SUPPORTING INFORMATION

Synthesis of β-lactam-Zidovudine pronucleosides as potential selective narrow-spectrum antibacterial agents

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1. Chemistry

General procedure for olefination reaction: The synthesis was prepared according to the published procedure by Augustine et *al*. (*Org. Biomol. Chem*., **2013**, *11*, 8065), with minor modifications thereof. To a solution of aldehyde (1 equiv) and methyl bromoacetate (1.1 equiv) in anhydrous DCM under argon atmosphere was added dropwise a freshly prepared solution of $TiCl_4$ [1 M in DCM] (1.5 equiv) over 10 minutes and was slightly heated at 30 °C. The mixture was then stirred at room temperature for 30 minutes. To this was added dropwise Et_3N (2 equiv) over 10 minutes while maintaining the reaction temperature at 30 °C. The resulting brown mixture was then stirred at room temperature for 2 hours. Once the reaction was completed, the mixture was diluted with DCM (100 mL) and washed with aqueous solution of HCl [1 M] (50 mL). The organic layer was washed with brine, dried over Na_2SO_4, and concentrated under reduced pressure.

(Z)-methyl 2-bromo-3-phenylacrylate (**7**). Starting from benzaldehyde **6** (1 equiv, 4.9 mmol, 0.52 g), methyl bromoacetate (1.1 equiv, 5.4 mmol, 0.51 mL), $TiCl_4$ [1M in DCM] (7.41 mmol, 6 mL), NEt_3 (9.89 mmol, 1.37 mL) in anhydrous DCM (7.4 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yield: 57%, 683 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 3.84 (s, 3H, CH_3); 7.49-7.50 (m, 3H, 3-CH_{Ar}); 7.89-7.91 (m, 2H, 2-CH_{Ar}); 8.28 (s, 1H, CH_{Ar}); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 53.6 (CH_3); 112.2 (C); 128.6 (2-CH_{Ar}); 130.1 (2-CH_{Ar}); 130.5 (CH_{Ar}); 133.2 (C); 140.9 (CH_{Ar}); 163.1 (CO); LC/MS, t_R: 1.82 min; m/z (ES+) 241.0 ($M+H^+$); HRMS: $[M + H]^+$ calcd for $C_{10}H_{10}BrO_2$, 240.9859, found 240.9859.

(Z)-methyl 2-bromo-3-(4-(hydroxymethyl)phenyl)acrylate (**9**). Starting from benzaldehyde **8** (7.34 mmol, 1 g), methyl bromoacetate (2 equiv, 14.69 mmol, 1.4 mL), $TiCl_4$ [1M in DCM] (11.0 mmol, 11 mL), NEt_3 (14.69 mmol, 2.0 mL) in anhydrous DCM (11 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yield: 33%, 654 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 3.84 (s, 3H, CH_3); 4.54 (s, 2H, CH_2); 7.42-7.44 (d, 2H, 2-CH_{Ar}, J = 8.5 Hz); 7.88-7.89 (d, 2H, 2-CH_{Ar}, J = 8.5 Hz); 8.26 (s, 1H, CH_{Ar}); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 53.6 (CH_3); 62.5 (CH_2); 111.5 (C); 126.3 (2-CH_{Ar}); 130.1 (2-CH_{Ar}); 131.5 (CH_{Ar}); 140.8 (CH_{Ar}); 145.4 (C); 163.2 (CO); LC/MS, t_R: 1.40 min; m/z (ES+) 270.9 ($M+H^+$); HRMS: $[M + H]^+$ calcd for $C_{11}H_{12}BrO_3$, 270.9964, found 270.9967.

(Z)-methyl 2-bromo-3-(4-(bromomethyl)phenyl)acrylate (**10**). To a solution of **9** (1 equiv, 0.17 mmol, 50 mg) in acetonitrile (1 mL) was added bromotrimethylsilane (2.5 equiv, 0.43 mmol, 57 µL) at 0 °C. The reaction was stirred overnight at room temperature. Once the reaction is finished, the reaction mixture was concentrated under vacuo and 50 mL of EtOAc was added. The organic layer was washed with brine, dried over Na_2SO_4, and concentrated under reduced pressure. The crude product was used without any further purification. ^{1}H NMR (400 MHz, DMSO-d_6) δ: 3.84 (s, 3H, CH_3); 4.74 (s, 2H, CH_2); 7.55-7.57 (d, 2H, 2-CH_{Ar}, J = 8.0 Hz); 7.88-7.90 (m, 2H, 2-CH_{Ar}); 8.27 (s, 1H, CH_{Ar}); LC/MS, t_R: 1.93 min; m/z (ES+) 332.8 ($M+H^+$).

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-bromoacrylate (**11**). The synthesis was prepared according to the general olefination procedure. Starting from benzaldehyde **12** (14.3 mmol, 5.8 g), methyl bromoacetate (2 equiv, 28.6 mmol, 2.72 mL), $TiCl_4$ [1M in DCM] (21.4 mmol, 21.4 mL), NEt_3 (35.7 mmol, 4.97 mL) in anhydrous DCM (21 mL). The crude product was purified by flash chromatography (eluent: 50-50% DCM/EtOAc). The obtained solid was triturated in a small amount of hexane to obtain the desired compound. White powder, Yield: 33 % (over two steps), 2.59 g. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.46 (2-m, 2H, CH_2); 3.59-3.68 (m, 2H, CH_2); 3.82-3.85 (m, 4H, CH_3 and CH); 4.40-4.42 (m, 1H, CH); 5.01-5.02 (m, 2H, CH_2); 5.25 (bs, 1H, OH); 6.13-6.15 (t, 1H, J = 6.5 Hz, CH); 7.35-7.37 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.83-7.86 (m, 3H, 3-CH_{Ar}); 8.24 (s, 1H, CH_{Ar}); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.8 (CH_3); 36.4 (CH_2); 43.5 (CH_2); 53.6 (CH_3); 59.8 (CH), 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.6 (C); 112.0 (C); 127.6 (2-CH_{Ar}); 130.2 (2-CH_{Ar}); 132.1 (C); 135.1 (CH_{Ar}); 139.6 (C); 140.5 (CH_{Ar}); 150.4 (CO); 162.6 (CO); 163.1 (CO); TLC: 1/1 (DCM/EtOAc), UV, Rf = 0.37; LC/MS, t_R: 1.76 min; m/z (ES+) 520.0 and 522.0 ($M+H^+$); HRMS: $[M + H]^+$ calcd for $C_{21}H_{23}BrN_5O_6$, 520.0826, found 520.0798.

4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)benzaldehyde (**13**). To a solution of 4-bromomethylbenzaldehyde **12** (1 equiv, 15.0 mmol, 3 g) and azidothymidine (1 equiv, 15.0 mmol, 4.0 g) in anhydrous DMF under argon atmosphere, was added K_2CO_3 (3 equiv, 45.0 mmol, 6.25 g) and the reaction was left under magnetic stirring at room temperature for 2 hours. Once the reaction is finished, the solvent was removed under reduced pressure and 100 mL of H_2O were added. The aqueous layer was extracted with 2x100 mL EtOAc and the combined organic layers were washed with brine, dried over Na_2SO_4, and concentrated under reduced pressure. The crude product was used without any further purification as a yellow oil. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.44 (2-m, 2H, CH_2); 3.63-3.68 (m, 2H, CH_2); 3.83-3.85 (q, 1H, J = 4.0 Hz, CH); 4.40-4.43 (q, 1H, J = 5.5 Hz, CH); 5.04-5.11 (m, 2H, CH_2);

5.23-5.25 (t, 1H, J = 5.0 Hz, OH); 6.12-6.15 (t, 1H, J = 6.5 Hz, CH); 7.45-7.47 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.84-7.86 (m, 3H, 3-CH_{Ar}); 9.97 (s, 1H, CHO); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.8 (CH_3); 36.4 (CH_2); 43.7 (CH_2); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.6 (C); 128.0 (2-CH_{Ar}); 129.6 (2-CH_{Ar}); 135.2 (CH_{Ar} and C); 143.9 (C); 150.4 (CO); 162.6 (CO); 192.6 (CHO); TLC: 5/5 (DCM/EtOAc), UV, Rf = 0.35; LC/MS, t_R: 1.45 min; m/z (ES+) 386.1 ($M+H^+$); HRMS: $[M + H]^+$ calcd for $C_{18}H_{20}N_5O_5$, 386.1459, found 386.1468.

General procedure for Buchwald-Hartwig cross coupling reaction: To a solution of corresponding azetidinone derivatives (1.2-1.5 equiv) in the corresponding solvent was added the bromoacrylate reagent (1 equiv), $Pd_2(dba)_3$ (0.05-0.1 equiv), RuPhos (0.15 equiv) and Cs_2CO_3 (1.4 equiv). The reaction was stirred for 2-5 hours at 80 °C under argon atmosphere. The progress of the reaction was monitored by TLC. Once the reaction is finished, the reaction mixture was concentrated under vacuo and 50 mL of EtOAc was added. The organic layer was filtered over celite under reduced pressure and the solvent was removed under vaccum.

(Z)-methyl 2-(2-oxoazetidin-1-yl)-3-phenylacrylate (**14a**). Starting from azetidinone **4a** (1.2 equiv., 0.28 mmol, 20 mg), bromoacrylate **7** (0.23 mmol, 56 mg), $Pd_2(dba)_3$ (0.05 equiv., 0.012 mmol, 10 mg), RuPhos (0.035 mmol, 21 mg) and Cs_2CO_3 (0.33 mmol, 106 mg) in toluene (5 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yield: 46%, 25 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 3.07-3.08 (t, 2H, CH_2, J = 4.2 Hz); 3.53-3.54 (t, 2H, CH_2, J = 4.2 Hz); 3.79 (s, 3H, CH_3); 7.42-7.45 (m, 3H, 3-CH_{Ar}); 7.47 (s, 1H, CH_{Ar}); 7.58-7.60 (m, 2H, 2-CH_{Ar}); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 36.8 (CH_2); 40.5 (CH_2); 52.6 (CH_3); 123.9 (C); 128.7 (2-CH_{Ar}); 129.9 (2-CH_{Ar}); 130.0 (CH_{Ar}); 132.8 (C); 135.3 (CH_{Ar}); 164.3 (CO); 166.3 (CO); LC/MS, t_R: 1.31 min; m/z (ES+) 232.0 ($M+H^+$), 254.0 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{13}H_{14}NO_3$, 232.0968, found 232.0970.

(S,Z)-methyl 2-(2-oxo-3-(2-phenoxyacetamido)azetidin-1-yl)-3-phenylacrylate (**14b**). Starting from azetidinone **4b** (1.5 equiv.,0.18 mmol, 40 mg), bromoacrylate **7** (0.12 mmol, 29 mg), $Pd_2(dba)_3$ (0.1 equiv., 0.012 mmol, 11 mg), RuPhos (0.018 mmol, 8 mg) and Cs_2CO_3 (0.17 mmol, 55 mg) in toluene (3 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yield: 51%, 23 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 3.72-3.77 (m, 2H, CH_2), 3.80 (s, 3H, CH_3); 4.60 (s, 2H, CH_2); 5.01-5.05 (m, 1H, CH); 6.97-7.00 (m, 3H, 3-CH_{Ar}); 7.30-7.34 (m, 2H, 2-CH_{Ar}); 7.39-7.41 (m, 3H, 3-CH_{Ar}); 7.44 (s, 1H, CH_{Ar}); 7.74-7.76 (m, 2H, 2-CH_{Ar}); 8.94 (d, 1H, NH, J = 8.0 Hz); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 48.3 (CH_2); 52.6 (CH_3); 55.6 (CH); 66.8 (CH_2); 114.8 (2-CH_{Ar}); 121.3 (CH_{Ar}); 123.3 (C); 128.6 (2-CH_{Ar}); 129.5 (2-CH_{Ar}); 130.0 (CH_{Ar}); 130.5 (2- CH_{Ar}); 132.6 (C); 134.5 (CH_{Ar}); 157.6 (C); 164.1 (CO); 166.0 (CO); 168.4 (CO); LC/MS, t_R: 1.62 min; m/z (ES+) 381.1 ($M+H^+$), 403.0 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{21}H_{21}N_2O_5$, 381.1445, found 381.1454.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-(2-oxoazetidin-1-yl)acrylate (**15a**). Starting from azetidinone **4a** (1.15 mmol, 82 mg), bromoacrylate **11** (0.58 mmol, 300 mg), $Pd_2(dba)_3$ (0.05 mmol, 53 mg), RuPhos (0.08 mmol, 40 mg) and Cs_2CO_3 (0.80 mmol, 262 mg) in dioxane (11 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yellow powder, Yield: 73 %, 216 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.31-2.45 (2-m, 2H, CH_2); 3.06-3.08 (t, 2H, J = 4.5 Hz, CH_2); 3.52-3.54 (t, 2H, J = 4.5 Hz, CH_2); 3.59-3.69 (2-m, 2H, CH_2); 3.78 (s, 3H, CH_3); 3.83-3.86 (q, 1H, J = 4.0 Hz, CH); 4.39-4.42 (q, 1H, J = 5.5 Hz, CH); 4.98-5.05 (m, 2H, CH_2); 5.19-5.21 (t, 1H, J = 5.0 Hz, OH); 6.13-6.16 (t, 1H, J = 6.0 Hz, CH); 7.30-7.32 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.43 (s, 1H, CH_{Ar}); 7.53-7.54 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.81 (s, 1H, CH_{Ar}); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.8 (CH_3); 36.3 (CH_2); 36.7 (CH_2); 40.5 (CH_2); 43.5 (CH_2); 52.4 (CH_3); 59.8 (CH); 60.6 (CH_2); 84.1 (CH); 84.5 (CH); 108.6 (C); 123.6 (C); 127.8 (2-CH_{Ar}); 130.0 (2-CH_{Ar}); 131.5 (C); 135.0 (2-CH_{Ar}); 139.1 (C); 150.4 (CO); 162.5 (CO); 164.2 (CO); 166.3 (CO); TLC: 100% (EtOAc), UV, Rf = 0.28; LC/MS, t_R: 1.49 min; m/z (ES+) 511.1 ($M+H^+$) 533.0 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{24}H_{27}N_6O_7$, 511.1936, found 511.1940.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-phenoxyacetamido)azetidin-1-yl)acrylate (**15b**)
Starting from azetidinone **4b** (1.15 mmol, 253 mg), bromoacrylate **11** (0.58 mmol, 300 mg), $Pd_2(dba)_3$ (0.05 mmol, 53 mg), RuPhos (0.08 mmol, 40 mg) and Cs_2CO_3 (0.80 mmol, 262 mg) in dioxane (11 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yellow powder, Yield: 66 %, 252 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.44 (2-m, 2H, CH_2); 3.58-3.63 (2-m, 2H, CH_2); 3.74-3.76 (m, 2H, CH_2); 3.79 (s, 3H, CH_3); 3.83-3.85 (q, 1H, J = 4.0 Hz, CH); 4.39-4.42 (m, 1H, CH); 4.60 (s, 2H, CH_2); 4.97-5.07 (m, 3H, CH_2 and CH); 5.19-5.22 (t, 1H, J = 5.5 Hz, OH); 6.14-6.16 (t, 1H, J = 6.5 Hz, CH); 6.98-7.01 (m, 3H, 3-CH_{Ar}); 7.30-7.34 (m, 4H, 4-CH_{Ar}); 7.41 (s, 1H, CH_{Ar}); 7.70-7.71 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.81 (s, 1H, CH_{Ar}); 8.91-8.92 (d, 1H, J = 8.0 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.8 (CH_3); 36.3 (CH_2); 43.5 (CH_2); 48.4 (CH_2); 52.5 (CH_3); 55.6 (CH); 59.8 (CH); 60.6 (CH_2); 66.8 (CH_2); 84.1 (CH); 84.5 (CH); 108.6 (C); 114.7 (2-CH_{Ar}); 121.2 (CH_{Ar}); 123.0 (C); 127.8 (CH_{Ar}); 129.4 (3-CH_{Ar}); 130.6 (2-CH_{Ar}); 131.4 (C); 134.3 (CH_{Ar});

135.1 (CH_{Ar}); 139.1 (C); 150.4 (C); 157.6 (CO); 162.6 (CO); 164.0 (CO); 166.1 (CO): 168.3 (CO); TLC: 100% (EtOAc), UV, R*f* = 0.34; LC/MS, t_R: 1.68 min; m/z (ES+) 660.0 ($M+H^+$) 682.1 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{32}H_{34}N_7O_9$, 660.2418, found 660.2426.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-3-((tert-butoxycarbonyl)amino)-2-oxoazetidin-1-yl)acrylate (**15c**). Starting from azetidinone **4c** (1.15 mmol, 214 mg), bromoacrylate **11** (0.58 mmol, 300 mg), $Pd_2(dba)_3$ (0.05 mmol, 53 mg), RuPhos (0.08 mmol, 40 mg) and Cs_2CO_3 (0.80 mmol, 262 mg) in dioxane (11 mL). The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Yellow powder, Yield: 63 %, 230 mg. ^{1}H NMR (500 MHz, DMSO-*d*$_6$) δ: 1.43 (s, 9H, 3-CH_3); 1.86 (s, 3H, CH_3); 2.30-2.45 (2-m, 2H, CH_2); 3.59-3.74 (3-m, 4H, 2-CH_2); 3.78 (s, 3H, CH_3); 3.84-3.86 (q, 1H, *J* = 4.0 Hz, CH); 4.39-4.42 (m, 1H, CH); 4.76-4.79 (m, 1H, CH); 4.98-5.05 (m, 2H, CH_2); 5.16-5.18 (t, 1H, *J* = 5.0 Hz, OH); 6.14-6.17 (t, 1H, *J* = 6.5 Hz, CH); 7.29-7.30 (d, 2H, *J* = 8.5 Hz, 2-CH_{Ar}); 7.40 (s, 1H, CH_{Ar}); 7.68-7.69 (d, 2H, *J* = 7.5 Hz, 2-CH_{Ar}); 7.76-7.78 (d, 1H, *J* = 7.5 Hz, NH); 7.80 (s, 1H, CH_{Ar}); ^{13}C NMR (125 MHz, DMSO-*d*$_6$) δ: 12.6 (CH_3); 28.0 (3-CH_3); 36.3 (CH_2); 43.4 (CH_2); 48.8 (CH_2); 52.4 (CH_3); 57.0 (CH); 59.8 (CH); 60.6 (CH_2); 78.7 (C); 84.1 (CH); 84.4 (CH); 108.5 (C); 122.9 (C); 127.6 (2-CH_{Ar}); 130.6 (2-CH_{Ar}); 131.2 (C); 134.5 (CH_{Ar}); 135.0 (CH_{Ar}); 139.1 (C); 150.3 (CO); 154.7 (CO); 162.5 (CO); 163.9 (CO); 166.7 (CO); TLC: 100% (EtOAc), UV, R*f* = 0.42; LC/MS, t_R: 1.69 min; m/z (ES+) 626.1 ($M+H^+$) 648.0 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{29}H_{36}N_7O_9$, 626.2569, found 626.2555.

(Z)-methyl 2-((S)-3-amino-2-oxoazetidin-1-yl)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)acrylate trifluoroacetic acid salt (**16c**). To a solution of **15c** (1 equiv, 2.4 mmol, 1.5 g) in CH_2Cl_2 (75 mL) at room temperature was added dropwise TFA (75 mL) and the reaction was left overnight under magnetic stirring. Once the reaction is finished, the solvent was removed under reduced pressure. The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 15-25 in 15CV, and the desired compound is obtained at 18 % of acetonitrile. White powder, Yield: 50 %, 770 mg. ^{1}H NMR (500 MHz, DMSO-*d*$_6$) δ: 1.86 (s, 3H, CH_3); 2.30-2.45 (2-m, 2H, CH_2); 3.36-3.38 and 3.72-3.75 (2-m, 2H, CH_2); 3.59-3.67 (m, 2H, CH_2); 3.77 (s, 3H, CH_3); 3.82-3.84 (m, 1H, *J* = 4.0 Hz, CH); 4.30-4.32 (m, 1H, CH); 4.40-4.44 (m, 1H, CH); 4.96-5.04 (m, 2H, CH_2); 5.27 (br s, 1H, OH); 6.14-6.16 (t, 1H, *J* = 6.5 Hz, CH); 7.30-7.31 (d, 2H, *J* = 8.5 Hz, 2-CH_{Ar}); 7.40 (s, 1H, CH_{Ar}); 7.54-7.56 (d, 2H, *J* = 8.5 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); ^{13}C NMR (125 MHz, DMSO-*d*$_6$) δ: 13.0 (CH_3); 36.4 (CH_2); 43.6 (CH_2); 51.3 (CH_2); 52.6 (CH_3); 59.7 (CH); 59.9 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 123.2 (C); 127.9 (2-CH_{Ar}); 130.4 (2-CH_{Ar}); 131.6 (C); 134.4 (CH); 135.2 (CH); 139.1 (C); 150.5 (CO); 162.7 (CO); 164.2 (CO); 169.1 (CO); ^{19}F NMR (376.5 MHz, DMSO - *d*$_6$) *δ*: -74.4; UPLC/MS, t_R: 1.98 min; m/z (ES+) 526.4 ($M+H^+$) 548.5 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{24}H_{28}N_7O_7$, 526.2045, found 526.2042.

General coupling procedure: To a solution of corresponding carboxylic acid derivatives (1.3 equiv) in THF was added the diisopropylethylamine (3.5 equiv) and the reaction was stirred at 0 °C. Then, 1-hydroxybenzotraizole hydrate (HOBt) (1.1 equiv) and 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI.HCl) (1.1 equiv) were added. After 20 min at 0 °C, **16c** (1 equiv) was added and the reaction was stirred for 5 hours. Once the reaction is finished, the solvent was evaporated and 25 mL EtOAc was added. The organic layer was washed with 2x25 mL of a solution of $KHSO_4$ [1 M], 2x 25 mL of a saturated solution of $NaHCO_3$, and with brine, dried over Na_2SO_4, and concentrated under reduced pressure.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-phenylacetamido)azetidin-1-yl)acrylate (**17d**). Starting from phenylacetic acid (0.06 mmol, 8 mg), diisopropylethylamine (0.16 mmol, 27 µL), EDCI.HCl (0.05 mmol, 9.8 mg), HOBt (0.05 mmol, 7.7 mg), **16c** (0.04 mmol, 30 mg) in 1.5 mL of THF. The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). White powder, Yield: 69 %, 21 mg. ^{1}H NMR (500 MHz, DMSO-*d*$_6$) δ: 1.87 (s, 3H, CH_3); 2.31-2.46 (2-m, 2H, CH_2); 3.53 (s, 2H, CH_2); 3.59-3.69 and 3.74-3.76 (2-m, 4H, 2-CH_2); 3.79 (s, 3H, CH_3); 3.84-3.86 (q, 1H, *J* = 4.0 Hz, CH); 4.38-4.45 (m, 1H, CH); 5.00-5.03 (m, 3H, CH_2 and CH); 5.15-5.17 (t, 1H, *J* = 5.5 Hz, OH); 6.14-6.17 (t, 1H, *J* = 6.5 Hz, CH); 7.22-7.34 (m, 7H, 7-CH_{Ar}); 7.42 (s, 1H, CH_{Ar}); 7.64-7.65 (d, 2H, *J* = 8.0 Hz, 2-CH_{Ar}); 7.80 (s, 1H, CH_{Ar}); 8.82-8.84 (d, 1H, *J* = 7.5 Hz, NH); ^{13}C NMR (125 MHz, DMSO-*d*$_6$) δ: 12.8 (CH_3); 36.3 (CH_2); 41.8 (CH_2); 43.5 (CH_2); 48.8 (CH_2); 52.4 (CH_3); 56.0 (CH); 59.8 (CH); 60.6 (CH_2); 84.1 (CH); 84.5 (CH); 108.5 (C); 122.9 (C); 126.3 (CH_{Ar}); 127.8 (2-CH_{Ar}); 128.1 (2-CH_{Ar}); 128.8 (2-CH_{Ar}); 130.4 (2-CH_{Ar}); 131.3 (C); 134.5 (CH_{Ar}); 135.0 (CH_{Ar}); 135.7 (C); 139.1 (C); 150.3 (CO); 162.5 (CO); 163.9 (CO); 166.1 (CO): 170.4 (CO); TLC: 100% (EtOAc), UV, R*f* = 0.26; LC/MS, t_R: 1.60 min; m/z (ES+) 644.1 ($M+H^+$) 666.1 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{32}H_{34}N_7O_8$, 644.2463, found 644.2465.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-(thiophen-2-yl)acetamido)azetidin-1-yl)acrylate (**17e**). Starting from 2-thiopheneacetic acid (0.06 mmol, 8 mg), diisopropylethylamine (0.16 mmol, 27 µL), EDCI.HCl (0.05 mmol, 9.8 mg), HOBt (0.05 mmol, 7.7 mg), **16c** (0.04 mmol, 30 mg) in 1.5 mL of THF. The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). White powder, Yield: 52 %, 16 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.45 (2-m, 2H, CH_2); 3.57-3.68 and 3.72-3.76 (2-m, 6H, 3-CH_2); 3.78 (s, 3H, CH_3); 3.82-3.85 (q, 1H, J = 4.0 Hz, CH); 4.40-4.43 (m, 1H, CH); 4.97-5.05 (m, 3H, CH_2 and CH); 5.24-5.26 (t, 1H, J = 5.5 Hz, OH); 6.14-6.16 (t, 1H, J = 6.0 Hz, CH); 6.90-6.98 (m, 2H, 2-CH_{Ar}); 7.30-7.31 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.38-7.39 (dd, 1H, J_1 = 5.0 Hz, J_2 = 1.0 Hz; CH_{Ar}); 7.43 (s, 1H, CH_{Ar}); 7.67-7.69 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.83 (s, 1H, CH_{Ar}); 8.95-8.96 (d, 1H, J = 8.0 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.1 (CH_2); 36.4 (CH_2); 43.6 (CH_2); 48.7 (CH_2); 52.6 (CH_3); 56.0 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 122.9 (C); 125.1 (CH_{Ar}); 126.2 (CH_{Ar}); 126.6 (CH_{Ar}); 127.9 (2-CH_{Ar}); 130.7 (2-CH_{Ar}); 131.4 (C); 134.7 (CH_{Ar}); 135.2 (CH_{Ar}); 137.0 (C); 139.3 (C); 150.5 (CO); 162.6 (CO); 164.1 (CO); 166.1 (CO): 169.6 (CO); TLC: 100% (EtOAc), UV, Rf = 0.26; LC/MS, t_R: 1.97 min; m/z (ES+) 650.1 ($M+H^+$) 672.2 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{30}H_{32}N_7O_8S$, 650.2028, found 650.2007.

(Z)-methyl-2-((S)-3-(2-([1,1'-biphenyl]-4-yl)acetamido)-2-oxoazetidin-1-yl)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)acrylate (**17f**). Starting from 4-biphenylacetic acid (0.30 mmol, 64 mg), diisopropylethylamine (0.82 mmol, 140 µL), EDCI.HCl (0.26 mmol, 49 mg), HOBt (0.26 mmol, 38 mg), **16c** (0.23 mmol, 150 mg) in 7.5 mL of THF. The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). Pale yellow powder, Yield: 96 %, 163 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.84 (s, 3H, CH_3); 2.28-2.45 (2-m, 2H, CH_2); 3.57 (s, 2H, CH_2); 3.60-3.65 and 3.74-3.77 (2-m, 4H, 2-CH_2); 3.78 (s, 3H, CH_3); 3.80-3.83 (q, 1H, J = 4.0 Hz, CH); 4.39-4.43 (m, 1H, CH); 4.96-5.05 (m, 3H, CH_2 and CH); 5.27 (br s, 1H, OH); 6.13-6.16 (t, 1H, J = 6.5 Hz, CH); 7.30-7.31 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.34-7.39 (m, 3H, 3-CH_{Ar}); 7.43 (s, 1H, CH_{Ar}); 7.44-7.47 (m, 2H, 2-CH_{Ar}); 7.62-7.68 (m, 6H, 6-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); 8.96-8.98 (d, 1H, J = 7.5 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 13.0 (CH_3); 36.4 (CH_2); 41.5 (CH_2); 43.6 (CH_2); 48.9 (CH_2); 52.7 (CH_3); 56.0 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 122.9 (C); 126.6, 126.7, 127.4, 128.0, 129.0, 129.7 and 130.7 (13-CH_{Ar}); 131.5 (C); 134.7 (CH_{Ar}); 135.1 (C); 135.2 (CH_{Ar}); 138.5 (C); 139.3 (C); 140.0 (C); 150.5 (CO); 162.7 (CO); 164.1 (CO); 166.3 (CO): 170.7 (CO); TLC: 100% (EtOAc), UV, Rf = 0.27; LC/MS, t_R: 1.82 min; m/z (ES+) 720.3 ($M+H^+$) 772.4 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{38}H_{38}N_7O_8$, 720.2776, found 720.2778.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-(3-phenoxyphenyl)acetamido)azetidin-1-yl)acrylate (**17g**). Starting from 2-(3-phenoxyphenyl)acetic acid (0.06 mmol, 14 mg), diisopropylethylamine (0.16 mmol, 27 µL), EDCI.HCl (0.05 mmol, 9.8 mg), HOBt (0.05 mmol, 7.7 mg), **16c** (0.23 mmol, 150 mg) in 2.5 mL of THF. The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). White powder, Yield: 86 %, 30 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.85 (s, 3H, CH_3); 2.29-2.45 (2-m, 2H, CH_2); 3.57 (s, 2H, CH_2); 3.58-3.68 and 3.72-3.75 (2-m, 4H, 2-CH_2); 3.78 (s, 3H, CH_3); 3.81-3.84 (q, 1H, J = 3.5 Hz, CH); 4.39-4.43 (m, 1H, CH); 4.96-5.04 (m, 3H, CH_2 and CH); 5.26-5.28 (t, 1H, J = 4.5 Hz, OH); 6.13-6.16 (t, 1H, J = 6.5 Hz, CH); 6.87-6.89 (dd, 1H, J_1 = 8.0 Hz and J_2 = 1.5 Hz, CH_{Ar}); 6.95-6.96 (m, 1H, CH_{Ar}); 7.01-7.03 (m, 2H, 2-CH_{Ar}); 7.05-7.07 (m, 1H, CH_{Ar}); 7.11-7.14 (m, 1H, CH_{Ar}); 7.28-7.30 (d, 2H, J = 8.5 Hz, 2-CH_{Ar}); 7.33-7.40 (m, 3H, 3-CH_{Ar}); 7.42 (s, 1H, CH_{Ar}); 7.64-7.66 (d, 2H, J = 8.5 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); 8.92-8.94 (d, 1H, J = 7.5 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 13.0 (CH_3); 36.4 (CH_2); 41.7 (CH_2); 43.6 (CH_2); 48.9 (CH_2); 52.7 (CH_3); 56.0 (CH); 59.9 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 116.7 (CH_{Ar}); 118.7 (2-CH_{Ar}); 119.2 (CH_{Ar}); 122.9 (C); 123.5 (CH_{Ar}); 124.2 (CH_{Ar}); 127.9, 129.9, 130.1 and 130.6 (7-CH_{Ar}); 131.5 (C); 134.7 (CH_{Ar}); 135.2 (CH_{Ar}); 138.0 (C); 139.3 (C); 150.5 (CO); 156.5 (C); 156.6 (C); 162.7 (CO); 164.1 (CO); 166.3 (CO): 170.3 (CO); TLC: 100% (EtOAc), UV, Rf = 0.37; LC/MS, t_R: 1.80 min; m/z (ES+) 736.4 ($M+H^+$) 758.4 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{38}H_{38}N_7O_9$, 736.2726, found 736.2726.

(Z)-methyl 3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-3-((R)-2-((tert-butoxycarbonyl)amino)-2-phenylacetamido)-2-oxoazetidin-1-yl)acrylate (**17i**). Starting from *N*-Boc-D-phenylglycine (0.40 mmol, 102 mg), diisopropylethylamine (1.09 mmol, 180 µL), EDCI.HCl (0.34 mmol, 65 mg), HOBt (0.34 mmol, 51 mg), **16c** (0.31 mmol, 200 mg) in 1.5 mL of THF. The crude product was purified by flash chromatography (eluent: 20-100% Hexane/EtOAc). White powder, Yield: 85 %, 202 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.40 (s, 9H, 3-CH_3); 1.86 (s, 3H, CH_3); 2.30-2.45 (2-m, 2H, CH_2); 3.56-3.65 and 3.71-3.73 (2-m, 4H, 2-CH_2); 3.77 (s, 3H, CH_3); 3.82-3.84 (q, 1H, J = 3.5 Hz, CH); 4.40-4.44 (m, 1H, CH); 4.97-5.04 (m, 3H, CH_2 and CH); 5.24-5.27 (m, 2H, CH and OH); 6.14-6.17 (t, 1H, J = 6.5 Hz, CH); 7.28-7.30 (m, 3H, 3-CH_{Ar}); 7.33-7.36 (m, 2H, 2-CH_{Ar}); 7.41-7.43 (m, 3H, 3-CH_{Ar}); 7.49-7.50 (d, 1H, J = 9.0 Hz, NH); 7.63-7.64 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.83 (s, 1H, CH_{Ar}); 9.06-9.08

(d, 1H, J = 8.0 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 13.0 (CH_3); 28.2 (3-CH_3); 36.4 (CH_2); 43.6 (CH_2); 48.8 (CH_2); 52.7 (CH_3); 55.9 (CH); 57.6 (CH); 59.9 (CH); 60.6 (CH_2); 78.5 (C); 84.2 (CH); 84.5 (CH); 108.7 (C); 122.8 (C); 127.4, 127.7, 127.9 and 128.4 (7-CH_{Ar}); 130.6 (2-CH_{Ar}); 131.5 (C); 134.5 (CH_{Ar}); 135.2 (CH_{Ar}); 138.4 (C); 139.2 (C); 150.5 (CO); 155.1 (CO); 162.7 (CO); 164.1 (CO); 165.9 (CO): 170.7 (CO); TLC: 100% (EtOAc), UV, Rf = 0.40; UPLC/MS, t_R: 3.42 min; m/z (ES+) 759.6 ($M+H^+$) 781.6 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{37}H_{43}N_8O_{10}$, 759.3097, found 759.3099.

(Z)-methyl-2-((S)-3-((R)-2-amino-2-phenylacetamido)-2-oxoazetidin-1-yl)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)acrylate trifluoroacetic acid salt (**17h**). To a solution of Boc derivative **17i** (1 equiv, 0.26 mmol, 195 mg) in CH_2Cl_2 (2.9 mL) at room temperature was added dropwise TFA (2.9 mL) and the reaction was left 1 hour under magnetic stirring. Once the reaction is finished, the solvent was removed under reduced pressure. The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 20-30 in 15CV, and the desired compound is obtained at 24 % of acetonitrile. White powder, Yield: 48 %, 97 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.45 (2-m, 2H, CH_2); 3.58-3.72 (2-m, 4H, 2-CH_2); 3.77 (s, 3H, CH_3); 3.82-3.84 (q, 1H, J = 3.5 Hz, CH); 4.40-4.44 (m, 1H, CH); 4.47 (s, 1H, CH); 4.96-5.04 (m, 3H, CH_2 and CH); 5.27 (br s, 1H, OH); 6.14-6.17 (t, 1H, J = 6.5 Hz, CH); 7.25-7.29 (m, 3H, 3-CH_{Ar}); 7.32-7.35 (m, 2H, 2-CH_{Ar}); 7.40 (s, 1H, CH_{Ar}); 7.42-7.43 (m, 2H, 2-CH_{Ar}); 7.66-7.68 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.83 (s, 1H, CH_{Ar}); 8.95 (br s, 1H, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 13.0 (CH_3); 36.4 (CH_2); 43.6 (CH_2); 48.6 (CH_2); 52.7 (CH_3); 55.9 (CH); 58.7 (CH); 59.9 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 122.9 (C); 126.9, 127.3, 127.9 and 128.2 (7-CH_{Ar}); 130.7 (2-CH_{Ar}); 131.5 (C); 134.4 (CH_{Ar}); 135.2 (CH_{Ar}); 139.2 (C); 141.8 (C); 150.5 (CO); 162.7 (CO); 164.1 (CO); 166.2 (CO): 173.6 (CO); ^{19}F NMR (376.5 MHz, DMSO -d_6) ***δ***: -73.4; UPLC/MS, t_R: 2.22 min; m/z (ES+) 659.6 ($M+H^+$) 681.5 ($M+Na^+$); HRMS: $[M + H]^+$ calcd for $C_{32}H_{35}N_8O_8$, 659.2572, found 659.2571.

General ester hydrolysis procedure: To a solution of the corresponding ester (1 equiv) in a mixture of H_2O/THF (1:1) was added a solution of [0.1 M] of NaOH (2 equiv) at room temperature and the reaction was stirred for 1 hour. Once the reaction is finished, the solution was lyophilized.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-(2-oxoazetidin-1-yl) sodium acrylate (**2a**). Starting from **15a** (0.39 mmol, 200 mg), [0.1 M] NaOH (7.8 mL) in a mixture of H_2O/THF (9.15 mL/ 9.15 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (10 mM $AcONH_4$); B: Acetonitrile (Neutral); gradient 20-35 in 8CV, and the desired compound is obtained at 23-25% of acetonitrile. White powder, Yield: 61 %, 120 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.31-2.44 (2-m, 2H, CH_2); 3.04-3.05 (t, 2H, J = 4.2 Hz, CH_2); 3.53-3.55 (t, 2H, J = 4.2 Hz, CH_2); 3.59-3.68 (2-m, 2H, CH_2); 3.82-3.84 (m, 1H, CH); 4.40-4.43 (m, 1H, CH); 4.97-5.03 (m, 2H, CH_2); 5.25 (br s, 1H, OH); 6.14-6.16 (t, 1H, J = 6.6 Hz, CH); 7.29-7.30 (d, 2H, J = 8.4 Hz, 2-CH_{Ar}); 7.40 (s, 1H, CH_{Ar}); 7.51-7.53 (d, 2H, J = 8.4 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.4 (CH_2); 36.7 (CH_2); 40.5 (CH_2); 43.5 (CH_2); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 124.7 (C); 127.8 (2-CH_{Ar}); 130.0 (2-CH_{Ar}); 131.9 (C); 134.5 (CH_{Ar}); 135.2 (CH_{Ar}); 138.9 (C); 150.5 (CO); 162.6 (CO); 165.3 (CO); 166.4 (CO); UPLC/MS, t_R: 2.35 min; m/z (ES+) 497.4 ($M+H^+$) 519.4 ($M+Na^+$); purity: 96%; HRMS: $[M + H]^+$ calcd for $C_{23}H_{25}N_6O_7$, 497.1779, found 497.1769.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-phenoxyacetamido)azetidin-1-yl)acrylic acid (**2b**) Starting from **15b** (0.30 mmol, 200 mg), [0.1 M] NaOH (6.0 mL) in a mixture of H_2O/THF (7.0 mL/ 7.0 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 35-45 in 15CV, and the desired compound is obtained at 40-41% of acetonitrile. White powder, Yield: 51 %, 100 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.42 (2-m, 2H, CH_2); 3.58-3.67 (2-m, 2H, CH_2); 3.74-3.77 (m, 2H, CH_2); 3.82-3.84 (m, 1H, CH); 4.40-4.43 (m, 1H, CH); 4.60 (s, 2H, CH_2); 4.97-5.04 (m, 3H, CH_2 and CH); 5.24 (br s, 1H, OH); 6.14-6.16 (t, 1H, J = 6.5 Hz, CH); 6.97-7.00 (m, 3H, 3-CH_{Ar}); 7.28-7.34 (m, 4H, 4-CH_{Ar}); 7.37 (s, 1H, CH_{Ar}); 7.68-7.69 (d, 2H, J = 8.4 Hz, 2-CH_{Ar}); 7.81 (s, 1H, CH_{Ar}); 8.93-8.95 (d, 1H, J = 7.8 Hz, NH); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.4 (CH_2); 41.9 (CH_2); 43.6 (CH_2); 48.9 (CH_2); 55.8 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 124.3 (C); 126.4 (CH_{Ar}); 127.8 (2-CH_{Ar}); 128.2 (2-CH_{Ar}); 129.0 (2-CH_{Ar}); 130.3 (2-CH_{Ar}); 131.8 (C); 133.7 (CH_{Ar}); 135.1 (CH_{Ar}); 135.9 (C); 138.8 (C); 150.5 (CO); 162.6 (CO); 165.1 (CO); 166.1 (CO): 170.5 (CO); UPLC/MS, t_R: 2.81 min; m/z (ES+) 646.5 ($M+H^+$) 668.5 ($M+Na^+$); purity: 98%; HRMS: $[M + H]^+$ calcd for $C_{31}H_{32}N_7O_9$, 646.2256, found 646.2249.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-3-((tert-butoxycarbonyl)amino)-2-oxoazetidin-1-yl)acrylic

acid (**2c**). Starting from **17c** (0.19 mmol, 120 mg), [0.1 M] NaOH (3.7 mL) in a mixture of H_2O/THF (4.3 mL/ 4.3 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 35-45 in 15CV, and the desired compound is obtained at 39-40% of acetonitrile. White powder, Yield: 51 %, 60 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 1.42 (s, 9H, 3-CH_3); 1.86 (s, 3H, CH_3); 2.30-2.44 (2-m, 2H, CH_2); 3.59-3.74 (3-m, 4H, 2-CH_2); 3.82-3.84 (q, 1H, J = 4.2 Hz, CH); 4.40-4.43 (m, 1H, CH); 4.73-4.75 (m, 1H, CH); 4.97-5.04 (m, 2H, CH_2); 5.25 (br s, 1H, OH); 6.14-6.16 (t, 1H, J = 6.0 Hz, CH); 7.26-7.28 (d, 2H, J = 8.4 Hz, 2-CH_{Ar}); 7.36 (s, 1H, CH_{Ar}); 7.66-7.67 (d, 2H, J = 7.8 Hz, 2-CH_{Ar}); 7.81-7.83 (m, 2H, NH and CH_{Ar}); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 12.9 (CH_3); 28.1 (3-CH_3); 36.4 (CH_2); 43.6 (CH_2); 48.9 (CH_2); 57.0 (CH); 59.9 (CH); 60.6 (CH_2); 78.8 (C); 84.2 (CH); 84.4 (CH); 108.7 (C); 124.2 (C); 127.7 (2-CH_{Ar}); 130.6 (2-CH_{Ar}); 131.7 (C); 133.7 (CH_{Ar}); 135.1 (CH_{Ar}); 138.8 (C); 150.5 (CO); 154.8 (CO); 162.6 (CO); 165.1 (CO); 166.7 (CO); UPLC/MS, t_R: 2.83 min; m/z (ES+) 612.4 (M+H^+) 634.5 (M+Na^+); purity: 97%; HRMS: [M + H]$^+$ calcd for $C_{28}H_{34}N_7O_9$, 612.2413, found 612.2409.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-phenylacetamido)azetidin-1-yl)acrylic acid (**2d**). Starting from **17d** (0.10 mmol, 70 mg), [0.1 M] NaOH (2.2 mL) in a mixture of H_2O/THF (2.5 mL/ 2.5 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 33-43 in 15CV, and the desired compound is obtained at 38% of acetonitrile. White powder, Yield: 70 %, 48 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.30-2.44 (2-m, 2H, CH_2); 3.52 (s, 2H, CH_2); 3.59-3.68 and 3.75-3.76 (2-m, 4H, 2-CH_2); 3.82-3.85 (q, 1H, J = 3.6 Hz, CH); 4.40-4.43 (m, 1H, CH); 4.97-5.04 (m, 3H, CH_2 and CH); 5.24 (br s, 1H, OH); 6.14-6.17 (t, 1H, J = 6.6 Hz, CH); 7.22-7.34 (m, 7H, 7-CH_{Ar}); 7.37 (s, 1H, CH_{Ar}); 7.62-7.63 (d, 2H, J = 8.4 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); 8.90-8.91 (d, 1H, J = 7.8 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.4 (CH_2); 41.9 (CH_2); 43.6 (CH_2); 48.9 (CH_2); 55.8 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 124.3 (C); 126.4 (CH_{Ar}); 127.8 (2-CH_{Ar}); 128.2 (2-CH_{Ar}); 129.0 (2-CH_{Ar}); 130.3 (2-CH_{Ar}); 131.8 (C); 133.7 (CH_{Ar}); 135.1 (CH_{Ar}); 135.9 (C); 138.8 (C); 150.5 (CO); 162.6 (CO); 165.1 (CO); 166.1 (CO): 170.5 (CO); UPLC/MS, t_R: 2.73 min; m/z (ES+) 630.4 (M+H^+) 652.4 (M+Na^+); purity: 100%; HRMS: [M + H]$^+$ calcd for $C_{31}H_{32}N_7O_8$, 630.2307, found 630.2317.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-(thiophen-2-yl)acetamido)azetidin-1-yl)acrylic acid (**2e**). Starting from **17e** (0.04 mmol, 30 mg), [0.1 M] NaOH (0.9 mL) in a mixture of H_2O/THF (1.0 mL/ 1.0 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (0.1% HCOOH); B: Acetonitrile (0.1% HCOOH); gradient 33-43 in 15CV, and the desired compound is obtained at 37-38% of acetonitrile. White powder, Yield: 32 %, 9.4 mg. ^{1}H NMR (600 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.31-2.44 (2-m, 2H, CH_2); 3.59-3.67 and 3.75-3.78 (2-m, 6H, 3-CH_2); 3.82-3.84 (q, 1H, J = 4.2 Hz, CH); 4.40-4.43 (m, 1H, CH); 4.97-5.04 (m, 3H, CH_2 and CH); 5.25 (br s, 1H, OH); 6.14-6.16 (t, 1H, J = 6.0 Hz, CH); 6.94-6.97 (m, 2H, 2-CH_{Ar}); 7.28-7.30 (d, 2H, J = 7.8 Hz, 2-CH_{Ar}); 7.35-7.38 (m, 1H, 2-CH_{Ar}); 7.61-7.63 (d, 2H, J = 7.8 Hz, 2-CH_{Ar}); 7.83 (s, 1H, CH_{Ar}); 8.95-8.96 (d, 1H, J = 7.8 Hz, NH); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.1 (CH_2); 36.4 (CH_2); 43.6 (CH_2); 48.8 (CH_2); 55.8 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 125.0 (C and CH_{Ar}); 126.2 (CH_{Ar}); 126.6 (CH_{Ar}); 127.8 (2-CH_{Ar}); 130.3 (2-CH_{Ar}); 132.0 (C); 132.1 (CH_{Ar}); 135.1 (CH_{Ar}); 137.0 (C); 138.6 (C); 150.5 (CO); 162.6 (CO); 165.3 (CO); 165.9 (CO): 169.6 (CO); UPLC/MS, t_R: 2.68 min; m/z (ES+) 636.3 (M+H^+) 658.2 (M+Na^+); purity: 97%; HRMS: [M + H]$^+$ calcd for $C_{29}H_{30}N_7O_8S$, 636.1871, found 636.1875.

(Z)-2-((S)-3-(2-([1,1'-biphenyl]-4-yl)acetamido)-2-oxoazetidin-1-yl)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl) sodium acrylate (**2f**). Starting from **17f** (0.22 mmol, 160 mg), [0.1 M] NaOH (4.4 mL) in a mixture of H_2O/THF (5.1 mL/ 5.1 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (10 mM $AcONH_4$); B: Acetonitrile (Neutral); gradient 35-45 in 8CV, and the desired compound is obtained at 37-39% of acetonitrile. White powder, Yield: 35 %, 57 mg. ^{1}H NMR (400 MHz, DMSO-d_6) δ: 1.85 (s, 3H, CH_3); 2.28-2.46 (2-m, 2H, CH_2); 3.56 (s, 2H, CH_2); 3.60-3.68 and 3.78-3.84 (2-m, 5H, CH and 2-CH_2); 4.39-4.43 (m, 1H, CH); 4.95-5.03 (m, 3H, CH_2 and CH); 5.25 (br s, 1H, OH); 6.14-6.17 (t, 1H, J = 6.5 Hz, CH); 7.27-7.39 (m, 6H, 6-CH_{Ar}); 7.44-7.47 (m, 2H, 2-CH_{Ar}); 7.57-7.67 (m, 6H, 6-CH_{Ar}); 7.81 (s, 1H, CH_{Ar}); 8.95-8.97 (d, 1H, J = 8.0 Hz, NH); ^{13}C NMR (150 MHz, DMSO-d_6) δ: 12.9 (CH_3); 36.4 (CH_2); 41.5 (CH_2); 43.6 (CH_2); 49.0 (CH_2); 55.7 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 126.6 and 126.7 (4-CH_{Ar}); 127.2 (C), 127.3 (CH_{Ar}); 127.9 (2-CH_{Ar}); 128.1 (C); 128.9 (2-CH_{Ar}); 129.6 (2-CH_{Ar}); 130.2 (2-CH_{Ar}); 130.8 (C); 132.3 (CH_{Ar}); 135.1 (C); 135.2 (CH_{Ar}); 138.3 (C); 138.4 (C); 140.0 (C); 150.5 (CO); 162.6 (CO); 165.4 (CO); 166.0 (CO): 170.5 (CO); UPLC/MS, t_R: 3.27 min; m/z (ES+) 706.3 (M+H^+) 728.3 (M+Na^+); purity: 100%; HRMS: [M + H]$^+$ calcd for $C_{37}H_{36}N_7O_8$, 706.2620, found 706.2620.

(Z)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)-2-((S)-2-oxo-3-(2-(3-phenoxyphenyl)acetamido)azetidin-1-yl) sodium acrylate (**2g**). Starting from **17g** (0.03 mmol, 25 mg), [0.1 M] NaOH (0.7 mL) in a mixture of H_2O/THF (0.8 mL/ 0.8 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (10 mM $AcONH_4$); B: Acetonitrile (Neutral); gradient 15-60 in 8CV, and the desired compound is obtained at 46-49% of acetonitrile. White powder, Yield: 45 %, 11.5 mg. ^{1}H NMR (500 MHz, DMSO-d_6) δ: 1.85 (s, 3H, CH_3); 2.29-2.43 (2-m, 2H, CH_2); 3.50 (s, 2H, CH_2); 3.58-3.67 and 3.75-3.77 (2-m, 4H, 2-CH_2); 3.81-3.83 (m, 1H, CH); 4.40-4.43 (m, 1H, CH); 4.95-5.02 (m, 3H, CH_2 and CH); 5.27 (m, 1H, OH); 6.13-6.16 (t, 1H, J = 6.5 Hz, CH); 6.86-6.88 (m, 1H, CH_{Ar}); 6.95 (m, 1H, CH_{Ar}); 7.01-7.02 (m, 2H, 2-CH_{Ar}); 7.05-7.06 (m, 1H, CH_{Ar}); 7.11-7.14 (m, 1H, CH_{Ar}); 7.24-7.28 (m, 2H, 2-CH_{Ar}); 7.31-7.39 (m, 3H, 3-CH_{Ar}); 7.57-7.59 (d, 2H, J = 8.5 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); 8.93-8.94 (d, 1H, J = 8.0 Hz, NH); ^{13}C NMR (125 MHz, DMSO-d_6) δ: 13.0 (CH_3); 36.4 (CH_2); 41.7 (CH_2); 43.6 (CH_2); 49.0 (CH_2); 55.7 (CH); 59.8 (CH); 60.6 (CH_2); 84.2 (CH); 84.5 (CH); 108.7 (C); 116.6 (CH_{Ar}); 118.8 (2-CH_{Ar}); 119.2 (CH_{Ar}); 123.5 (CH_{Ar}); 124.2 (CH_{Ar}); 125.5 (C); 127.9 and 128.1 (2-CH_{Ar}); 129.8, 130.1, 130.2 and 130.7 (6-CH_{Ar}); 132.2 (C); 135.1 and 135.2 (CH_{Ar}); 138.0 (C); 138.4 (C); 150.5 (CO); 156.5 (C); 156.6 (C); 162.7 (CO); 165.4 (CO); 166.0 (CO): 170.2 (CO); UPLC/MS, t_R: 3.25 min; m/z (ES-) 720.2 (M-H^+); purity: 98%; HRMS: [M + H]$^+$ calcd for $C_{37}H_{36}N_7O_9$, 722.2569, found 722.2566.

(Z)-2-((S)-3-((R)-2-amino-2-phenylacetamido)-2-oxoazetidin-1-yl)-3-(4-((3-((2R,4S,5S)-4-azido-5-(hydroxymethyl)tetrahydrofuran-2-yl)-5-methyl-2,6-dioxo-2,3-dihydropyrimidin-1(6H)-yl)methyl)phenyl)sodium acrylate (**2h**).Starting from **17h** (0.13 mmol, 97 mg), [0.1 M] NaOH (2.5 mL) in a mixture of H_2O/THF (2.9 mL/ 2.9 mL). The crude product was purified by HPLC reverse phase: Eluent A: Water (10 mM $AcONH_4$); B: Acetonitrile (Neutral); gradient 20-40 in 8CV, and the desired compound is obtained at 29-31% of acetonitrile. Yellow powder, Yield: 68 %, 81 mg. ^{1}H NMR (400 MHz, DMSO-d_6) δ: 1.86 (s, 3H, CH_3); 2.29-2.46 (2-m, 2H, CH_2); 3.58-3.77 (2-m, 4H, 2-CH_2); 3.82-3.85 (q, 1H, J = 4.2 Hz, CH); 4.39-4.44 (m, 1H, CH); 4.64 (s, 1H, CH); 4.95-5.03 (m, 3H, CH_2 and CH); 6.14-6.17 (t, 1H, J = 6.5 Hz, CH); 7.23-7.31 (m, 4H, 4-CH_{Ar}); 7.34-7.38 (m, 2H, 2-CH_{Ar}); 7.45-7.47 (m, 2H, 2-CH_{Ar}); 7.53-7.55 (d, 2H, J = 8.0 Hz, 2-CH_{Ar}); 7.82 (s, 1H, CH_{Ar}); 9.14 (br s, 1H, NH); ^{13}C NMR (125 MHz, DMSO-d_6): fast chemical degradation; UPLC/MS, t_R: 2.07 min; m/z (ES+) 645.4 (M+H^+) 667.3 (M+Na^+); purity: 97%; HRMS: [M + H]$^+$ calcd for $C_{31}H_{33}N_8O_8$, 645.2416, found 645.2422.

2. Determination of kinetic parameters of hydrolysis by ITC against KPC-2

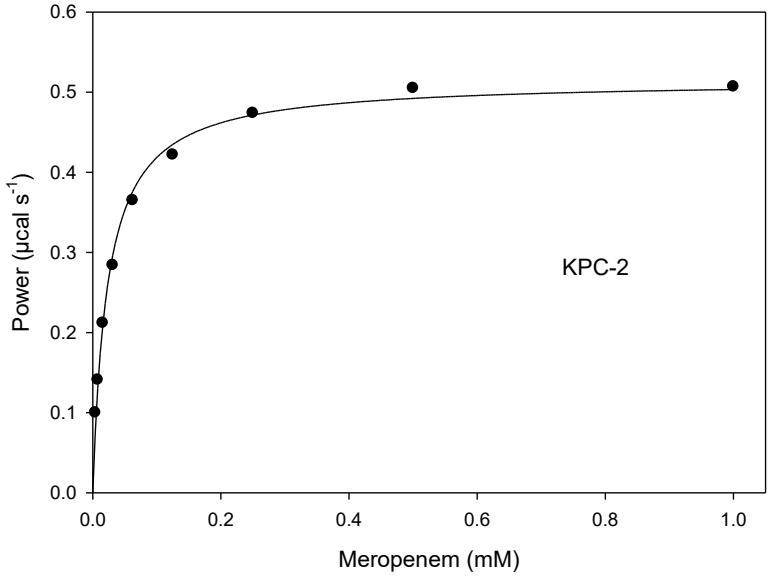


Figure S1. Meropenem

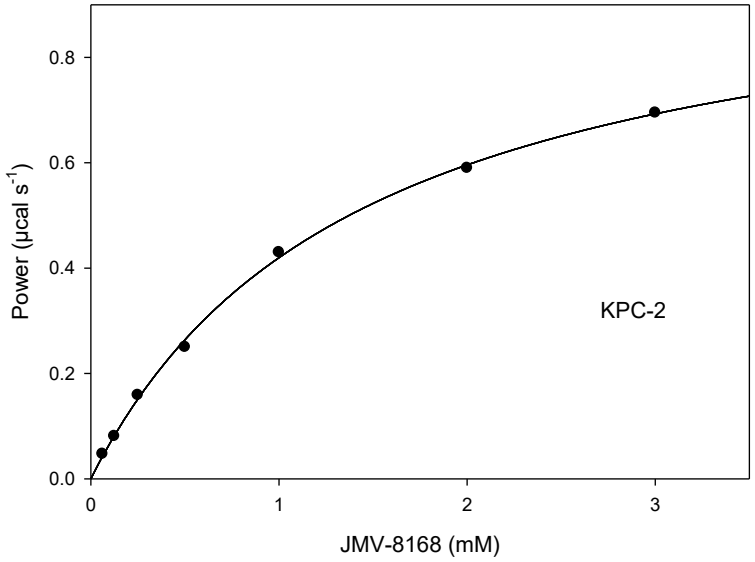


Figure S2. Compound **2b – JMV8168**

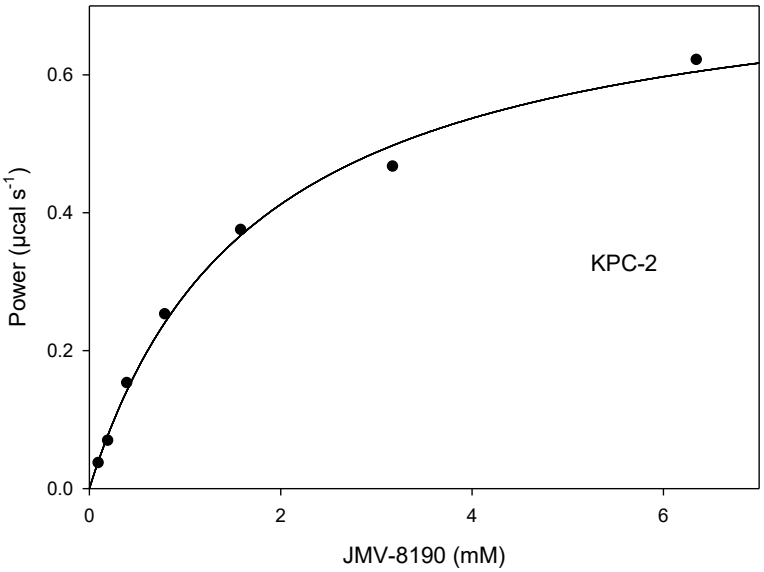


Figure S3. Compound **2c – JMV8190**

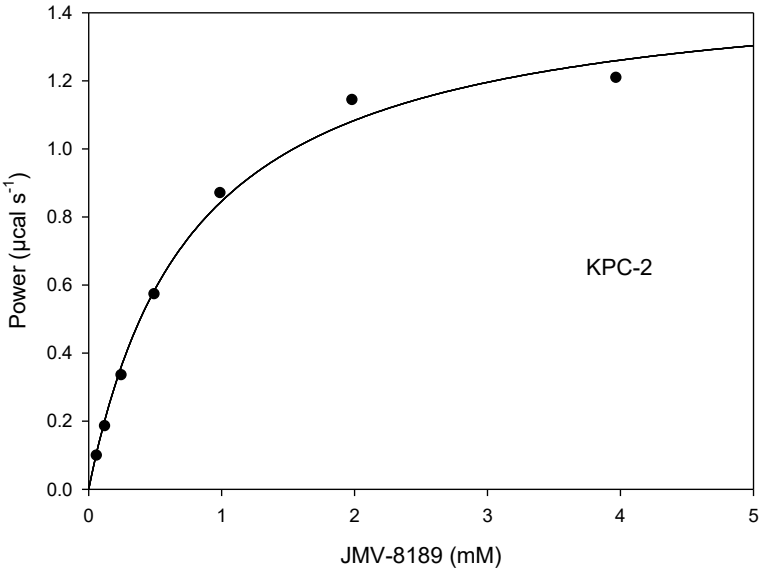


Figure S4. Compound **2d – JMV8189**

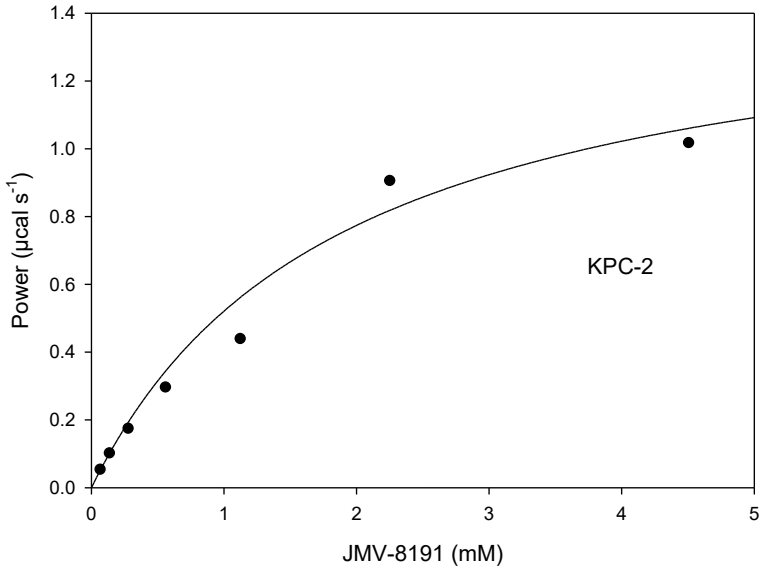


Figure S5. Compound **2e – JMV8191**

3. Determination of kinetic parameters of hydrolysis by ITC against NDM-1

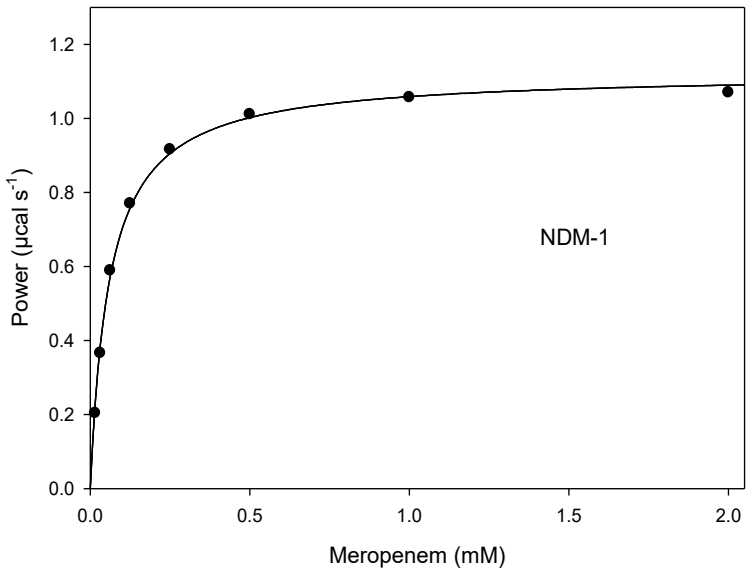


Figure S6. Meropenem

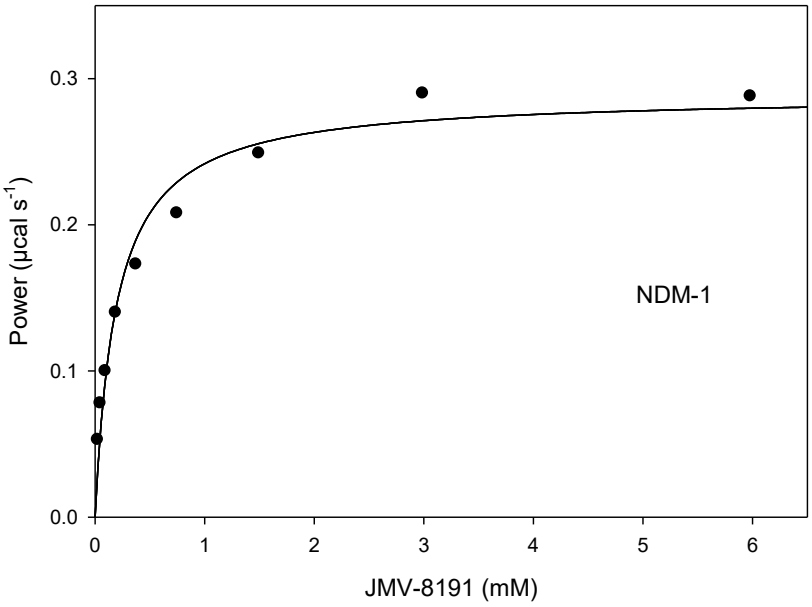


Figure S7. Compound **2e – JMV8191**

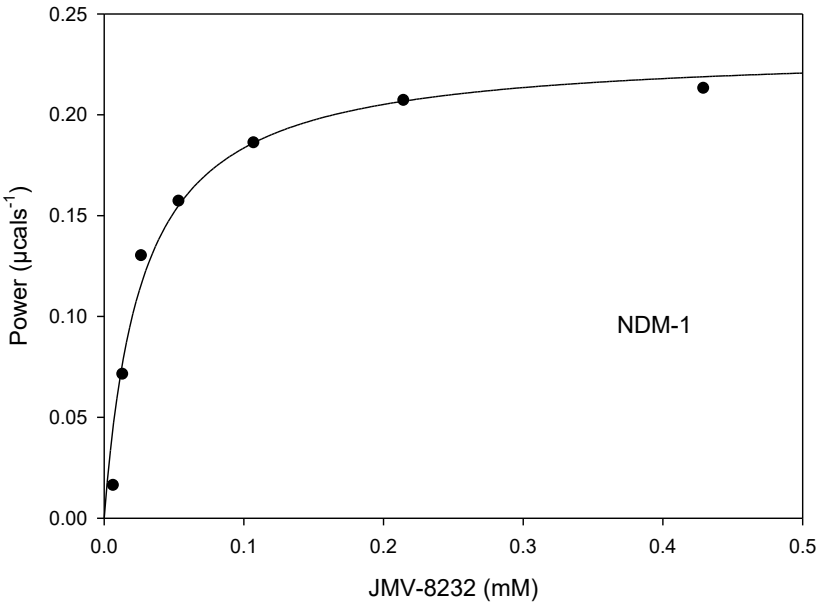


Figure S8. Compound **2f – JMV8232**

4. Linear notations of final compounds 2a-h

Table S1. SMILES strings

Cpd	SMILES string
2a	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4CCC4=O)/C(O)=O)C=C3)=O
2b	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(COC5=CC=CC=C5)=O)C4=O)/C(O)=O)C=C3)=O
2c	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(OC(C)(C)C)=O)C4=O)/C(O)=O)C=C3)=O
2d	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(CC5=CC=CC=C5)=O)C4=O)/C(O)=O)C=C3)=O
2e	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(CC5=CC=CS5)=O)C4=O)/C(O)=O)C=C3)=O
2f	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(CC5=CC=C(C6=CC=CC=C6)C=C5)=O)C4=O)/C(O)=O)C=C3)=O
2g	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC(CC5=CC(OC6=CC=CC=C6)=CC=C5)=O)C4=O)/C(O)=O)C=C3)=O
2h	O=C1C(C)=CN([C@@H]2O[C@H](CO)[C@@H](N=[N+]=[N-])C2)C(N1CC3=CC=C(/C=C(N4C[C@H](NC([C@H](N)C5=CC=CC=C5)=O)C4=O)/C(O)=O)C=C3)=O

Table S2. InChI keys strings

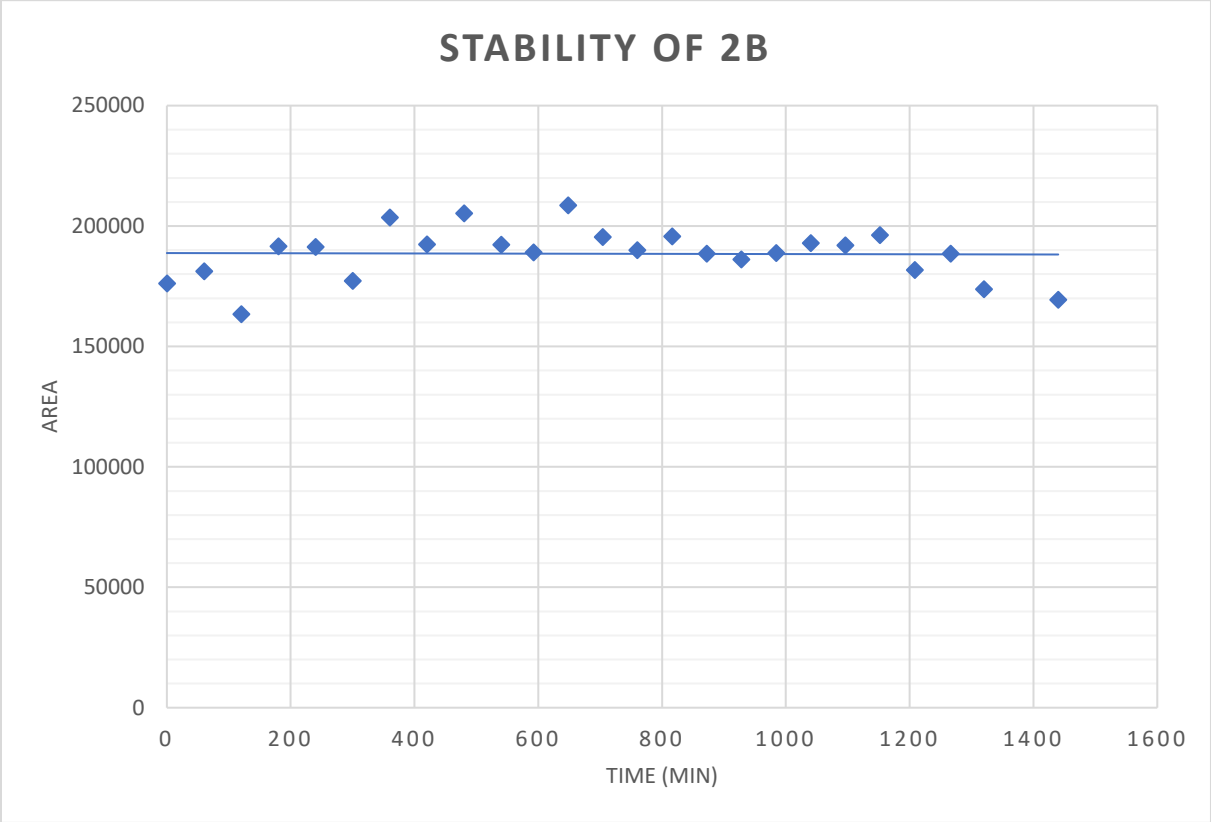
Cpd	InChI keys string
2a	ZKMJQTWTYNBRSX-AWEBRRROSA-N
2b	NCDQODLKFWIQQX-YVRANPBISA-N
2c	RCOCPNXLLDXQAO-MMQYDYQQSA-N
2d	GJAJVXHJLFFIAB-UGQFBHRZSA-N
2e	UGYDCNVFIXOBBH-RQGFHRILSA-N
2f	NPTCQLSLHAEQFR-MWGDSCJSSA-N
2g	YMGCUBSDKFDAOK-MWGDSCJSSA-N
2h	XBTVADGQYWKIJH-QXBZZKCWSA-N

5. UPLC separation and tandem mass spectrometry

Table S3. Specific tandem mass spectrometry settings for each compound

Cpd	MW (g/mol)	Rt (min)	ESI mode	MRM channel	CV (V)	CE (V)
AZT NEG	267.4	0.4	**(-)**	266.3 > 223.3	30	15
2b	645.5	1.32	**(-)**	644 > 266	50	30

5.1. Stability of compound 2b – JMV8168



Graph S1. Stability of **2b**

Dataset: Untitled

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Printed: Wednesday, July 20, 2022 10:50:43 Romance Daylight Time

Method: C:\MassLynx\Laurent Gavara.PRO\TL JMV8168 bis.mdb 19 Jul 2022 10:35:40
Calibration: C:\MassLynx\Laurent Gavara.PRO\courbe calibration NJMV8168.cdb 19 Jul 2022 10:29:48

Compound name: New Compound

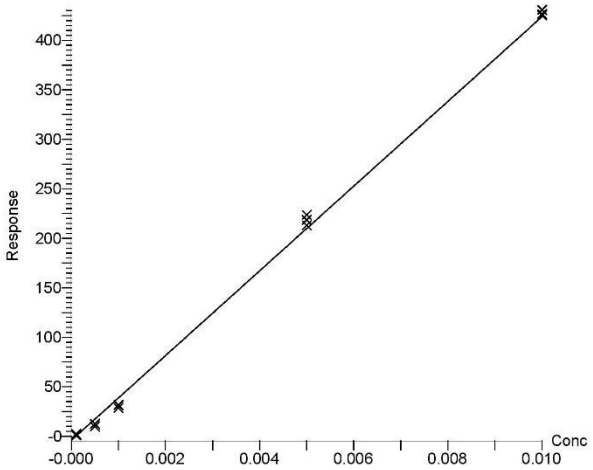
	#	Name	Type	Std. Conc	RT	Area	mg/mL	%Dev	Acq.Date	Acq.Time
1	1	JMV8168 T0	Analyte		1.34	176.169	0.00421		19-Jul-22	10:31:08
2	2	JMV8168 1H	Analyte		1.36	181.220	0.00433		19-Jul-22	11:31:05
3	3	JMV8168 2H	Analyte		1.38	163.417	0.00391		19-Jul-22	12:31:23
4	4	JMV8168 3H	Analyte		1.37	191.600	0.00457		19-Jul-22	13:31:04
5	5	JMV8168 4H	Analyte		1.36	191.391	0.00457		19-Jul-22	14:31:08
6	6	JMV8168 5H	Analyte		1.35	177.287	0.00424		19-Jul-22	15:31:03
7	7	JMV8168 6H	Analyte		1.38	203.535	0.00485		19-Jul-22	16:31:11
8	8	JMV8168 7H	Analyte		1.31	192.372	0.00459		19-Jul-22	17:35:54
9	9	JMV8168 8H	Analyte		1.31	205.360	0.00489		19-Jul-22	18:33:11
10	10	JMV8168 9H	Analyte		1.30	192.266	0.00459		19-Jul-22	19:30:27
11	11	JMV8168 9H52	Analyte		1.30	189.113	0.00451		19-Jul-22	20:27:43
12	12	JMV8168 10H48	Analyte		1.30	208.578	0.00497		19-Jul-22	21:25:00
13	13	JMV8168 11H44	Analyte		1.31	195.540	0.00466		19-Jul-22	22:22:17
14	14	JMV8168 12H40	Analyte		1.31	190.089	0.00454		19-Jul-22	23:19:33
15	15	JMV8168 13H36	Analyte		1.31	195.775	0.00467		20-Jul-22	00:16:50
16	16	JMV8168 14H32	Analyte		1.31	188.613	0.00450		20-Jul-22	01:14:06
17	17	JMV8168 15H28	Analyte		1.32	186.116	0.00444		20-Jul-22	02:11:23
18	18	JMV8168 16H24	Analyte		1.32	188.892	0.00451		20-Jul-22	03:08:37
19	19	JMV8168 17H20	Analyte		1.32	192.895	0.00460		20-Jul-22	04:05:54
20	20	JMV8168 18H16	Analyte		1.32	191.972	0.00458		20-Jul-22	05:03:10
21	21	JMV8168 19H12	Analyte		1.32	196.319	0.00468		20-Jul-22	06:00:24
22	22	JMV8168 20H08	Analyte		1.32	181.844	0.00434		20-Jul-22	06:57:39
23	23	JMV8168 21H06	Analyte		1.33	188.632	0.00450		20-Jul-22	07:54:54
24	24	JMV8168 22H	Analyte		1.33	173.842	0.00416		20-Jul-22	08:52:12
25	25	JMV8168 24H	Analyte		1.36	169.416	0.00405		20-Jul-22	10:30:43

Dataset: Untitled

Last Altered: Wednesday, July 20, 2022 10:50:03 Romance Daylight Time
Printed: Wednesday, July 20, 2022 10:50:43 Romance Daylight Time

Compound name: New Compound

Compound name: New Compound
Correlation coefficient: r = 0.996425, r^2 = 0.992863
Calibration curve: 42793.4 * x + -4.05662
Response type: External Std, Area
Curve type: Linear, Origin: Exclude, Weighting: 1/x, Axis trans: None



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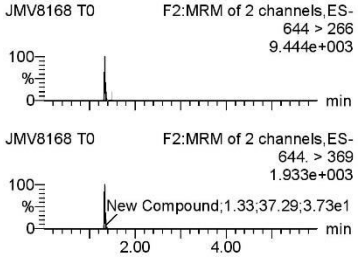
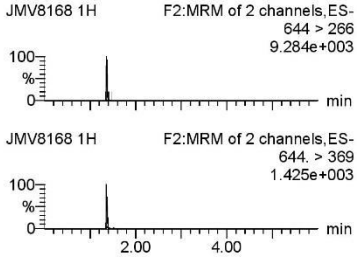
Calibration: C:\MassLynx\Laurent Gavara.PRO\courbe calibration NJMV8168.cdb 19 Jul 2022 10:29:48

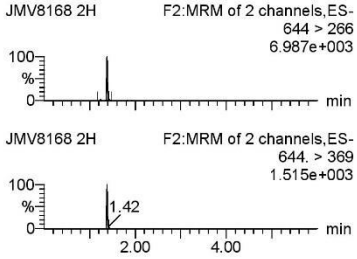
Sample Name: JMV8168 T0



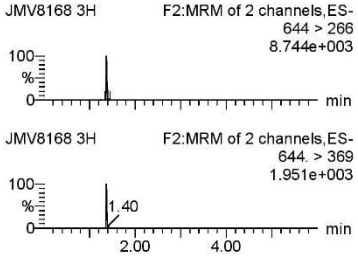
Sample Name: JMV8168 1H



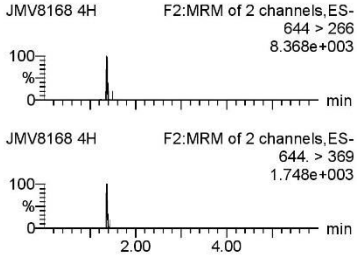
Sample Name: JMV8168 2H



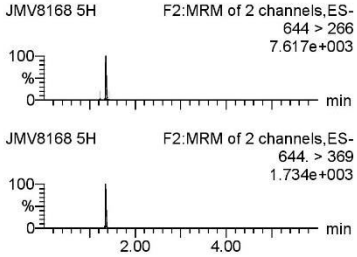
Sample Name: JMV8168 3H



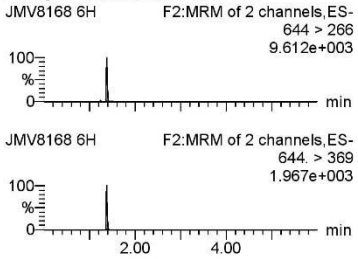
Sample Name: JMV8168 4H



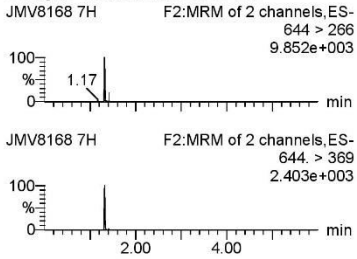
Sample Name: JMV8168 5H



Sample Name: JMV8168 6H



Sample Name: JMV8168 7H



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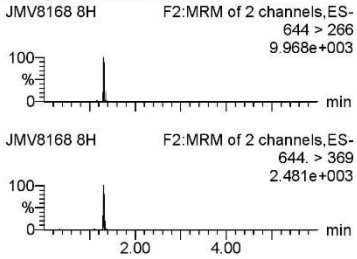

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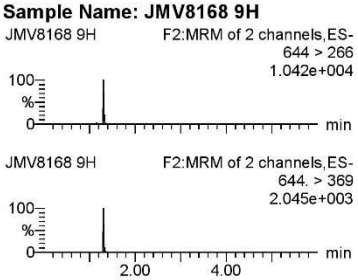
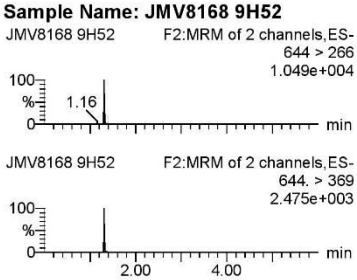
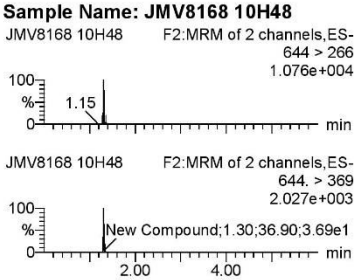


Sample Name: JMV8168 9H52



Sample Name: JMV8168 10H48



MUSE SYNBIO3 IBMM

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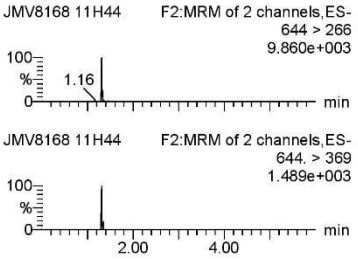
Printed: Wednesday, July 20, 2022 10:50:43 Romance Daylight Time

Sample Name: JMV8168 11H44



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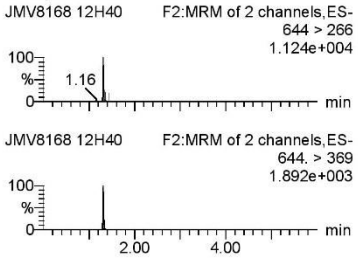
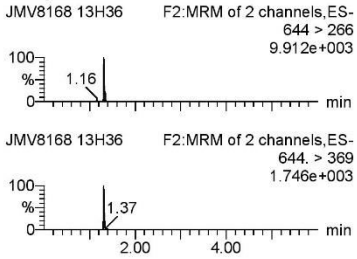
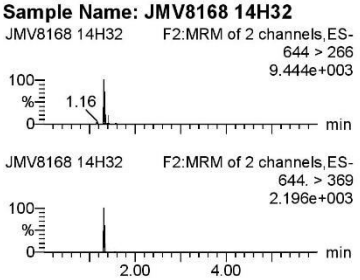


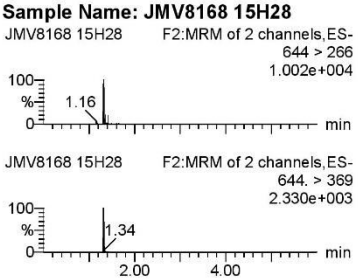
Sample Name: JMV8168 13H36



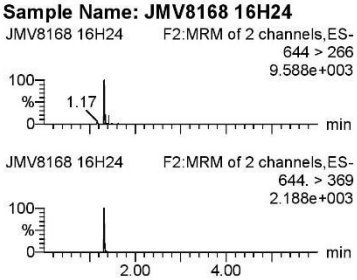
Sample Name: JMV8168 14H32



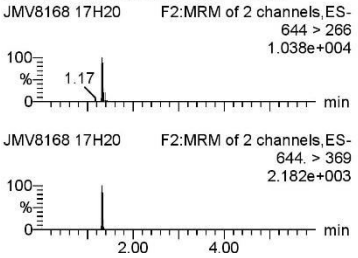
Sample Name: JMV8168 15H28



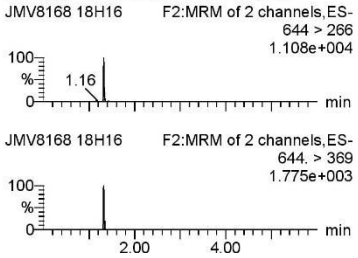
Sample Name: JMV8168 16H24



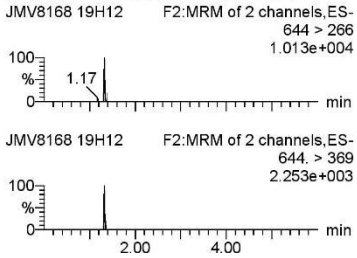
Sample Name: JMV8168 17H20



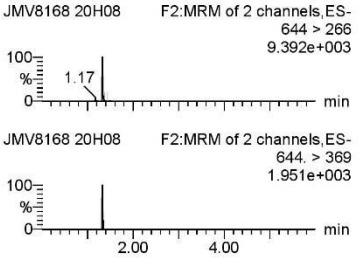
Sample Name: JMV8168 18H16



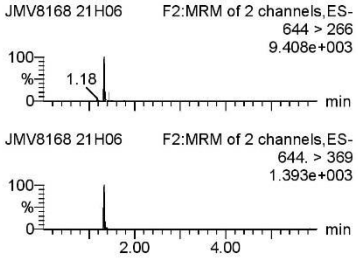
Sample Name: JMV8168 19H12



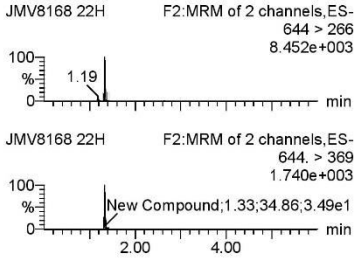
Sample Name: JMV8168 20H08



Sample Name: JMV8168 21H06



Sample Name: JMV8168 22H



MUSE SYNBIO3 IBMM

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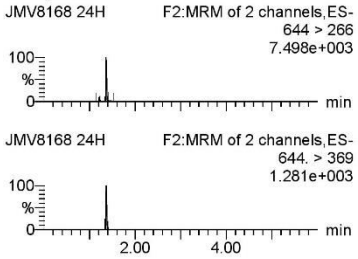
Sample Name: JMV8168 24H



	#	Name	Type	Std. Conc	RT	Area	IS Area	Response	Primar...	mg/mL	%Dev
1	1	JMV8168 T0	Analyte		1.34	176.169		176.169	MM	0.0	
2	2	JMV8168 1H	Analyte		1.36	181.220		181.220	MM	0.0	
3	3	JMV8168 2H	Analyte		1.38	163.417		163.417	MM	0.0	
4	4	JMV8168 3H	Analyte		1.37	191.600		191.600	MM	0.0	
5	5	JMV8168 4H	Analyte		1.36	191.391		191.391	MM	0.0	
6	6	JMV8168 5H	Analyte		1.35	177.287		177.287	MM	0.0	
7	7	JMV8168 6H	Analyte		1.38	203.535		203.535	bb	0.0	
8	8	JMV8168 7H	Analyte		1.31	192.372		192.372	MM	0.0	
9	9	JMV8168 8H	Analyte		1.31	205.360		205.360	bb	0.0	
10	10	JMV8168 9H	Analyte		1.30	192.266		192.266	bb	0.0	
11	11	JMV8168 9H52	Analyte		1.30	189.113		189.113	MM	0.0	
12	12	JMV8168 10H48	Analyte		1.30	208.578		208.578	MM	0.0	
13	13	JMV8168 11H44	Analyte		1.31	195.540		195.540	bb	0.0	
14	14	JMV8168 12H40	Analyte		1.31	190.089		190.089	MM	0.0	
15	15	JMV8168 13H36	Analyte		1.31	195.775		195.775	MM	0.0	
16	16	JMV8168 14H32	Analyte		1.31	188.613		188.613	MM	0.0	
17	17	JMV8168 15H28	Analyte		1.32	186.116		186.116	MM	0.0	
18	18	JMV8168 16H24	Analyte		1.32	188.892		188.892	MM	0.0	
19	19	JMV8168 17H20	Analyte		1.32	192.895		192.895	MM	0.0	
20	20	JMV8168 18H16	Analyte		1.32	191.972		191.972	bb	0.0	
21	21	JMV8168 19H12	Analyte		1.32	196.319		196.319	bb	0.0	
22	22	JMV8168 20H08	Analyte		1.32	181.844		181.844	MM	0.0	
23	23	JMV8168 21H06	Analyte		1.33	188.632		188.632	MM	0.0	
24	24	JMV8168 22H	Analyte		1.33	173.842		173.842	MM	0.0	
25	25	JMV8168 24H	Analyte		1.36	169.416		169.416	MM	0.0	

6. Chemical degradation of 2h

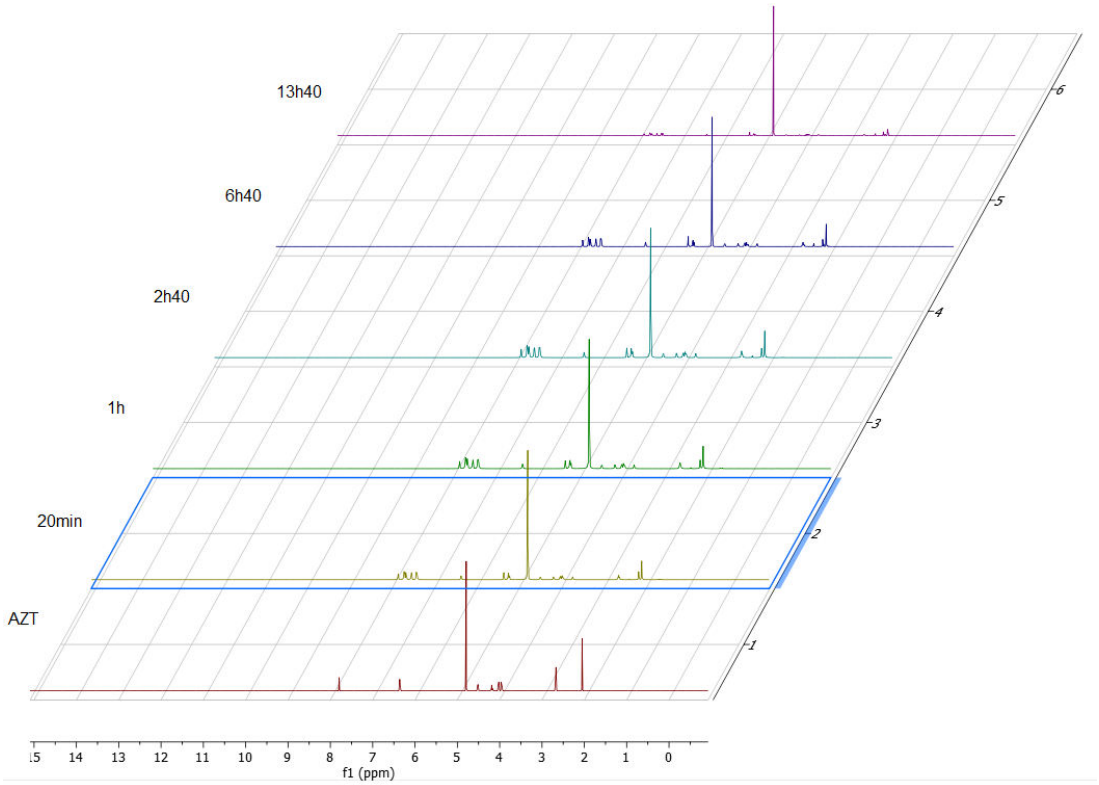


Figure S9. Stability assay of **2h** by ^{1}H NMR in D_2O at 37 °C

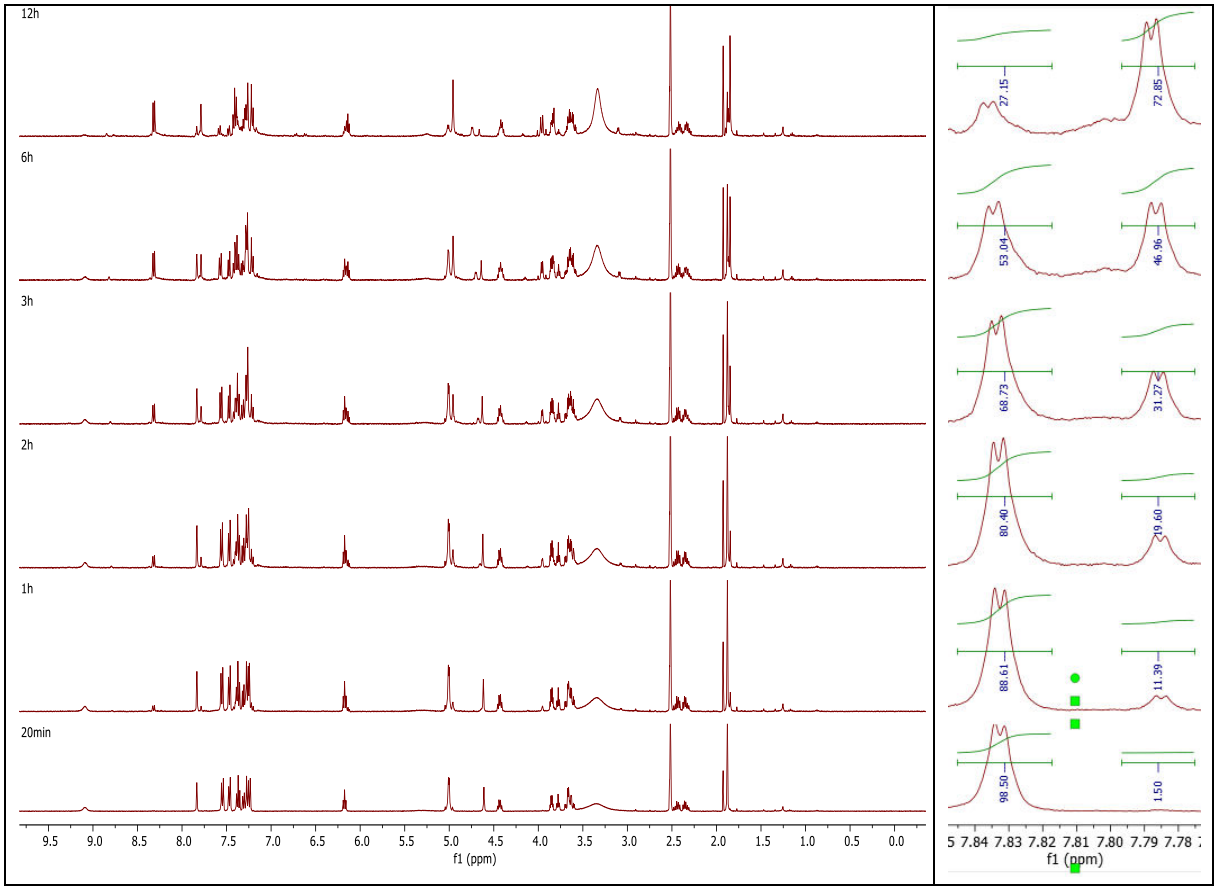
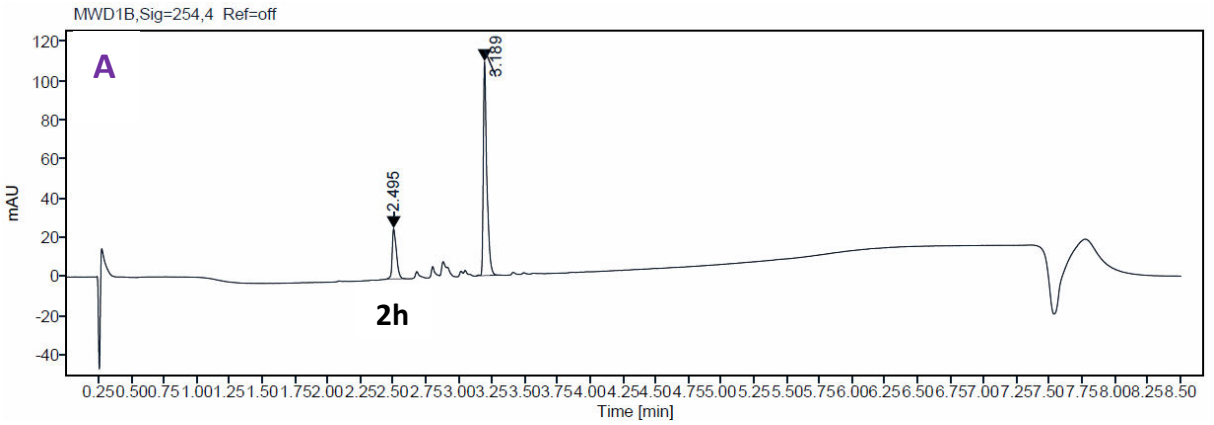


Figure S10. Stability assay of **2h** by ^{1}H NMR in DMSO-d_6 at 37 °C



Signal: MWD1B,Sig=254,4 Ref=off

B

RT [min]	Name	Area	Area%	Max Peak%	Height	Type	Width (50%)
2.495		57.1155	21.8945	28.032	25.686	MM m	
3.189		203.7519	78.1055	100.000	109.425	MM m	
	Sum	**260.8674**					

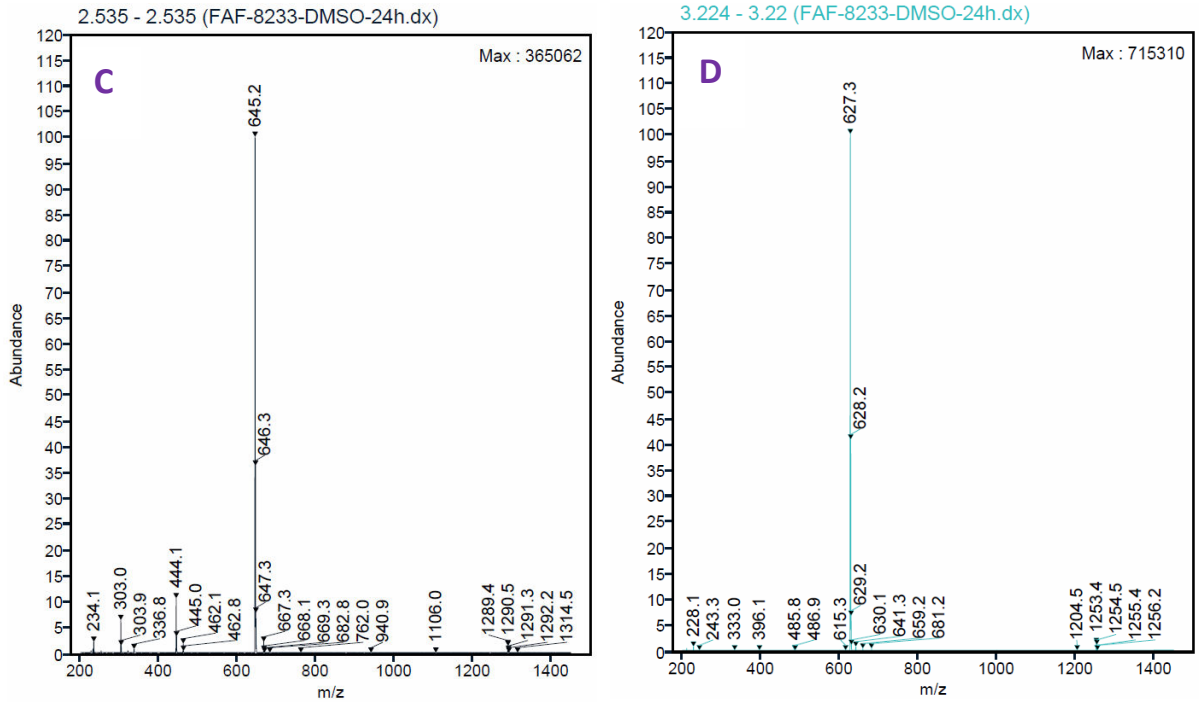
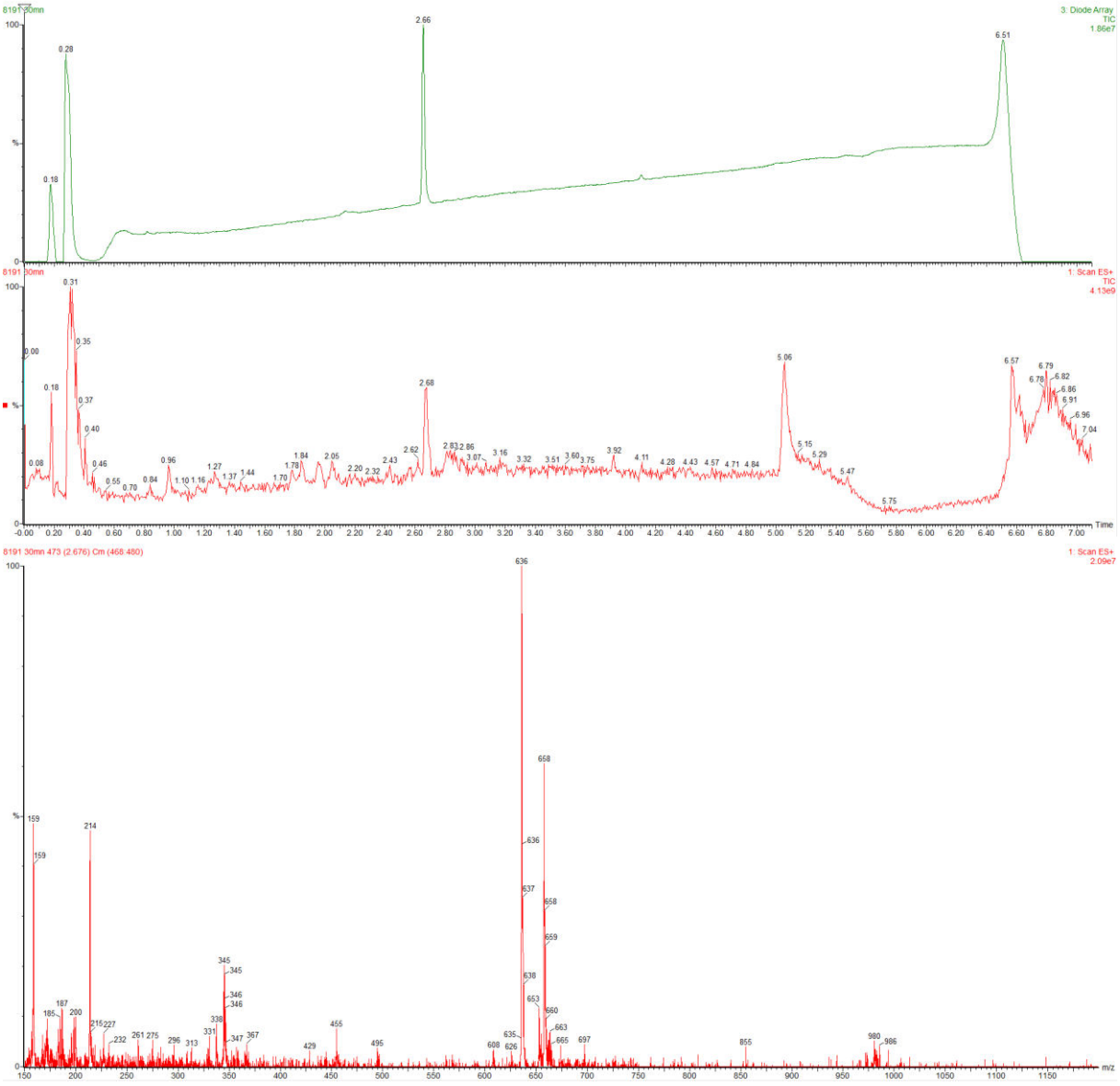


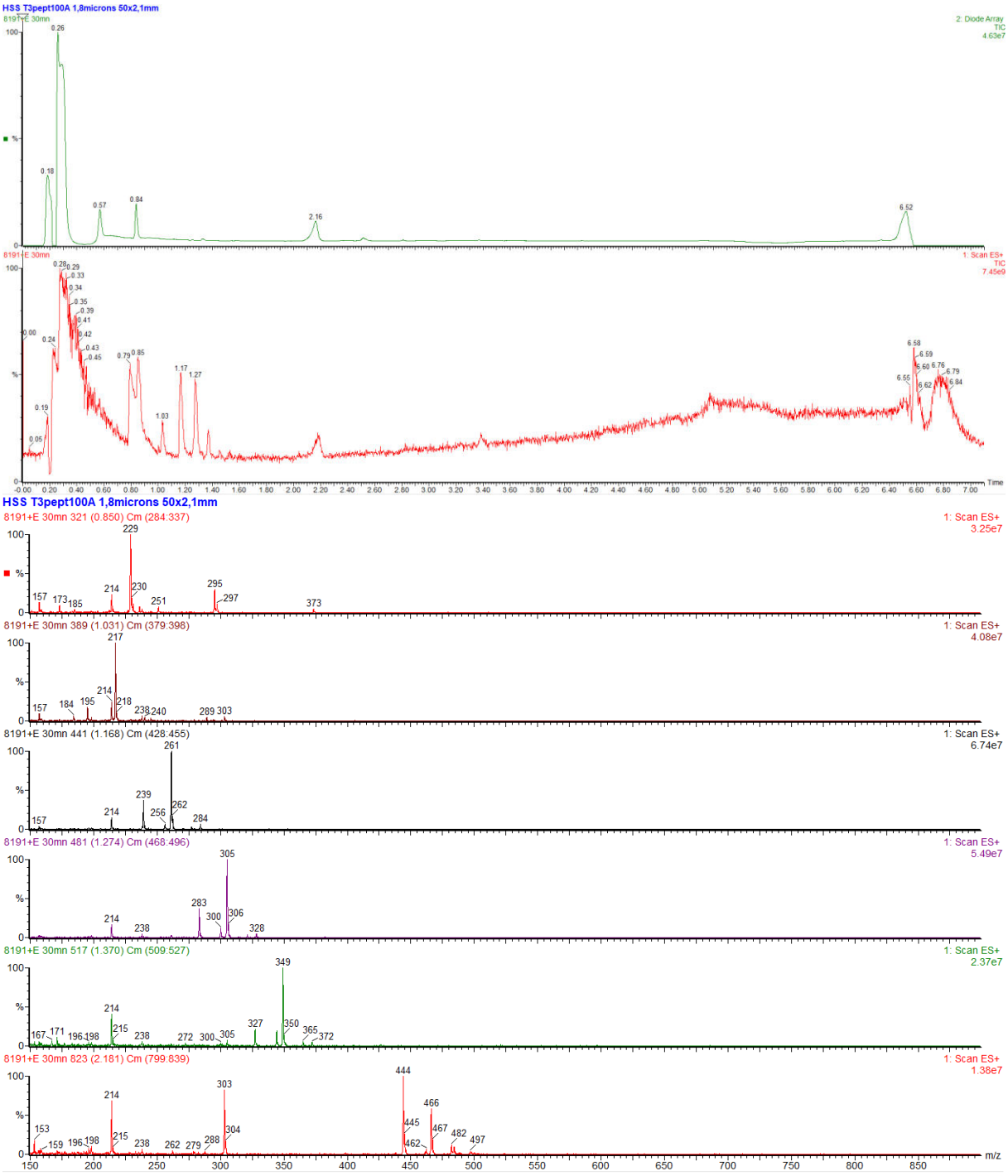
Figure S11. LCMS of **2h** after 24h in DMSO-d_6. **(A)** LC analysis; **(B)** Area% calculation of **2h** and corresponding side product; **(C)** mass analysis of **2h** (ES+); **(D)** mass analysis of the side product (ES+).

7. Enzymatic degradation of 2e by KPC-2 and NDM-1

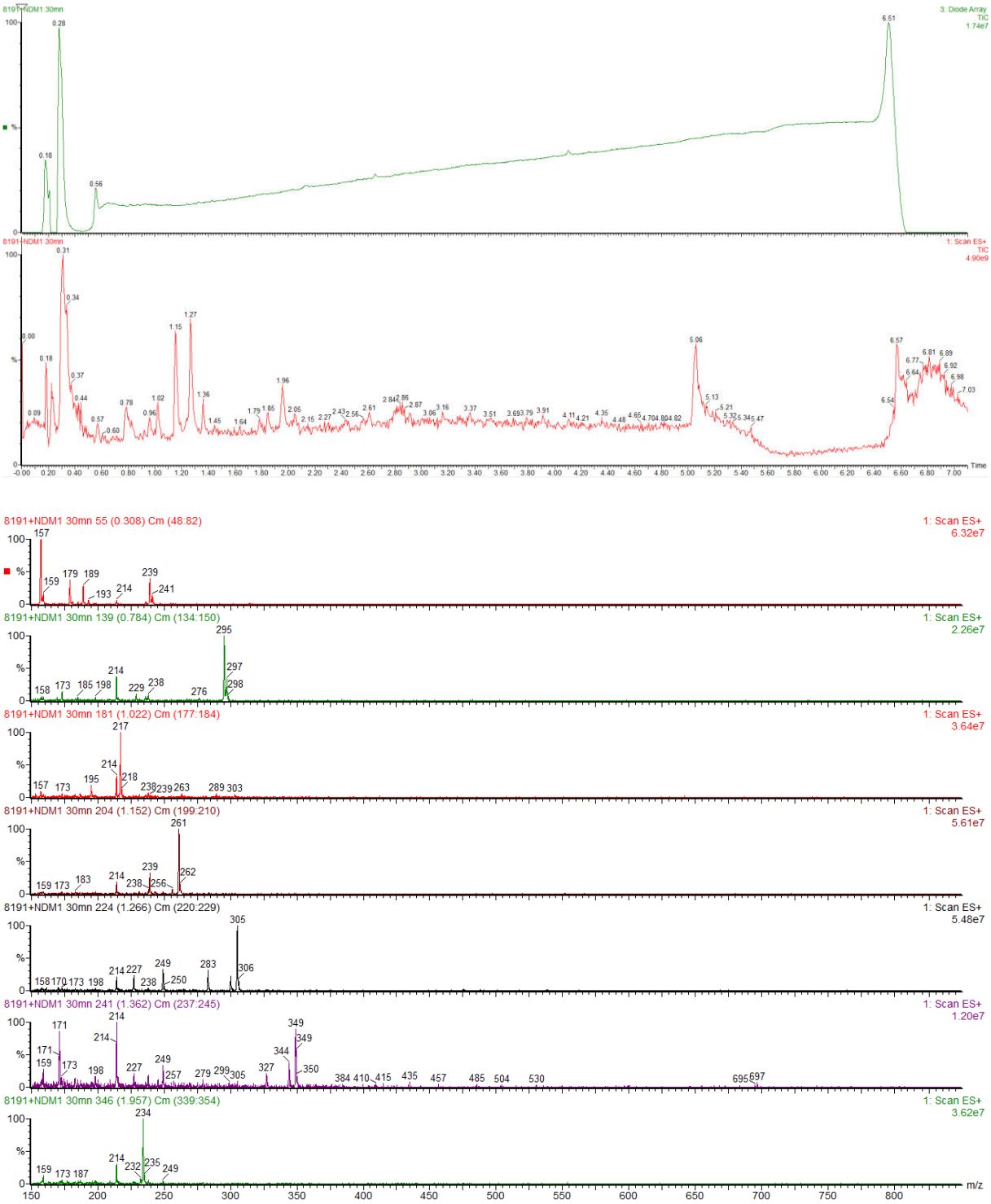
LC-MS of **2e** after 30 min without any β-lactamase:



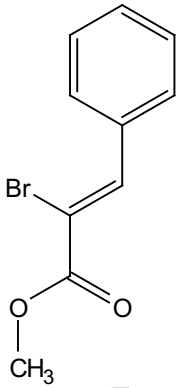
LC-MS of **2e** after 30 min in presence of KPC-2:



LC-MS of **2e** after 30 min in presence of NDM-1:

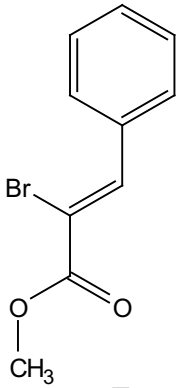


ROS-49.60.fid
MR-MBL-443-DMSO

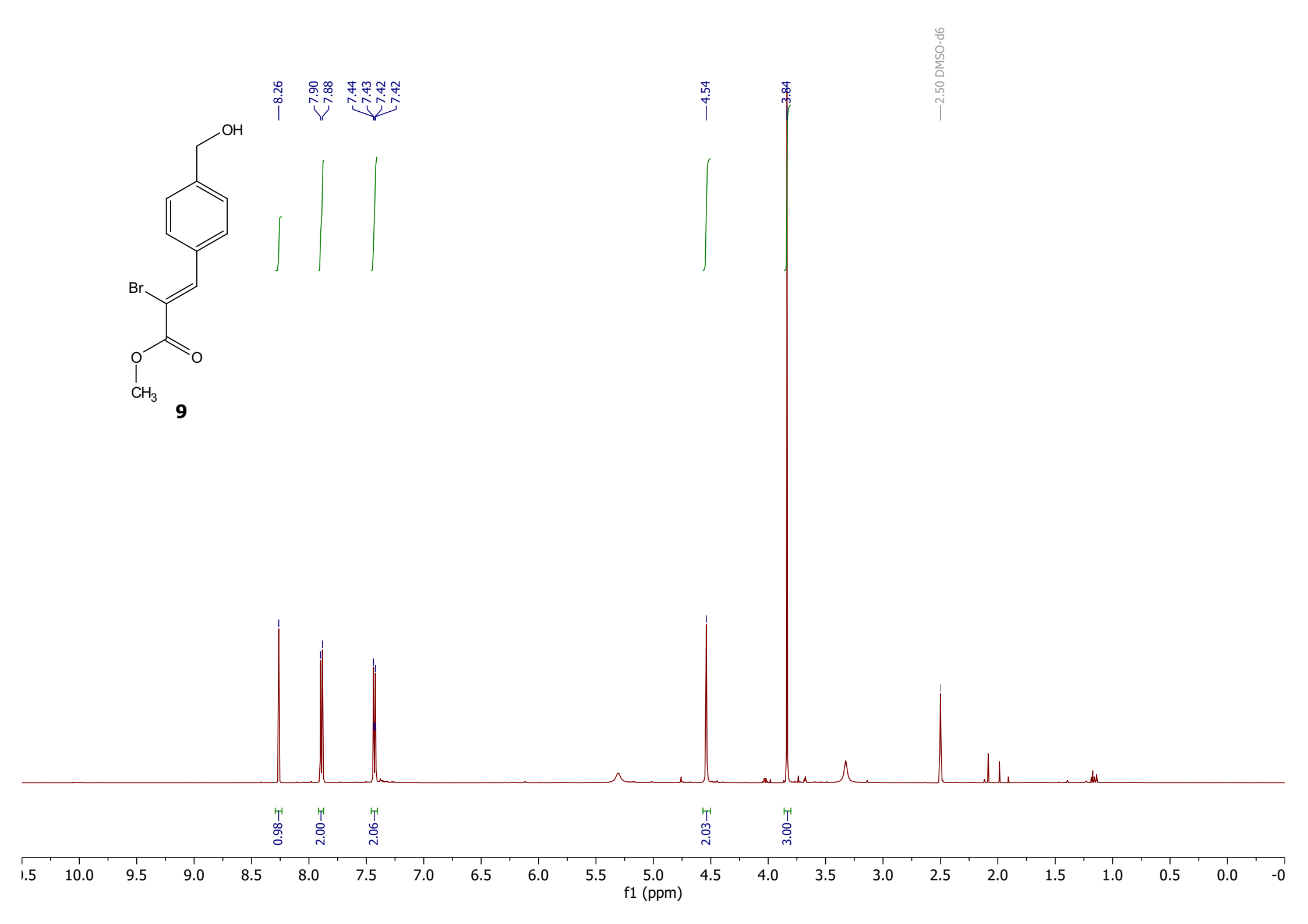


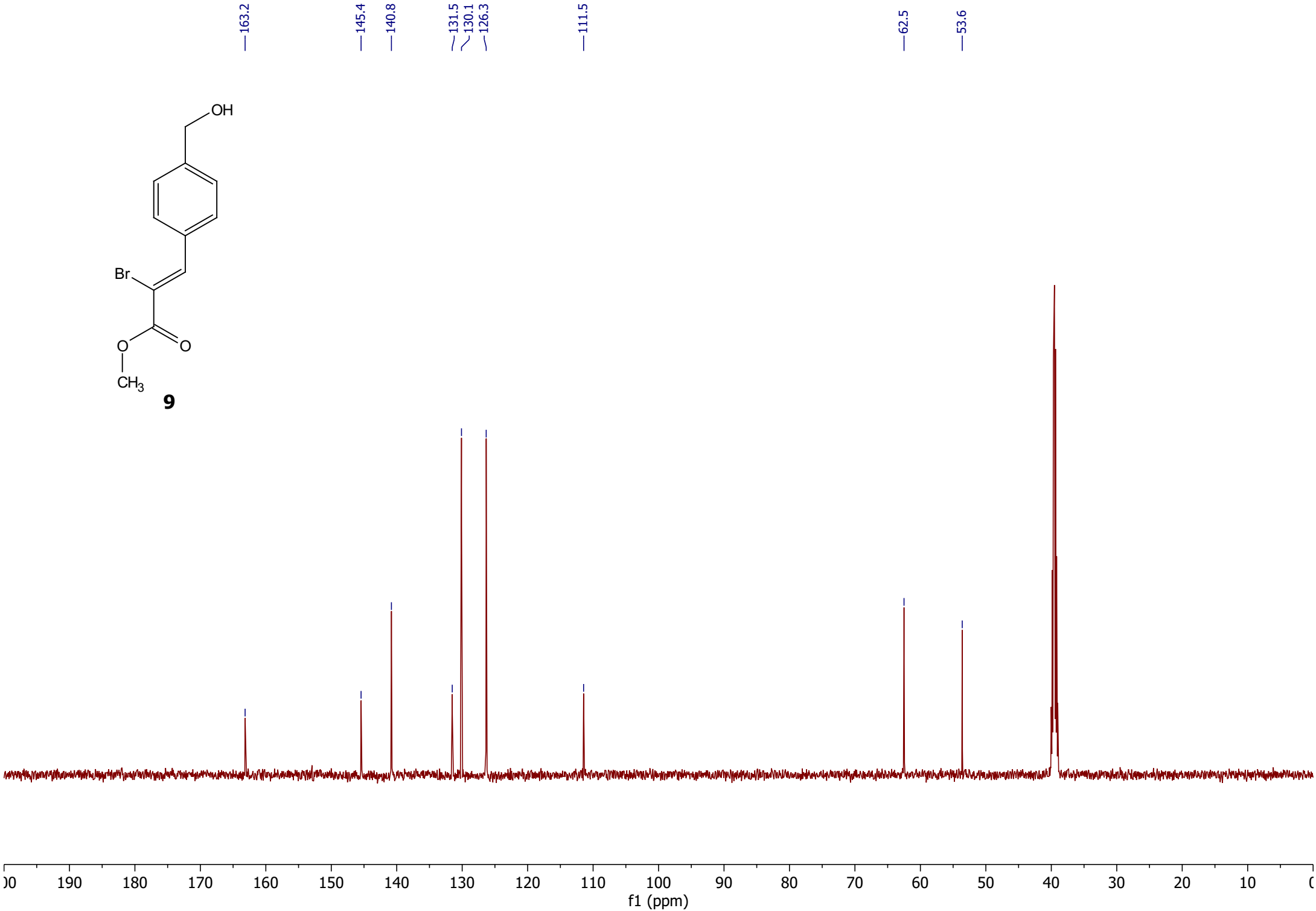
7

ROS-49.64.fid
MR-MBL-443-DMSO

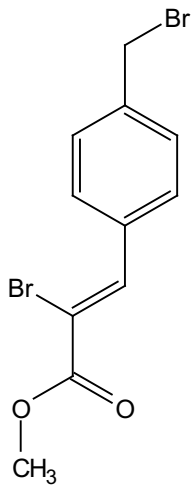


7

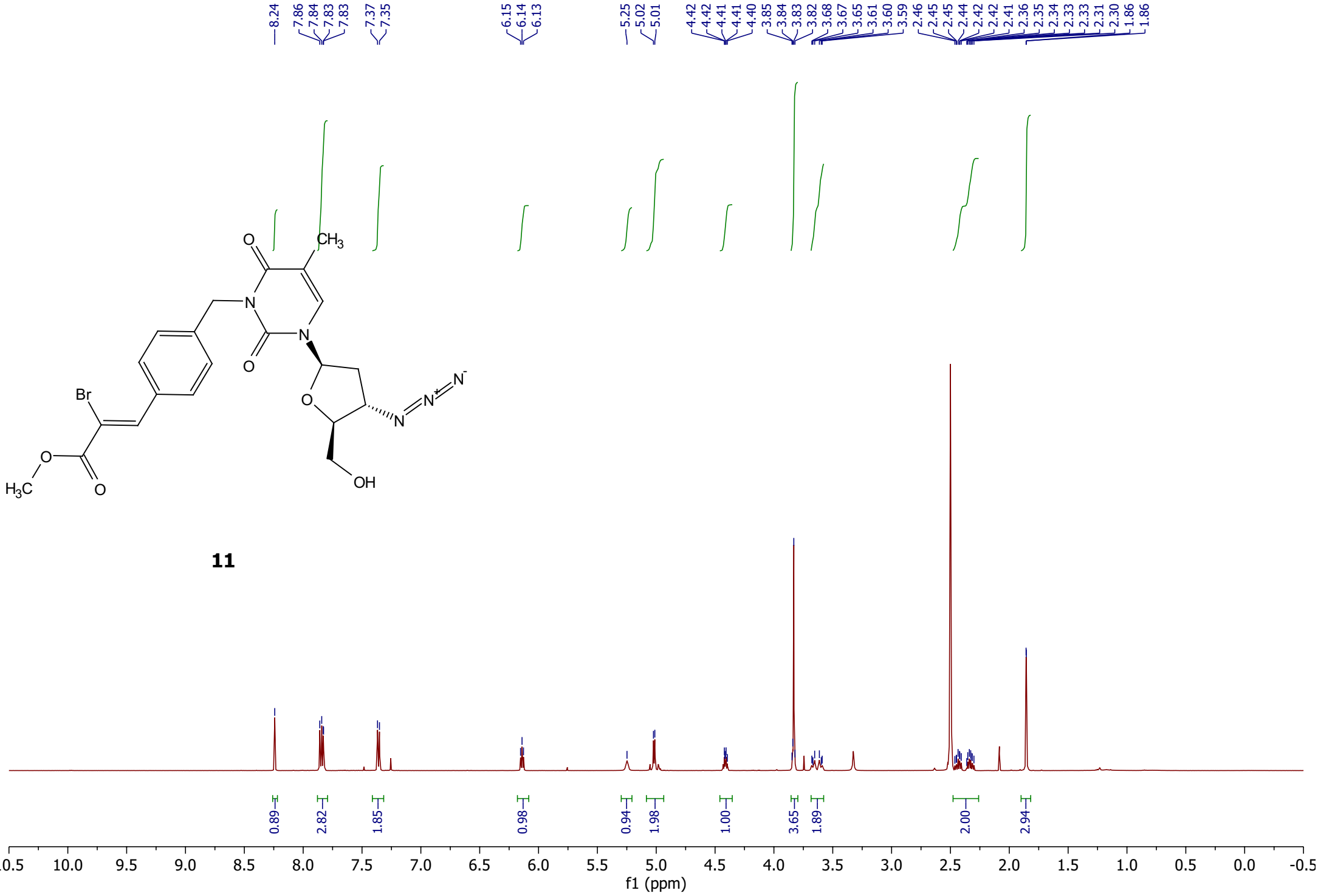

8.26
7.90
7.88
7.44
7.43
7.42
7.42
4.54
3.84
2.50 DMSO-d6
OH
Br
O
O
O
CH3
9
0.98
2.00
2.06
2.03
3.00
f1 (ppm)

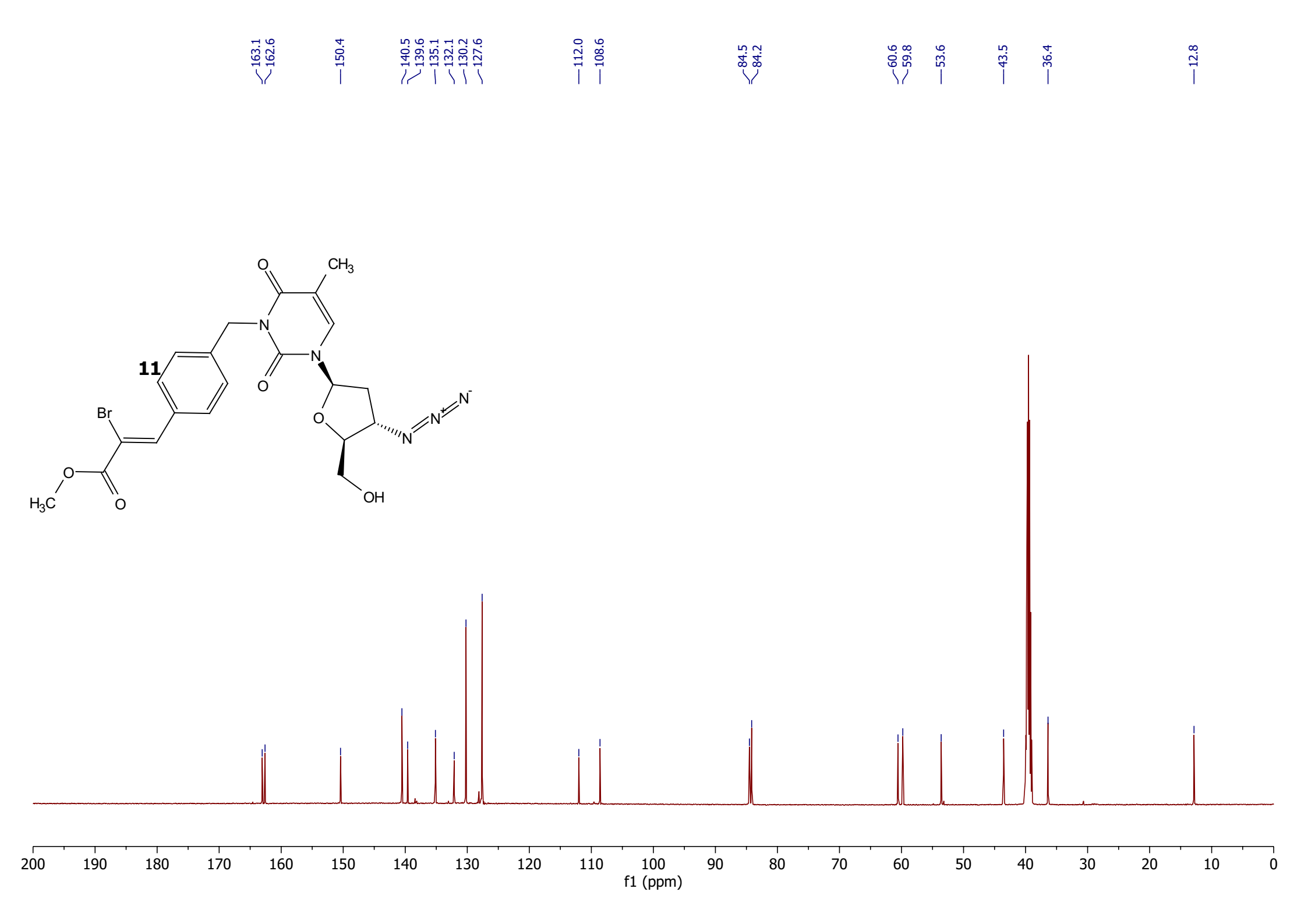

163.2
145.4
140.8
131.5
130.1
126.3
111.5
62.5
53.6
OH
Br
O
O
O
CH3
9
f1 (ppm)

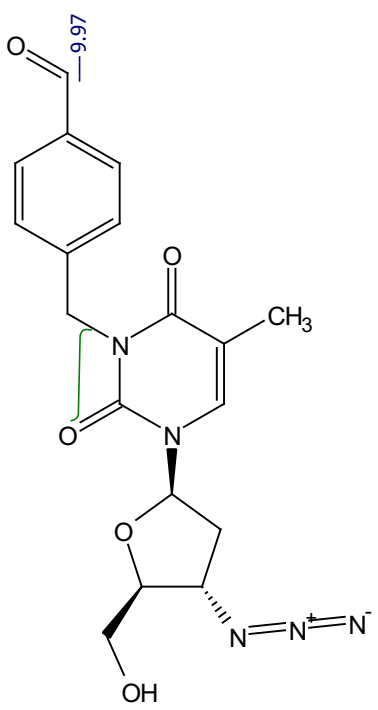
MRH-MR-MBL-486-B-DMSO.1.fid



10

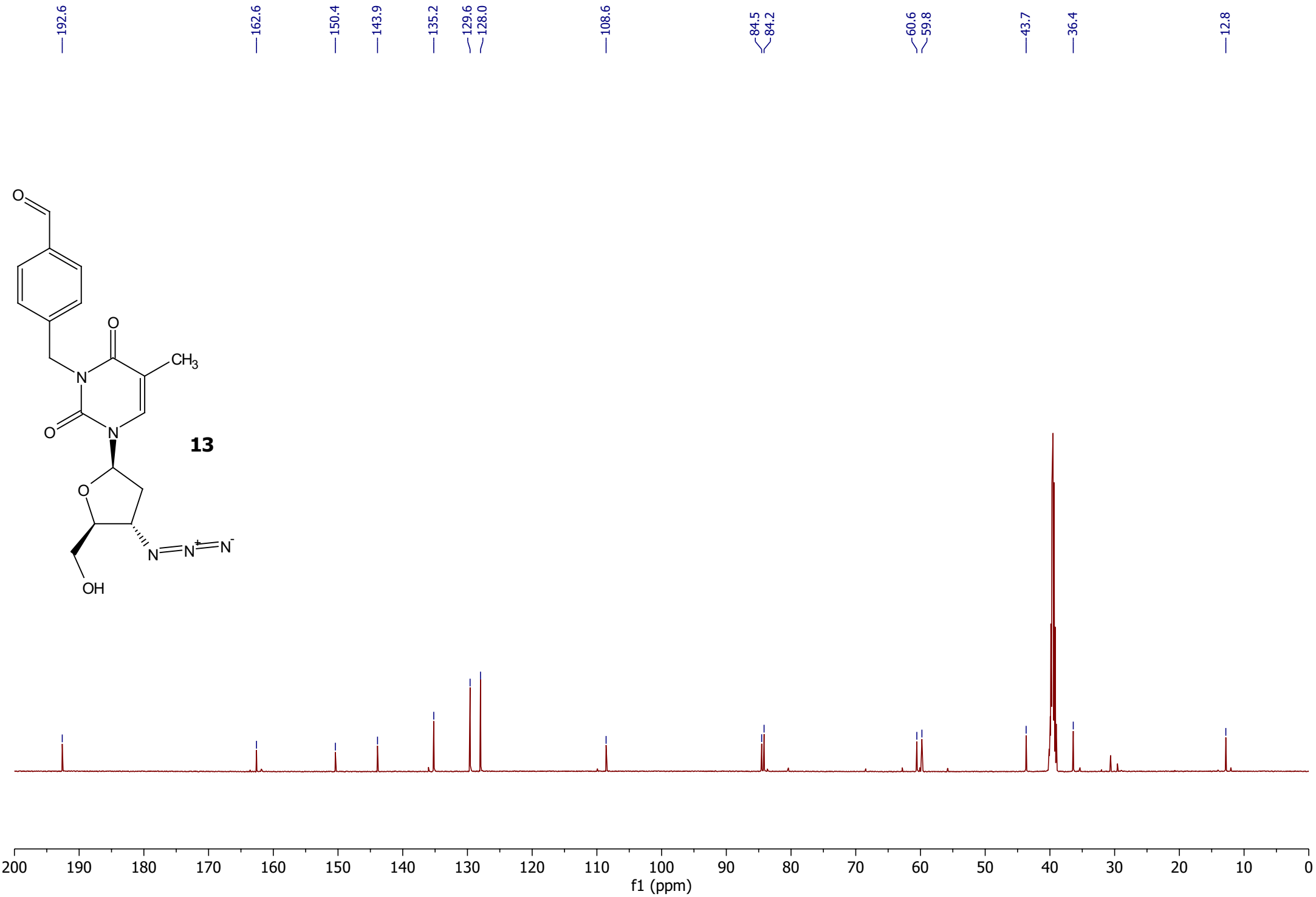

8.24
7.86
7.84
7.83
7.83
7.37
7.35
6.15
6.14
6.13
5.25
5.02
5.01
4.42
4.42
4.41
4.41
4.40
3.85
3.84
3.83
3.82
3.68
3.67
3.65
3.61
3.60
3.59
2.46
2.45
2.44
2.42
2.42
2.41
2.36
2.35
2.34
2.33
2.33
2.31
2.30
1.86
1.86
O
CH3
N
N
O
Br
O
O
H3C
O
N
N+
N-
OH
11
0.89
2.82
1.85
0.98
0.94
1.98
1.00
3.65
1.89
2.00
2.94
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


163.1
162.6
150.4
140.5
139.6
135.1
132.1
130.2
127.6
112.0
108.6
84.5
84.2
60.6
59.8
53.6
43.5
36.4
12.8
11
O
CH3
N
N
O
Br
O
N
N+
N-
O
O
H3C
O
OH
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

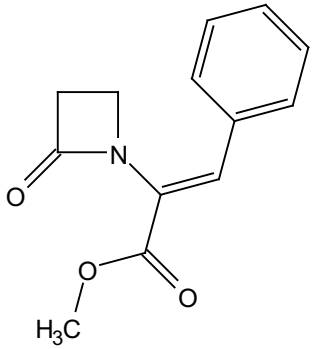

O
9.97
O
CH3
N
O
N
O
N
N
N
OH

13

7.86
7.84
7.84
7.47
7.45
6.15
6.14
6.12
5.25
5.24
5.23
5.11
5.08
5.07
5.04
4.43
4.42
4.41
4.40
3.85
3.84
3.83
3.83
3.68
3.67
3.67
3.66
3.65
3.63
2.44
2.42
2.41
2.36
2.35
2.34
2.33
2.31
2.30
1.86
0.97
2.93
2.00
1.07
0.97
1.97
1.02
0.99
2.00
2.06
2.95
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

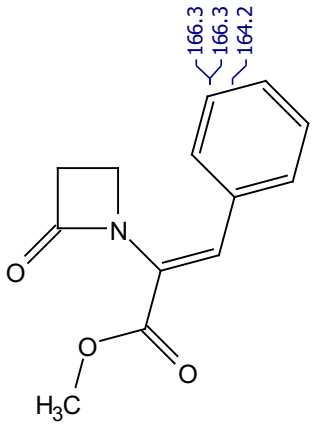

192.6
162.6
150.4
143.9
135.2
129.6
128.0
108.6
84.5
84.2
60.6
59.8
43.7
36.4
12.8
O
O
CH3
N
O
N
13
O
N=N+=N-
OH
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

ROS-52.60.fid
MR-MBL-444-P



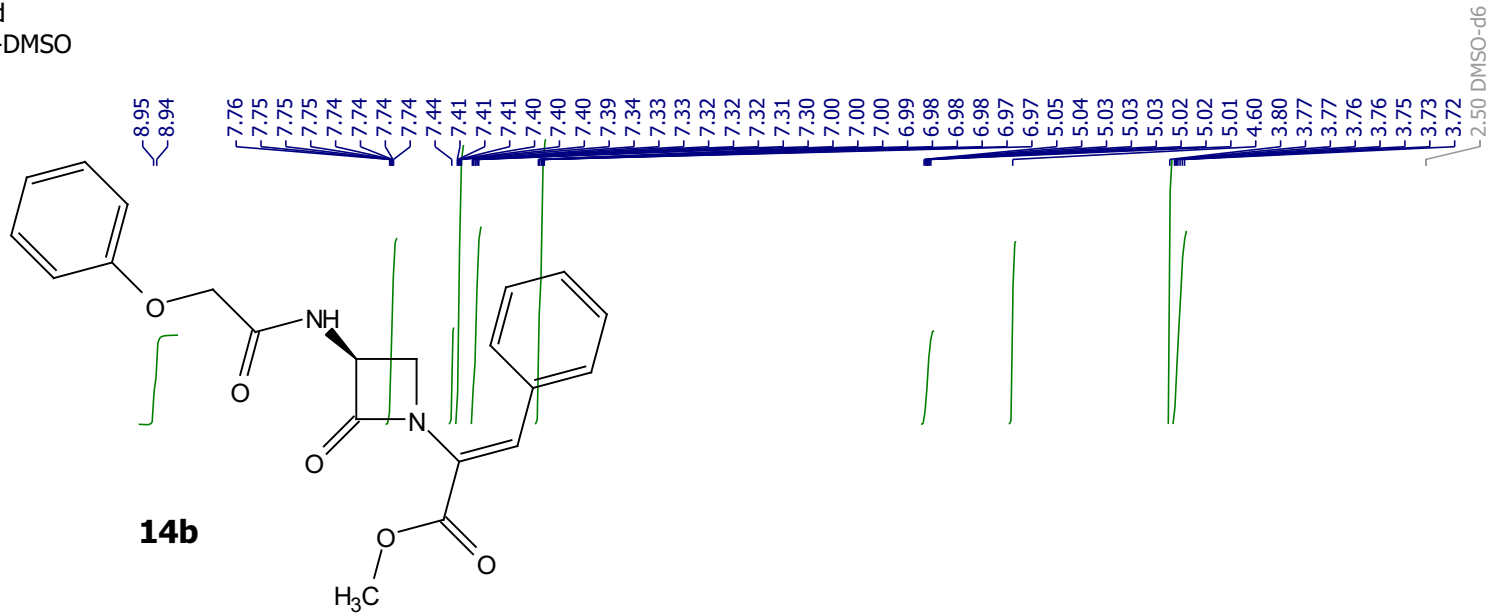
14a

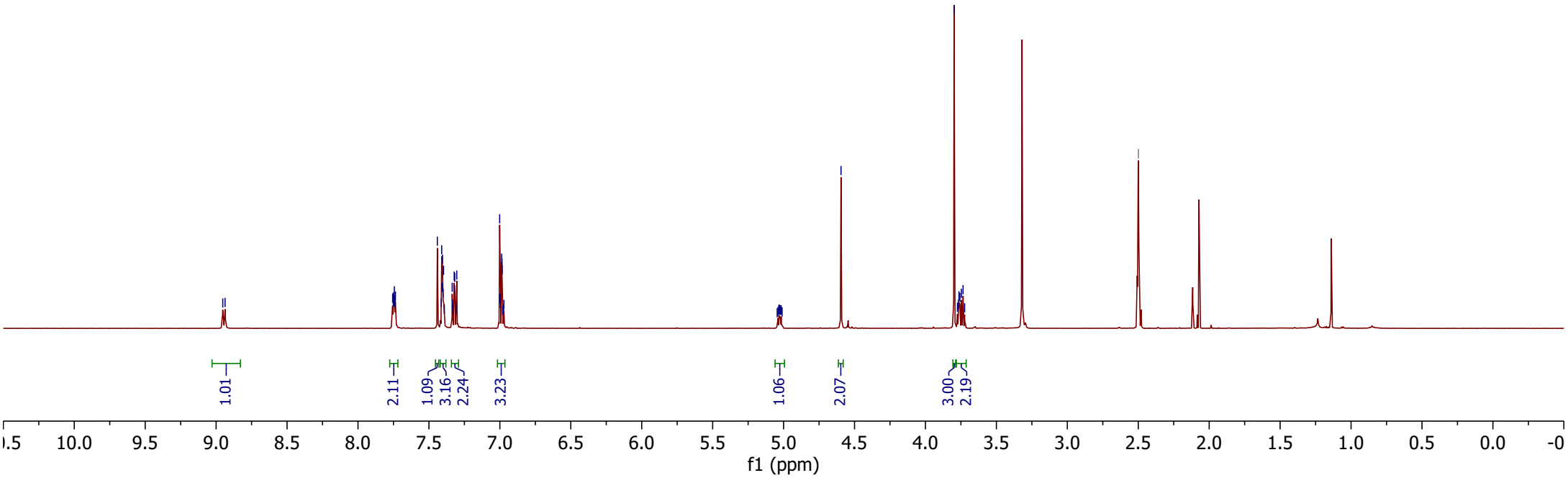
ROS-52.64.1.1r
MR-MBL-444-P



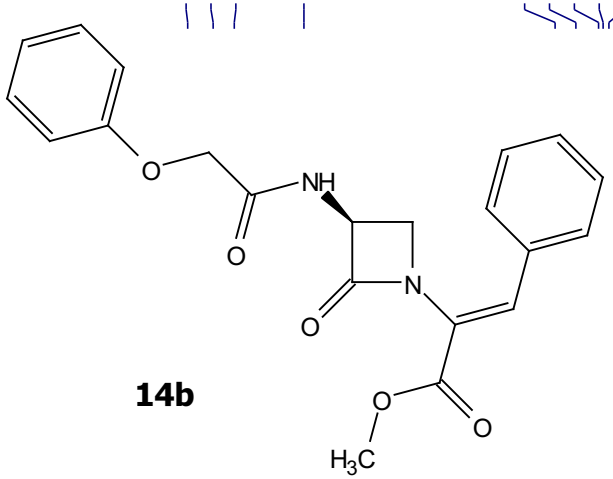
14a

ROS-58.57.fid
MR-MBL-455-DMSO





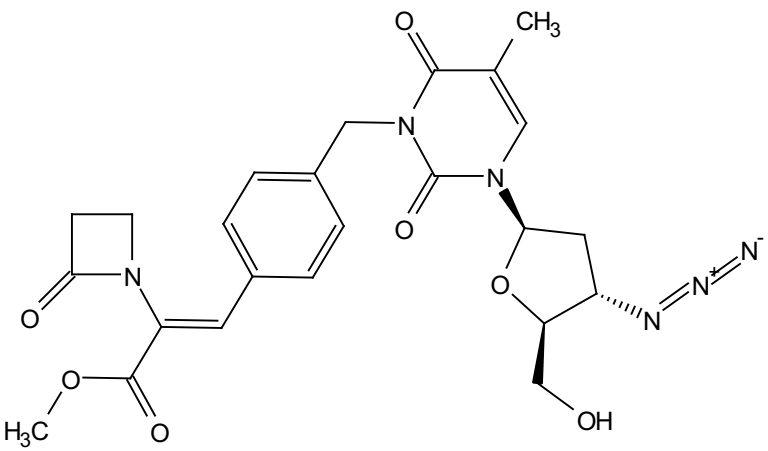
ROS-58.56.fid
MR-MBL-455-DMSO



14b

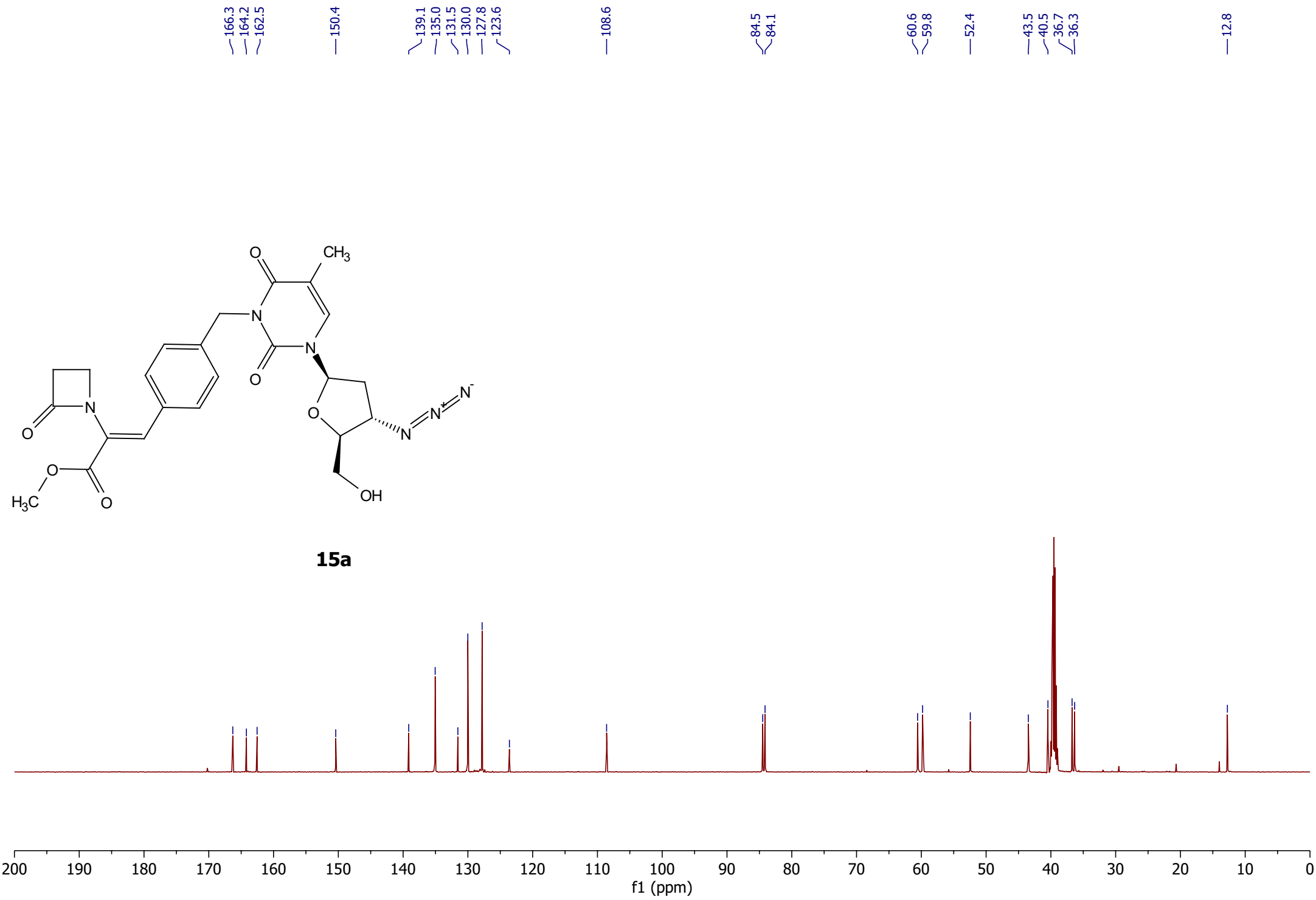
168.4
166.0
164.1
157.6
134.5
132.6
130.5
130.0
129.5
128.6
123.3
121.3
114.8
66.8
55.6
52.6
48.3
39.5 DMSO-d6

f1 (ppm)

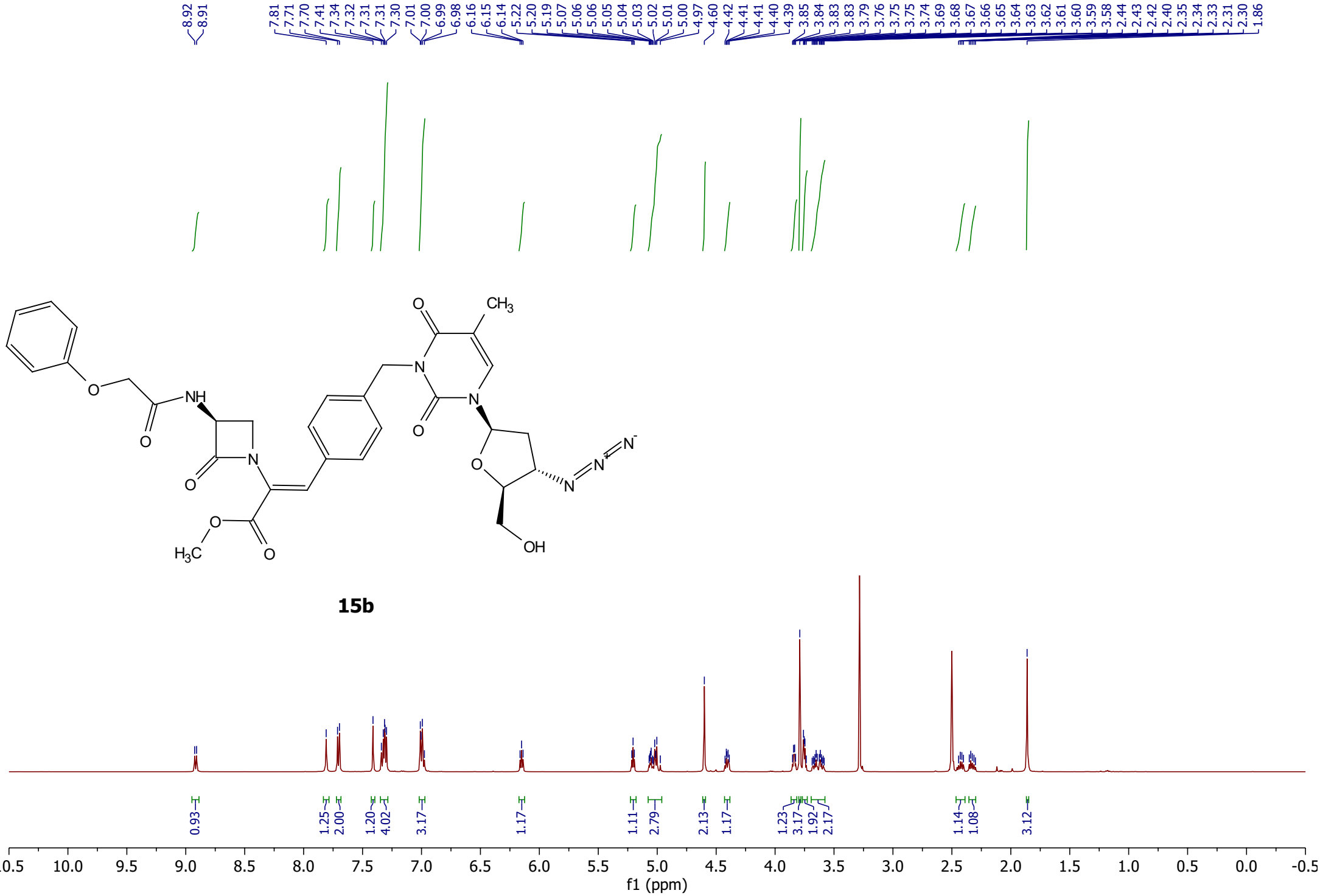

O
CH3
N
N
O
O
N
N+
N-
N
O
O
O
H3C
O
OH

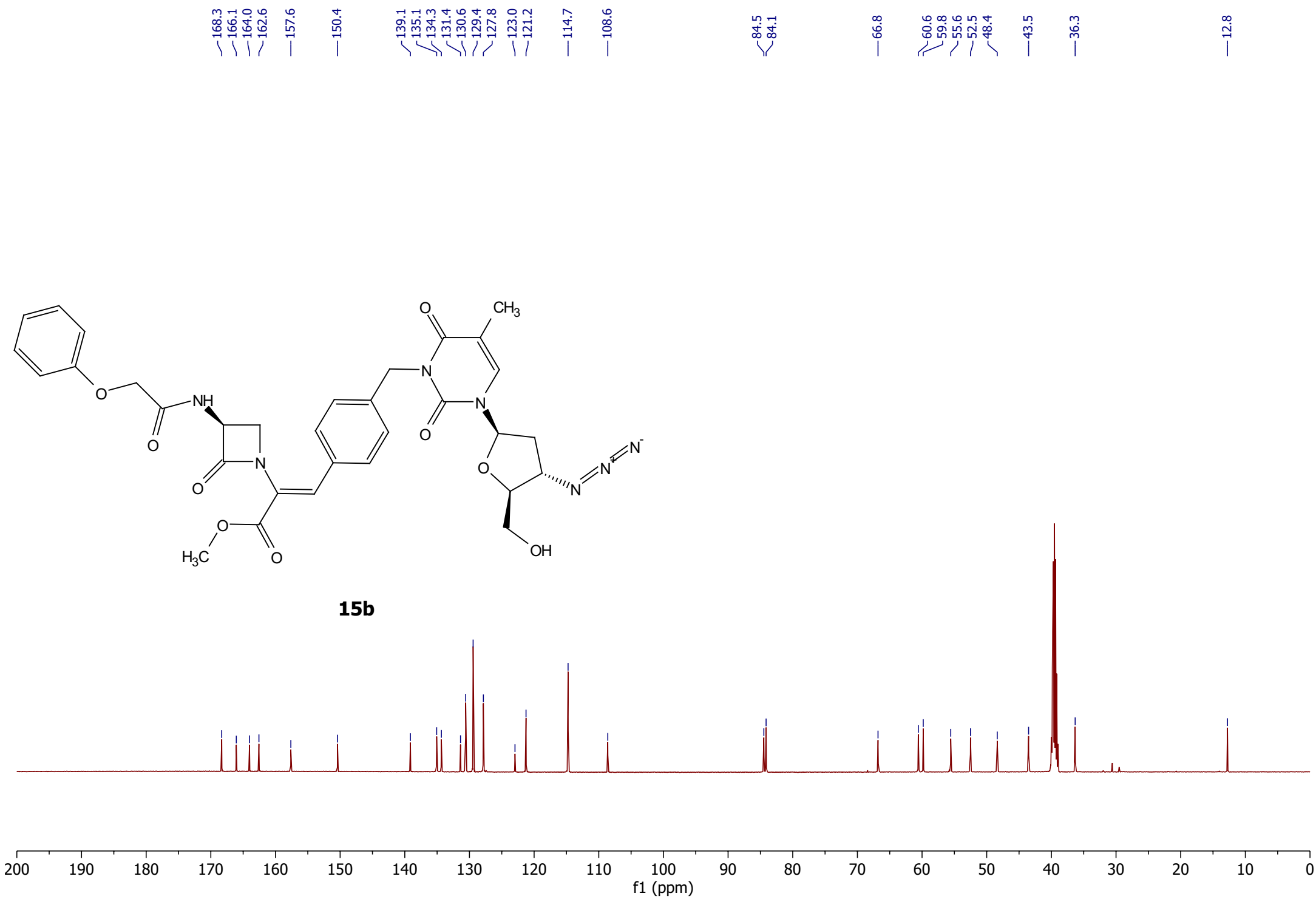
15a

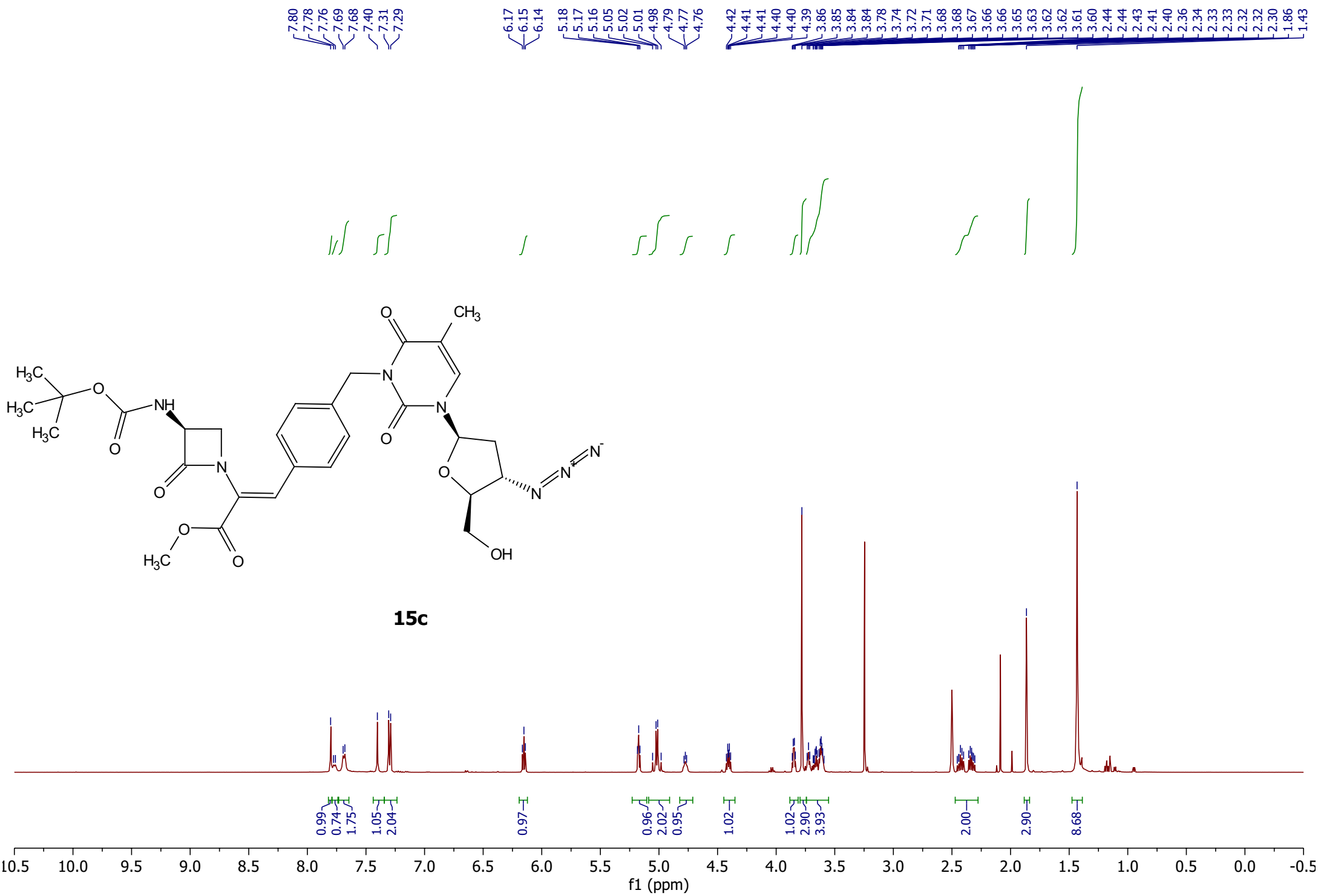
7.81
7.54
7.53
7.43
7.32
7.30
6.16
6.15
6.13
5.21
5.20
5.19
5.05
5.02
5.01
4.98
4.43
4.41
4.40
4.39
3.86
3.85
3.84
3.83
3.78
3.75
3.69
3.68
3.67
3.66
3.65
3.63
3.62
3.61
3.61
3.60
3.59
3.54
3.54
3.53
3.08
3.07
3.06
2.45
2.44
2.42
2.41
2.36
2.34
2.33
2.32
2.31
1.86
1.02
2.00
0.97
2.03
1.01
0.99
2.07
1.04
1.08
2.93
2.20
1.98
2.03
2.09
3.03
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

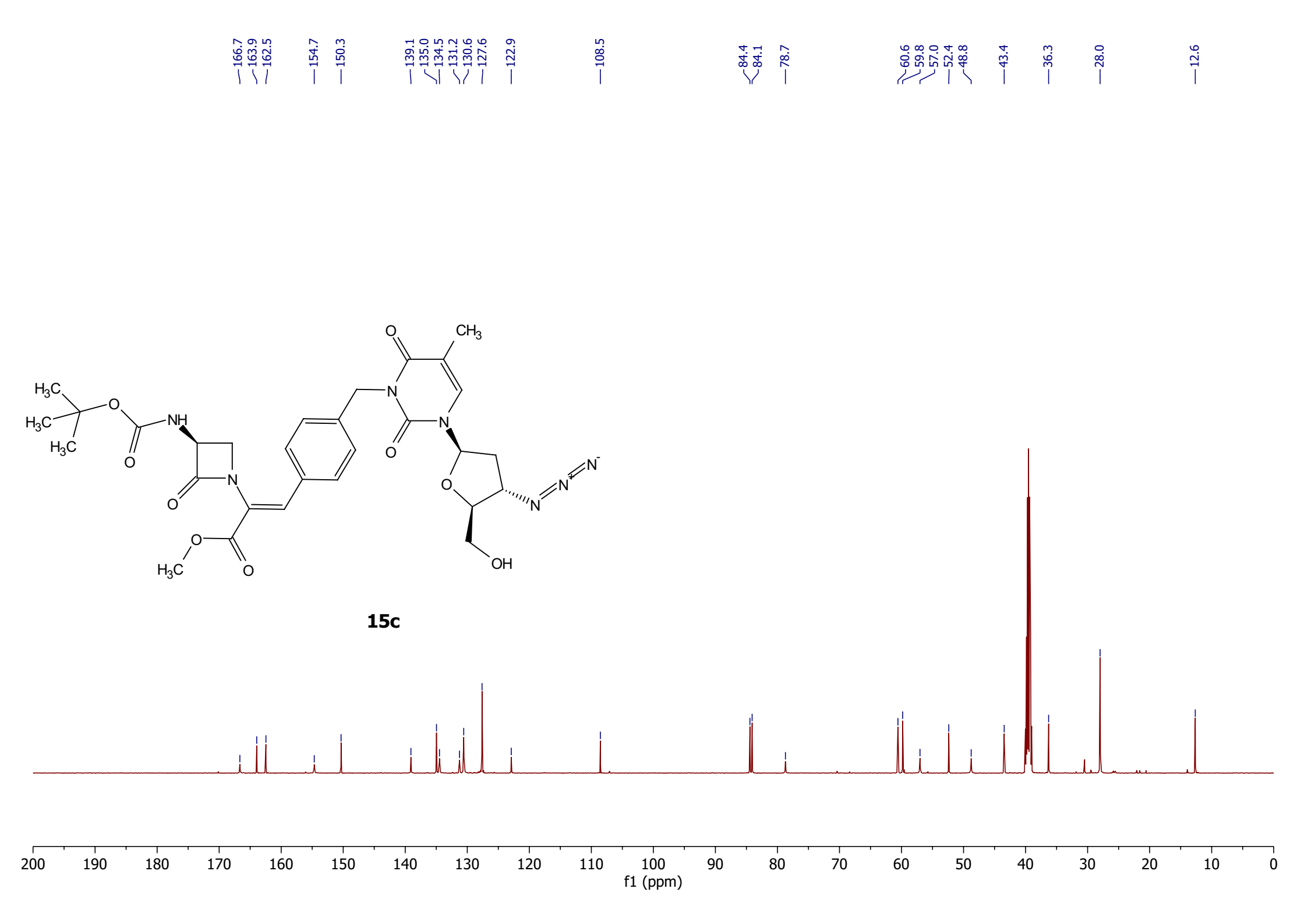

166.3
164.2
162.5
150.4
139.1
135.0
131.5
130.0
127.8
123.6
108.6
84.5
84.1
60.6
59.8
52.4
43.5
40.5
36.7
36.3
12.8
O
CH3
N
N
O
O
N
N+
N-
O
OH
H3C
O
O
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

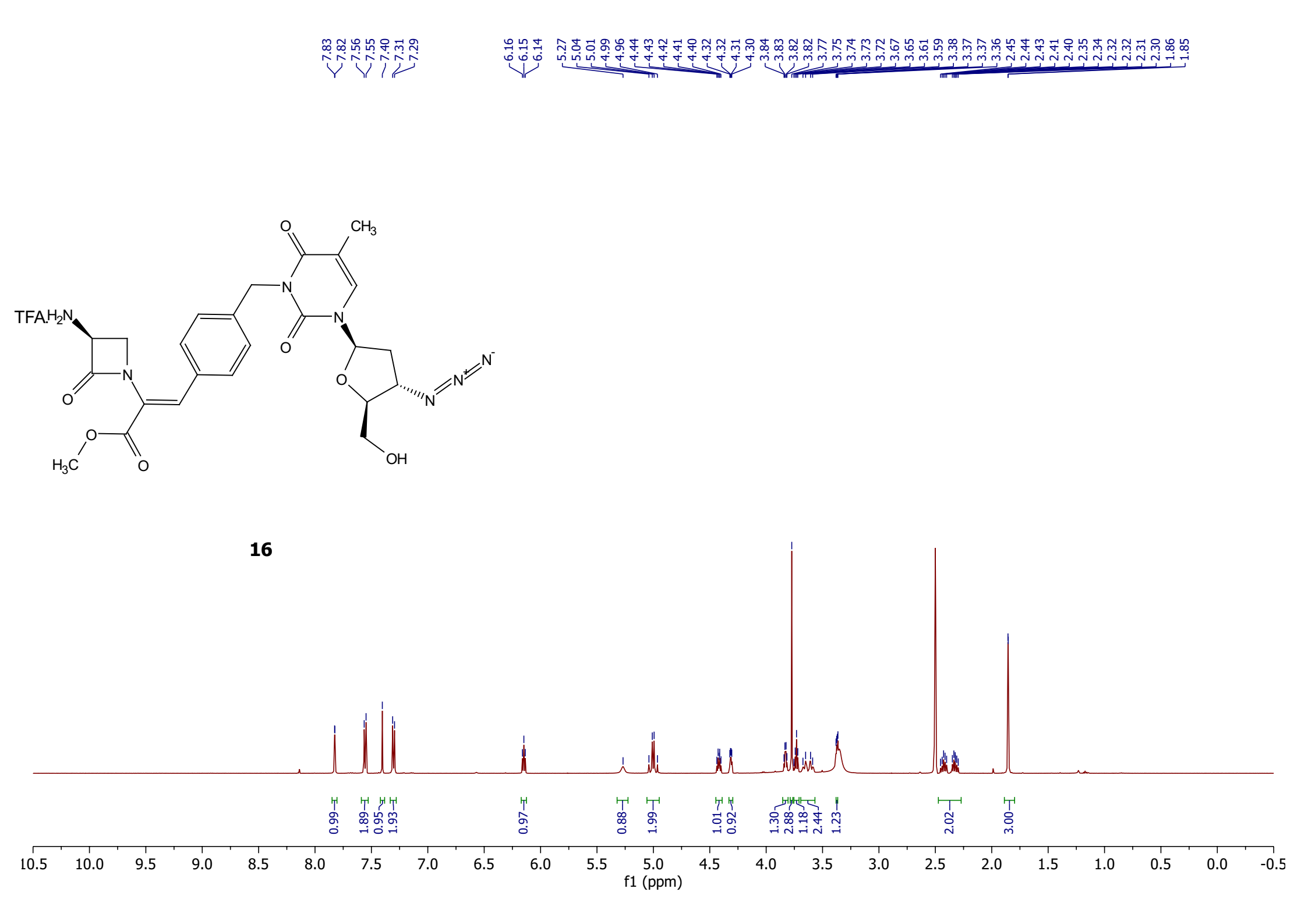
15a

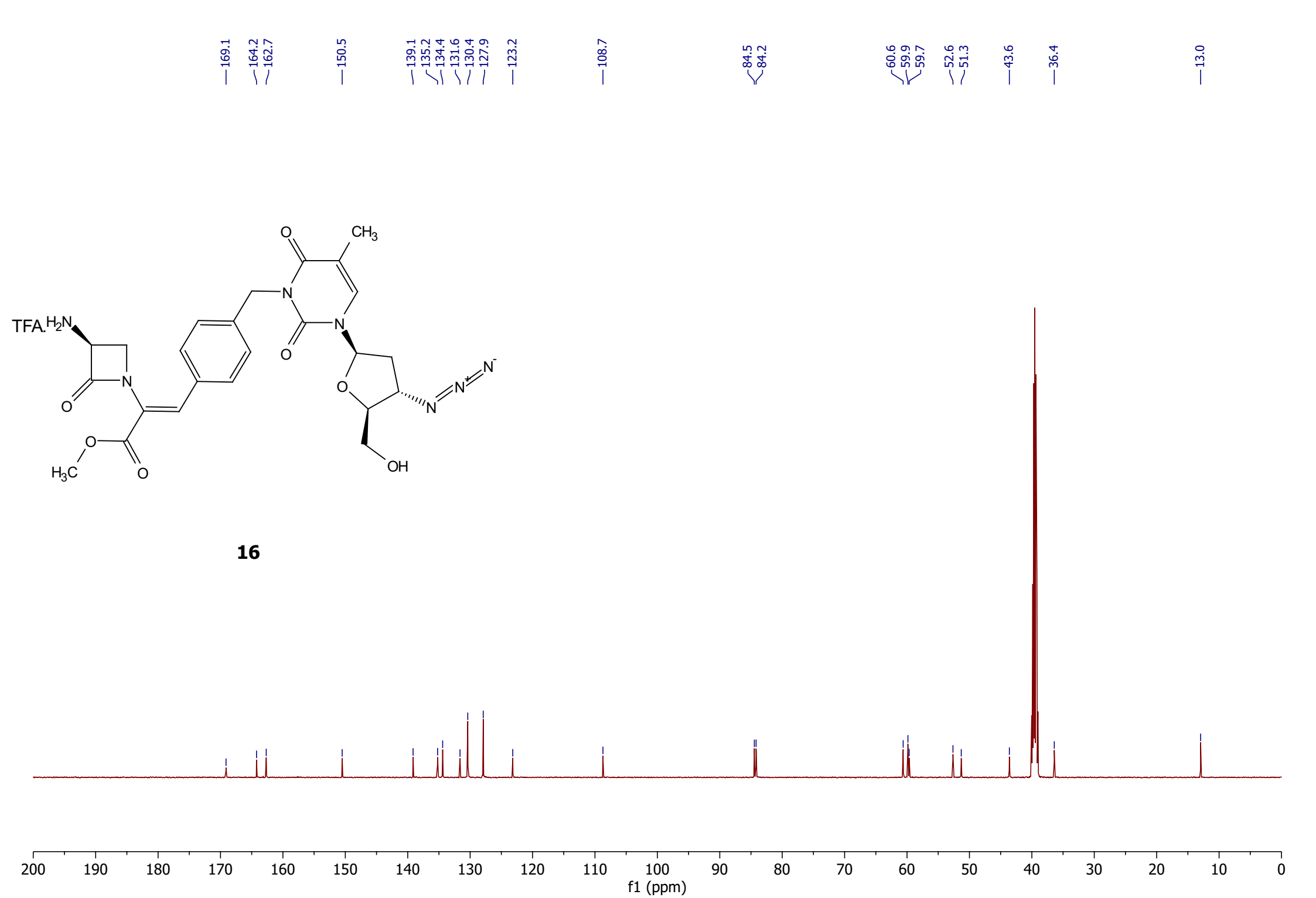

8.92
8.91
7.81
7.71
7.70
7.41
7.34
7.32
7.31
7.31
7.30
7.01
7.00
6.99
6.98
6.16
6.15
6.14
5.22
5.20
5.19
5.07
5.06
5.06
5.05
5.04
5.03
5.02
5.01
5.00
4.97
4.60
4.42
4.41
4.41
4.40
4.39
3.85
3.84
3.83
3.83
3.79
3.76
3.75
3.75
3.74
3.69
3.68
3.67
3.66
3.65
3.64
3.63
3.62
3.61
3.60
3.59
3.58
2.44
2.43
2.42
2.40
2.35
2.34
2.33
2.31
2.30
1.86
O
CH3
N
O
NH
N
O
O
N
N
O
O
N
N
O
H3C
O
OH
15b
0.93
1.25
2.00
1.20
4.02
3.17
1.17
1.11
2.79
2.13
1.17
1.23
3.17
1.92
2.17
1.14
1.08
3.12
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


168.3
166.1
164.0
162.6
157.6
150.4
139.1
135.1
134.3
131.4
130.6
129.4
127.8
123.0
121.2
114.7
108.6
84.5
84.1
66.8
60.6
59.8
55.6
52.5
48.4
43.5
36.3
12.8
O
CH3
N
NH
O
O
N
O
N
O
N
N
N
O
O
H3C
O
OH
15b
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

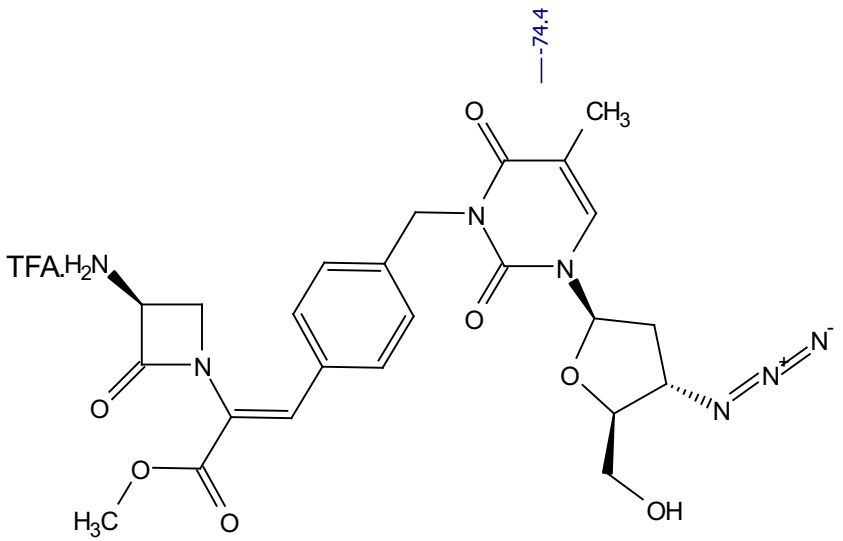

7.80
7.78
7.76
7.69
7.68
7.40
7.31
7.29
6.17
6.15
6.14
5.18
5.17
5.16
5.05
5.02
5.01
4.98
4.79
4.77
4.76
4.42
4.41
4.41
4.40
4.40
4.39
3.86
3.85
3.84
3.84
3.78
3.74
3.72
3.71
3.68
3.68
3.67
3.66
3.66
3.65
3.63
3.62
3.62
3.61
3.60
2.44
2.44
2.43
2.41
2.40
2.36
2.34
2.33
2.33
2.32
2.32
2.30
1.86
1.43
O
CH3
H3C
H3C
H3C
O
NH
O
N
O
N
O
O
N
N
N
N
O
H3C
O
O
OH
15c
0.99
0.74
1.75
1.05
2.04
0.97
0.96
2.02
0.95
1.02
1.02
2.90
3.93
2.00
2.90
8.68
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


166.7
163.9
162.5
154.7
150.3
139.1
135.0
134.5
131.2
130.6
127.6
122.9
108.5
84.4
84.1
78.7
60.6
59.8
57.0
52.4
48.8
43.4
36.3
28.0
12.6
15c
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


7.83
7.82
7.56
7.55
7.40
7.31
7.29
6.16
6.15
6.14
5.27
5.04
5.01
4.99
4.96
4.44
4.43
4.42
4.41
4.40
4.32
4.32
4.31
4.30
3.84
3.83
3.82
3.82
3.77
3.75
3.74
3.73
3.72
3.67
3.65
3.61
3.59
3.38
3.37
3.37
3.36
2.45
2.44
2.43
2.41
2.40
2.35
2.34
2.32
2.32
2.31
2.30
1.86
1.85
TFA.H2N
O
CH3
N
N
O
O
N
N
N+
N-
O
O
OH
O
H3C
O
16
0.99
1.89
0.95
1.93
0.97
0.88
1.99
1.01
0.92
1.30
2.88
1.18
2.44
1.23
2.02
3.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


169.1
164.2
162.7
150.5
139.1
135.2
134.4
131.6
130.4
127.9
123.2
108.7
84.5
84.2
60.6
59.9
59.7
52.6
51.3
43.6
36.4
13.0
TFA.H2N
CH3
OH
H3C
f1 (ppm)

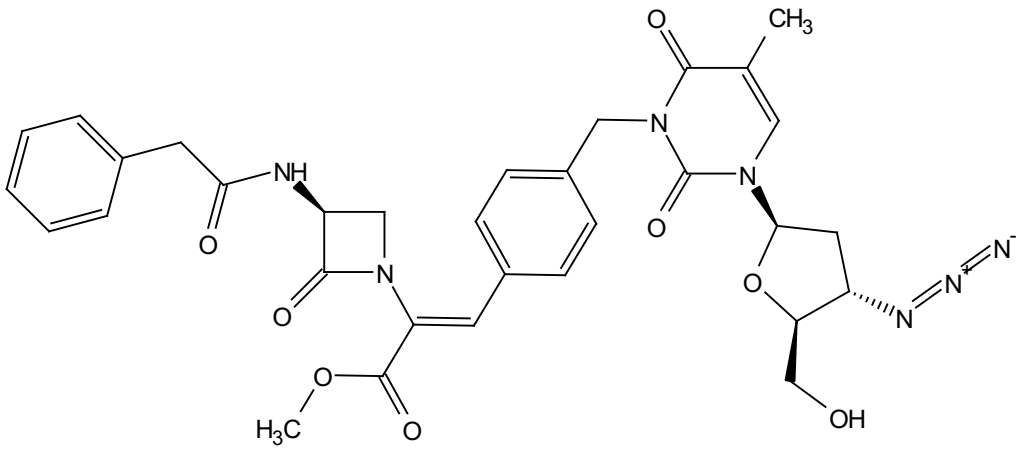
16



16

-10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260 -270 -280 -290 -300

f1 (ppm)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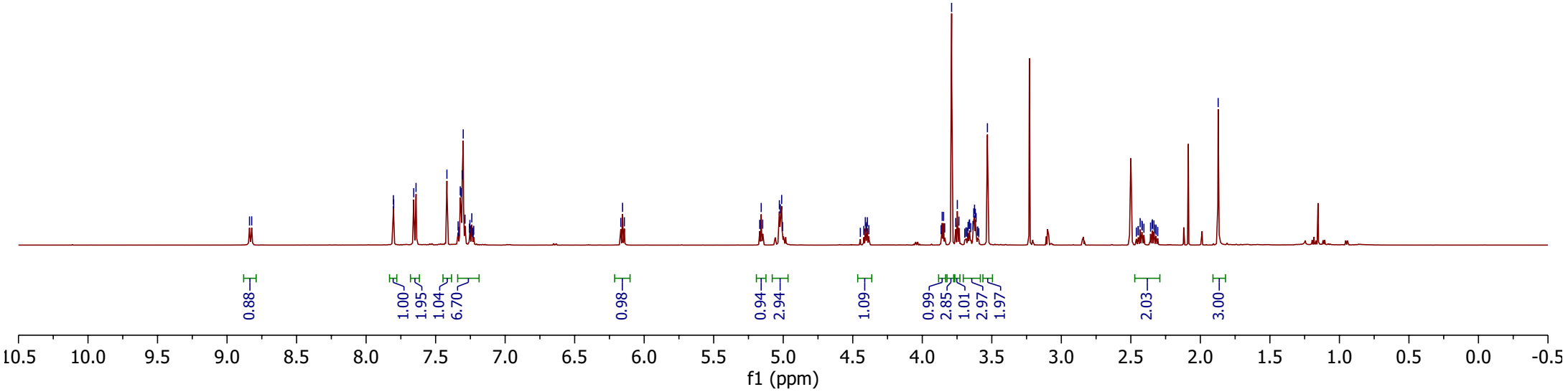
CH3
N
NH
N
O
O
N
O
O
N
N
N
O
O
H3C
O
OH

17d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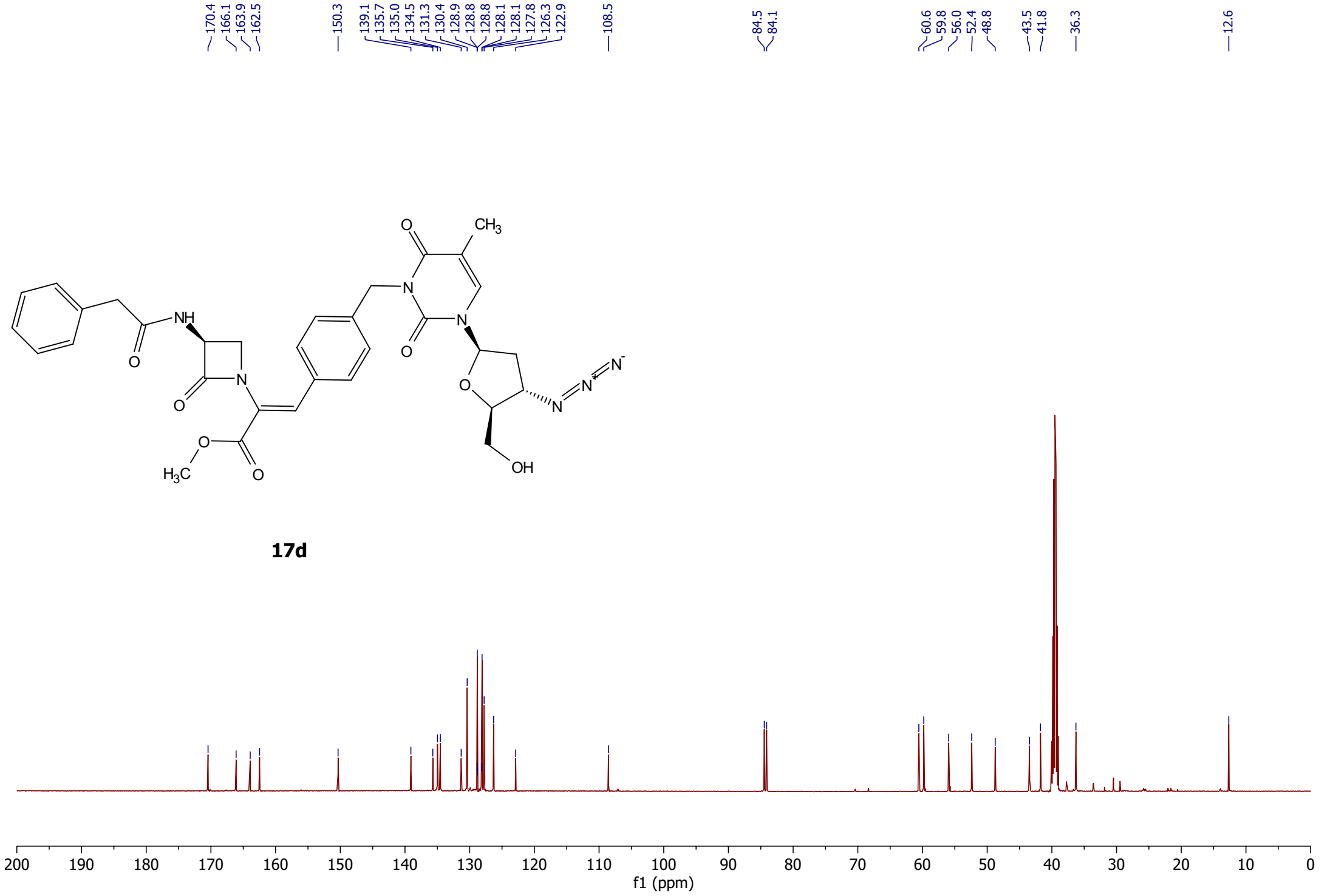
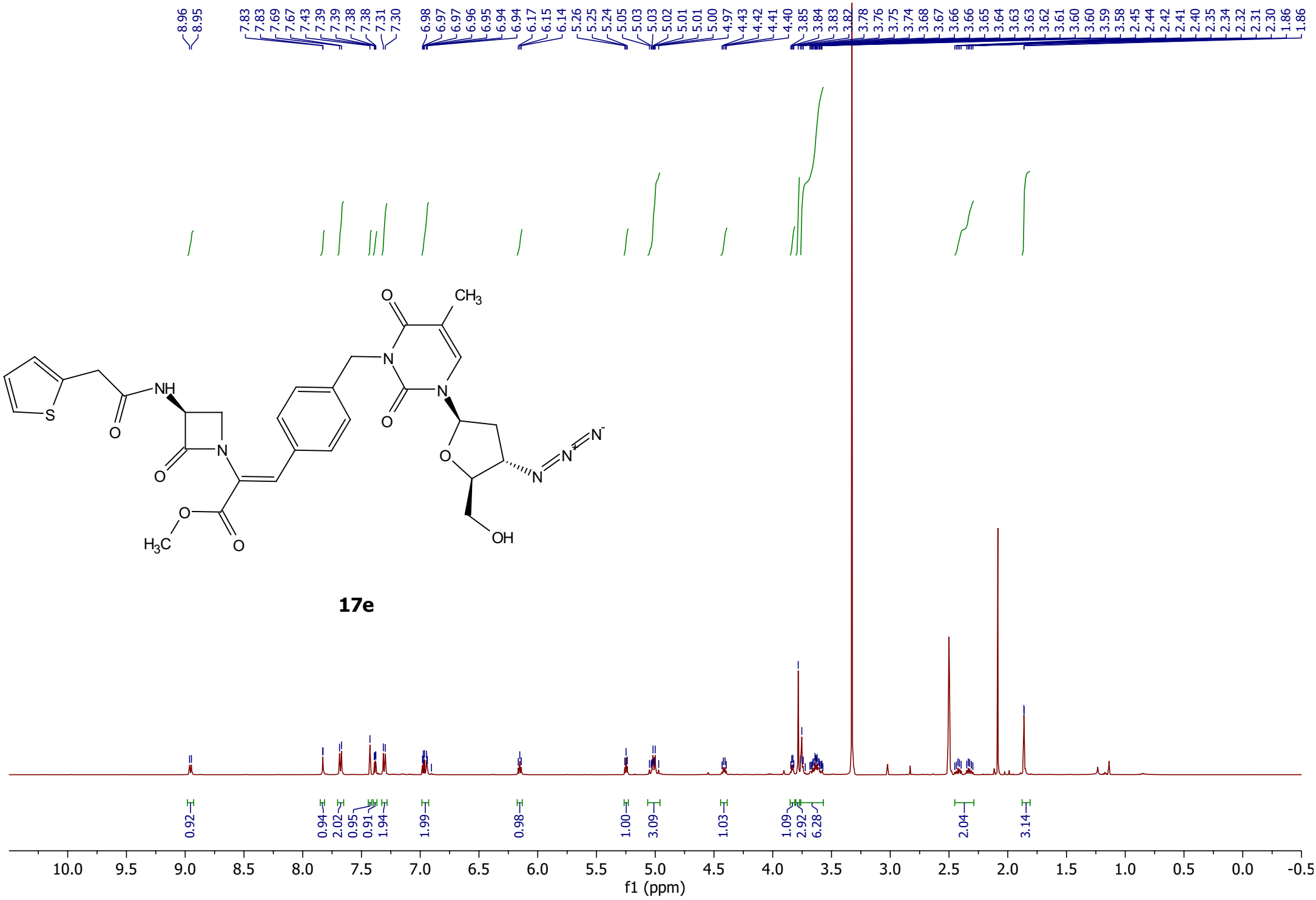
1.95
1.04
6.70
0.98
0.94
2.94
1.09
0.99
2.85
1.01
2.97
1.97
2.03
3.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


170.4
166.1
163.9
162.5
150.3
139.1
135.7
135.0
134.5
131.3
130.4
128.9
128.8
128.8
128.1
128.1
127.8
126.3
122.9
108.5
84.5
84.1
60.6
59.8
56.0
52.4
48.8
43.5
41.8
36.3
12.6
NH
O
N
O
O
O
CH3
N
N
O
N
N
N
O
OH
H3C
O
O
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

17d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8.95
7.83
7.83
7.69
7.67
7.43
7.39
7.39
7.38
7.38
7.31
7.30
6.98
6.97
6.97
6.96
6.95
6.94
6.94
6.17
6.15
6.14
5.26
5.25
5.24
5.05
5.03
5.03
5.02
5.01
5.01
5.00
4.97
4.43
4.42
4.41
4.40
3.85
3.84
3.83
3.82
3.78
3.76
3.75
3.74
3.68
3.67
3.66
3.66
3.65
3.64
3.63
3.63
3.62
3.61
3.60
3.60
3.59
3.58
2.45
2.44
2.42
2.41
2.40
2.35
2.34
2.32
2.31
2.30
1.86
1.86
O
CH3
N
NH
S
O
N
N
O
O
N
N
N
O
O
O
H3C
O
OH
17e
0.92
0.94
2.02
0.95
0.91
1.94
1.99
0.98
1.00
3.09
1.03
1.09
2.92
6.28
2.04
3.14
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
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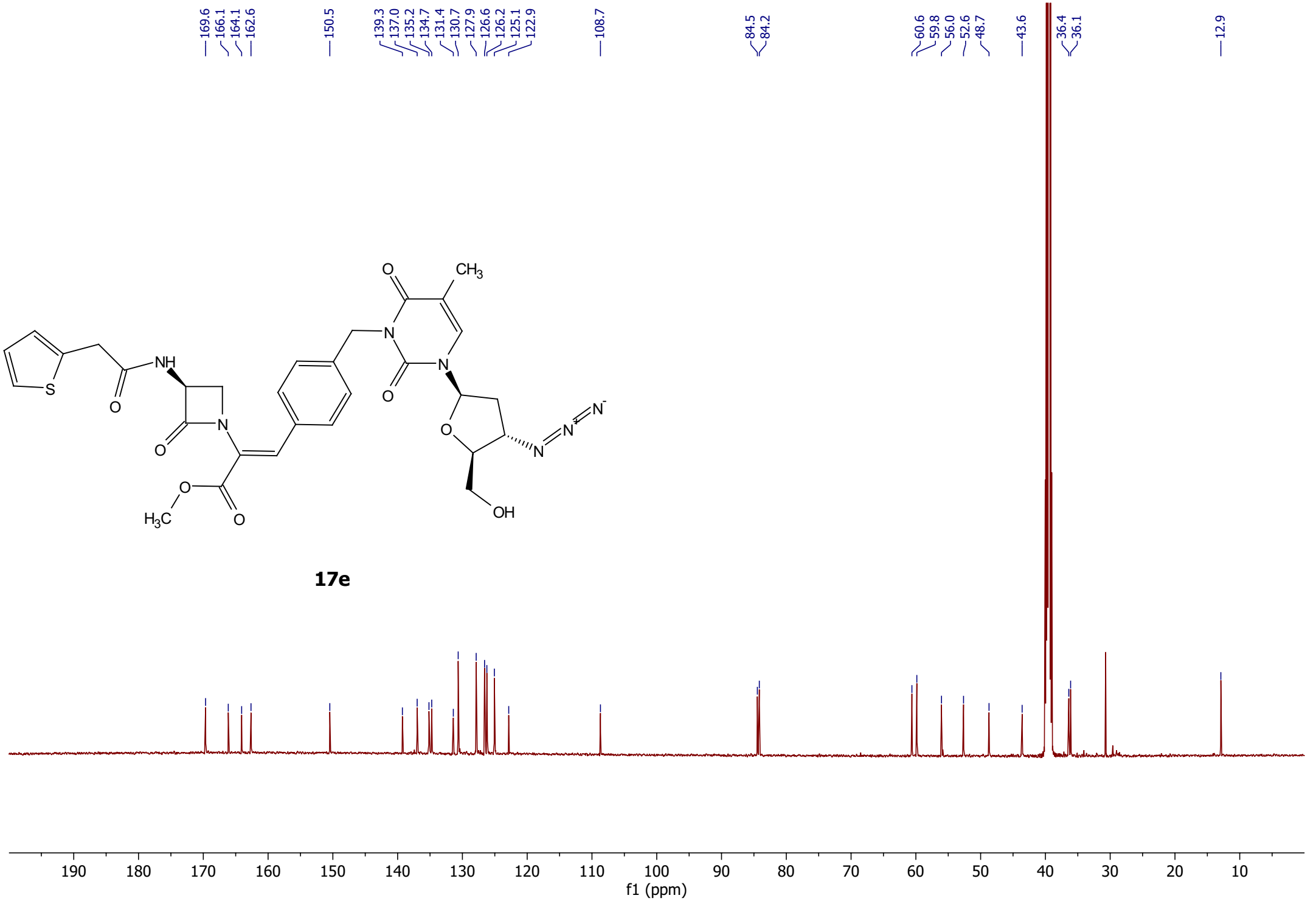
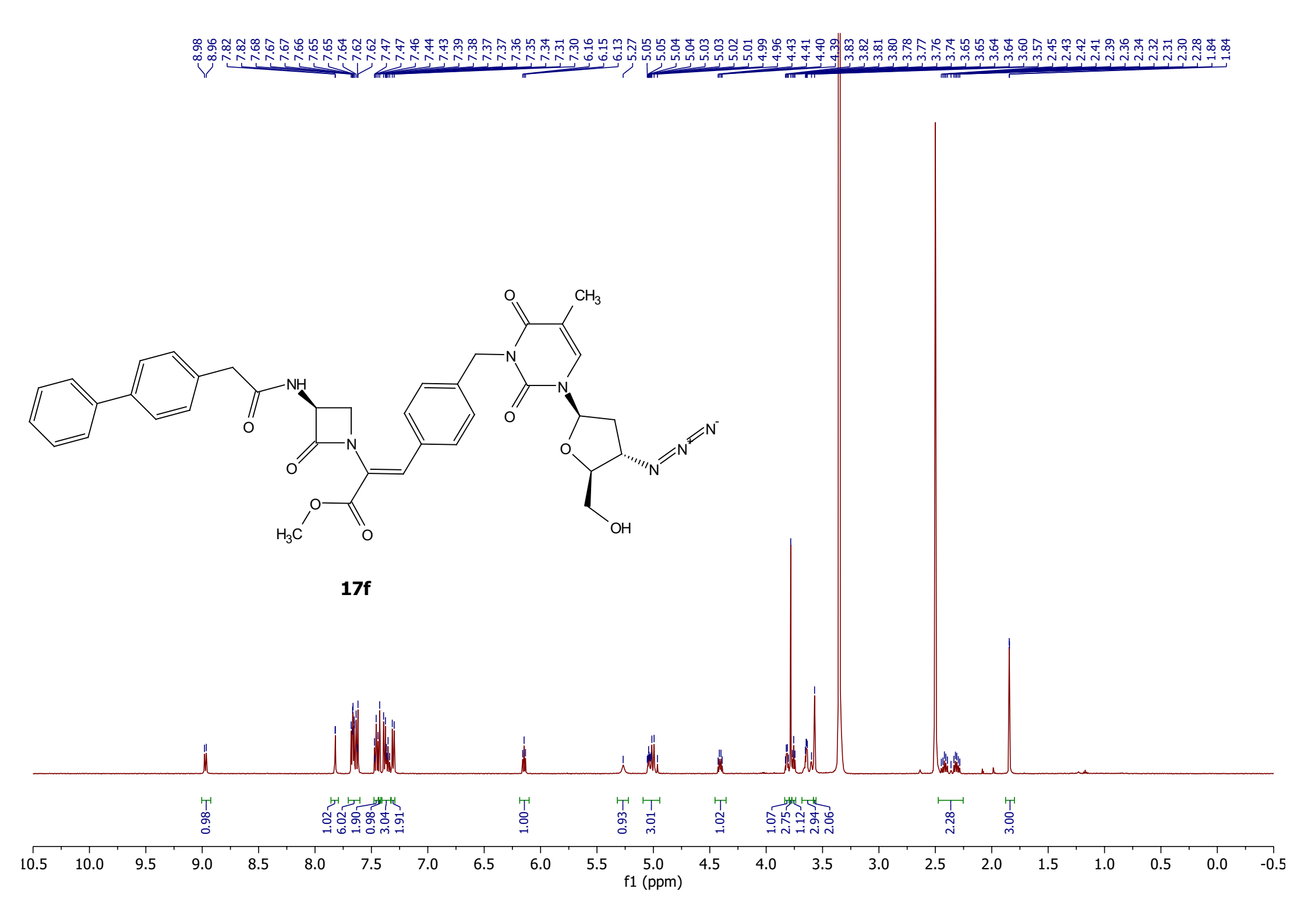
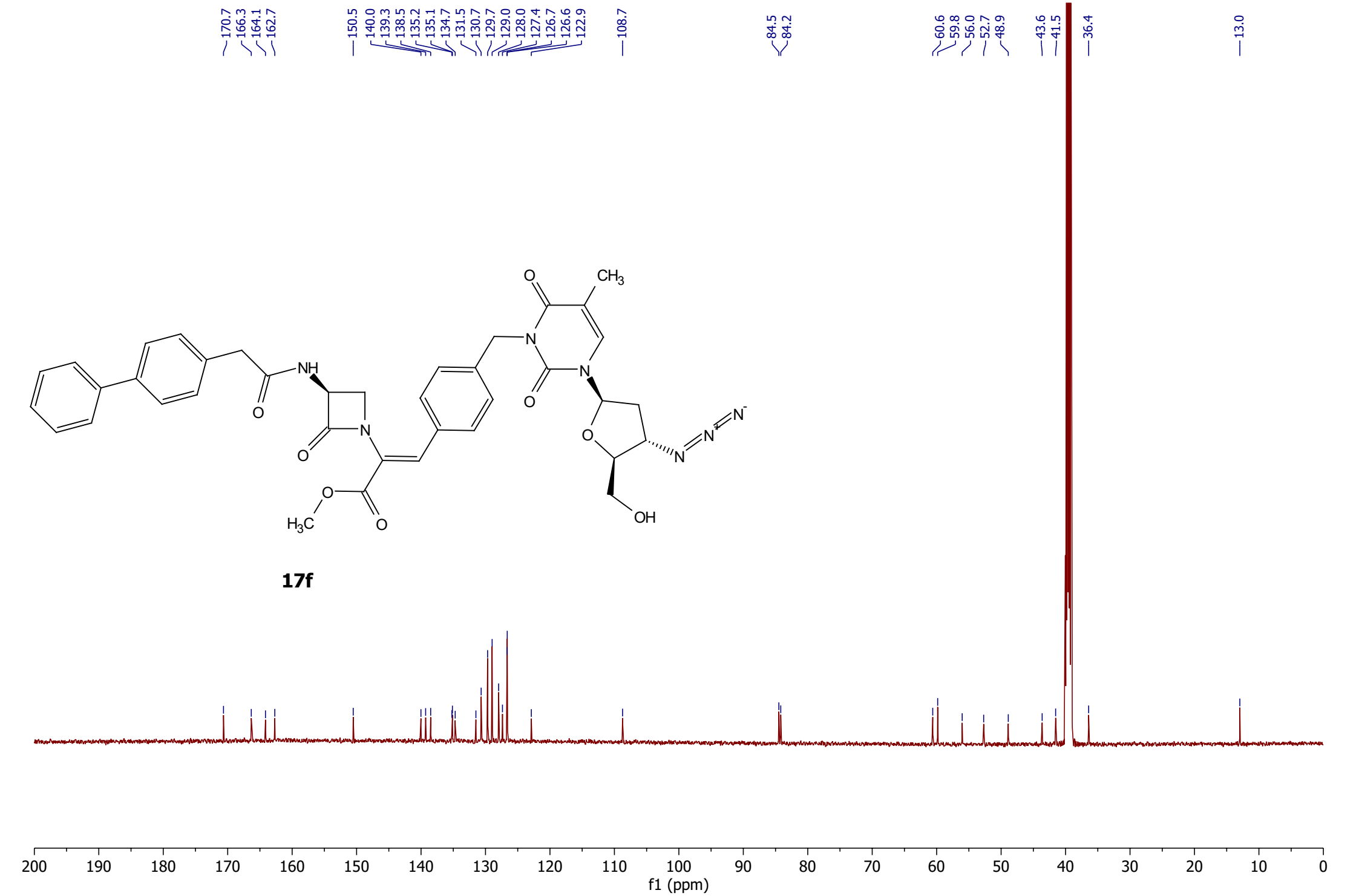
0.5
0.0
-0.5
f1 (ppm)


169.6
166.1
164.1
162.6
150.5
139.3
137.0
135.2
134.7
131.4
130.7
127.9
126.6
126.2
125.1
122.9
108.7
84.5
84.2
60.6
59.8
56.0
52.6
48.7
43.6
36.4
36.1
12.9
CH3
NH
S
O
N
H3C
OH
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
f1 (ppm)

17e


8.98 8.96 7.82 7.82 7.68 7.67 7.67 7.66 7.65 7.65 7.64 7.62 7.62 7.47 7.47 7.46 7.44 7.43 7.39 7.38 7.37 7.37 7.36 7.35 7.34 7.31 7.30 6.16 6.15 6.13 5.27 5.05 5.05 5.04 5.04 5.03 5.02 5.01 4.99 4.96 4.43 4.41 4.40 4.39 3.83 3.82 3.81 3.80 3.78 3.77 3.76 3.74 3.65 3.65 3.64 3.64 3.60 3.57 2.45 2.43 2.42 2.41 2.39 2.36 2.34 2.32 2.31 2.30 2.28 1.84 1.84
NH
O
N
O
O
O
N
CH3
N
O
O
N
N
N
O
OH
H3C
O
O
17f
0.98 1.02 6.02 1.90 0.98 3.04 1.91 1.00 0.93 3.01 1.02 1.07 2.75 1.12 2.94 2.06 2.28 3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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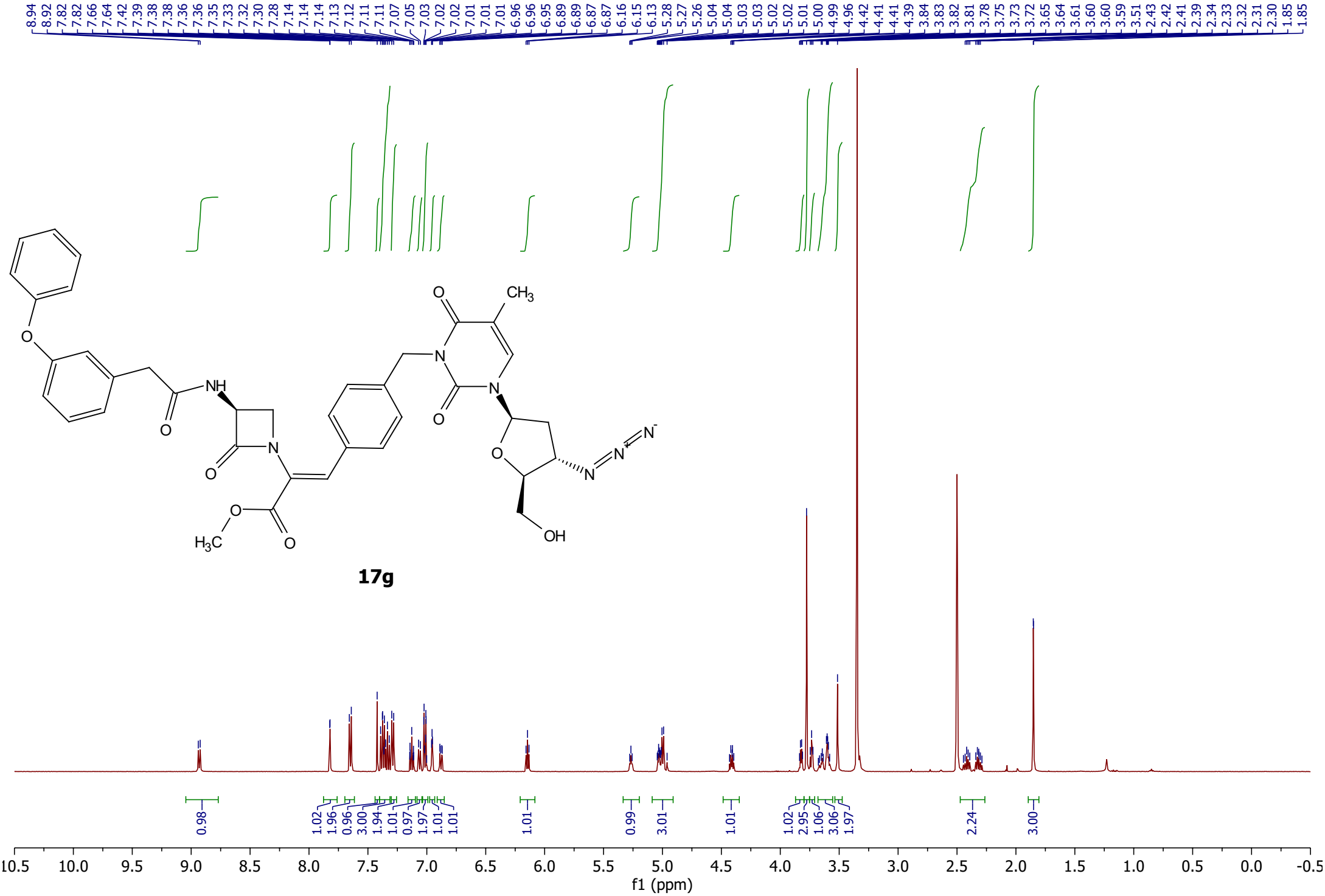
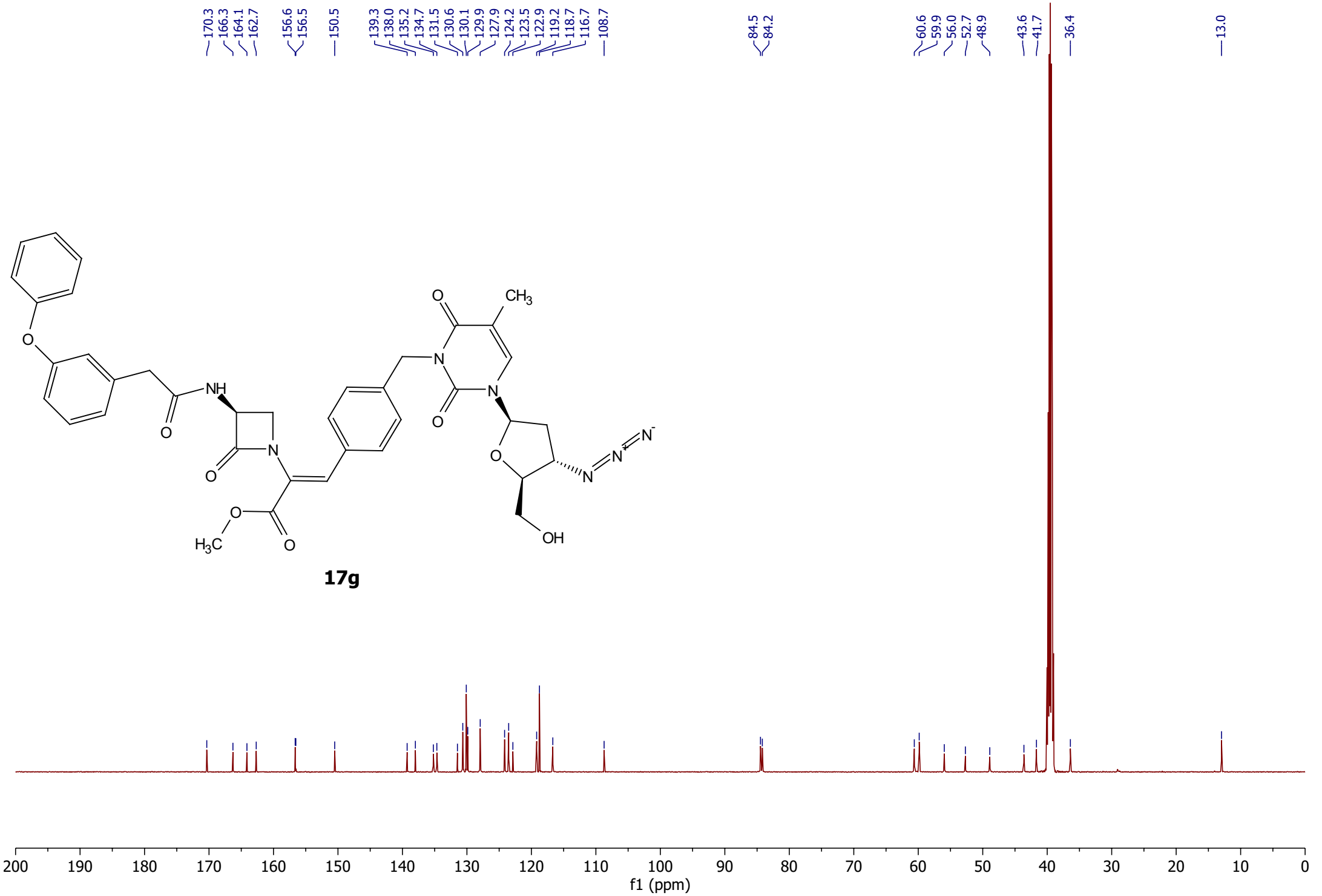
166.3
164.1
162.7
150.5
140.0
139.3
138.5
135.2
135.1
134.7
131.5
130.7
129.7
129.0
128.0
127.4
126.7
126.6
122.9
108.7
84.5
84.2
60.6
59.8
56.0
52.7
48.9
43.6
41.5
36.4
13.0
O
CH3
N
NH
O
N
O
N
O
O
N
N
N
N
O
O
H3C
O
OH
17f
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


8.94 8.92 7.82 7.82 7.66 7.64 7.42 7.39 7.38 7.38 7.36 7.36 7.35 7.33 7.32 7.30 7.28 7.14 7.14 7.14 7.13 7.12 7.11 7.11 7.07 7.05 7.03 7.02 7.02 7.01 7.01 7.01 6.96 6.96 6.95 6.89 6.89 6.87 6.87 6.16 6.15 6.13 5.28 5.27 5.26 5.04 5.04 5.03 5.03 5.02 5.02 5.01 5.00 4.99 4.96 4.42 4.41 4.41 4.39 3.84 3.83 3.82 3.81 3.78 3.75 3.73 3.72 3.65 3.64 3.61 3.60 3.60 3.59 3.51 2.43 2.42 2.41 2.39 2.34 2.33 2.32 2.31 2.30 1.85 1.85
O
NH
O
N
O
O
N
CH3
O
N
N
O
O
N
N+
N-
OH
O
O
H3C
O
17g
0.98
1.02
1.96
0.96
3.00
1.94
1.01
0.97
1.97
1.01
1.01
1.01
0.99
3.01
1.01
1.02
2.95
1.06
3.06
1.97
2.24
3.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)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166.3
164.1
162.7
156.6
156.5
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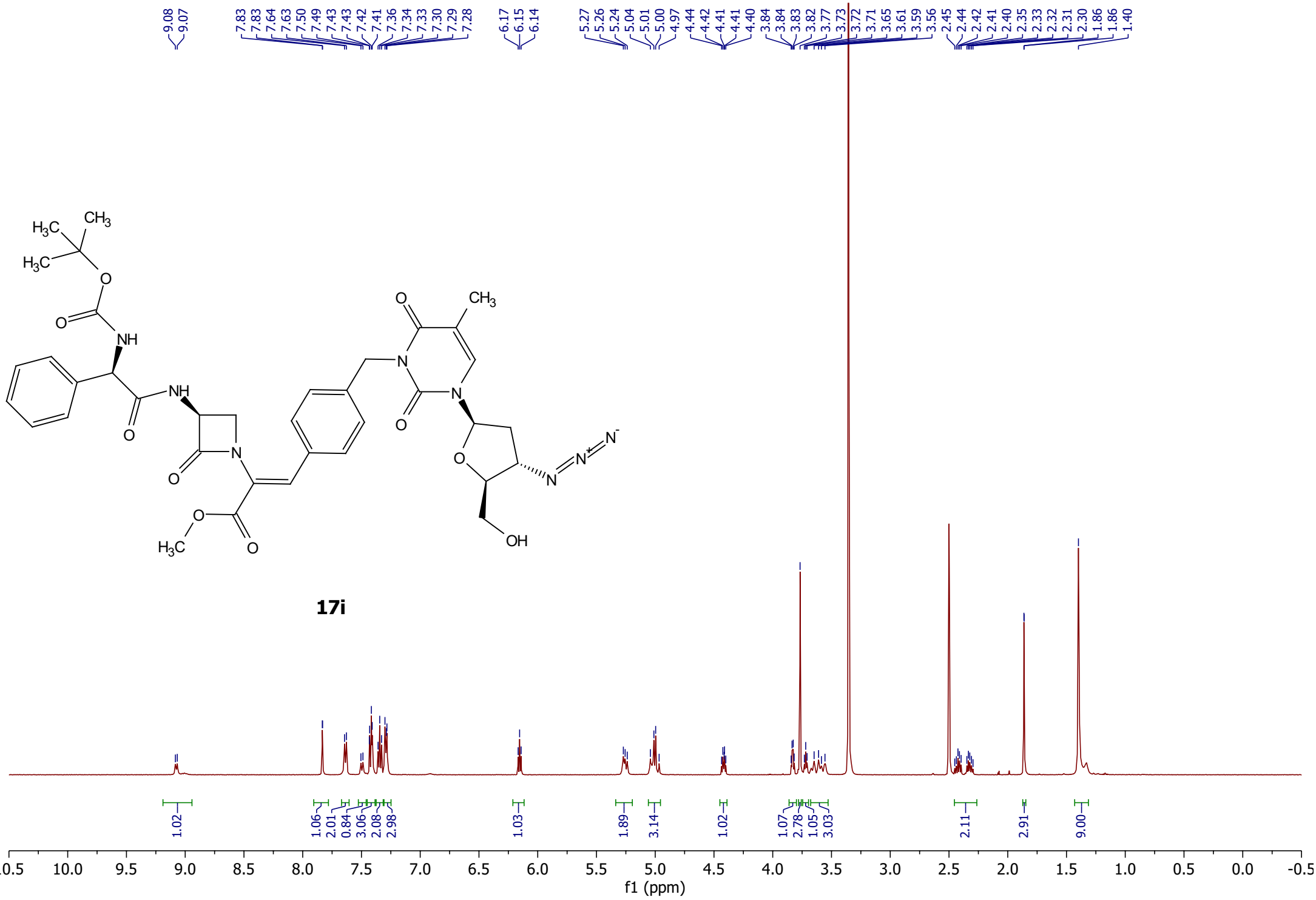
139.3
138.0
135.2
134.7
131.5
130.6
130.1
129.9
127.9
124.2
123.5
122.9
119.2
118.7
116.7
108.7
84.5
84.2
60.6
59.9
56.0
52.7
48.9
43.6
41.7
36.4
13.0
O
NH
O
N
O
O
CH3
N
N
O
O
N
N+
N-
OH
H3C
O
O
17g
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)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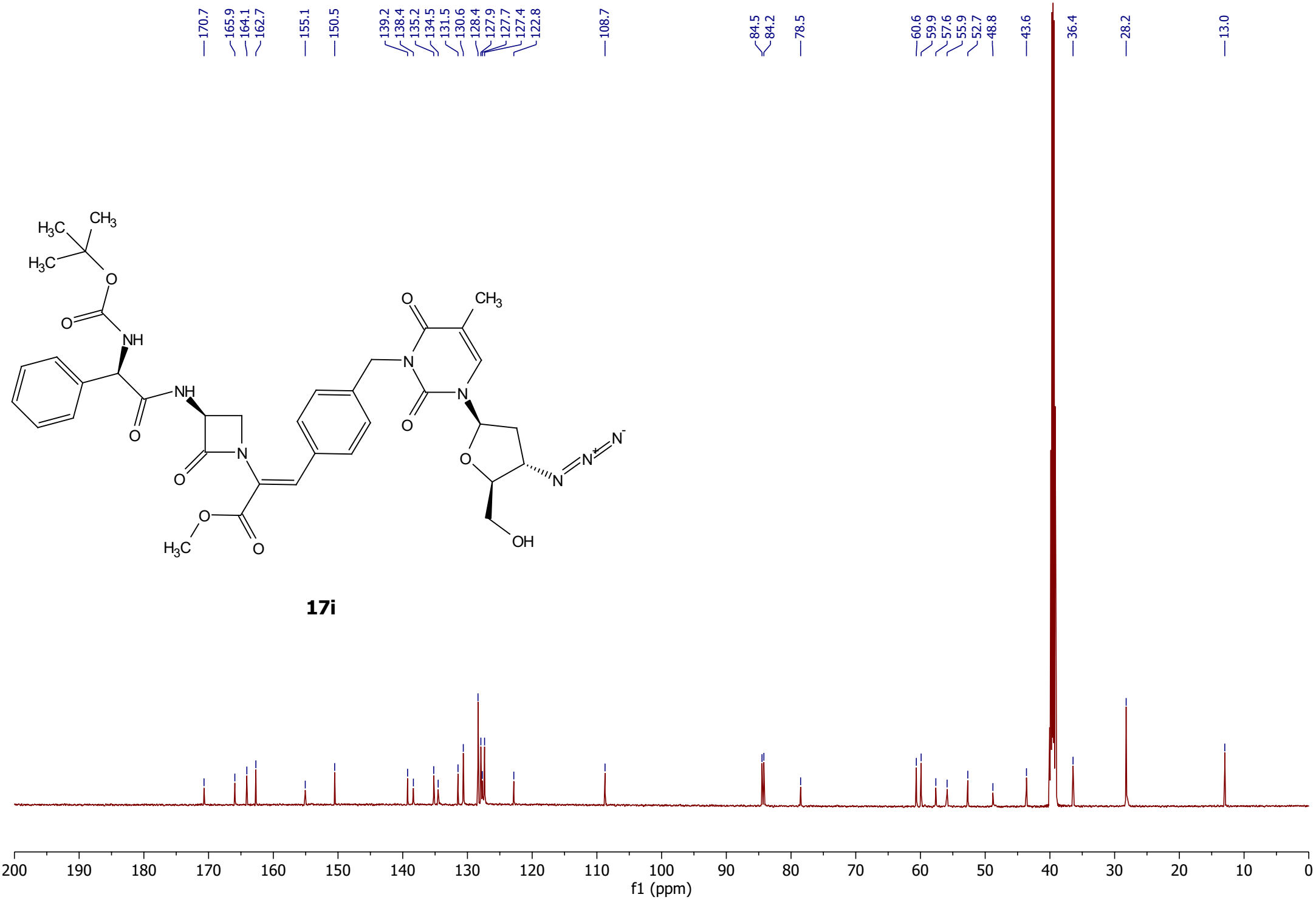
9.07
7.83
7.83
7.64
7.63
7.50
7.49
7.43
7.43
7.42
7.41
7.36
7.34
7.33
7.30
7.29
7.28
6.17
6.15
6.14
5.27
5.26
5.24
5.04
5.01
5.00
4.97
4.44
4.42
4.41
4.41
4.40
3.84
3.84
3.83
3.82
3.77
3.73
3.72
3.71
3.65
3.61
3.59
3.56
2.45
2.44
2.42
2.41
2.40
2.35
2.33
2.32
2.31
2.30
1.86
1.86
1.40
17i
1.02
1.06
2.01
0.84
3.06
2.08
2.98
1.03
1.89
3.14
1.02
1.07
2.78
1.05
3.03
2.11
2.91
9.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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165.9
164.1
162.7
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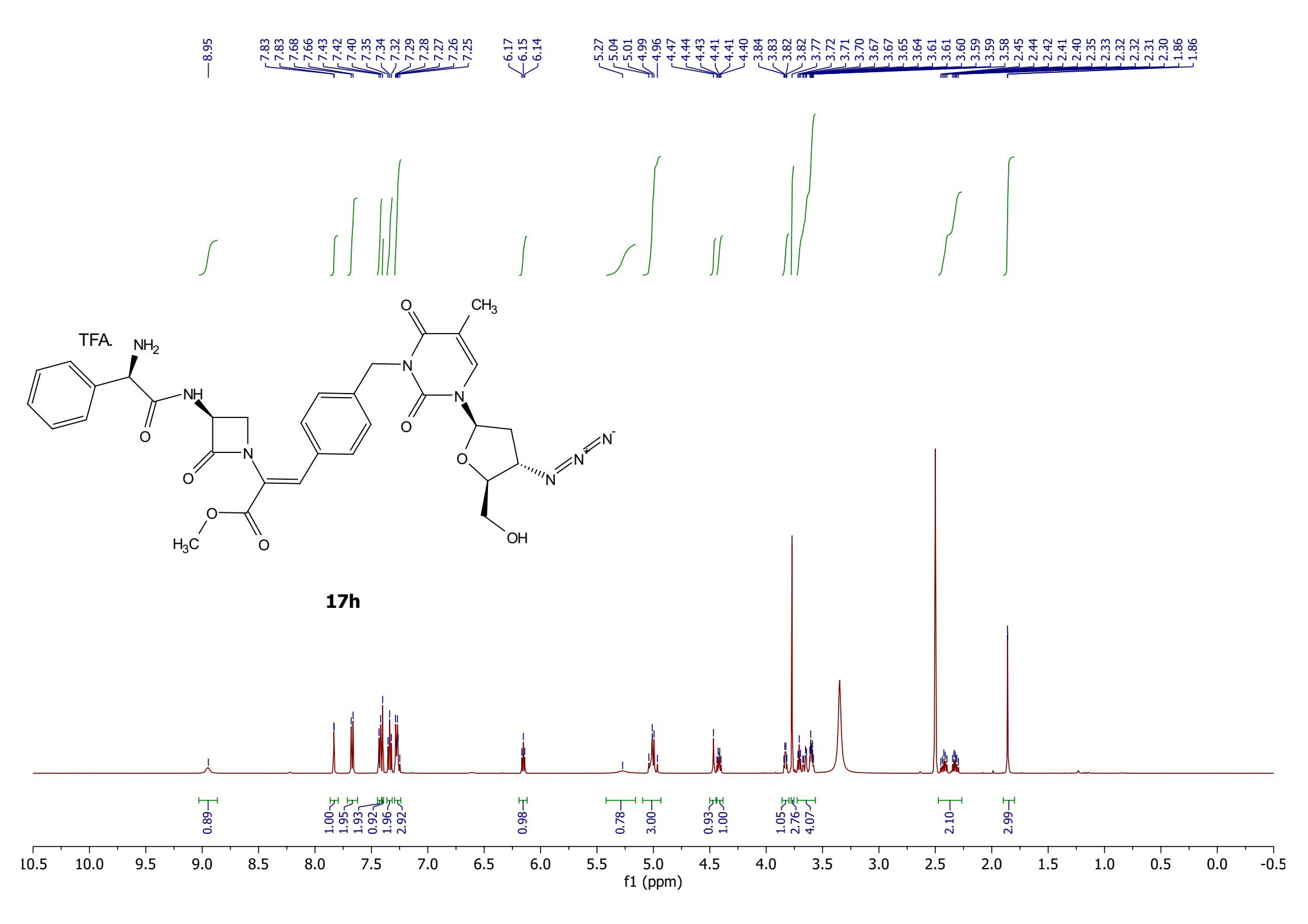
150.5
139.2
138.4
135.2
134.5
131.5
130.6
128.4
127.9
127.7
127.4
122.8
108.7
84.5
84.2
78.5
60.6
59.9
57.6
55.9
52.7
48.8
43.6
36.4
28.2
13.0
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

17i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7.83
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7.43
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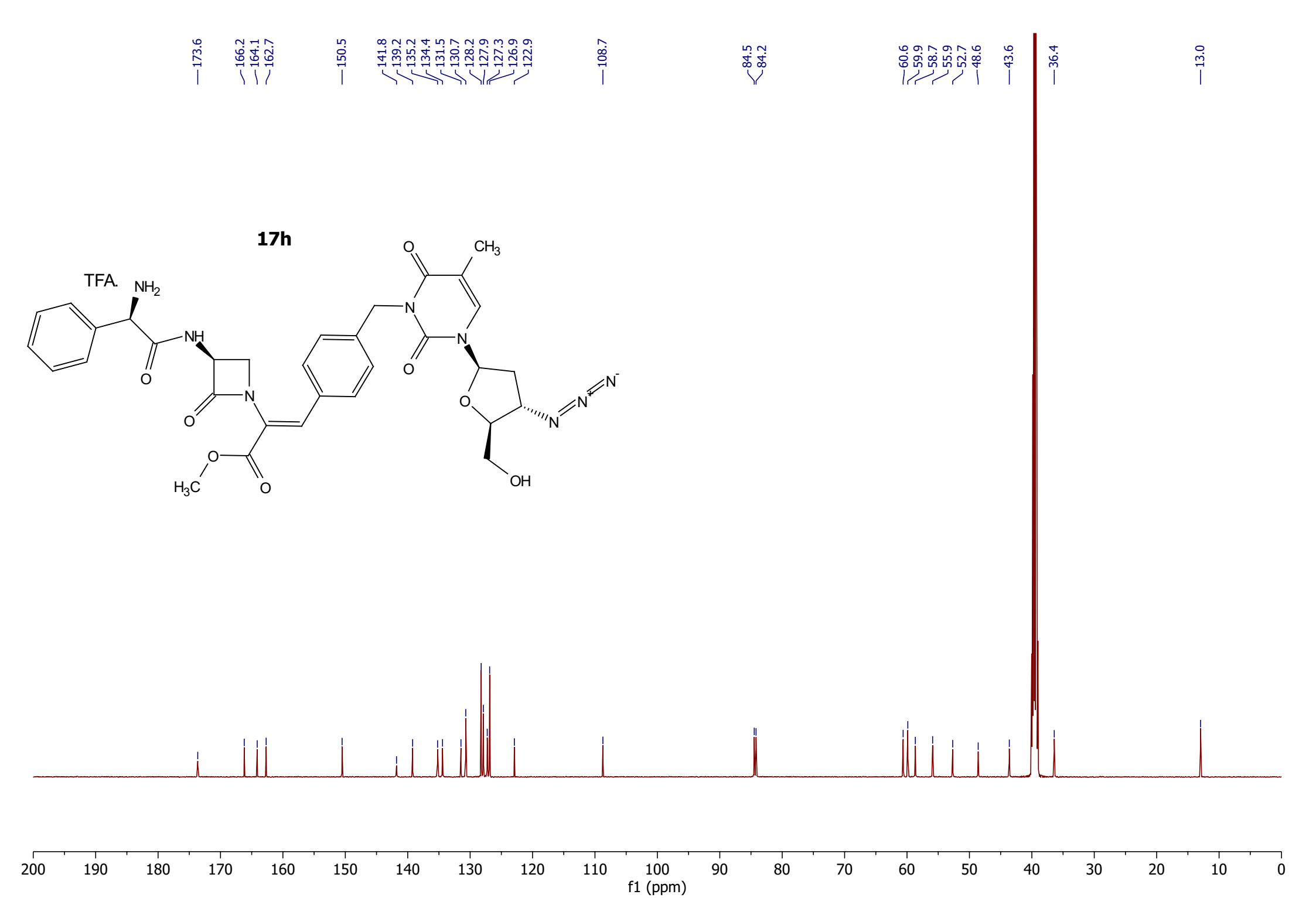
7.40
7.35
7.34
7.32
7.29
7.28
7.27
7.26
7.25
6.17
6.15
6.14
5.27
5.04
5.01
4.99
4.96
4.47
4.44
4.43
4.41
4.41
4.40
3.84
3.83
3.82
3.82
3.77
3.72
3.71
3.70
3.67
3.67
3.65
3.64
3.61
3.61
3.60
3.59
3.59
3.58
2.45
2.44
2.42
2.41
2.40
2.35
2.33
2.32
2.32
2.31
2.30
1.86
1.86
TFA.
NH2
NH
O
O
N
O
O
N
N
O
CH3
O
N
N
N
N
O
OH
O
H3C
O
17h
0.89
1.00
1.95
1.93
0.92
1.96
2.92
0.98
0.78
3.00
0.93
1.00
1.05
2.76
4.07
2.10
2.99
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)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166.2
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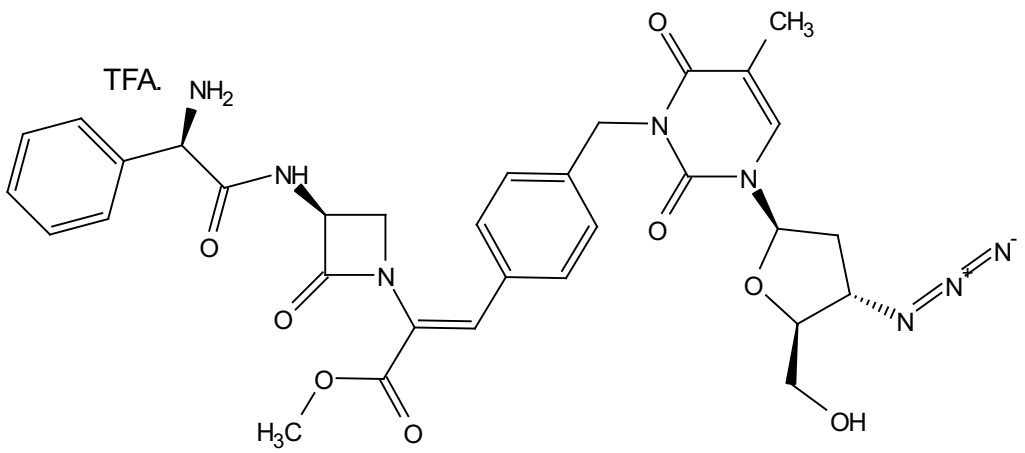
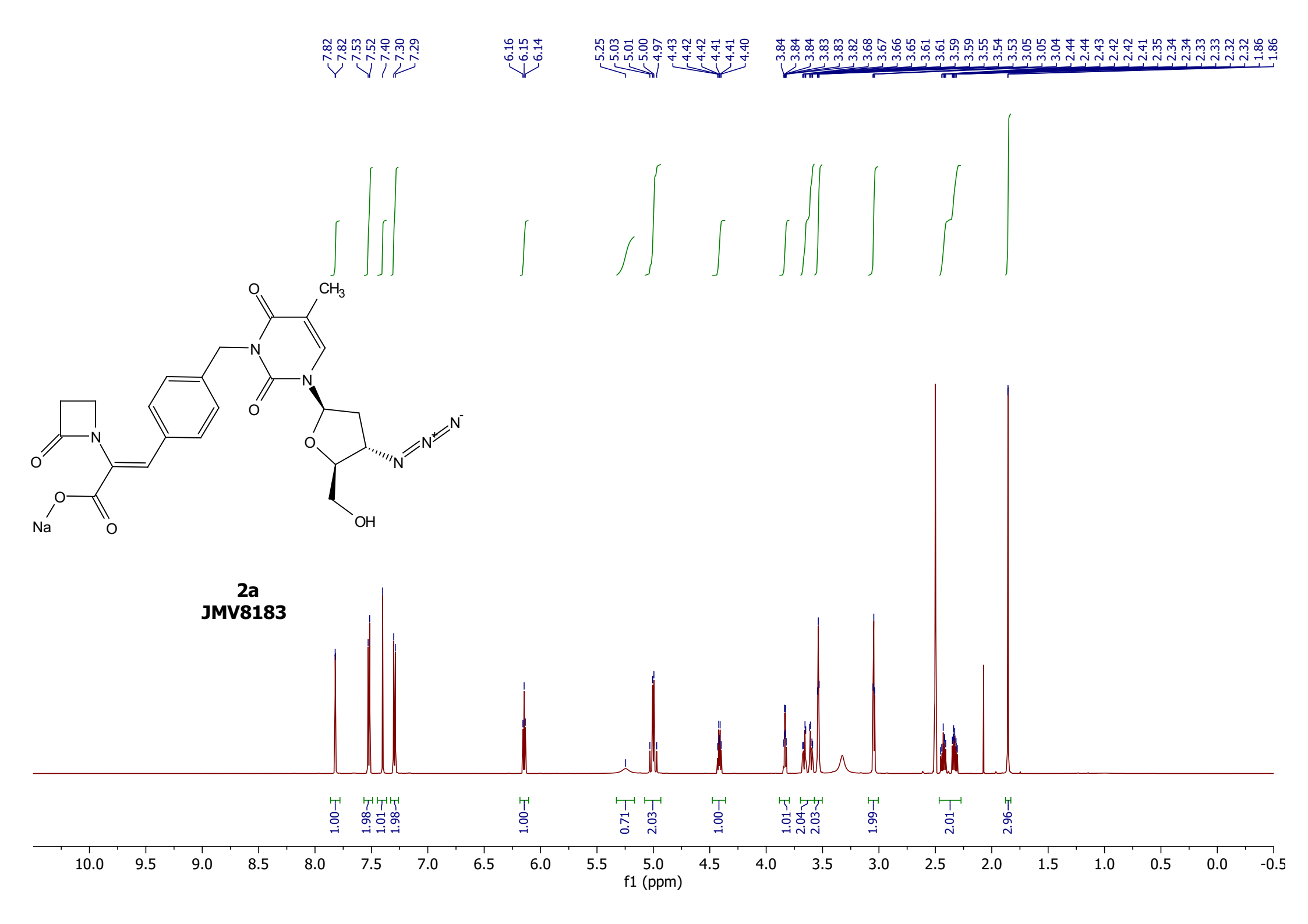
141.8
139.2
135.2
134.4
131.5
130.7
128.2
127.9
127.3
126.9
122.9
108.7
84.5
84.2
60.6
59.9
58.7
55.9
52.7
48.6
43.6
36.4
13.0
17h
TFA.
NH2
NH
O
N
O
O
CH3
N
N
O
O
O
N
N
N
O
H3C
O
OH
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


TFA.
NH2
NH
O
N
O
O
O
H3C
O
N
O
CH3
N
O
N
N
N
N
OH

17h

-73.4
-25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85 -90 -95 -100 -105 -110 -115 -120 -125 -130 -135 -140 -145 -150 -155 -160 -165 -170 -175
f1 (ppm)


7.82
7.82
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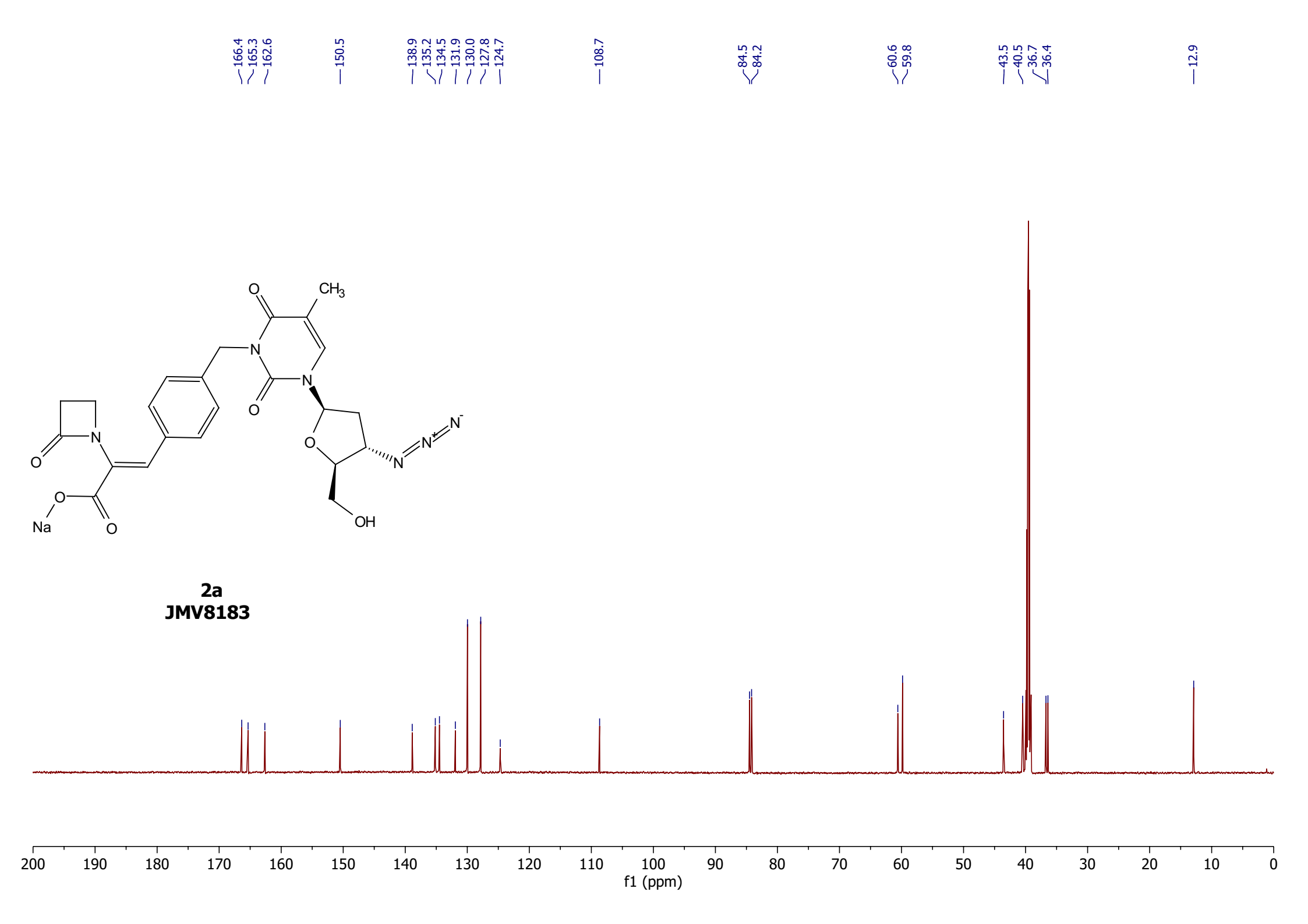
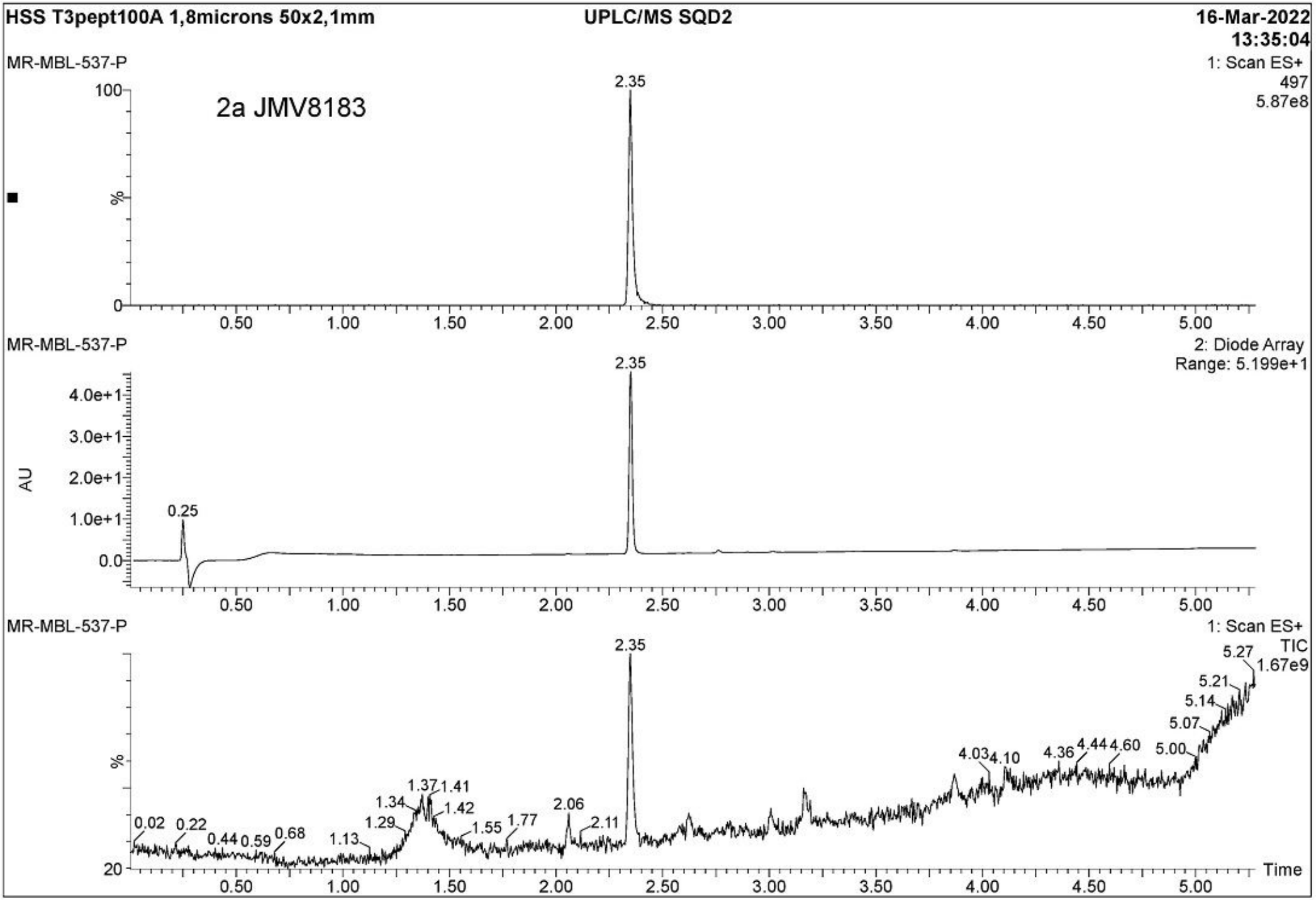
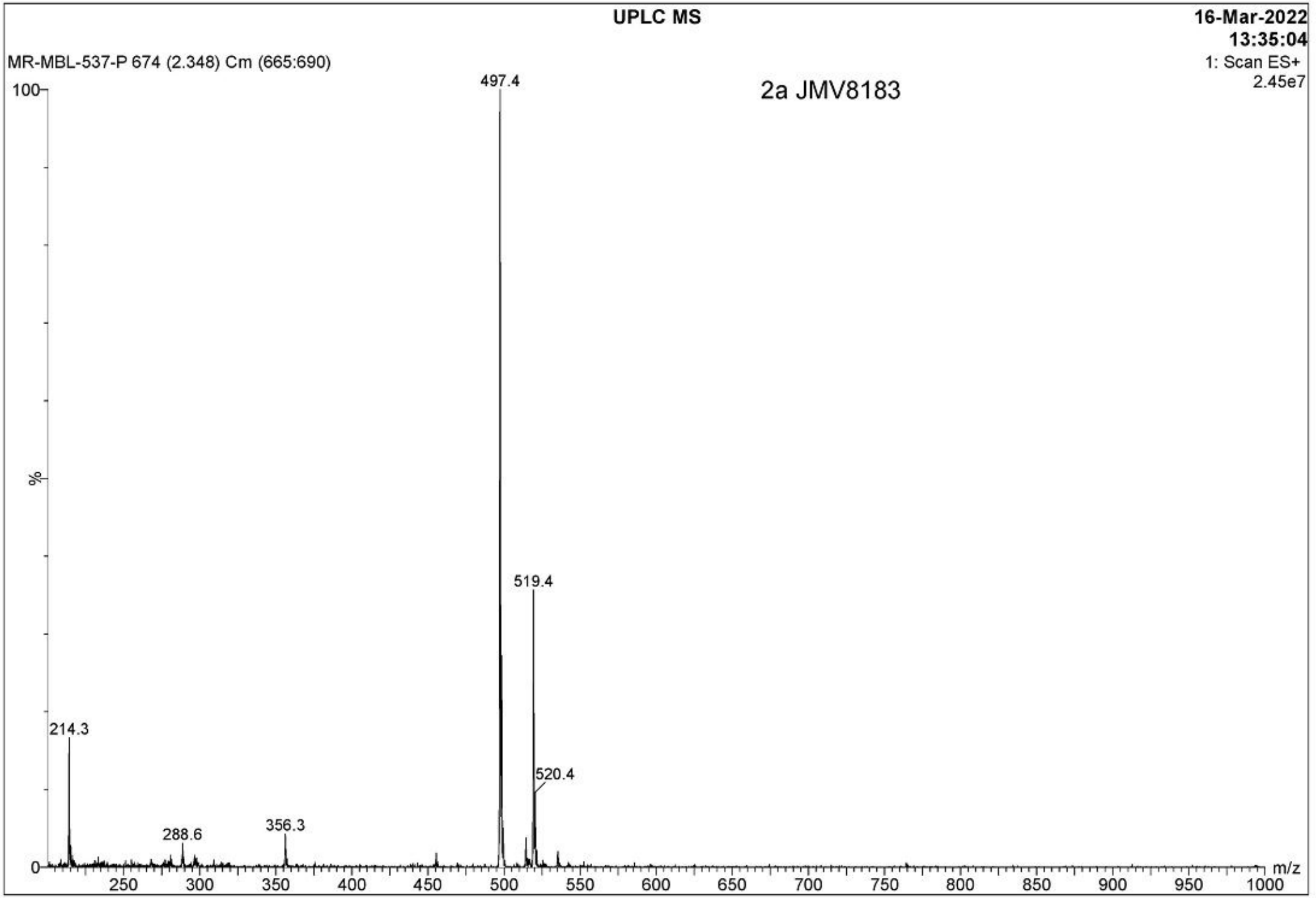
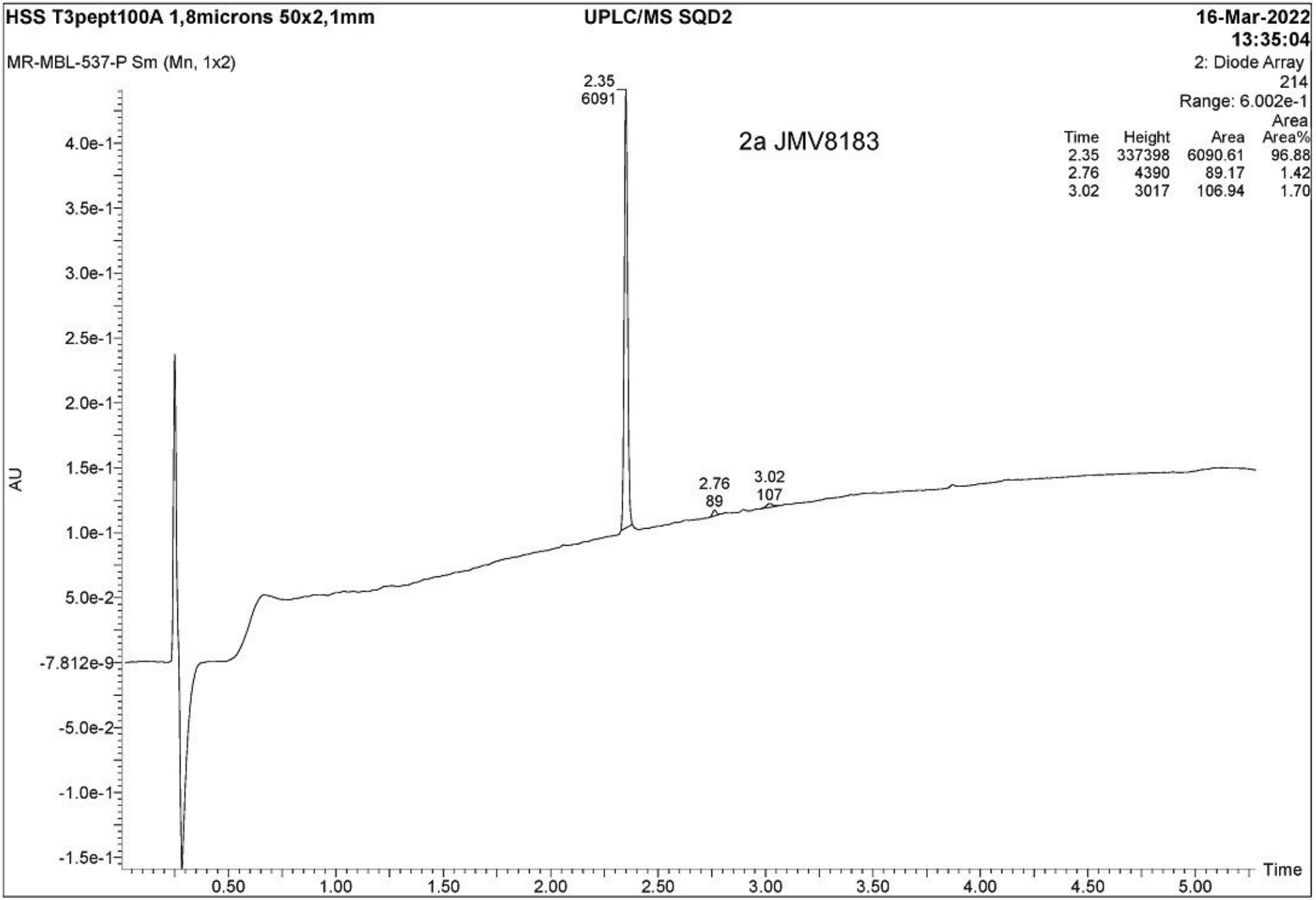
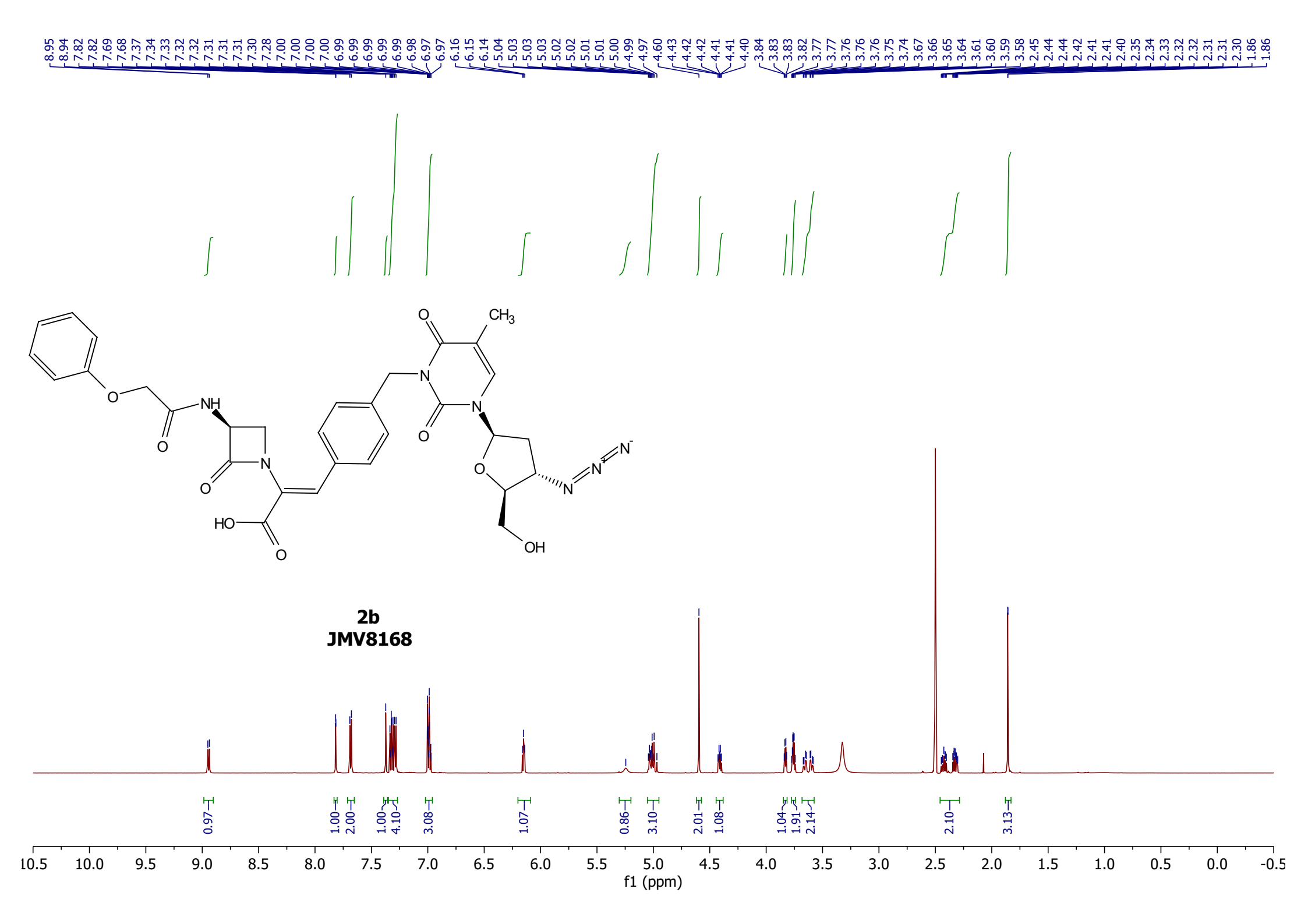
7.40
7.30
7.29
6.16
6.15
6.14
5.25
5.03
5.01
5.00
4.97
4.43
4.42
4.42
4.41
4.41
4.40
3.84
3.84
3.84
3.83
3.83
3.82
3.68
3.67
3.66
3.65
3.61
3.61
3.59
3.59
3.55
3.54
3.53
3.05
3.05
3.04
2.44
2.44
2.43
2.42
2.42
2.41
2.35
2.34
2.34
2.33
2.33
2.32
2.32
1.86
1.86
CH3
O
N
N
O
O
N
N+
N-
O
OH
N
O
O
Na
O
2a
JMV8183
1.00
1.98
1.01
1.98
1.00
0.71
2.03
1.00
1.01
2.04
2.03
1.99
2.01
2.96
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

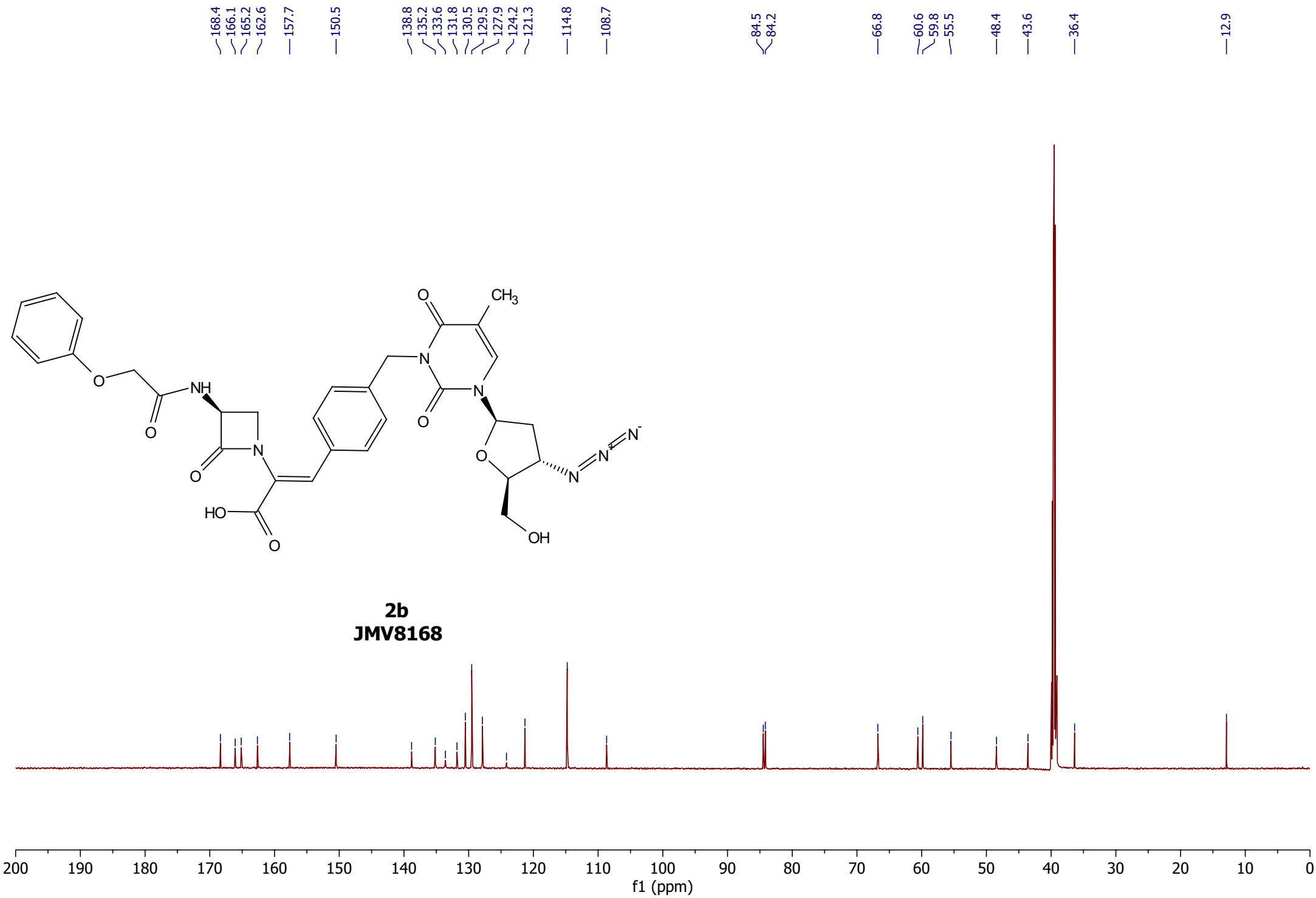

166.4
165.3
162.6
150.5
138.9
135.2
134.5
131.9
130.0
127.8
124.7
108.7
84.5
84.2
60.6
59.8
43.5
40.5
36.7
36.4
12.9
O
CH3
N
N
O
O
N
N+
N-
O
OH
N
O
O
Na
O
2a
JMV8183
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

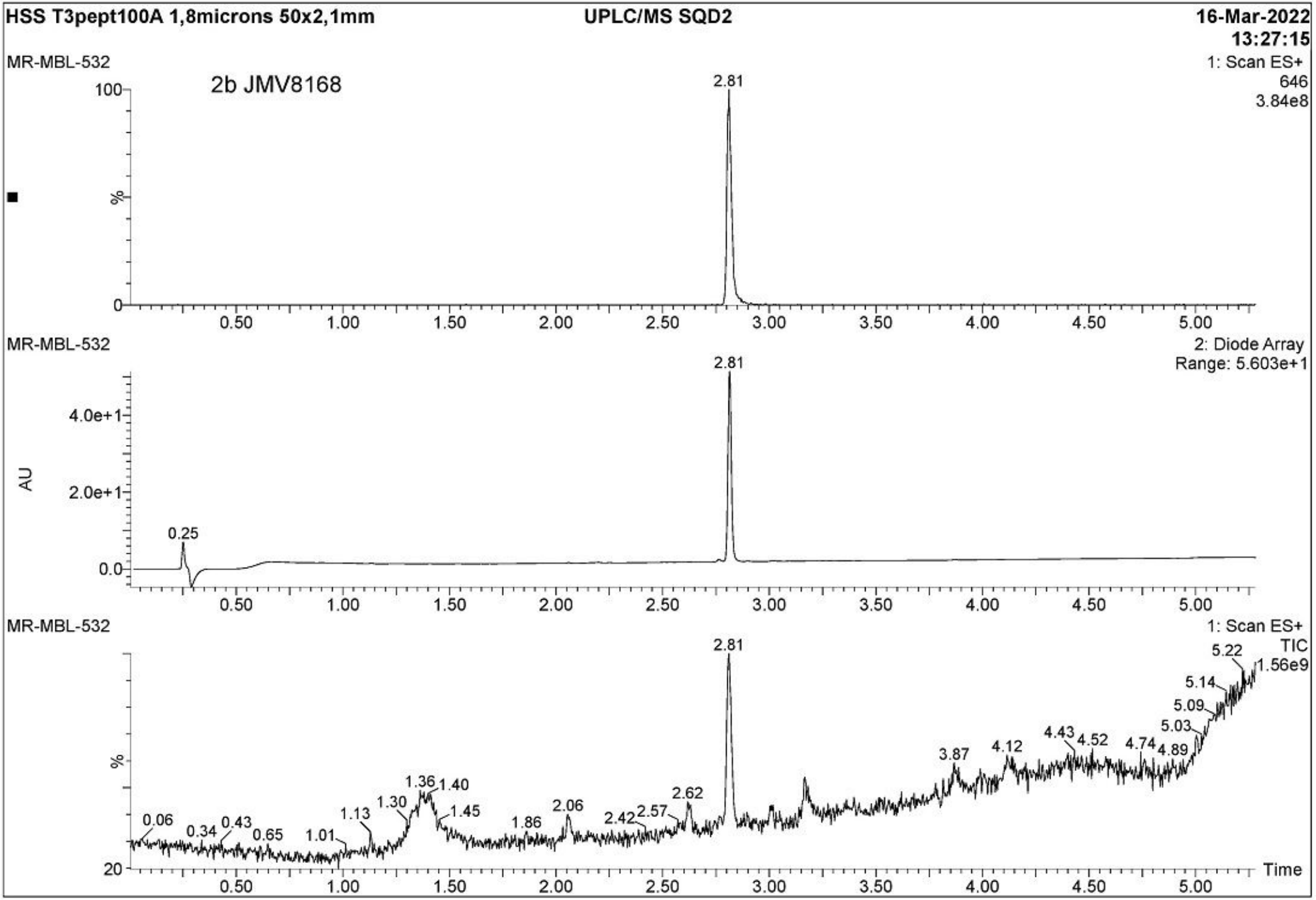

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
16-Mar-2022
13:35:04
MR-MBL-537-P
1: Scan ES+
497
5.87e8
2a JMV8183
2.35
100
%
0
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
MR-MBL-537-P
2: Diode Array
Range: 5.199e+1
2.35
4.0e+1
3.0e+1
2.0e+1
1.0e+1
0.0
AU
0.25
MR-MBL-537-P
1: Scan ES+
TIC
1.67e9
2.35
5.27
5.21
5.14
5.07
5.00
4.03
4.10
4.36
4.44
4.60
1.37
1.41
1.34
1.42
1.29
1.55
1.77
2.06
2.11
0.02
0.22
0.44
0.59
0.68
1.13
20
Time

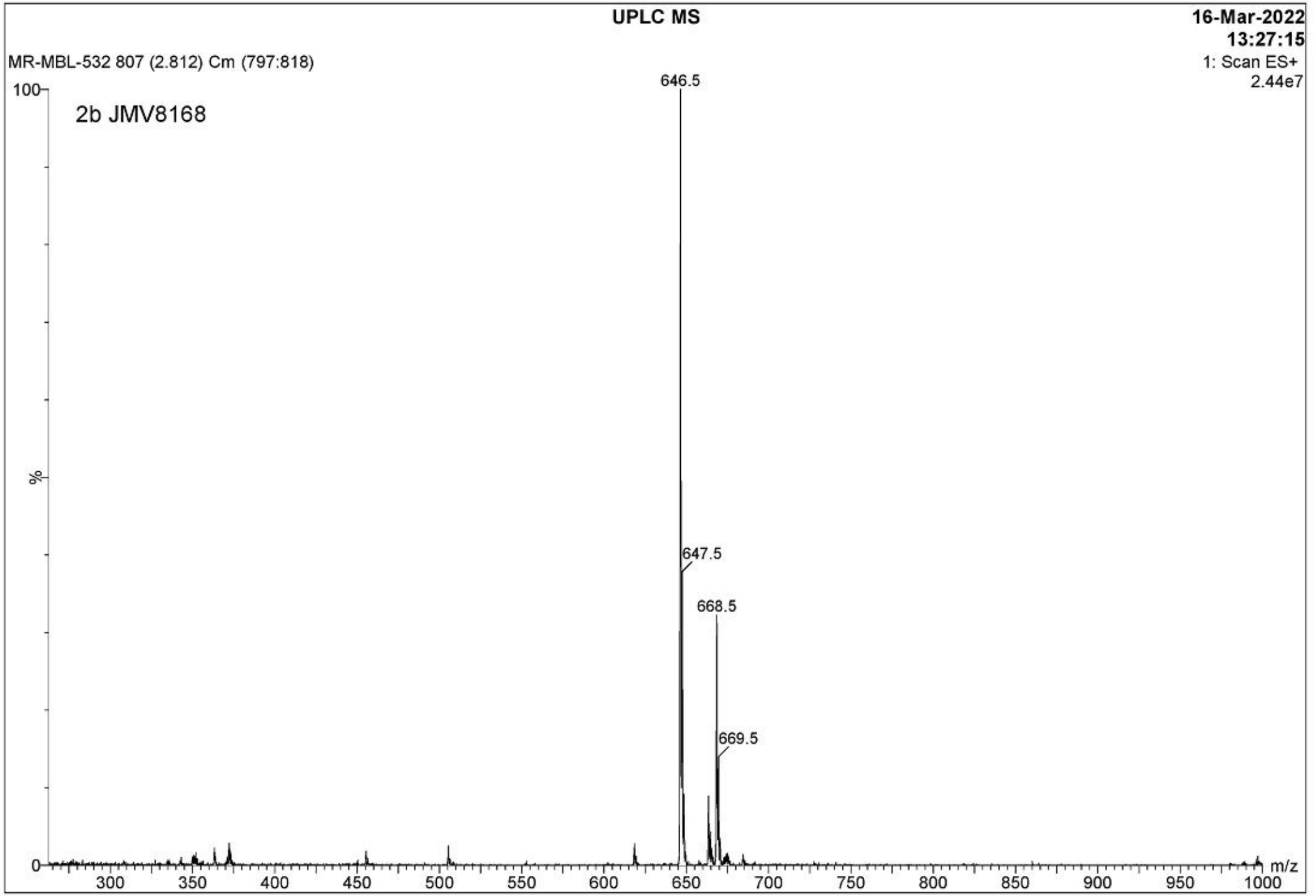

UPLC MS
16-Mar-2022
13:35:04
MR-MBL-537-P 674 (2.348) Cm (665:690)
1: Scan ES+
2.45e7
2a JMV8183
497.4
519.4
520.4
214.3
288.6
356.3
100
%
0
m/z
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000

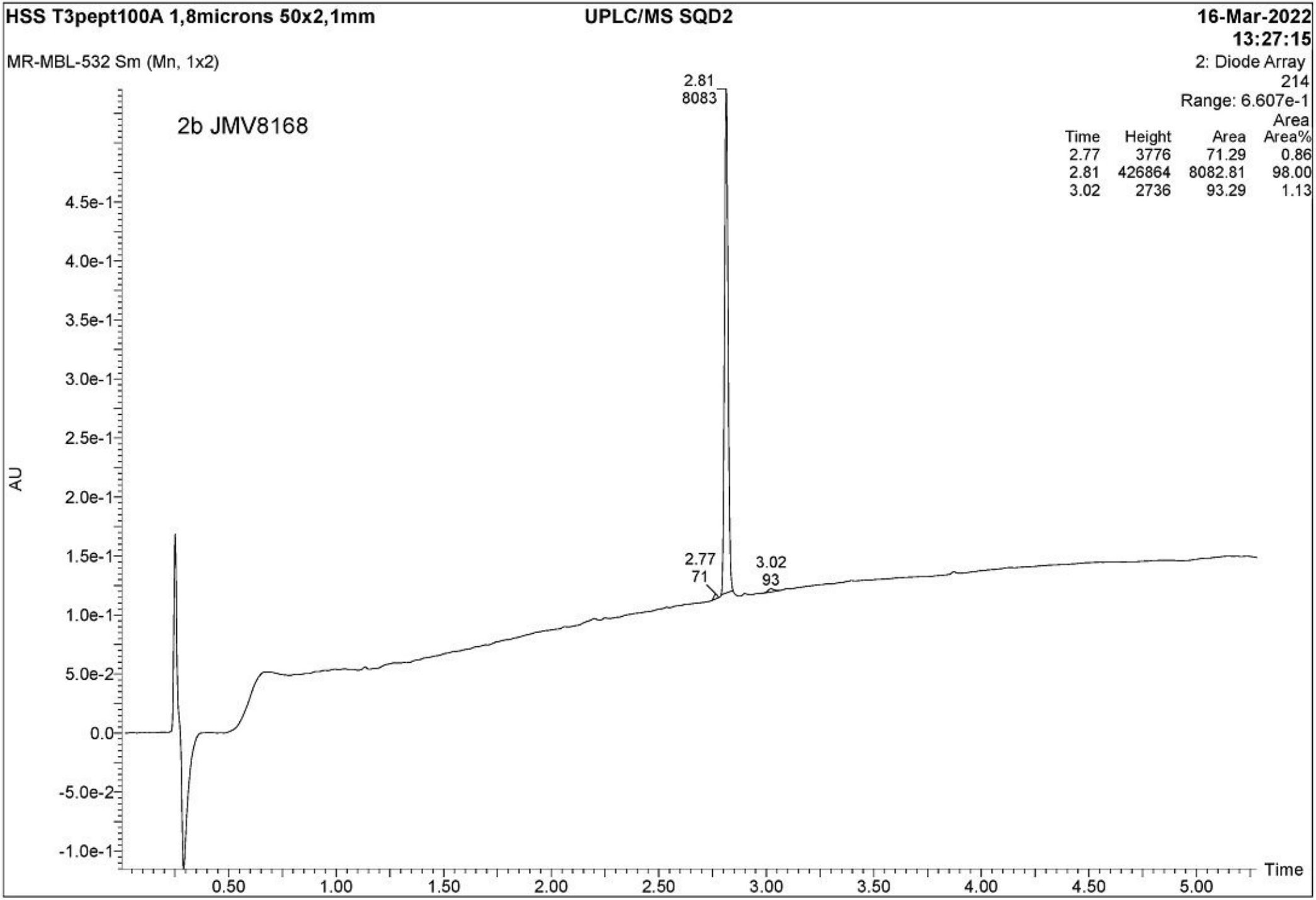

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
16-Mar-2022
13:35:04
MR-MBL-537-P Sm (Mn, 1x2)
2: Diode Array
214
Range: 6.002e-1
2a JMV8183
Time Height Area Area%
2.35 337398 6090.61 96.88
2.76 4390 89.17 1.42
3.02 3017 106.94 1.70
2.35
6091
2.76
89
3.02
107
AU
4.0e-1
3.5e-1
3.0e-1
2.5e-1
2.0e-1
1.5e-1
1.0e-1
5.0e-2
-7.812e-9
-5.0e-2
-1.0e-1
-1.5e-1
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Time

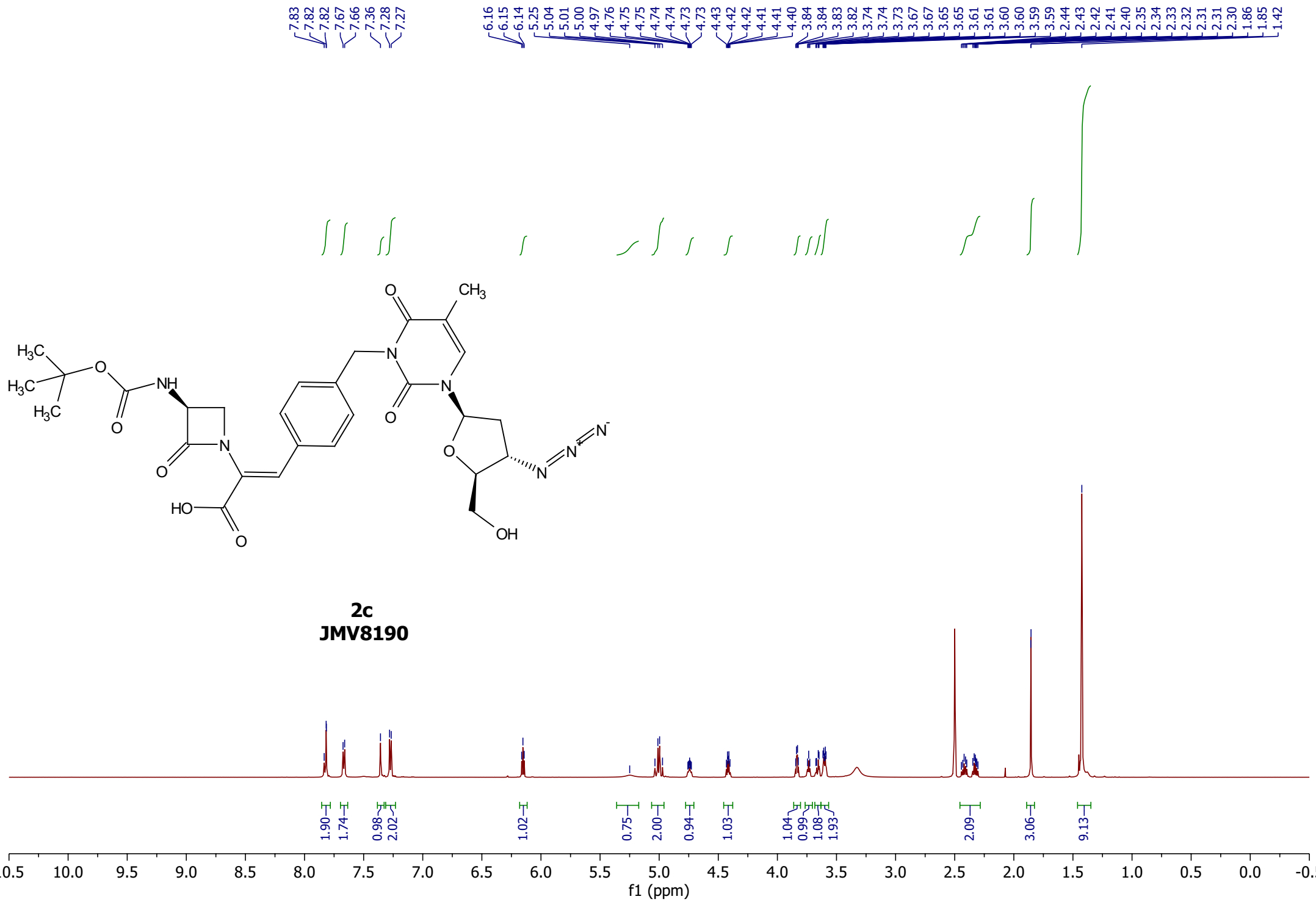

8.95 8.94 7.82 7.82 7.69 7.68 7.37 7.34 7.33 7.32 7.32 7.31 7.31 7.31 7.30 7.28 7.00 7.00 7.00 7.00 6.99 6.99 6.99 6.99 6.99 6.98 6.97 6.97
6.16 6.15 6.14 5.04 5.03 5.03 5.02 5.02 5.01 5.01 5.00 4.99 4.97 4.60 4.43 4.42 4.42 4.41 4.41 4.40
3.84 3.83 3.83 3.82 3.77 3.77 3.76 3.76 3.76 3.75 3.74 3.67 3.66 3.65 3.64 3.61 3.60 3.59 3.58 2.45 2.44 2.44 2.42 2.41 2.41 2.40 2.35 2.34 2.33 2.32 2.32 2.31 2.31 2.30 1.86 1.86
O
NH
O
O
N
HO
O
O
N
N
O
CH3
O
N
N
N
N-
O
OH
2b
JMV8168
0.97
1.00
2.00
1.00
4.10
3.08
1.07
0.86
3.10
2.01
1.08
1.04
1.91
2.14
2.10
3.13
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

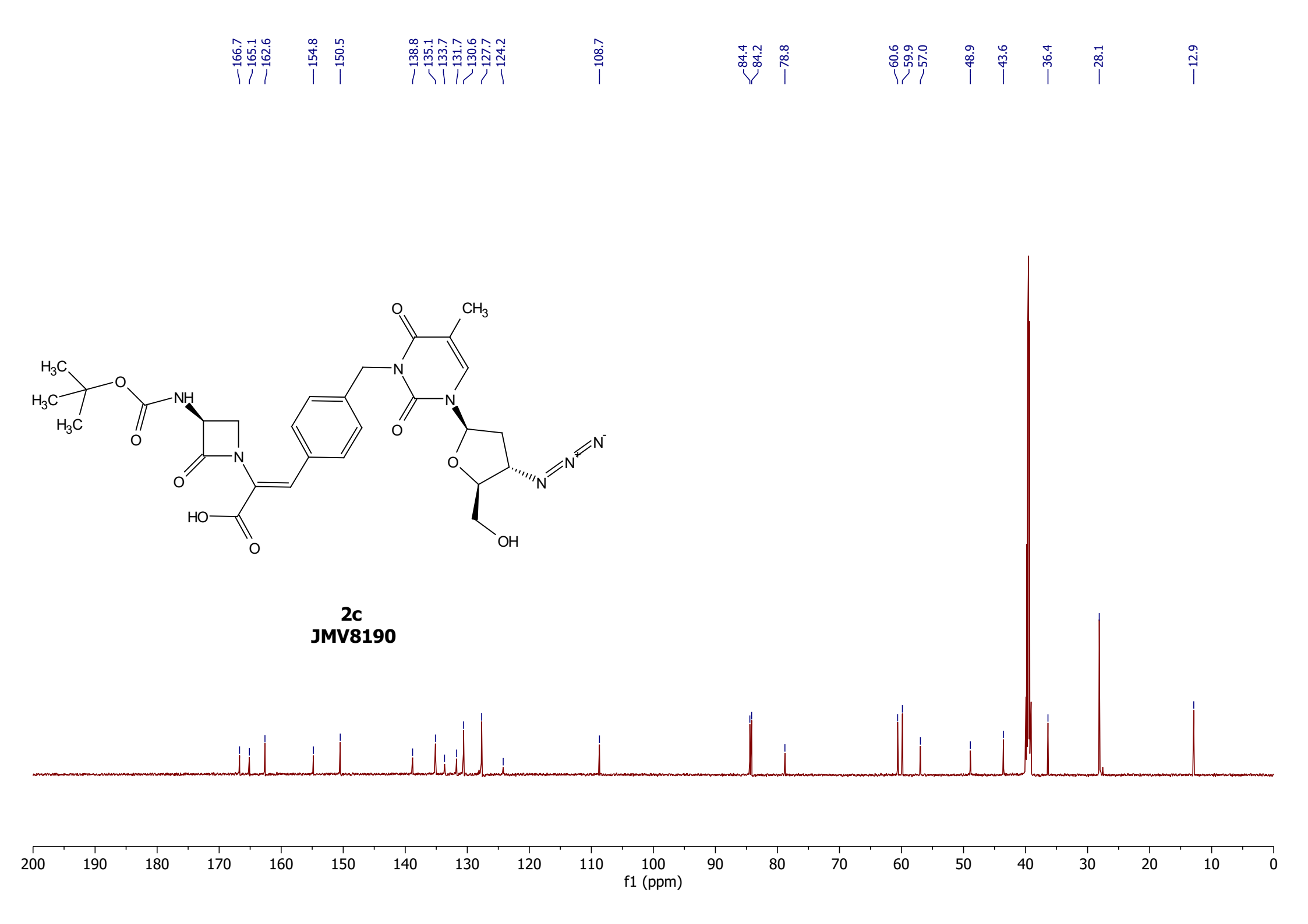

168.4
166.1
165.2
162.6
157.7
150.5
138.8
135.2
133.6
131.8
130.5
129.5
127.9
124.2
121.3
114.8
108.7
84.5
84.2
66.8
60.6
59.8
55.5
48.4
43.6
36.4
12.9
2b
JMV8168
f1 (ppm)

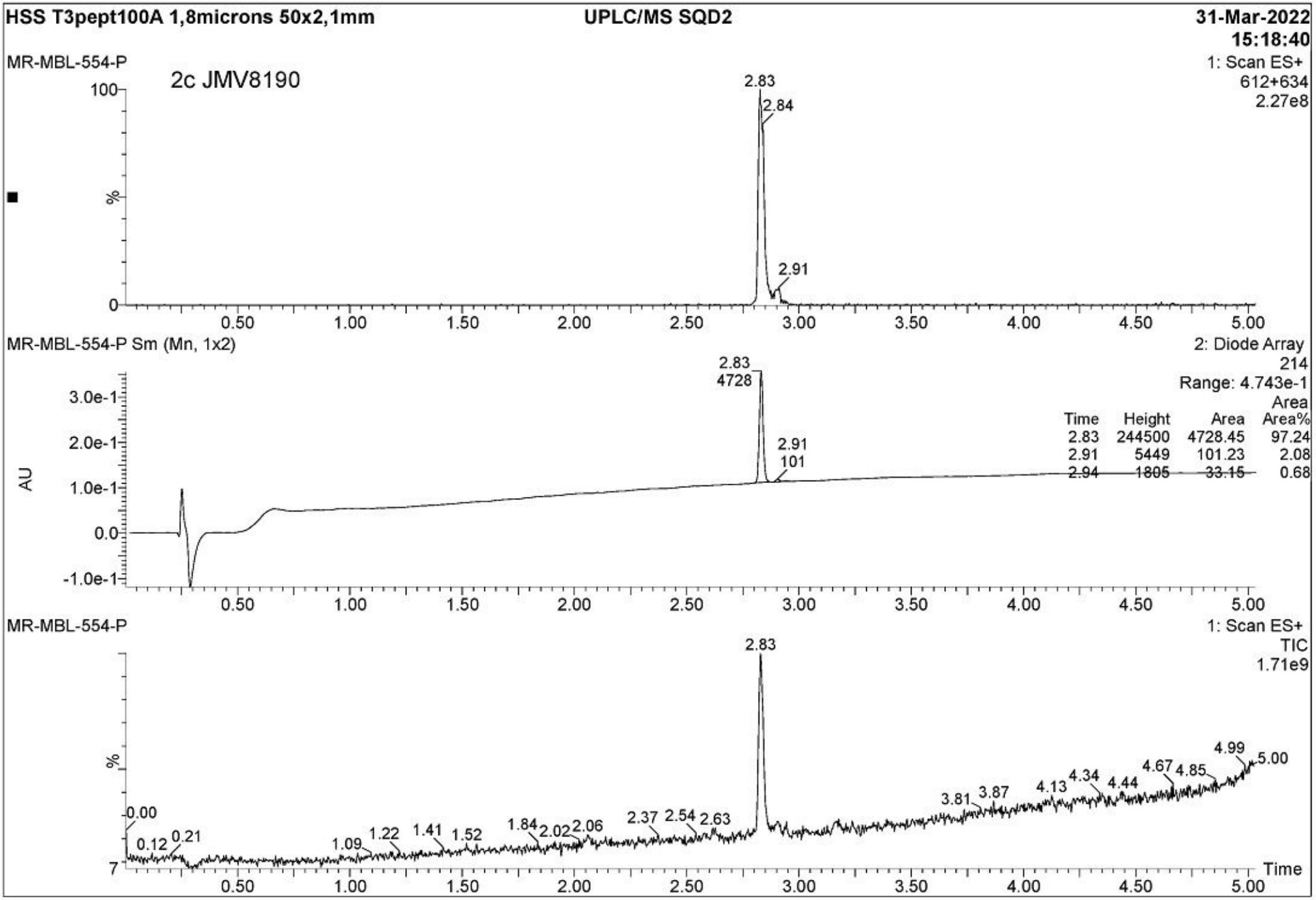

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
16-Mar-2022
13:27:15
MR-MBL-532
2b JMV8168
1: Scan ES+
646
3.84e8
2.81
100
%
0
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
MR-MBL-532
2: Diode Array
Range: 5.603e+1
2.81
4.0e+1
2.0e+1
AU
0.0
0.25
MR-MBL-532
1: Scan ES+
TIC
1.56e9
2.81
5.22
5.14
5.09
5.03
4.89
4.74
4.52
4.43
4.12
3.87
2.62
2.57
2.42
2.06
1.86
1.45
1.40
1.36
1.30
1.13
1.01
0.65
0.43
0.34
0.06
%
20
Time

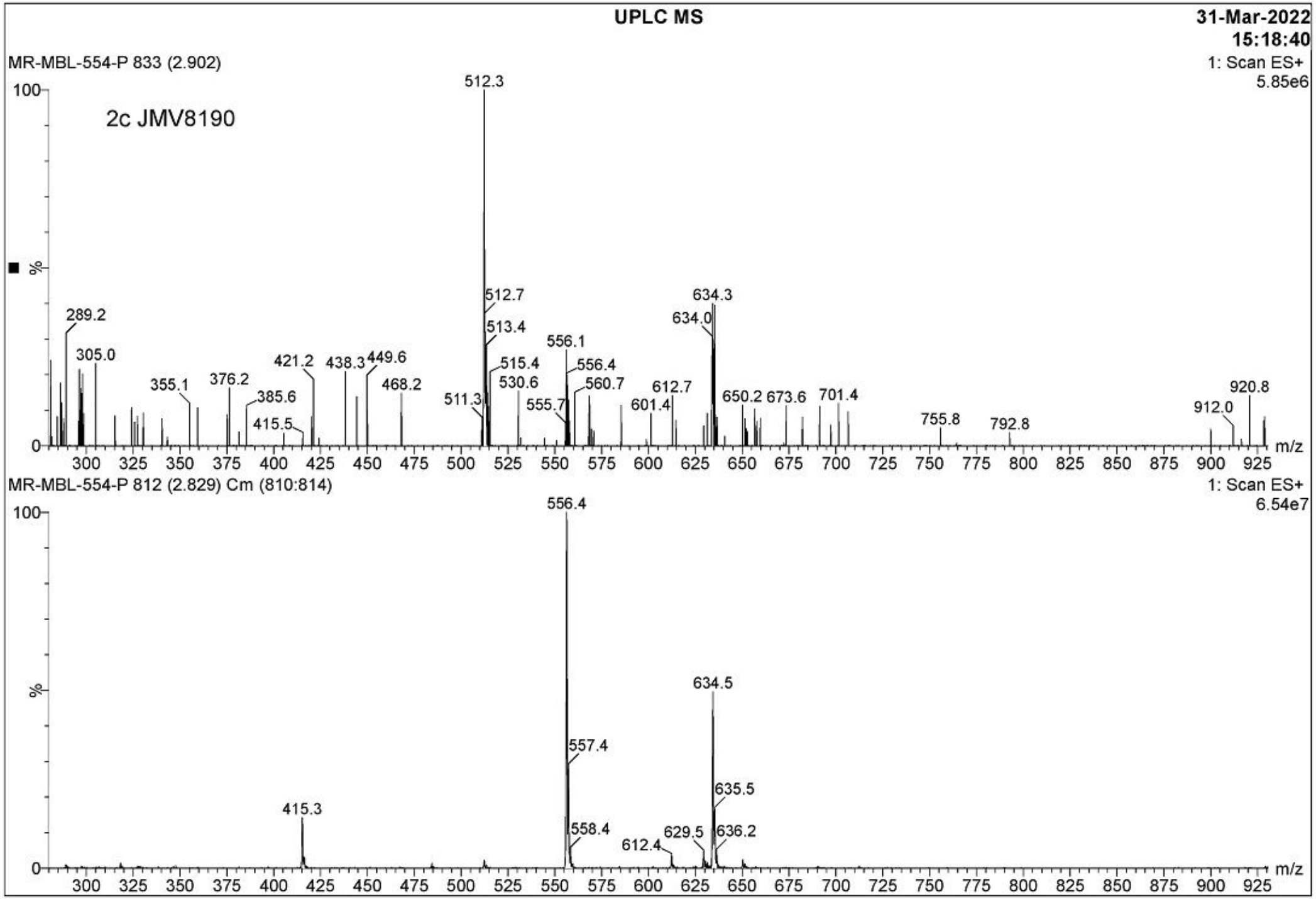

UPLC MS
16-Mar-2022
13:27:15
MR-MBL-532 807 (2.812) Cm (797:818)
1: Scan ES+
2.44e7
2b JMV8168
646.5
647.5
668.5
669.5
100
%
0
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
m/z

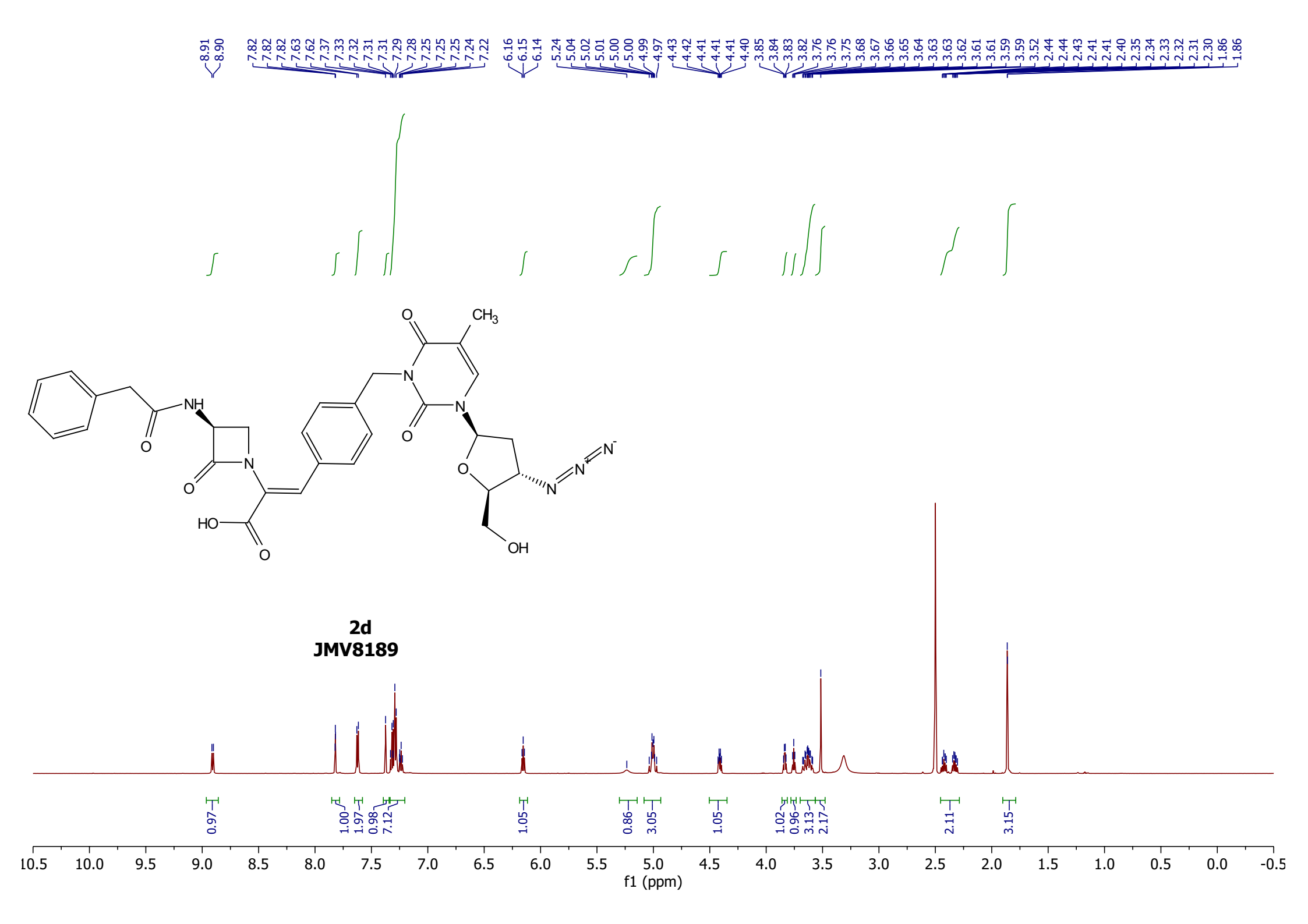

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
16-Mar-2022
13:27:15
MR-MBL-532 Sm (Mn, 1x2)
2: Diode Array
214
Range: 6.607e-1
2b JMV8168
Area
Time Height Area Area%
2.77 3776 71.29 0.86
2.81 426864 8082.81 98.00
3.02 2736 93.29 1.13
2.81
8083
2.77
71
3.02
93
AU
4.5e-1
4.0e-1
3.5e-1
3.0e-1
2.5e-1
2.0e-1
1.5e-1
1.0e-1
5.0e-2
0.0
-5.0e-2
-1.0e-1
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Time

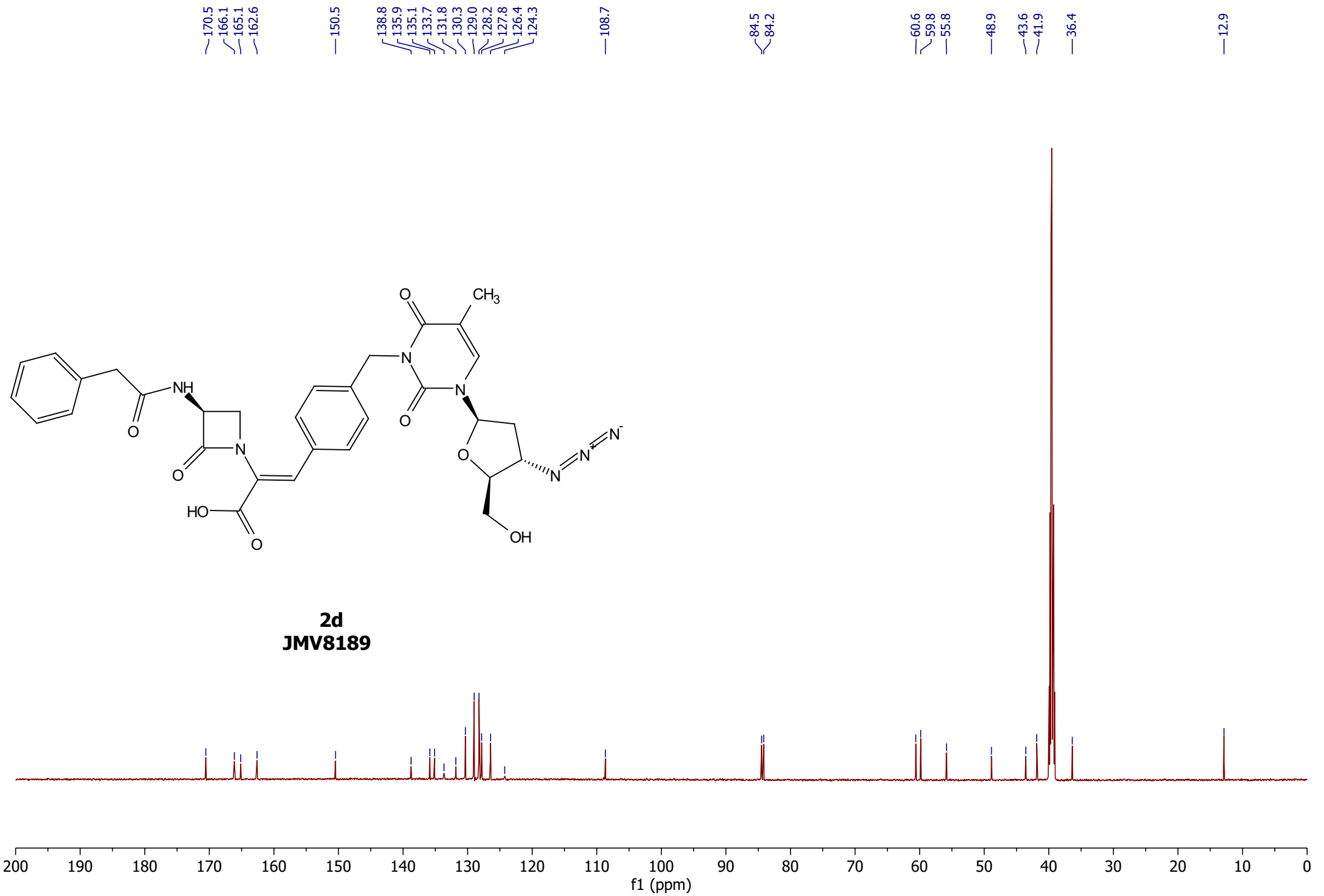

7.83
7.82
7.82
7.67
7.66
7.36
7.28
7.27
6.16
6.15
6.14
5.25
5.04
5.01
5.00
4.97
4.76
4.75
4.75
4.74
4.74
4.73
4.73
4.43
4.42
4.42
4.41
4.41
4.40
3.84
3.84
3.83
3.82
3.74
3.74
3.73
3.67
3.67
3.65
3.65
3.61
3.61
3.60
3.60
3.59
3.59
2.44
2.43
2.42
2.41
2.40
2.35
2.34
2.33
2.32
2.31
2.31
2.30
1.86
1.85
1.42
CH3
H3C
H3C
H3C
O
NH
O
N
O
HO
O
N
O
N
N
N
N
O
OH
2c
JMV8190
1.90
1.74
0.98
2.02
1.02
0.75
2.00
0.94
1.03
1.04
0.99
1.08
1.93
2.09
3.06
9.13
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

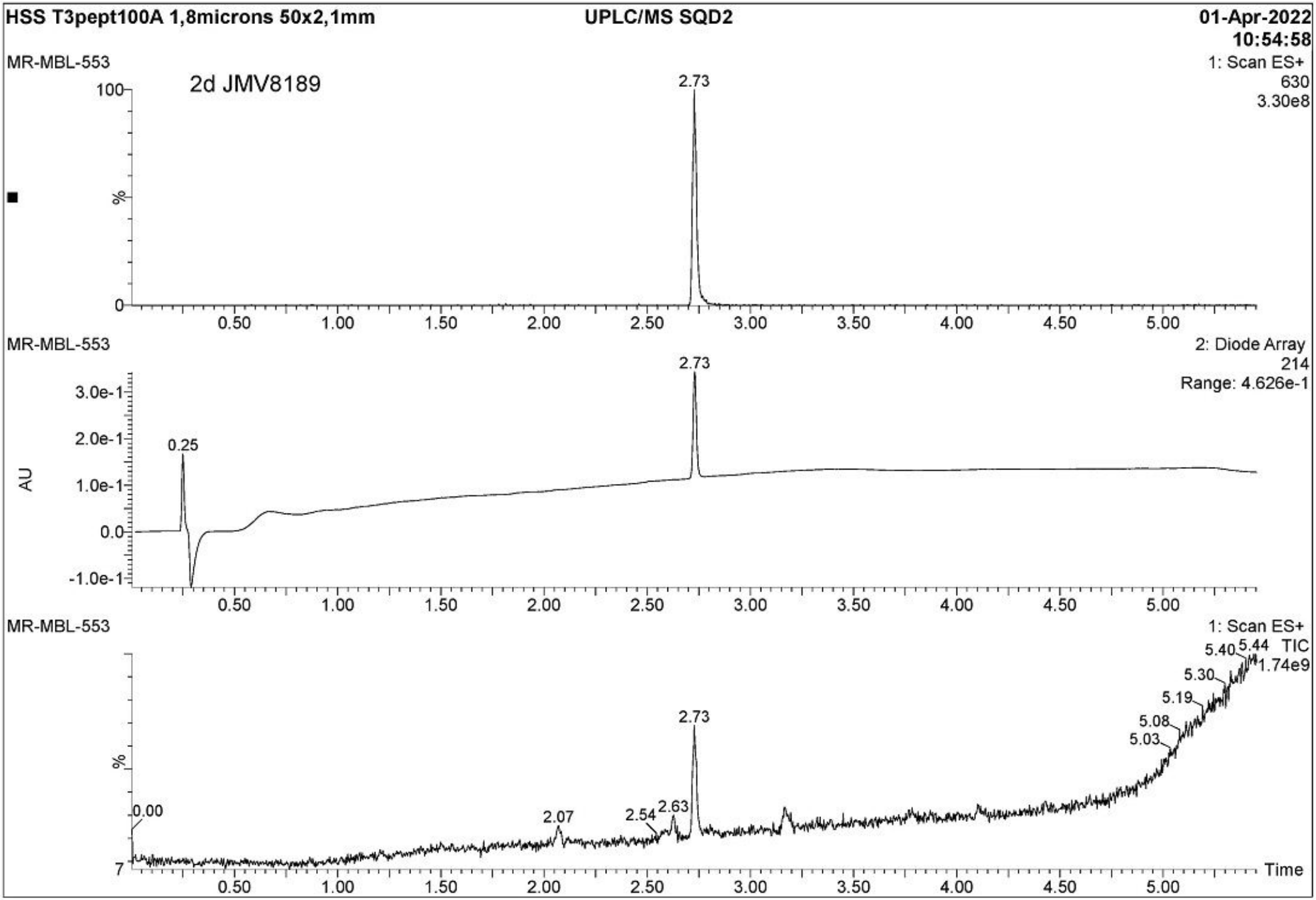

166.7
165.1
162.6
154.8
150.5
138.8
135.1
133.7
131.7
130.6
127.7
124.2
108.7
84.4
84.2
78.8
60.6
59.9
57.0
48.9
43.6
36.4
28.1
12.9
2c
JMV8190
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

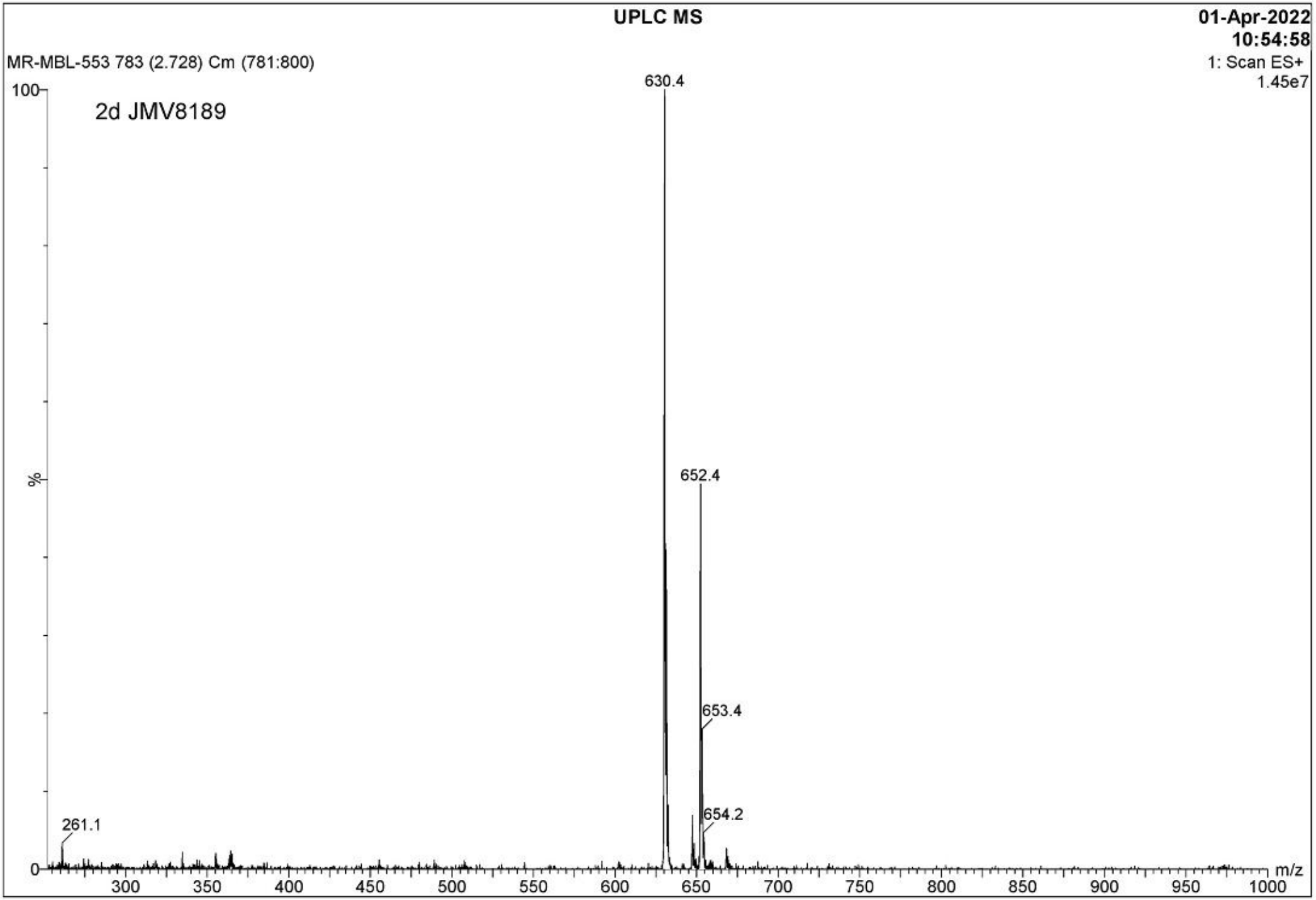

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
31-Mar-2022
15:18:40
MR-MBL-554-P
2c JMV8190
1: Scan ES+
612+634
2.27e8
2.83
2.84
2.91
MR-MBL-554-P Sm (Mn, 1x2)
2: Diode Array
214
Range: 4.743e-1
Area
Time Height Area Area%
2.83 244500 4728.45 97.24
2.91 5449 101.23 2.08
2.94 1805 33.15 0.68
2.83
4728
2.91
101
AU
MR-MBL-554-P
1: Scan ES+
TIC
1.71e9
2.83
0.00
0.12
0.21
1.09
1.22
1.41
1.52
1.84
2.02
2.06
2.37
2.54
2.63
3.81
3.87
4.13
4.34
4.44
4.67
4.85
4.99
5.00
Time

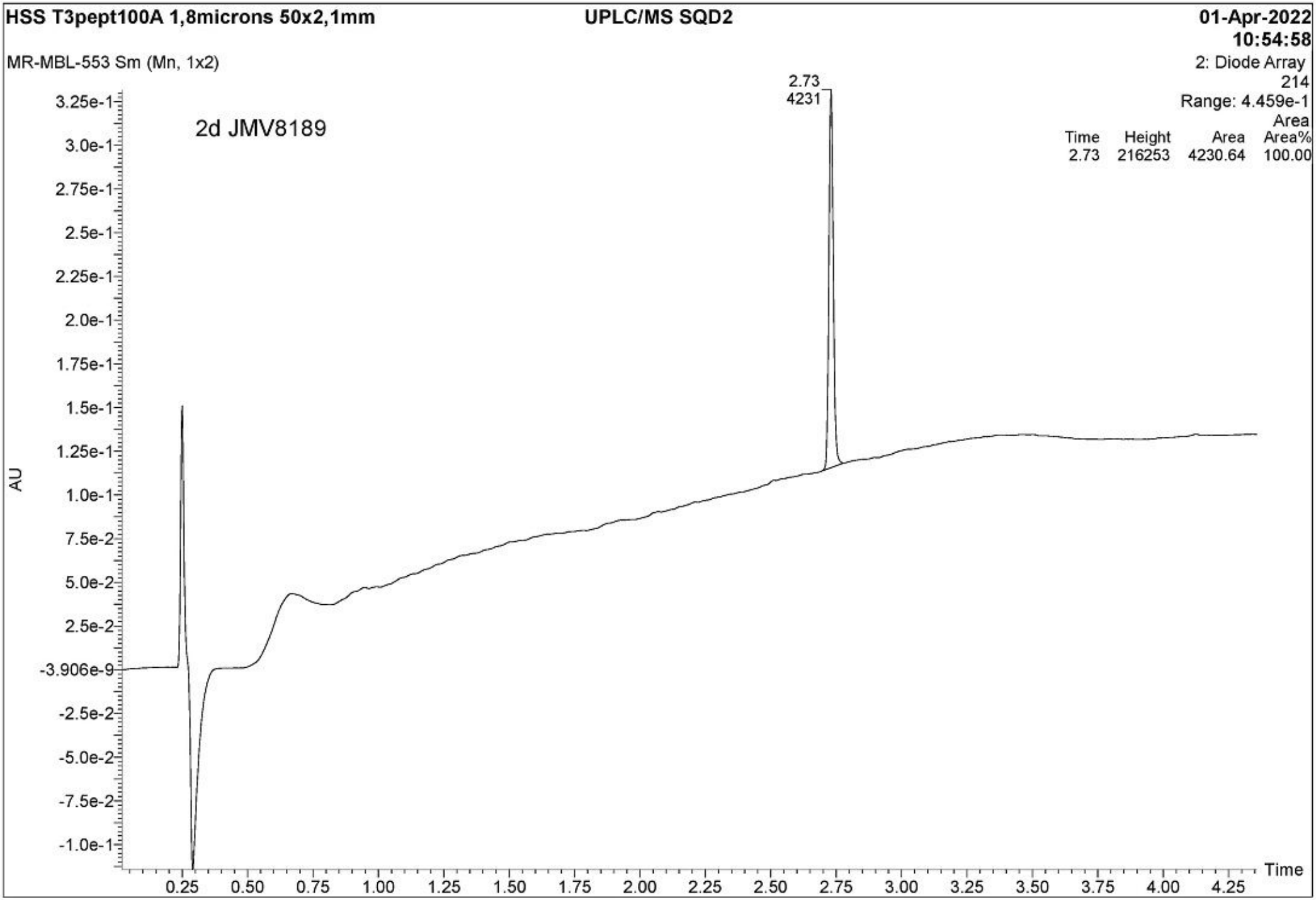

UPLC MS
31-Mar-2022
15:18:40
MR-MBL-554-P 833 (2.902)
1: Scan ES+
5.85e6
2c JMV8190
100
%
0
512.3
512.7
513.4
634.3
634.0
556.1
289.2
305.0
421.2
438.3
449.6
515.4
556.4
355.1
376.2
530.6
560.7
612.7
468.2
385.6
511.3
555.7
601.4
650.2
673.6
701.4
920.8
912.0
415.5
755.8
792.8
m/z
300 325 350 375 400 425 450 475 500 525 550 575 600 625 650 675 700 725 750 775 800 825 850 875 900 925
MR-MBL-554-P 812 (2.829) Cm (810:814)
1: Scan ES+
6.54e7
100
%
0
556.4
634.5
557.4
635.5
415.3
558.4
629.5
636.2
612.4
m/z
300 325 350 375 400 425 450 475 500 525 550 575 600 625 650 675 700 725 750 775 800 825 850 875 900 925

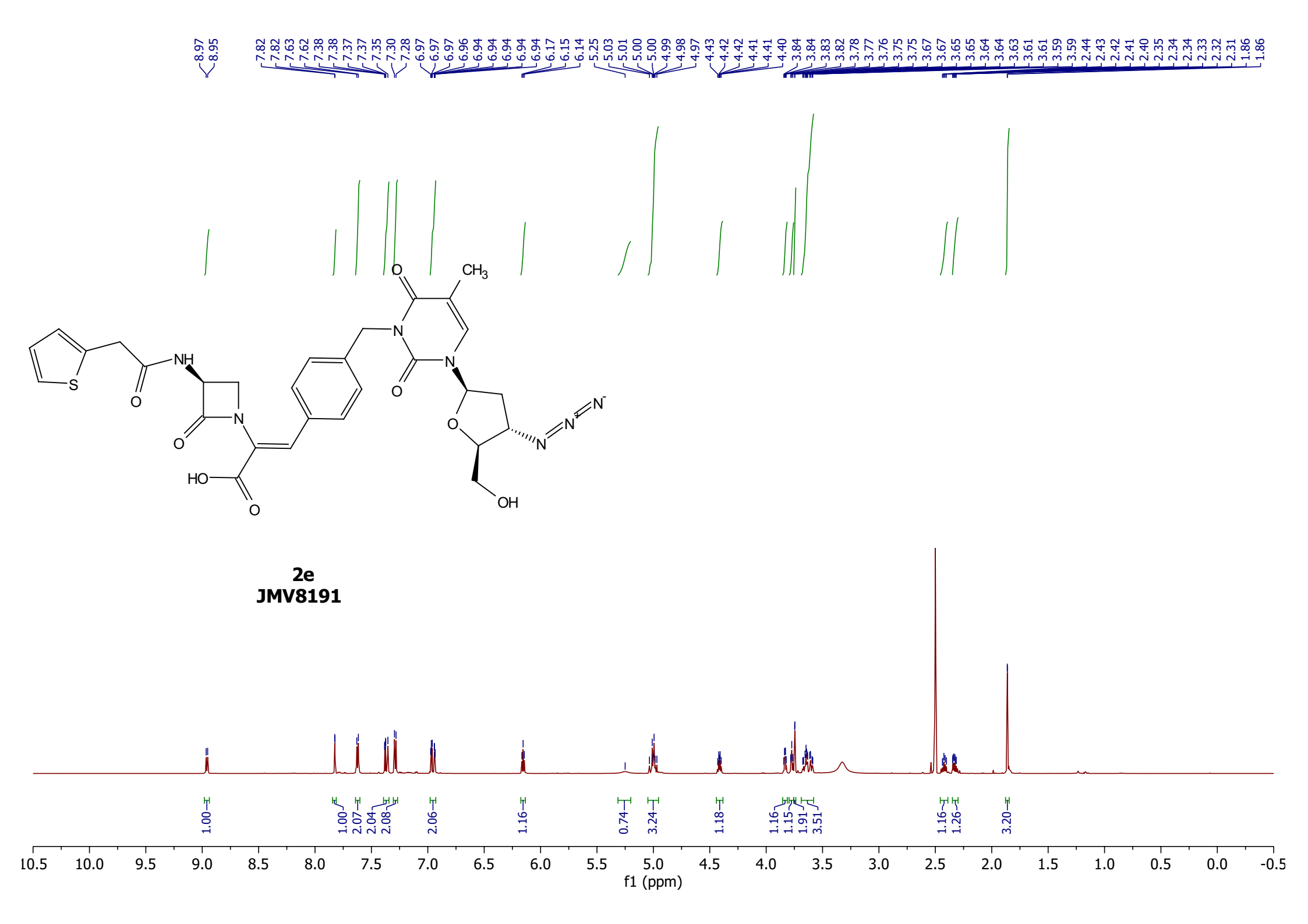

8.91 8.90 7.82 7.82 7.82 7.63 7.62 7.37 7.33 7.32 7.31 7.31 7.29 7.28 7.25 7.25 7.25 7.24 7.22 6.16 6.15 6.14 5.24 5.04 5.02 5.01 5.00 5.00 4.99 4.97 4.43 4.42 4.41 4.41 4.41 4.40 3.85 3.84 3.83 3.82 3.76 3.76 3.75 3.68 3.67 3.66 3.65 3.64 3.63 3.63 3.62 3.61 3.61 3.59 3.59 3.52 2.44 2.44 2.43 2.41 2.41 2.40 2.35 2.34 2.33 2.32 2.31 2.30 1.86 1.86
CH3
NH
HO
OH
2d
JMV8189
0.97 1.00 1.97 0.98 7.12 1.05 0.86 3.05 1.05 1.02 0.96 3.13 2.17 2.11 3.15
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

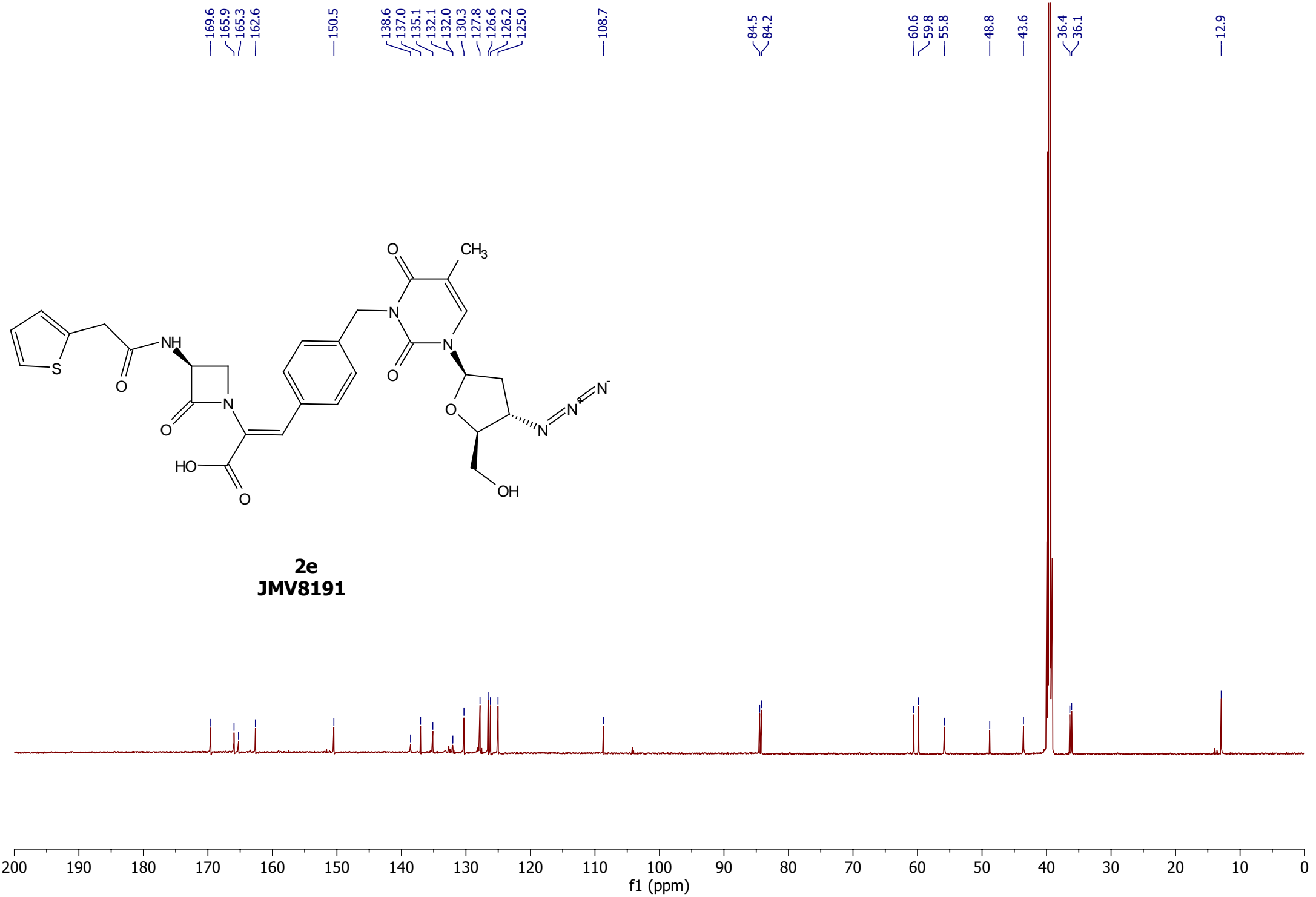

170.5
166.1
165.1
162.6
150.5
138.8
135.9
135.1
133.7
131.8
130.3
129.0
128.2
127.8
126.4
124.3
108.7
84.5
84.2
60.6
59.8
55.8
48.9
43.6
41.9
36.4
12.9
O
CH3
N
NH
O
N
O
N
HO
O
O
N
N+
N-
OH
2d
JMV8189
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

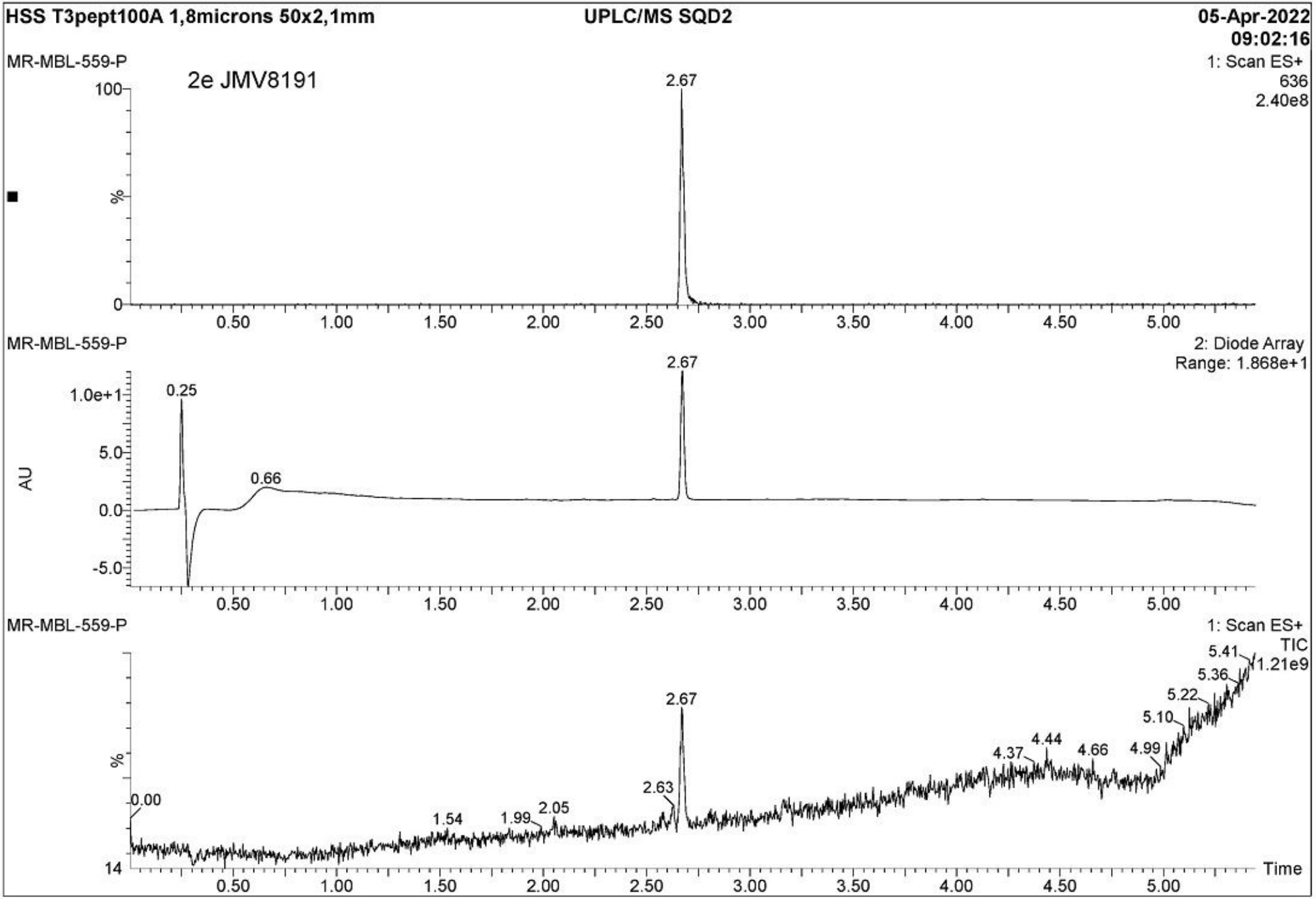

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
01-Apr-2022
10:54:58
MR-MBL-553
2d JMV8189
1: Scan ES+
630
3.30e8
2.73
100
%
0
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
MR-MBL-553
2: Diode Array
214
Range: 4.626e-1
2.73
3.0e-1
2.0e-1
1.0e-1
0.0
-1.0e-1
AU
0.25
MR-MBL-553
1: Scan ES+
TIC
1.74e9
5.40
5.44
5.30
5.19
5.08
5.03
2.73
%
0.00
2.07
2.54
2.63
7
Time

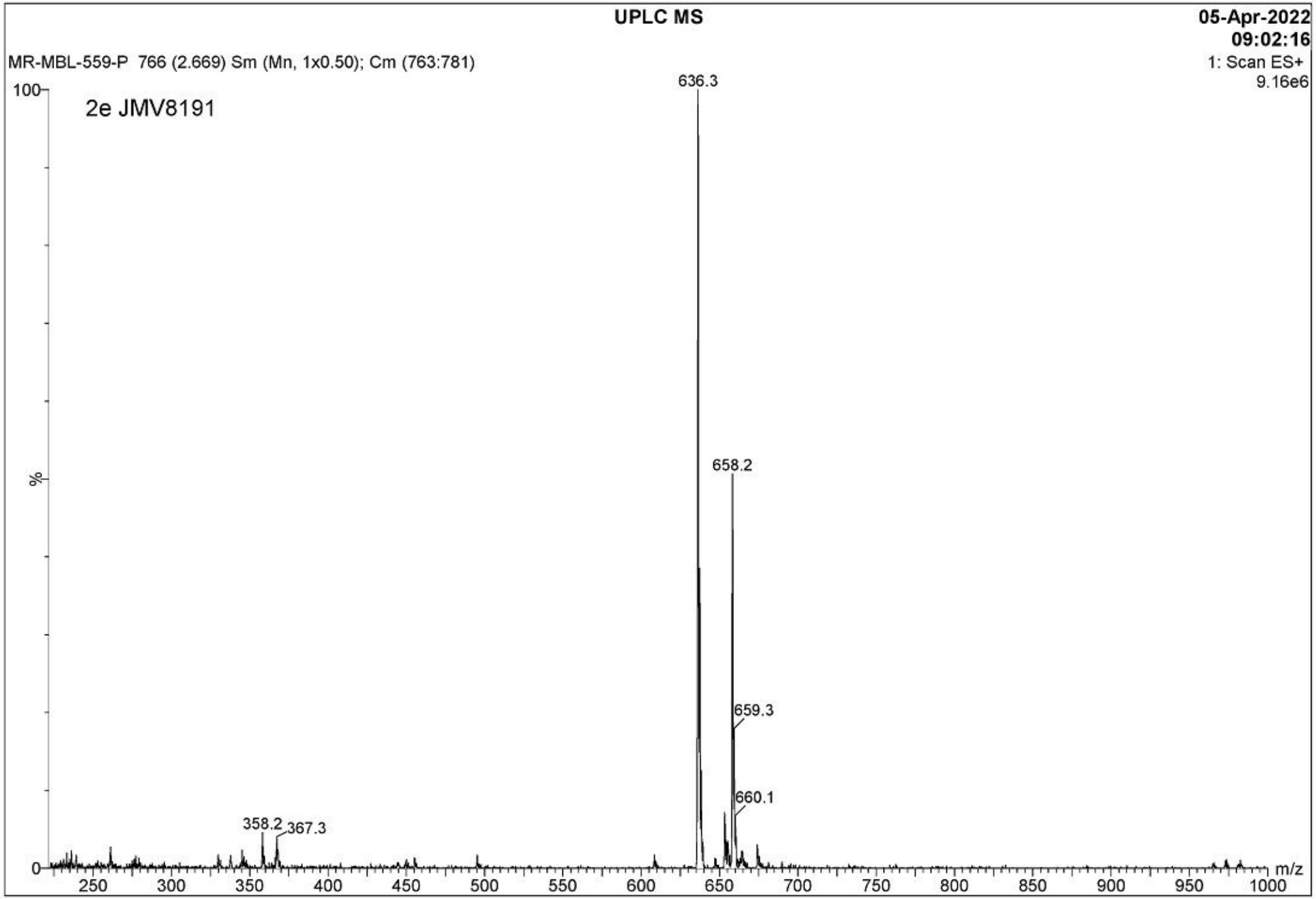

UPLC MS
01-Apr-2022
10:54:58
MR-MBL-553 783 (2.728) Cm (781:800)
1: Scan ES+
1.45e7
100
2d JMV8189
630.4
652.4
653.4
654.2
261.1
%
0
m/z
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000

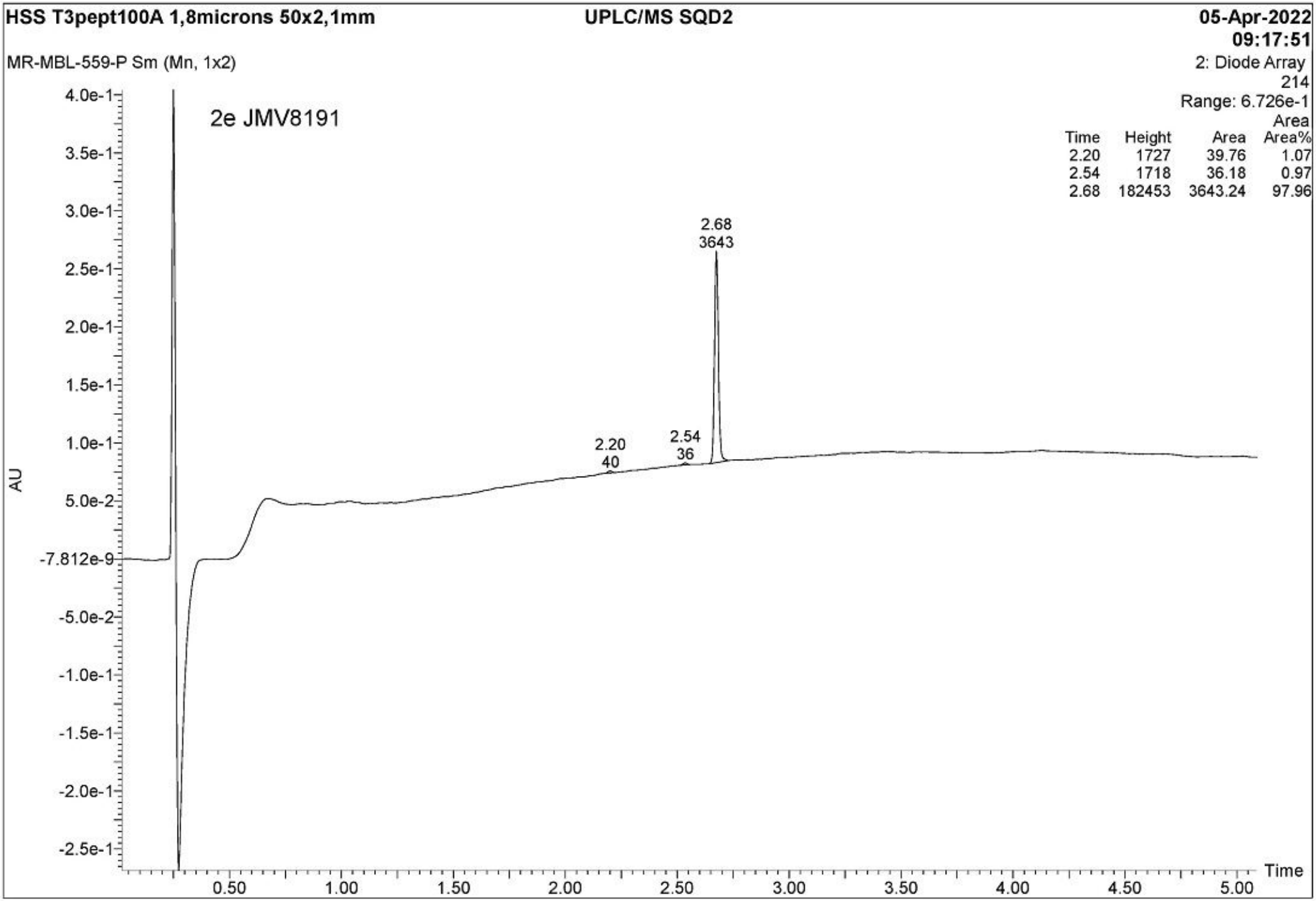

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
01-Apr-2022
10:54:58
MR-MBL-553 Sm (Mn, 1x2)
2: Diode Array
214
Range: 4.459e-1
2d JMV8189
2.73
4231
Time Height Area Area%
2.73 216253 4230.64 100.00
AU
3.25e-1
3.0e-1
2.75e-1
2.5e-1
2.25e-1
2.0e-1
1.75e-1
1.5e-1
1.25e-1
1.0e-1
7.5e-2
5.0e-2
2.5e-2
-3.906e-9
-2.5e-2
-5.0e-2
-7.5e-2
-1.0e-1
0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25
Time

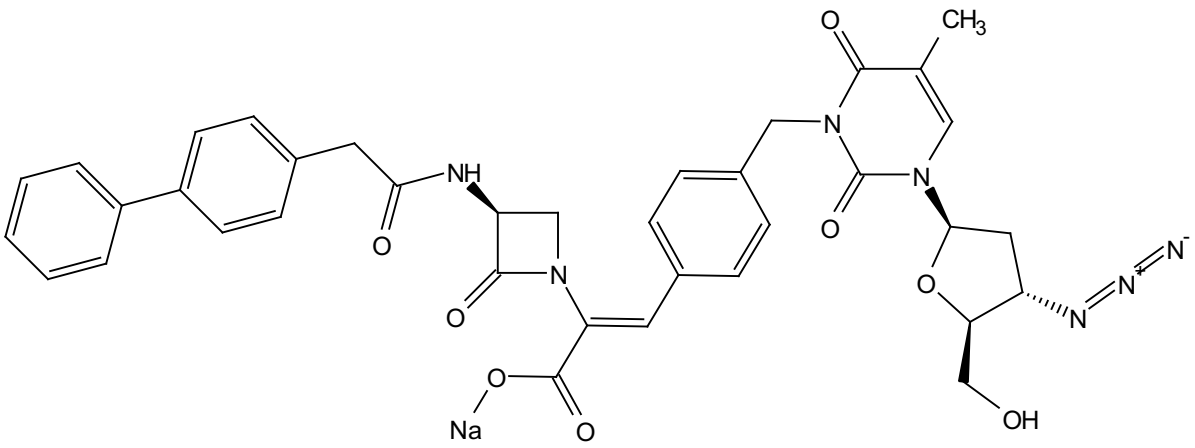

8.97
8.95
7.82
7.82
7.63
7.62
7.38
7.38
7.37
7.37
7.35
7.30
7.28
6.97
6.97
6.97
6.96
6.94
6.94
6.94
6.94
6.94
6.17
6.15
6.14
5.25
5.03
5.01
5.00
5.00
4.99
4.98
4.97
4.43
4.42
4.42
4.41
4.41
4.40
3.84
3.84
3.83
3.82
3.78
3.77
3.76
3.75
3.75
3.67
3.67
3.65
3.65
3.64
3.64
3.63
3.61
3.61
3.59
3.59
2.44
2.43
2.42
2.41
2.40
2.35
2.34
2.34
2.33
2.32
2.31
1.86
1.86
CH3
O
N
NH
S
O
N
O
HO
O
N
N
N
O
O
N
N
OH
2e
JMV8191
1.00
1.00
2.07
2.04
2.08
2.06
1.16
0.74
3.24
1.18
1.16
1.15
1.91
3.51
1.16
1.26
3.20
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


169.6
165.9
165.3
162.6
150.5
138.6
137.0
135.1
132.1
132.0
130.3
127.8
126.6
126.2
125.0
108.7
84.5
84.2
60.6
59.8
55.8
48.8
43.6
36.4
36.1
12.9
O
CH3
N
NH
S
O
N
O
N
O
HO
O
O
N
N
N
OH
2e
JMV8191
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

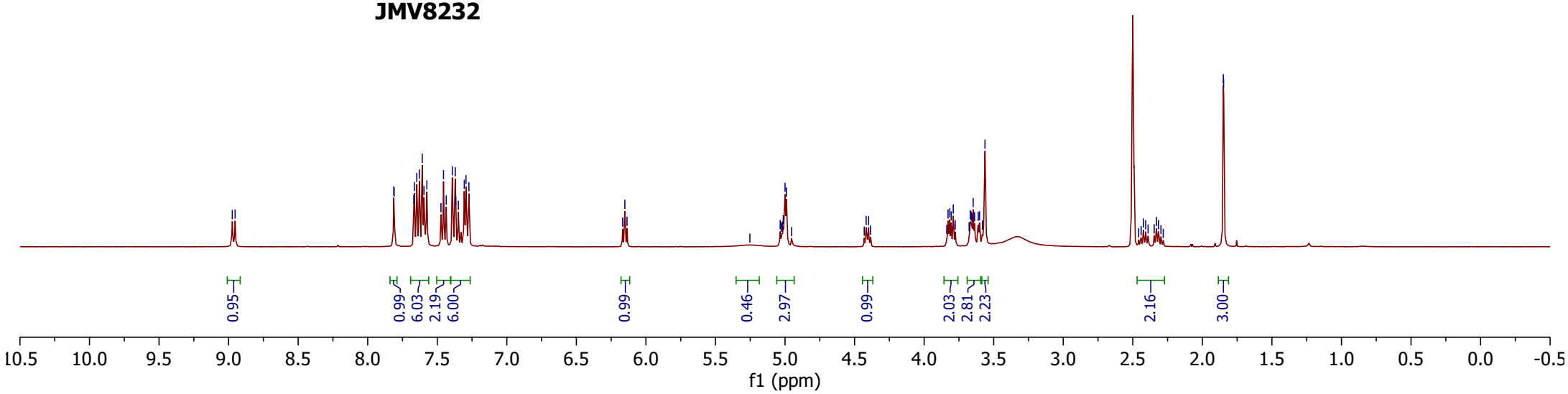

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
05-Apr-2022
09:02:16
MR-MBL-559-P
2e JMV8191
1: Scan ES+
636
2.40e8
2.67
100
%
0
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
MR-MBL-559-P
2: Diode Array
Range: 1.868e+1
2.67
0.25
0.66
1.0e+1
5.0
0.0
-5.0
AU
MR-MBL-559-P
1: Scan ES+
TIC
5.41
1.21e9
5.36
5.22
5.10
4.99
4.66
4.44
4.37
2.67
2.63
2.05
1.99
1.54
0.00
14
Time

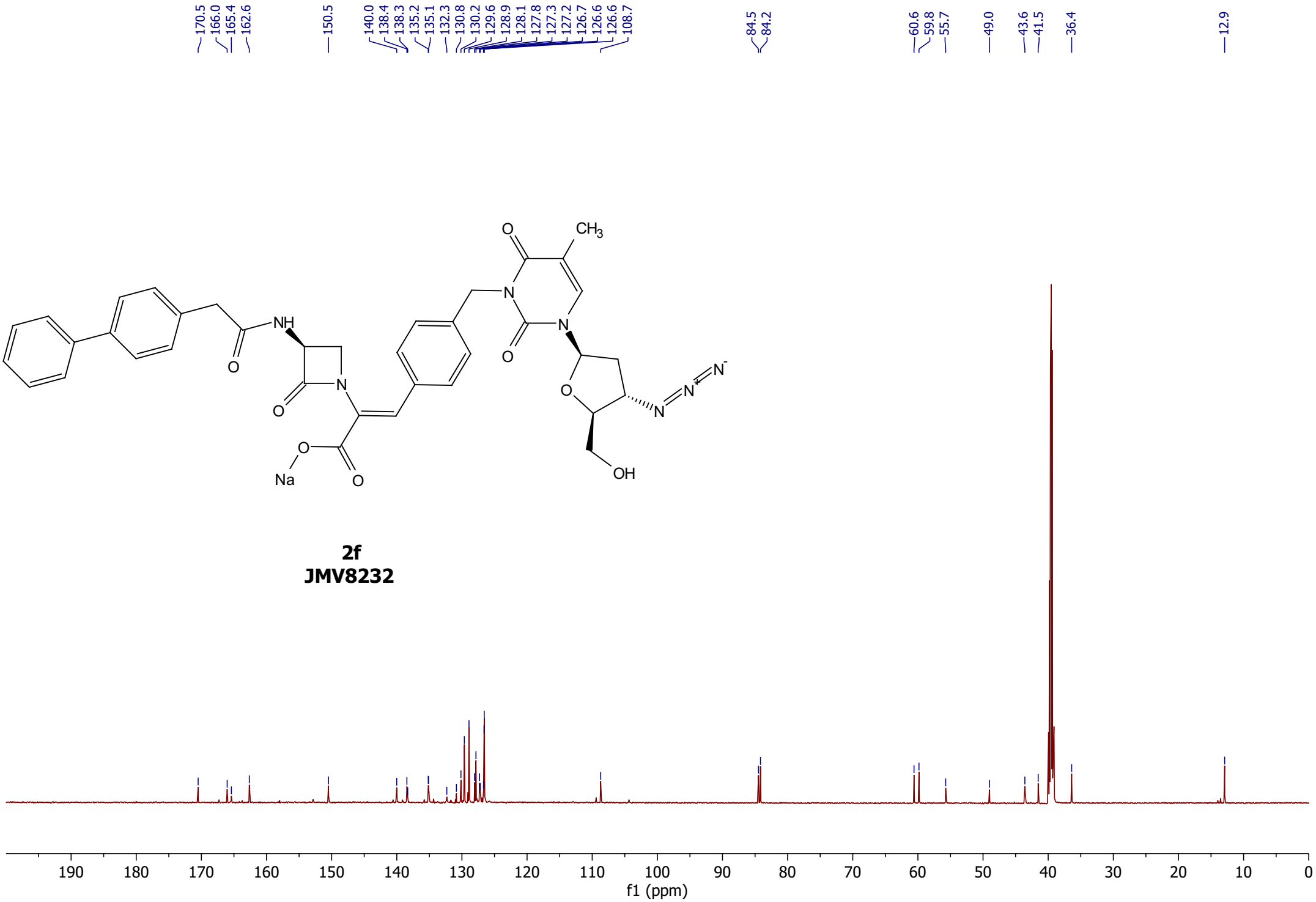

UPLC MS
05-Apr-2022
09:02:16
MR-MBL-559-P 766 (2.669) Sm (Mn, 1x0.50); Cm (763:781)
1: Scan ES+
9.16e6
2e JMV8191
636.3
658.2
659.3
660.1
358.2
367.3
100
%
0
m/z
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000

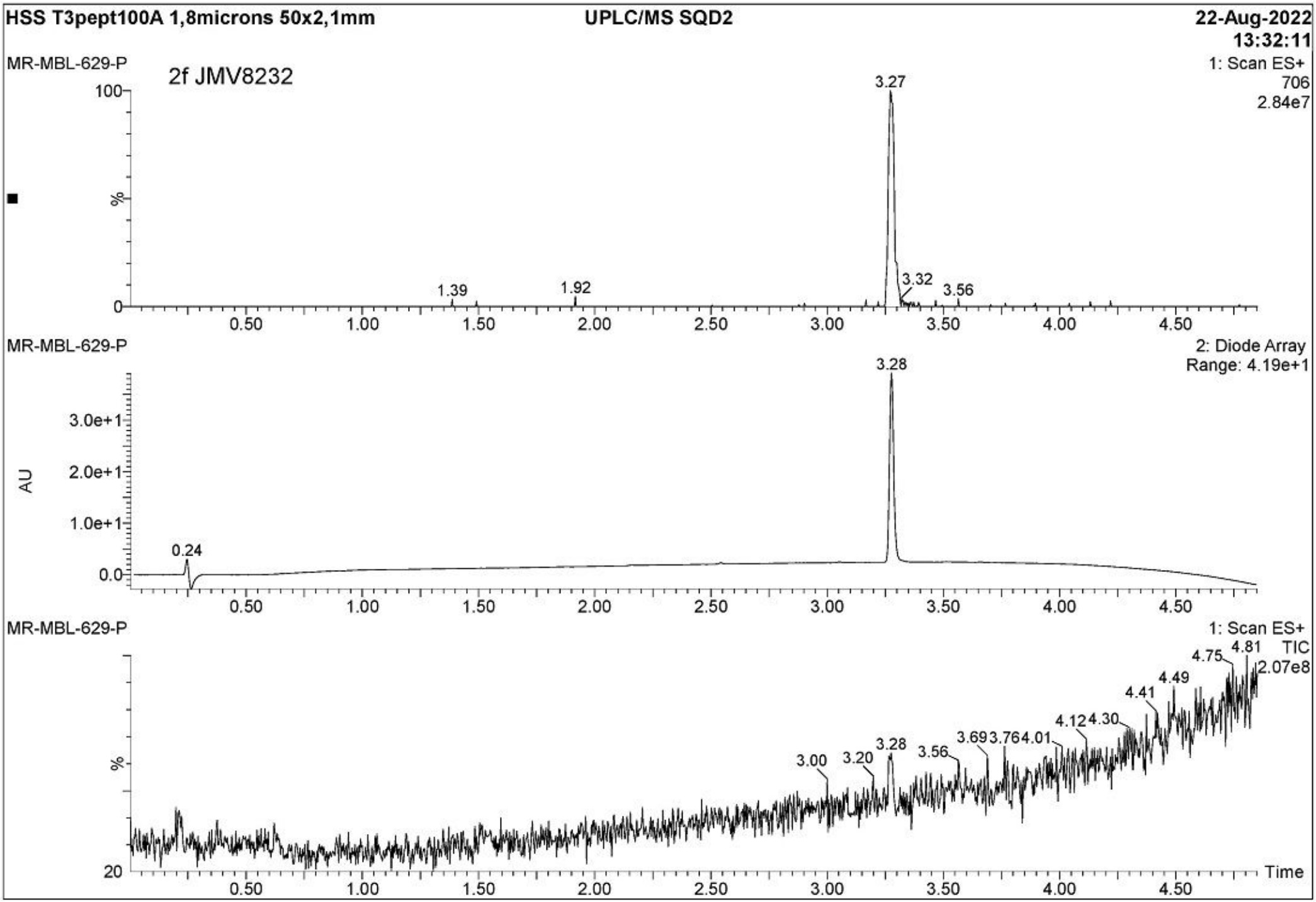

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
05-Apr-2022
09:17:51
MR-MBL-559-P Sm (Mn, 1x2)
2: Diode Array
214
Range: 6.726e-1
Area
Time Height Area Area%
2.20 1727 39.76 1.07
2.54 1718 36.18 0.97
2.68 182453 3643.24 97.96
2e JMV8191
2.68
3643
2.20
40
2.54
36
AU
4.0e-1
3.5e-1
3.0e-1
2.5e-1
2.0e-1
1.5e-1
1.0e-1
5.0e-2
-7.812e-9
-5.0e-2
-1.0e-1
-1.5e-1
-2.0e-1
-2.5e-1
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Time

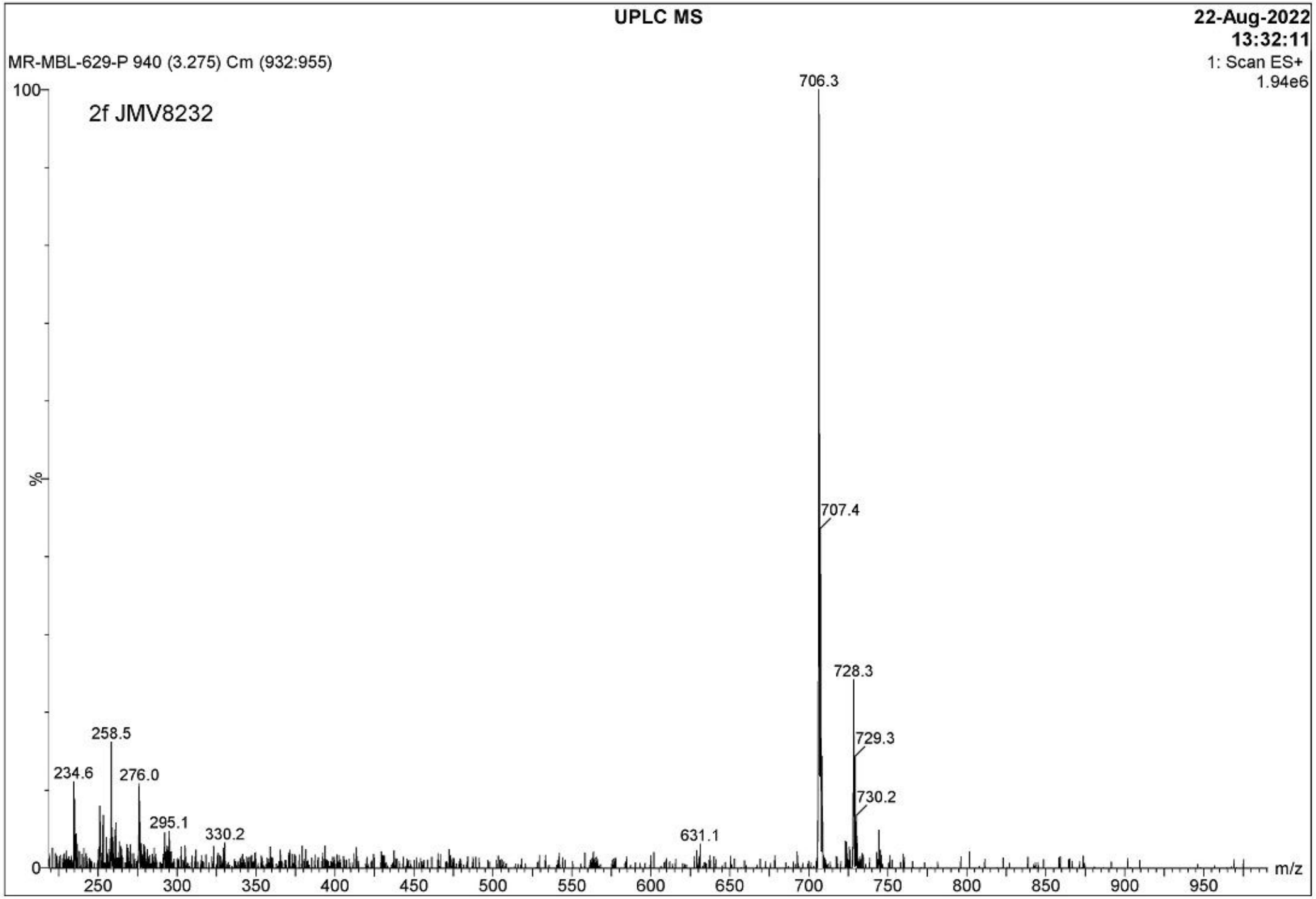

O
CH3
N
NH
O
N
O
O
N
O
N
N
N
O
O
Na
O
OH

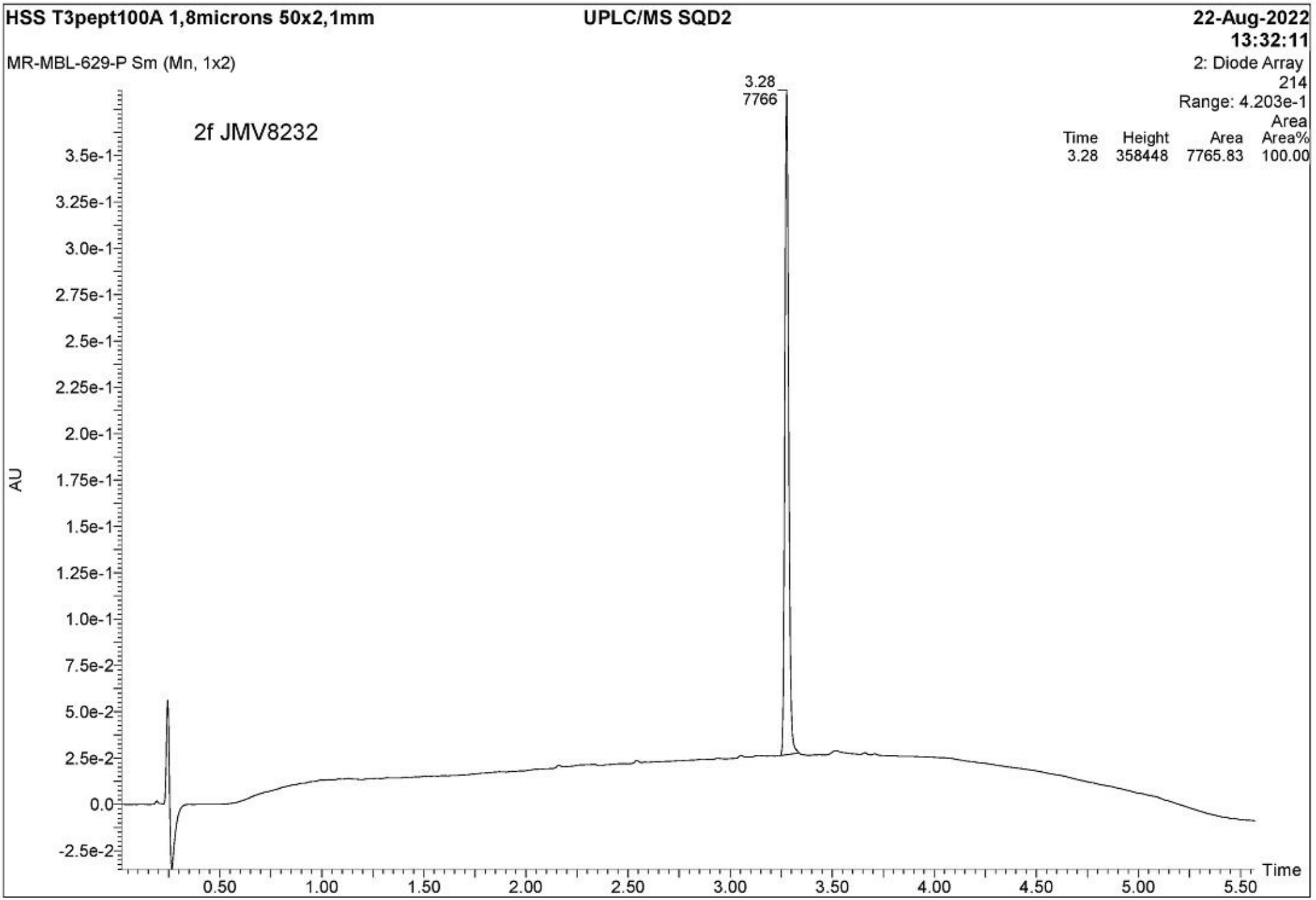
2f
JMV8232

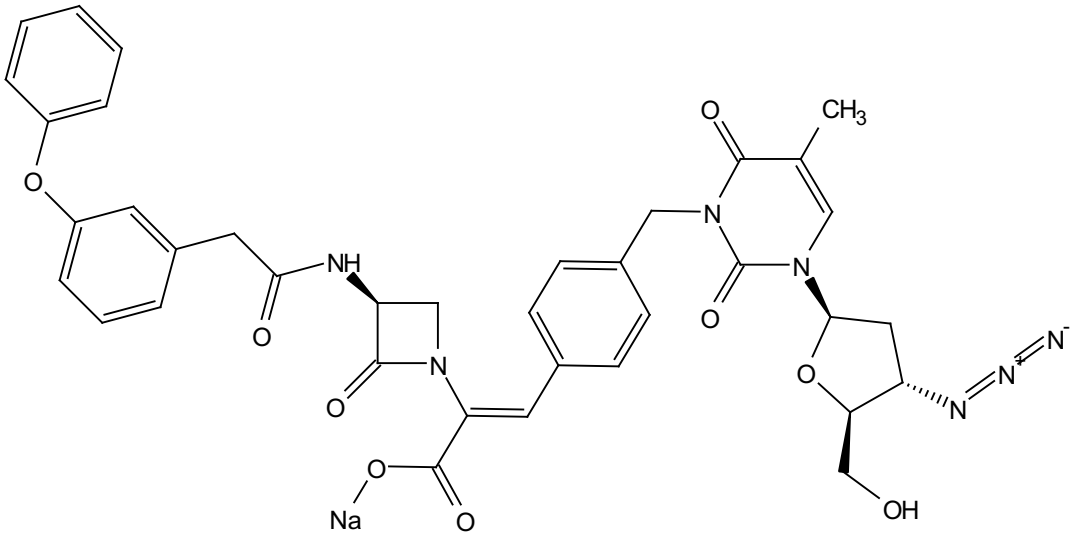

0.95
0.99
6.03
2.19
6.00
0.99
0.46
2.97
0.99
2.03
2.81
2.23
2.16
3.00
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


170.5
166.0
165.4
162.6
150.5
140.0
138.4
138.3
135.2
135.1
132.3
130.8
130.2
129.6
128.9
128.1
127.8
127.3
127.2
126.7
126.6
126.6
108.7
84.5
84.2
60.6
59.8
55.7
49.0
43.6
41.5
36.4
12.9
CH3
NH
N
O
Na
OH
2f
JMV8232
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)


HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
22-Aug-2022
13:32:11
MR-MBL-629-P
2f JMV8232
1: Scan ES+
706
2.84e7
3.27
1.39
1.92
3.32
3.56
%
MR-MBL-629-P
2: Diode Array
Range: 4.19e+1
3.28
0.24
AU
MR-MBL-629-P
1: Scan ES+
TIC
2.07e8
4.75
4.81
4.49
4.41
4.12
4.30
3.69
3.76
4.01
3.00
3.20
3.28
3.56
Time

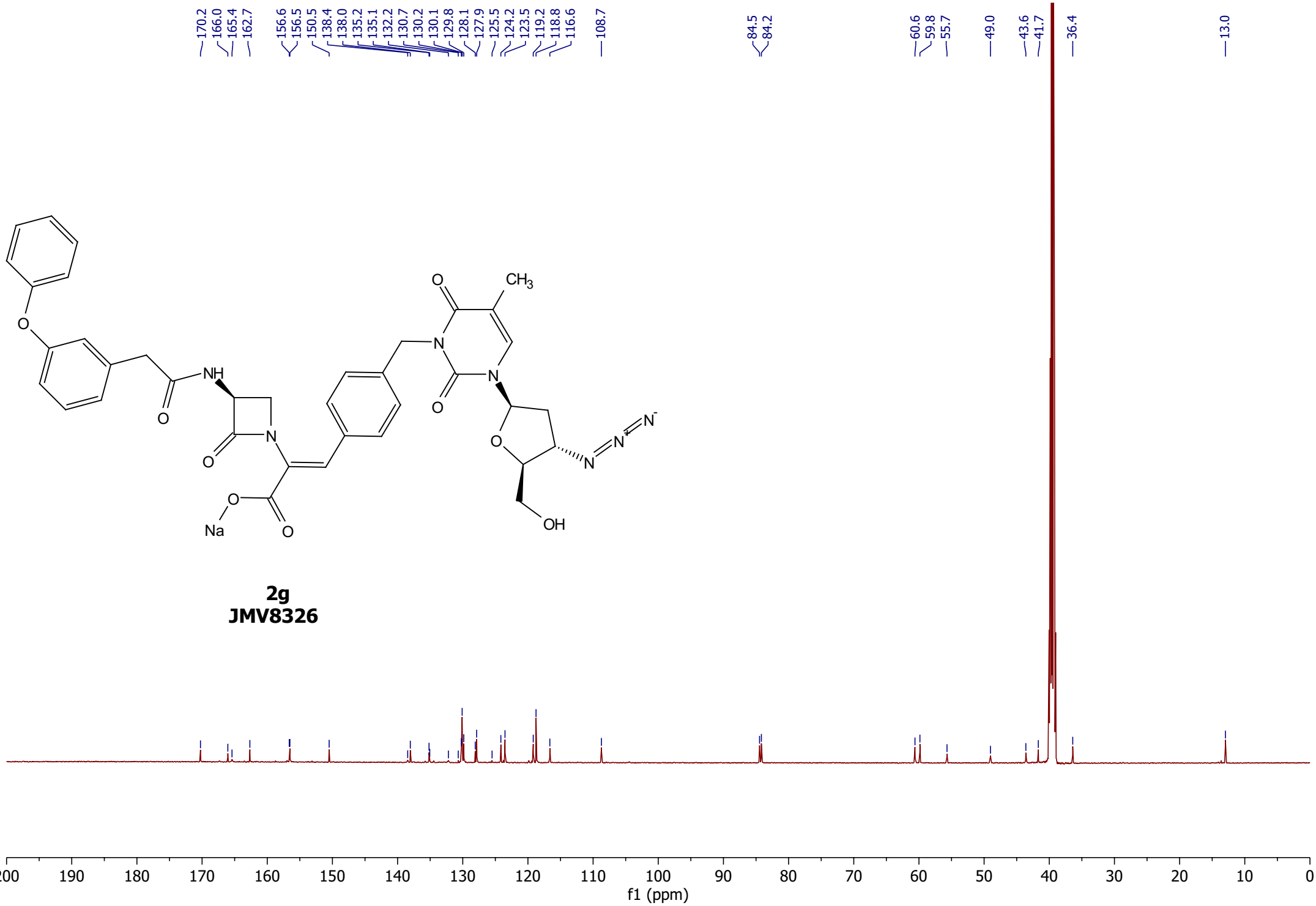

UPLC MS
22-Aug-2022
13:32:11
MR-MBL-629-P 940 (3.275) Cm (932:955)
1: Scan ES+
1.94e6
100
2f JMV8232
706.3
%
707.4
728.3
729.3
730.2
258.5
234.6
276.0
295.1
330.2
631.1
0
m/z
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950

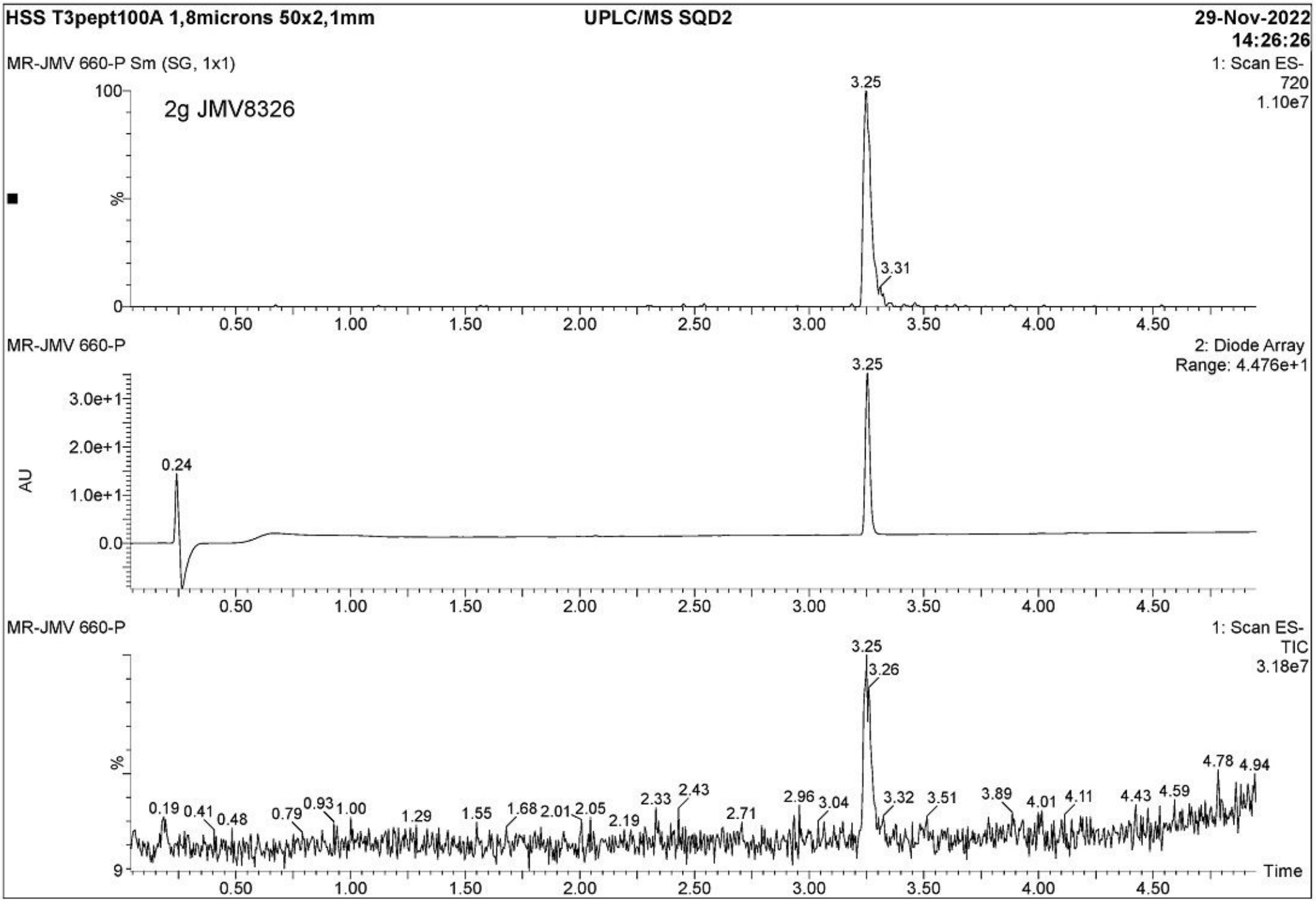

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
22-Aug-2022
13:32:11
MR-MBL-629-P Sm (Mn, 1x2)
2: Diode Array
214
Range: 4.203e-1
Area
2f JMV8232
3.28
7766
Time Height Area Area%
3.28 358448 7765.83 100.00
AU
3.5e-1
3.25e-1
3.0e-1
2.75e-1
2.5e-1
2.25e-1
2.0e-1
1.75e-1
1.5e-1
1.25e-1
1.0e-1
7.5e-2
5.0e-2
2.5e-2
0.0
-2.5e-2
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
Time

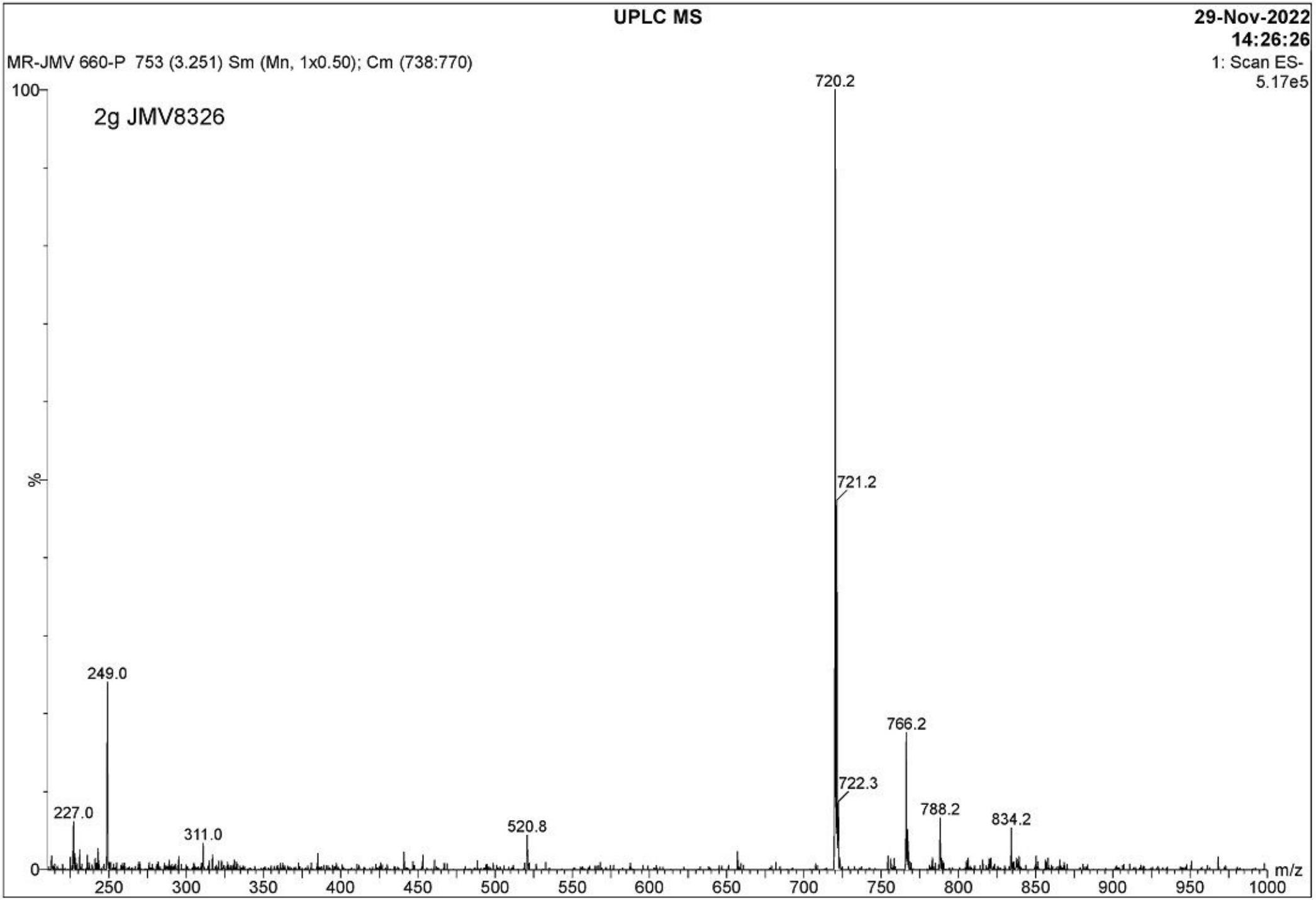

O
NH
O
N
O
O
O
Na
O
N
O
CH3
N
O
N
O
N
N
N
OH

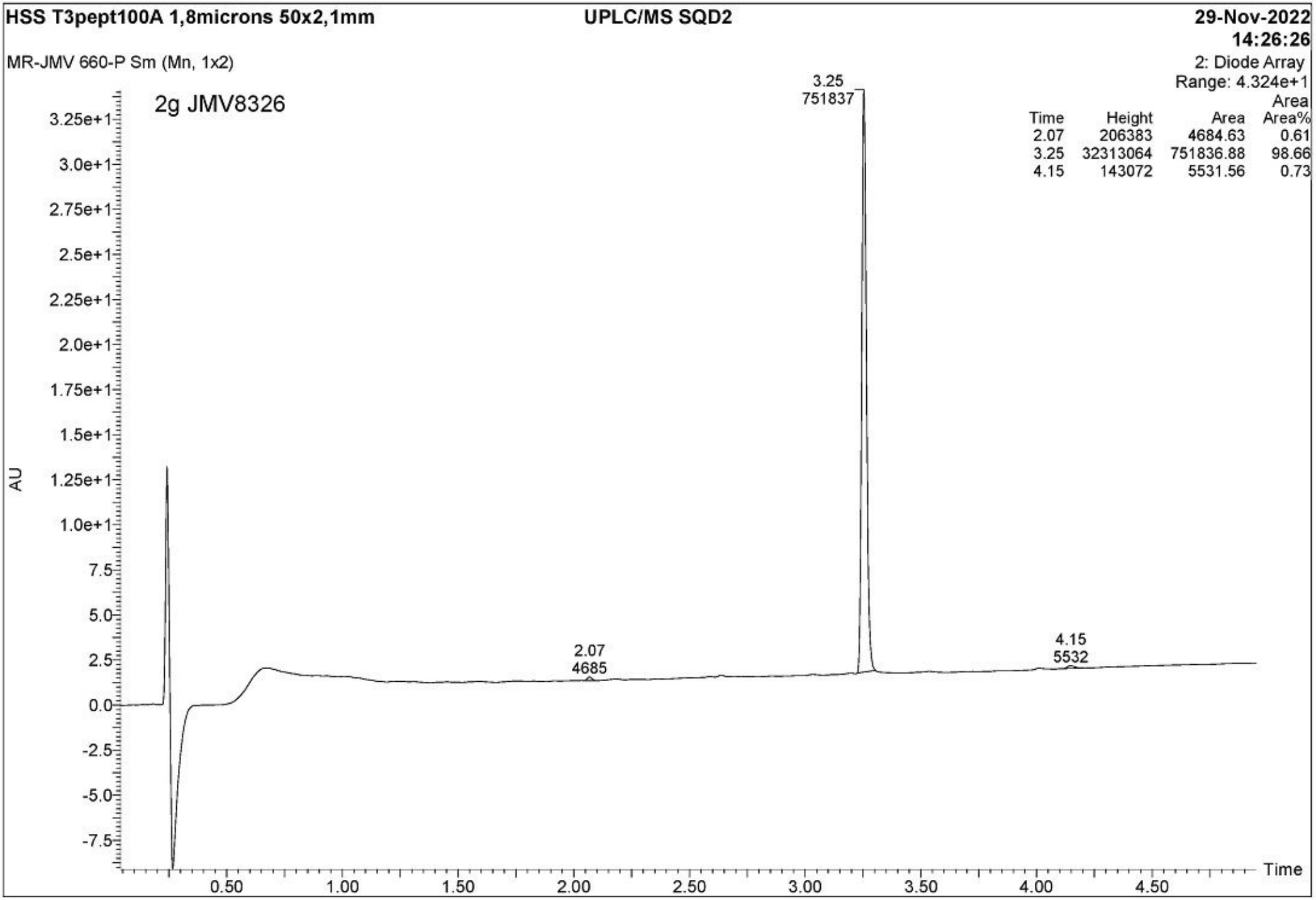
2g
JMV8326

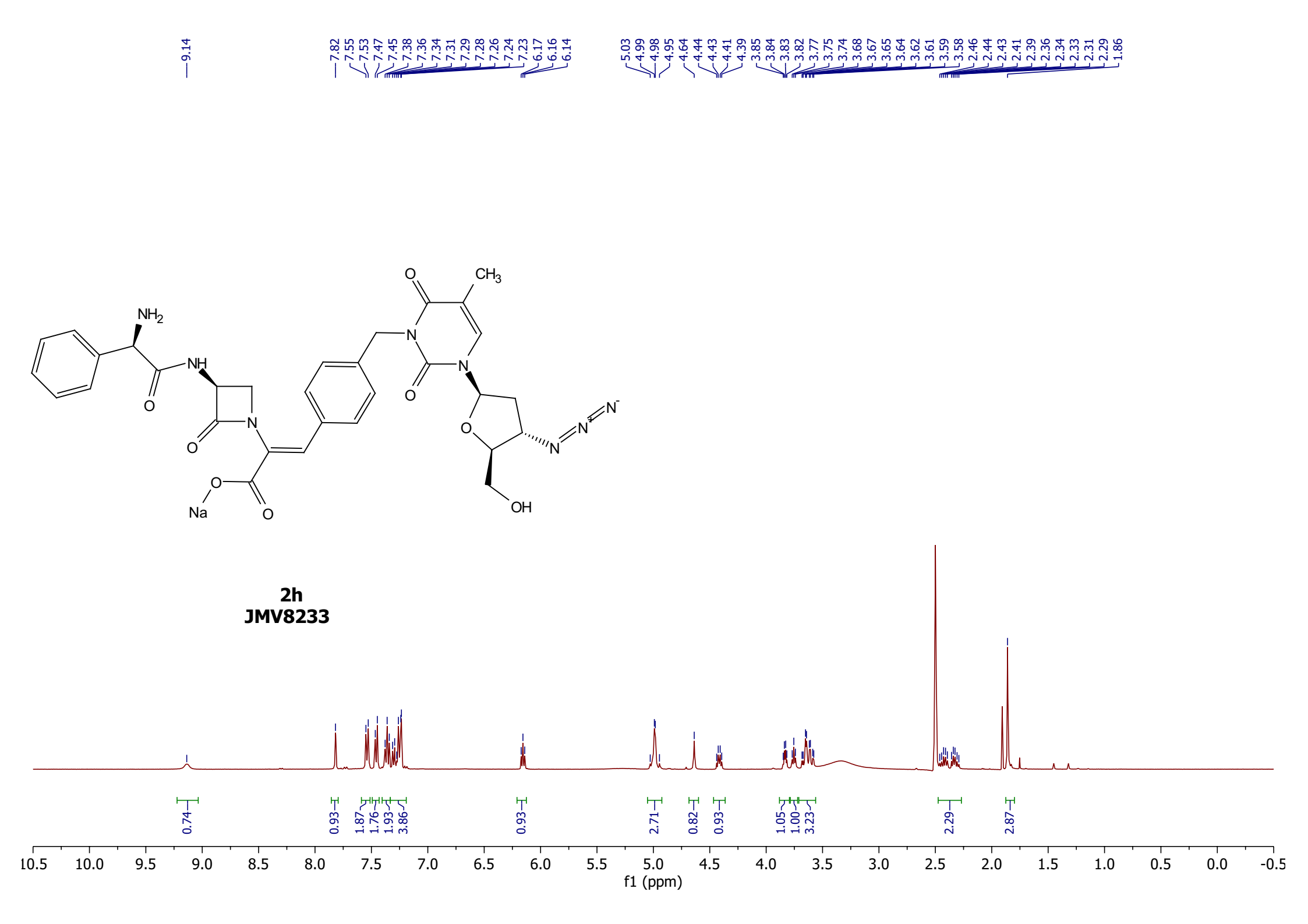
0.80
1.00
1.60
2.14
1.70
2.16
1.02
1.02
1.81
0.89
0.90
1.21
0.84
2.83
1.05
1.06
0.83
2.95
1.80
2.29
3.13
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

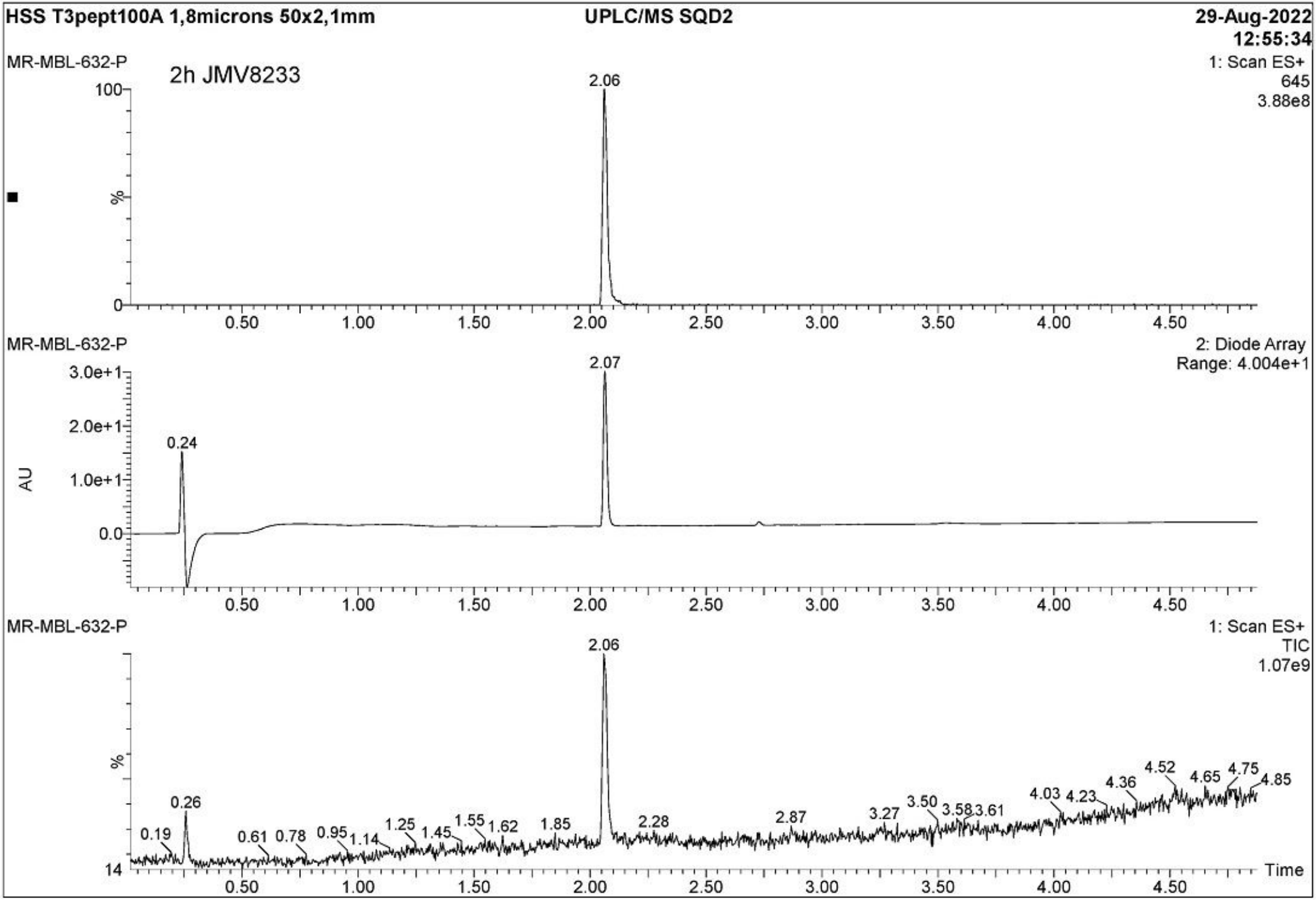

170.2
166.0
165.4
162.7
156.6
156.5
150.5
138.4
138.0
135.2
135.1
132.2
130.7
130.2
130.1
129.8
128.1
127.9
125.5
124.2
123.5
119.2
118.8
116.6
108.7
84.5
84.2
60.6
59.8
55.7
49.0
43.6
41.7
36.4
13.0
O
NH
O
N
O
O
Na
O
N
O
CH3
O
N
N
O
N
N
N
OH
2g
JMV8326
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
f1 (ppm)

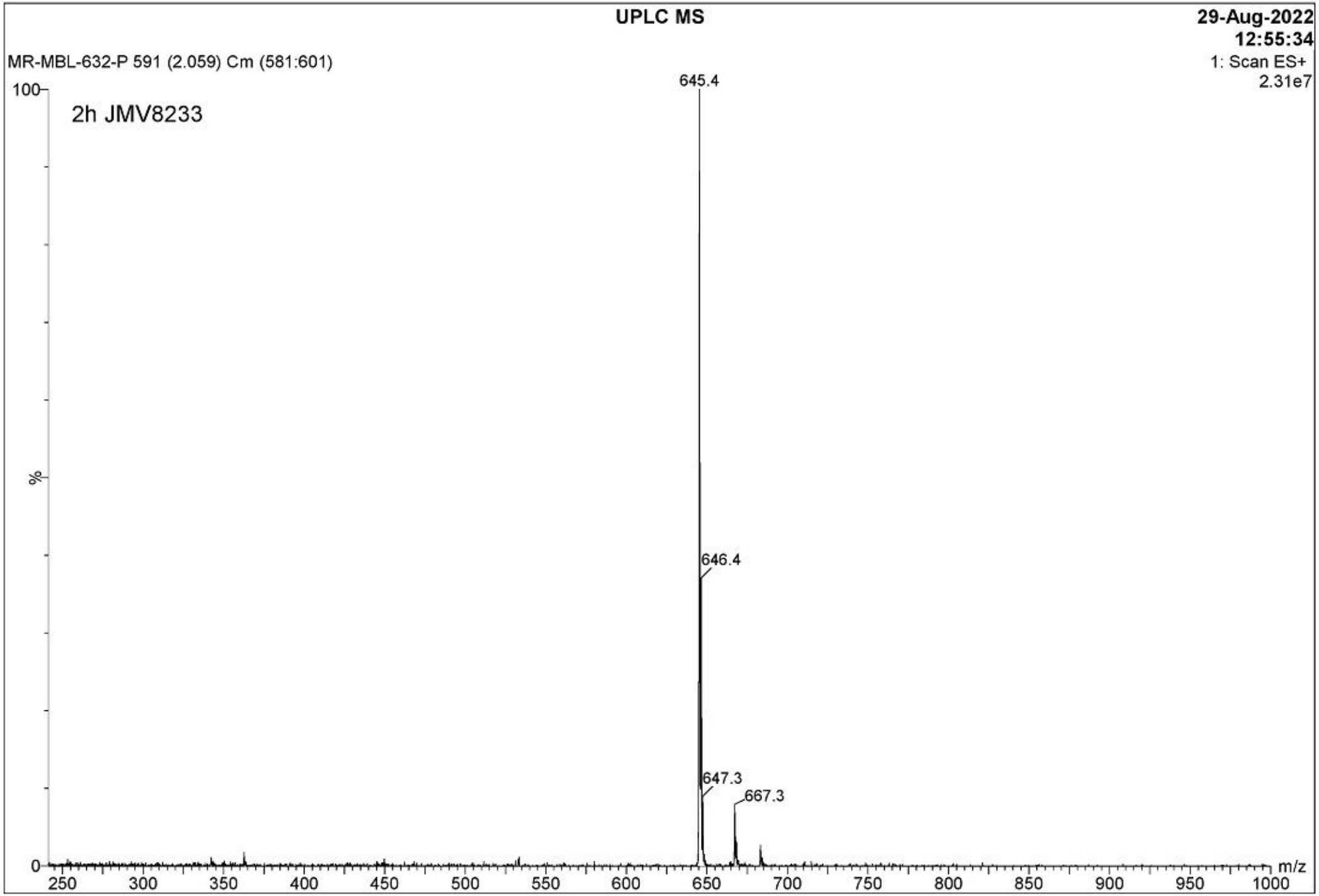

HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
29-Nov-2022
14:26:26
MR-JMV 660-P Sm (SG, 1x1)
1: Scan ES-
720
1.10e7
2g JMV8326
100
%
0
3.25
3.31
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
MR-JMV 660-P
2: Diode Array
Range: 4.476e+1
3.25
3.0e+1
2.0e+1
1.0e+1
0.0
AU
0.24
MR-JMV 660-P
1: Scan ES-
TIC
3.18e7
3.25
3.26
%
9
0.19
0.41
0.48
0.79
0.93
1.00
1.29
1.55
1.68
2.01
2.05
2.19
2.33
2.43
2.71
2.96
3.04
3.32
3.51
3.89
4.01
4.11
4.43
4.59
4.78
4.94
Time

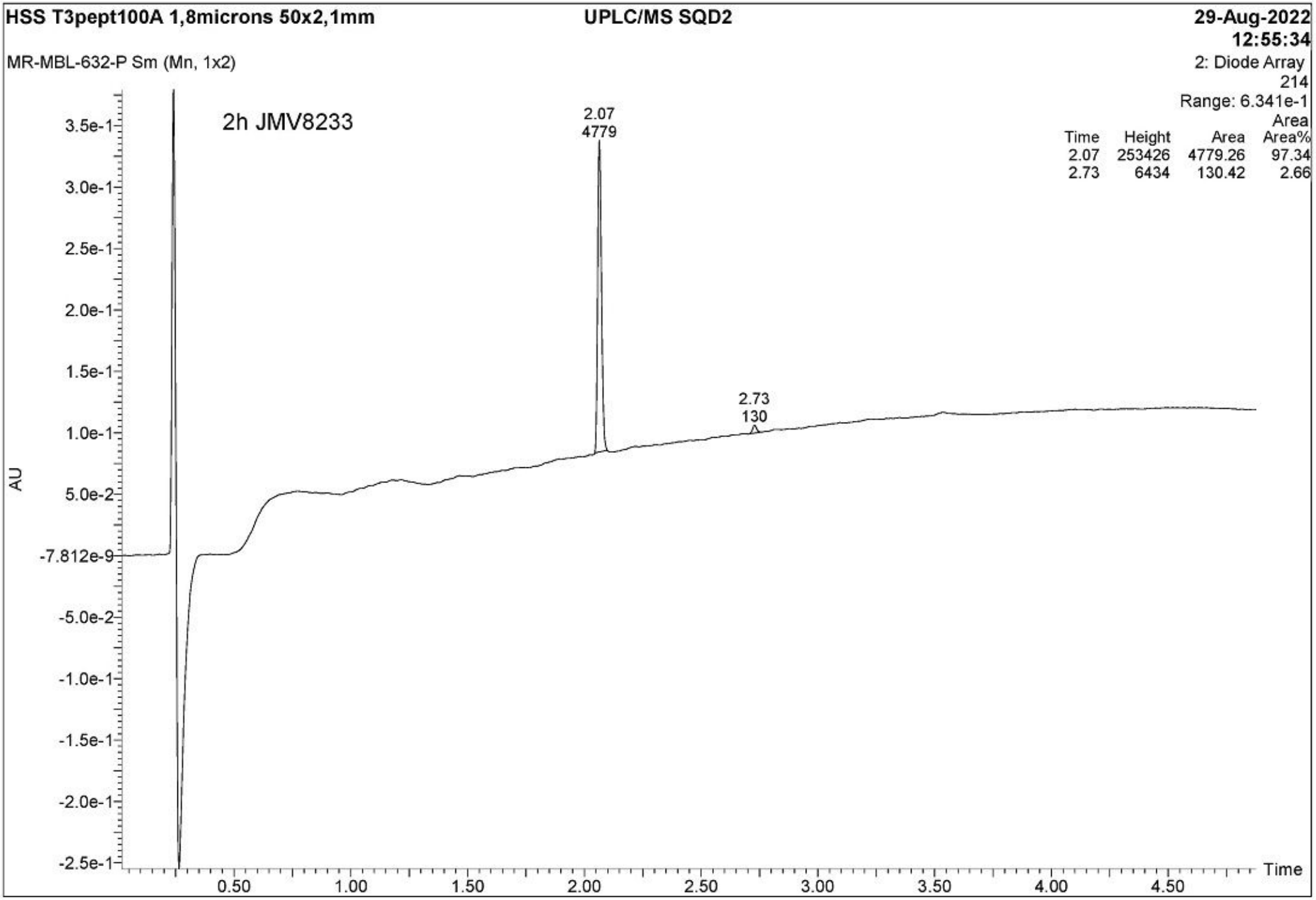

UPLC MS
29-Nov-2022
14:26:26
MR-JMV 660-P 753 (3.251) Sm (Mn, 1x0.50); Cm (738:770)
1: Scan ES-
5.17e5
2g JMV8326
100
%
0
720.2
721.2
249.0
766.2
722.3
227.0
788.2
834.2
311.0
520.8
m/z
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000


HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
29-Nov-2022
14:26:26
MR-JMV 660-P Sm (Mn, 1x2)
2: Diode Array
Range: 4.324e+1
2g JMV8326
3.25
751837
Time Height Area Area Area%
2.07 206383 4684.63 0.61
3.25 32313064 751836.88 98.66
4.15 143072 5531.56 0.73
2.07
4685
4.15
5532
AU
Time
3.25e+1
3.0e+1
2.75e+1
2.5e+1
2.25e+1
2.0e+1
1.75e+1
1.5e+1
1.25e+1
1.0e+1
7.5
5.0
2.5
0.0
-2.5
-5.0
-7.5
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50


9.14
7.82
7.55
7.53
7.47
7.45
7.38
7.36
7.34
7.31
7.29
7.28
7.26
7.24
7.23
6.17
6.16
6.14
5.03
4.99
4.98
4.95
4.64
4.44
4.43
4.41
4.39
3.85
3.84
3.83
3.82
3.77
3.75
3.74
3.68
3.67
3.65
3.64
3.62
3.61
3.59
3.58
2.46
2.44
2.43
2.41
2.39
2.36
2.34
2.33
2.31
2.29
1.86
NH2
NH
O
N
O
O
N
O
CH3
N
N
O
O
N
N
N
O
Na
O
OH
2h
JMV8233
0.74
0.93
1.87
1.76
1.93
3.86
0.93
2.71
0.82
0.93
1.05
1.00
3.23
2.29
2.87
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
29-Aug-2022
12:55:34
MR-MBL-632-P
2h JMV8233
1: Scan ES+
645
3.88e8
2.06
100
%
0
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
MR-MBL-632-P
2: Diode Array
Range: 4.004e+1
2.07
3.0e+1
2.0e+1
1.0e+1
0.0
AU
0.24
MR-MBL-632-P
1: Scan ES+
TIC
1.07e9
2.06
%
14
0.19
0.26
0.61
0.78
0.95
1.14
1.25
1.45
1.55
1.62
1.85
2.28
2.87
3.27
3.50
3.58
3.61
4.03
4.23
4.36
4.52
4.65
4.75
4.85
Time


UPLC MS
29-Aug-2022
12:55:34
MR-MBL-632-P 591 (2.059) Cm (581:601)
1: Scan ES+
2.31e7
100
2h JMV8233
645.4
646.4
647.3
667.3
%
0
m/z
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000


HSS T3pept100A 1,8microns 50x2,1mm
UPLC/MS SQD2
29-Aug-2022
12:55:34
MR-MBL-632-P Sm (Mn, 1x2)
2: Diode Array
214
Range: 6.341e-1
Area
Time Height Area Area%
2.07 253426 4779.26 97.34
2.73 6434 130.42 2.66
2h JMV8233
2.07
4779
2.73
130
AU
3.5e-1
3.0e-1
2.5e-1
2.0e-1
1.5e-1
1.0e-1
5.0e-2
-7.812e-9
-5.0e-2
-1.0e-1
-1.5e-1
-2.0e-1
-2.5e-1
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
Time