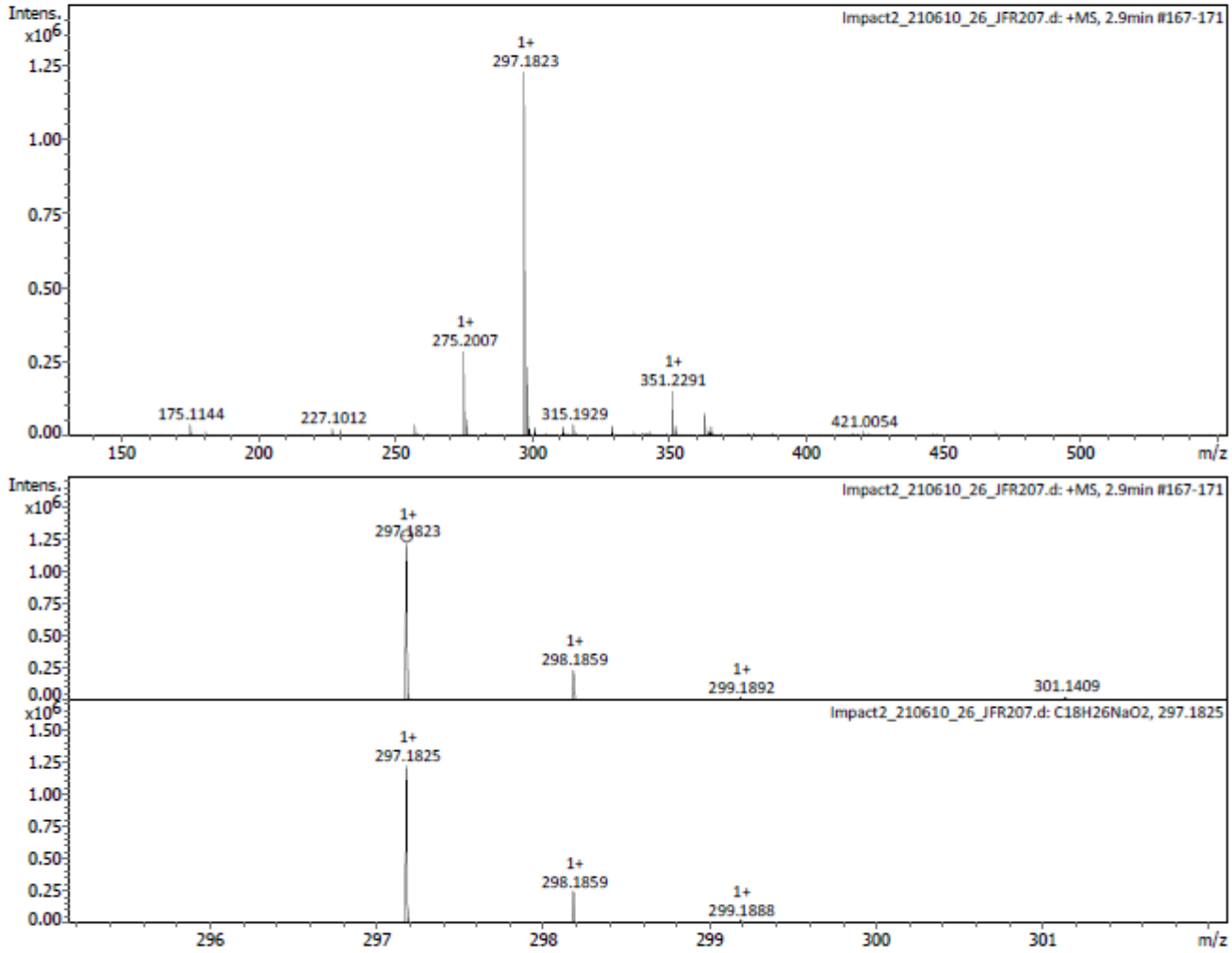
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210610_26_JFR207.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 6/10/2021 1:57:02 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

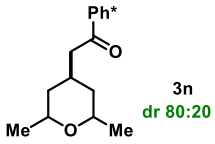
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1200 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1500 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 275.2007 | C18H27O2 | 275.2006 | C18H26O2 | -0.5 | 3.0 | M+H | 1+ |
| 297.1823 | C18H26NaO2 | 297.1825 | | 0.5 | 4.2 | M+Na | 1+ |

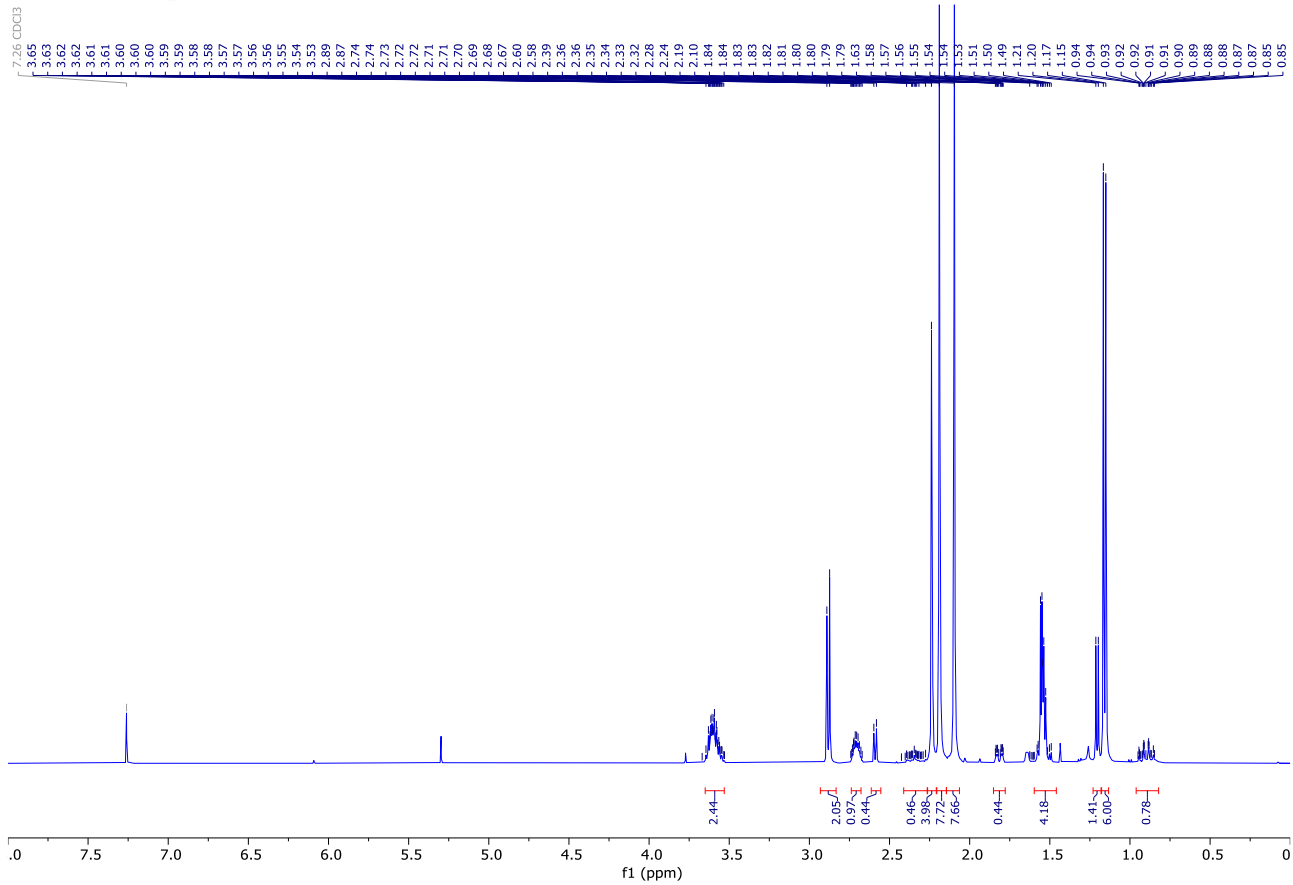
**2-((2*R*,4*r*,6*S*)-2,6-dimethyltetrahydro-*2H*-pyran-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3n**



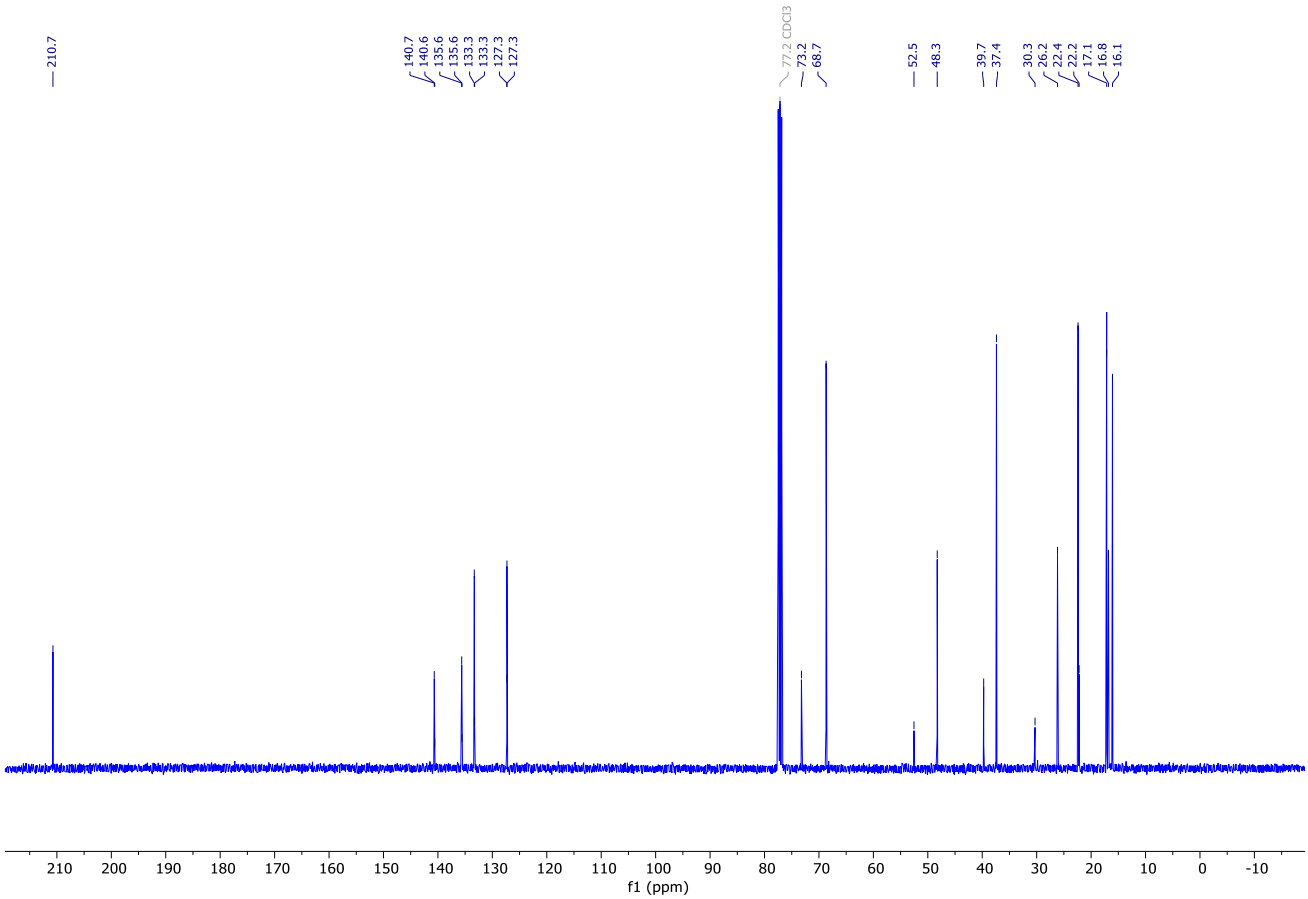

**3n**

**dr 80:20**

JFR387-2.100.fid — no_title




JFR387-2.102.fid — no_title



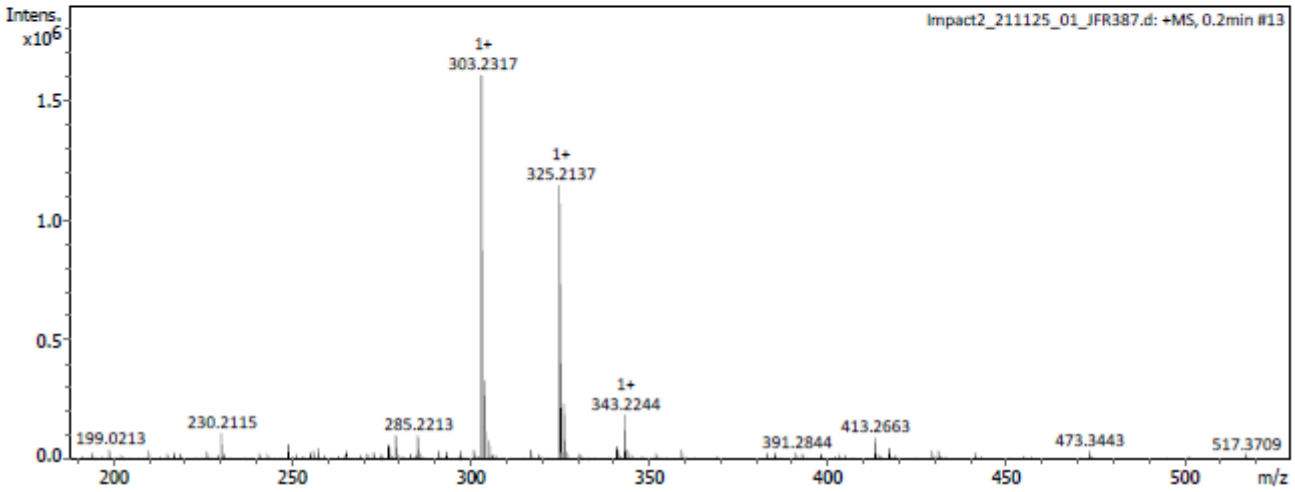
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

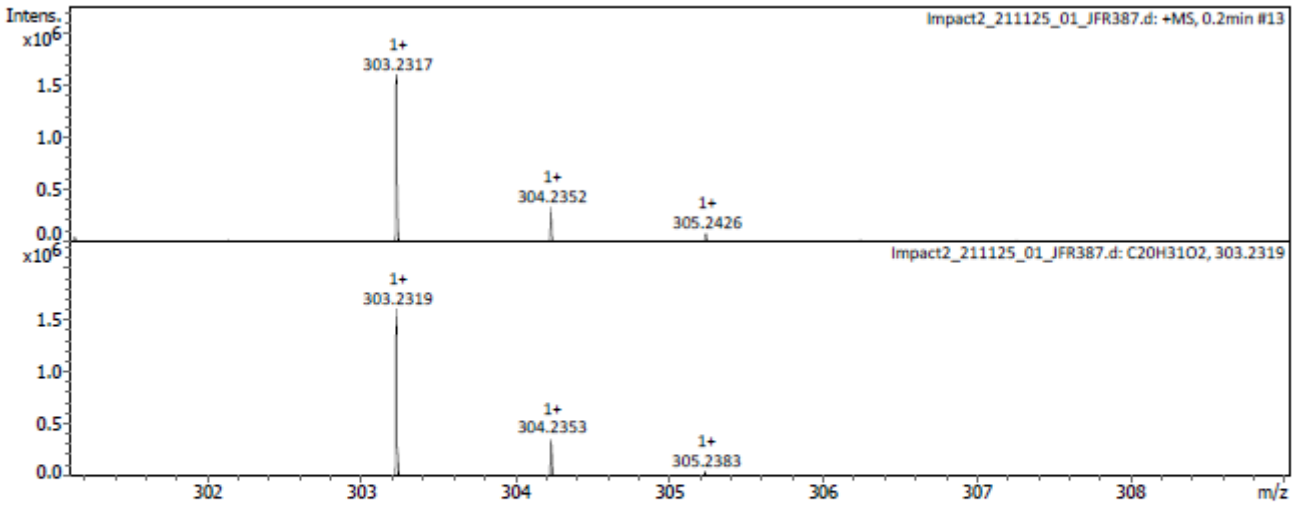
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211125_01_JFR387.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/25/2021 9:04:39 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

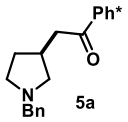
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



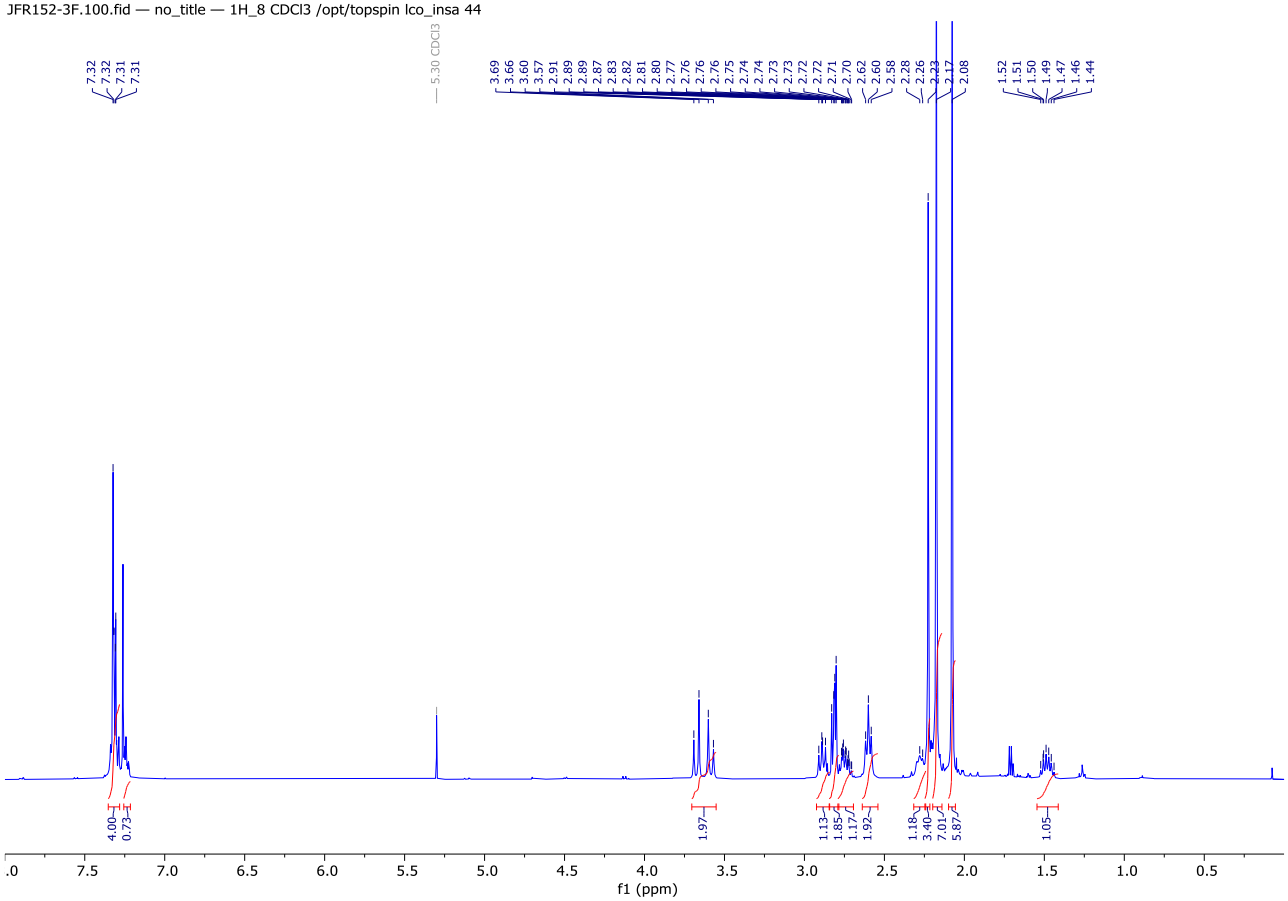

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 303.2317 | C20H31O2 | 303.2319 | C20H30O2 | 0.4 | 14.5 | M+H | 1+ |
| 325.2137 | C20H30NaO2 | 325.2138 | | 0.2 | 8.8 | M+Na | 1+ |

## 2-(1-Benzylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5a

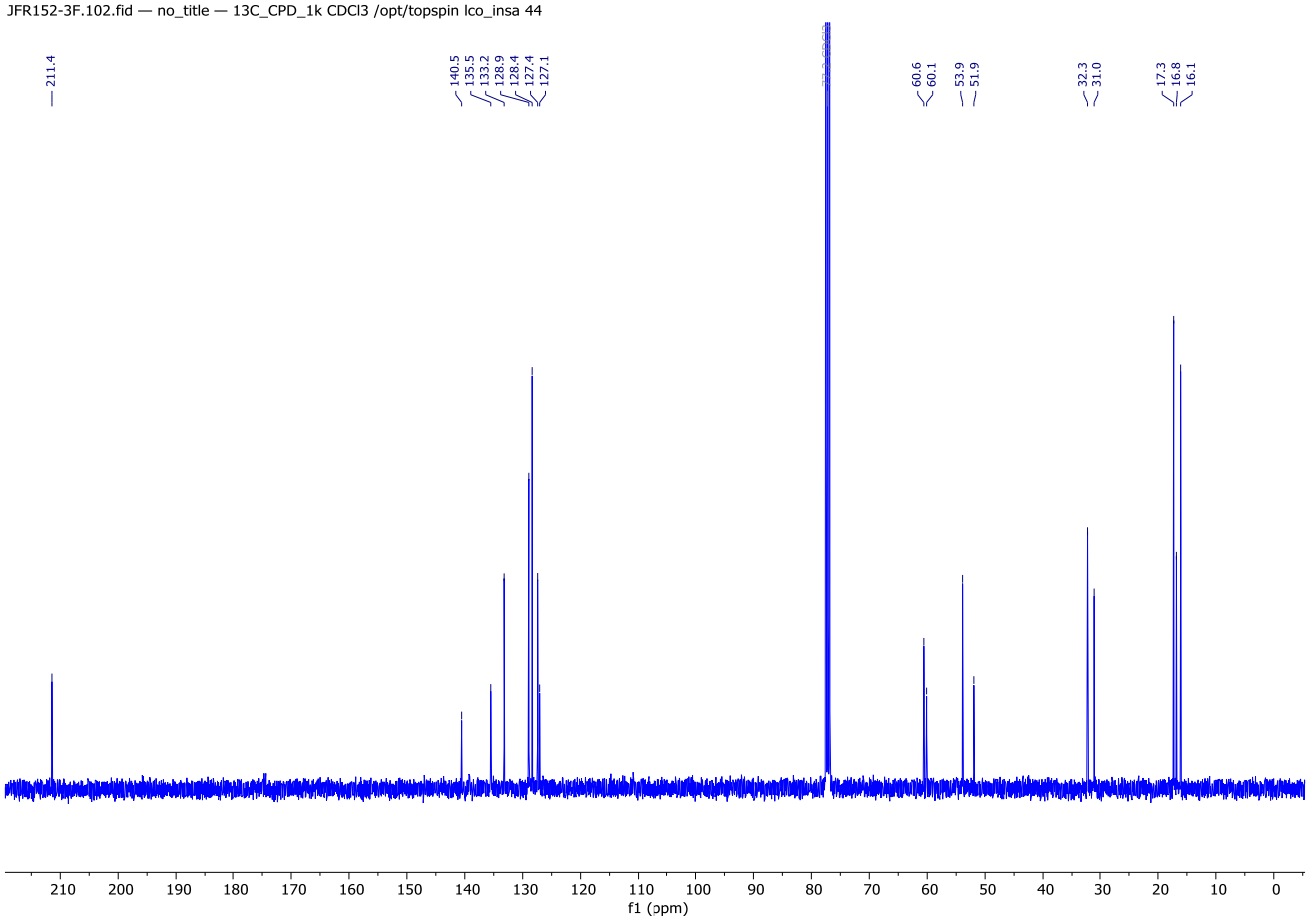



5a

JFR152-3F.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 44




JFR152-3F.102.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 44



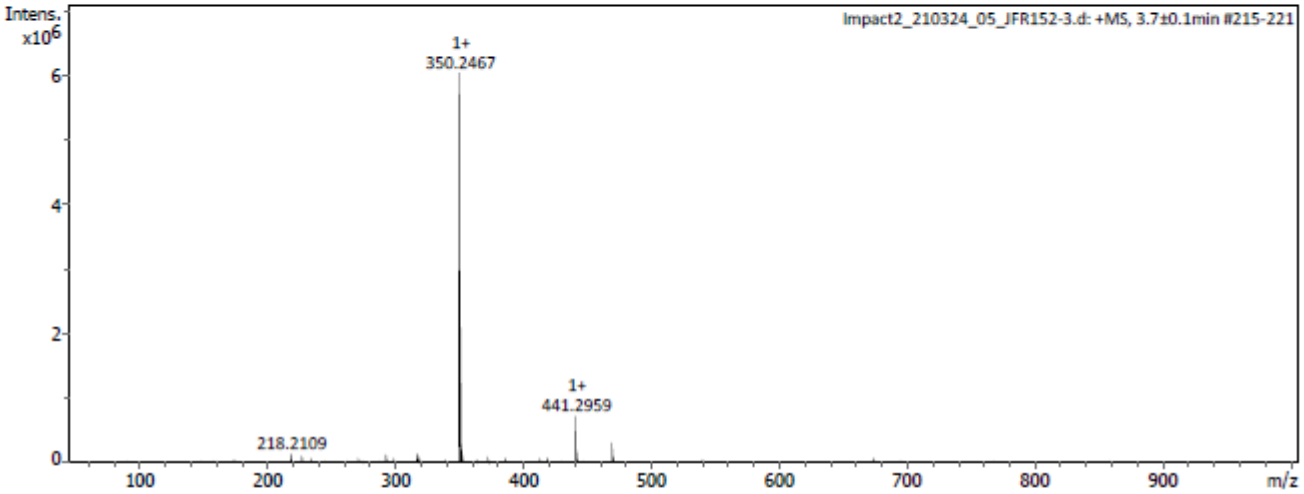
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

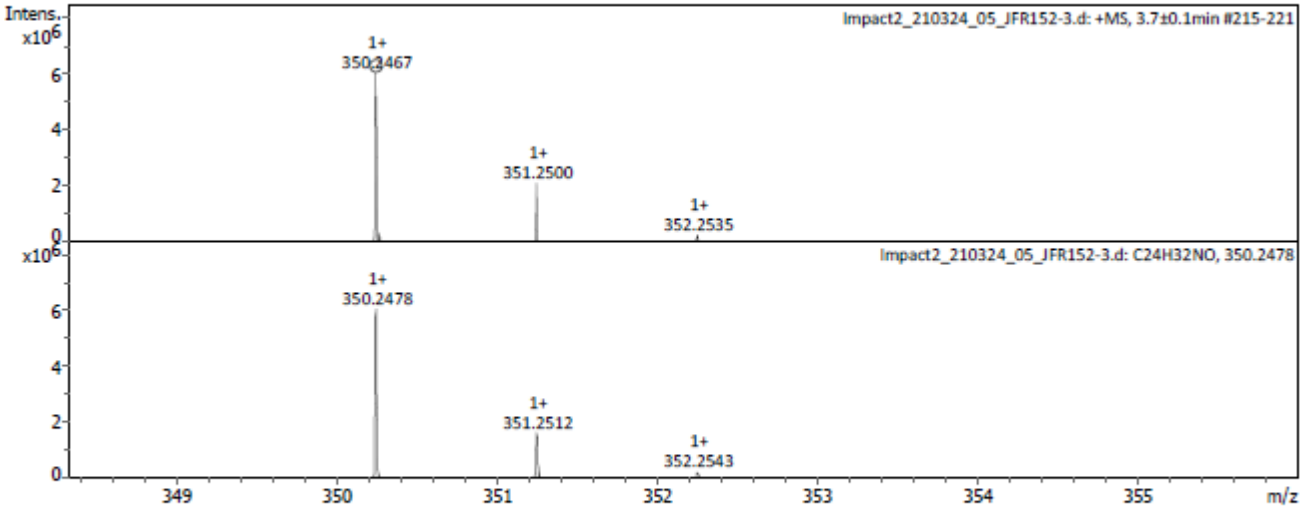
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210324_05_JFR152-3.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 3/24/2021 2:15:00 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

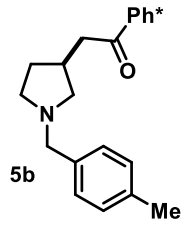
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



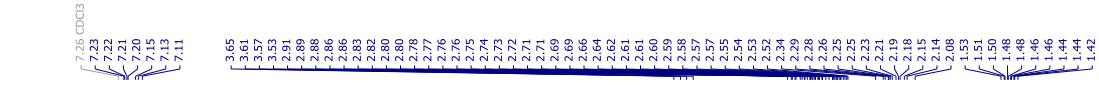



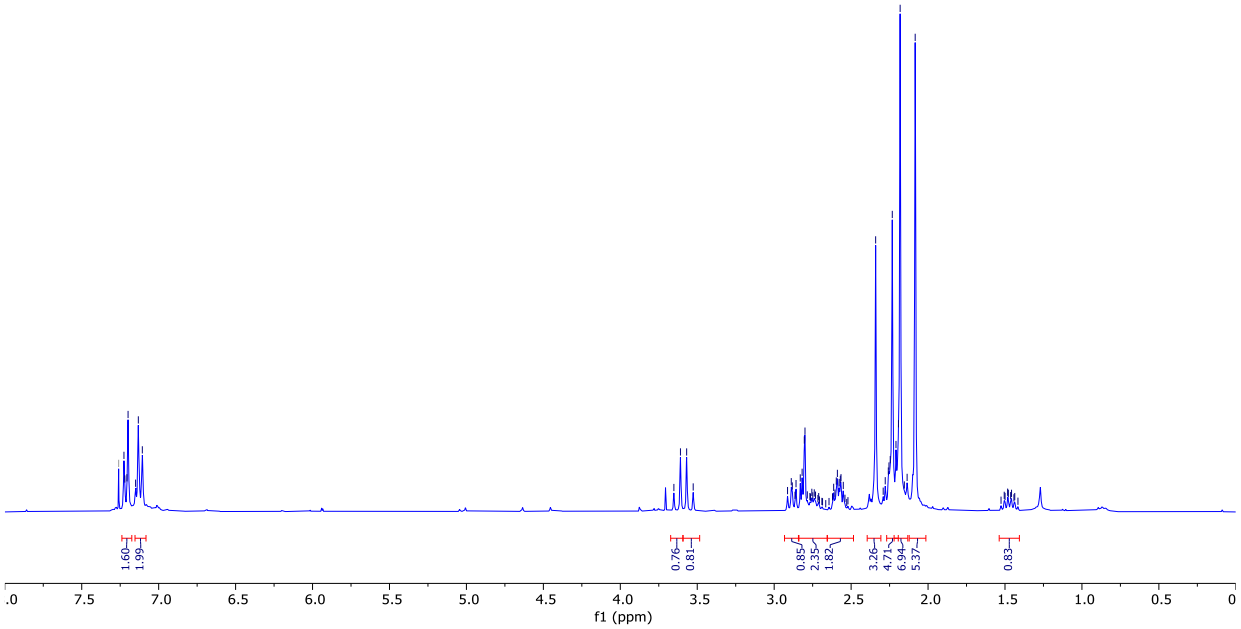

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 350.2467 | C24H32NO | 350.2478 | C24H31NO | 3.3 | 46.9 | M+H | 1+ |

**2-(1-(4-Methylbenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5b**

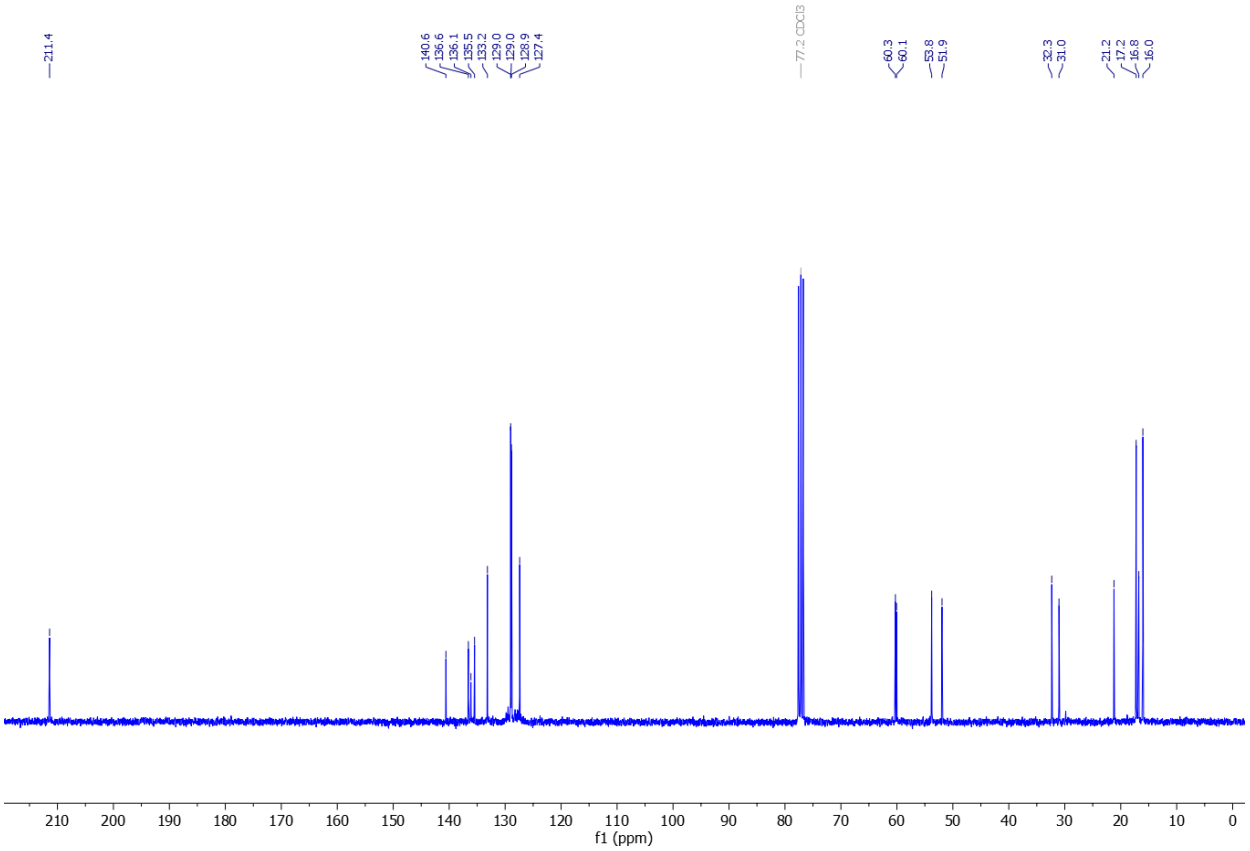



JFR576-2.1.fid — 1H zg30




JFR576-2.3.fid — 13C{1H} zgpg30 RD=2s



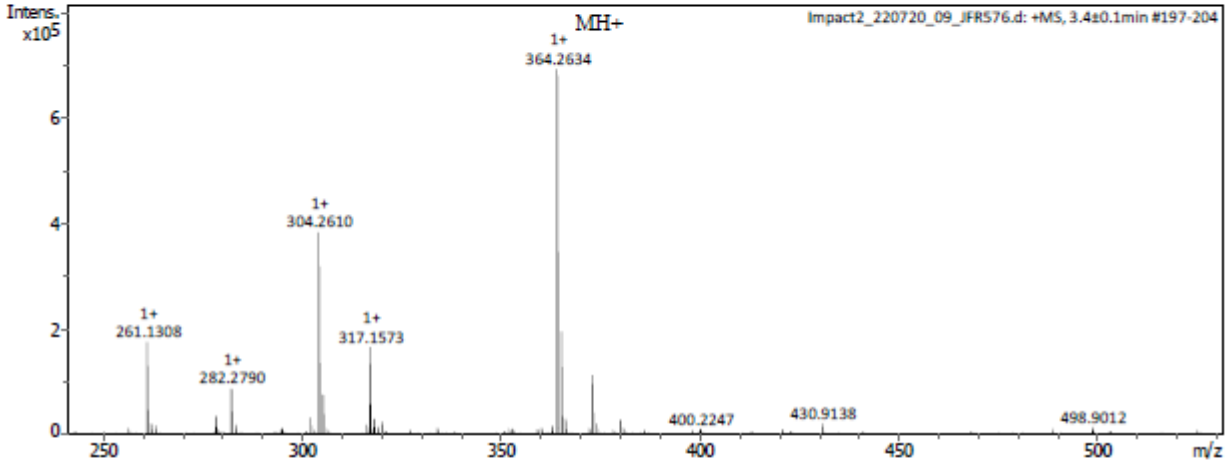
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

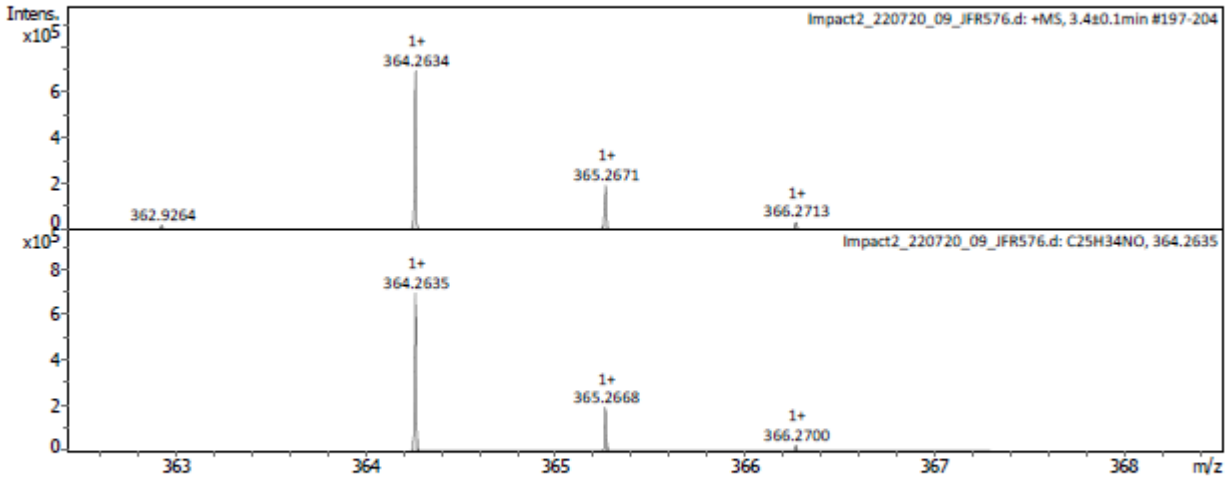
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220720_09_JFR576.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 7/20/2022 3:08:42 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

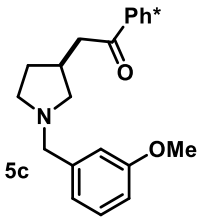
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 2000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



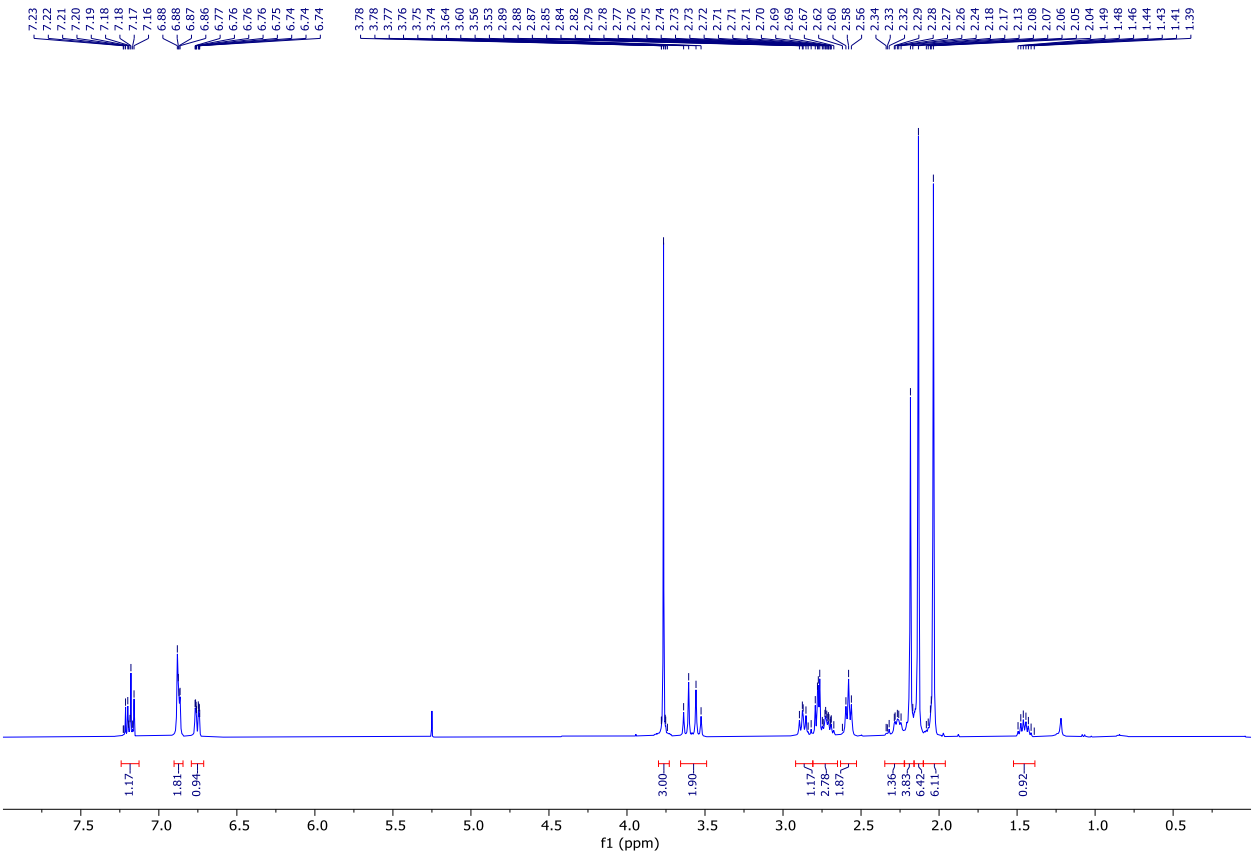




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 364.2634 | C25H34NO | 364.2635 | C25H33NO | 0.2 | 4.0 | M+H | 1+ |

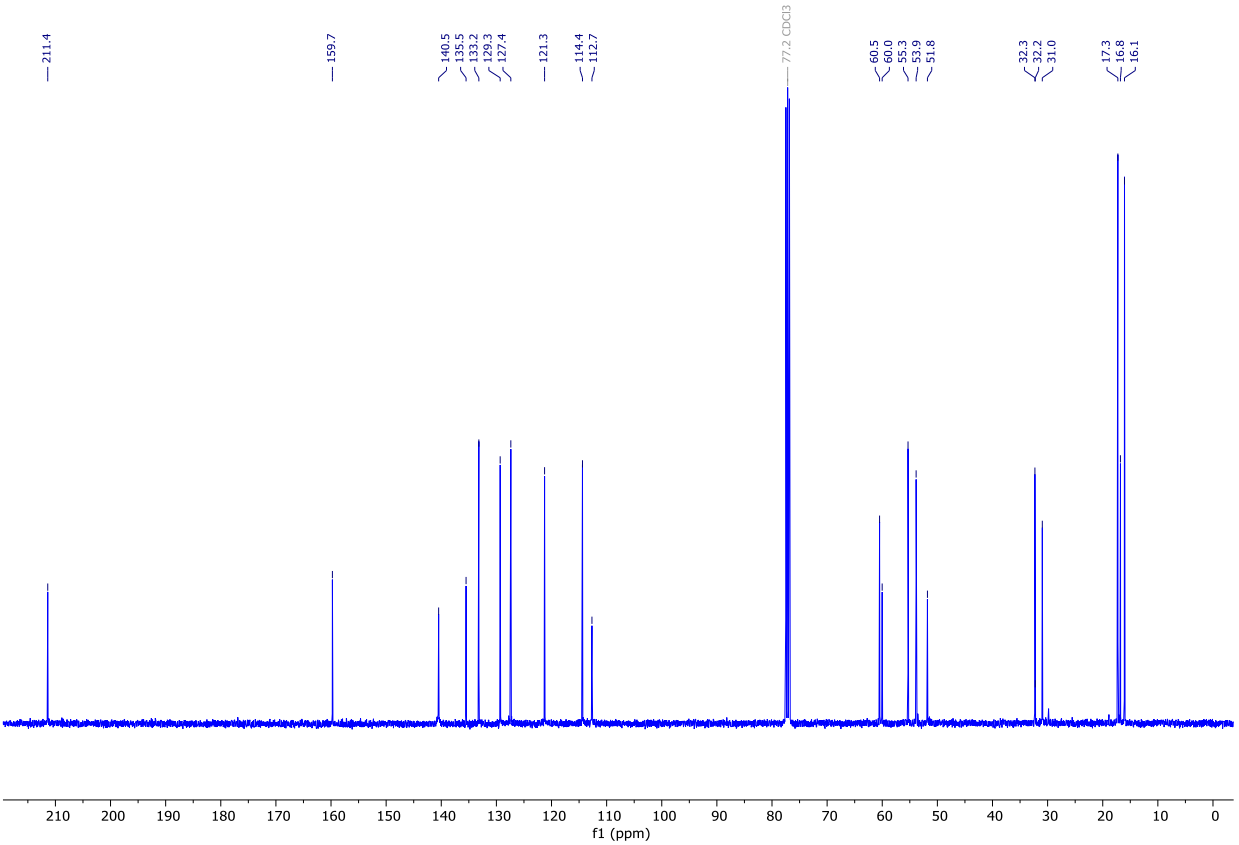
**2-(1-(3-Methoxybenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5c**




JFR531-2.100.fid — no_title




JFR531-2.102.fid — no_title



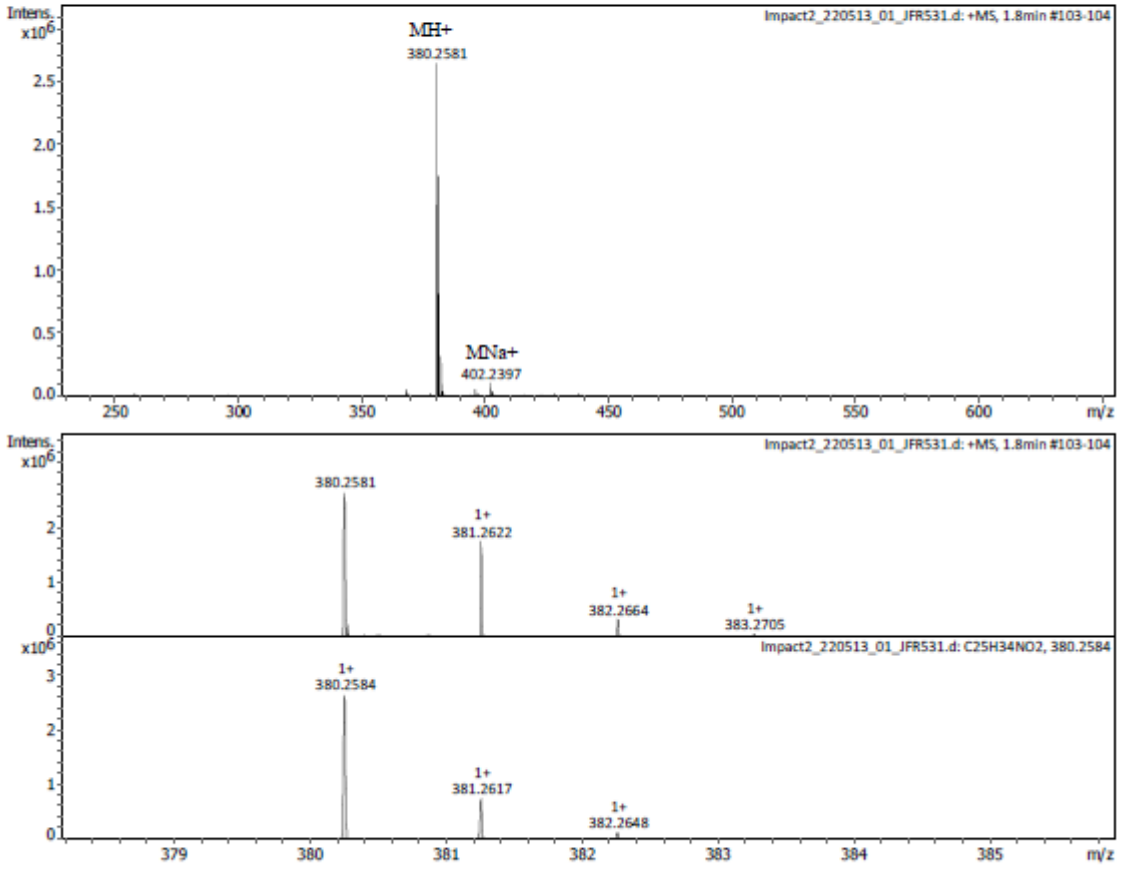
## CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220513_01_JFR531.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 5/13/2022 8:01:15 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

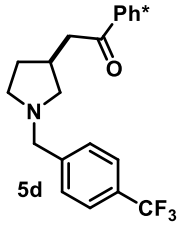
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |

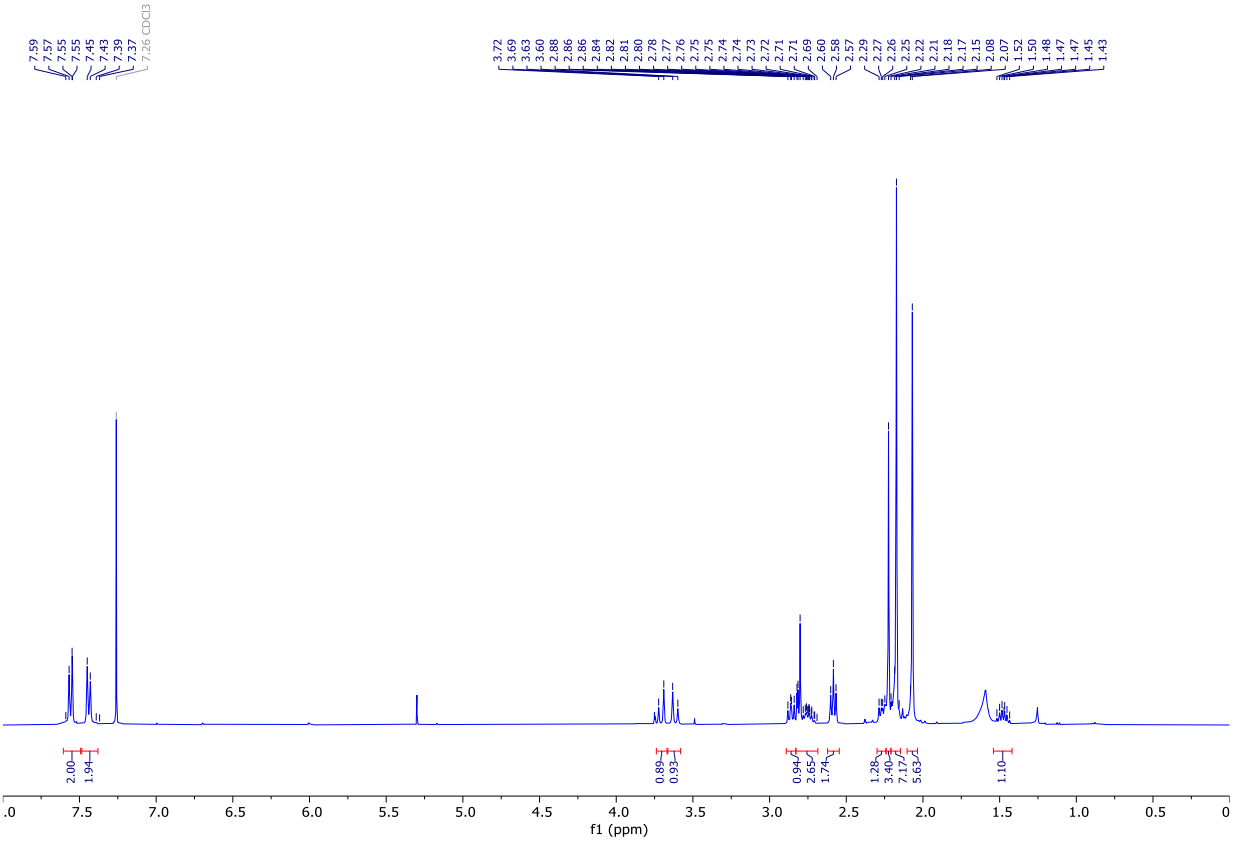



| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 380.2581 | C25H34NO2 | 380.2584 | C25H33NO2 | 0.8 | 227.3 | M+H | 1+ |
| 402.2397 | C25H33NNaO2 | 402.2404 | | 1.6 | 71.4 | M+Na | 1+ |

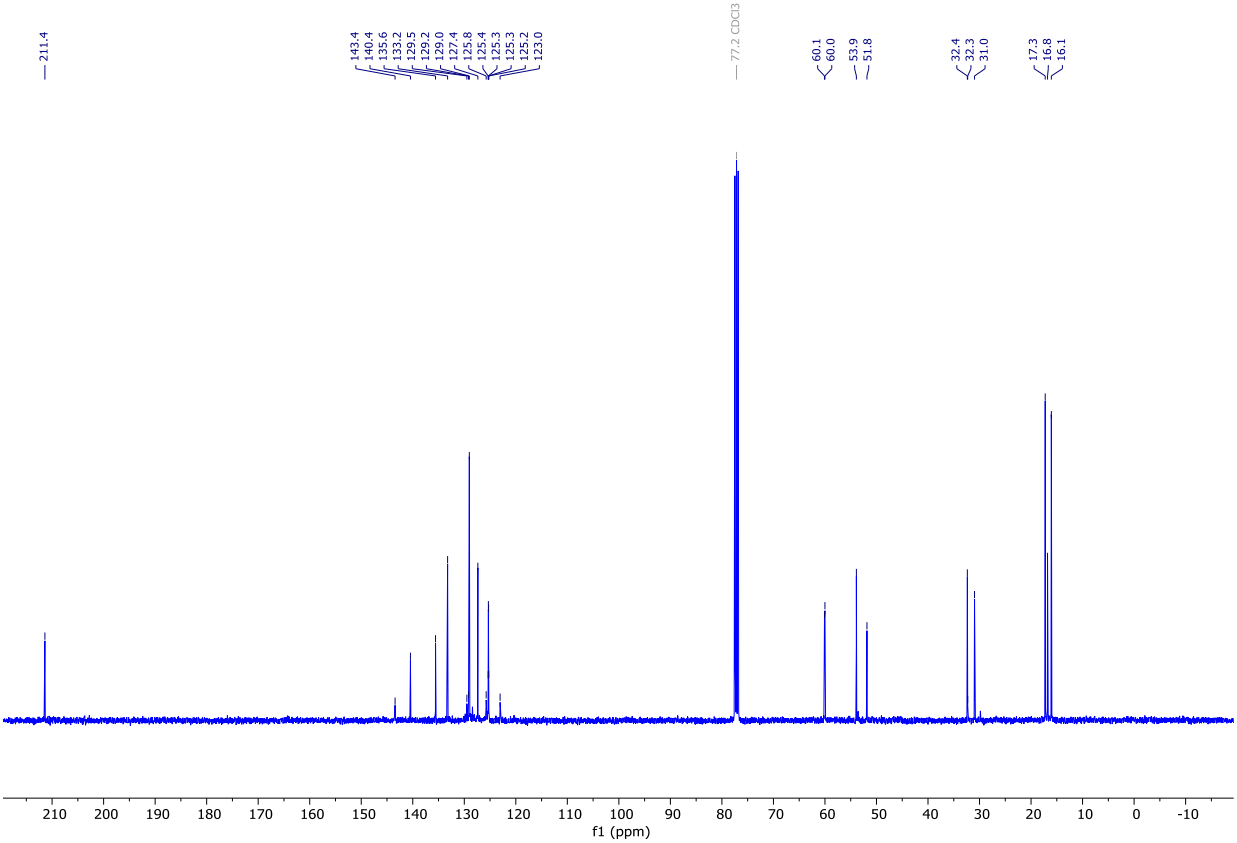
**1-(2,3,4,5,6-Pentamethylphenyl)-2-(1-(4-(trifluoromethyl)benzyl)pyrrolidin-3-yl)ethanone 5d**

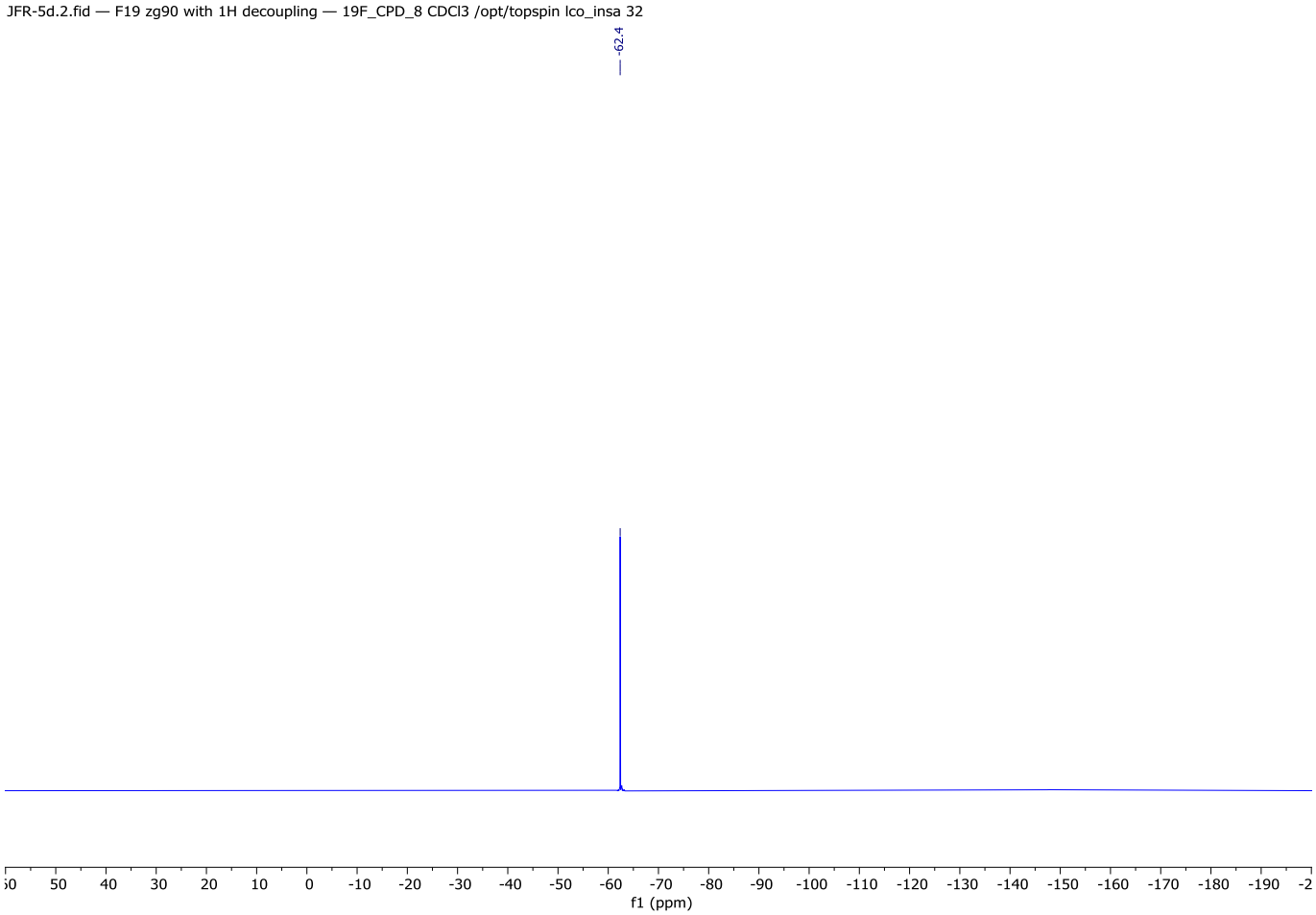



JFR543F.100.fid — no_title




JFR543FC.100.fid — no_title




JFR-5d.2.fid — F19 zg90 with 1H decoupling — 19F_CPD_8 CDCl3 /opt/topspin lco_insa 32
— -62.4
50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190
f1 (ppm)

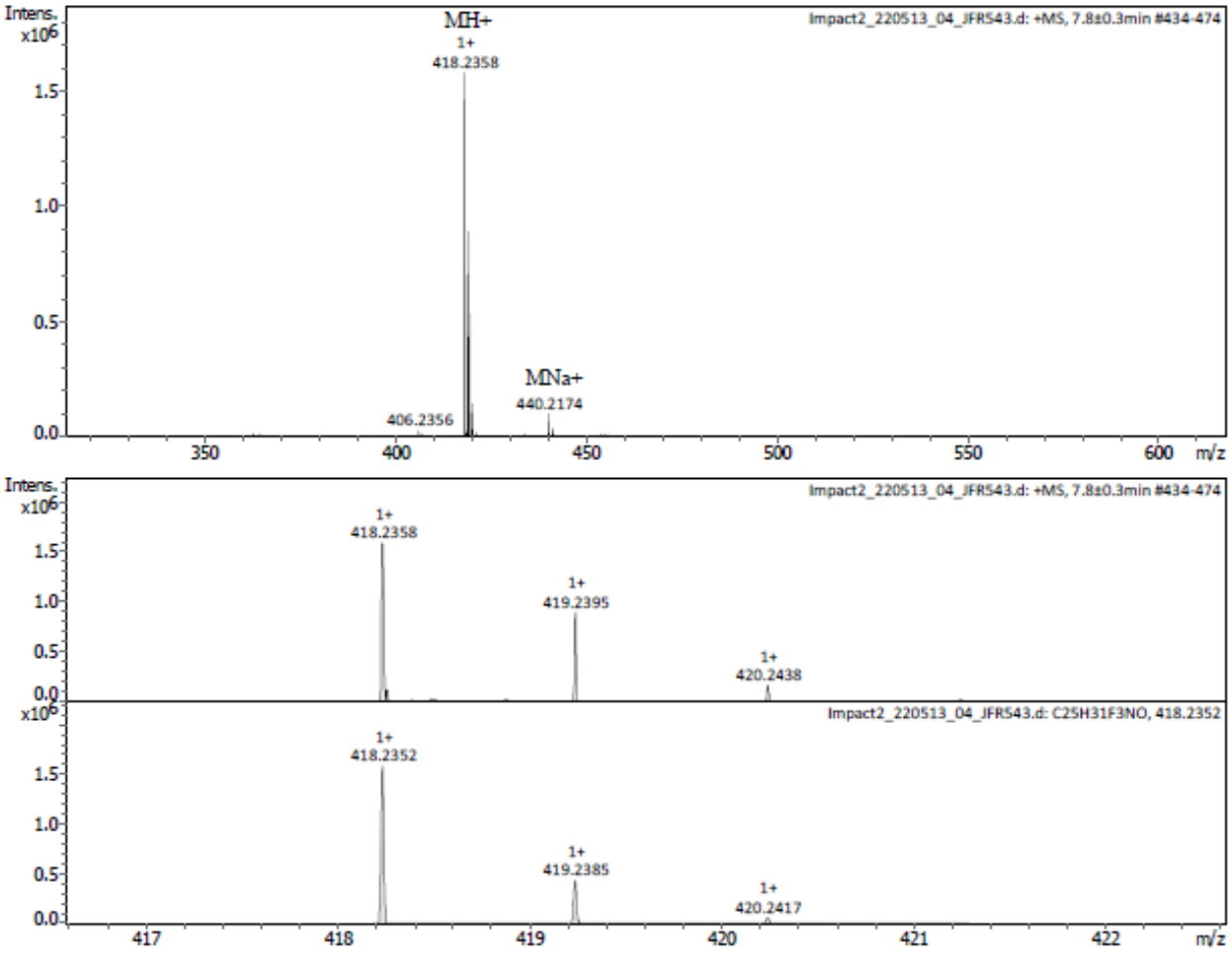
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220513_04_JFR543.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 5/13/2022 8:17:16 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |

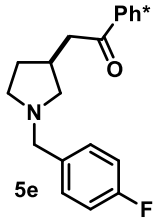




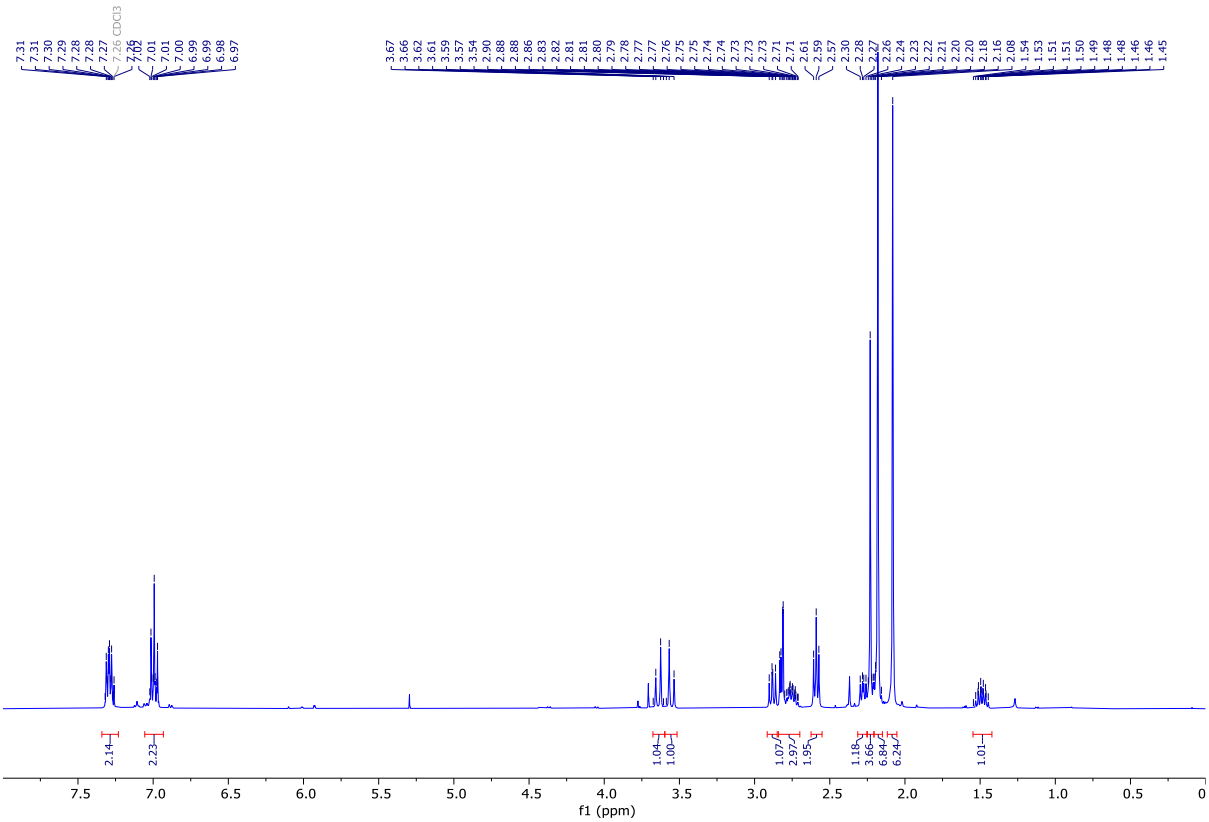


| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 418.2358 | C25H31F3NO | 418.2352 | C25H30F3NO | -1.5 | 168.7 | M+H | 1+ |
| 440.2174 | C25H30F3NNaO | 440.2172 | | -0.6 | 54.5 | M+Na | 1+ |

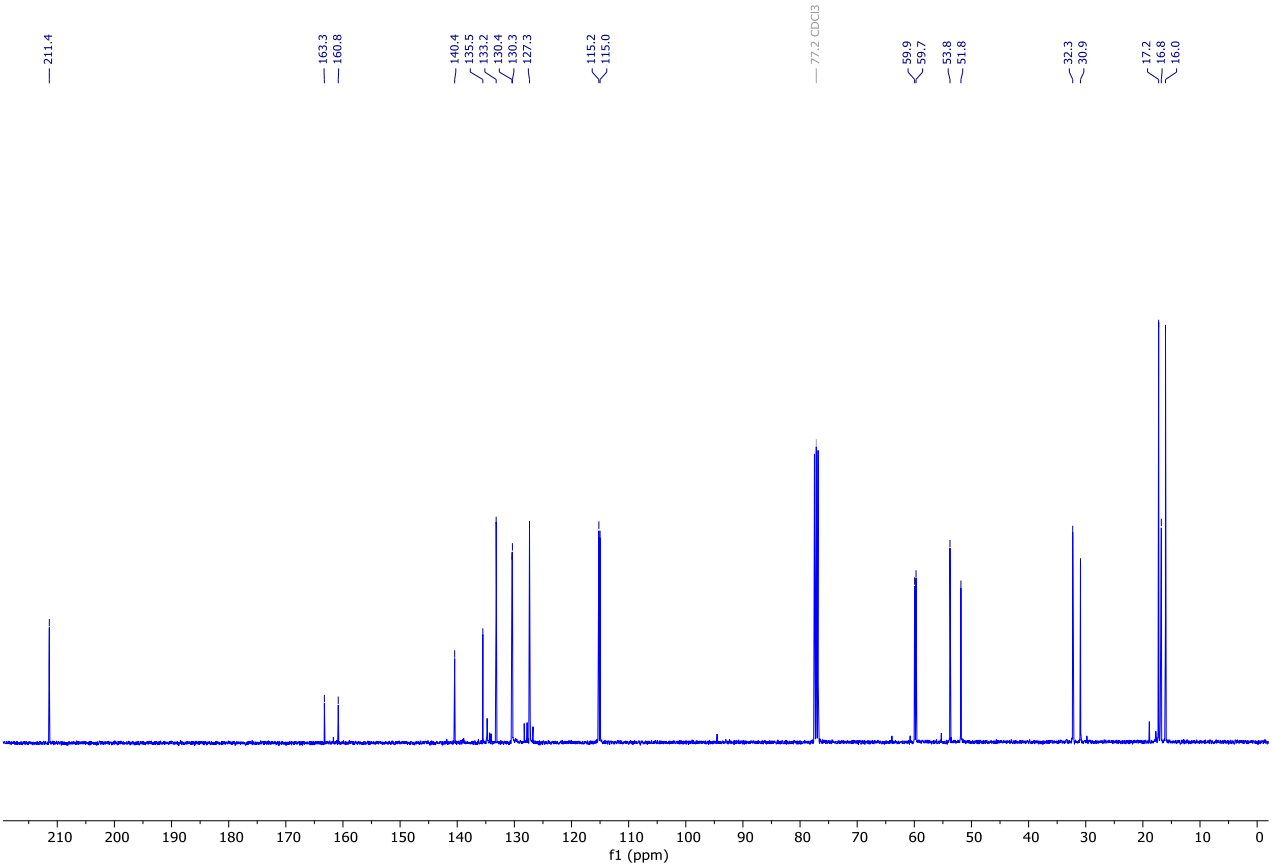
**2-(1-(4-Fluorobenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5e**



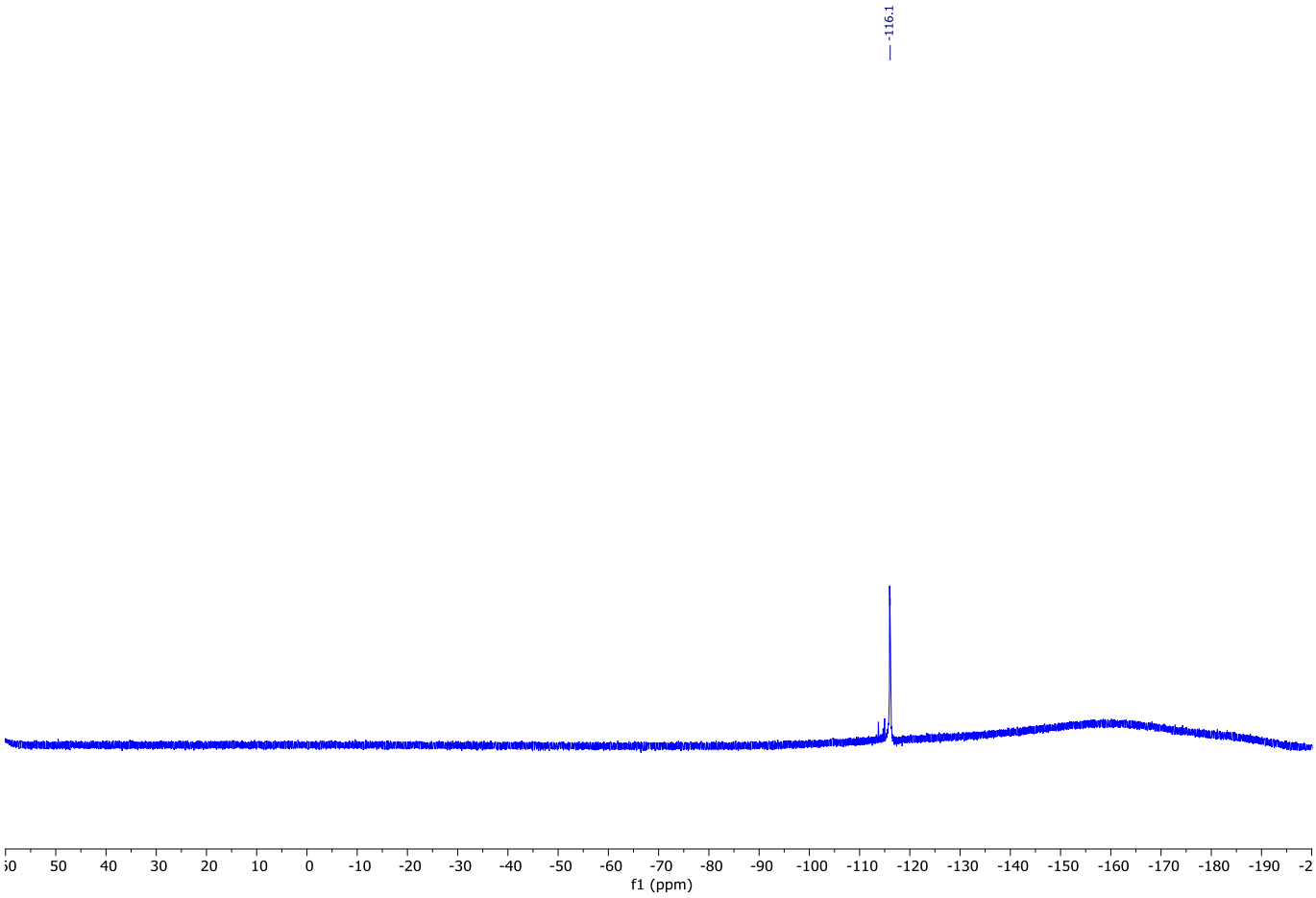

JFR548-2F.100.fid — no_title




JFR548-2F.102.fid — no_title



JFR-5e-bis.1.fid — F19 zg90 with 1H decoupling — 19F_CPD_8 CDCl3 /opt/topspin lco_insa 51



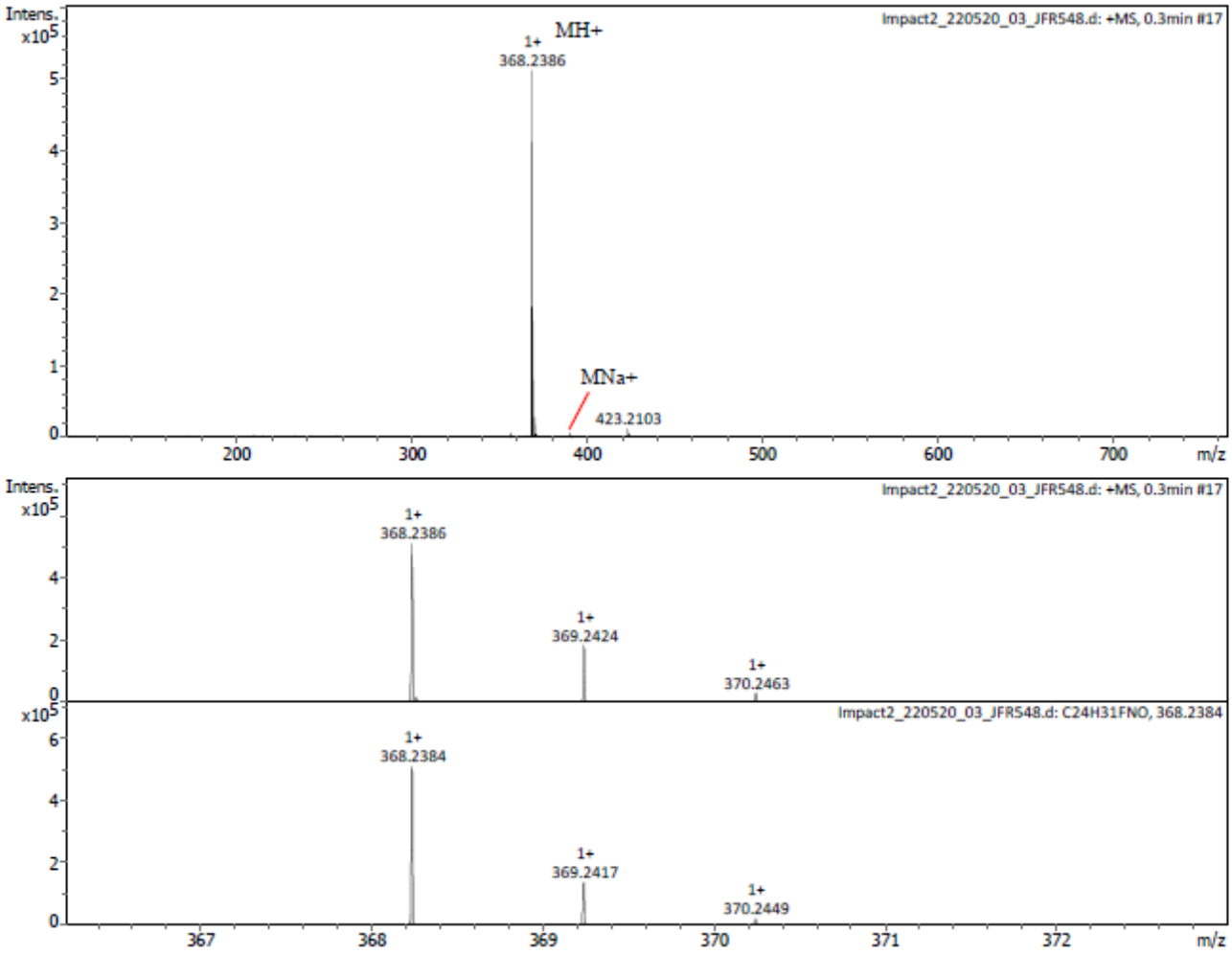
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220520_03_JFR548.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 5/20/2022 11:19:58 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

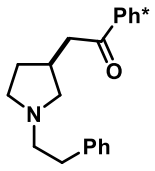
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 2000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



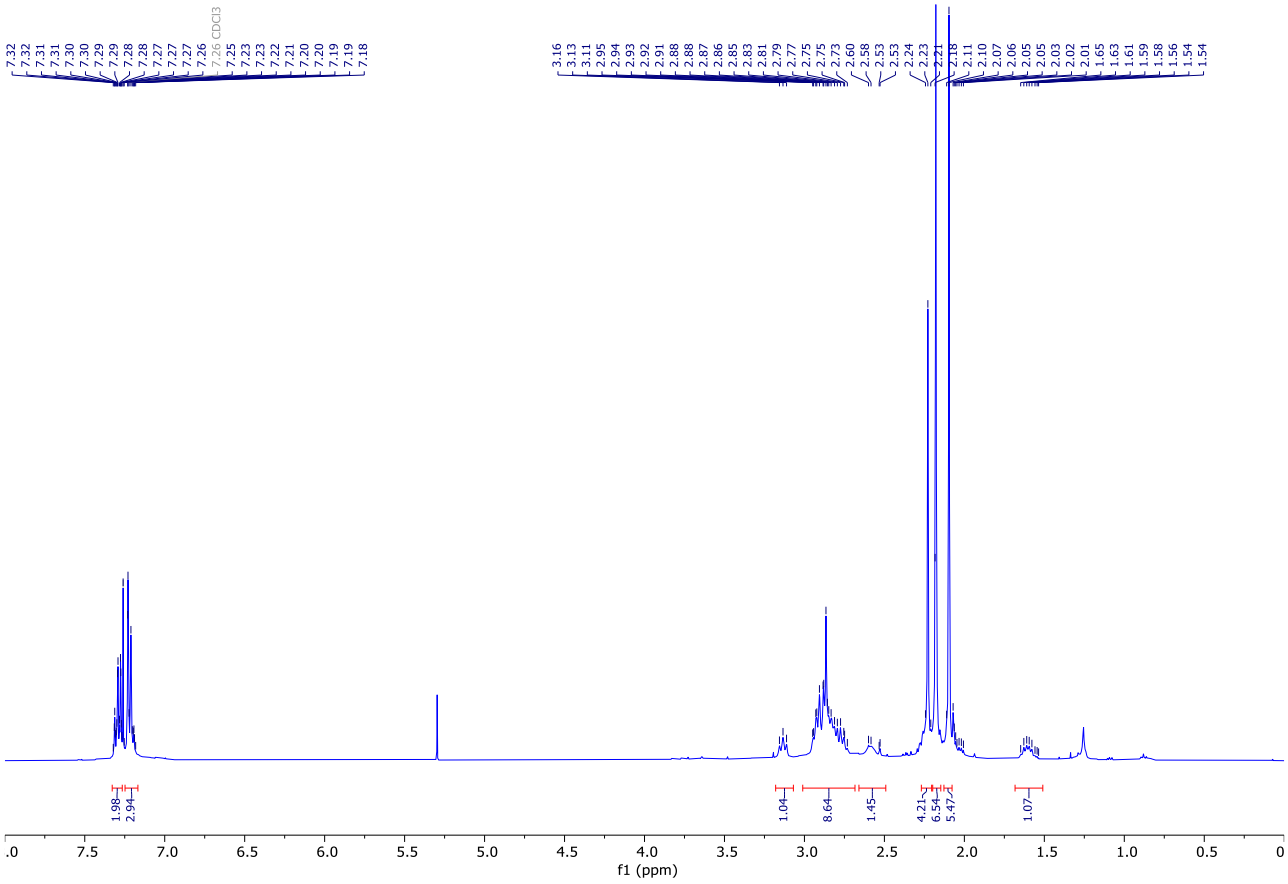

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 368.2386 | C24H31FNO | 368.2384 | C24H30FNO | -0.4 | 52.3 | M+H | 1+ |
| 390.2205 | C24H30FNNaO | 390.2204 | | -0.4 | 34.4 | M+Na | 1+ |

**1-(2,3,4,5,6-pentamethylphenyl)-2-(1-phenethylpyrrolidin-3-yl)ethanone 5f**

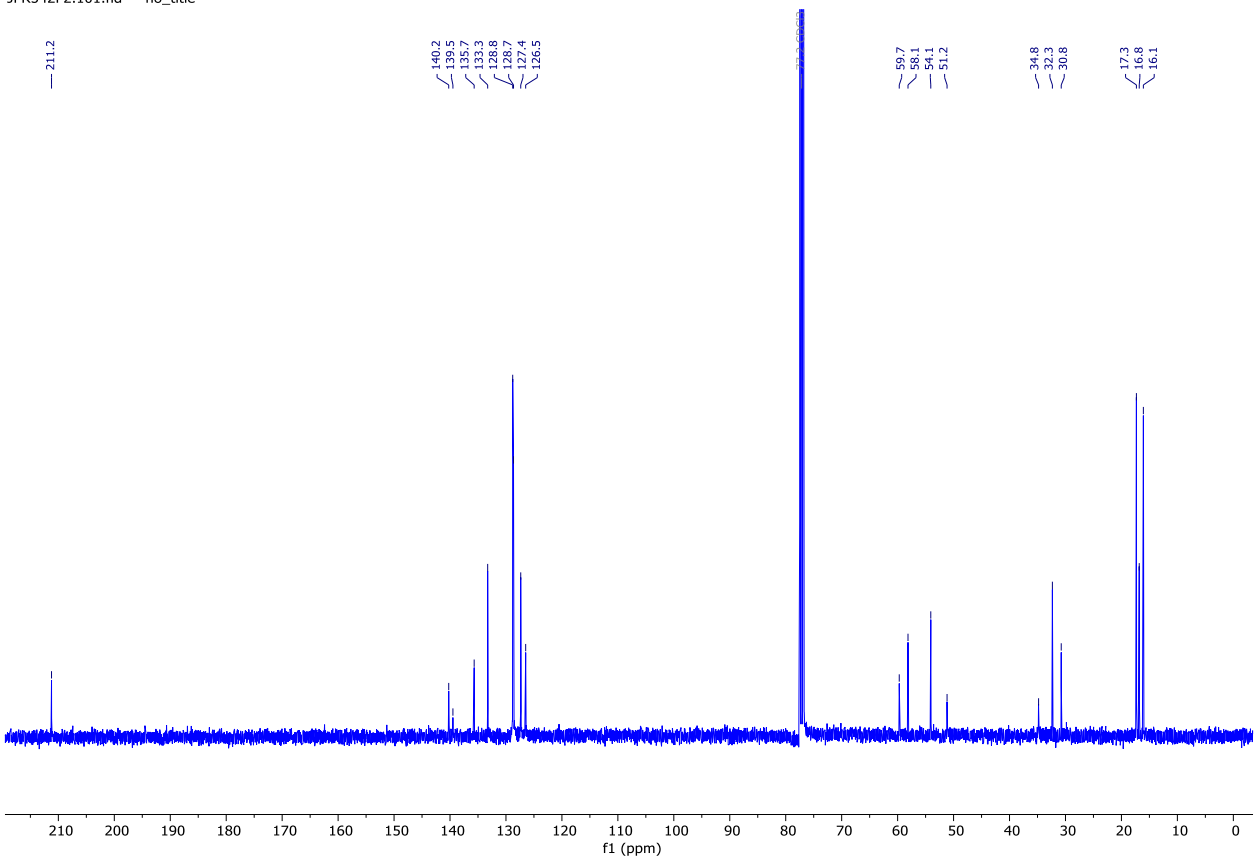



5f

JFR542F2.100.fid — no_title




JFR542F2.101.fid — no_title



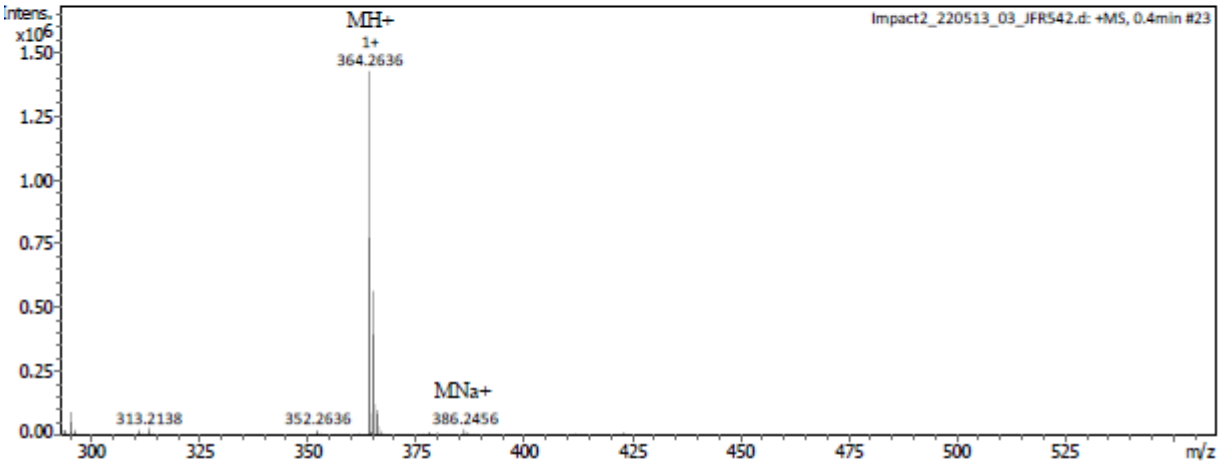
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

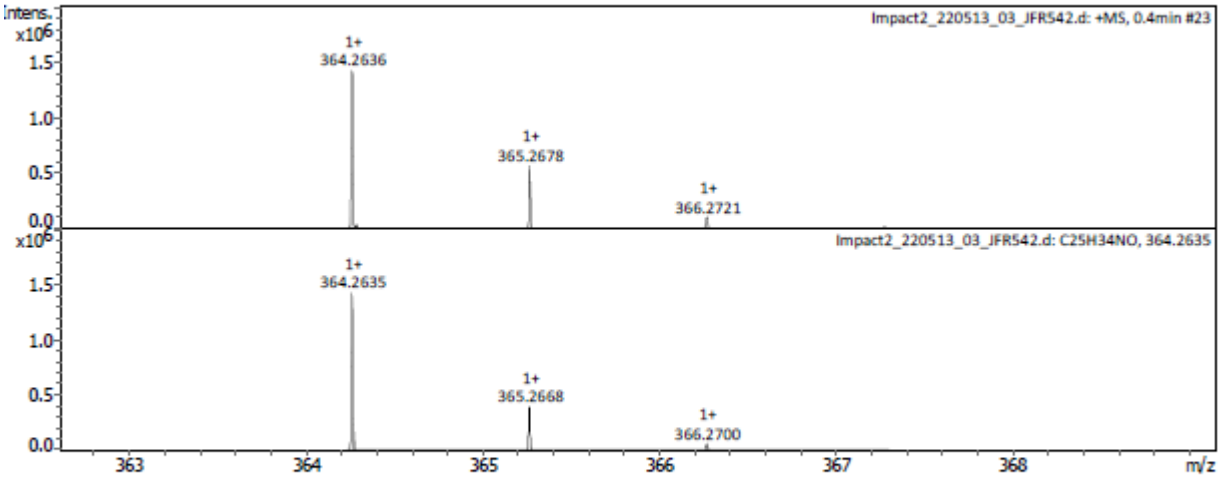
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220513_03_JFR542.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 5/13/2022 8:15:10 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

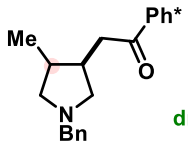
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 364.2636 | C25H34NO | 364.2635 | C25H33NO | -0.4 | 71.6 | M+H | 1+ |
| 386.2456 | C25H33NNaO | 386.2454 | | -0.4 | 52.9 | M+Na | 1+ |

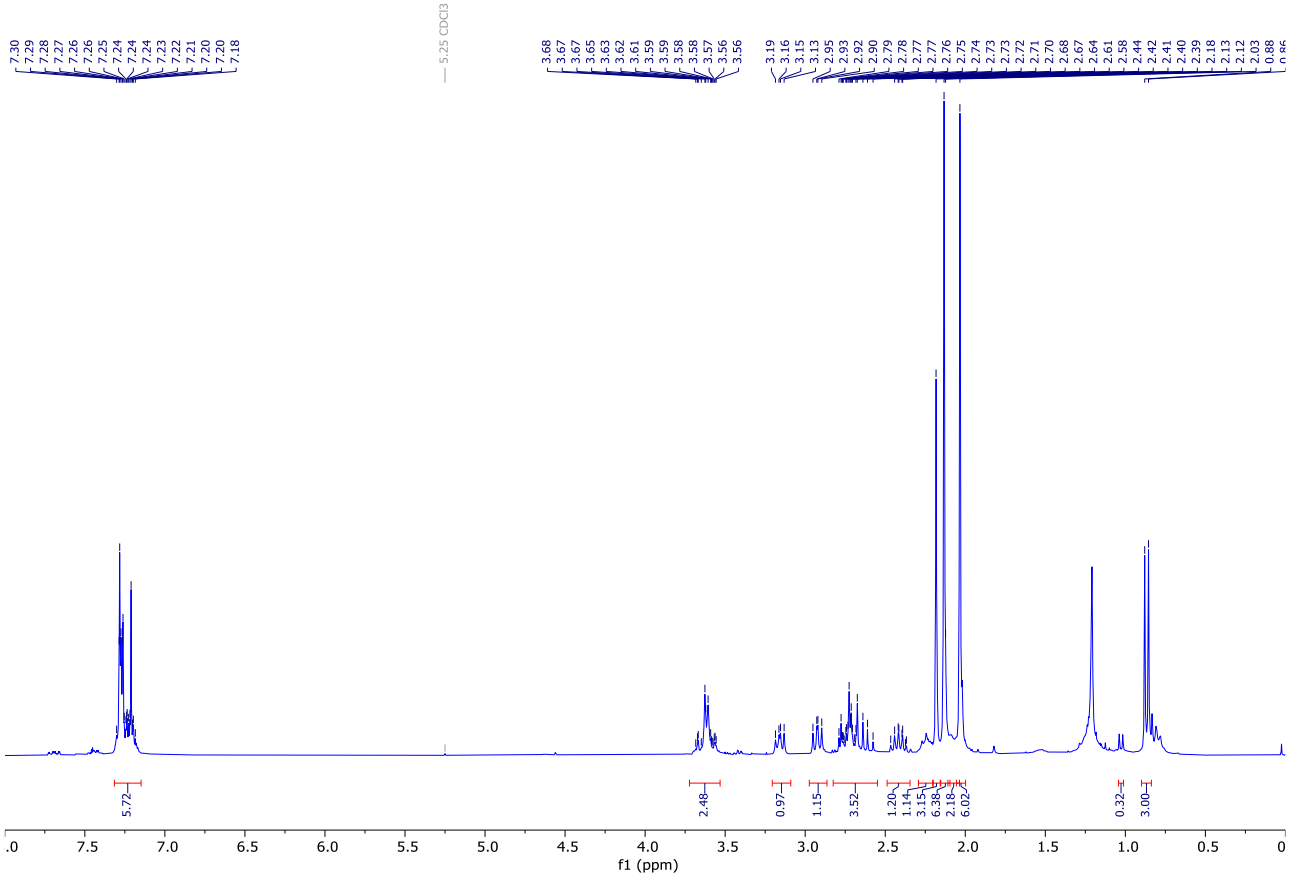
**2-(1-Benzyl-4-methylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5g**



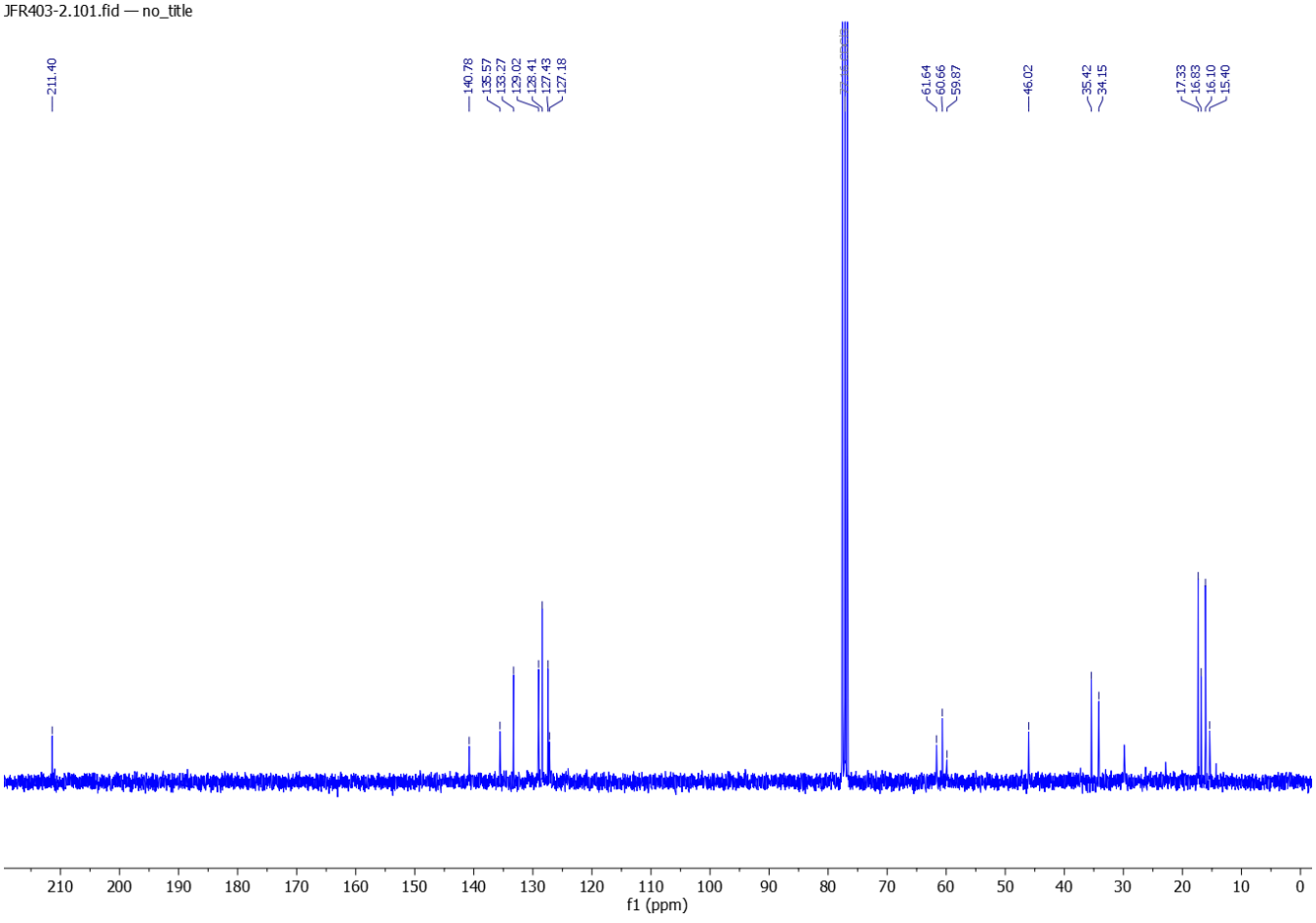

5g

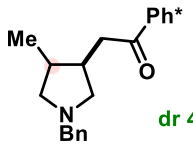
dr 90:10

JFR403-2.1.fid — 1H zg90 — 1H_8




JFR403-2.101.fid — no_title

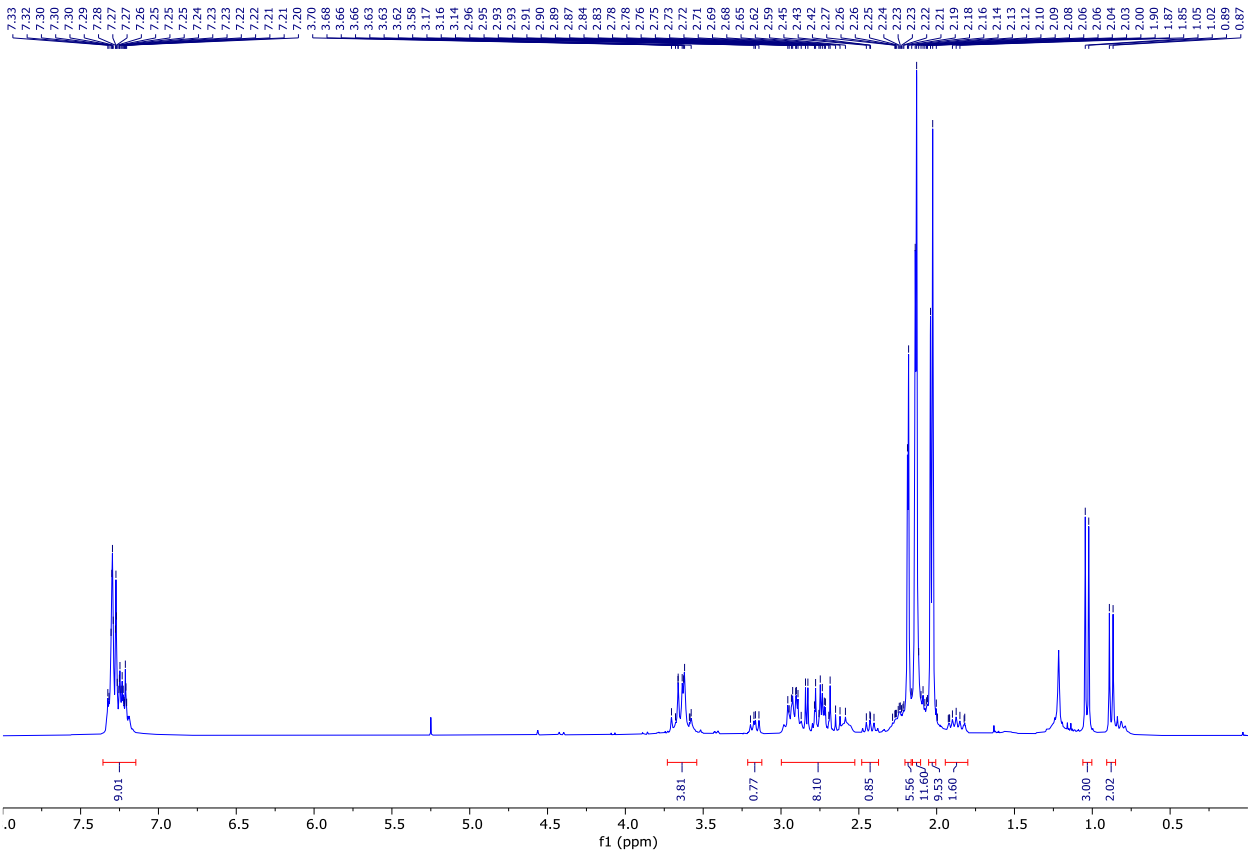




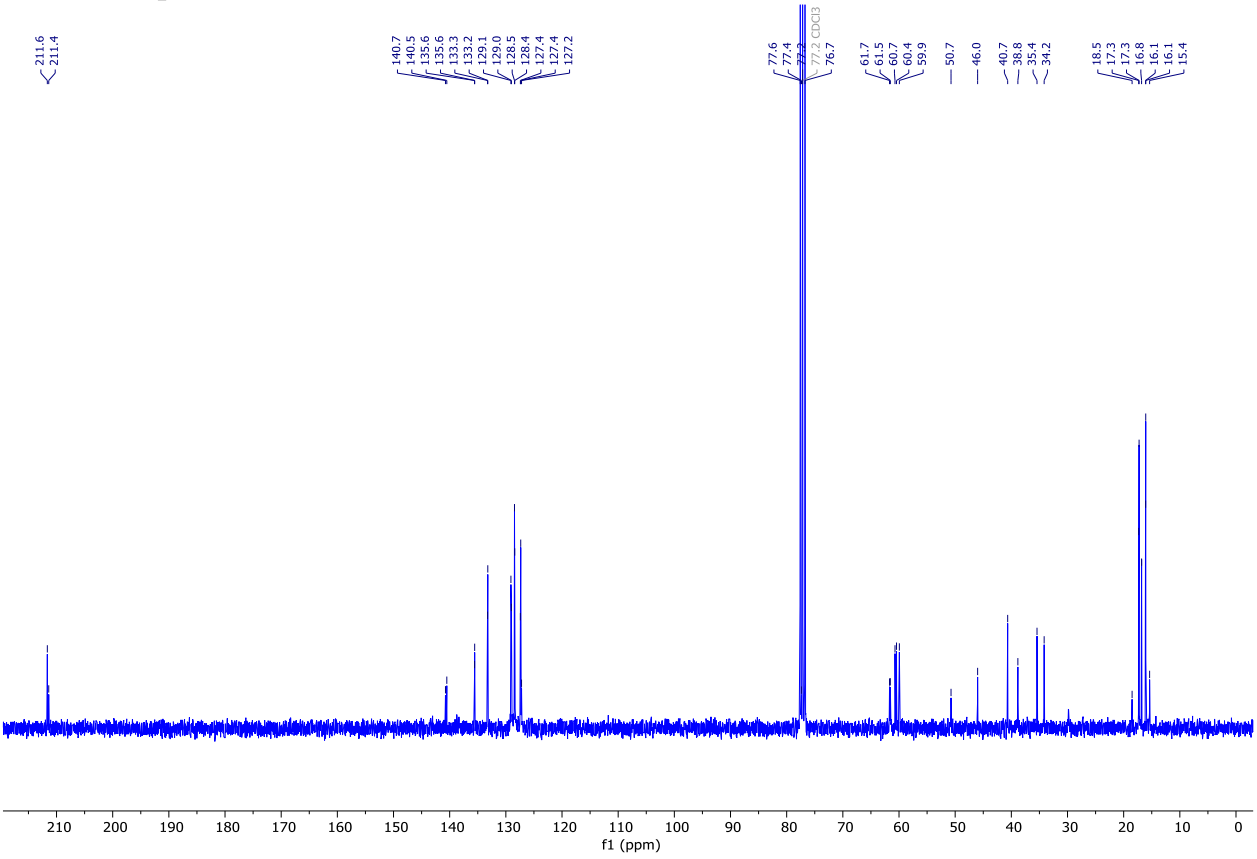

**5g**

**dr 40:60**

JFR402-2.100.fid — no_title




JFR402-2.102.fid — no_title



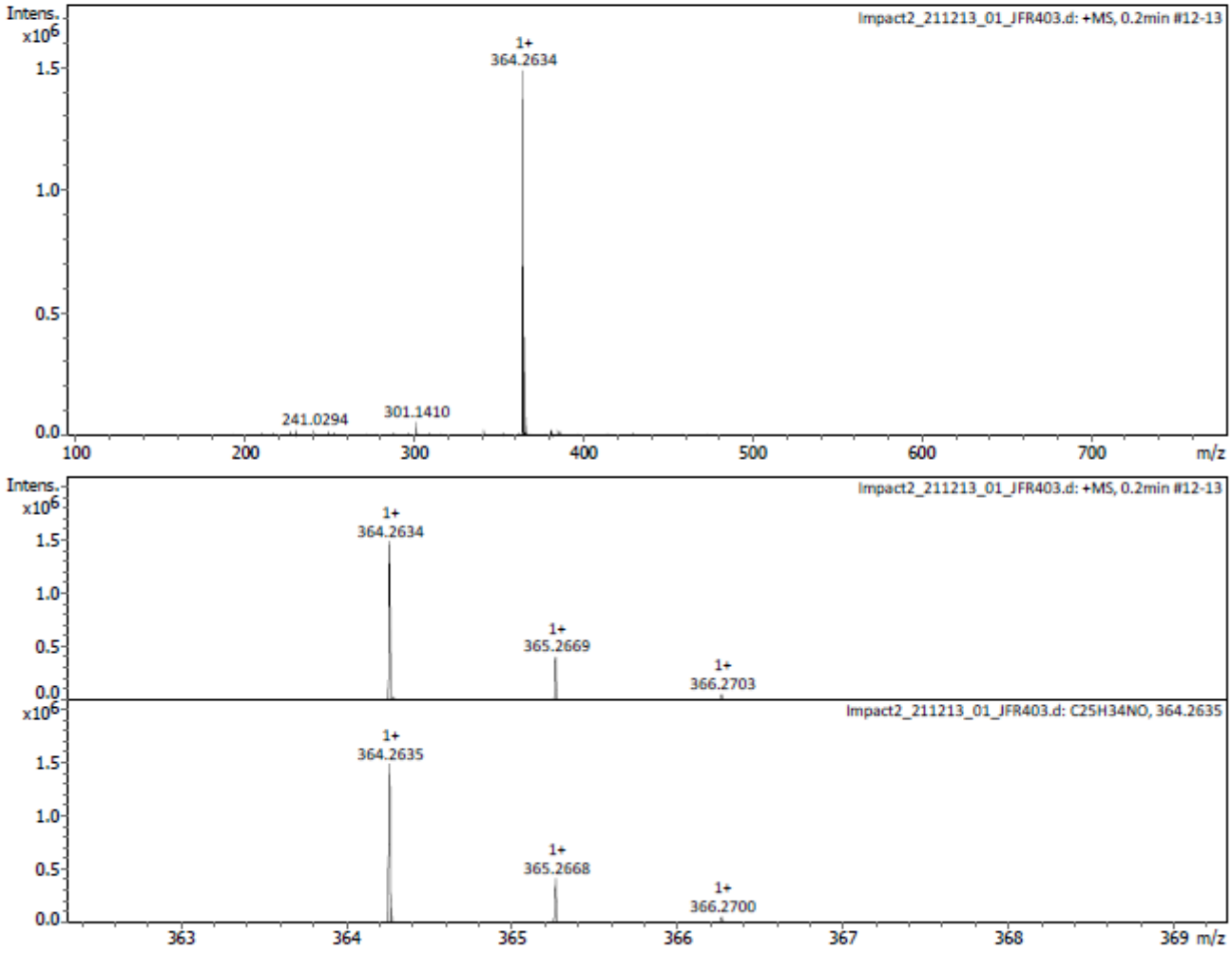
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211213_01_JFR403.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 12/13/2021 1:21:19 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

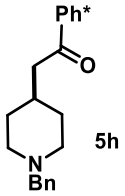
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 100 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |

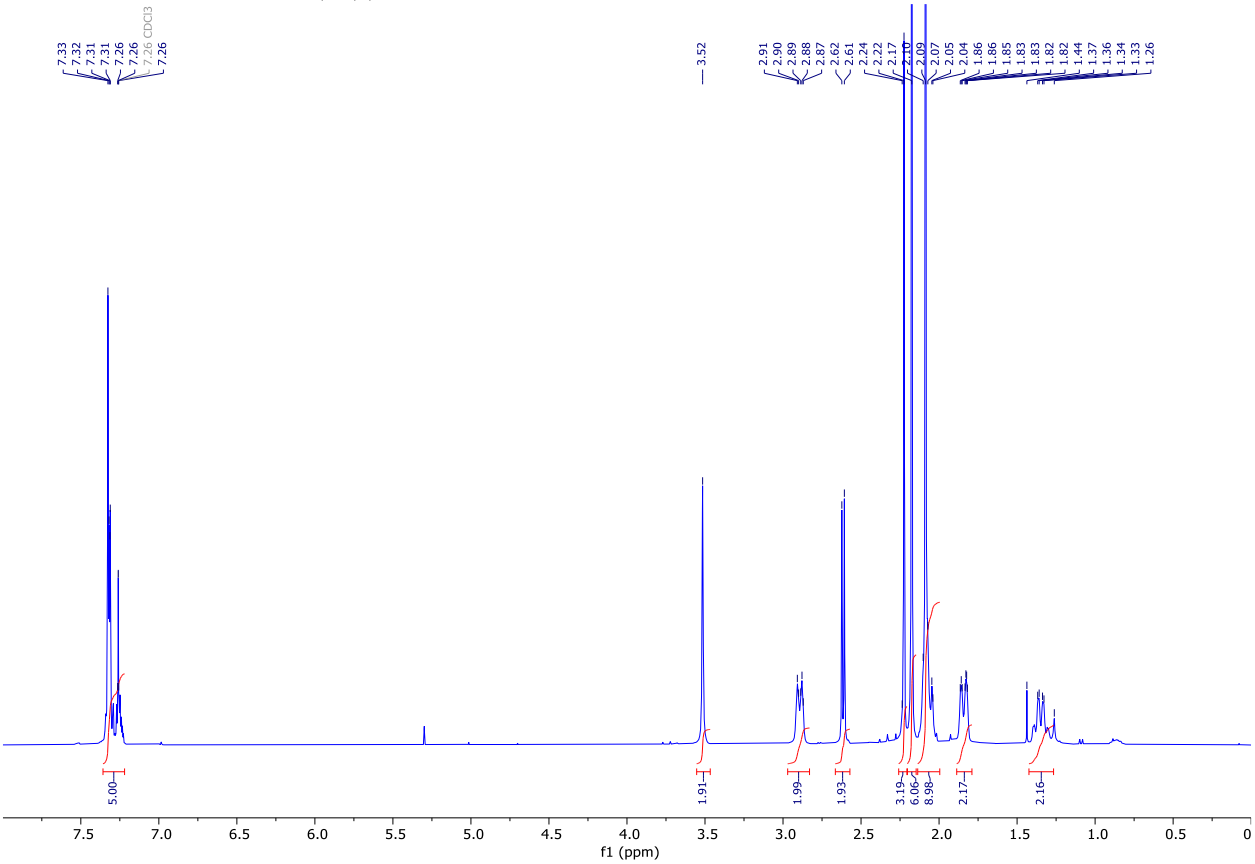



| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 364.2634 | C25H34NO | 364.2635 | C25H33NO | 0.2 | 4.1 | M+H | 1+ |

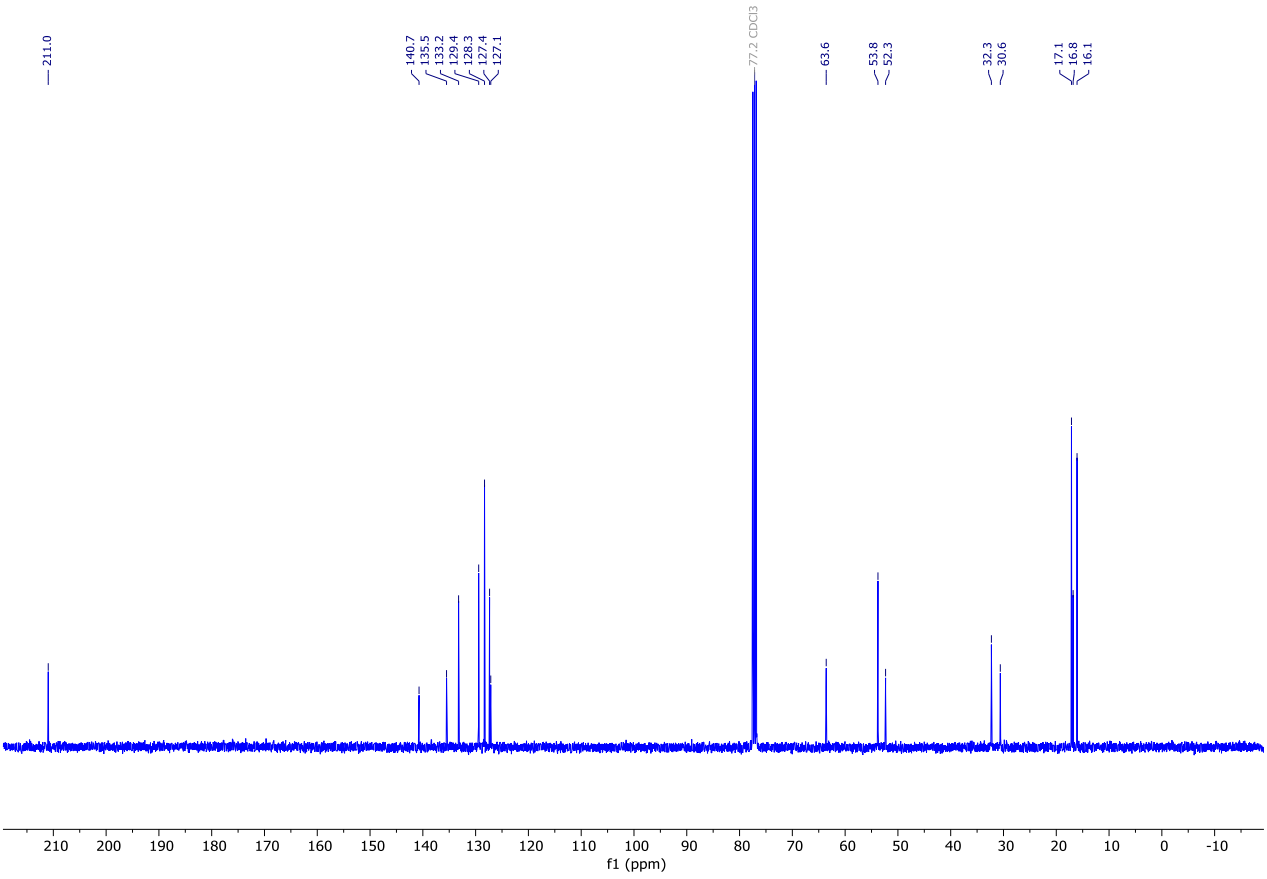
## 2-(1-Benzylpiperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5h [2075811-80-0]




JFR217-2F.100.fid — no_title — 1H_8 CDCl3 /opt/topspin lco_insa 44




JFR217-2F.101.fid — no_title — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 44



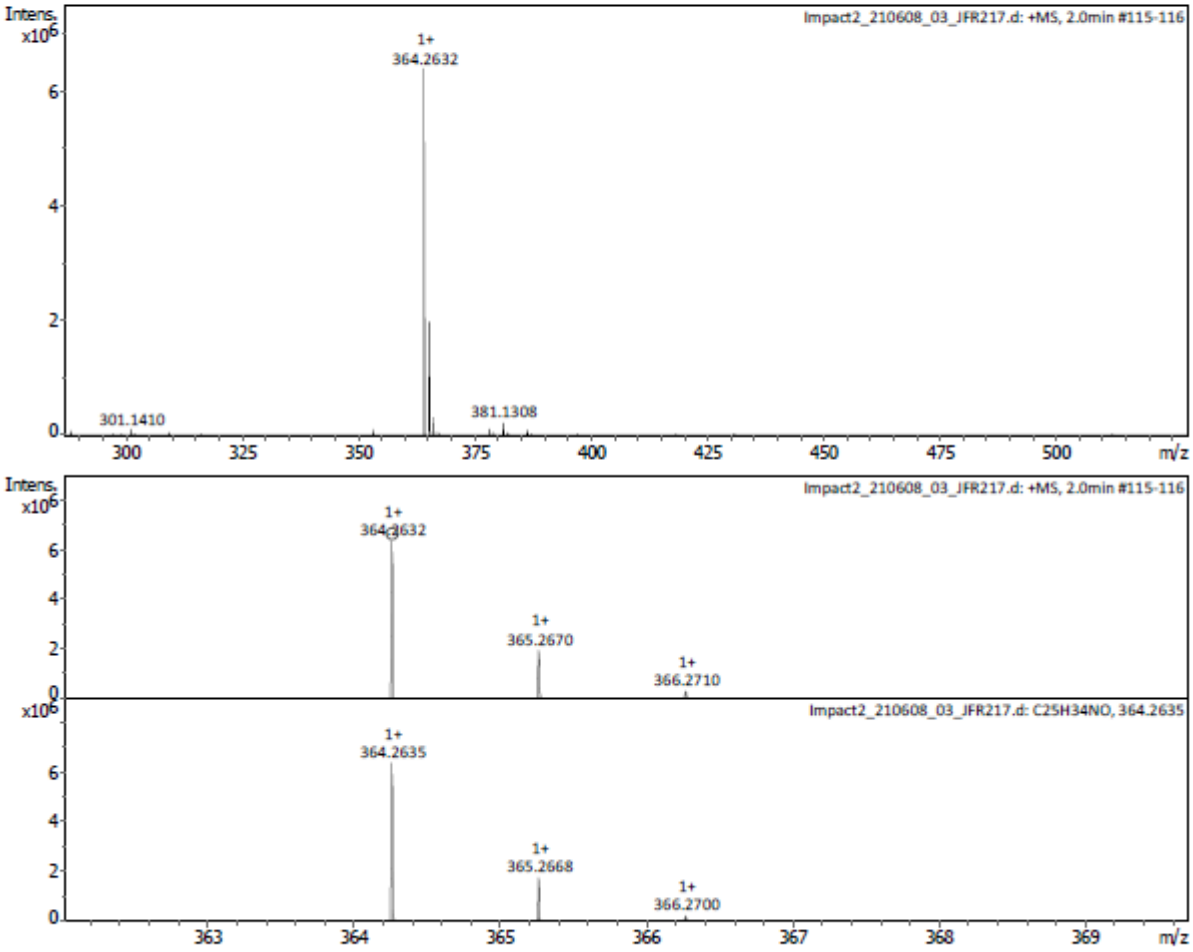
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210608_03_JFR217.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 6/8/2021 8:53:34 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

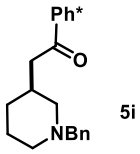
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



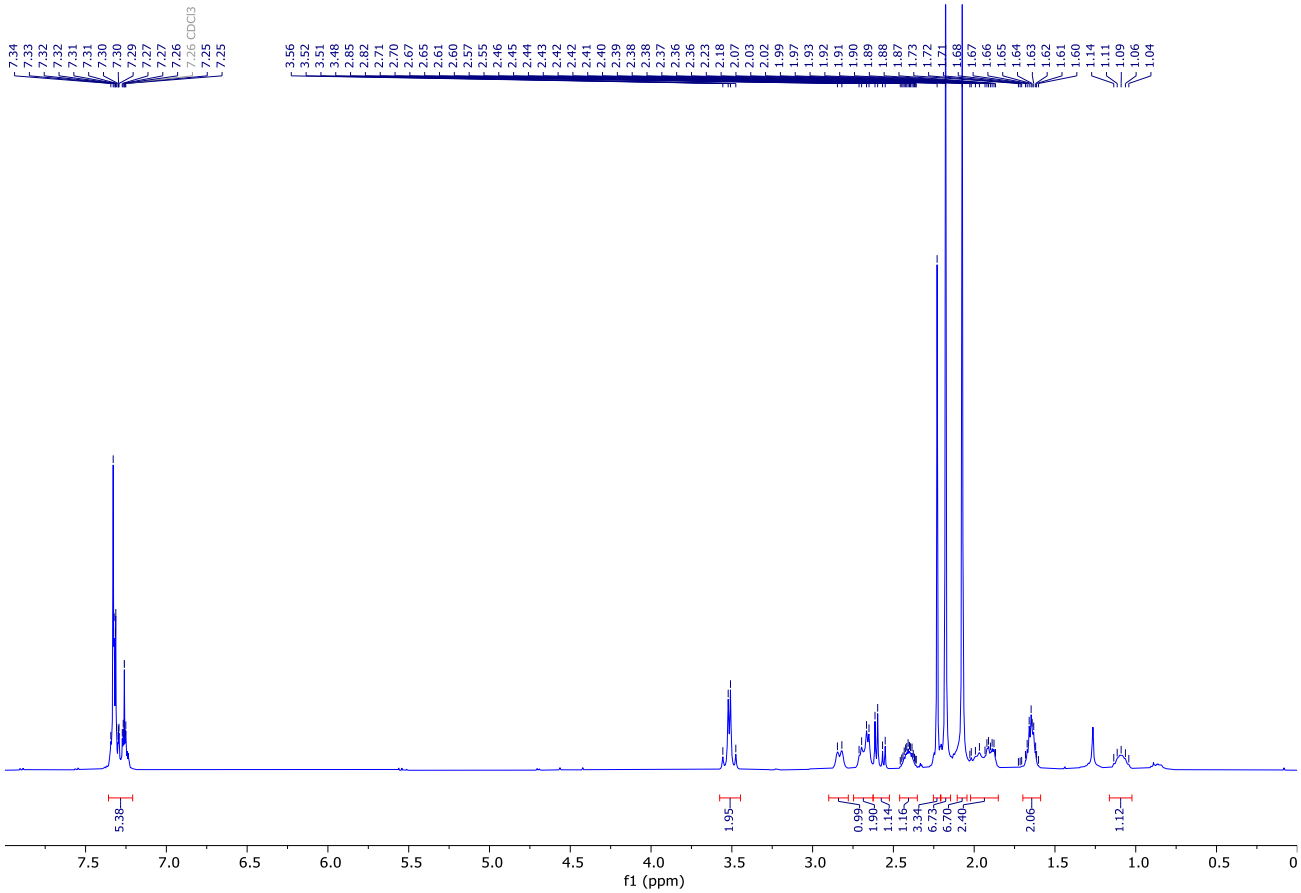

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 364.2632 | C25H34NO | 364.2635 | C25H33NO | 0.8 | 20.2 | M+H | 1+ |

## 2-(1-Benzylpiperidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethenone 5i

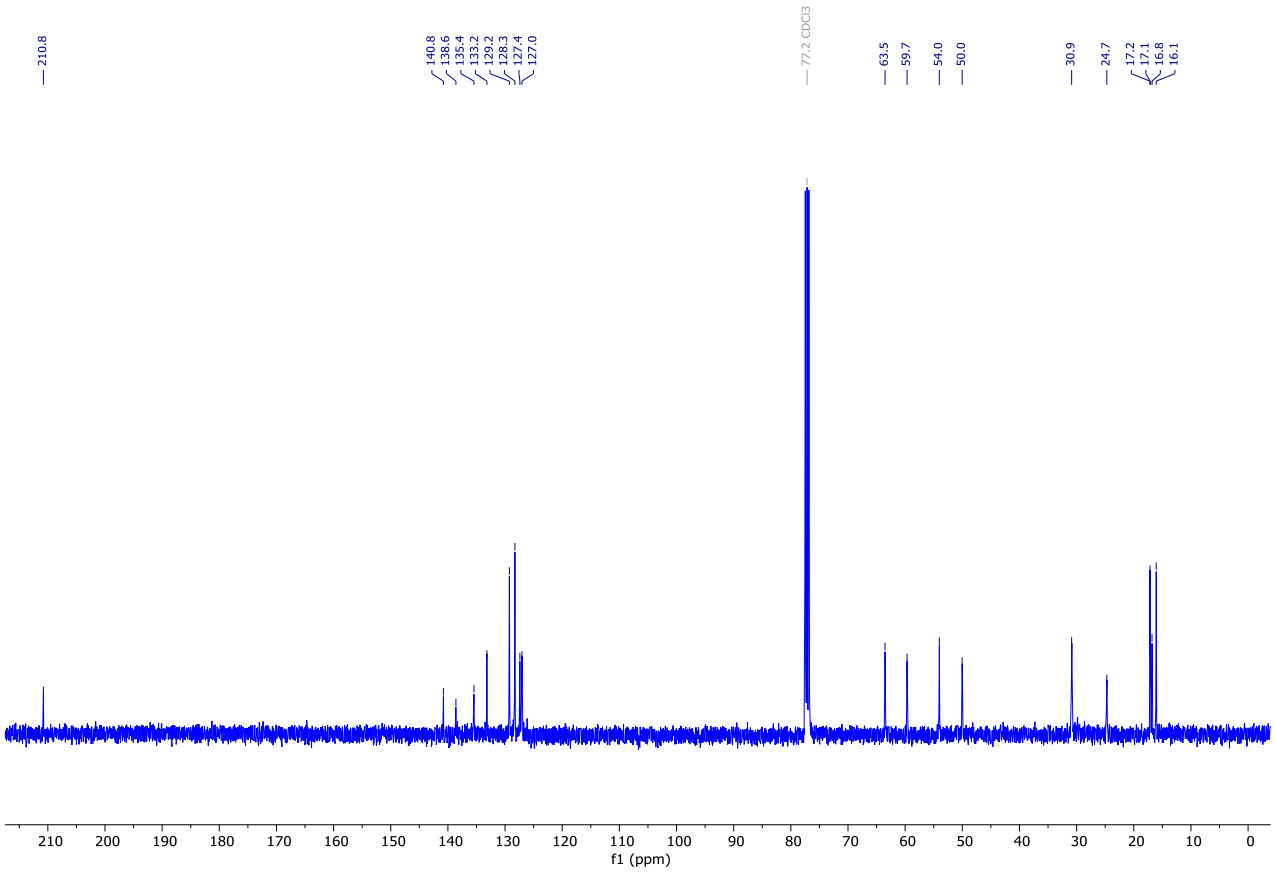



5i

JFR312-2F.109.fid — no_title




JFR312-2F.101.fid — no_title



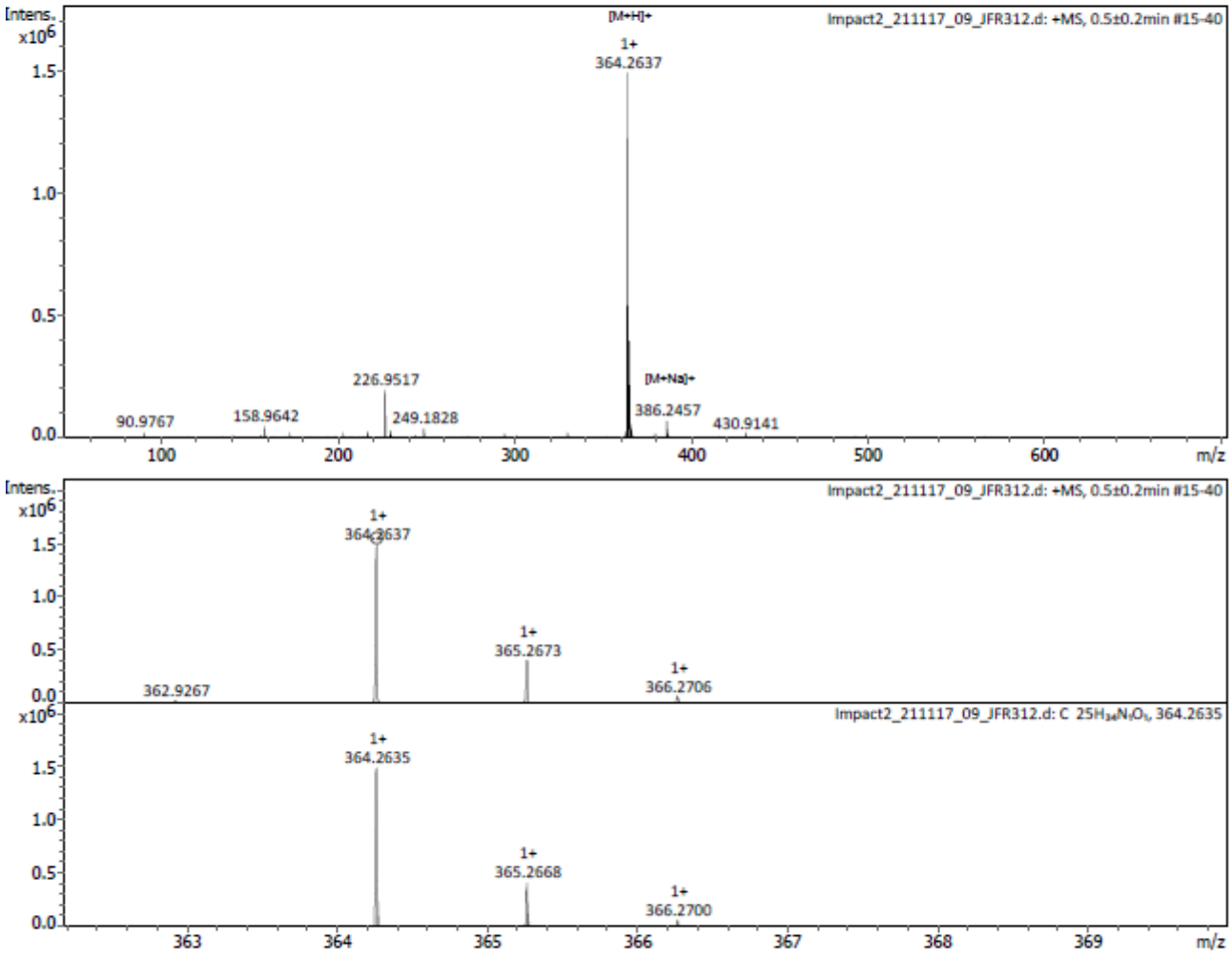
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211117_09_JFR312.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 11/17/2021 1:44:06 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

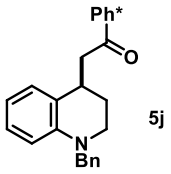
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



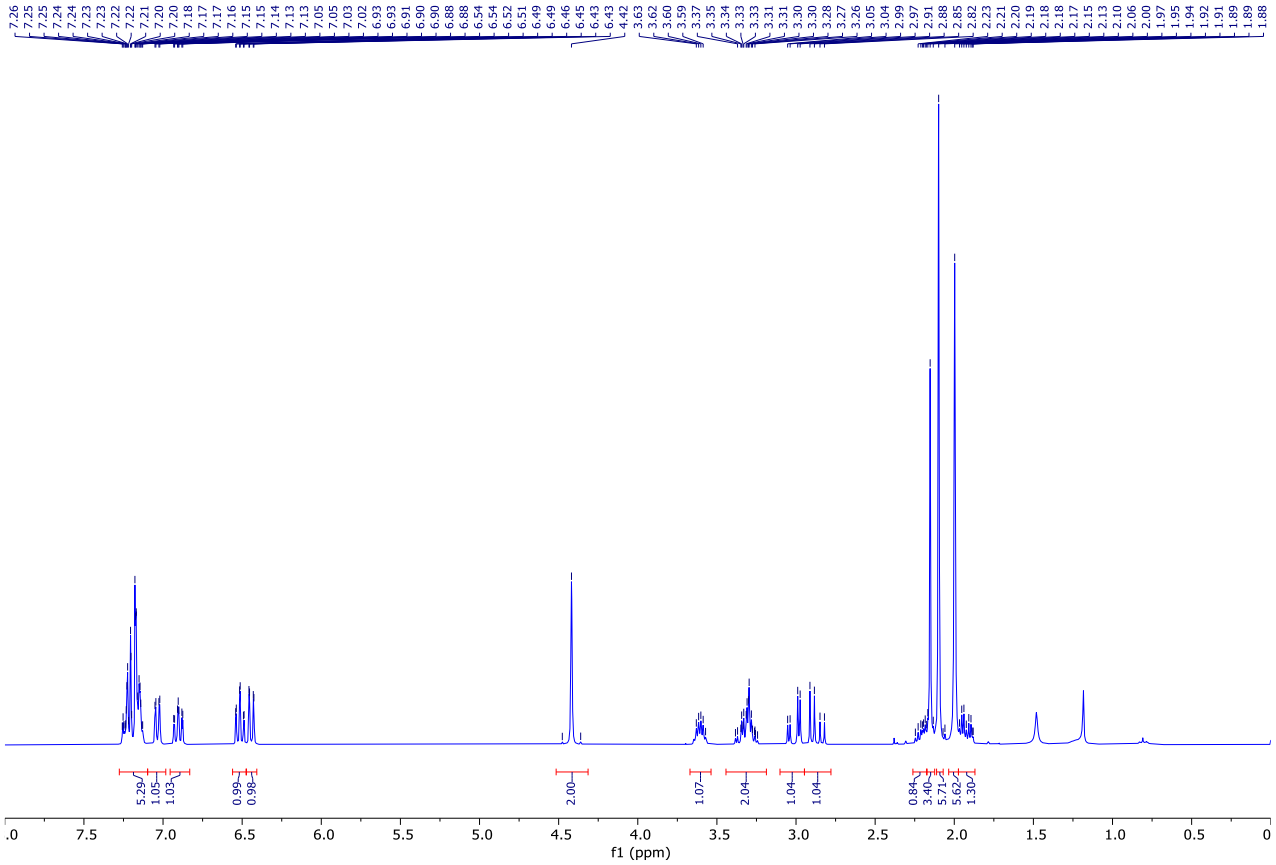

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 364.2637 | C25H34NO | 364.2635 | C25H33NO | -0.5 | 5.5 | M+H | 1+ |
| 386.2457 | C25H33NNaO | 386.2454 | | -0.7 | 7.2 | M+Na | 1+ |

## 2-(1-Benzyl-1,2,3,4-tetrahydroquinolin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5j

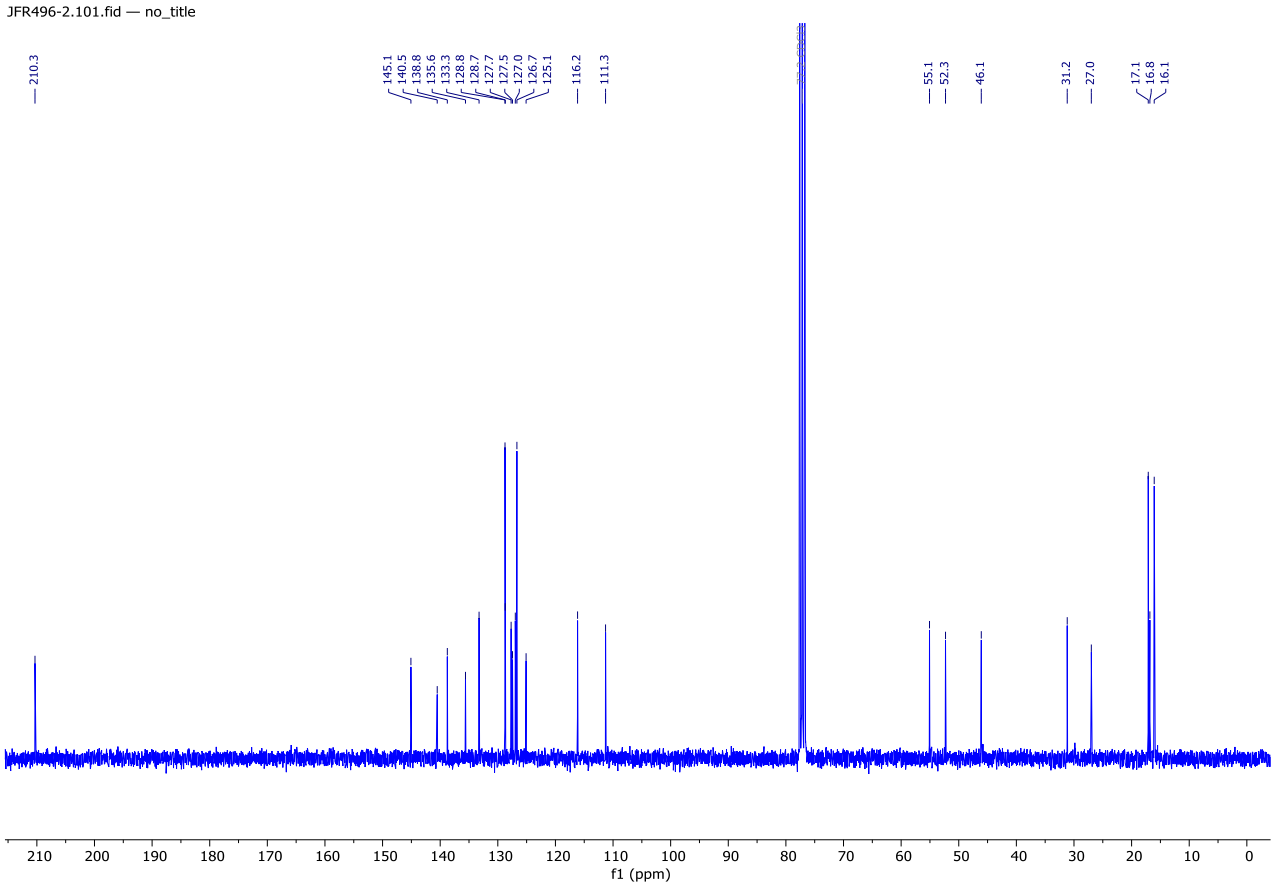



5j

JFR496-2.100.fid — no_title




JFR496-2.101.fid — no_title



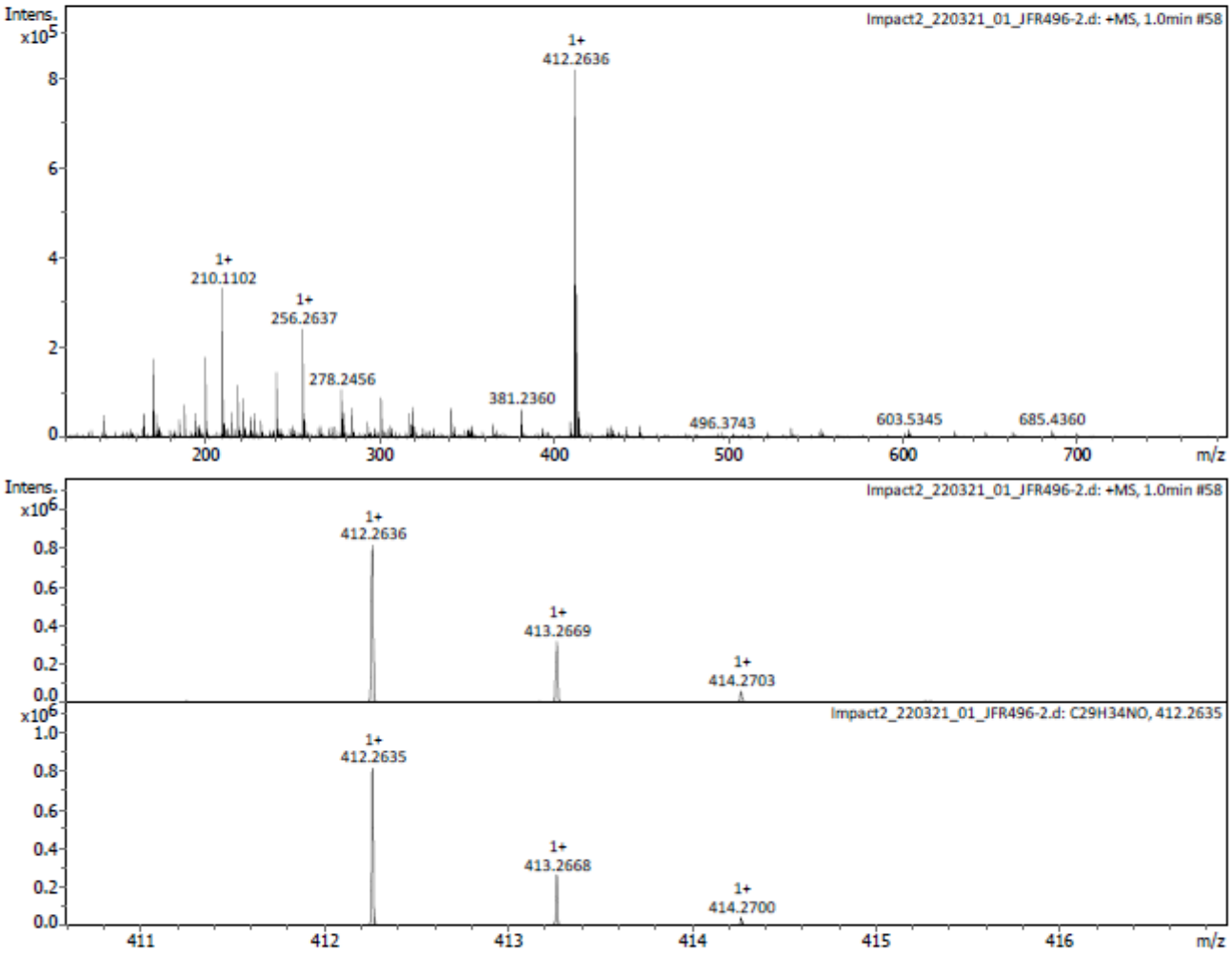
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220321_01_JFR496-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 3/21/2022 9:43:02 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

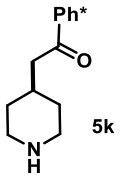
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



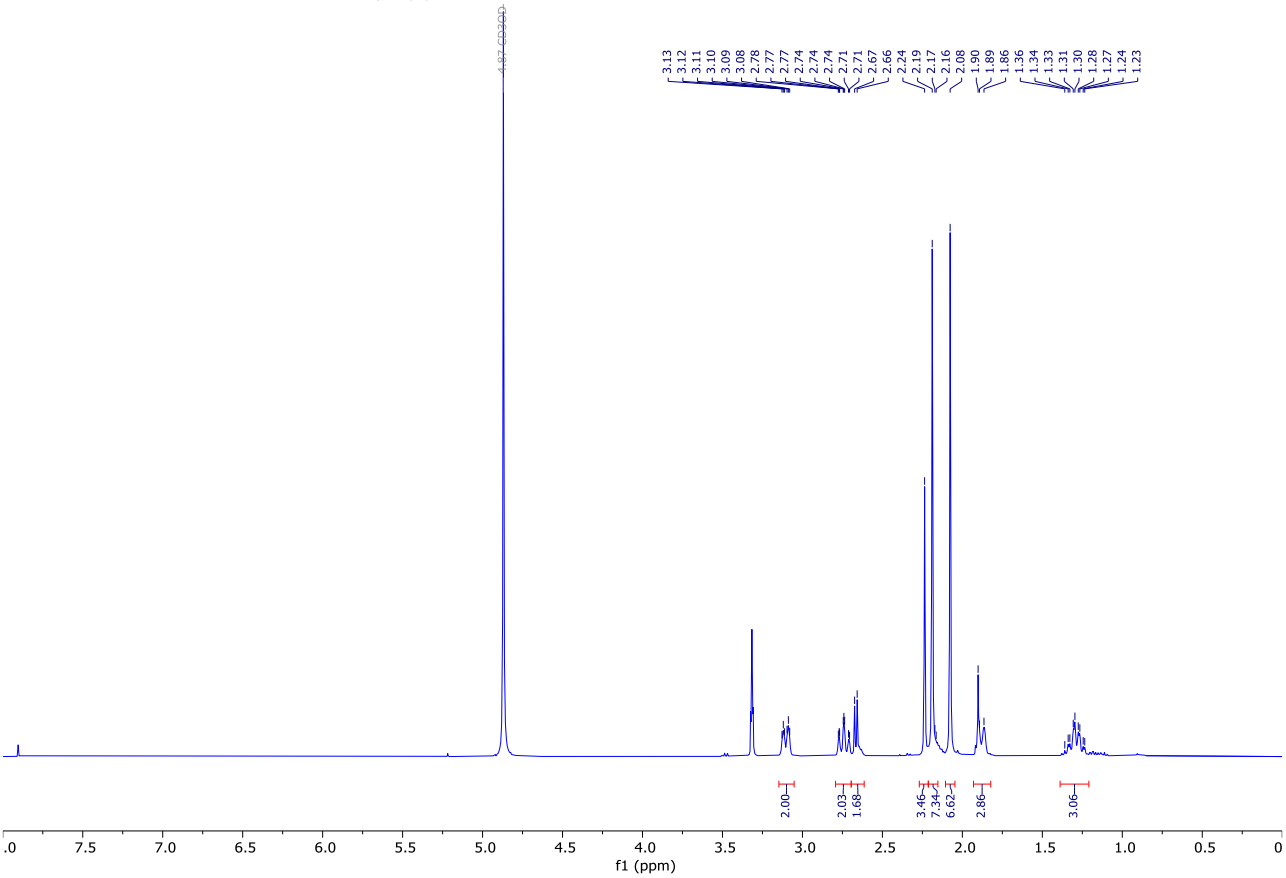

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 412.2636 | C29H34NO | 412.2635 | C29H33NO | -0.3 | 41.7 | M+H | 1+ |
| 434.2459 | C29H33NNaO | 434.2454 | | -1.0 | 62.7 | M+Na | 1+ |

## 1-(2,3,4,5,6-pentamethylphenyl)-2-(piperidin-4-yl)ethanone 5k

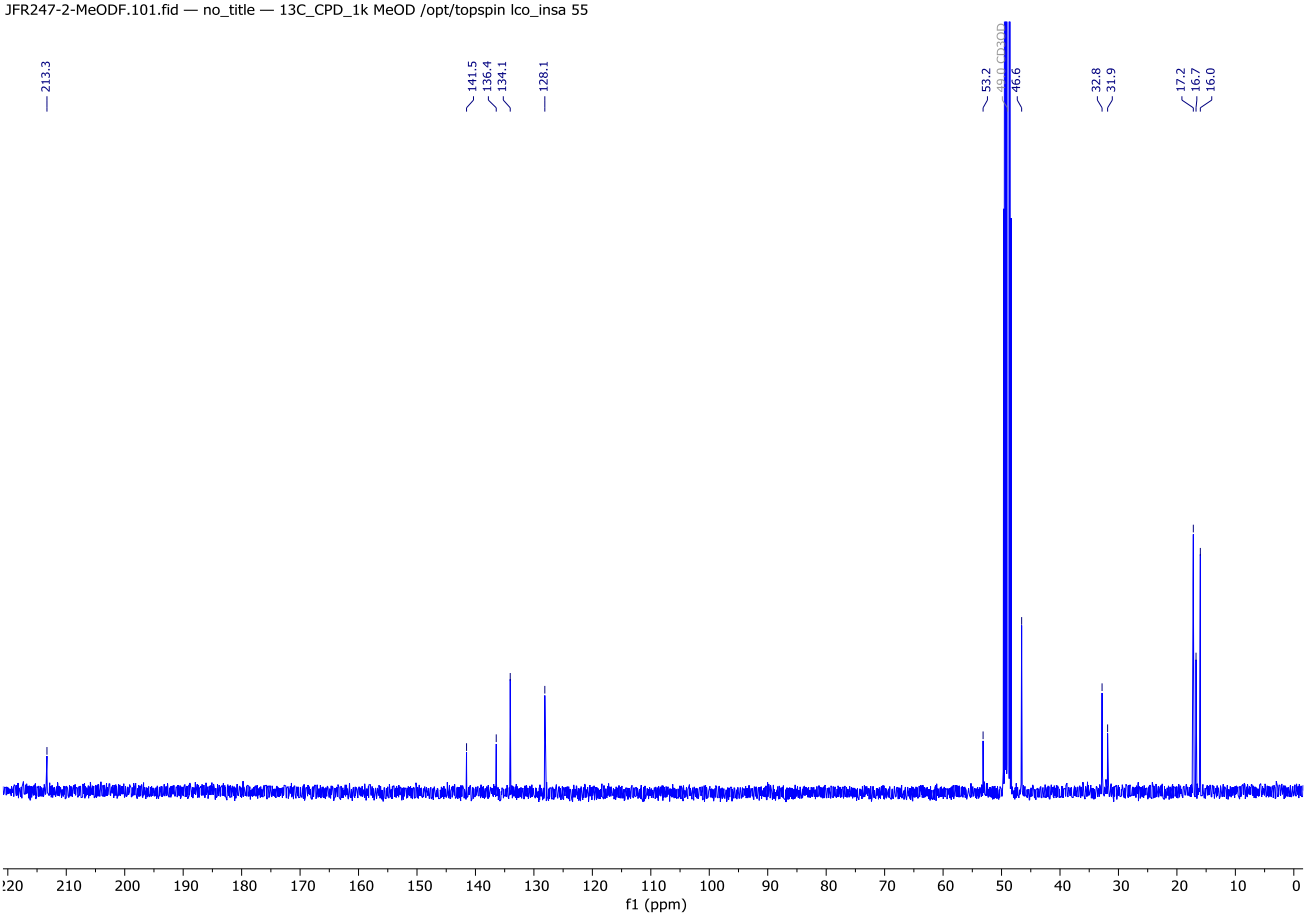



5k

JFR247-2-MeODF.100.fid — no_title — 1H_8 MeOD /opt/topspin lco_insa 55




JFR247-2-MeODF.101.fid — no_title — 13C_CPD_1k MeOD /opt/topspin lco_insa 55



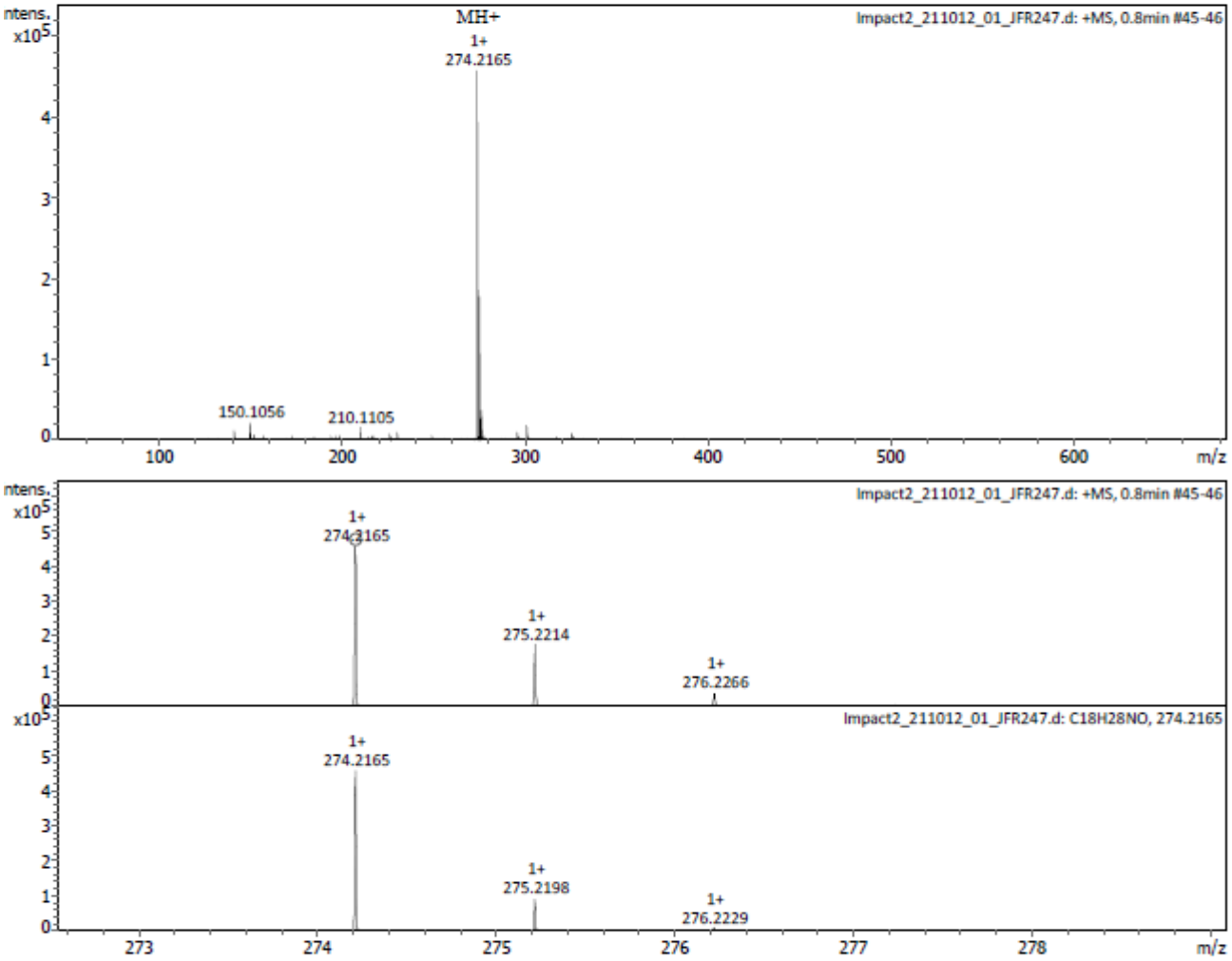
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211012_01_JFR247.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/12/2021 9:07:26 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

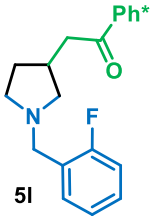
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



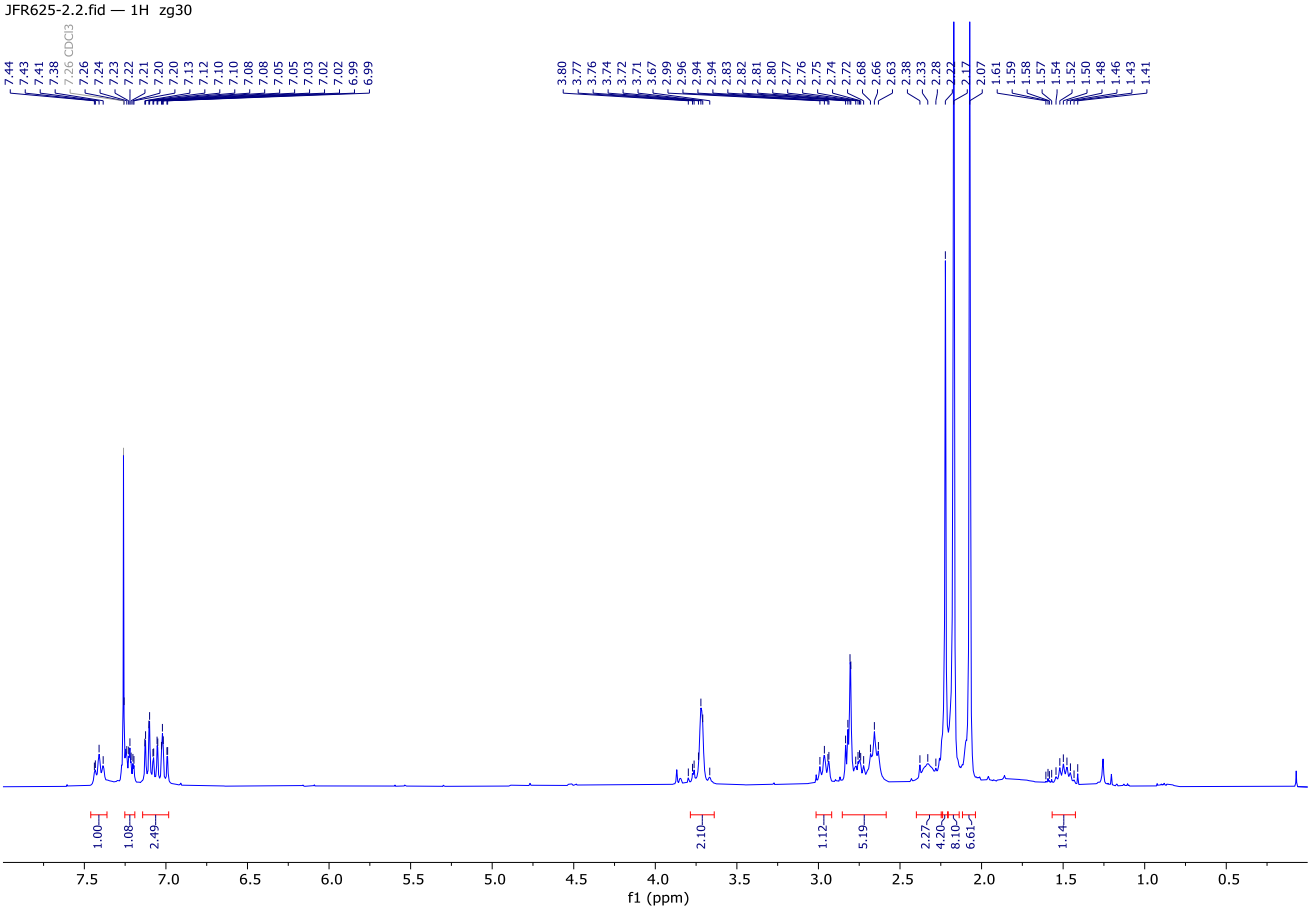

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 274.2165 | C18H28NO | 274.2165 | C18H27NO | 0.1 | 112.6 | M+H | 1+ |

**2-(1-(2-Fluorobenzyl)pyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5l**

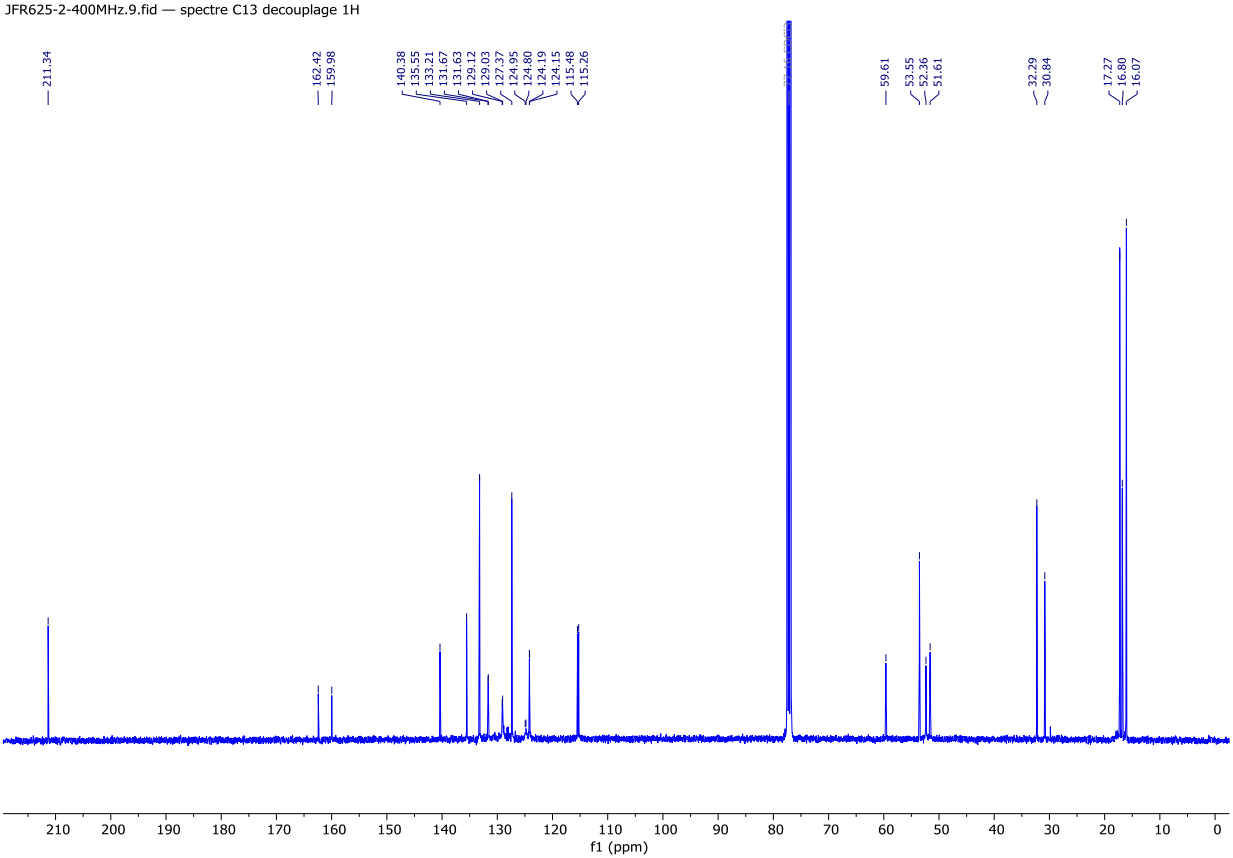



5l

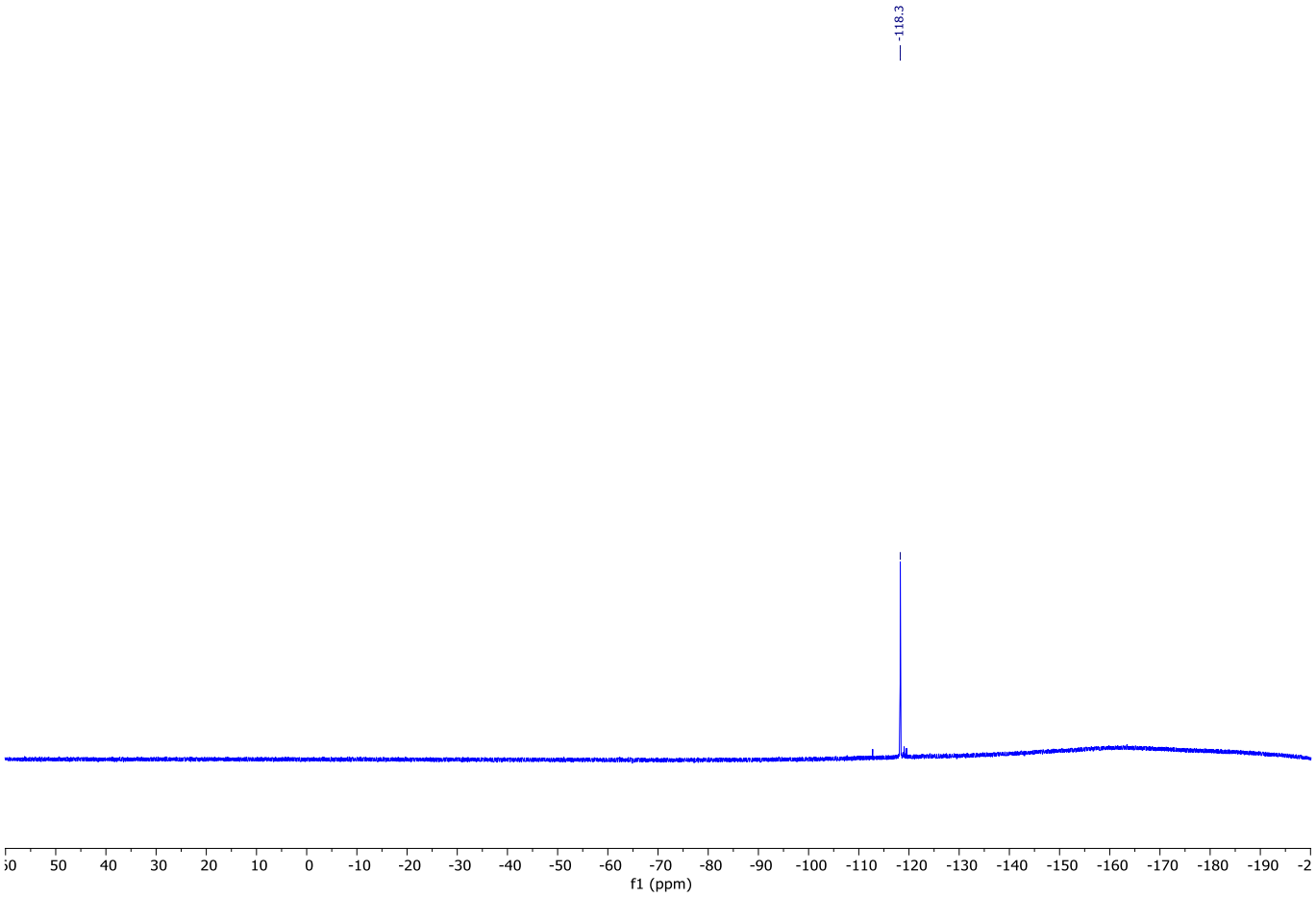
JFR625-2.2.fid — 1H zg30




JFR625-2-400MHz.9.fid — spectre C13 decouplage 1H



JFR-5I-bis.1.fid — F19 zg90 with 1H decoupling — 19F_CPD_8 CDCl3 /opt/topspin lco_insa 52



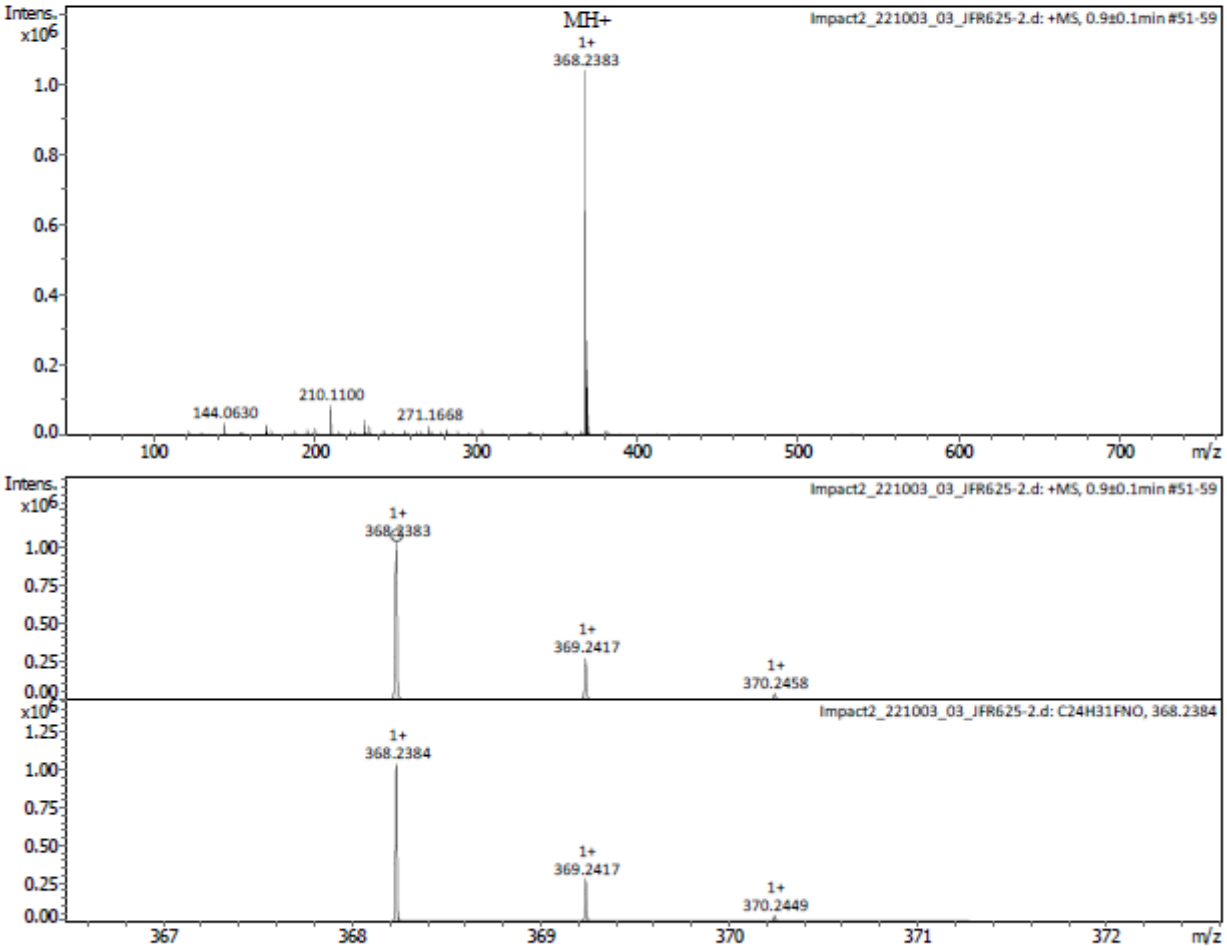
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_221003_03_JFR625-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/3/2022 10:50:20 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

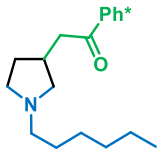
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



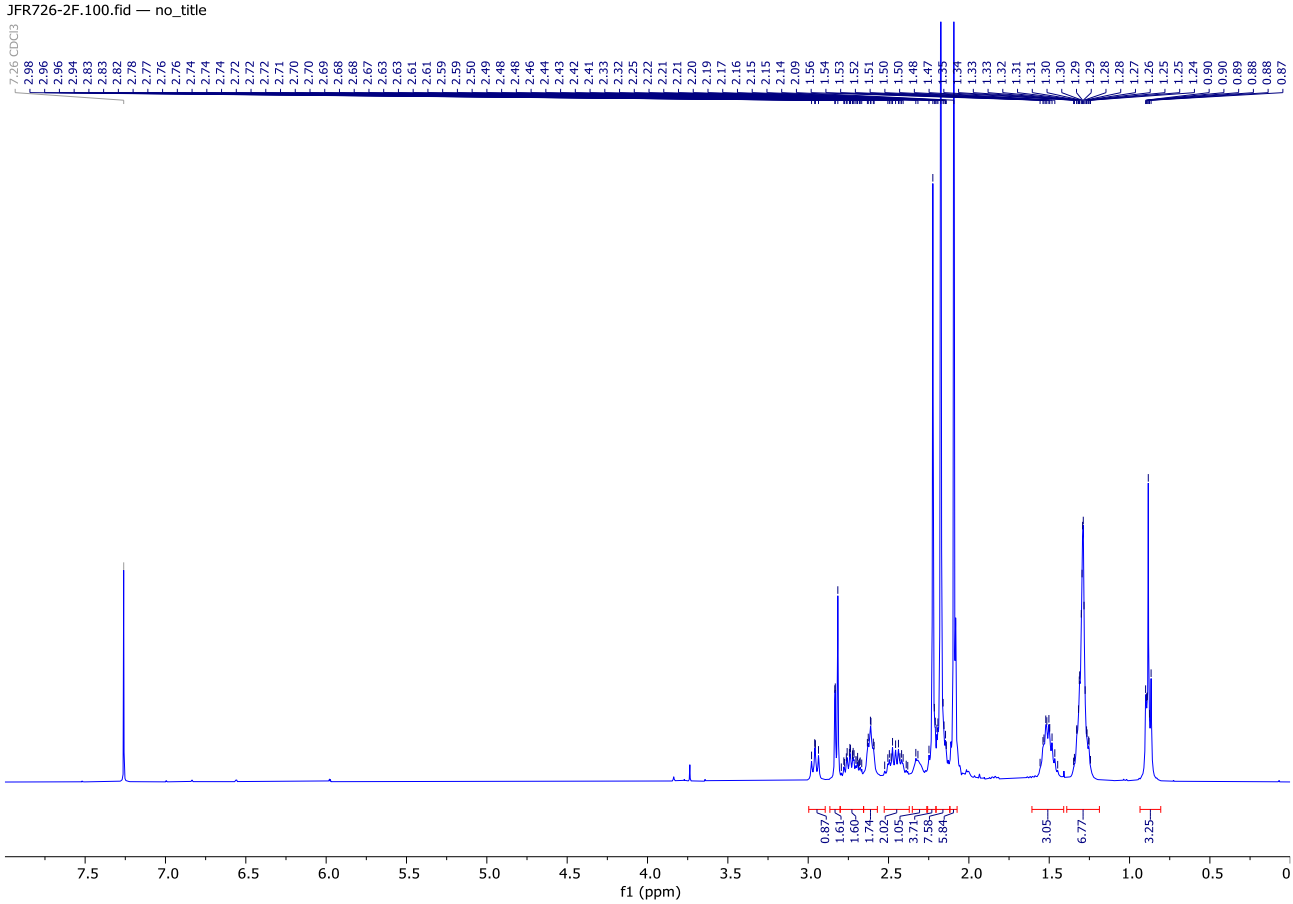

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 368.2383 | C24H31FNO | 368.2384 | C24H30FNO | 0.4 | 3.6 | M+H | 1+ |

## 2-(1-Hexylpyrrolidin-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5m

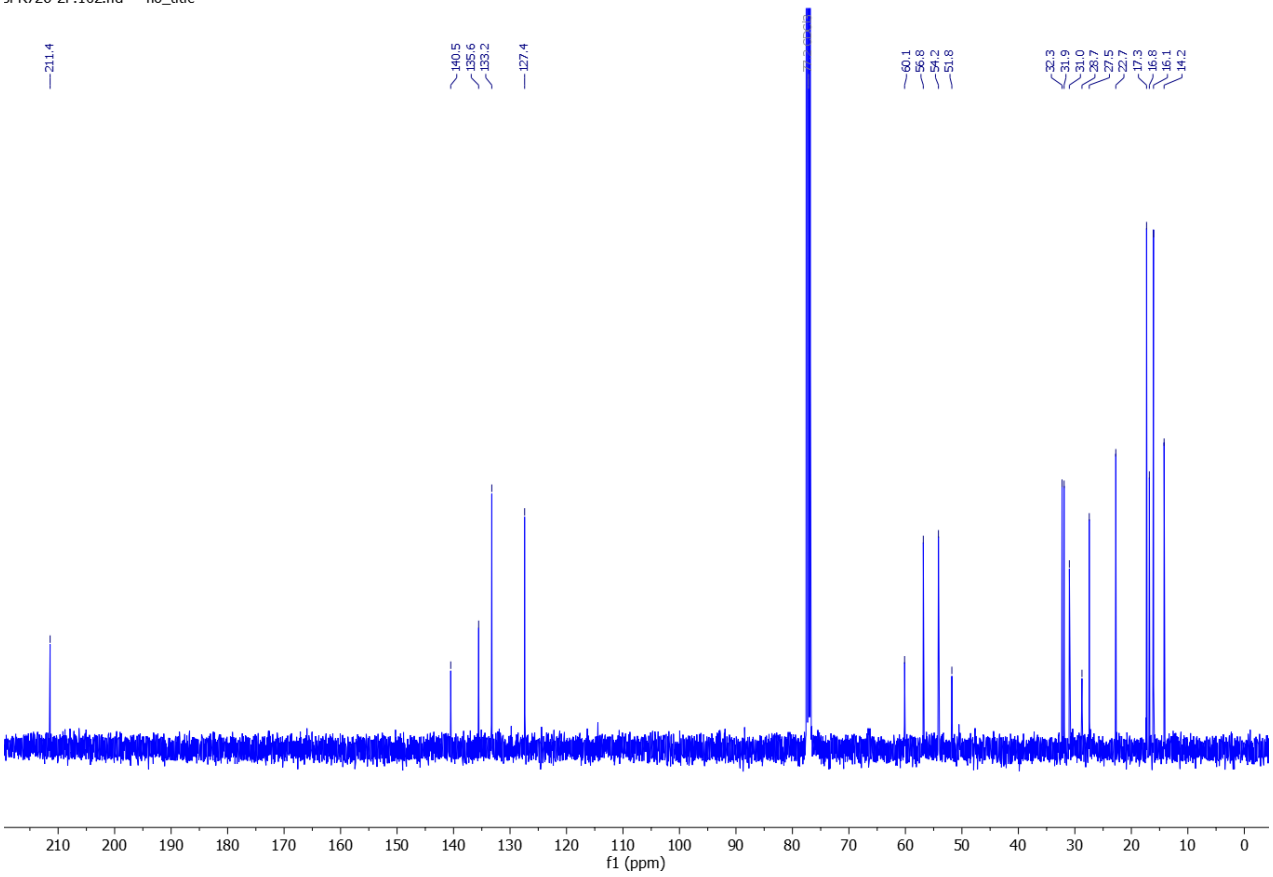



**5m**

JFR726-2F.100.fid — no_title




JFR726-2F.102.fid — no_title



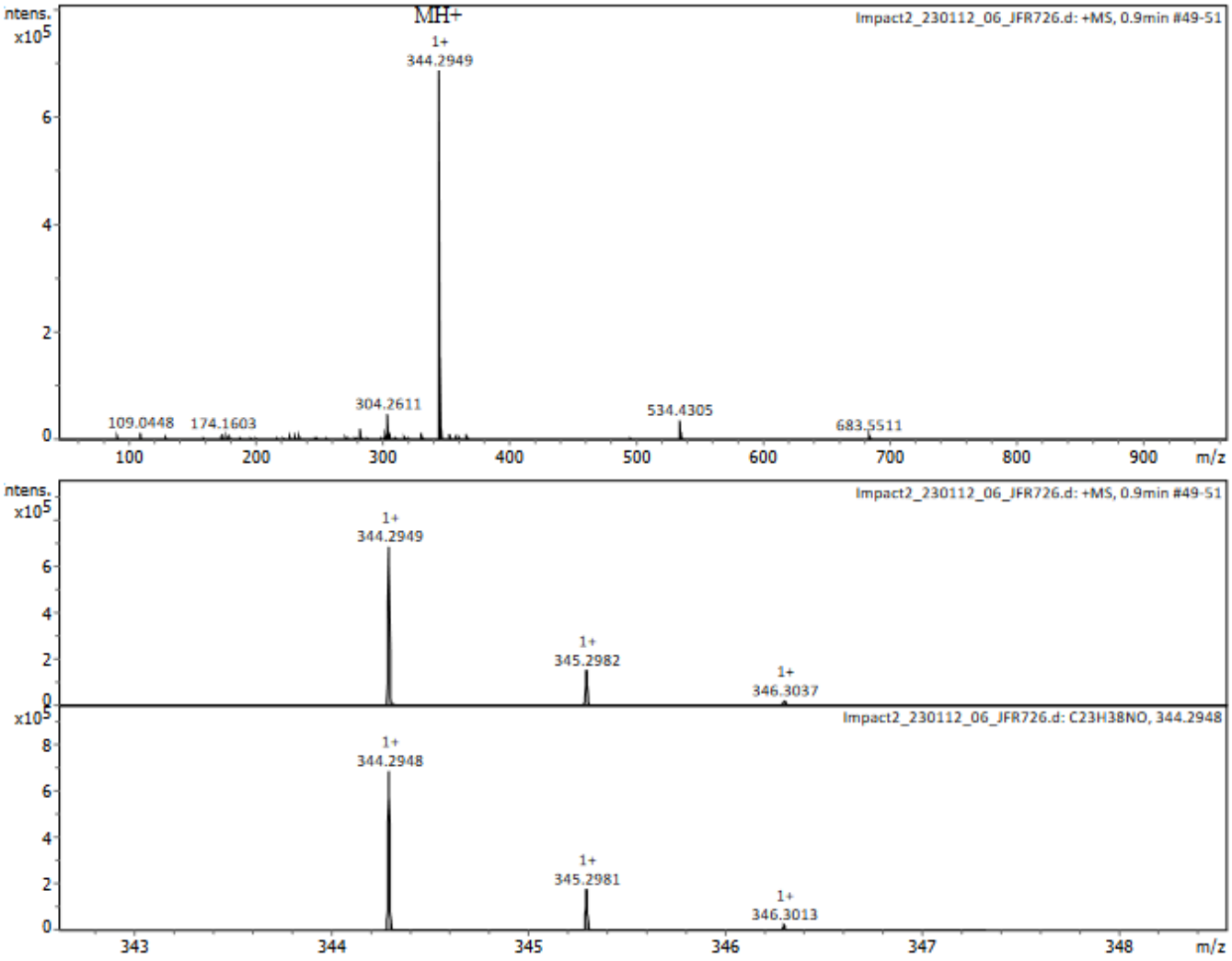
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230112_06_JFR726.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 1/12/2023 4:10:43 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

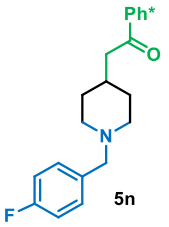
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 400.0 Vpp | Set Divert Valve | Source |



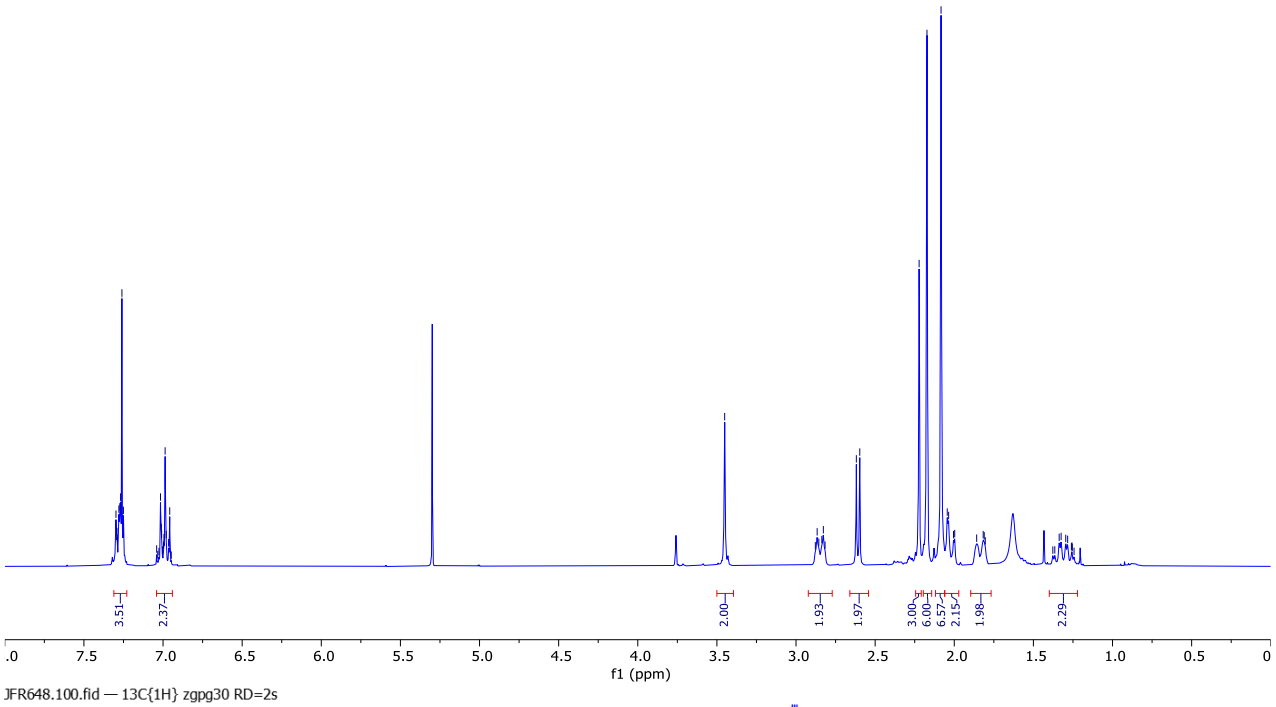

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 344.2949 | C23H38NO | 344.2948 | C23H37NO | -0.2 | 20.1 | M+H | 1+ |

**2-(1-(4-Fluorobenzyl)piperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5n**

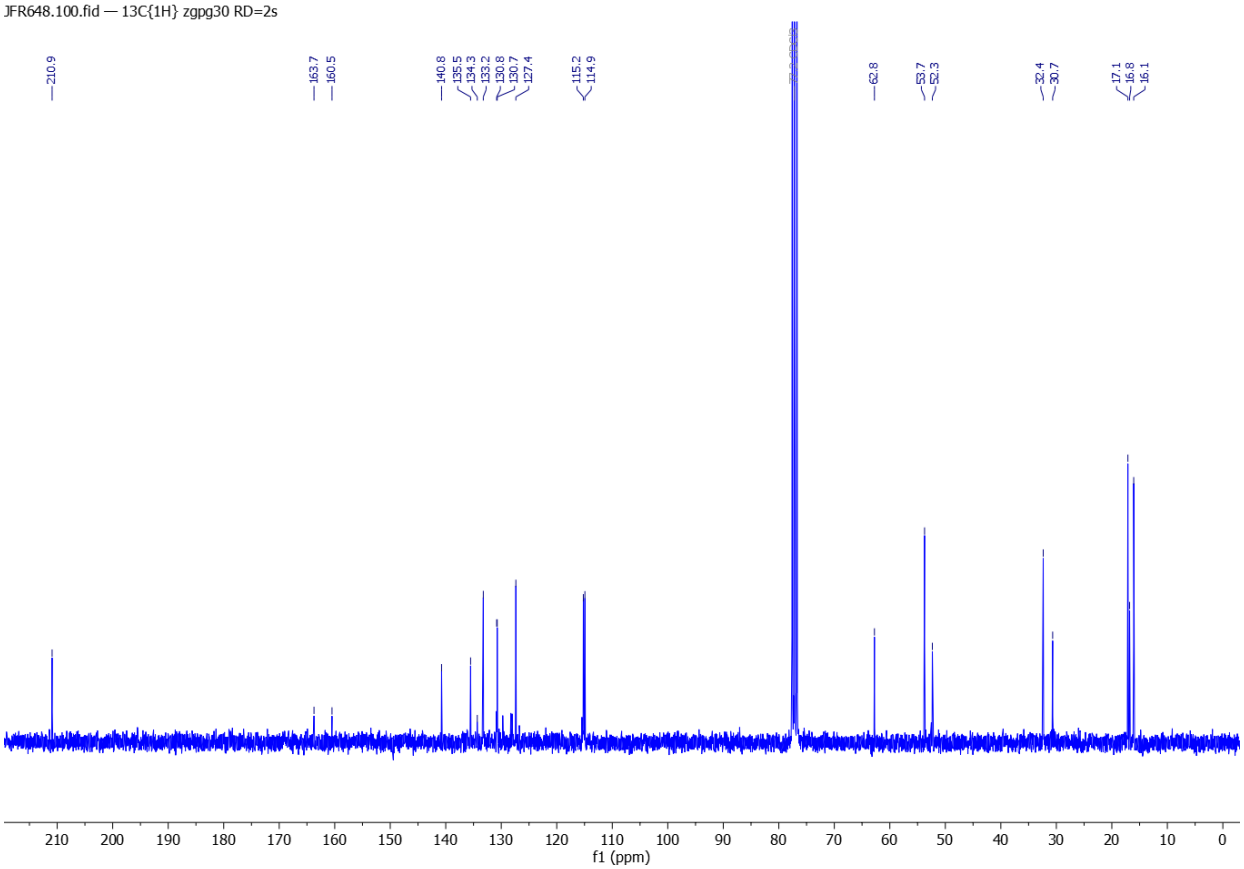



5n

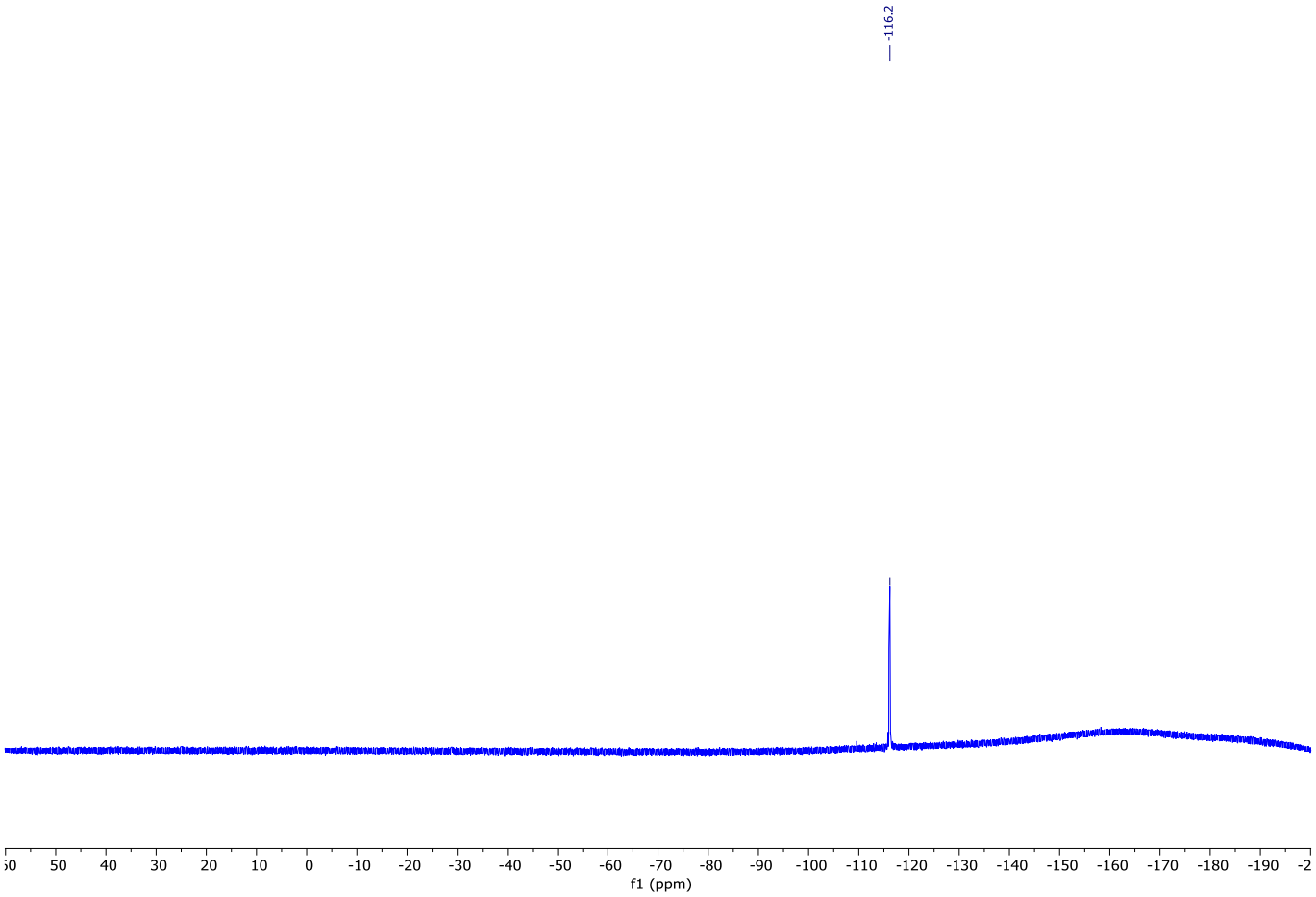
JFR648-2.1.fid — 1H zg30


JFR648.100.fid — 13C{1H} zgpg30 RD=2s



JFR-5n.2.fid — F19 zg90 with 1H decoupling — 19F_CPD_8 CDCl3 /opt/topspin lco_insa 35



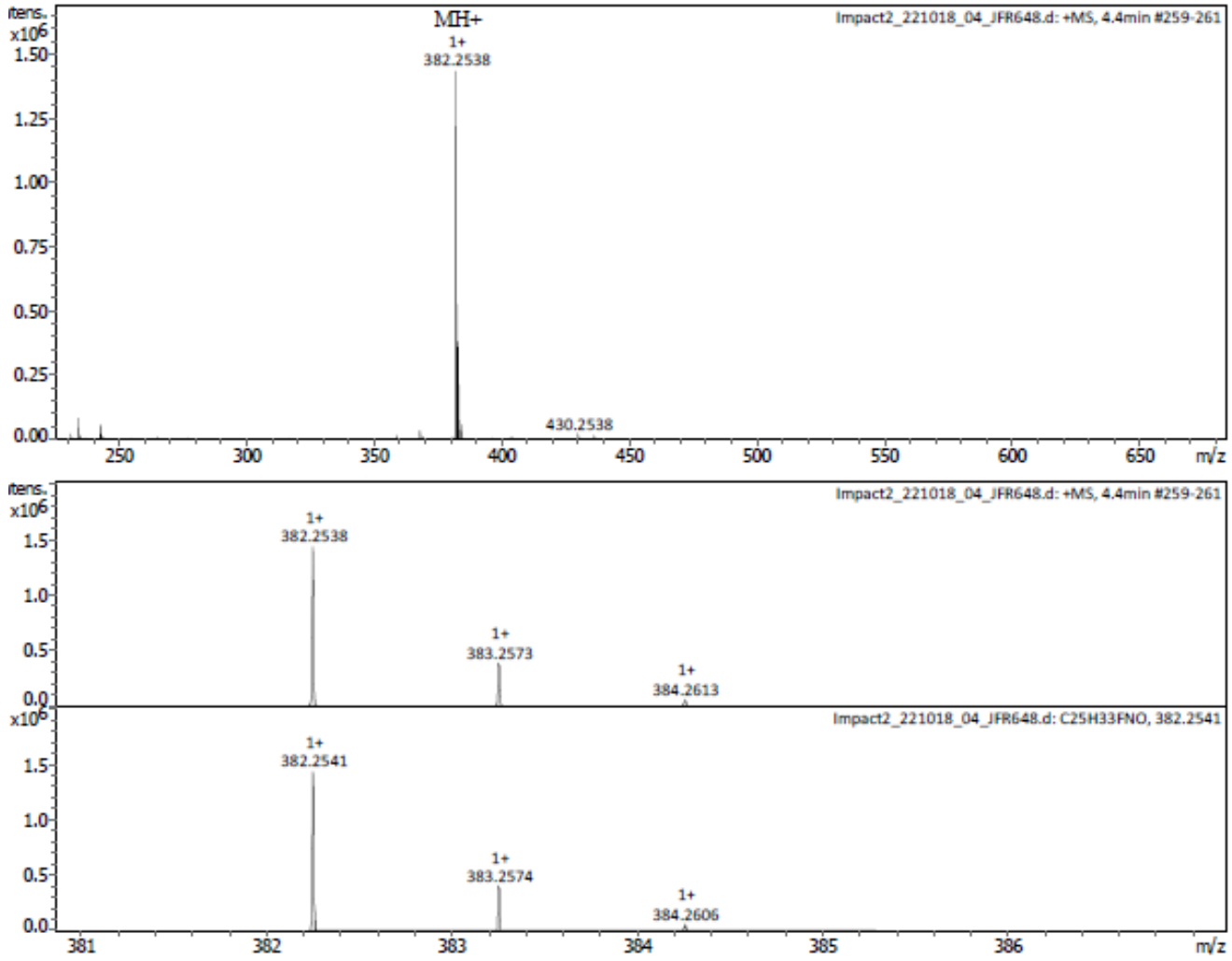
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_221018_04_JFR648.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/18/2022 5:01:13 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

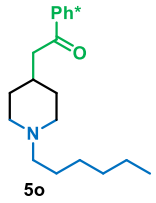
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 3000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



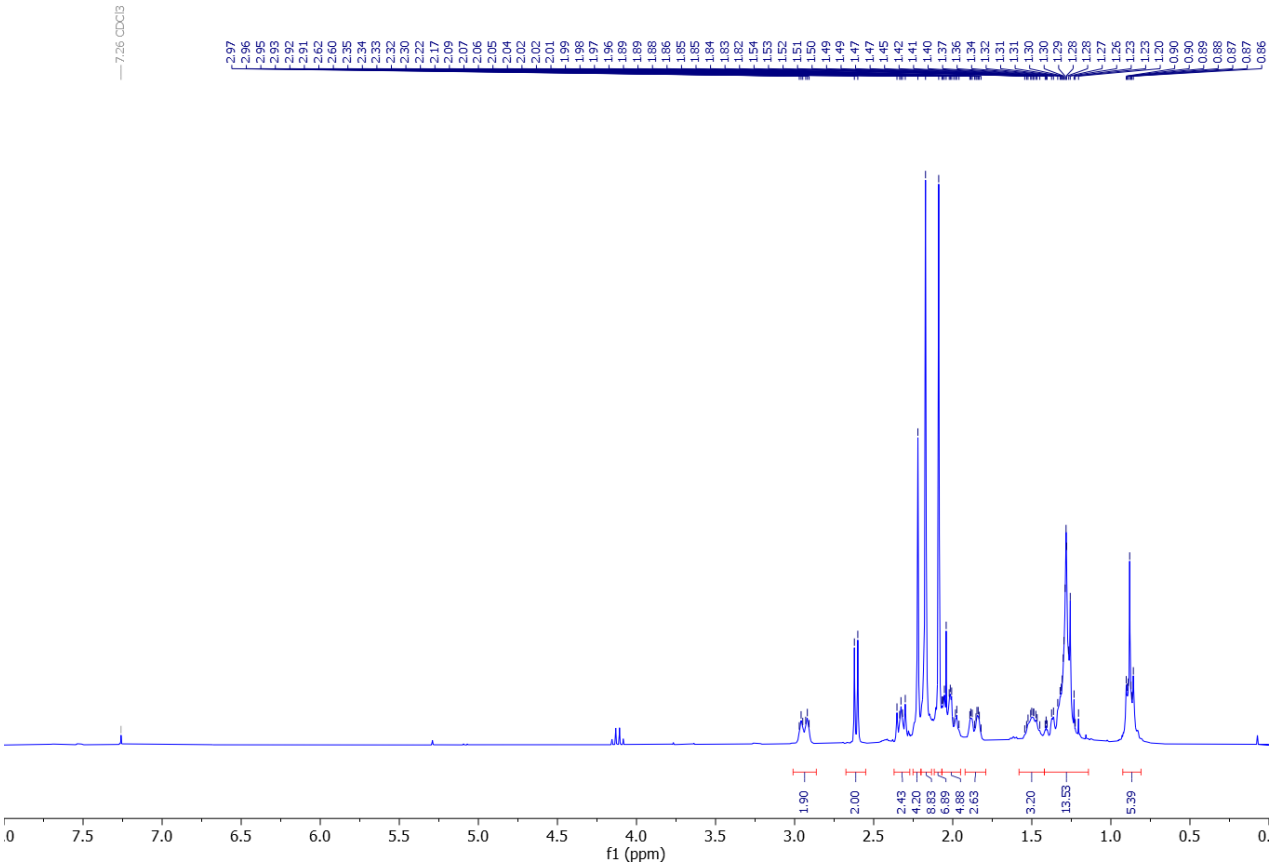

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 382.2538 | C25H33FNO | 382.2541 | C25H32FNO | 0.6 | 5.7 | M+H | 1+ |

## 2-(1-Hexylpiperidin-4-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 5o

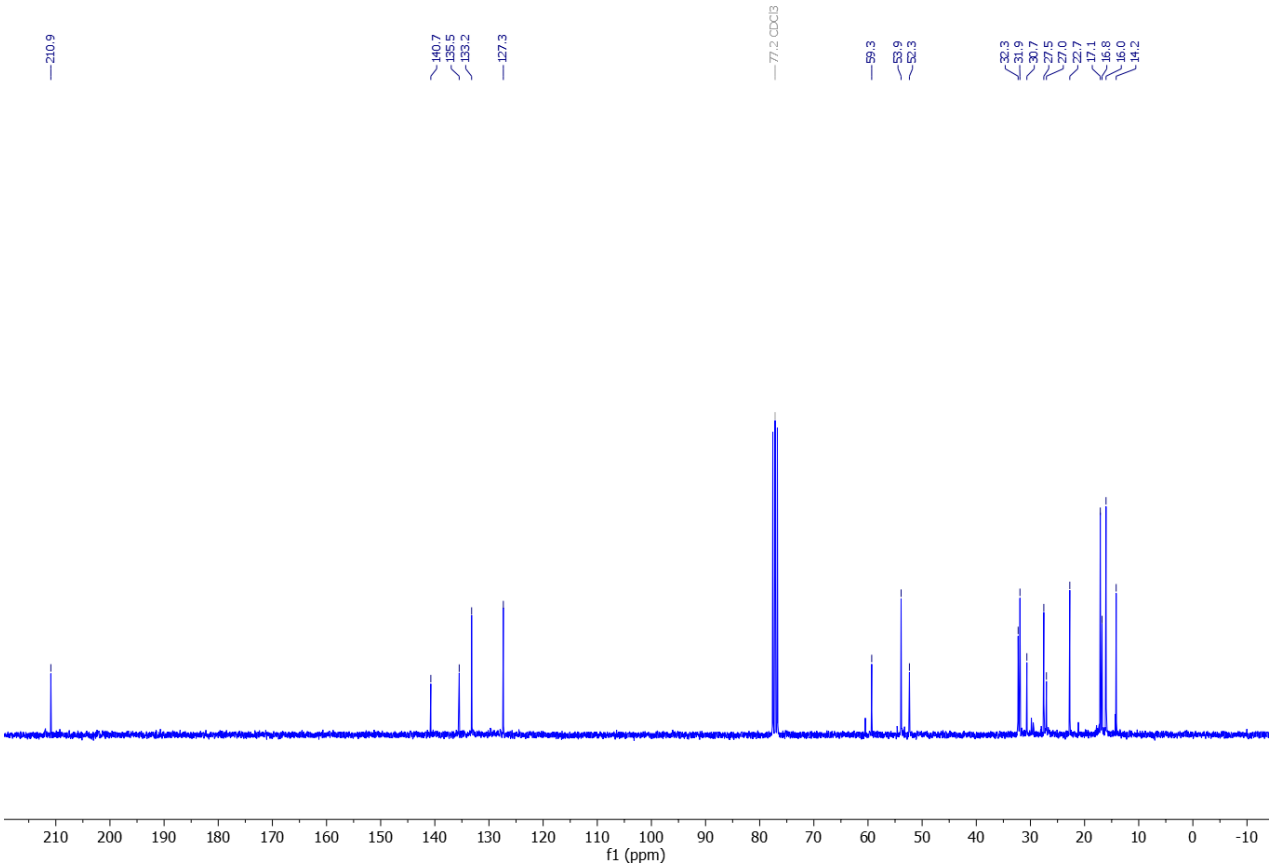



**5o**

JFR745-2.100.fid — 1H zg30




JFR745-2.102.fid — 13C{1H} zgpg30 RD=2s



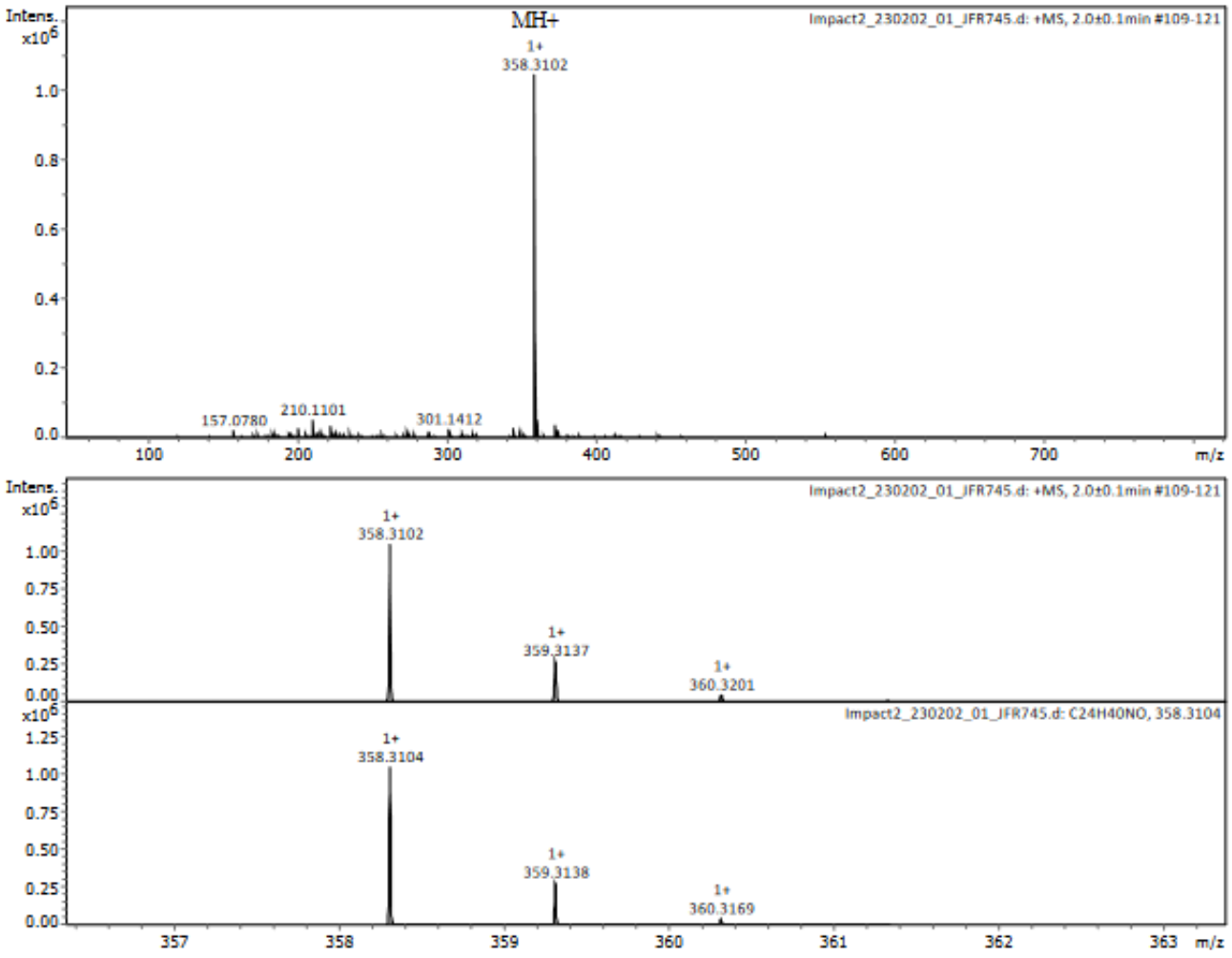
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230202_01_JFR745.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/2/2023 9:34:13 AM |
| Comment | | Instrument / Ser# | Impact II 1825265.10081 |

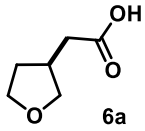
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



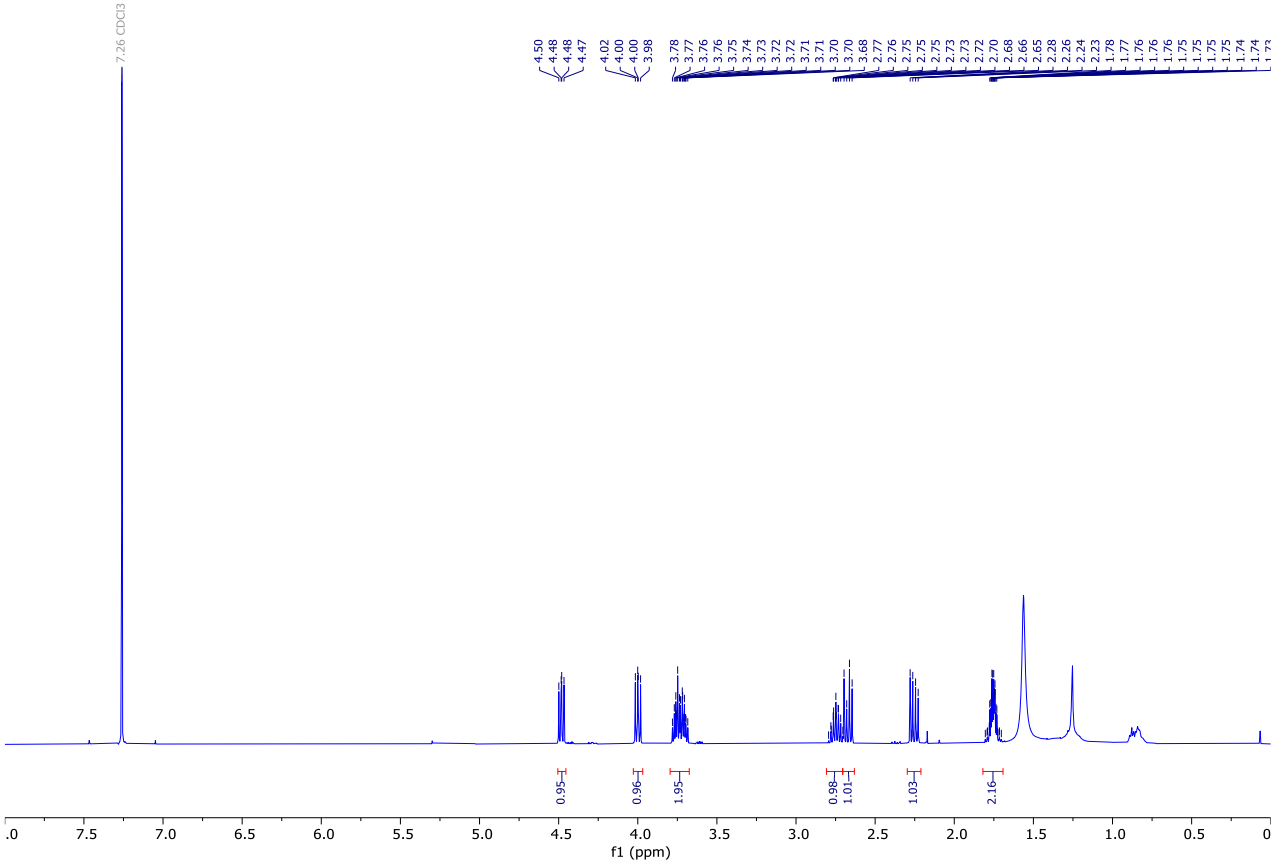

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 358.3102 | C24H40NO | 358.3104 | C24H39NO | 0.8 | 5.0 | M+H | 1+ |

## 2-(Tetrahydrofuran-3-yl)acetic acid 6a [138498-97-2]

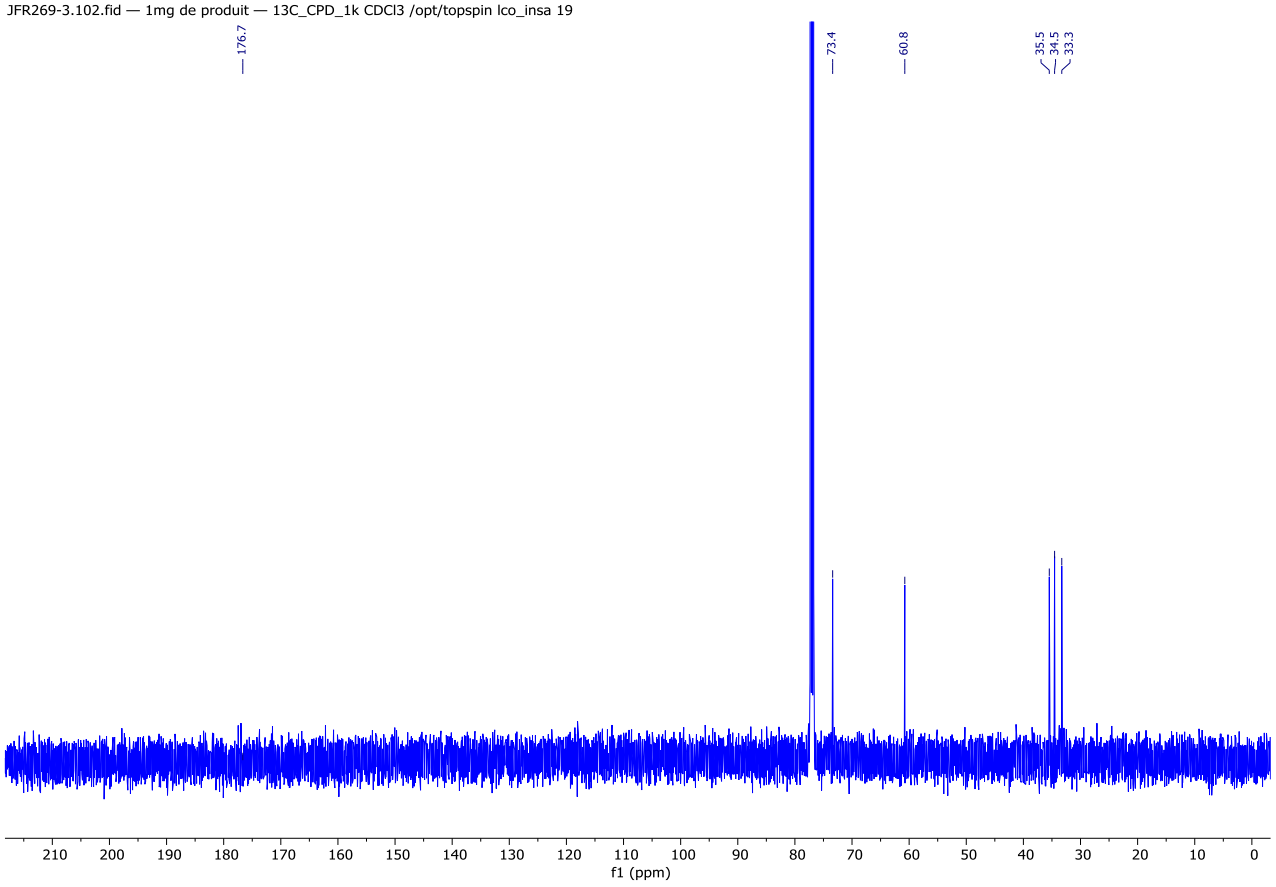



6a

JFR269-3.100.fid — no_title — 1H_4 CDCl3 /opt/topspin lco_insa 19




JFR269-3.102.fid — 1mg de produit — 13C_CPD_1k CDCl3 /opt/topspin lco_insa 19



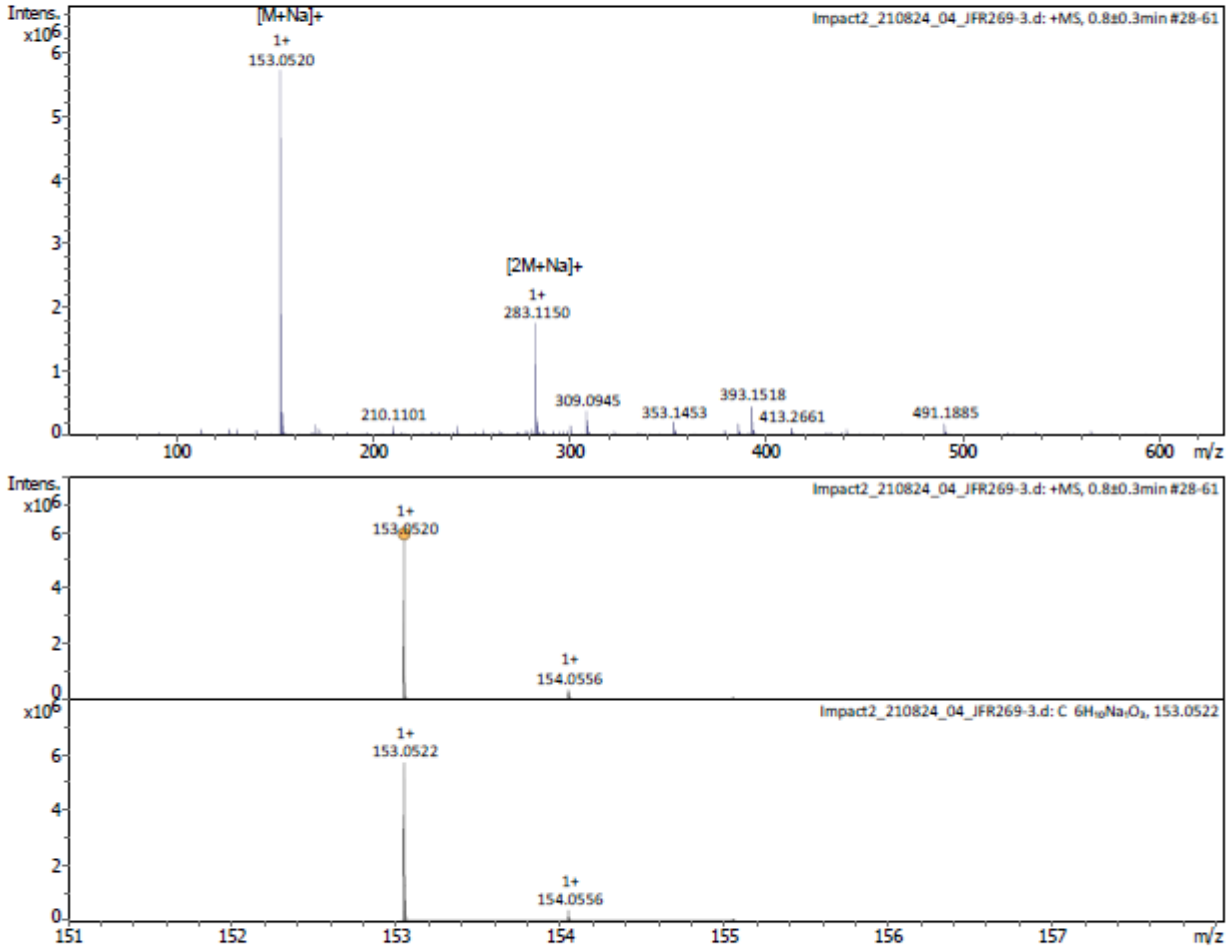
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210824_04_JFR269-3.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 8/24/2021 4:30:37 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

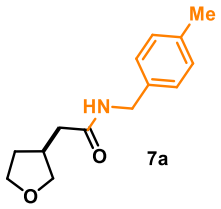
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.2 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1200 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



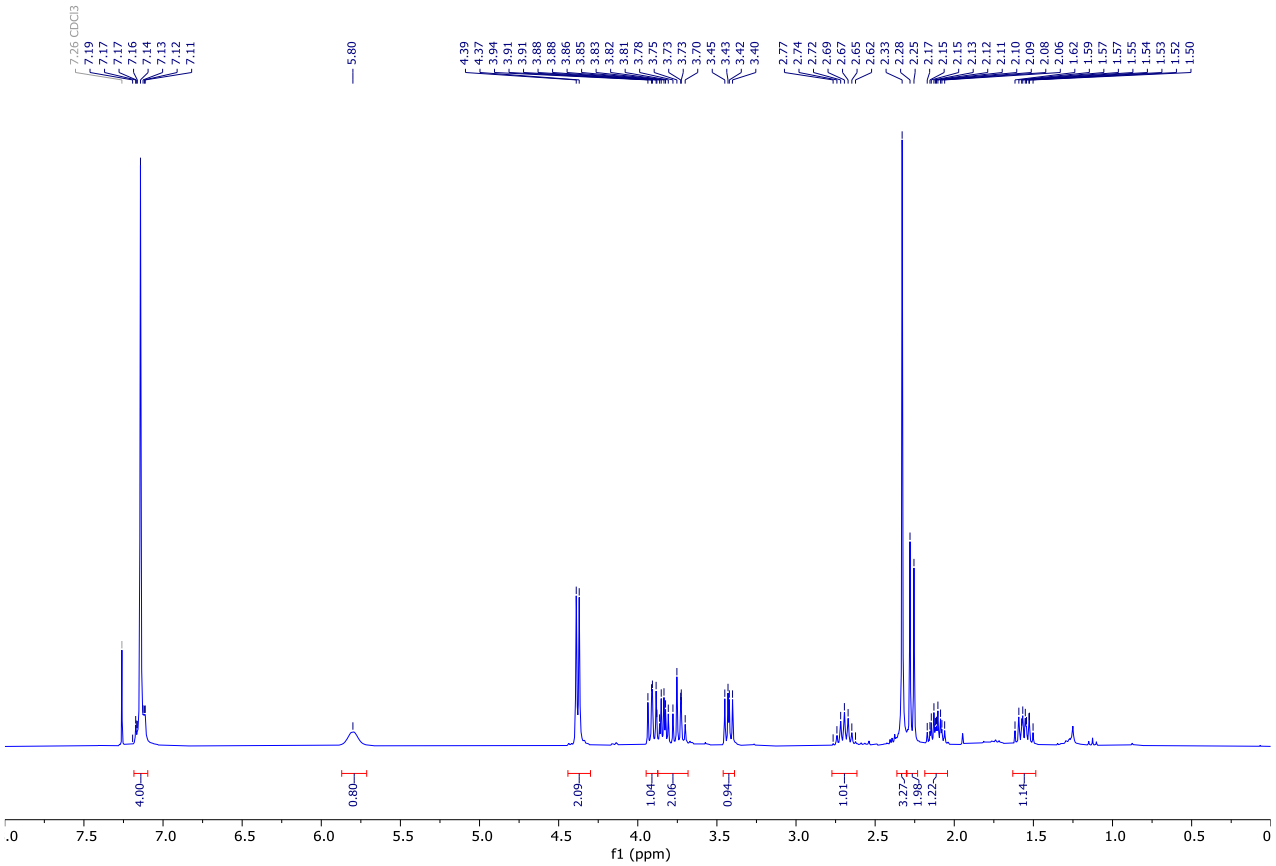

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 131.0702 | C6H11O3 | 131.0703 | C6H10O3 | 0.3 | 5.1 | M+H | 1+ |
| 153.0520 | C6H10NaO3 | 153.0522 | | 1.1 | 2.2 | M+Na | 1+ |
| 261.1323 | C12H21O6 | 261.1333 | | 3.9 | 12.4 | 2M+H | 1+ |

## *N*-(4-Methylbenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7a

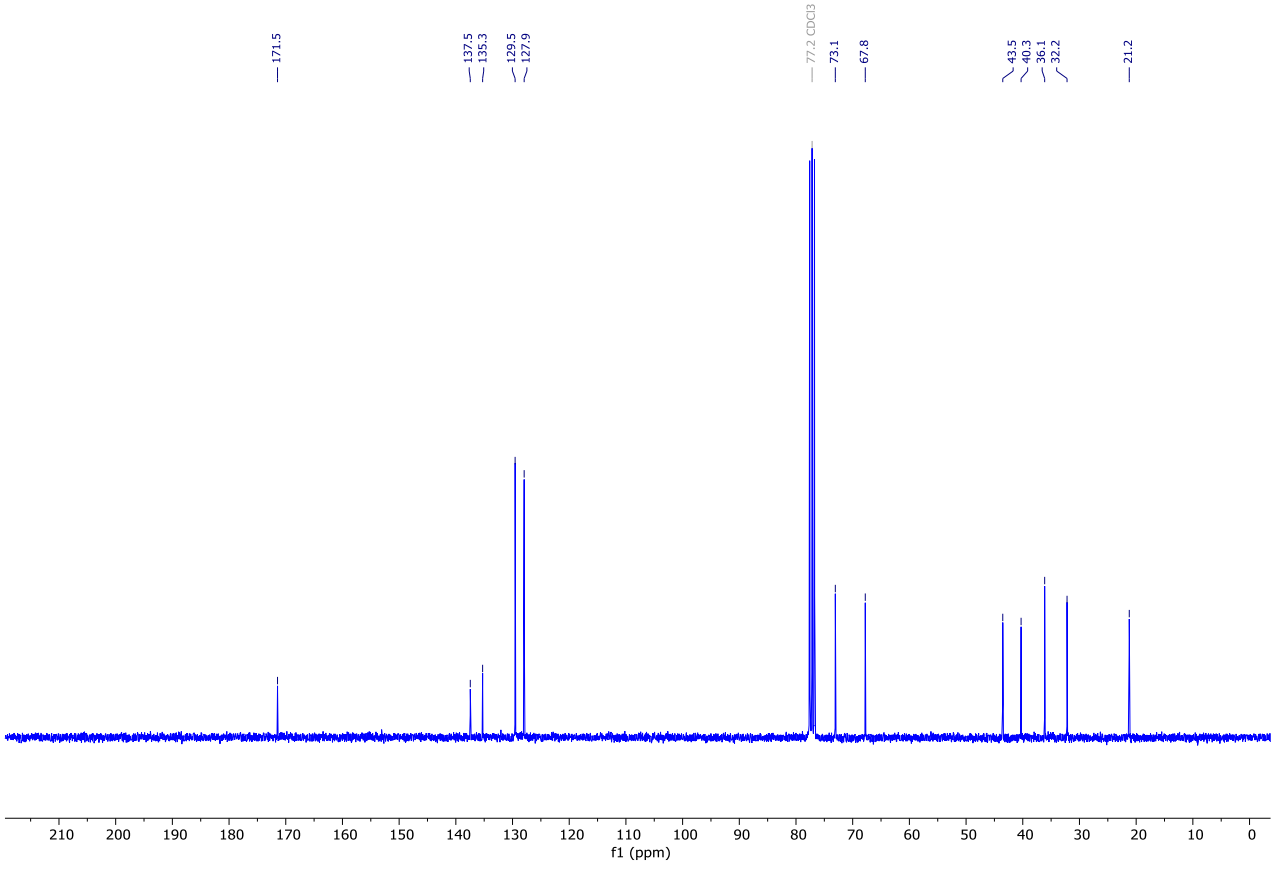



**7a**

JFR405F.100.fid — no_title




JFR405F.102.fid — no_title



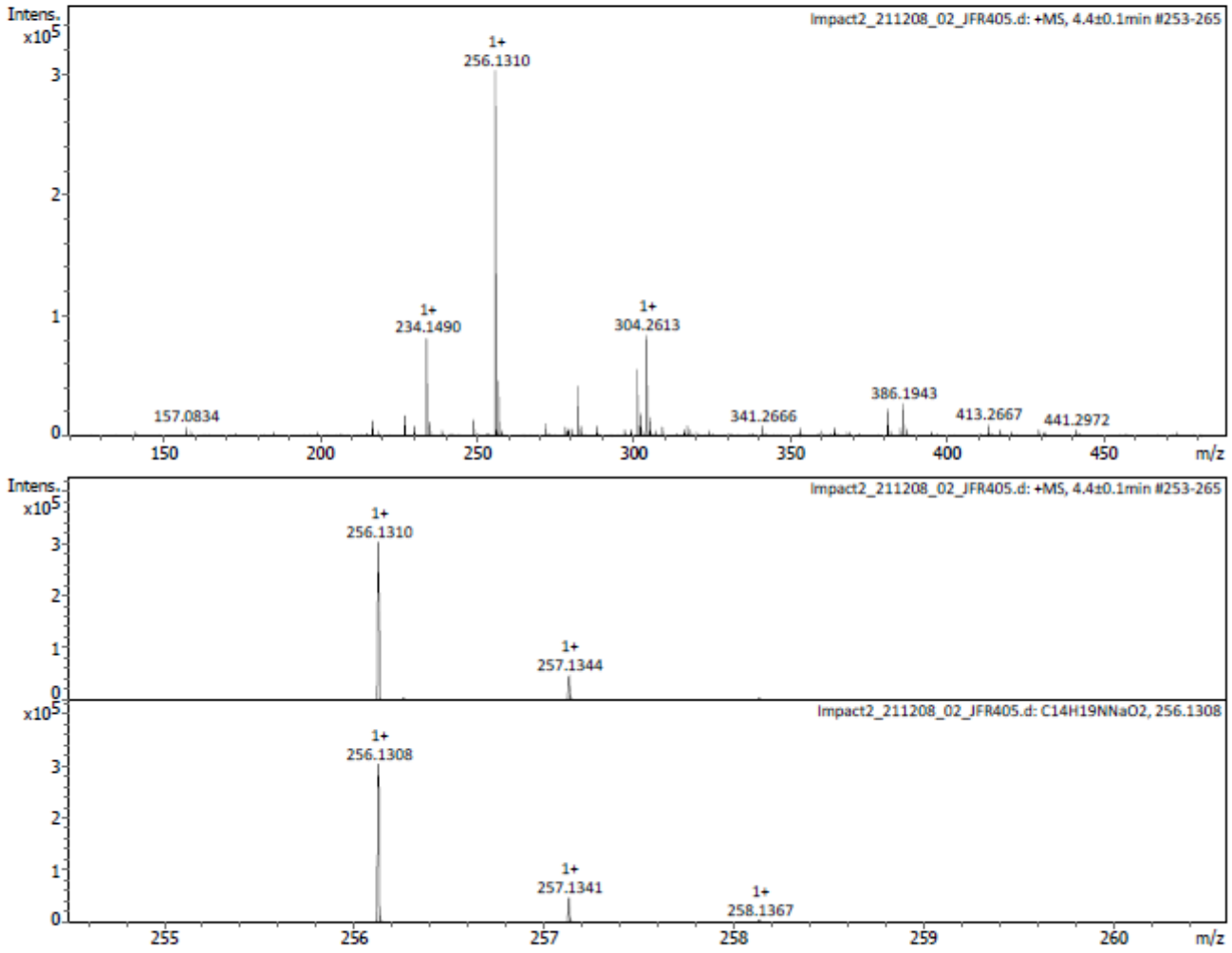
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_211208_02_JFR405.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 12/8/2021 12:58:39 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

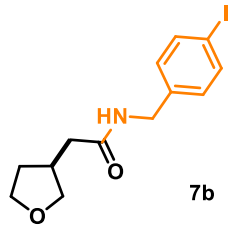
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 2500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



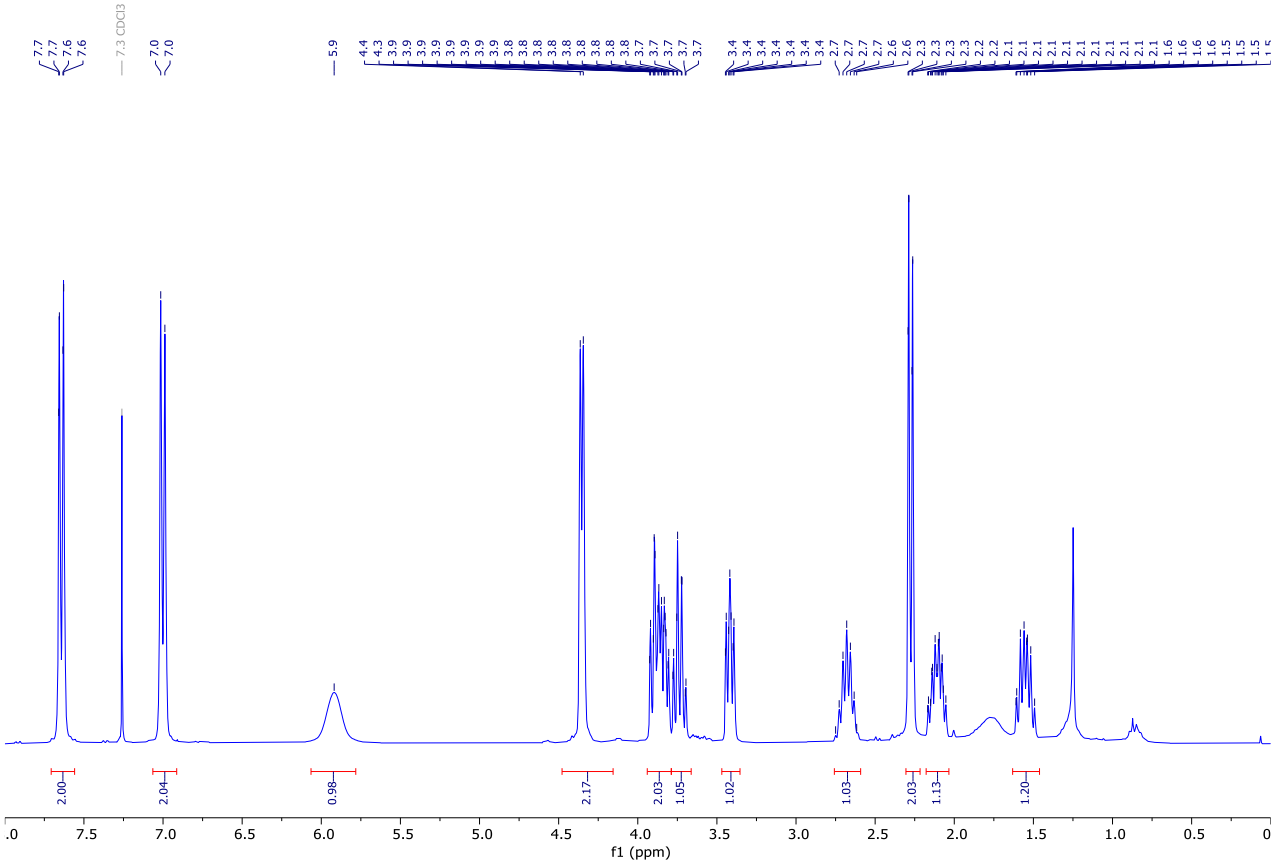

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 234.1490 | C14H20NO2 | 234.1489 | C14H19NO2 | -0.7 | 1.1 | M+H | 1+ |
| 256.1310 | C14H19NNaO2 | 256.1308 | | -0.7 | 3.7 | M+Na | 1+ |

**_N_-(4-Iodobenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7b**

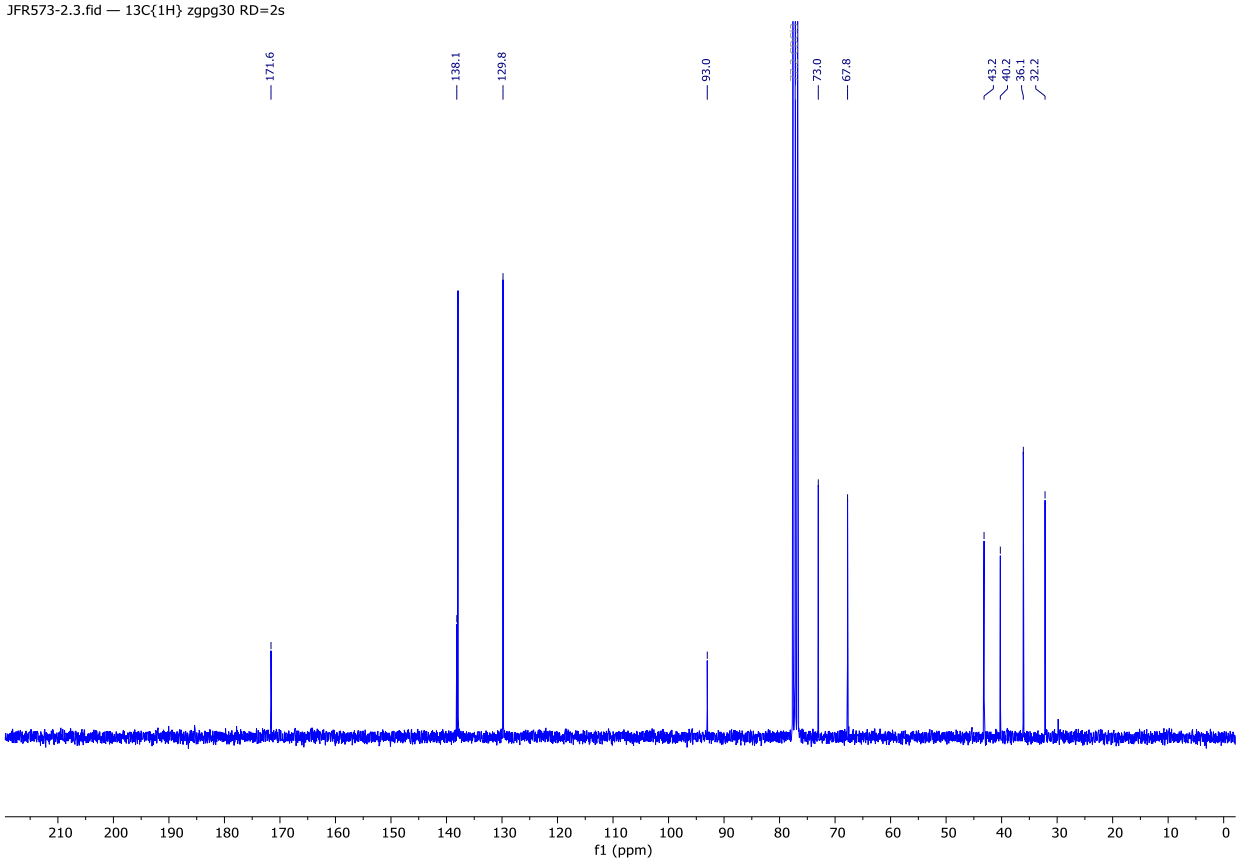



**7b**

JFR573-2.1.fid — 1H zg30




JFR573-2.3.fid — 13C{1H} zgpg30 RD=2s



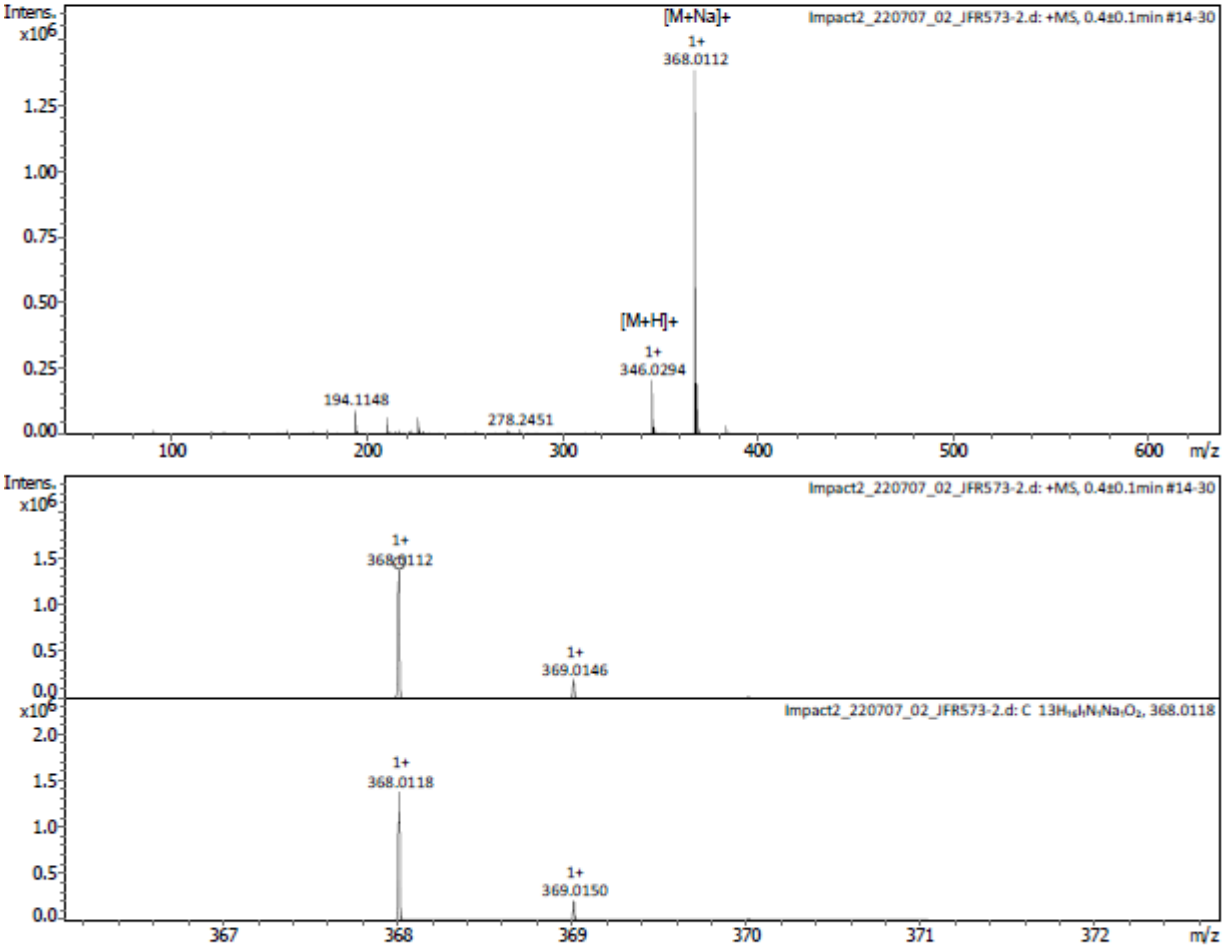
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220707_02_JFR573-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 7/7/2022 2:31:43 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

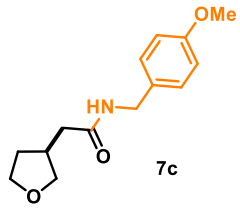
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



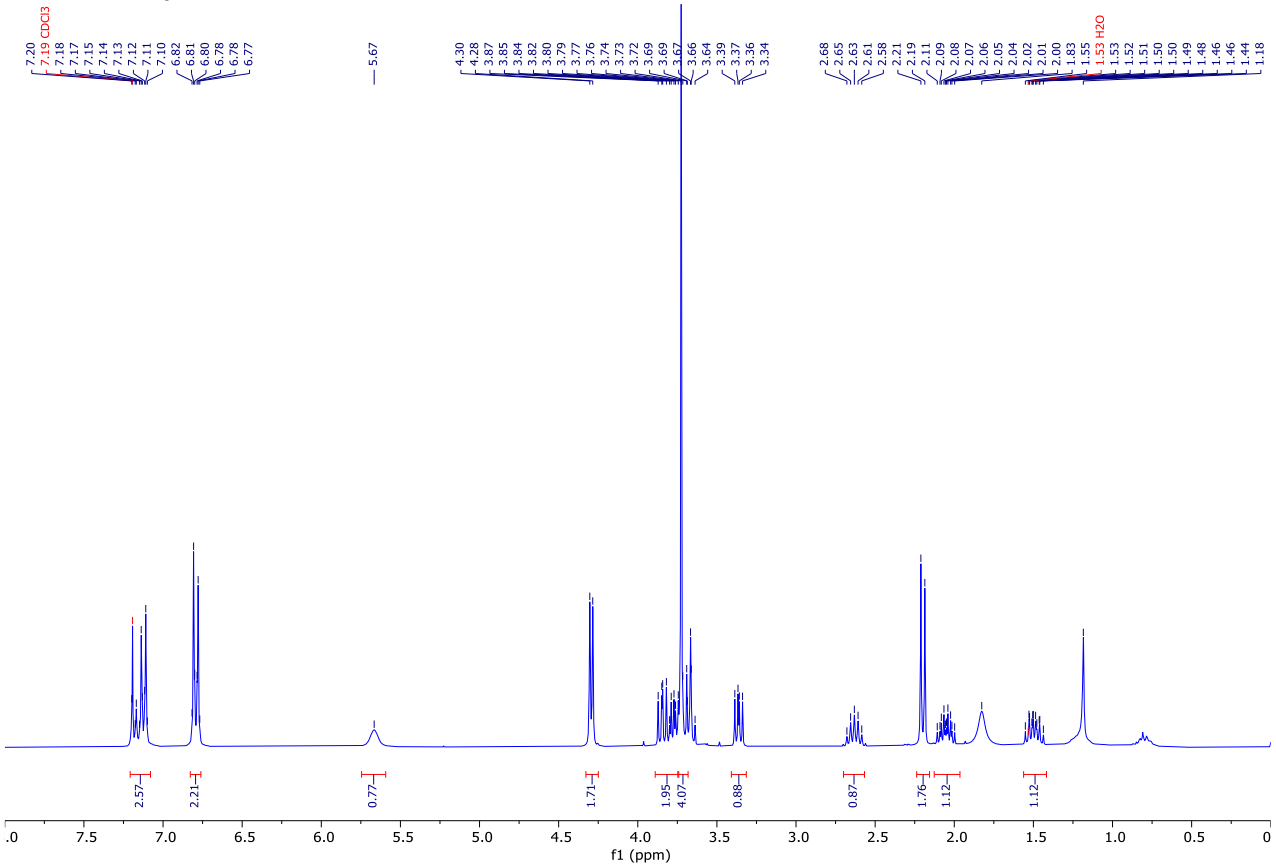

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 346.0294 | C13H17INO2 | 346.0299 | C13H16INO2 | 1.4 | 1.9 | M+H | 1+ |
| 368.0112 | C13H16INNaO2 | 368.0118 | | 1.6 | 4.1 | M+Na | 1+ |
| 383.9853 | C13H16IKNO2 | 383.9857 | | 1.2 | 6.8 | M+K | 1+ |

## *N*-(4-Methoxybenzyl)-2-(tetrahydrofuran-3-yl)acetamide 7c

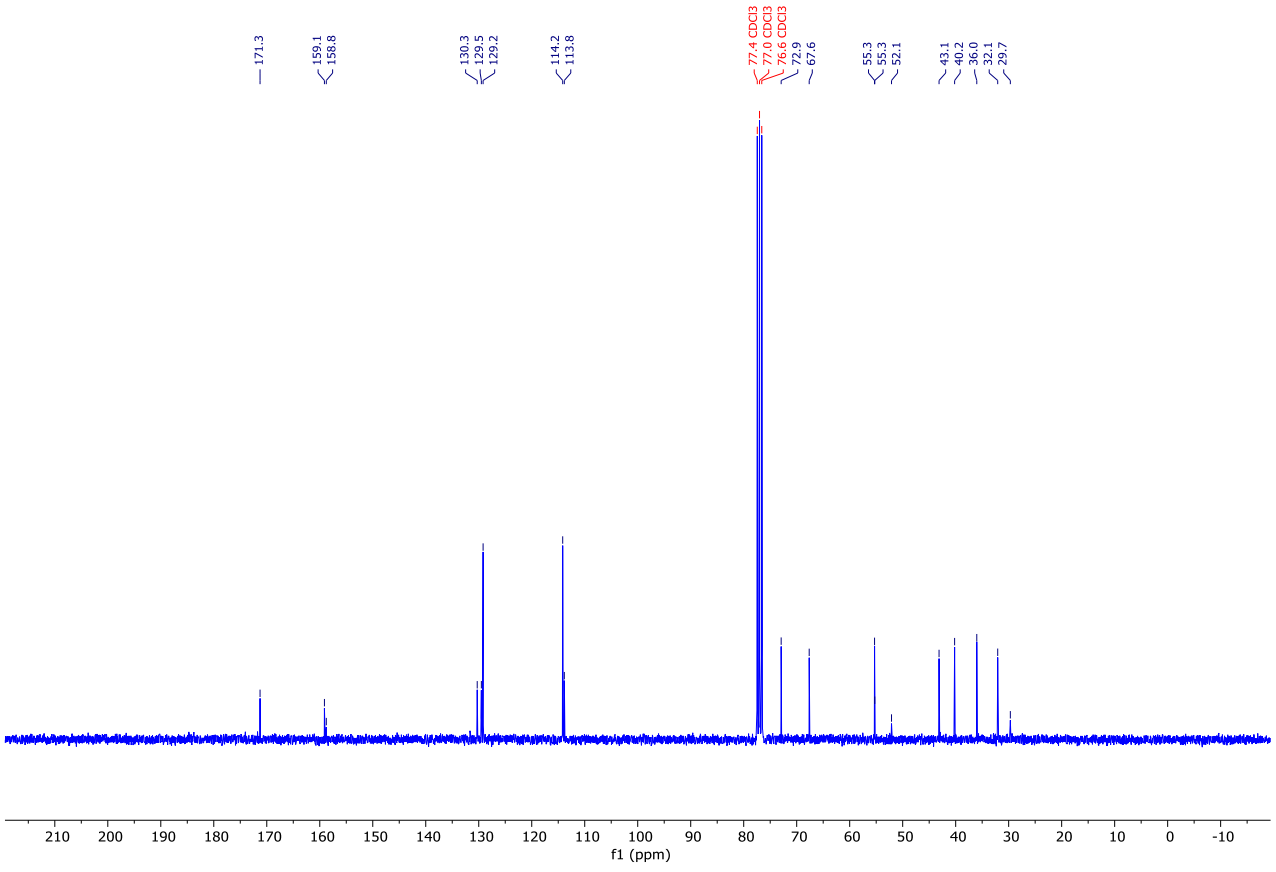



**7c**

JFR580-2.1.fid — 1H zg30




JFR580-2.3.fid — 13C{1H} zgpg30 RD=2s



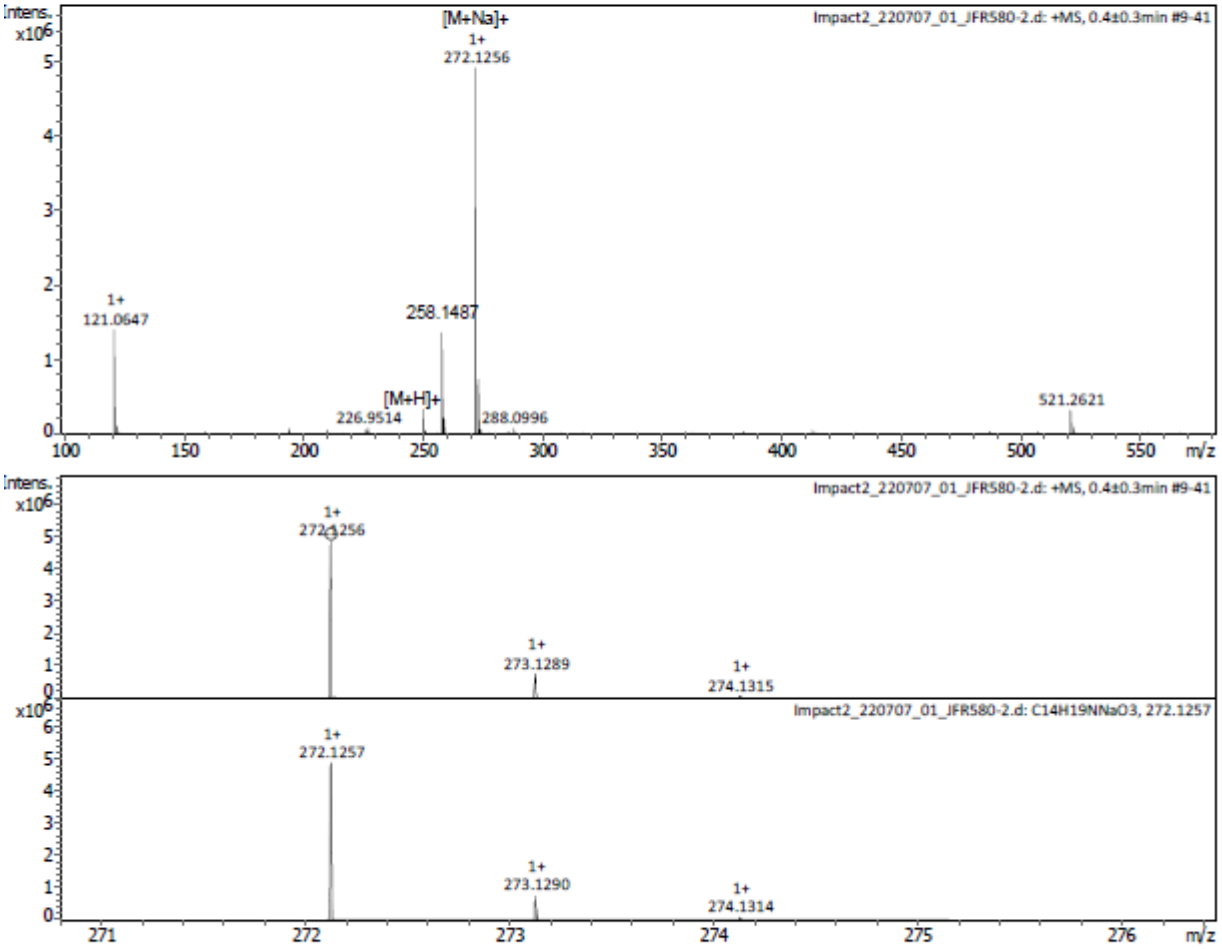
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220707_01_JFR580-2.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 7/7/2022 2:25:41 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

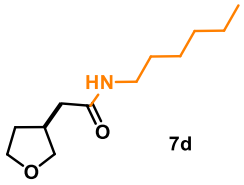
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



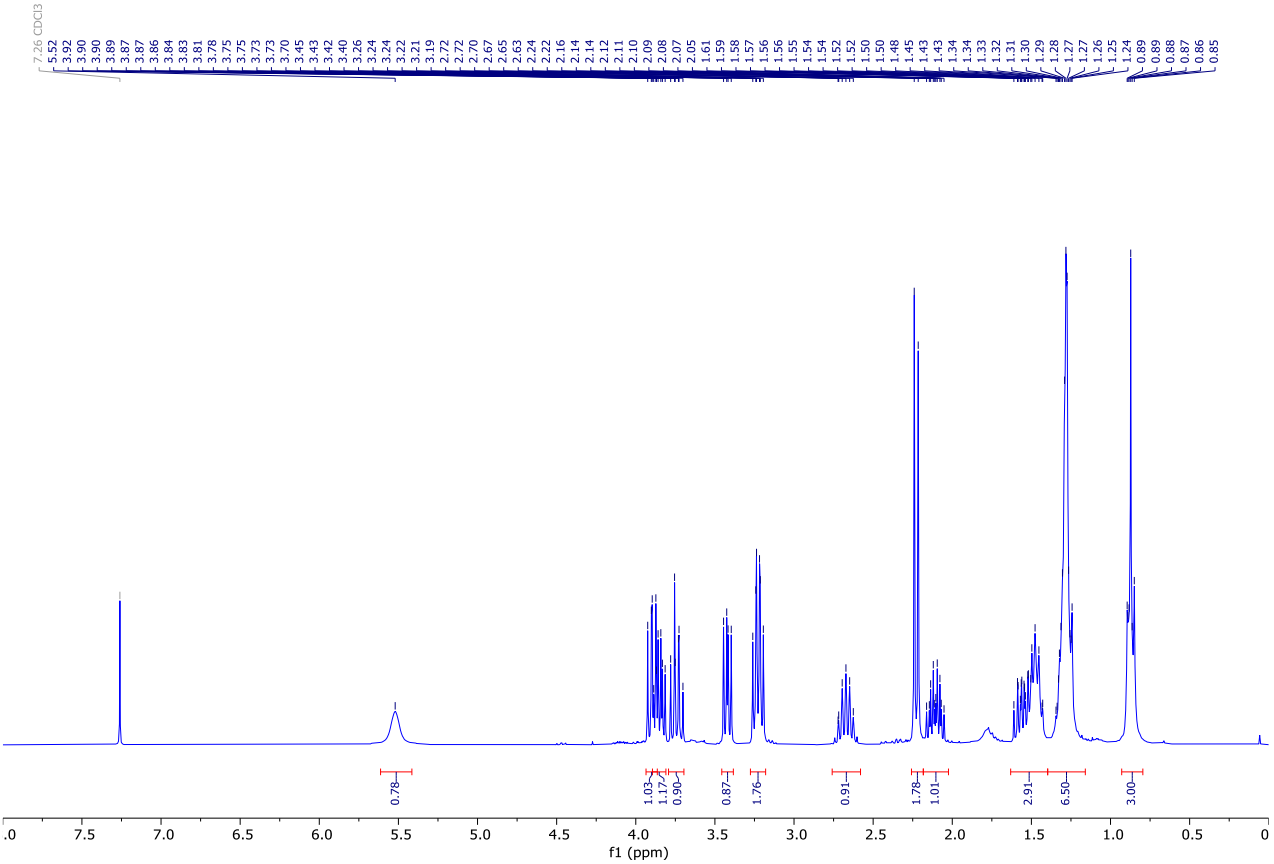

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 250.1436 | C14H20NO3 | 250.1438 | C14H19NO3 | 0.5 | 1.5 | M+H | 1+ |
| 272.1256 | C14H19NNaO3 | 272.1257 | | 0.6 | 3.5 | M+Na | 1+ |
| 521.2621 | C28H38N2NaO6 | 521.2622 | | 0.3 | 6.6 | 2M+Na | 1+ |

## *N*-Hexyl-2-(tetrahydrofuran-3-yl)acetamide 7d

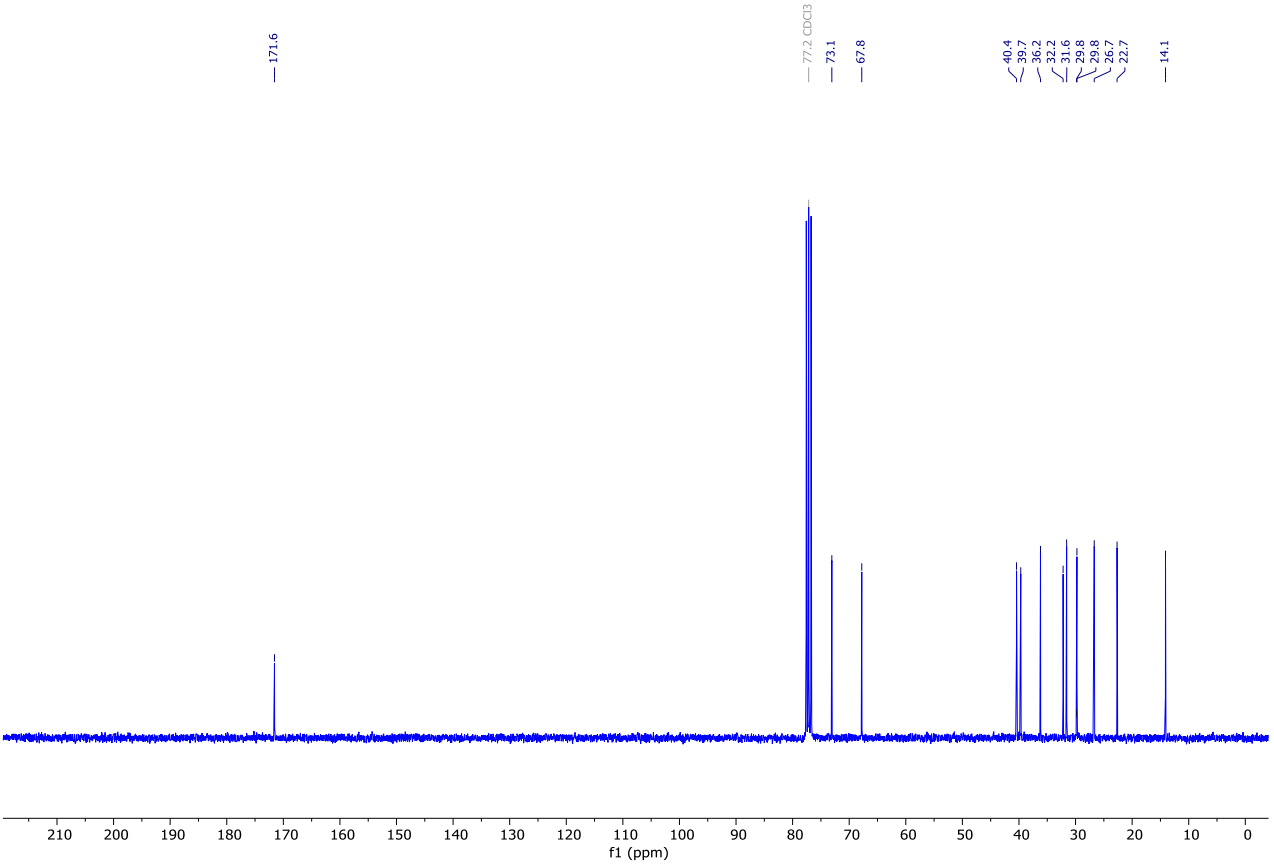



**7d**

JFR583-2.1.fid — 1H zg30




JFR583-2.2.fid — 13C{1H} zgpg30 RD=2s



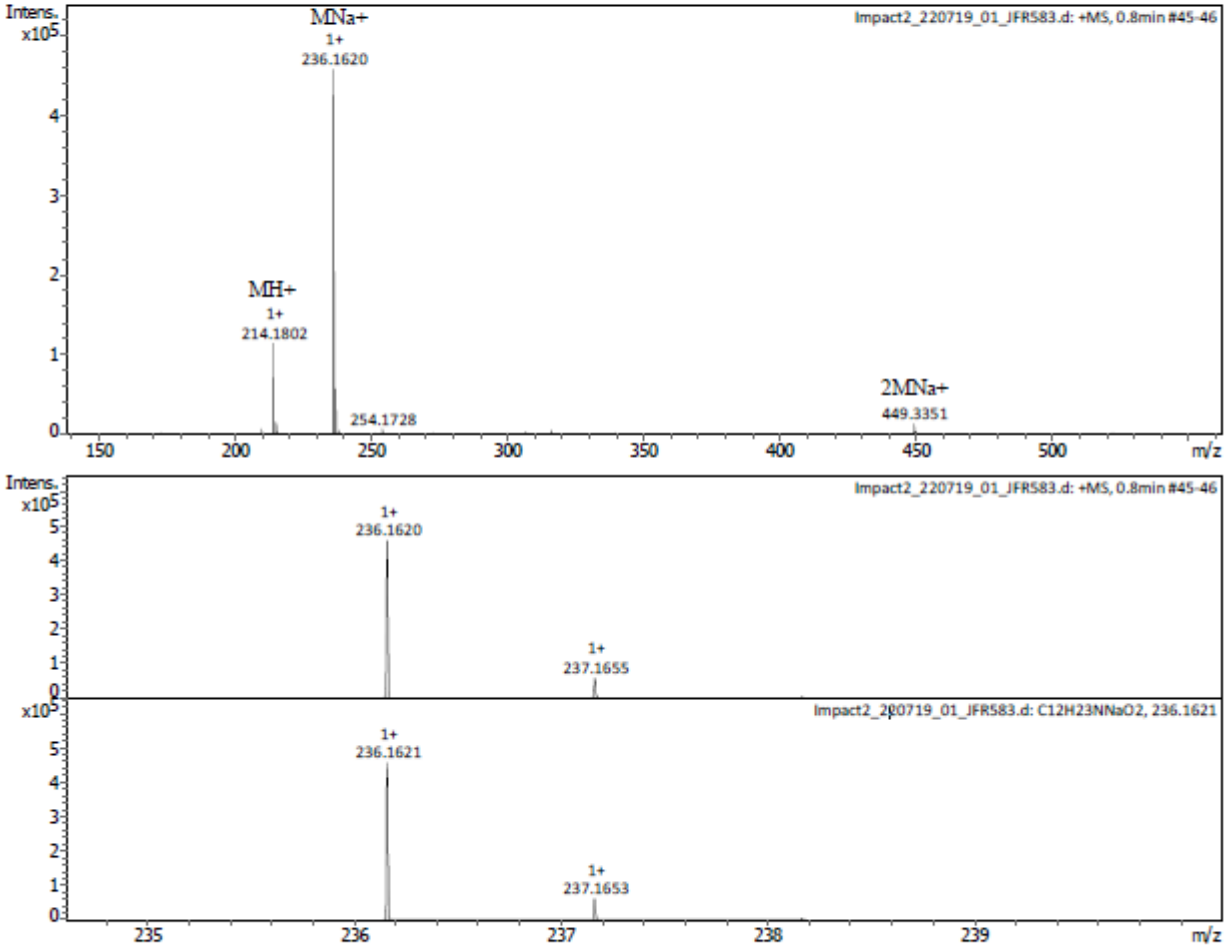
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220719_01_JFR583.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 7/19/2022 9:49:04 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

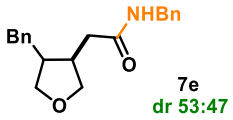
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



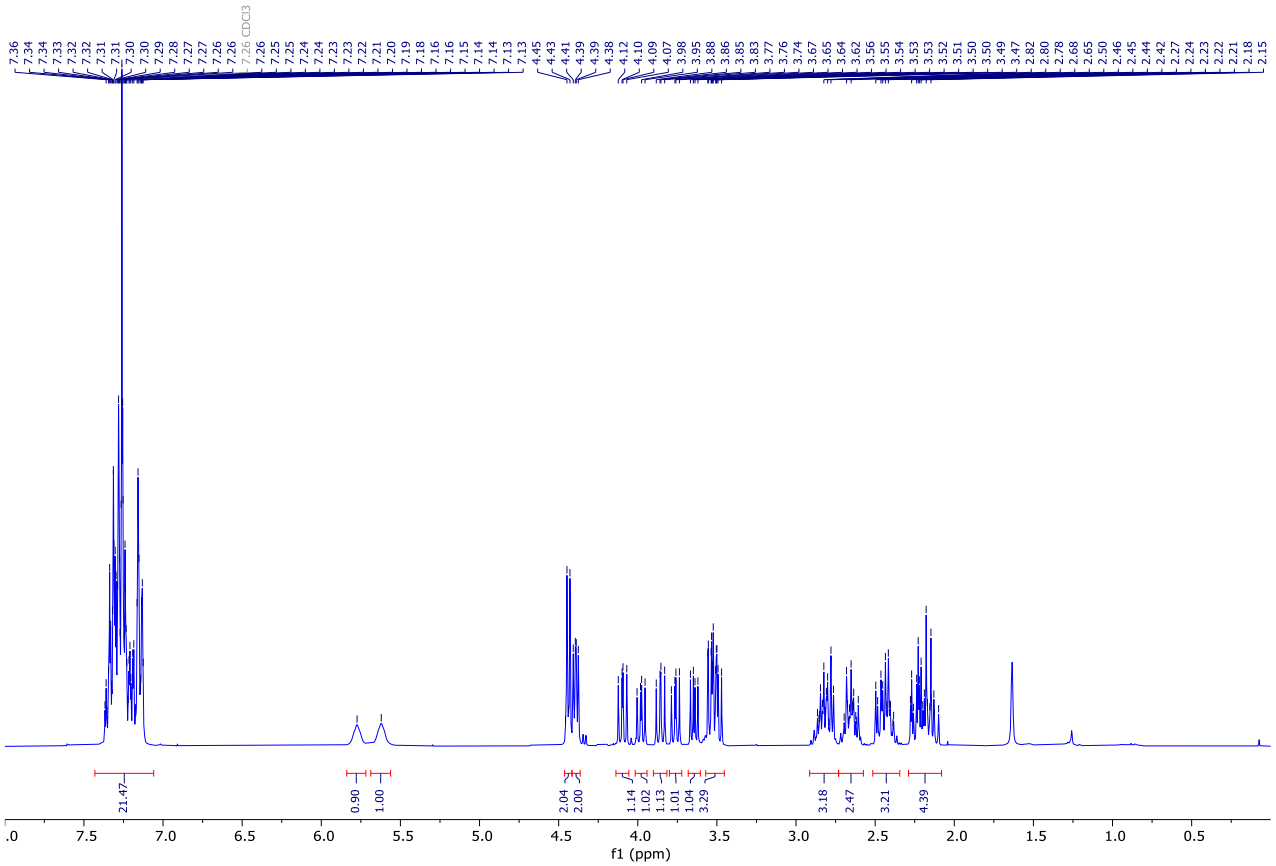

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 214.1802 | C12H24NO2 | 214.1802 | C12H23NO2 | 0.0 | 1.8 | M+H | 1+ |
| 236.1620 | C12H23NNaO2 | 236.1621 | | 0.3 | 5.7 | M+Na | 1+ |
| 449.3351 | C24H46N2NaO4 | 449.3350 | | -0.3 | 9.3 | 2M+Na | 1+ |

## 2-(4-Benzyltetrahydrofuran-3-yl)-*N*-benzylacetamide 7e

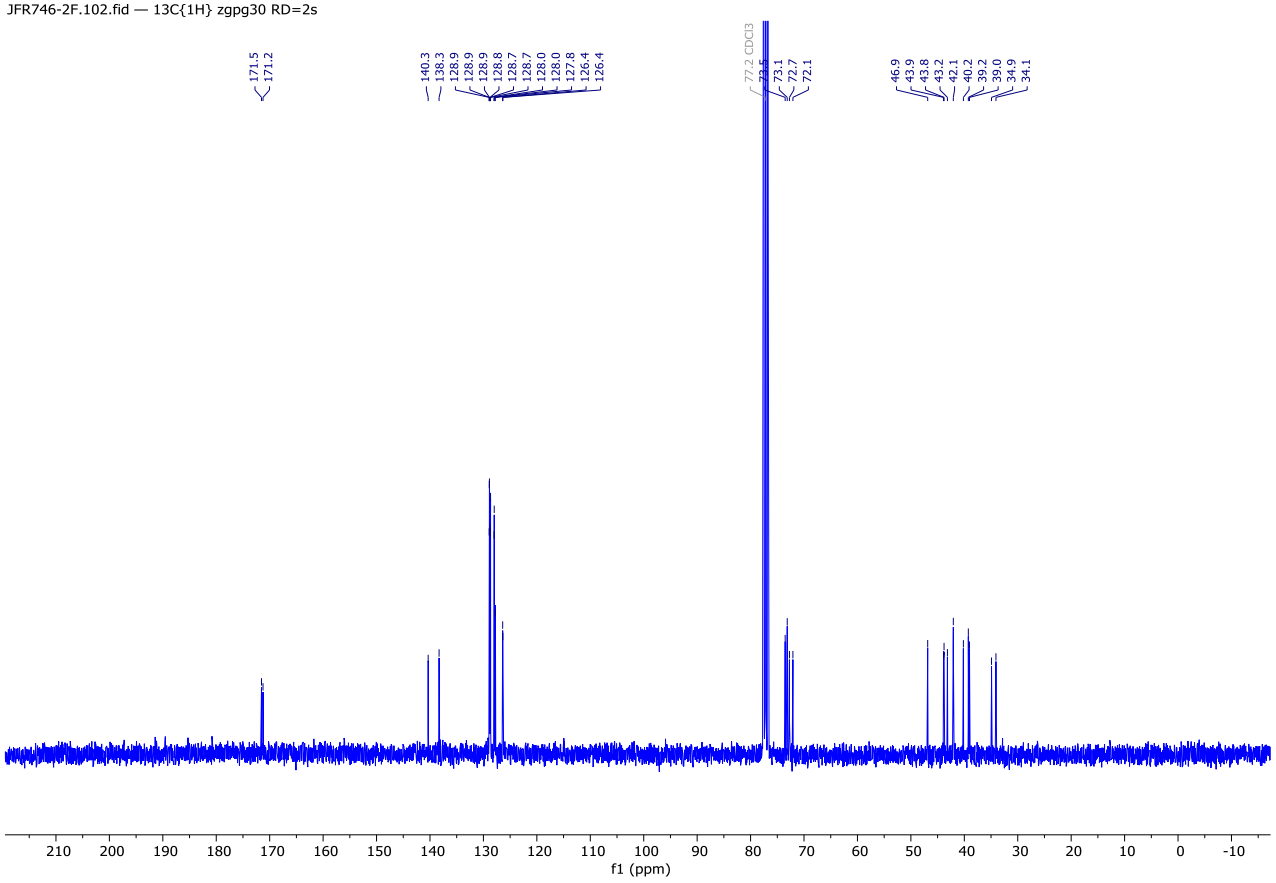



**7e**
**dr 53:47**

JFR746-2F.100.fid — 1H zg30




JFR746-2F.102.fid — 13C{1H} zgpg30 RD=2s



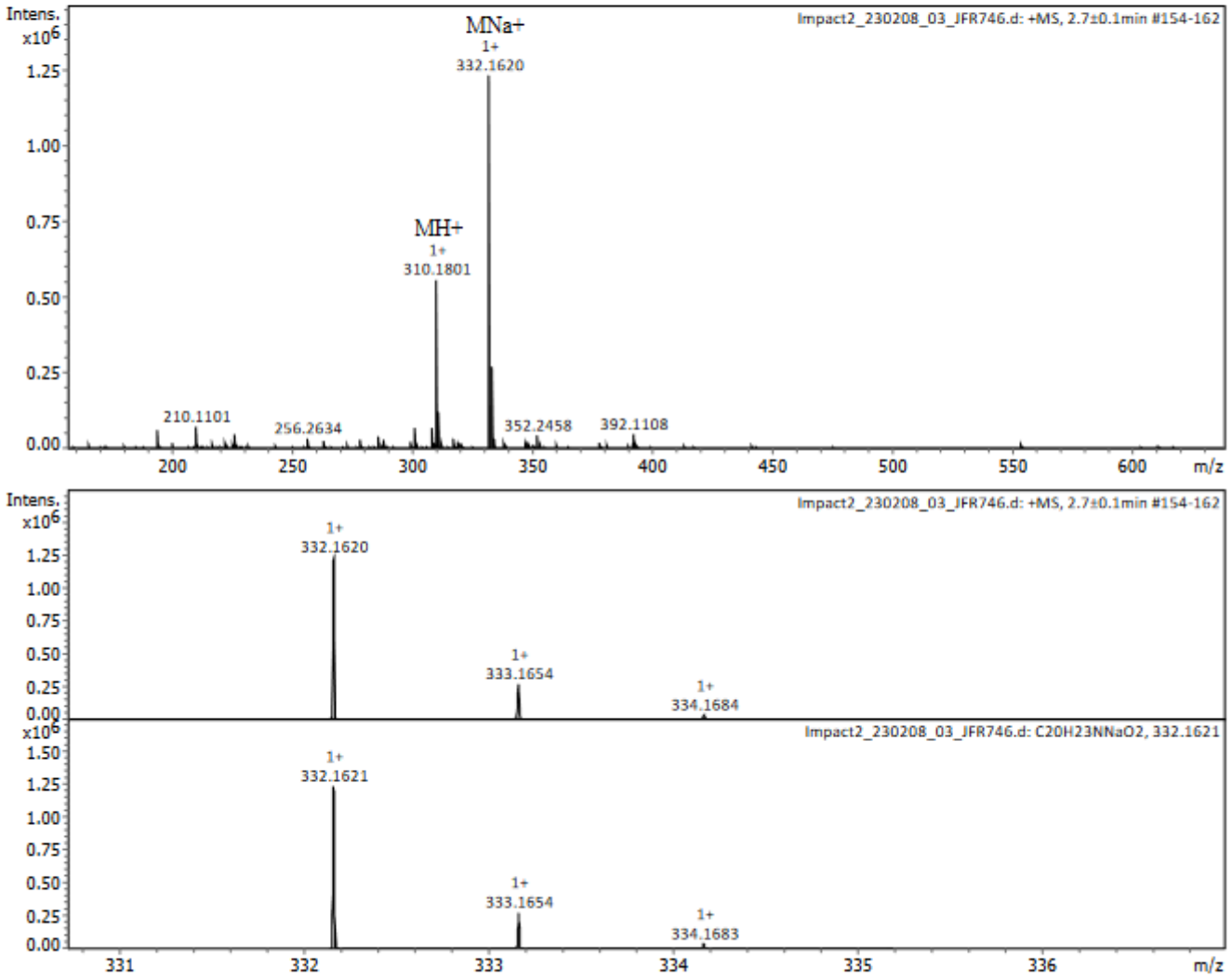
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230208_03_JFR746.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/8/2023 11:30:28 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

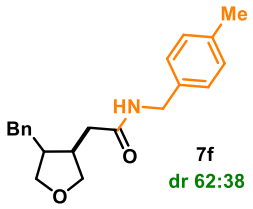
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 310.1801 | C20H24NO2 | 310.1802 | C20H23NO2 | 0.2 | 3.4 | M+H | 1+ |
| 332.1620 | C20H23NNaO2 | 332.1621 | | 0.4 | 2.1 | M+Na | 1+ |

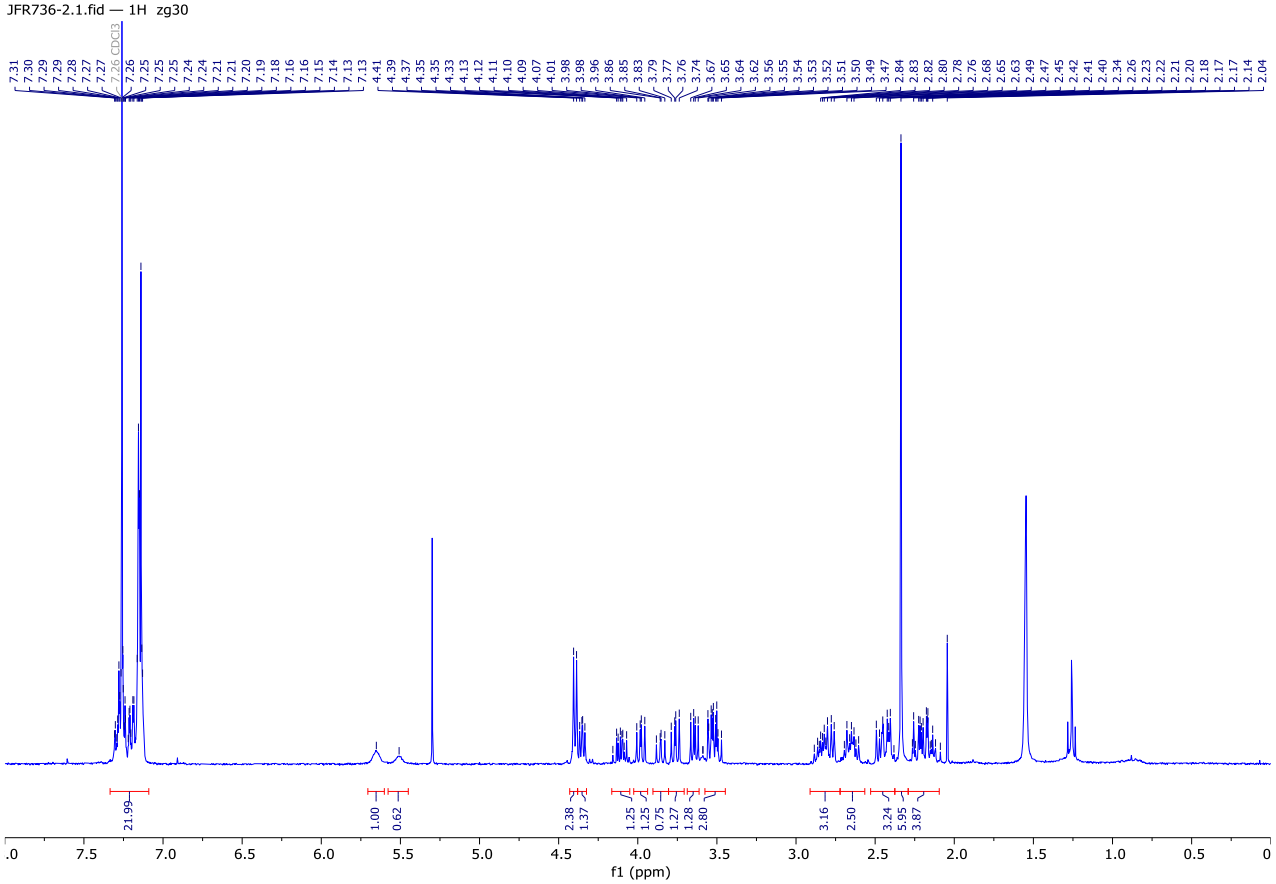
**2-(4-Benzyltetrahydrofuran-3-yl)-N-(4-methylbenzyl)acetamide 7f**



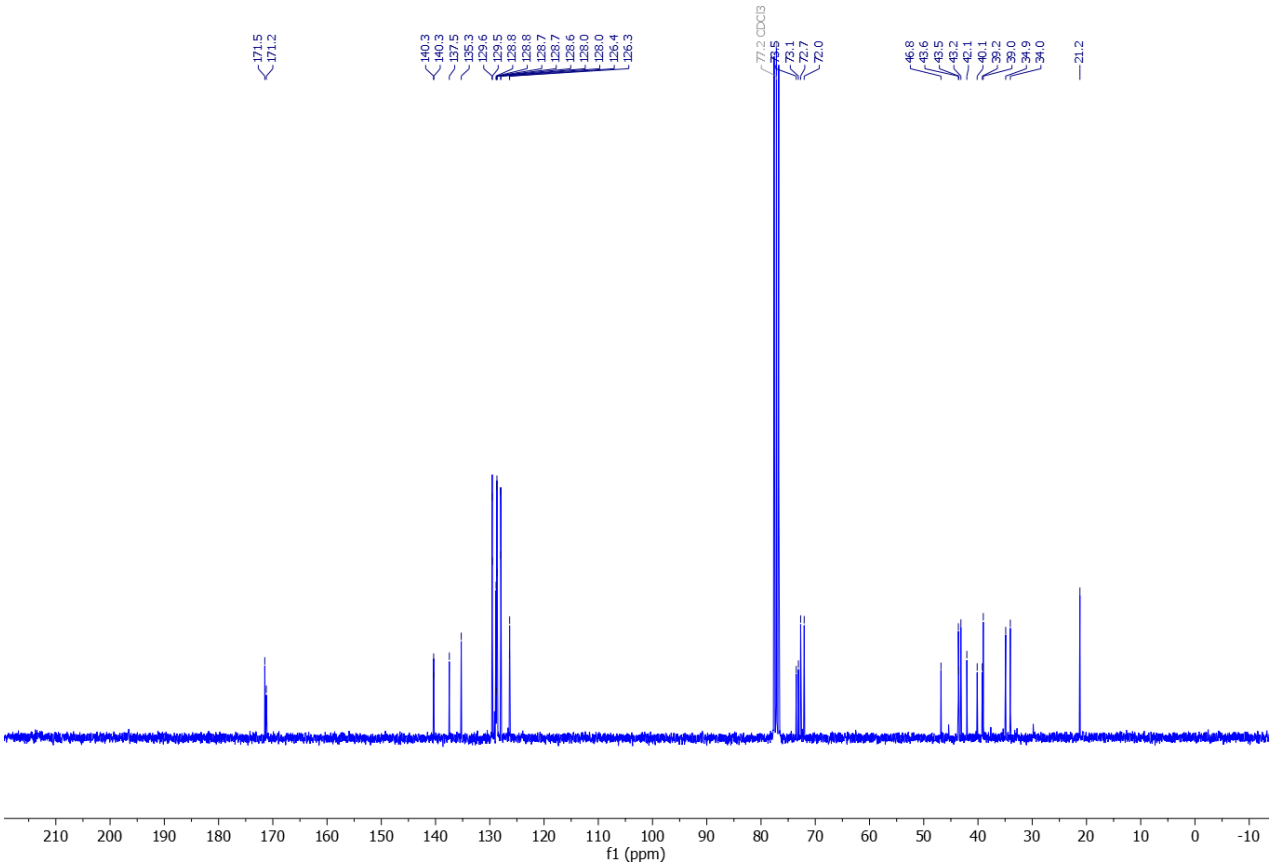

**7f**

**dr 62:38**

JFR736-2.1.fid — 1H zg30




JFR736-2FC.1.fid — 13C{1H} zgpg30 RD=2s



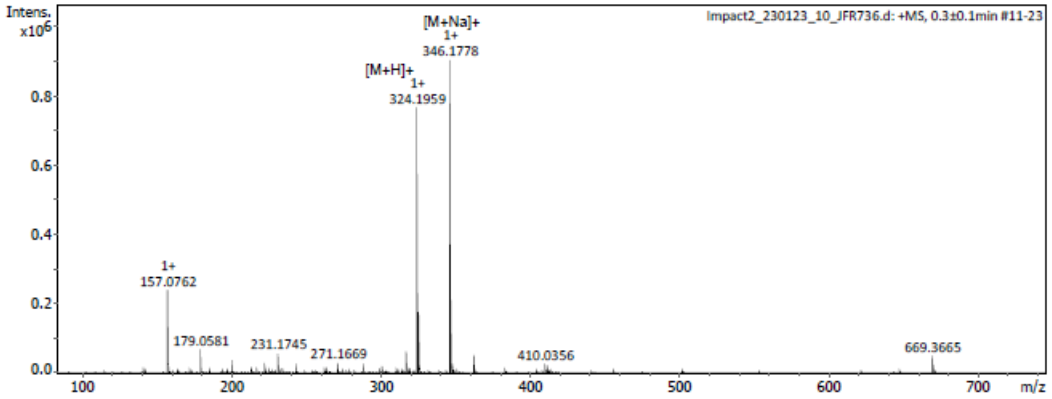
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

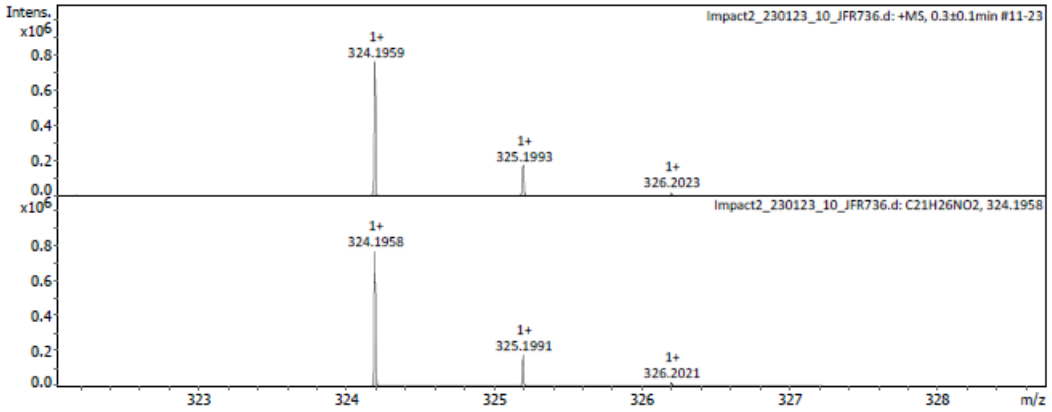
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230123_10_JFR736.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 1/23/2023 3:01:18 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10001 |

**Acquisition Parameter**

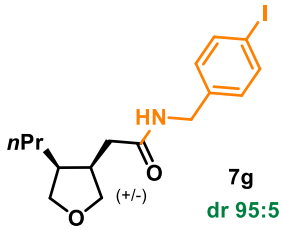
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



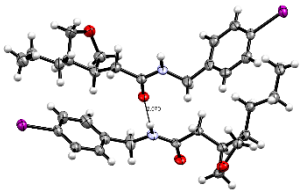

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 324.1959 | C21H26NO2 | 324.1958 | C21H25NO2 | -0.2 | 3.4 | M+H | 1+ |
| 346.1778 | C21H25NNaO2 | 346.1777 | | -0.2 | 5.3 | M+Na | 1+ |
| 647.3846 | C42H51N2O4 | 647.3843 | | -0.4 | 14.0 | 2M+H | 1+ |

**(±)-*N*-(4-iodobenzyl)-2-((3*R*,4*S*)-4-propyltetrahydrofuran-3-yl)acetamide7g**

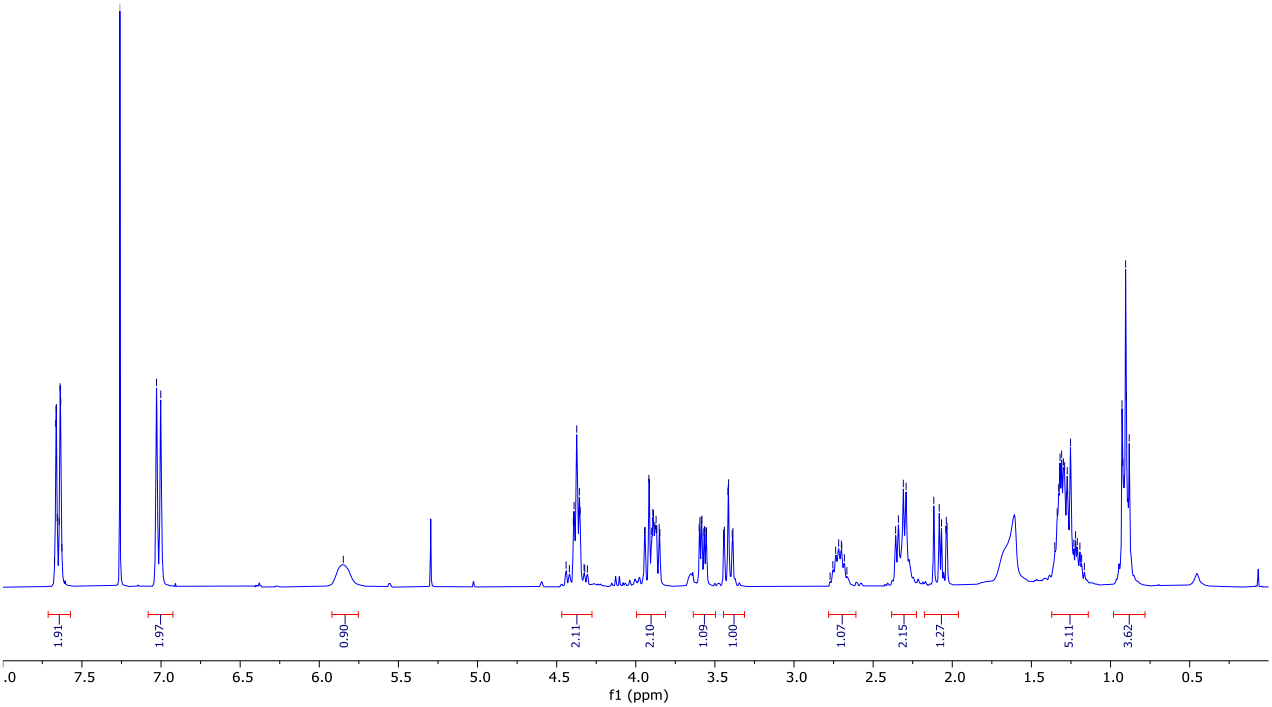



**7g**

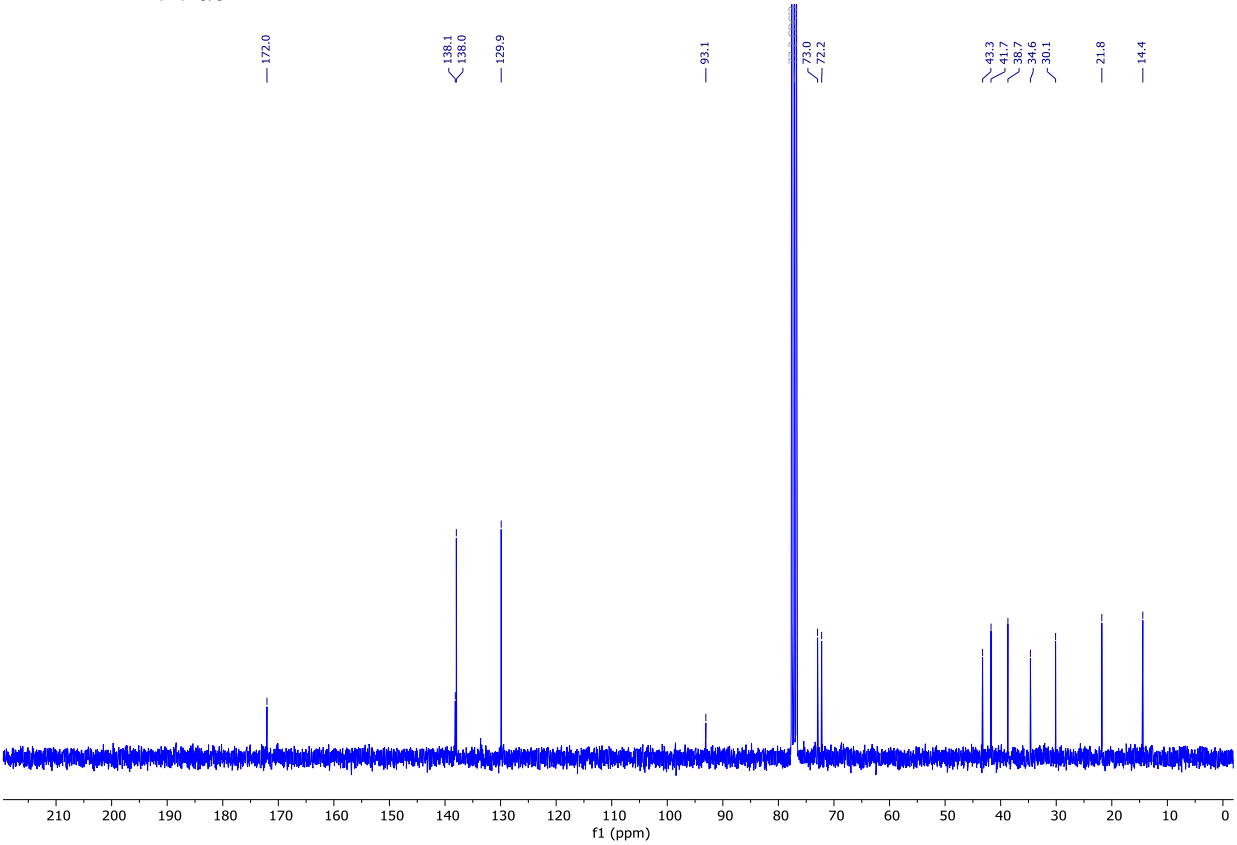
**dr 95:5**



JFR659-2F.1.fid — 1H zg30




JFR659-2F.3.fid — 13C{1H} zgpg30 RD=2s



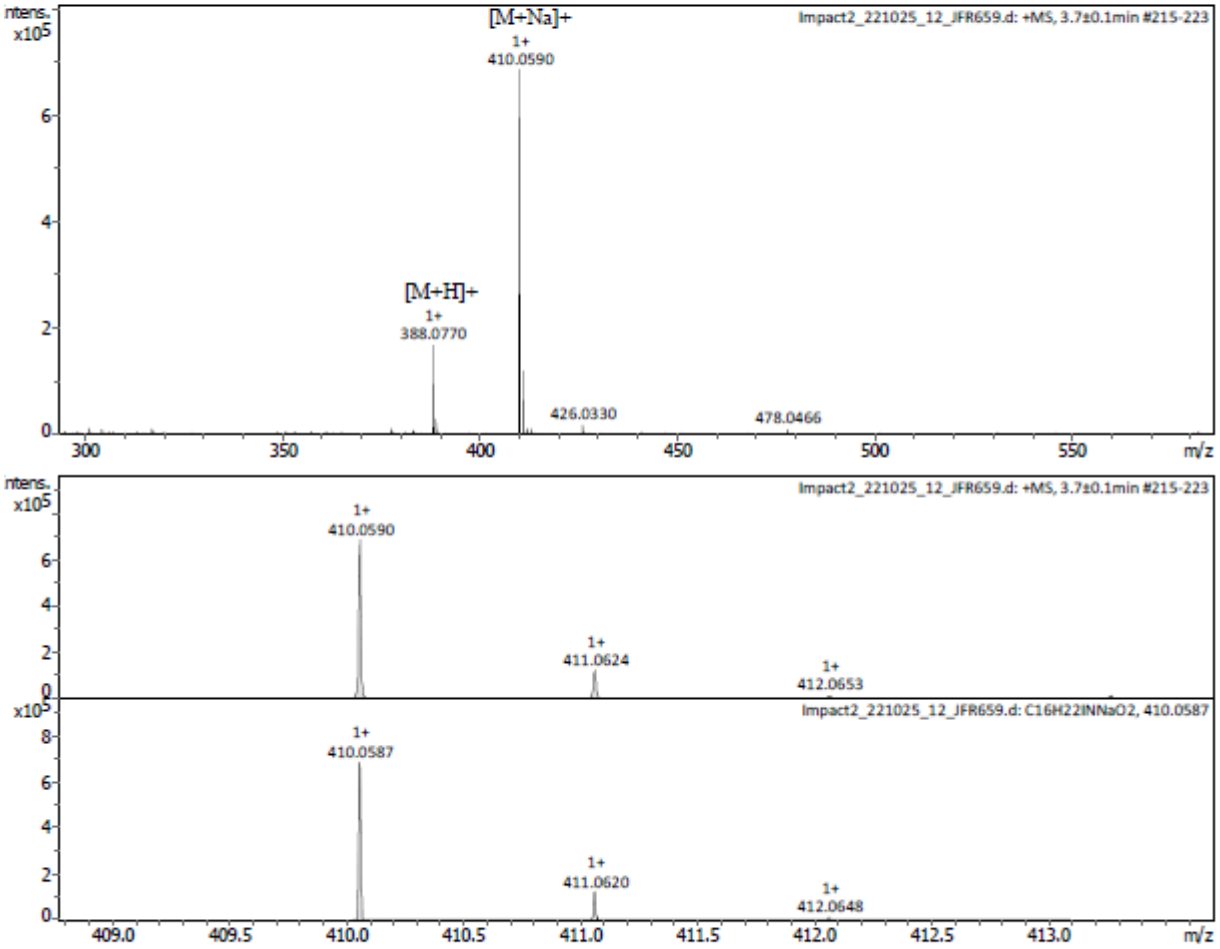
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_221025_12_JFR659.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/25/2022 2:11:22 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

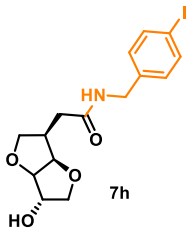
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



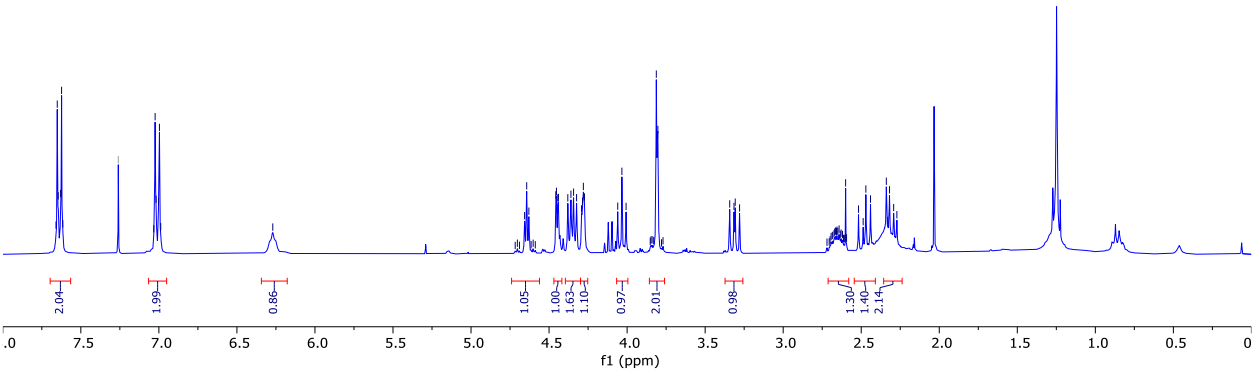

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 388.0770 | C16H23INO2 | 388.0768 | C16H22INO2 | -0.5 | 0.6 | M+H | 1+ |
| 410.0590 | C16H22INNaO2 | 410.0587 | | -0.5 | 2.9 | M+Na | 1+ |

**2-((3*R*,6*S*)-6-Hydroxyhexahydrofuro[3,2-*b*]furan-3-yl)-*N*-(4-iodobenzyl)acetamide 7h**

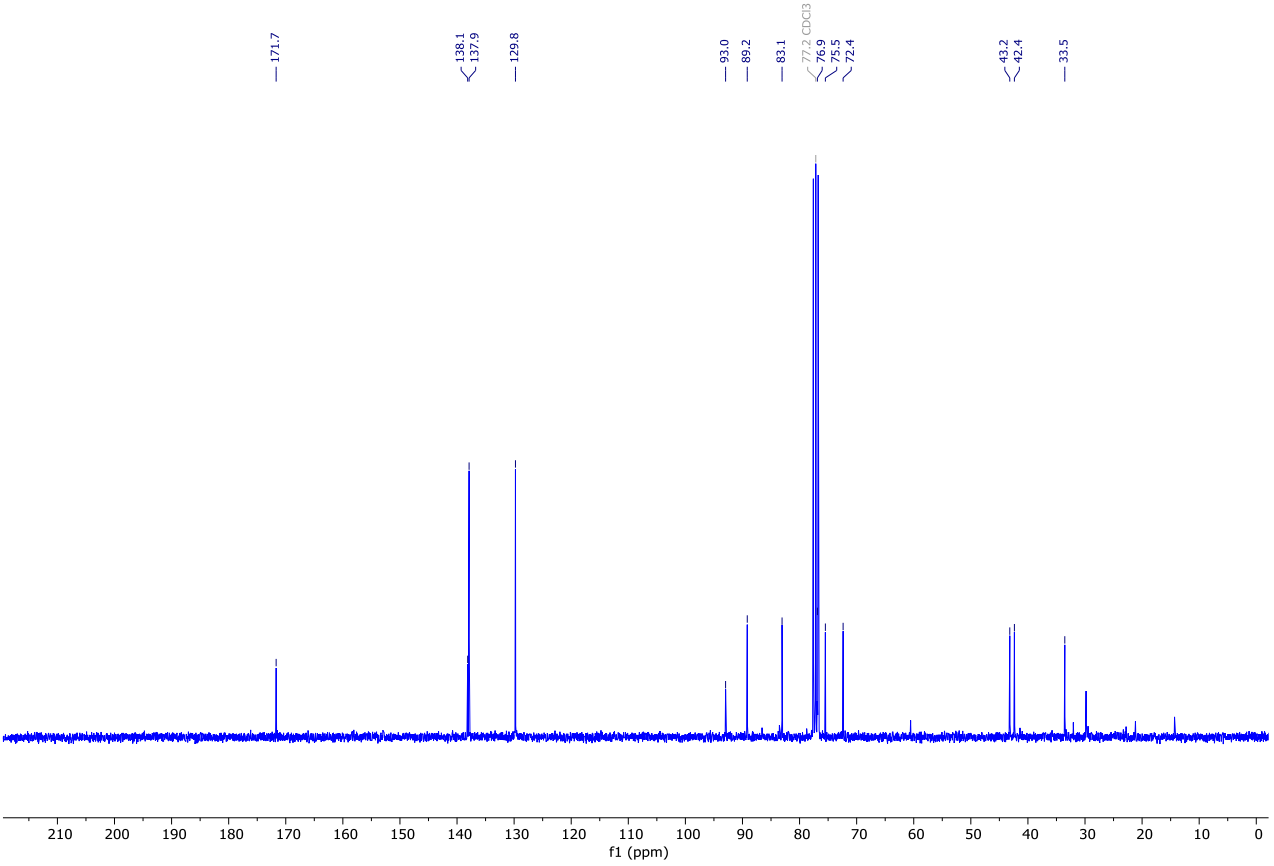



7h

JFR660-3F.1.fid — 1H zg30


JFR660-3F.3.fid — 13C{1H} zgpg30 RD=2s



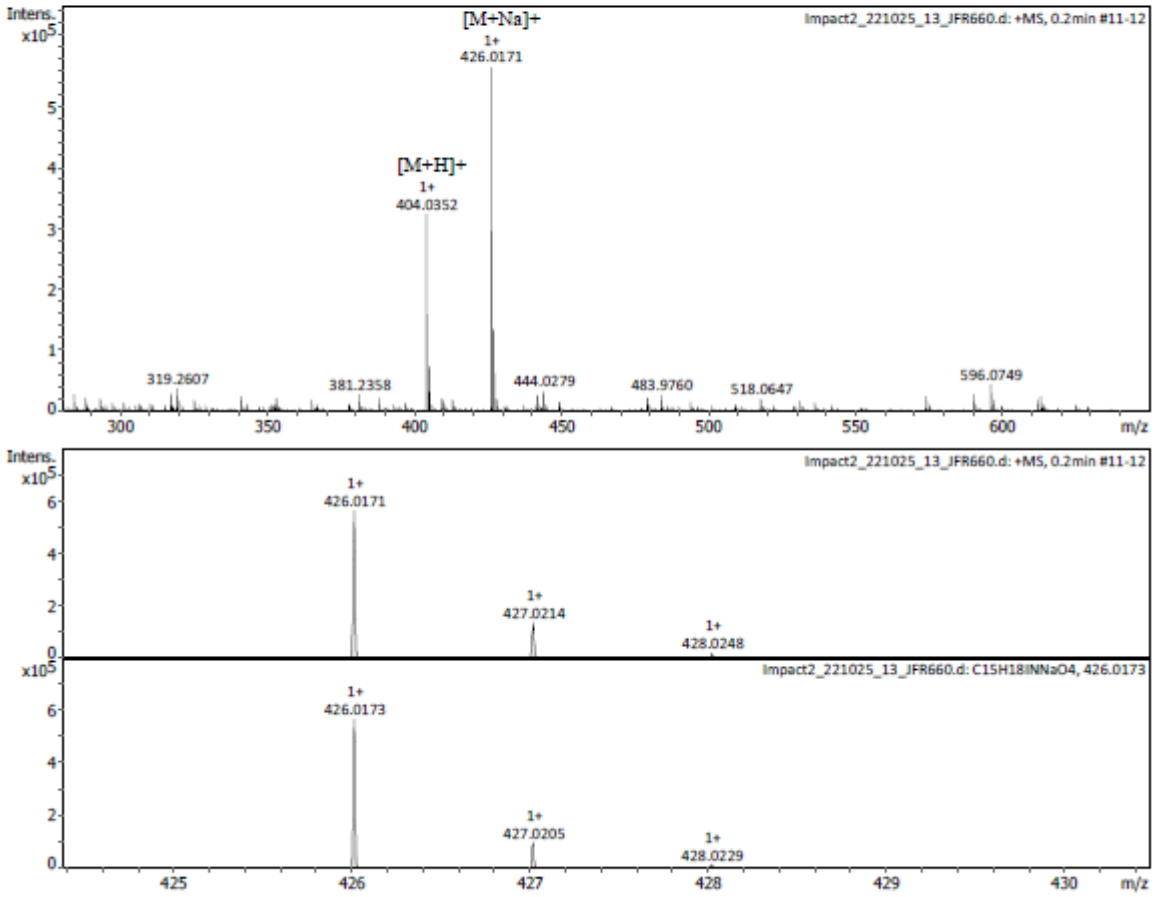
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_221025_13_JFR660.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/25/2022 2:19:04 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

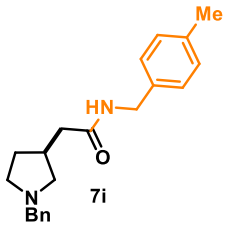
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 3000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



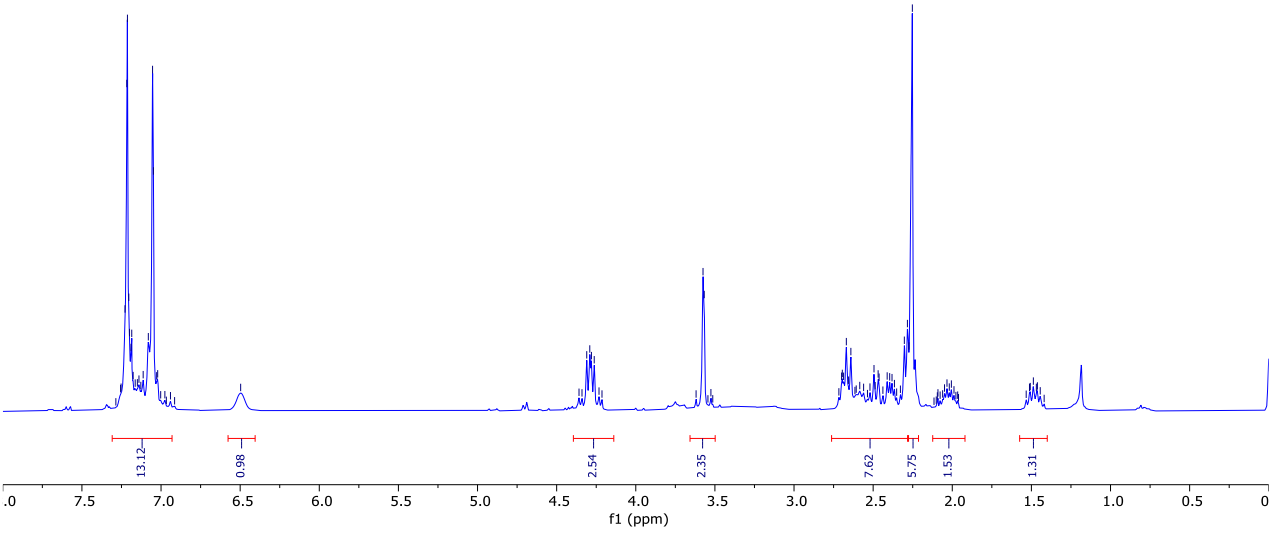

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 404.0352 | C15H19INO4 | 404.0353 | C15H18INO4 | 0.2 | 36.2 | M+H | 1+ |
| 426.0171 | C15H18INNaO4 | 426.0173 | | 0.3 | 40.7 | M+Na | 1+ |

**2-(1-Benzylpyrrolidin-3-yl)-*N*-(4-methylbenzyl)acetamide 7i**

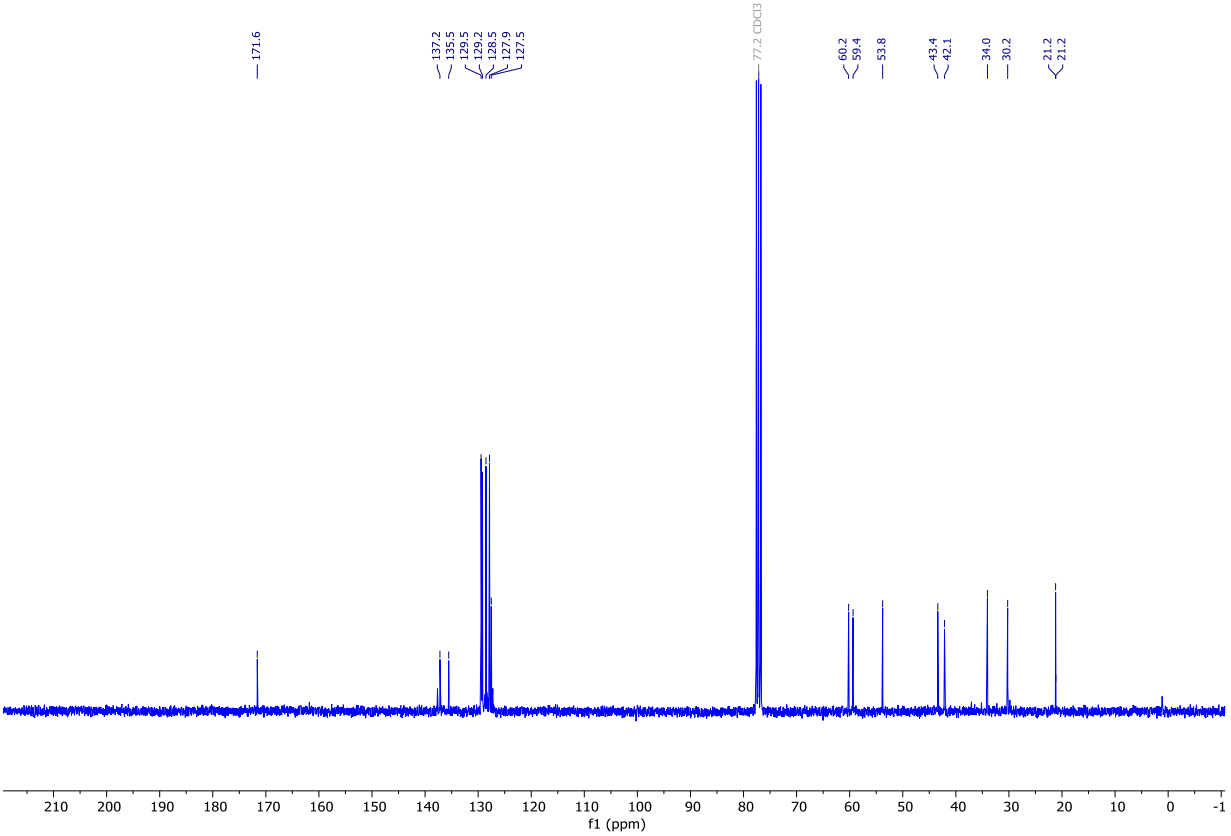



7i

JFR713F.1.fid — 1H zg30


JFR713F.3.fid — 13C{1H} zgpg30 RD=2s



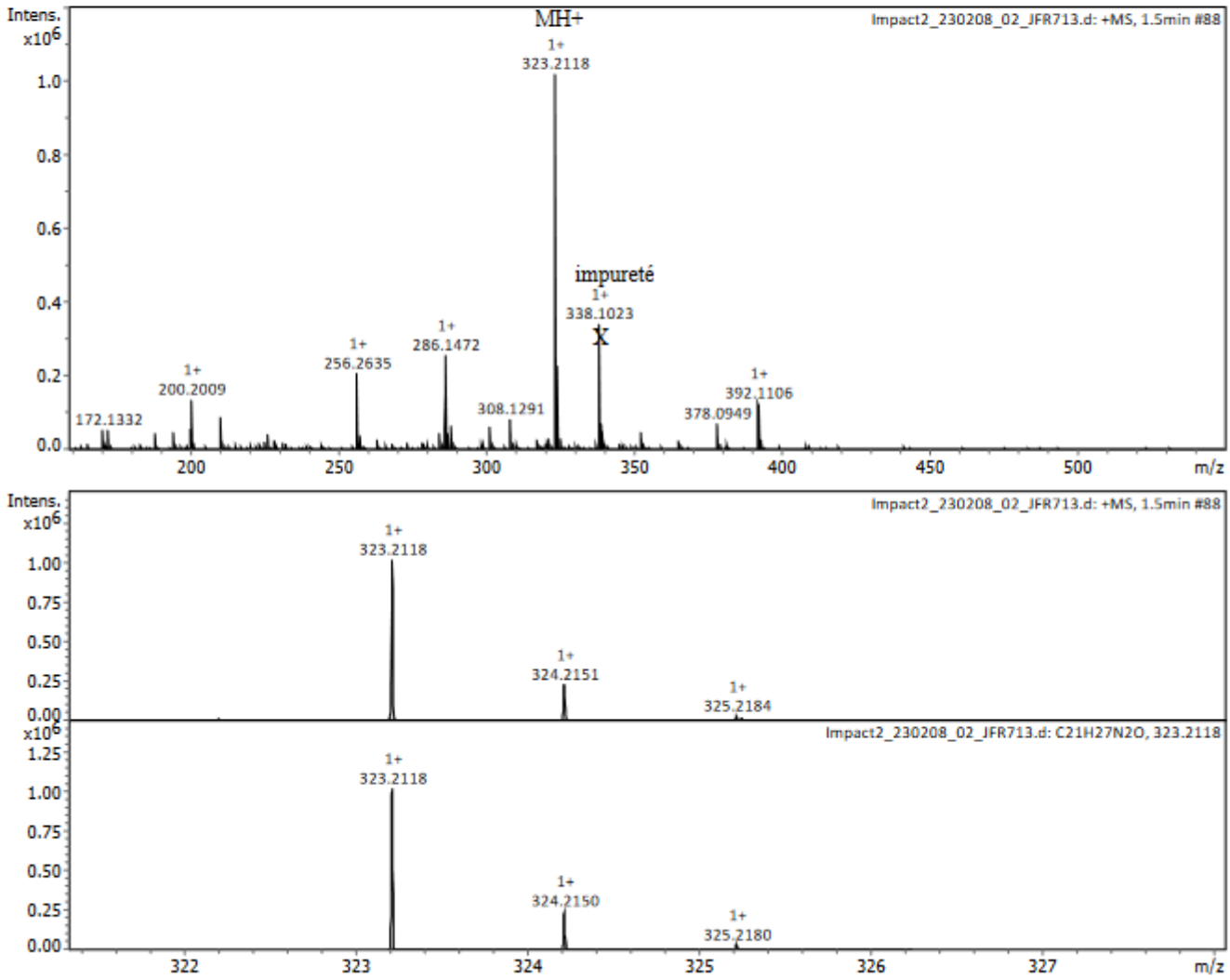
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230208_02_JFR713.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 2/8/2023 11:27:32 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

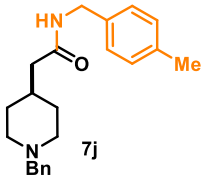
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



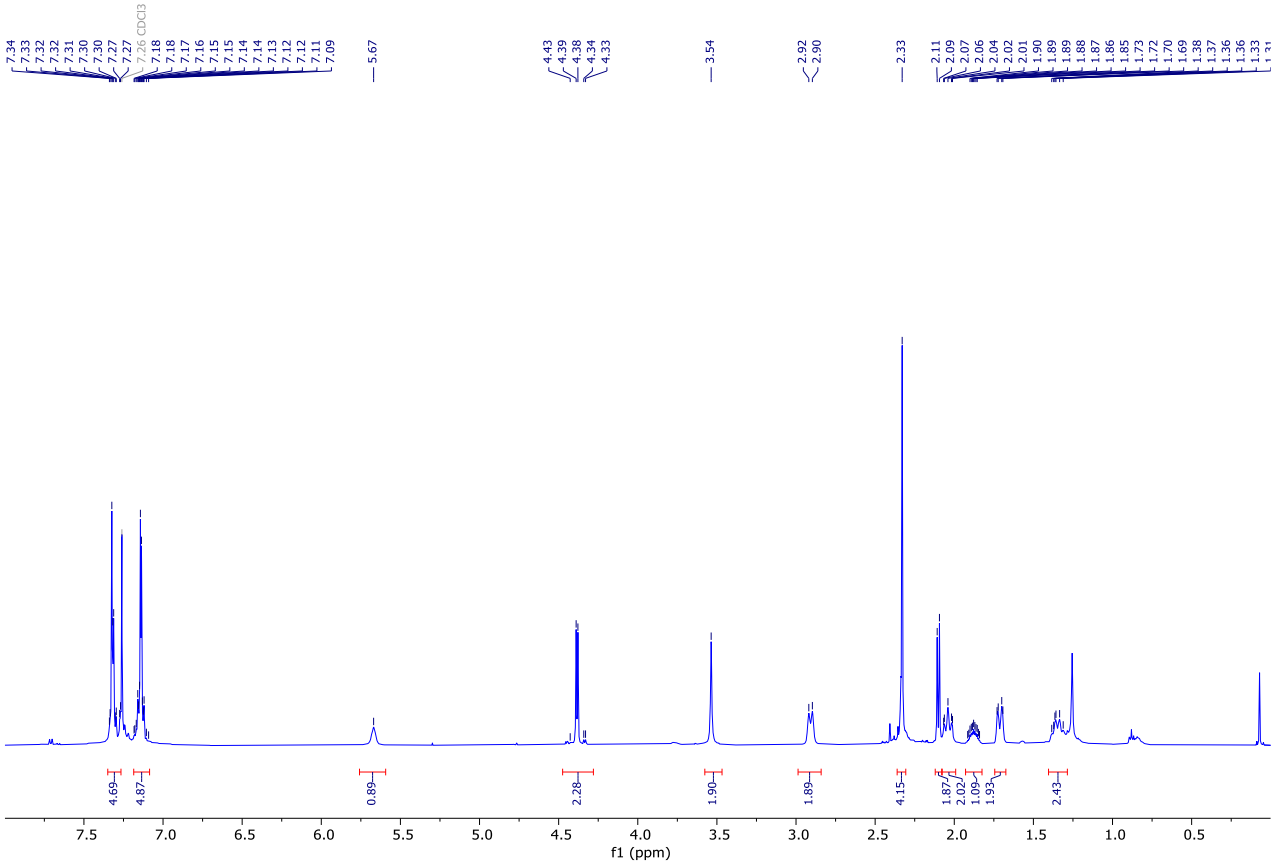

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 323.2118 | C21H27N2O | 323.2118 | C21H26N2O | 0.0 | 8.4 | M+H | 1+ |

## 2-(1-Benzylpiperidin-4-yl)-*N*-(4-methylbenzyl)acetamide 7j

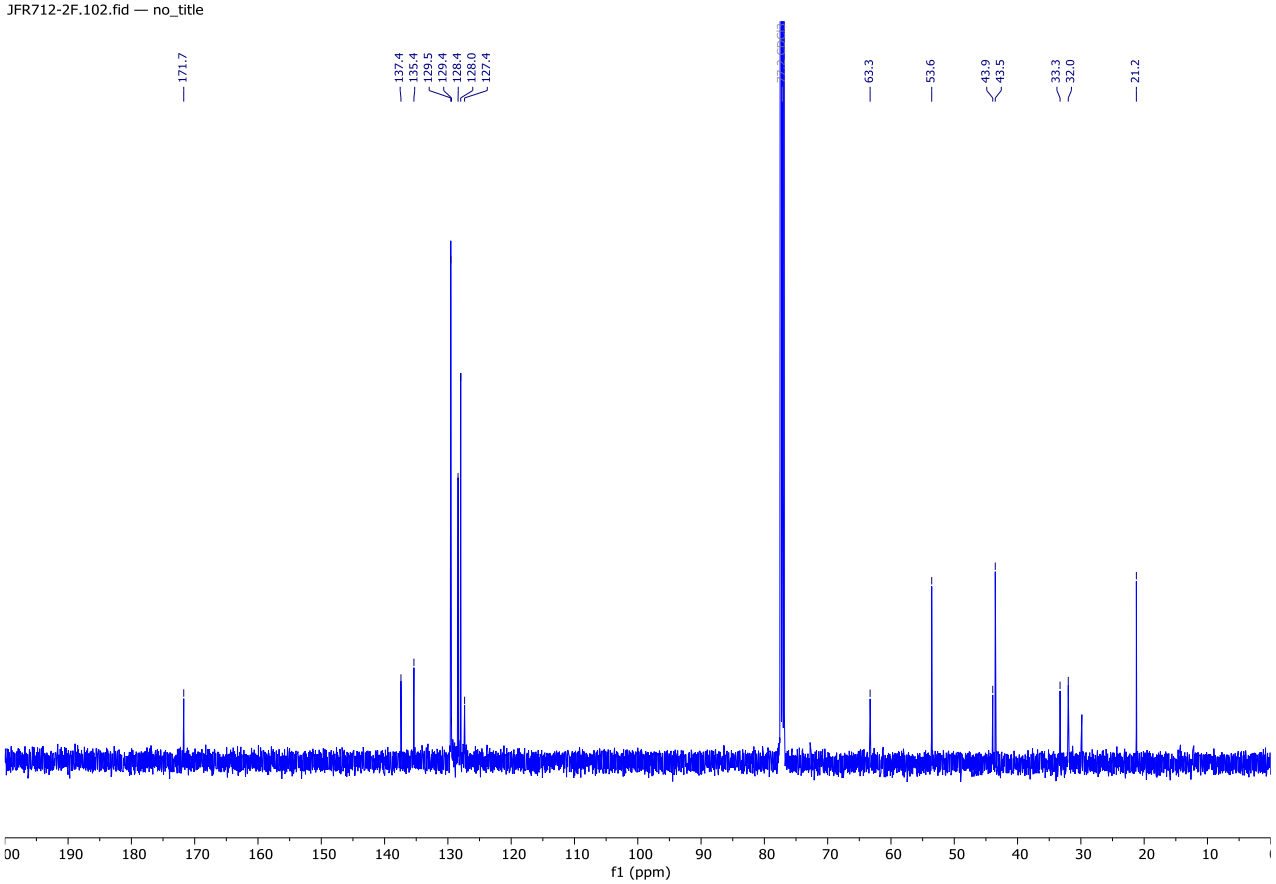



7j

JFR712-2F.100.fid — no_title




JFR712-2F.102.fid — no_title



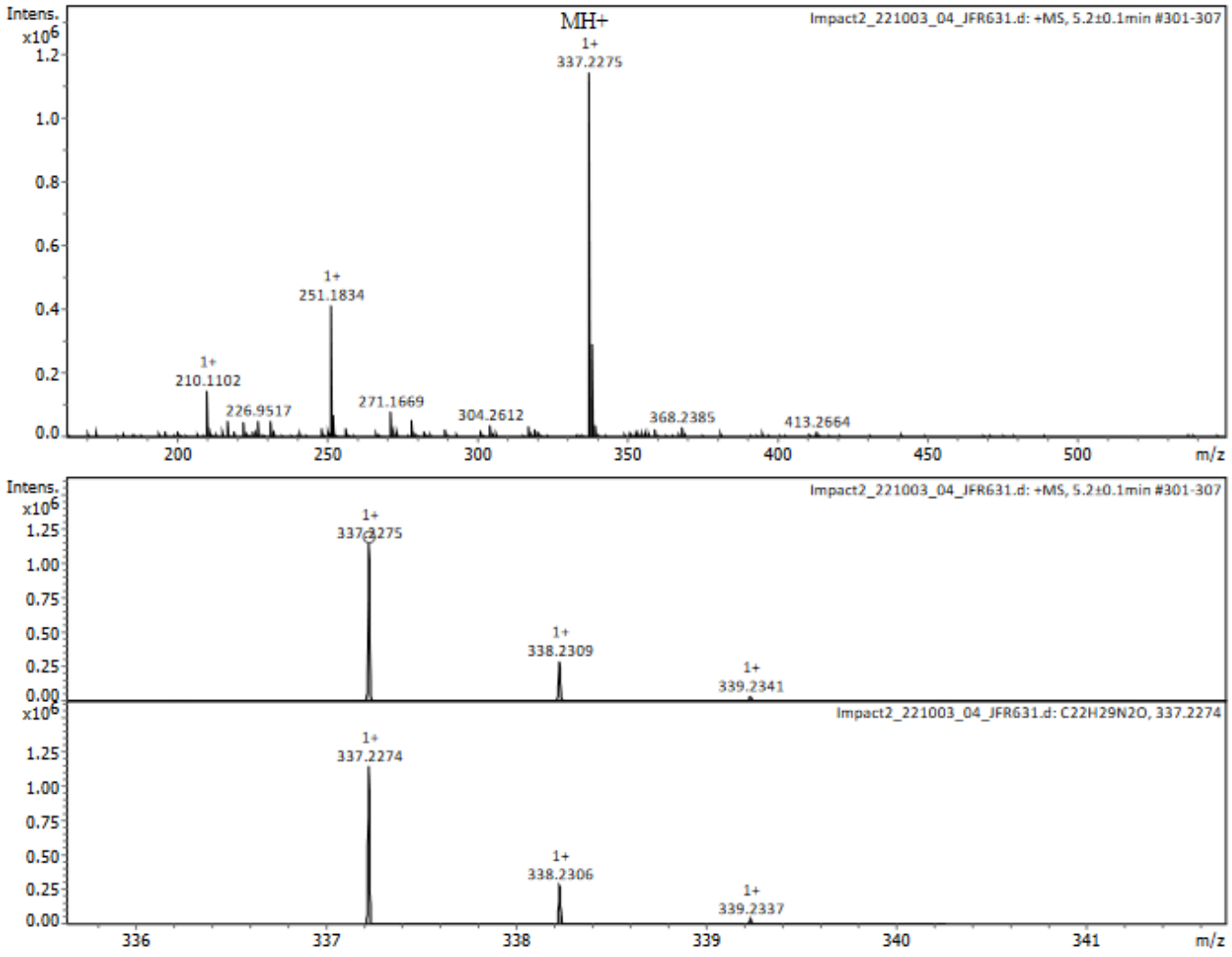
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_221003_04_JFR631.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 10/3/2022 10:59:37 AM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

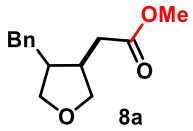
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 337.2275 | C22H29N2O | 337.2274 | C22H28N2O | -0.2 | 4.7 | M+H | 1+ |

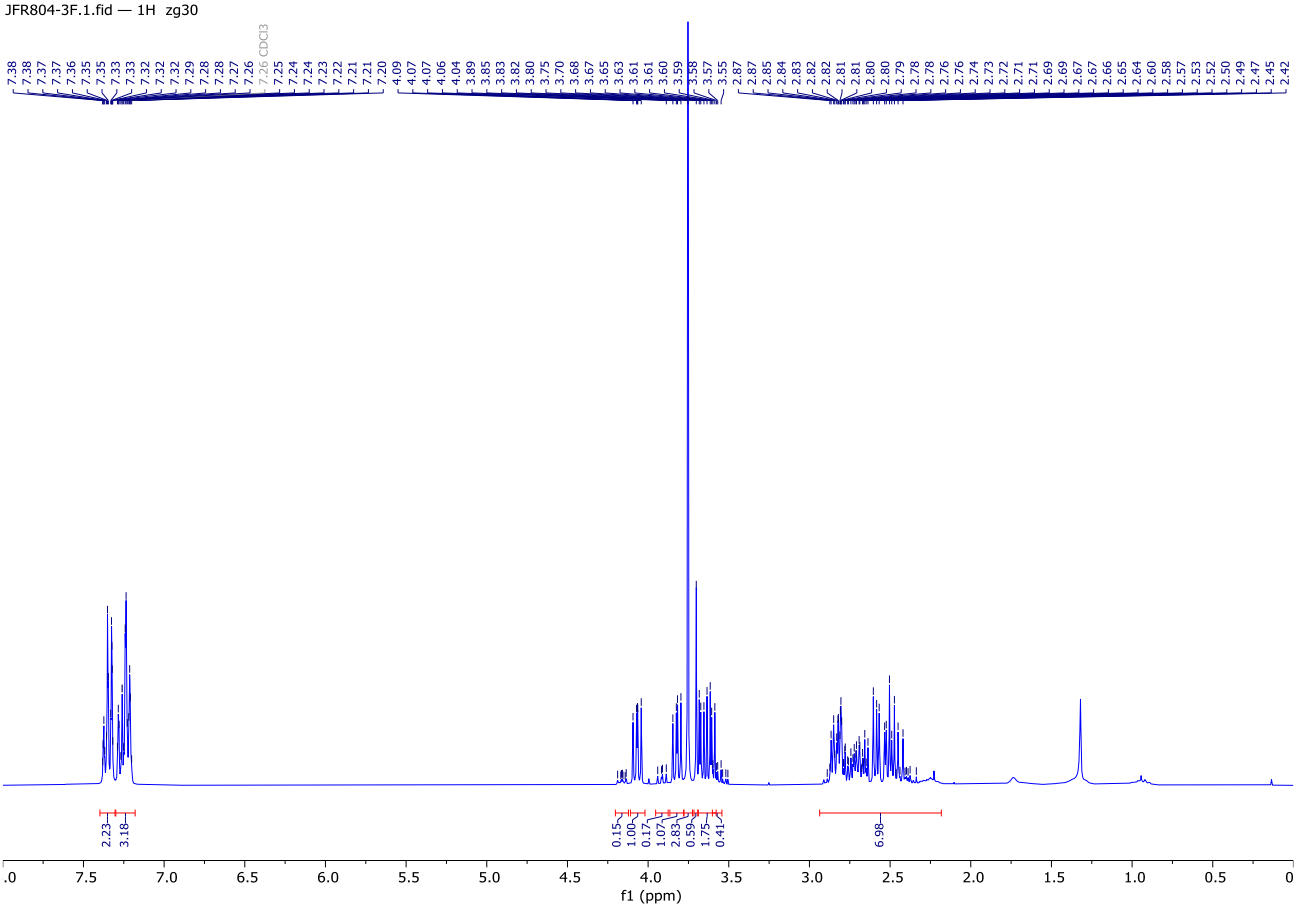
**Methyl 2-(4-benzyltetrahydrofuran-3-yl)acetate 8a**



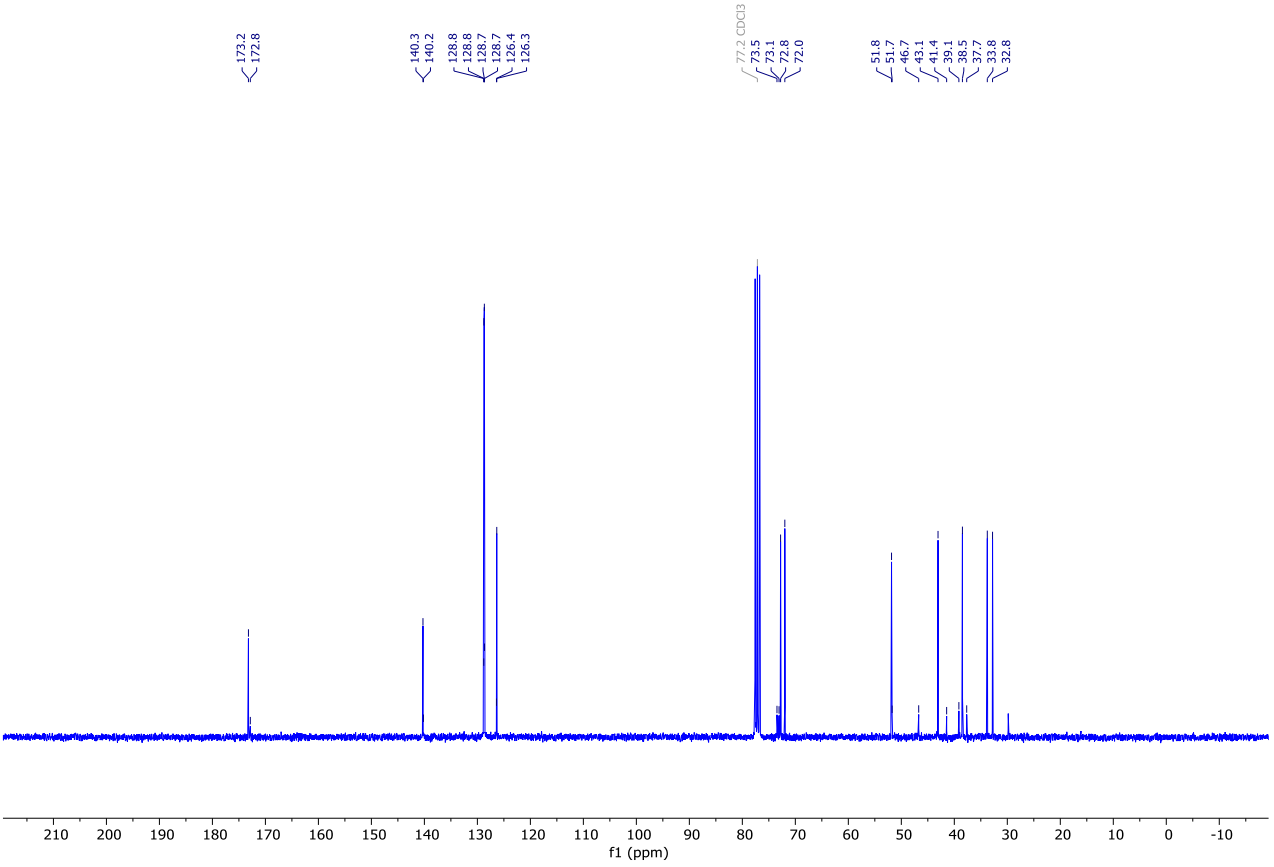

8a

dr 87:13

JFR804-3F.1.fid — 1H zg30




JFR804-3F.3.fid — 13C{1H} zgpg30 RD=2s



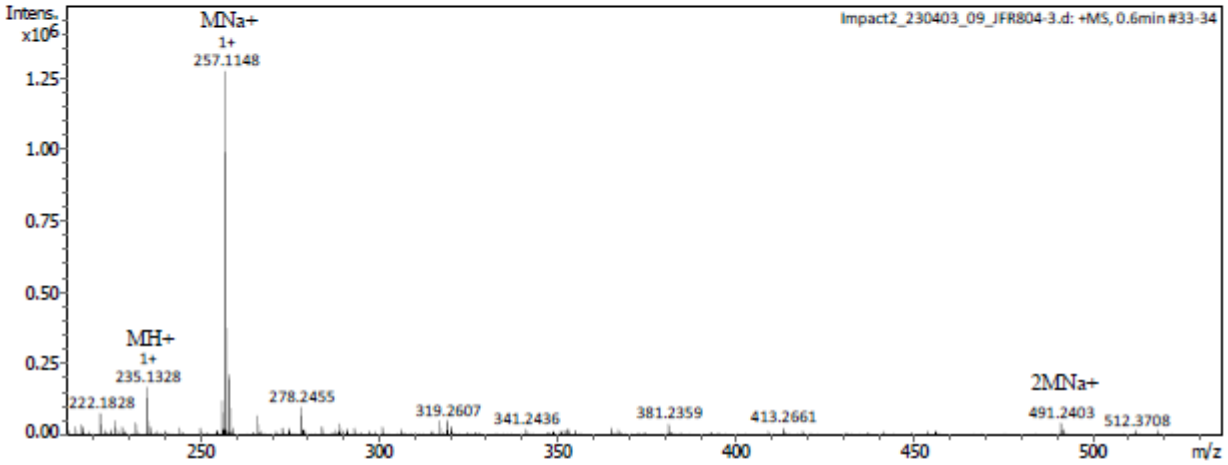
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

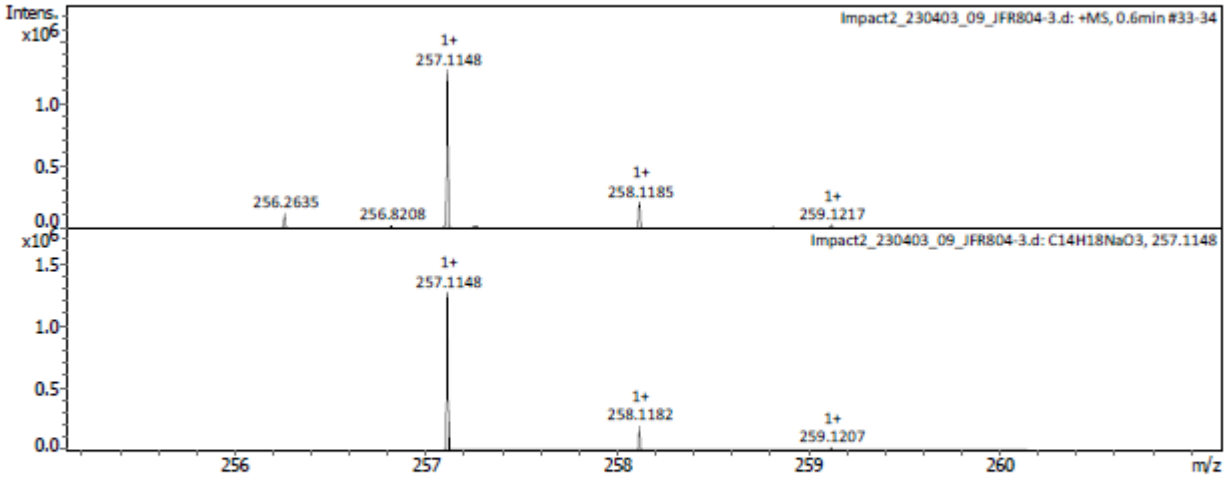
**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_230403_09_JFR804-3.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 4/3/2023 5:24:31 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

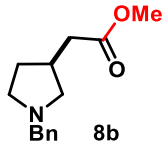
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



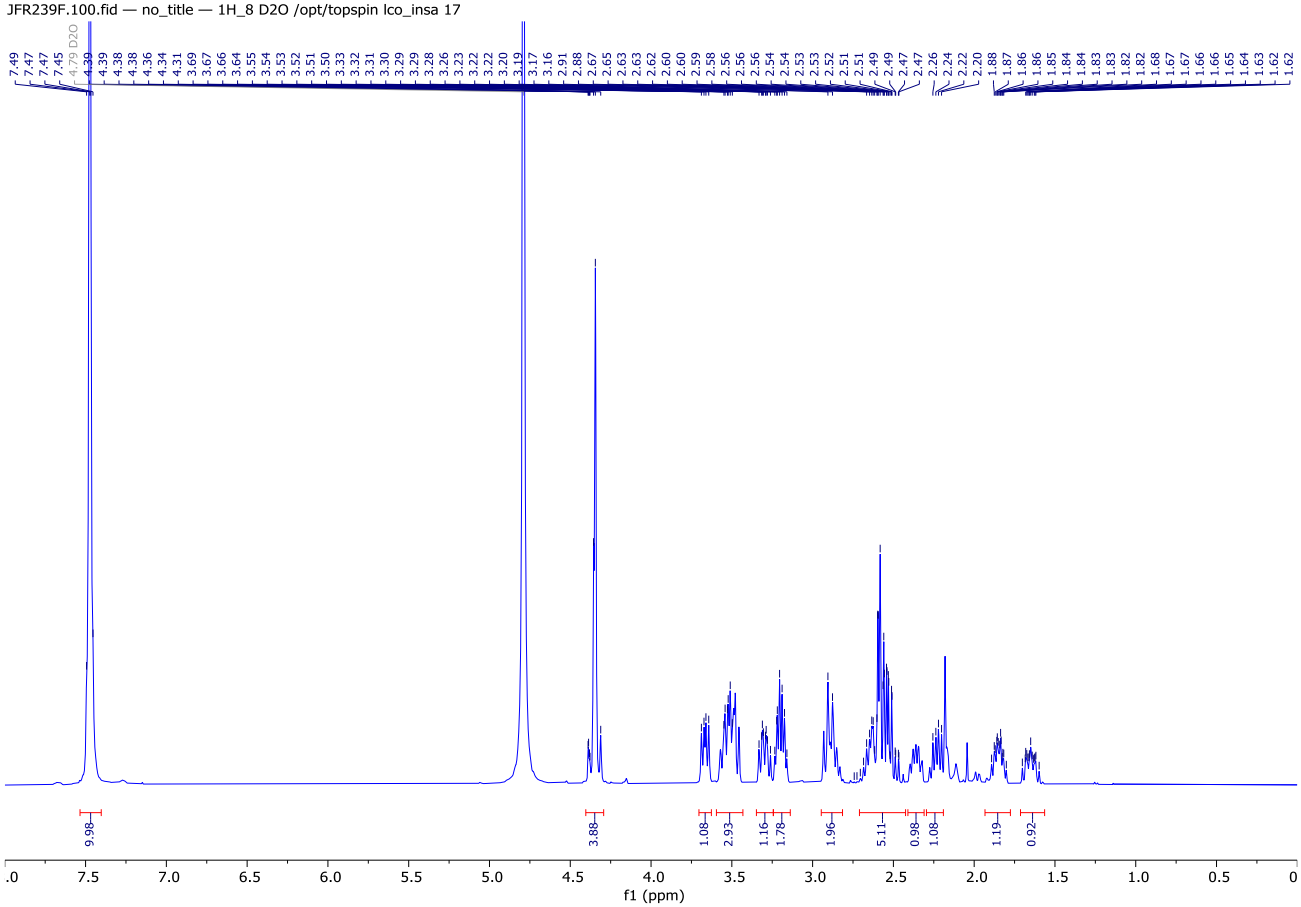

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 235.1328 | C14H19O3 | 235.1329 | C14H18O3 | 0.4 | 20.2 | M+H | 1+ |
| 257.1148 | C14H18NaO3 | 257.1148 | | 0.2 | 6.8 | M+Na | 1+ |
| 491.2403 | C28H36NaO6 | 491.2404 | | 0.3 | 21.4 | 2M+Na | 1+ |

**Methyl 2-(1-benzylpyrrolidin-3-yl)acetate 8b [95274-12-7]**

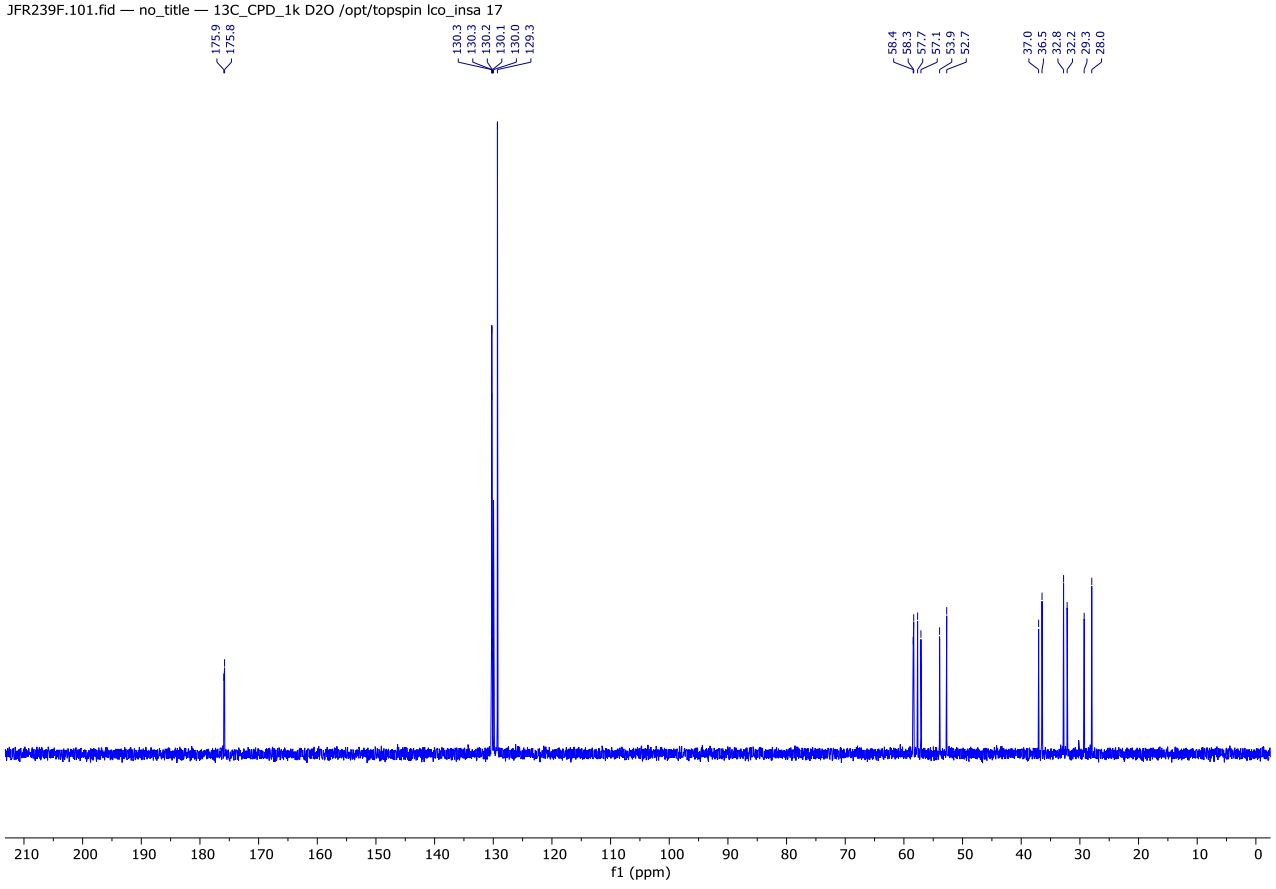



8b

JFR239F.100.fid — no_title — 1H_8 D2O /opt/topspin lco_insa 17




JFR239F.101.fid — no_title — 13C_CPD_1k D2O /opt/topspin lco_insa 17



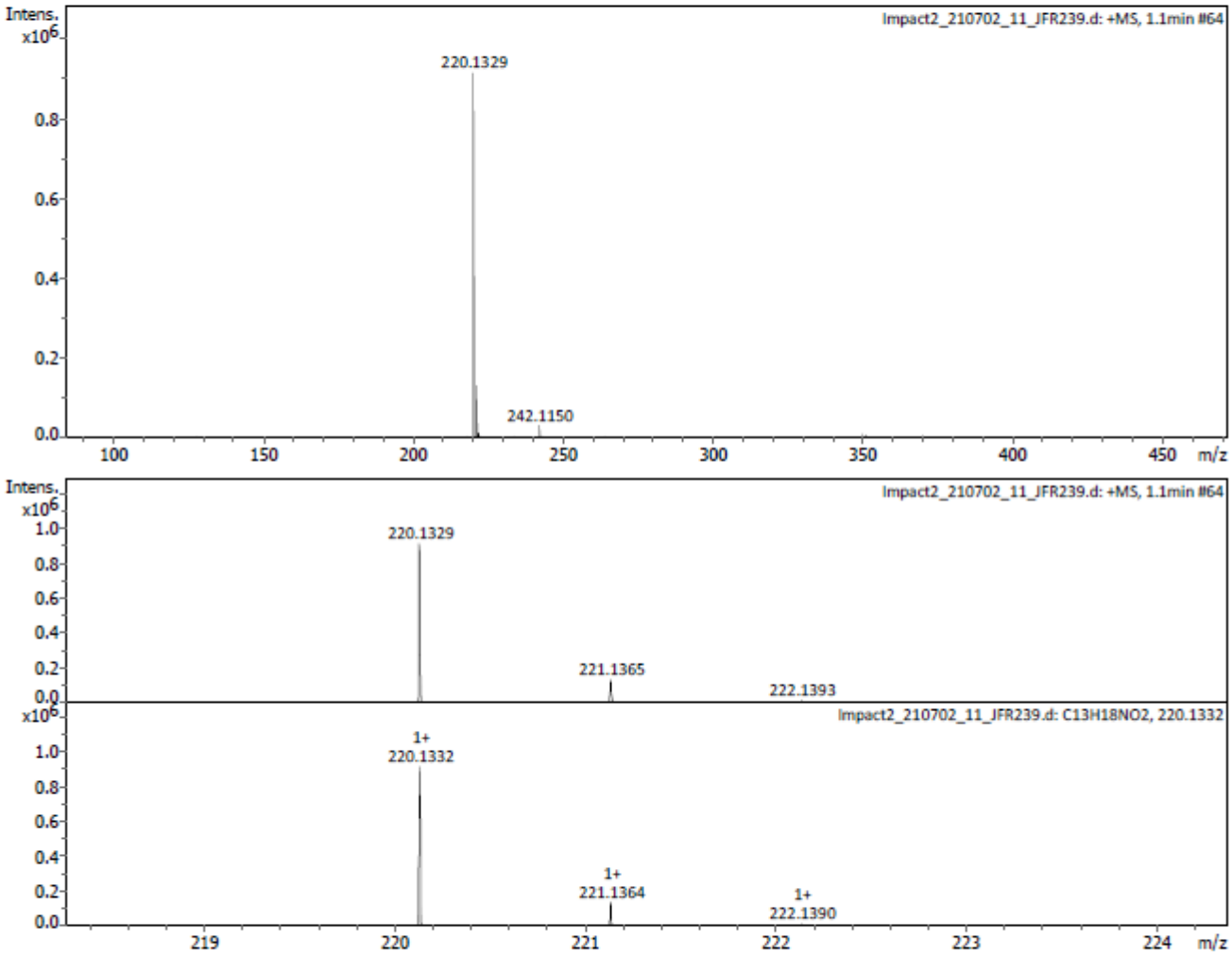
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_210702_11_JFR239.d | | |
| Method | LHCEP_n5-.m | Acquisition Date | 7/2/2021 3:41:19 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

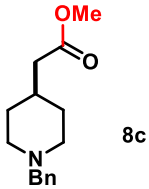
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1000 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



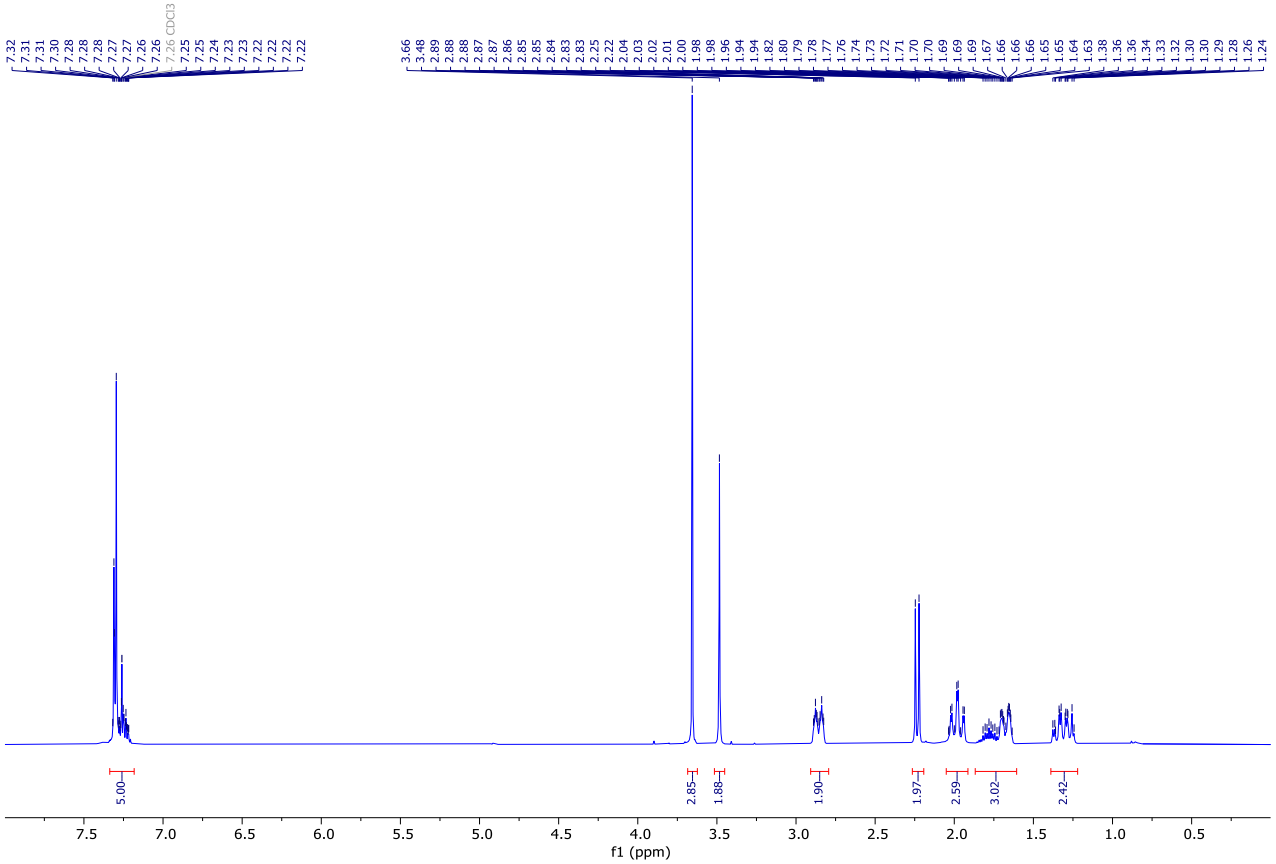

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 220.1329 | C13H18NO2 | 220.1332 | C13H17NO2 | 1.3 | 2.0 | M+H | 1+ |
| 242.1150 | C13H17NNaO2 | 242.1151 | | 0.8 | 8.2 | M+Na | 1+ |

## Methyl 2-(1-Benzylpiperidin-4-yl)acetate 8c

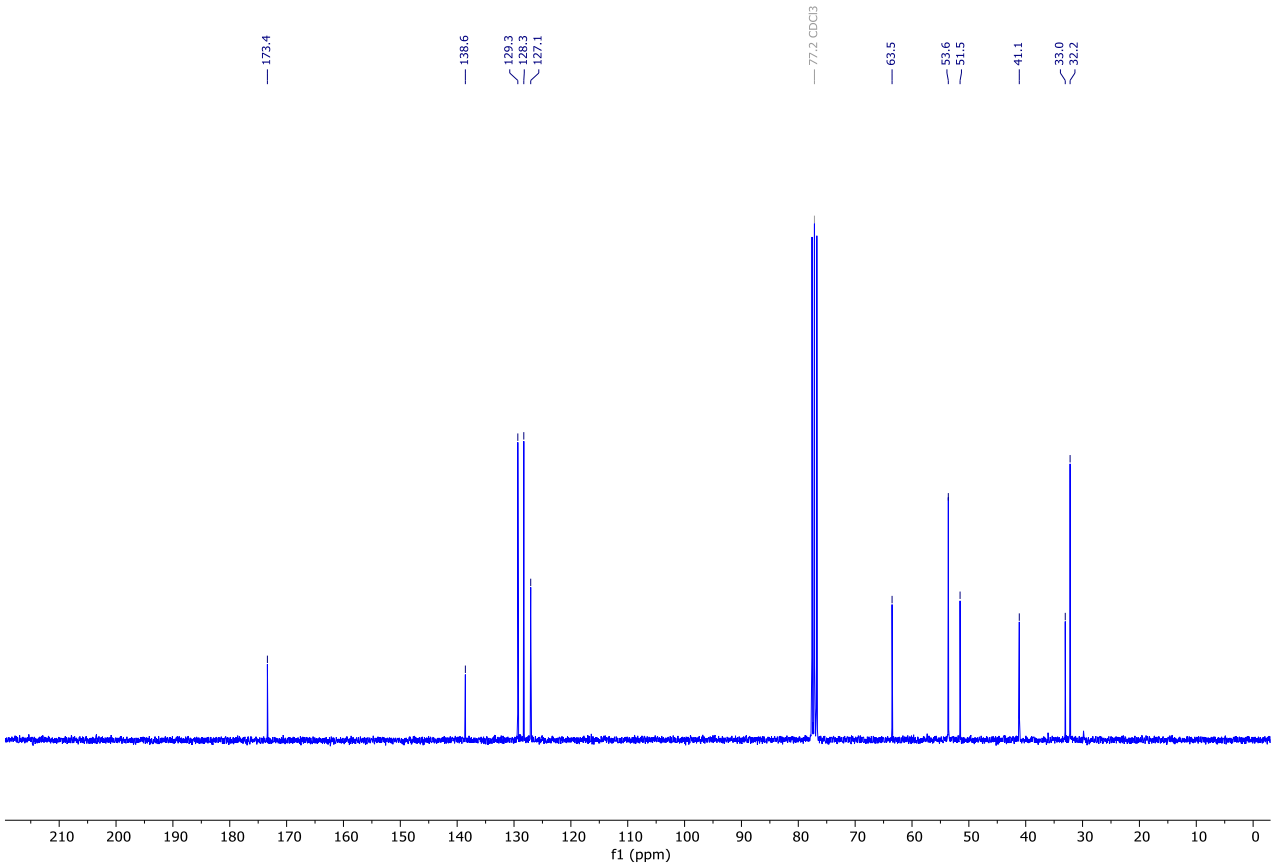



8c

JFR595-OMe.2.fid — 1H zg30




JFR595-OMe.4.fid — 13C{1H} zgpg30 RD=2s



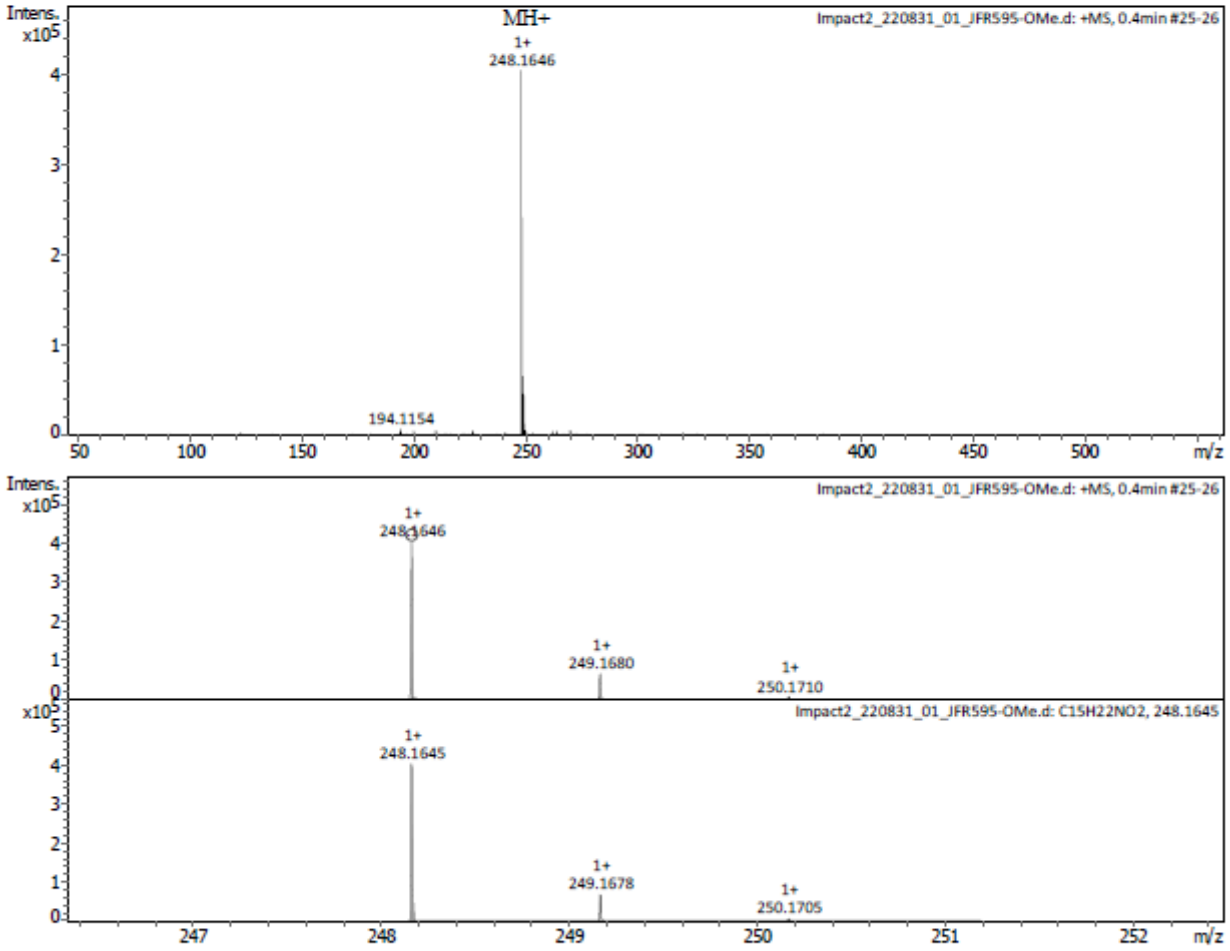
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220831_01_JFR595-OMe.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 8/31/2022 4:55:14 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

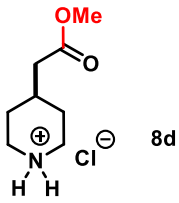
**Acquisition Parameter**

| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 1500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 750.0 Vpp | Set Divert Valve | Source |



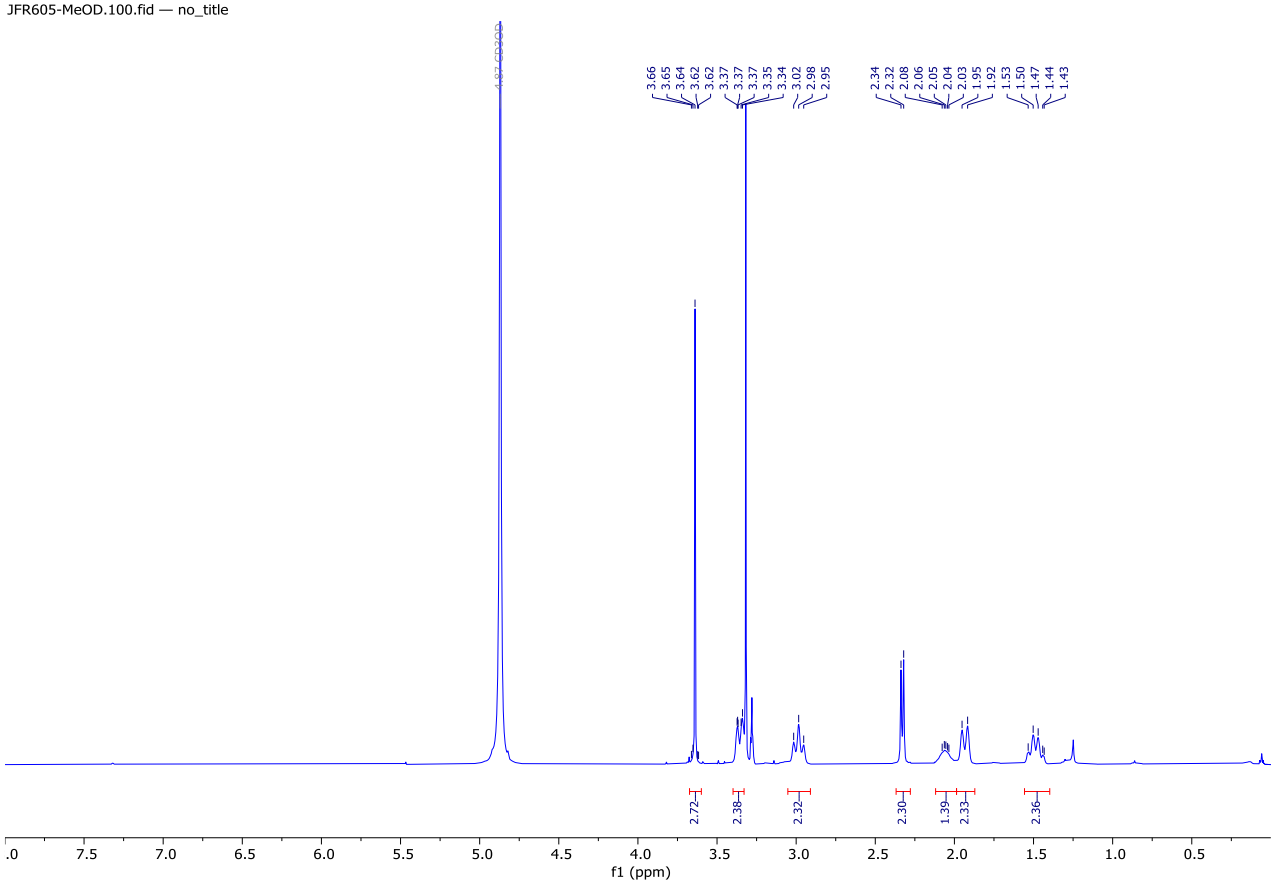

| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 248.1646 | C15H22NO2 | 248.1645 | C15H21NO2 | -0.4 | 2.8 | M+H | 1+ |

**4-(2-Methoxy-2-oxoethyl)piperidinium chloride 8d [81270-37-3]**

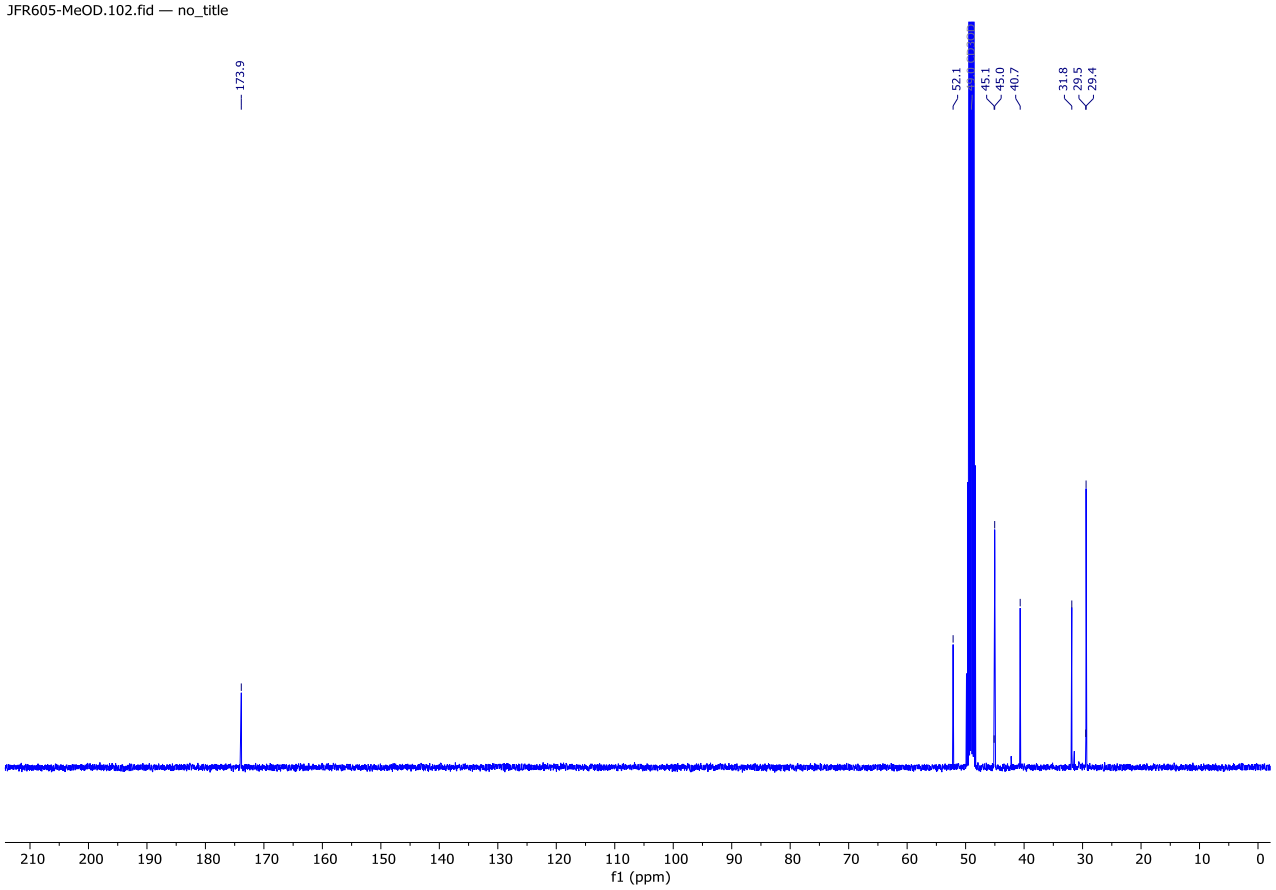



8d

JFR605-MeOD.100.fid — no_title




JFR605-MeOD.102.fid — no_title



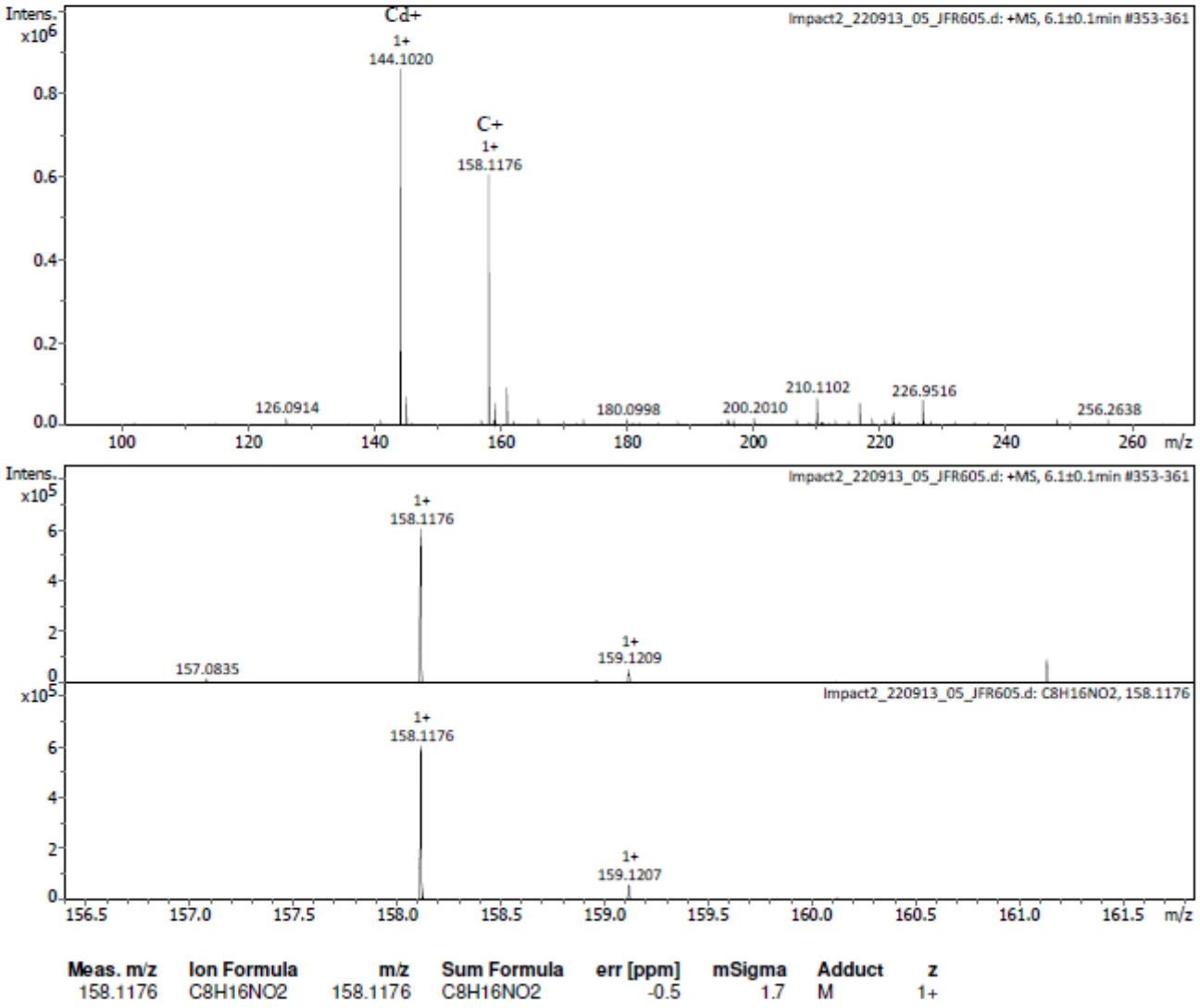
# CENTRE COMMUN DE SPECTROMETRIE DE MASSE

**Analysis Info**

| | | | |
|---|---|---|---|
| Analysis Name | Impact2_220913_05_JFR605.d | | |
| Method | Tune_pos_Standard.m | Acquisition Date | 9/13/2022 2:32:37 PM |
| Comment | | Instrument / Ser# | impact II 1825265.10081 |

**Acquisition Parameter**

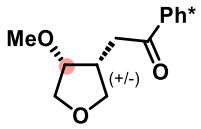
| | | | | | |
|---|---|---|---|---|---|
| Source Type | ESI | Ion Polarity | Positive | Set Nebulizer | 0.3 Bar |
| Focus | Active | Set Capillary | 4500 V | Set Dry Heater | 200 °C |
| Scan Begin | 50 m/z | Set End Plate Offset | -500 V | Set Dry Gas | 4.0 l/min |
| Scan End | 1000 m/z | Set Collision Cell RF | 300.0 Vpp | Set Divert Valve | Source |




| Meas. m/z | Ion Formula | m/z | Sum Formula | err [ppm] | mSigma | Adduct | z |
|---|---|---|---|---|---|---|---|
| 158.1176 | C8H16NO2 | 158.1176 | C8H16NO2 | -0.5 | 1.7 | M | 1+ |

# ***Single-Crystal X-ray diffraction***

## (±)-2-((3*R*,4*R*)-4-Methoxytetrahydrofuran-3-yl)-1-(2,3,4,5,6-pentamethylphenyl)ethanone 3k




**3k**

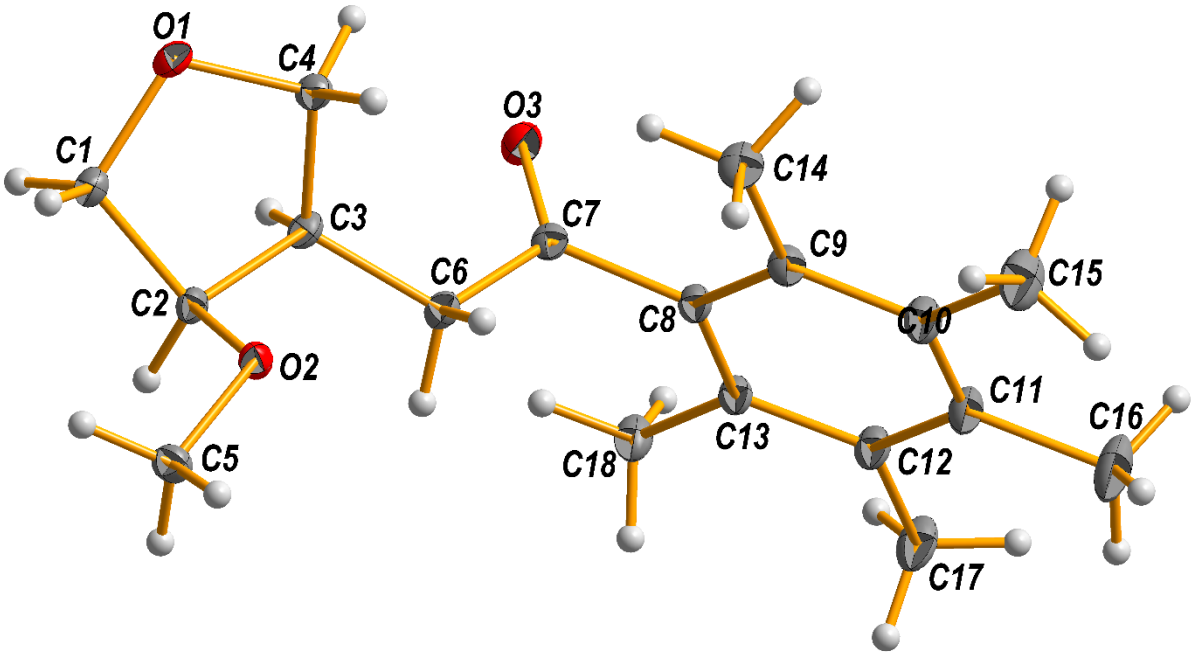
A suitable single-crystal of **3k** was selected and mounted on an Xcalibur Gemini kappa-geometry diffractometer equipped with an Atlas CCD detector and a Copper X-ray source (l = 1.54184 Å). Intensities were collected at 150 K by means of the CrysalisPro software. Reflection indexing, unit-cell parameters refinement, Lorentz-polarization correction, peak integration and background determination were carried out with the CrysalisPro software.[7] An analytical absorption correction was applied using the modeled faces of the crystal.[8] The resulting set of *hkl* was used for structure solution and refinement. The structures were solved with the ShelXT[9] structure solution program using the intrinsic phasing solution method and by using Olex2[10] as the graphical interface. The model was refined with version 2018/3 of ShelXL[11] using least-squares minimization.

**CCDC 2243885** contains the supplementary crystallographic data for this paper. These data can be obtained free of charge from The Cambridge Crystallographic Date Centre via www.ccdc.cam.ac.uk/data_request/cif.

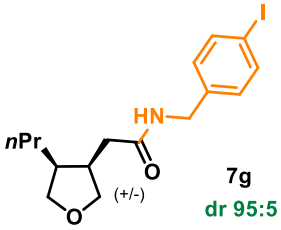
**Table S1.** Crystallographic Data Collection and Refinement Statistics

| **Compound** | **3k** |
|---|---|
| Formula | $C_{18}H_{26}O_3$ |
| $D_{calc.}$/ g cm$^{-3}$ | 1.208 |
| $m$/mm$^{-1}$ | 0.638 |
| Formula Weight | 290.39 |
| Colour | colourless |
| Shape | needle-shaped |
| Size/mm$^3$ | 0.47×0.14×0.10 |
| $T$/K | 150.00(10) |
| Crystal System | monoclinic |
| Space Group | $P2_1/c$ |
| $a$/Å | 23.1710(9) |
| $b$/Å | 7.8602(3) |
| $c$/Å | 8.8261(3) |
| $a$/° | 90 |
| $b$/° | 96.465(3) |
| $g$/° | 90 |
| V/Å$^3$ | 1597.28(10) |
| $Z$ | 4 |
| $Z'$ | 1 |
| Wavelength/Å | 1.54184 |
| Radiation type | Cu $K_a$ |
| $Q_{min}$/° | 3.840 |
| $Q_{max}$/° | 66.939 |
| Measured Refl's. | 32638 |
| Indep't Refl's | 2843 |
| Refl's I≥2 $s$(I) | 2571 |
| $R_{int}$ | 0.0623 |
| Parameters | 196 |
| Restraints | 2 |
| Largest Peak | 0.341 |
| Deepest Hole | -0.254 |
| GooF | 1.024 |
| $wR_2$ (all data) | 0.1465 |
| $wR_2$ | 0.1414 |
| $R_1$ (all data) | 0.0549 |
| $R_1$ | 0.0512 |

Molecular view of **3k** with displacement ellipsoids plotted at the 30 % probability level.



## (±)-*N*-(4-iodobenzyl)-2-((3*R*,4*S*)-4-propyltetrahydrofuran-3-yl)acetamide7g




**7g**
**dr 95:5**

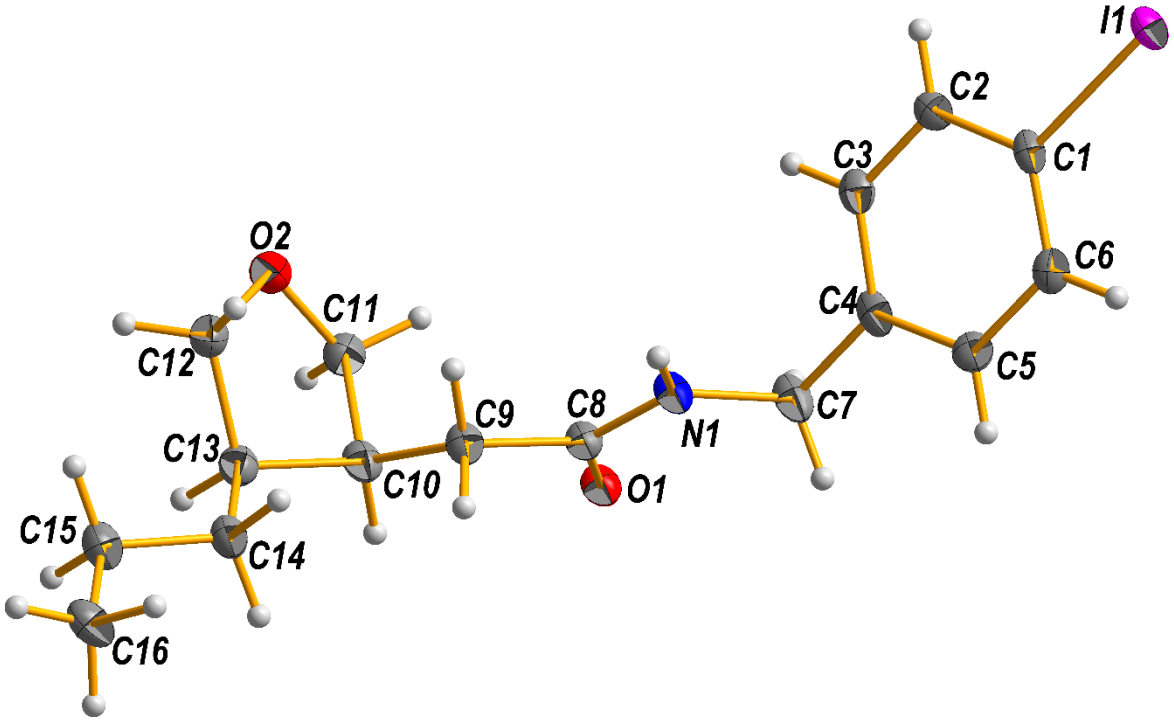
A suitable single-crystal of **7g** was selected and mounted on an Xcalibur Gemini kappa-geometry diffractometer equipped with an Atlas CCD detector and a Copper X-ray source (l = 1.54184 Å). Intensities were collected at 150 K by means of the CrysalisPro software. Reflection indexing, unit-cell parameters refinement, Lorentz-polarization correction, peak integration and background determination were carried out with the CrysalisPro software.[7] An analytical absorption correction was applied using the modeled faces of the crystal.[8] The resulting set of *hkl* was used for structure solution and refinement. The structures were solved with the ShelXT[9] structure solution program using the intrinsic phasing solution method and by using Olex2[10] as the graphical interface. The model was refined with version 2018/3 of ShelXL[11] using least-squares minimization.

**CCDC 2246522** contains the supplementary crystallographic data for this paper. These data can be obtained free of charge from The Cambridge Crystallographic Date Centre via www.ccdc.cam.ac.uk/data_request/cif.

**Table S2.** Crystallographic Data Collection and Refinement Statistics

| **Compound** | **7g** |
|---|---|
| Formula | $C_{16}H_{22}INO_2$ |
| $D_{calc.}$/ g cm$^{-3}$ | 1.584 |
| $m$/mm$^{-1}$ | 15.506 |
| Formula Weight | 387.24 |
| Colour | colourless |
| Shape | needle-shaped |
| Size/mm$^3$ | 0.47×0.03×0.01 |
| $T$/K | 100.00(10) |
| Crystal System | triclinic |
| Space Group | *P*-1 |
| $a$/Å | 9.6026(3) |
| $b$/Å | 10.9032(3) |
| $c$/Å | 15.9038(5) |
| $a$/° | 80.907(3) |
| $b$/° | 89.846(2) |
| $g$/° | 80.988(2) |
| V/Å$^3$ | 1623.48(9) |
| $Z$ | 4 |
| $Z'$ | 2 |
| Wavelength/Å | 1.54184 |
| Radiation type | Cu K$_a$ |
| $Q_{min}$/° | 5.385 |
| $Q_{max}$/° | 76.996 |
| Measured Refl's. | 47510 |
| Indep't Refl's | 6462 |
| Refl's I≥2 $s$(I) | 5557 |
| $R_{int}$ | 0.0971 |
| Parameters | 363 |
| Restraints | 0 |
| Largest Peak | 2.091 |
| Deepest Hole | -1.391 |
| GooF | 1.040 |
| $wR_2$ (all data) | 0.1555 |
| $wR_2$ | 0.1498 |
| $R_1$ (all data) | 0.0634 |
| $R_1$ | 0.0565 |

Molecular view of **7g** with displacement ellipsoids plotted at the 30 % probability level.





1 P. J. Stevenson, *Org. Biomol. Chem.*, 2011, **9**, 2078–2084.
2 M. Jacolot, S. Moebs-Sanchez and F. Popowycz, *J. Org. Chem.*, 2018, **83**, 9456–9463.
3 M. Larduinat, J. François, M. Jacolot and F. Popowycz, *J. Org. Chem.*, 2023, **88**, 7512–7517.
4 B. J. Stokes, S. M. Opra and M. S. Sigman, *J. Am. Chem. Soc.*, 2012, **134**, 11408–11411.
5 J. François, J. Rio, E. Jeanneau, M.-È. L. Perrin, M. Jacolot, P.-A. Payard and F. Popowycz, *Org. Chem. Front.*, 2023, **10**, 4732–4739.
6 W. M. Akhtar, C. B. Cheong, J. R. Frost, K. E. Christensen, N. G. Stevenson and T. J. Donohoe, *J. Am. Chem. Soc.*, 2017, **139**, 2577–2580.
7 Rigaku Oxford Diffraction, (2022), CrysAlisPro Software system, version 1.171.42.74a, Rigaku Corporation, Oxford, UK, .
8 R. C. Clark and J. S. Reid, *Acta Crystallogr A Found Crystallogr*, 1995, **51**, 887–897.
9 G. M. Sheldrick, *Acta Crystallogr A Found Adv*, 2015, **71**, 3–8.
10 O. V. Dolomanov, L. J. Bourhis, R. J. Gildea, J. A. K. Howard and H. Puschmann, *J Appl Crystallogr*, 2009, **42**, 339–341.
11 G. M. Sheldrick, *Acta Crystallogr C Struct Chem*, 2015, **71**, 3–8.