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Supporting Information

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Supporting Information

Solid-Phase Synthesis of Epigallocatechin Gallate Derivatives .

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General Techniques

NMR spectra were recorded on a JEOL Model ECP-400 (400 MHz for ^{1}H, 100 MHz for ^{13}C) instrument in the indicated solvent. Chemical shifts are reported in units parts per million (ppm) relative to the signal (0 ppm) for internal tetramethylsilane for solutions in $CDCl_3$. ^{1}H NMR spectrum data are reported as follows: $CDCl_3$ (7.26 ppm) or CD_3OD (3.30 ppm), acetone-d_6 (2.00 ppm), DMSO-d_6 (2.50 ppm). ^{13}C NMR spectrum data are reported as follows: $CDCl_3$ (77.1 ppm) or acetone-d_6 (30.3 ppm) as internal standard for D_2O. Multiplicities are reported by using the following abbreviations: s; singlet, d; doublet, t; triplet, q; quartet, m; multiplet, br; broad, *J*; coupling constants in Hertz.

IR spectra was recorded on a Perkin-Elmer Spectrum One FT-IR spectrophotometer. Only the strongest and/or structurally important peaks are reported as the IR data given in cm^{-1}.

All reactions were monitored by thin-layer chromatography carried out on 0.2 mm E. Merck silica gel plates (60F-254) with UV light, visualized by 10% ethanolic phosphomolybdic acid, *p*-anisaldehyde solution.

Merck silica gel was used for column chromatography.

Gel permeation chromatography (GPC) for qualitative analysis were performed on Japan Analytical Industry Model LC908 (recycling preparative HPLC), on a Japan Analytical Industry Model RI-5 refractive index detector and on a Japan Analytical Industry Model 310 ultra violet detector with a polystylene gel column (JAIGEL-1H, 20mm x 600 mm), using chloroform as solvent (3.5 mL / min).

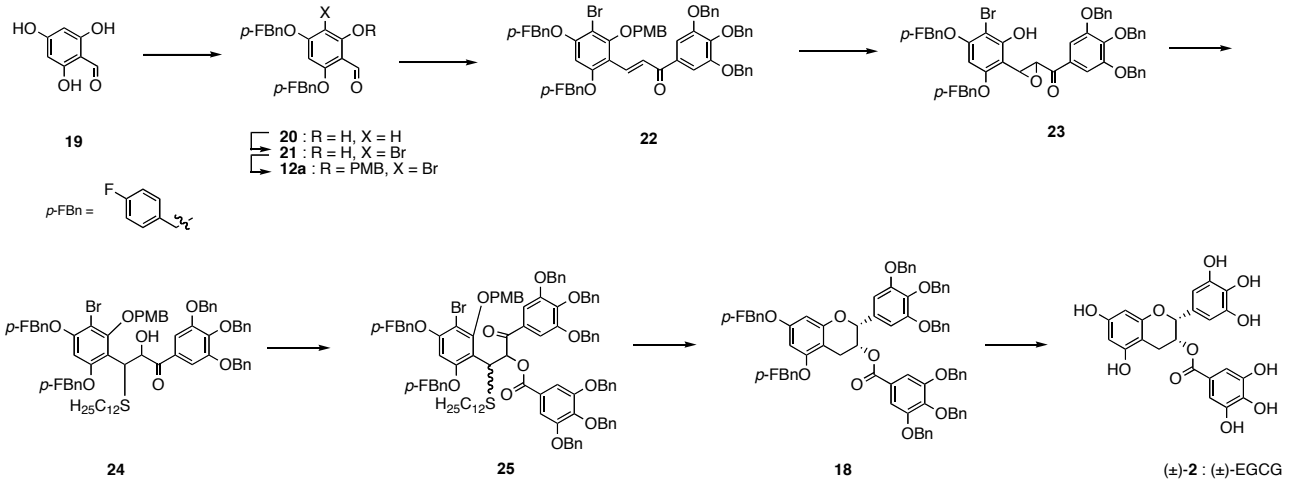
ESI-TOF Mass spectra were measured with Waters LCT Premier™ XE.

Dry dichloromethane was distilled from P_2O_5. Dry triethylamine and dry acetonitrile were distilled from CaH_2.

LC/MS were obtained on Hewlett-Pachard Series 1100 (GL Science Inc. Inertsil ODS-3, 3μm, 4.6 x 75 mm with a linear gradient of 10 % acetonitrile containing 0.1% formic acid/water containing 0.1% formic acid to 80% acetonitrile containing 0.1% formic acid/water containing 0.1% formic acid over 3 min, to 100% acetonitrile containing 0.1% formic acid further 10 min at 10 mL mon-1 flow rat).

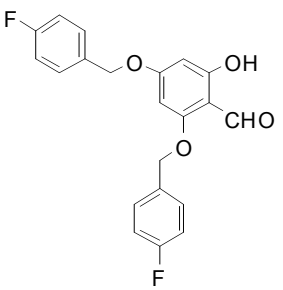
Experimental Section

Solution-Phase Synthesis of Epigallocatechin-3-gallate (2)



2,4-Bis(4-fluorobenzyloxy)-6-hydroxybenzaldehyde (20)

To a suspension of 2,4,6-trihydroxybenzaldehyde (**19**) (5.00 g, 26.3 mmol, 1.00 eq.) in DMF (55.0 mL) was added K_2CO_3 (8.36 g, 60.5 mmol, 2.30 eq.) at 0 ˚C under argon. After the reaction mixture was stirred at the same temperature for 5 min, a solution of 4-fluorobenzyl bromide (6.55 mL, 52.6 mmol, 2.00 eq.) in DMF (15.0 mL) was added dropwise to the reaction mixture. After being stirred at the room temperature for 16 h, the reaction mixture was poured into the mixture of 1 M aqueous HCl and ethyl acetate at 0 ˚C. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with three portions of H_2O and brine, dried over $MgSO_4$, and concentrated *in vacuo*. The residue was purified by column chromatography on silica gel (elution with chloroform), and recrystallized from CH_2Cl_2-hexane to afford benzaldehyde **20** (2.86 g, 7.65 mmol, 29% yield) as a white solid.

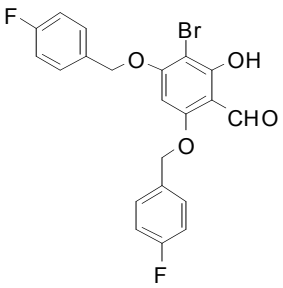


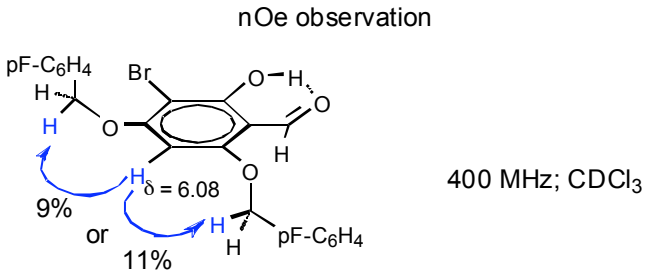
TLC R*f* 0.49 (hexane/ethyl acetate = 2/1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.50 (s, 1H), 10.14 (s, 1H), 7.38 (dd, J = 8.2 Hz, $J_{H,F}$ = 5.3 Hz, 2H), 7.37 (dd, J = 8.2 Hz, $J_{H,F}$ = 5.3 Hz, 2H), 7.09 (dd, J = 8.2 Hz, $J_{H,F}$ = 8.7 Hz, 4H), 6.10 (d, J = 1.9 Hz, 1H), 6.04 (d, J = 1.9 Hz, 1H), 5.04 (s, 2H), 5.03 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.9, 166.9, 166.4, 162.8x2 ($J_{C,F}$ = 247 Hz), 162.5, 131.5 ($J_{C,F}$ = 3.0 Hz), 131.4 ($J_{C,F}$ = 3.0 Hz), 129.6 ($J_{C,F}$ = 8.4 Hz), 129.4 ($J_{C,F}$ = 8.4 Hz), 115.8 ($J_{C,F}$ = 21.3 Hz), 106.4, 94.2, 92.4, 70.0, 69.8; FT-IR (solid) 3037, 2873, 1624, 1575, 1510, 1291, 1153, 828, 795, 585, 504 cm^{-1}; Anal. Calcd for $C_{21}H_{16}F_2O_4$: C, 68.11; H, 4.35. Found: C, 67.80; H, 4.47.

4,6-Bis(4-fluorobenzyloxy)-3-bromo-2-hydroxybenzaldehyde (12a)

To a solution of the benzaldehyde **20** (1.51 g, 4.09 mmol, 1.00 eq.) in CH_2Cl_2 (10.0 mL) was added dropwise a solution of bromine (209 μL, 4.09 mmol, 1.00 eq.) in CH_2Cl_2 at 0 °C under argon. After being stirred at the same temperature for 20 min, the reaction mixture was poured into the mixture of 10 wt% aqueous $Na_2S_2O_3$, saturated aqueous $NaHCO_3$ and ethyl acetate at 0 °C. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with brine, dried over $MgSO_4$, and concentrated *in vacuo*. The residue was recrystallized from CH_2Cl_2-hexane to afford bromide **12a** (1.51 g, 3.37 mmol, 82% yield) as a pale yellow solid. Structure determination of the bromide **12a** was achieved by analysis of ^{1}H nOe spectra.

TLC R*f* 0.41 (hexane/ethyl acetate = 2/1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 12.94 (s, 1H), 10.12 (s, 1H), 7.40 (dd, J = 8.2 Hz, $J_{H,F}$ = 5.3 Hz, 2H), 7.35 (dd, J = 8.2 Hz, $J_{H,F}$ = 5.3 Hz, 2H), 7.09 (dd, J = 8.2 Hz, $J_{H,F}$ = 8.7 Hz, 4H), 6.08 (s, 1H), 5.16 (s, 2H), 5.07 (s, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 191.6, 164.0, 162.9 ($J_{C,F}$ = 247 Hz), 162.7 ($J_{C,F}$ = 247 Hz), 162.6, 162.1, 161.6, 131.1 ($J_{C,F}$ = 3.0 Hz), 131.0 ($J_{C,F}$ = 3.0 Hz), 129.4 ($J_{C,F}$ = 7.6 Hz), 128.8 ($J_{C,F}$ = 8.4 Hz), 116.0 ($J_{C,F}$ = 21.3 Hz), 115.9 ($J_{C,F}$ = 22.1 Hz), 106.8, 91.8, 89.7, 70.5, 70.3; FT-IR (solid) 3048, 2924, 1646, 1604, 1515, 1301, 1240, 1199, 1118, 972, 787, 716 cm^{-1}; Anal. Calcd for $C_{21}H_{15}BrF_2O_4$: C, 56.14; H, 3.37. Found: C, 56.26; H, 3.37.





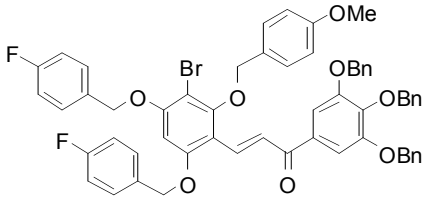
3-[4,6-Bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-1-[3,4,5-tris(benzyloxy)phenyl]prop-2-en-1-one (22)

To a suspension of benzaldehyde **12a** (894 mg, 1.99 mmol, 1.00 eq.) and Cs_2CO_3 (1.30 g, 3.98 mmol, 2.00 eq.) in DMF (10.0 mL) was added 4-methoxybenzyl chloride (565 μL, 4.15 mmol, 2.08 eq.) and sodium iodide (120 mg, 796 μmol, 0.40 eq.) at room temperature under argon. After being stirred at the same temperature for 11 h, the reaction mixture was poured into the mixture of H_2O and ethyl acetate. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with two portions of H_2O and brine, dried over $MgSO_4$, and concentrated *in vacuo*. The crude mixture was used for the next reaction without further purification.

To a solution of the above residue in THF (5.00 mL) was added 3',4',5'-tris(benzyloxy)acetophenone (**11a**) (829 mg, 1.89 mmol, 0.95 eq.) and sodium methoxide (322 mg, 5.97 mmol, 3.00 eq.) at room temperature. After being stirred at the same temperature for 3 h, the reaction mixture was poured into the mixture of H_2O and ethyl

acetate at 0 ˚C. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with brine, dried over $MgSO_4$, and concentrated *in vacuo*. The residue was recrystallized from CH_2Cl_2-hexane to afford chalcone **22** (1.62 g, 1.64 mmol, 82% yield in 2 steps) as a pale yellow solid.

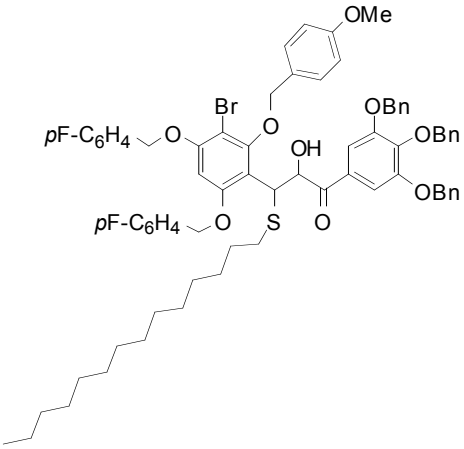
TLC R*f* 0.57 (toluene/acetone = 20/1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.16 (d, *J* = 15.9 Hz, 1H), 7.95 (d, *J* = 15.9 Hz, 1H), 7.31-7.45 (m, 21H), 7.22 (s, 2H), 7.10 (dd, *J* = 8.2 Hz, 8.7 Hz, 2H), 7.04 (dd, *J* = 8.2 Hz, 8.7 Hz, 2H), 6.82 (d, *J* = 8.7 Hz, 2H), 6.42 (s, 1H), 5.11 (s, 4H), 5.09 (s, 2H), 4.95 (s, 4H), 4.84 (s, 2H), 3.64 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 189.7, 162.7 ($J_{C,F}$ = 248 Hz), 160.0, 158.9, 157.6, 157.5, 152.7, 142.5, 137.6, 136.7, 135.3, 133.8, 131.6x2 ($J_{C,F}$ = 3.0 Hz), 130.8, 129.1 ($J_{C,F}$ = 7.6 Hz), 128.9 ($J_{C,F}$ = 8.4 Hz), 128.5, 128.2x2, 128.0x2, 127.8, 123.9, 115.9 ($J_{C,F}$ = 21.3 Hz), 115.8 ($J_{C,F}$ = 21.3 Hz), 114.0, 113.8, 108.3, 101.1, 96.0, 75.3, 75.2, 71.2, 70.6x2, 55.2; FT-IR (solid) 3031, 2936, 1643, 1586, 1251, 1184, 1159, 1093, 1031, 885, 799, 733, 698 cm^{-1}; Anal. Calcd for $C_{58}H_{47}BrF_2O_8$: C, 70.37; H, 4.79. Found: C, 70.22; H, 4.81.



3-[4,6-Bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-3-dodecylsulfanyl-2-hydroxy-1-[3,4,5-tris(benzyloxy)phenyl]propan-1-one (24)

To a solution of chalcone **22** (200 mg, 202 μmol, 1.00 eq.) in CH_2Cl_2 (3.00 mL) was added 30 wt% aqueous H_2O_2 (2.29 mL, 20.2 mmol, 100 eq.), 3 M aqueous KOH (1.00 mL) and $Bu_4N \cdot HSO_4$ (137 mg, 404 μL, 2.00 eq.) at room temperature. After being stirred at the same temperature for 26 h, the reaction mixture was poured into saturated aqueous Na_2SO_3 and ethyl acetate at 0 ˚C. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with saturated aqueous Na_2SO_3, brine, dried over Na_2SO_4, and concentrated *in vacuo*. The crude mixture was used for the next reaction without further purification.

To a solution of the crude in acetonitrile (2.02 mL) and CH_2Cl_2 (750 μL) was added 1-dodecanethiol (73.0 μL, 303 μmol, 1.50 eq.) and $Zn(OTf)_2$ (14.7 mg, 40.4 μmol, 0.20 eq.) at room temperature under argon. After being stirred at the same temperature for 15 min, the mixture was quenched by addition of triethylamine and concentrated *in vacuo*. The residue was purified by column chromatography on silica gel (elution with 20% ethyl acetate in hexane) to afford a diastereo mixture of α-hydroxyketones **24** (210 mg, 174 μmol, 86% in 2 steps) as a white solid.

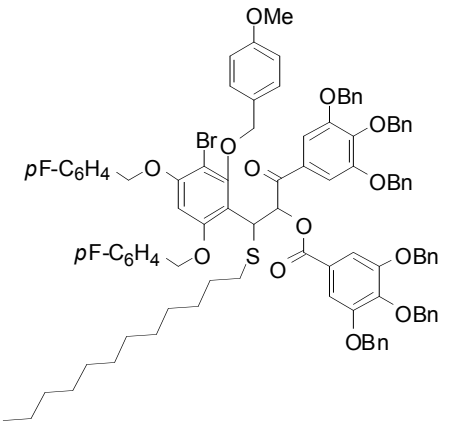


TLC R*f* 0.45 (hexane/ethyl acetate = 3/1); ^{1}H NMR (400 MHz, DMSO-d_6) δ 7.02-8.31 (m, 45H), 6.96 (d, *J* = 8.2 Hz, 1.3H), 6.85 (d, *J* = 8.2 Hz, 0.7H), 6.75(s, 0.32H), 6,66 (s, 0.09H), 6.62 (s, 0.59H), 6.25 (d, *J* = 7.7 Hz, 0.64H), 6.16 (d, *J* = 6.8 Hz, 0.05H), 6.09 (d, *J* = 7.3 Hz, 0.31H), 5.71 (br t, *J* = 9.7, 8.2 Hz, 0.38H), 5.61 (br t, *J* = 8.7 Hz, 0.62H), 4.77-5.29 (m, 12.4H), 4.57 (d, *J* = 9.7 Hz, 0.60H), 3.75,(s,

2.1H), 3.60 (s, 0.9H), 2.60-2.71 (m, 2H), 0.83-1.49 (m, 23H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 198.9, 198.7, 161.7 ($J_{C,F}$ = 244 Hz), 161.6 ($J_{C,F}$ = 244 Hz), 159.1, 156.7, 155.6, 155.2, 155.1, 154.8, 153.4, 151.8x2, 141.2, 141.0, 137.3, 136.5, 132.6 ($J_{C,F}$ = 2.3 Hz), 132.5 ($J_{C,F}$ = 2.3 Hz), 131.7, 131.5, 130.0, 129.6 ($J_{C,F}$ = 8.4 Hz), 129.4 ($J_{C,F}$ = 7.6 Hz), 128.8, 128.3, 128.1, 128.0x2, 127.9, 127.7, 127.6, 117.1, 115.2 ($J_{C,F}$ = 21.3 Hz), 113.7, 107.1, 106.7, 99.1, 74.4, 74.3, 74.0, 73.5, 72.6, 70.3, 70.1, 69.9, 69.8x2, 69.4, 55.0, 54.8, 44.6, 40.4, 33.6, 33.4, 31.3, 29.7, 29.6, 29.0, 28.7, 28.6, 28.5, 28.4, 22.1; FT-IR (solid) 3471, 2924, 2855, 1674, 1608, 1589, 1514, 1103, 914, 824, 733, 697 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{70}H_{74}F_2BrO_9S$ $[M+H]^+$ 1207.4205, found 1207.4204.

3-[4,6-Bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-3-dodecylsulfanyl-1-[3,4,5-tris(benzyloxy)phenyl]propan-1-one-2-yl 3,4,5-tris(benzyloxy)benzoate (25)

To a solution of hydroxyketone **24** (195 mg, 162 μmol, 1.00 eq.) in pyridine (800 μL) was added 3,4,5-tris(benzyloxy)benzoic acid (**7a**) (92.5 mg, 210 μmol, 1.30 eq.), EDCI・HCl (55.3 mg, 288 μmol, 1.78 eq.) and DMAP (3.90 mg, 32.4 μmol, 0.20 eq.) at room temperature under argon. After being stirred at the same temperature for 20 h, the reaction mixture was poured into 1 M aqueous HCl and ethyl acetate at 0 ˚C. The aqueous layer was extracted with two portions of ethyl acetate. The combined organic layers were washed with 1 M aqueous HCl, saturated aqueous $NaHCO_3$, brine, dried over $MgSO_4$, and concentrated *in vacuo*. The residue was purified by column chromatography on silica gel (elution with toluene) to afford a diastereo mixture of acyloxyketones **25** (219 mg, 134 μmol, 83% yield) as a white solid.



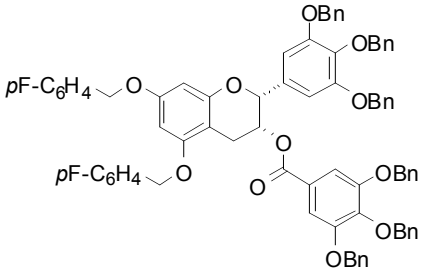
TLC R*f* 0.51 (hexane/ethyl acetate = 2/1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.70-7.65 (m, 46H), 6.40 (s, 0.05H), 6.13 (s, 0.36H), 5.94 (s, 0.59H), 5.39 (d, *J* = 9.2 Hz, 0.31H), 4.65-5.17 (m, 19.69H), 3.79 (s, 0.15H), 3.70 (s, 1.86H), 3.65 (s, 0.99H), 2.61-2.88 (m, 2H), 0.85-1.66 (m, 23H); FT-IR (solid) 3020, 2928, 1713, 1691, 1588, 1514, 1216, 1107, 927, 757, 669 cm^{-1}.

***cis*-5,7-Bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (18)**

To a solution of acyloxyketone **25** (100 mg, 61.5 μmol, 1.00 eq.) in CH_2Cl_2 (1.50 mL) was added trifluoroacetic acid (300 μL) at -10 ˚C under argon. After being stirred at -10 ˚C for 2 h, the reaction mixture was treated with triethylsilane (200 μL). After being stirred at the same temperature for further 1 h, the reaction mixture was quenched by addition of triethylamine, diluted with toluene, and concentrated *in vacuo*. The residue was purified by gel permeation chromatography (GPC) to afford chroman **18** (64.7 mg, 53.2 μmol, 87% yield) as a white solid.

TLC R*f* 0.43 (hexane/ethyl acetate = 2/1); ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.19-7.39 (m, 36H), 7.00-7.07 (m, 4H),

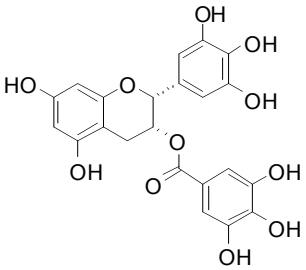
6.73 (s, 2H), 6.38 (d, J = 1.9 Hz, 1H), 6.30 (d, J = 1.9 Hz, 1H), 5.65 (br s, 1H), 5.04 (s, 1H), 4.66-5.01 (m, 16H), 3.10 (dd, J_{gem} = 17.9 Hz, J = 4.4 Hz, 1H), 3.03 (dd, J_{gem} = 17.9 Hz, J = 2.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 164.9, 162.6x2 ($J_{C,F}$ = 247 Hz), 158.8, 158.0, 155.8, 153.0, 152.5, 142.9, 138.6, 137.8, 137.5, 137.0, 136.5, 133.2, 132.6 ($J_{C,F}$ = 3.0 Hz), 129.4 ($J_{C,F}$ = 8.4 Hz), 129.1 ($J_{C,F}$ = 8.4 Hz), 128.6x2, 128.5, 128.4, 128.3, 128.2x2, 128.0, 127.9, 127.8, 127.6x2, 125.0, 115.6 ($J_{C,F}$ = 22.1 Hz), 109.3, 106.9, 101.2, 94.8, 94.1, 78.1, 75.2, 75.1, 71.3, 71.2, 69.6, 69.5, 68.3, 26.3; FT-IR (solid) 3033, 2870, 1717, 1620, 1594, 1512, 1455, 1369, 1220, 1118, 909, 819, 734, 696, 502 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{78}H_{64}F_2O_{11}$ $[M+H]^+$ 1215.4495, found 1215.4495.; Anal. Calcd for $C_{78}H_{64}F_2O_{11}$: C, 77.08; H, 5.31. Found: C, 76.76; H, 5.41.



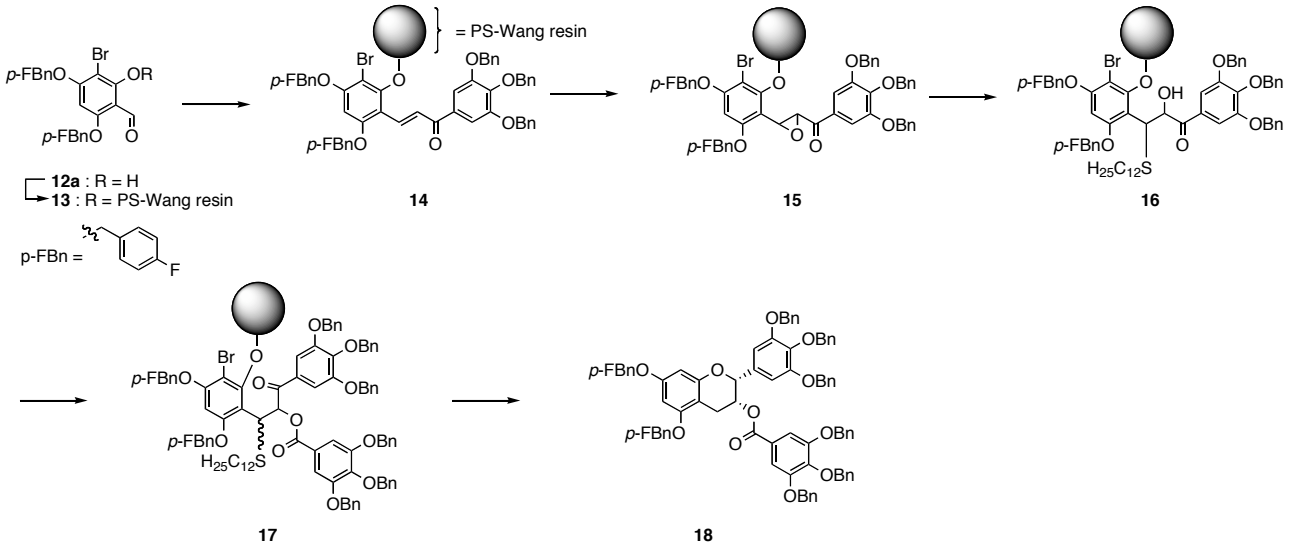
(±)-Epigallocatechin-3-gallate (2)

To a stirred solution of chroman **52** (9.10 mg, 7.45 μmol, 1.00 eq.) in THF/methanol (1:1, 2.00 mL) was added 20 wt% $Pd(OH)_2$ (19.1 mg) and formic acid (5.00 μL) at room temperature. The reaction mixture was hydrogenolyzed for 29 h under hydrogen gas atmosphere. The reaction mixture was filtered and concentrated *in vacuo*. The residue was purified by column chromatography on silica gel (elution with 10% methanol in CH_2Cl_2) to afford epigallocatechin-3-gallate (**1**) (2.80 mg, 6.11 μmol, 82% yield) as a white solid.

^{1}H NMR (400 MHz, acetone-d_6/D_2O = 1/1); δ 6.86 (s, 2H), 6.51 (s, 2H), 5.89 (s, 2H), 5.27 (br s, 1H), 4.89 (s, 1H), 2.87 (dd, J_{gem} = 17.4 Hz, J = 4.4 Hz, 1H), 2.76 (br d, J_{gem} = 17.4 Hz, 1H); ^{13}C NMR (100 MHz, acetone-d_6/D_2O = 1/1) δ 167.3, 157.0, 156.9, 156.8, 146.0, 145.7, 139.3, 133.0, 130.6, 121.0, 110.2, 106.8, 99.0, 96.5, 95.8, 77.9, 70.3, 26.4; FT-IR (solid) 3508, 1687, 1608, 1451, 1227, 1029, 730, 549 cm^{-1}.

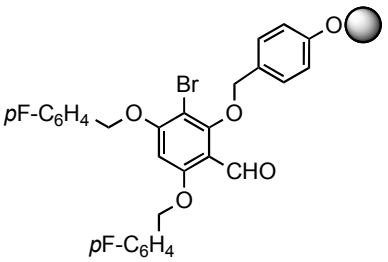


Solid-Phase Synthesis



Polymer-supported 4,6-bis(4-fluorobenzyloxy)-3-bromo-2-hydroxybenzaldehyde (13)

PS-Wang-Br resin® (Novabiochem, 1.6 mmol/g loading, 140 mg) was placed in a syringe-shaped vessel. To this reaction vessel was added a suspention of hydroxybenzaldehyde **12a** (180 mg, 400 μmol) in DMF (2.00 mL), Cs_2CO_3 (130 mg, 400 μmol) and sodium iodide (15.0 mg, 120 μmol) at room temperature. After being shaken at the same temperature for 24 h, the solvent was removed and the resin was rinsed with DMF (10 min). The remained resin was washed consecutively with DMF/H_2O (2:1, 10 min x 3), DMF (10 min x 3), methanol (10 min x 3), CH_2Cl_2 (10 min x 3), and dried under reduced pressure to afford polymer-supported benzaldehyde **13** (202.5 mg).



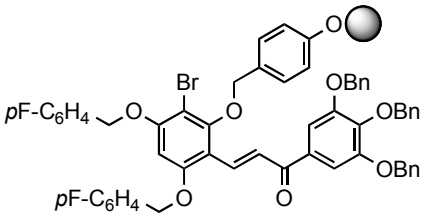
FT-IR (solid) 3025, 2909, 1685, 1615, 1104, 923, 851, 701, 576 cm^{-1}.

Procedure for Cleavage from PS resins

A part of the polymer-supported benzaldehyde **13** (84.8 mg) was placed in a syringe-shaped vessel. To this reaction vessel was added a solution of trifluoroacetic acid (50.0 μL) in CH_2Cl_2 (1.95 mL) at room temperature. After being shaken at the same temperature for 1 h, the reaction vessel was filtered and washed with CH_2Cl_2 (5 min x 3). The filtrate was concentrated *in vacuo*. The residue was purified by short-pad column chromatography (elution with chloroform) to afford benzaldehyde **12a** (20.3 mg, 45.2 μmol, 48% yield based on the resin).

Polymer-supported 3-[4,6-bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-1-[3,4,5-tris (benzyloxy)phenyl]prop-2-en-1-one (14)

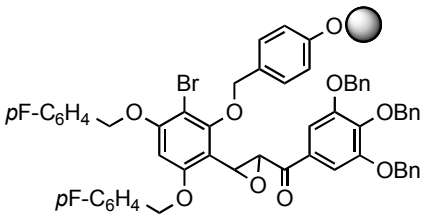
Polymer-supported benzaldehyde **13** (118 mg, 62.5 μmol) was placed in a syringe-shaped vessel. To this reaction vessel was added 3',4',5'-tris(benzyloxy)acetophenone (**11a**) (329 mg, 750 μmol) in THF (1.20 mL) at room temperature. After being shaken for 15 min, the reaction mixture was added 0.5 M sodium methoxide in methanol (300 μL). After being shaken for 24 h, the solvent was removed and rinsed with THF (10 min). The remained resin was washed consecutively with THF (10 min x 3), methanol (10 min x 3), CH_2Cl_2 (10 min x 3), and dried under reduced pressure to afford polymer-supported chalcone **14**.



FT-IR (solid) 3028, 2925, 1655, 1583, 1174, 1104, 828, 740 cm^{-1}.

Polymer-supported 3-[4,6-bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-2,3-epoxy-1-[3,4,5-tris(benzyloxy)phenyl]propan-1-one (15)

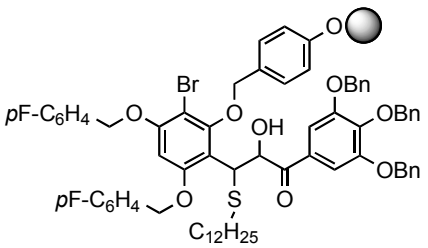
The polymer-supported chalcone **14** was placed in a syringe-shaped vessel. To this reaction vessel was added 5.5 M *t*-butyl hydrogen peroxide in decane (380 μL, 2.09 mmol), CH_2Cl_2 (1.00 mL) and 2.5 M KOH in methanol (120 μL) at room temperature. After being shaken for 72 h, the solvent was removed and the resin was rinsed with CH_2Cl_2 (10 min). The remained resin was washed consecutively with methanol (10 min x 4), CH_2Cl_2 (10 min x 4), and dried under reduced pressure to afford the polymer-supported epoxide **15**.



FT-IR (solid) 3464, 3027, 2921, 1676, 1610, 1158, 1078, 1028, 829, 739 cm^{-1}.

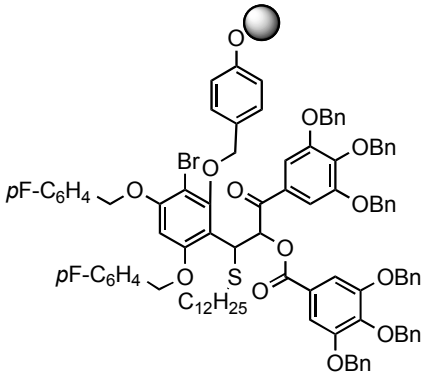
Polymer-supported 3-[4,6-bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-3-dodecylsulfanyl-2-hydroxy-1-[3,4, 5-tris(benzyloxy)phenyl]propan-1-one (16)

Polymer-supported epoxide **15** was placed in a syringe-shaped vessel. To this reaction vessel was added dodecanethiol (180 μL, 2.09 mmol), CH_2Cl_2 (750 μL) and 0.02 M $Zn(OTf)_2$ in acetonitrile (750 μL, 15.0 μmol) at room temperature. After being shaken for 3 h, the solution was quenched by addition of triethylamine, and the solvent was removed and the resin was rinsed with CH_2Cl_2 (10 min). The remained resin was washed consecutively with acetonitrile (10 min x 2), methanol (10 min x 4), CH_2Cl_2 (10 min x 4), and dried under reduced pressure to afford polymer-supported hydroxyketone **16**.



FT-IR (solid) 3490, 3028, 2927, 1667, 1173, 1079, 1030, 829, 737 cm^{-1}.

Polymer-supported 3-[4,6-bis(4-fluorobenzyloxy)-3-bromo-2-(4-methoxybenzyloxy)phenyl]-3-dodecylsulfanyl-1-[3,4,5-tris(benzyloxy)phenyl]propan-1-one-2-yl 3,4,5-tris(benzyloxy)benzoate (17)



Polymer-supported α-hydroxyketone **16** was packed in MacroKan™. In flask, to a suspension of MacroKan™ and 3,4,5-tris(benzyloxy)benzoic acid (441 mg, 1.00 mmol), in pyridine/DMF (1:1, 5.00 mL) was added EDCI・HCl (192 mg, 1.00 mmol) and DMAP (36.6 mg, 300 μmol) at 50 ˚C. After being stirred at the same temperature for 48 h, the reaction mixture was filtered and the MacroKan™ was rinsed with DMF (10 min). The MacroKan™ was washed consecutively with DMF (10 min x 3), DMF/H_2O (2:1, 10 min x 3), CH_2Cl_2 (10 min x 3), methanol (10 min x 3), and dried under reduced pressure to afford polymer-supported acyloxyketone **17**.
FT-IR (solid) 3029, 2932, 1718, 1676, 1028, 1017, 828, 737, 702 cm^{-1}.

Procedure for the Release and cyclization of 17 to provide (18)

To a suspension of polymer-supported acyloxyketone **17** was added trifluoroacetic acid (0.600 mL) in CH_2Cl_2 (2.00 mL). After being stirred at -10 ˚C for 5 h, to the reaction mixture was added triethylsilane (0.400 mL). After being stirred at the same temperature for further 19 h, the reaction mixture was filtered. The remained resin was rinsed with ethyl acetate and the filtrate was concentrated *in vacuo*. The residue was purified by gel permeation chromatography (GPC) to afford chroman **18**.

Parallel synthesis of 60-membered EGCG analogues

General Procedure for Loading of 4,6-*O*-protective-2-hydroxybenzaldehyde

Each MiniKans™ contained PS-Wang-Br resin® (Novabiochem, 1.6 mmol/g loading, ca.70 mg) and color tag. To suspension of hydroxybenzaldehydes **12a-b** (0.2 M) and MiniKans™ in DMF was added Cs_2CO_3 (0.2 M) and sodium iodide (0.06 M) at room temperature. After being shaken at the same temperature for 24 h, the reaction mixture was filtered. The resin was washed with DMF/H_2O (2:1, 10 min x 3), DMF (10 min x 3), methanol (10 min x 3), CH_2Cl_2 (10 min x 3), and dried under reduced pressure to afford the polymer-supported benzaldehydes, respectively.

General Procedure for Cleavage from PS resins

To a MiniKans™ in 10 mL vial was added a solution of trifluoroacetic acid (50.0 μL) in CH_2Cl_2 (1.95 mL) at room temperature. After being shaken at the same temperature for 1 h, MiniKans™ was filtered and washed with CH_2Cl_2 (5 min x 3). The filtrate was concentrated *in vacuo*. The residue was purified by short-pad column chromatography (elution with chloroform).

General Procedure for aldol condensation with ketones 11a-f

The 60 MiniKans™ were sorted and distributed into six sets of 10 MiniKans™. To a suspension of each set of MiniKans™ and ketones **11a-f** (7.50 mmol) in THF (12.0 mL) was added a solution of sodium methoxide (81.0 mg, 1.50 mmol) in methanol (3.00 mL) at room temperature. After being shaken for 36 h, the reaction mixture was filtered and the MiniKans™ were rinsed with THF (10 min). All MiniKans™ were pooled together, and washed consecutively with THF (10 min x 3), THF/H_2O (2:1, 10 min x 3), CH_2Cl_2 (10 min x 3), methanol (10 min x 3), and dried under reduced pressure.

Procedure for epoxidation

The 60 MiniKans™ in CH_2Cl_2 (50.0 mL) at room temperature were treated with a solution of 5.5 M *t*-butyl hydrogen peroxide in decane (19.0 mL) and a solution of 2.5 M KOH in methanol (19.0 mL). After being shaken for 72 h, the solvent was removed. The MiniKans™ were rinsed with CH_2Cl_2 (10 min). The MiniKans™ were washed consecutively with CH_2Cl_2 (10 min x 4), methanol (10 min x 4), and dried under reduced pressure.

Procedure for epoxide opening

The 60 MiniKans™ in dry CH_2Cl_2/acetonitrile (1:1, 80.0 mL) at room temperature were treated with dodecantiol (9.59 mL, 40.0 mmol) and $Zn(OTf)_2$ (291 mg, 800 μmol). After being vigorously shaken for 3 h, the solution was quenched by addition of triethylamine, and the solvent was removed and the MiniKans™ were rinsed with acetonitrile (10 min). The MiniKans™ were washed consecutively with acetonitrile (10 min x 3), CH_2Cl_2 (10 min x 3), methanol (10 min x 3), and dried under reduced pressure.

General Procedure for acylation with acid 7a-e

The 60 MiniKans™ were sorted and distributed into five sets of 12 MiniKans™. To a suspension of each set of MiniKans™ and acids **7a-e** (3.00 mmol) in pyridine/DMF (1:1, 15.0 mL) was added EDCI・HCl (575 mg, 3.00 mmol) and DMAP (36.6 mg, 300 μmol) at room temperature. And the solution of acids **7a-e** was added to the reaction mixture at 50 ˚C. After being shaken at the same temperature for 48 h, the reaction mixture was filtered, and rinsed with DMF (10 min). All MiniKans™ were pooled together, and washed consecutively with DMF (10 min x 3), DMF/H_2O (2:1, 10 min x 3), CH_2Cl_2 (10 min x 3), methanol (10 min x 3), and dried under reduced pressure.

General Procedure for cleavage of the 60 polymer supported acyloxyketones

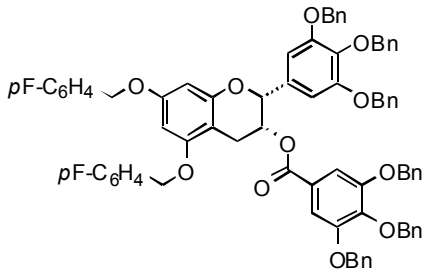
Each MiniKans™ was treated with a solution of trifluoroacetic acid (600 μL) in CH_2Cl_2 (2.00 mL) in the presence of PS-benzaldehyde resin (Argonaut, 1.13 mmol/g loading, 200 mg) at -10 ˚C. After the reaction mixture was shaken at the same temperature for 5 h, triethylsilane (400 μL) was added to the mixture. After being shaken at the same temperature for further 19 h, the reaction mixture was filtered to remove the MiniKans™. The MiniKans™ was rinsed with ethyl acetate. The filtrate was concentrated *in vacuo*. The residue was purified by gel permeation chromatography (GPC) to afford EGCG analogues.

Entry	aldehyde	ketone	acid	Product	Crude yield(%)	Purity (%)	Isolated Yield (mg)	Isolated Yield (%)
1	**12a**	**11a**	**7a**	**2**	89	20	8.5	13
2	**12a**	**11a**	**7b**	**5aab**	129	27	10.8	17
3	**12a**	**11a**	**7c**	**5aac**	105	32	7.3	12
4	**12a**	**11a**	**7d**	**5aad**	114	16	3.1	5
5	**12a**	**11a**	**7e**	**5aae**	135	35	16.4	28
6	**12a**	**11b**	**7a**	**5aba**	87	15	8.0	13
7	**12a**	**11b**	**7b**	**5abb**	111	48	26.4	45
8	**12a**	**11b**	**7c**	**5abc**	143	51	14.3	26
9	**12a**	**11b**	**7d**	**5abd**	-	-	-	-
10	**12a**	**11b**	**7e**	**5abe**	118	49	21.6	39
11	**12a**	**11c**	**7a**	**5aca**	96	12	2.4	4
12	**12a**	**11c**	**7b**	**5acb**	108	22	6.5	12
13	**12a**	**11c**	**7c**	**5acc**	107	18	3.6	7
14	**12a**	**11c**	**7d**	**5acd**	115	31	3.2	6
15	**12a**	**11c**	**7e**	**5ace**	98	23	8.0	16
16	**12a**	**11d**	**7a**	**5ada**	64	23	5.7	10
17	**12a**	**11d**	**7b**	**5adb**	104	43	10.6	21
18	**12a**	**11d**	**7c**	**5adc**	152	57	20.3	44
19	**12a**	**11d**	**7d**	**5add**	111	45	8.7	18
20	**12a**	**11d**	**7e**	**5ade**	140	40	24.2	52
21	**12a**	**11e**	**7a**	**5aea**	142	7	1.5	3
22	**12a**	**11e**	**7b**	**5aeb**	110	48	8.3	16
23	**12a**	**11e**	**7c**	**5aec**	118	18	6.4	13
24	**12a**	**11e**	**7d**	**5aed**	85	9	-	-
25	**12a**	**11e**	**7e**	**5aee**	104	25	9.0	18
26	**12a**	**11f**	**7a**	**5afa**	93	11	3.6	6
27	**12a**	**11f**	**7b**	**5afb**	106	25	10.4	18
28	**12a**	**11f**	**7c**	**5afc**	141	15	8.0	15
29	**12a**	**11f**	**7d**	**5afd**	102	20	3.3	5
30	**12a**	**11f**	**7e**	**5afe**	152	18	9.4	18
31	**12b**	**11a**	**7a**	**5baa**	87	25	11.6	18
32	**12b**	**11a**	**7b**	**5bab**	80	27	9.0	15
33	**12b**	**11a**	**7c**	**5bac**	100	11	6.1	11
34	**12b**	**11a**	**7d**	**5bad**	75	18	4.0	7
35	**12b**	**11a**	**7e**	**5bae**	134	41	13.4	24
36	**12b**	**11b**	**7a**	**5bba**	100	8	-	-
37	**12b**	**11b**	**7b**	**5bbb**	173	22	10.2	18
38	**12b**	**11b**	**7c**	**5bbc**	117	40	10.1	20
39	**12b**	**11b**	**7d**	**5bbd**	66	23	4.6	9
40	**12b**	**11b**	**7e**	**5bbe**	99	47	16.1	32
41	**12b**	**11c**	**7a**	**5bca**	82	8	-	-
42	**12b**	**11c**	**7b**	**5bcb**	91	41	7.5	15
43	**12b**	**11c**	**7c**	**5bcc**	83	6	-	-
44	**12b**	**11c**	**7d**	**5bcd**	78	5	-	-
45	**12b**	**11c**	**7e**	**5bce**	87	6	-	-
46	**12b**	**11d**	**7a**	**5bda**	208	16	-	-
47	**12b**	**11d**	**7b**	**5bdb**	93	16	-	-
48	**12b**	**11d**	**7c**	**5bdc**	134	45	11.3	28
49	**12b**	**11d**	**7d**	**5bdd**	80	33	9.7	22

50	**12b**	**11d**	**7e**	**5bde**	73	59	10.3	25
51	**12b**	**11e**	**7a**	**5bea**	63	23	6.0	10
52	**12b**	**11e**	**7b**	**5beb**	85	32	10.8	19
53	**12b**	**11e**	**7c**	**5bec**	-	26	2.1	4
54	**12b**	**11e**	**7d**	**5bed**	96	26	3.5	6
55	**12b**	**11e**	**7e**	**5bee**	79	37	10.4	20
56	**12b**	**11f**	**7a**	**5bfa**	66	25	20.3	30
57	**12b**	**11f**	**7b**	**5bfb**	67	25	12.2	20
58	**12b**	**11f**	**7c**	**5bfc**	86	29	12.2	22
59	**12b**	**11f**	**7d**	**5bfd**	59	24	5.5	9
60	**12b**	**11f**	**7e**	**5bfe**	90	25	15.6	28

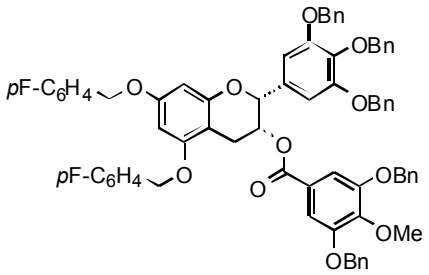
Epicatechin Analogues

***Cis*-5,7-bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (18)**

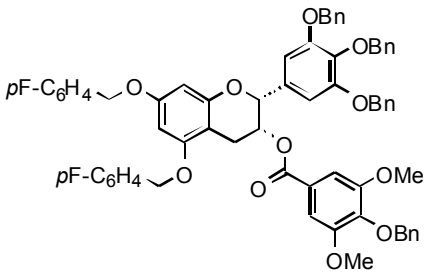


Yield 8.5 mg; Purity 32%; Retention Time 13.23 minutes;

***Cis*-5,7-bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5aab)**

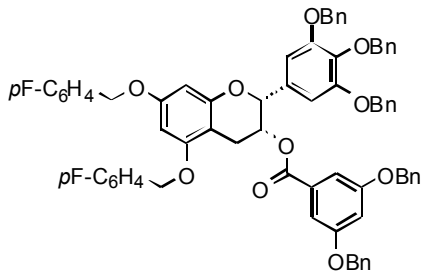


Yield 10.8 mg; Purity 27%; Retention Time 12.23 minutes; HRMS (ESI-TOF) calcd for $C_{72}H_{61}F_2O_{11}$ $[M+H]^+$ 1139.4182, found 1139.4186.



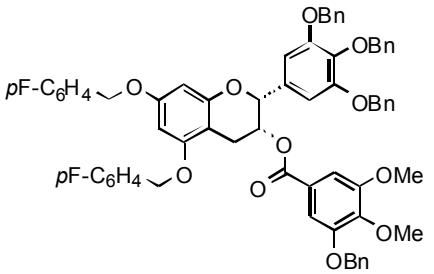
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5aac)**

Yield 7.3 mg; Purity 20%; Retention Time 11.67 minutes; MS (ESI-TOF) calcd for $C_{66}H_{57}F_2O_{11}$ $[M+H]^+$ 1063.4, found 1063.4.



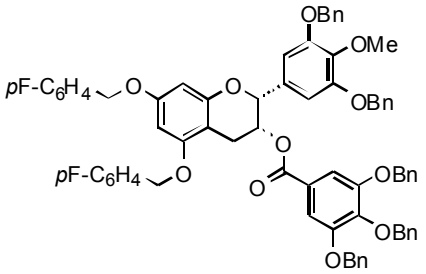
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,5-bis(benzyloxy)benzoate (5aad)**

Yield 3.1 mg; Purity 16%; Retention Time 12.75 minutes; HRMS (ESI-TOF) calcd for $C_{71}H_{59}F_2O_{10}$ $[M+H]^+$ 1109.4076, found 1109.4076.



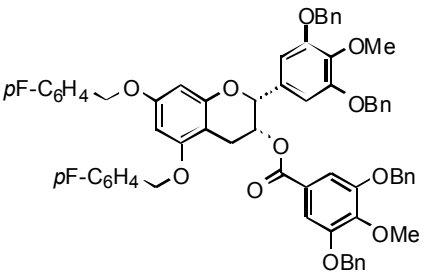
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,-benzyloxy-4,5-dimethoxybenzoate (5aae)**

Yield 16.4 mg; Purity 35%; Retention Time 11.27 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.20-7.39 (m, 25H), 7.18x2 (t, J = 8.2, 8.7 Hz, 2H), 6.75 (s, 2H), 6.36 (d, J = 2.4 Hz, 1H), 6.29 (d, J = 2.4 Hz, 1H), 5.65 (br s, 1H), 5.05 (br s, 1H), 4.97-5.07 (m, 9H), 4.84 (d, J = 11.6 Hz, 2H), 4.72 (d, J = 11.6 Hz, 2H),3.78 (s, 3H), 3.78 (s, 3H), 3.11 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.04 (dd, J_{gem} = 17.9 Hz, J = 2.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.0, 162.6x2 ($J_{C,F}$ = 246 Hz), 158.8, 158.0, 155.8, 153.3, 153.0, 151.8, 143.3, 138.6, 137.8, 137.0, 136.5, 133.3, 132.6 ($J_{C,F}$ = 2.3 Hz), 129.4 ($J_{C,F}$ = 7.6 Hz), 129.1 ($J_{C,F}$ = 7.6 Hz), 128.7, 128.6, 128.5, 128.2, 128.0, 127.9, 127.8x2, 127.5, 124.9, 115.6x2 ($J_{C,F}$ = 22.1 Hz), 109.1, 107.4, 106.9, 101.1, 94.8, 94.0, 78.0, 75.2, 71.4, 71.1, 69.6, 69.5, 68.4, 60.9, 56.4, 26.2; FT-IR (solid) 3421, 3032, 2932, 1713, 1590, 1511, 1220, 1107, 1001, 823, 754, 696 cm^{-1}; MS (ESI-TOF) calcd for $C_{66}H_{57}F_2O_{11}$ $[M+H]^+$ 1063.4, found 1063.2.



***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5aba)**

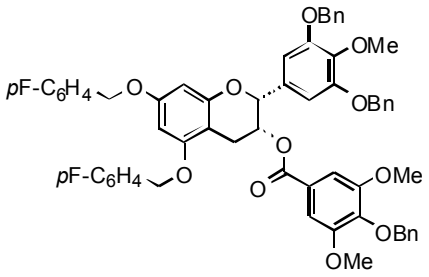
Yield 8.0 mg; Purity 15%; Retention Time 12.15 minutes; MS (ESI-TOF) calcd for $C_{72}H_{61}F_2O_{11}$ $[M+H]^+$ 1139.4, found 1139.3.



***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl**

3,5-bis(benzyloxy)-4-methoxybenzoate (5abb)

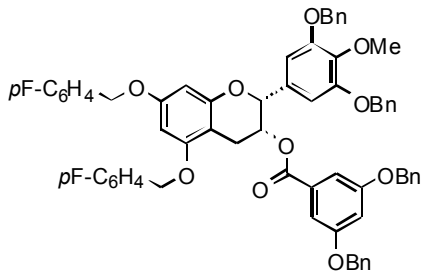
Yield 26.4 mg; Purity 48%; Retention Time 11.10 minutes; MS (ESI-TOF) calcd for $C_{66}H_{57}F_2O_{11}$ $[M+H]^+$ 1063.4, found 1063.4.



***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl**

4-benzyloxy-3,5-dimethoxybenzoate (5abc)

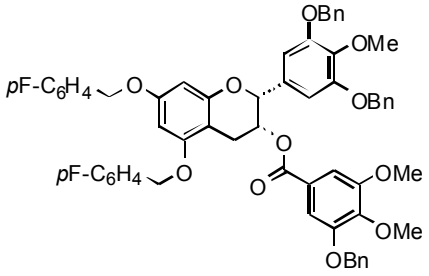
Yield 14.3 mg; Purity 51%; Retention Time 10.33 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27-7.43 (m, 19H), 7.18 (s, 2H), 7.03-7.11 (m, 4H), 6.78 (s, 2H), 6.30 (d, J = 2.4 Hz, 1H), 6.25 (d, J = 2.4 Hz, 1H), 5.62 (ddd, J = 1.5, 3.4, 4.4 Hz, 1H), 5.05 (br s, 1H), 4.88-5.02 (m, 10H), 3.84 (s, 3H), 3.76 (s, 6H), 3.10 (dd, J_{gem} = 17.9 Hz, J = 4.4 Hz, 1H), 3.04 (dd, J_{gem} = 17.9 Hz, J = 3.4 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.3, 162.6x2 ($J_{C,F}$ = 247 Hz), 158.7, 157.9, 155.7, 153.4, 152.7, 141.7, 139.9, 137.5, 137.0, 133.1, 132.7 ($J_{C,F}$ = 3.0 Hz), 132.6 ($J_{C,F}$ = 3.0 Hz), 129.4 ($J_{C,F}$ = 8.4 Hz), 129.1 ($J_{C,F}$ = 8.4 Hz), 128.6, 128.3x2, 128.0x2, 127.4, 125.2, 115.6x2 ($J_{C,F}$ = 22.1 Hz), 107.4, 107.2, 101.1, 94.8, 94.0, 77.7, 75.0, 71.5, 69.6, 69.5, 68.6, 61.0, 56.4, 26.0; FT-IR (solid) 2999, 2935, 1712, 1590, 1509, 1223, 1129, 1102, 959, 833, 731, 696, 492 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{60}H_{53}F_2O_{11}$ $[M+H]^+$ 987.3556, found 987.3556.



***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl**

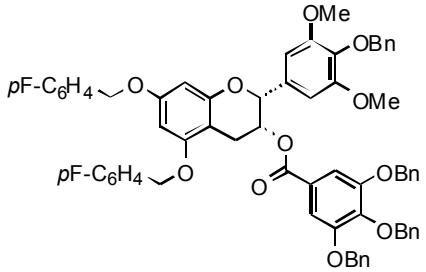
3,5-bis(benzyloxy)benzoate (5abd)

Yield - mg; Purity -%; Retention Time - minutes;



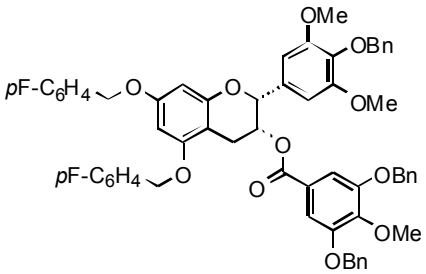
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5abe)**

Yield 21.6 mg; Purity 49%; Retention Time 10.03 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28-7.37 (m, 20H), 7.18 (d, J = 1.0 Hz, 1H), 7.03-7.07 (m, 4H), 6.73 (s, 2H), 6.35 (d, J = 1.9 Hz, 1H), 6.29 (d, J = 1.9 Hz, 1H), 5.64 (br s, 1H), 4.99-5.07 (m, 7H), 4.87 (d, J_{gem} = 12.1 Hz, 2H), 4.76 (d, J_{gem} = 12.1 Hz, 2H), 3.82 (s, 3H), 3.79 (s, 6H), 3.10 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.03 (dd, J_{gem} = 17.9 Hz, J = 2.4 Hz, 1H); FT-IR (solid) 3034, 2935, 1714, 1591, 1512, 1423, 1224, 1112, 1002, 827, 737, 697 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{60}H_{53}F_2O_{11}$ $[M+H]^+$ 987.3556, found 987.3570.



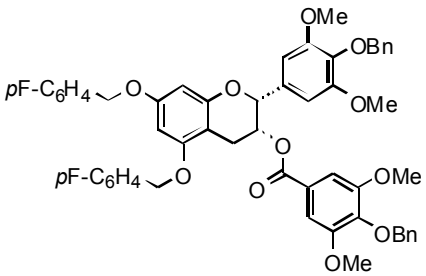
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5aca)**

Yield 2.4 mg; Purity 12%; Retention Time 11.45 minutes; MS (ESI-TOF) calcd for $C_{66}H_{57}F_2O_{11}$ $[M+H]^+$ 1063.4, found 1063.5.



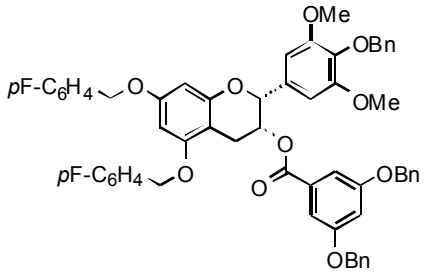
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5acb)**

Yield 6.5 mg; Purity 22%; Retention Time 10.23 minutes; HRMS (ESI-TOF) calcd for $C_{60}H_{53}F_2O_{11}$ $[M+H]^+$ 987.3556, found 987.3552.



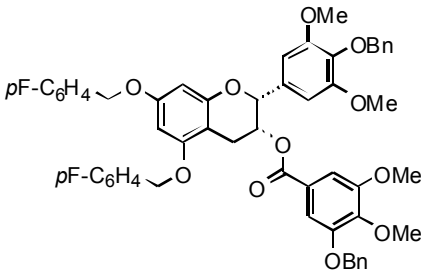
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5acc)**

Yield 3.6 mg; Purity 18%; Retention Time 9.38 minutes; HRMS (ESI-TOF) calcd for $C_{54}H_{49}F_2O_{11}$ $[M+H]^+$ 911.3243, found 911.3243.



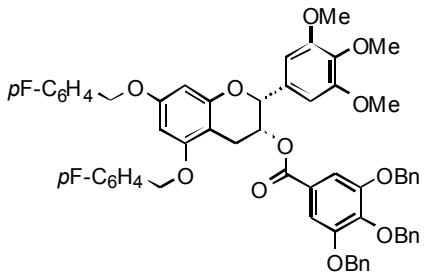
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)benzoate (5acd)**

Yield 3.2 mg; Purity 31%; Retention Time 10.93 minutes; HRMS (ESI-TOF) calcd for $C_{59}H_{51}F_2O_{10}$ $[M+H]^+$ 957.3450, found 957.3447.



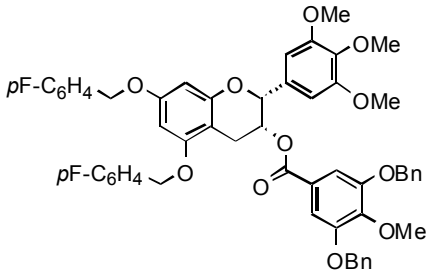
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5ace)**

Yield 8.0 mg; Purity 23%; Retention Time 9.12 minutes; HRMS (ESI-TOF) calcd for $C_{54}H_{49}F_2O_{11}$ $[M+H]^+$ 911.3243, found 911.3224.



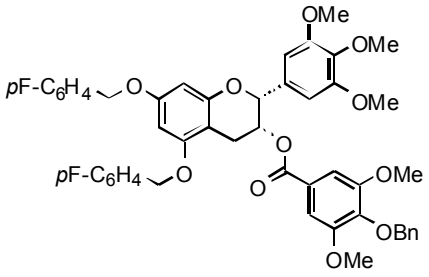
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5ada)**

Yield 5.7 mg; Purity 23%; Retention Time 10.28 minutes; HRMS (ESI-TOF) calcd for $C_{60}H_{53}F_2O_{11}$ $[M+H]^+$ 987.3556, found 987.3552.



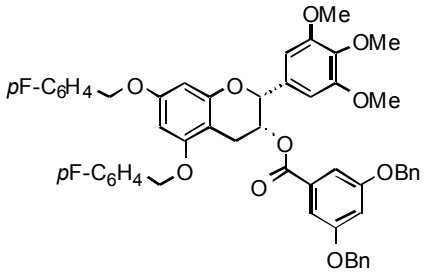
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5adb)**

Yield 10.6 mg; Purity 43%; Retention Time 8.95 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28-7.40 (m, 16H), 7.04 (t, J = 8.7 Hz, 2H), 7.02 (t, J = 8.7 Hz, 2H), 6.60 (s, 2H), 6.40 (d, J = 2.4 Hz, 1H), 6.30 (d, J = 2.4 Hz, 1H), 5.67 (br s, 1H), 4.99-5.09 (m, 9H), 3.89 (s, 3H), 3.78 (s, 3H), 3.53 (s, 6H), 3.11 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.04 (dd, J_{gem} = 17.9 Hz, J = 1.9 Hz, 1H); HRMS (ESI-TOF) calcd for $C_{54}H_{49}F_2O_{11}$ $[M+H]^+$911.3243, found 911.3281.



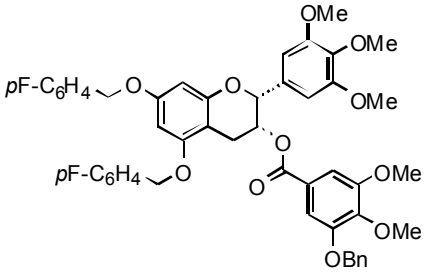
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-(3,4,5-trimethoxyphenyl)chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5adc)**

Yield 20.3 mg; Purity 57%; Retention Time 8.08 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29-7.45 (m, 9H), 7.17 (s, 2H), 7.03-7.11 (m, 4H), 6.69 (s, 2H), 6.33 (d, J = 2.4 Hz, 1H), 6.26 (d, J = 2.4 Hz, 1H), 5.66 (br s, 1H), 5.09 (s, 1H), 5.06 (s, 2H), 5.00 (s, 2H), 4.98 (s, 2H), 3.80 (s, 3H), 3.78 (s, 6H), 3.69 (s, 6H), 3.15 (dd, J_{gem} = 17.9 Hz, J = 3.9 Hz, 1H), 3.07 (dd, J_{gem} = 17.9 Hz, J = 2.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.2, 162.6 ($J_{C,F}$ = 247 Hz), 162.5 ($J_{C,F}$ = 246 Hz), 158.7, 157.9, 155.7, 153.3, 153.2, 141.4, 138.1, 137.5, 137.3, 133.3, 132.6x2 ($J_{C,F}$ = 3.0 Hz), 129.4 ($J_{C,F}$ = 7.6 Hz), 129.1 ($J_{C,F}$ = 7.6 Hz), 128.5, 128.3, 128.1, 125.2, 115.6 ($J_{C,F}$ = 21.3 Hz), 115.5 ($J_{C,F}$ = 21.3 Hz), 107.3, 104.1, 101.1, 94.8, 94.0, 78.0, 75.0, 69.5, 69.4, 68.6, 60.9, 56.3, 56.1, 26.2; FT-IR (solid) 2937, 1715, 1587, 1510, 1220, 1123, 1009, 825, 754 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{48}H_{45}F_2O_{11}$ $[M+H]^+$ 835.2930, found 835.2915.



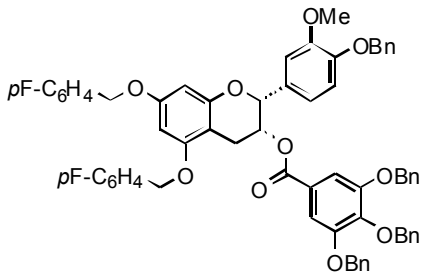
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,5-bis(benzyloxy)benzoate (5add)**

Yield 8.7 mg; Purity 45%; Retention Time 9.63 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.31-7.39 (m, 14H), 7.20 (d, *J* = 2.4 Hz, 2H), 7.03-7.07 (m, 4H), 6.75 (t, *J* = 2.4 Hz, 1H), 6.68 (s, 2Hc), 6.36 (d, *J* = 2.4 Hz, 1H), 6.26 (d, *J* = 2.4 Hz, 1H), 5.64 (t, *J* = 2.9 Hz, 1H), 5.07 (s, 1H), 4.99-5.00 (m, 8H), 3.80 (s, 3H), 3.67 (s, 6H), 3.05-3.17 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.3, 162.6x2 ($J_{C,F}$ = 247 Hz), 159.8, 158.8, 158.0, 155.7, 153.3, 138.1, 136.4, 133.2, 132.7 ($J_{C,F}$ = 3.0 Hz), 132.6 ($J_{C,F}$ = 3.0 Hz), 129.5 ($J_{C,F}$ = 8.4 Hz), 129.1 ($J_{C,F}$ = 8.4 Hz), 128.8, 128.3, 127.8, 115.6 ($J_{C,F}$ = 21.3 Hz), 108.8, 106.9, 104.1, 101.1, 95.1, 94.2, 78.2, 70.4, 69.6, 69.5, 68.8, 60.9, 56.1, 26.3; FT-IR (solid) 3431, 2928, 1719, 1591, 1510, 1221, 1125, 1050, 823, 736, 696, 667, 502 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{53}H_{47}F_2O_{10}$ $[M+H]^+$ 881.3137, found 881.3133.



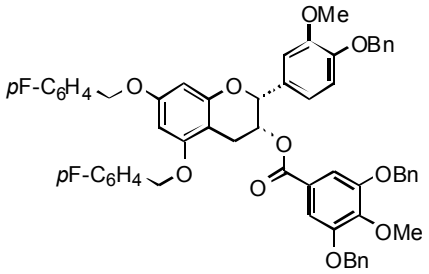
***Cis*-5,7-bis(4-fluorobenzyloxy)-2-(3,4,5-trimethoxyphenyl))chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5ade)**

Yield 24.2 mg; Purity 40%; Retention Time 7.82 minutes; HRMS (ESI-TOF) calcd for $C_{48}H_{45}F_2O_{11}$ $[M+H]^+$ 835.2930, found 835.2950.



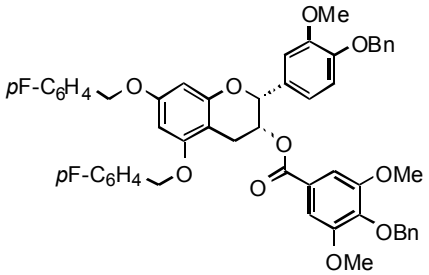
***Cis*-2-(4-benzyloxy-3-methoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5aea)**

Yield 1.5 mg; Purity 7%; Retention Time 11.52 minutes; MS (ESI-TOF) calcd for $C_{65}H_{55}F_2O_{10}$ $[M+H]^+$ 1033.4, found 1033.3.



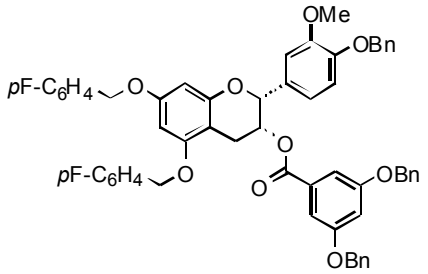
***Cis*-2-(4-benzyloxy-3-methoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5aeb)**

Yield 8.3 mg; Purity 48%; Retention Time 10.17 minutes; HRMS (ESI-TOF) calcd for $C_{59}H_{51}F_2O_{10}$ $[M+H]^+$ 957.3450, found 957.3452.



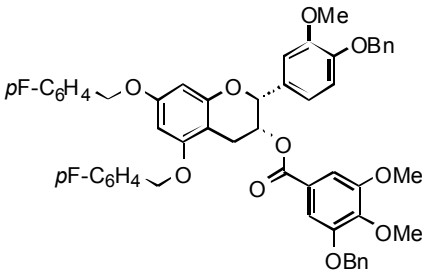
***Cis*-2-(4-benzyloxy-3-methoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5aec)**

Yield 6.4 mg; Purity 18%; Retention Time 9.32 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29-7.45 (m, 14H), 7.15 (s, 2H), 7.02-7.10 (m, 5H), 6.94 (dd, J = 8.2, 1.9 Hz, 1H), 6.88 (d, J = 8.2 Hz, 1H), 6.31 (d, J = 1.9 Hz, 1H), 6.24 (d, J = 1.9 Hz, 1H), 5.61 (br s 1H), 5.12 (br s, 3H), 5.05 (s, 2H), 4.99 (s, 2H), 4.97 (s, 2H), 3.77 (s, 6H), 3.68 (s, 3H), 3.11 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.06 (dd, J_{gem} = 17.9 Hz, J = 2.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.4, 162.6 ($J_{C,F}$ = 247 Hz), 162.5 ($J_{C,F}$ = 246 Hz), 158.7, 157.9, 155.8, 153.3, 149.7, 148.2, 141.4, 137.4, 137.1, 132.7 ($J_{C,F}$ = 3.0 Hz), 132.6 ($J_{C,F}$ = 3.0 Hz), 130.9, 129.4 ($J_{C,F}$ = 7.6 Hz), 129.1 ($J_{C,F}$ = 8.4 Hz), 128.6, 128.5, 128.3, 128.1, 127.9, 127.3, 125.2, 119.1, 115.6 ($J_{C,F}$ = 22.1 Hz), 115.6 ($J_{C,F}$ = 21.3 Hz), 113.4, 110.7, 107.3, 101.2, 94.8, 94.0, 77.7, 75.1, 71.1, 69.6, 69.5, 68.9, 56.3, 56.0, 26.1; FT-IR (solid) 2936, 1714, 1592, 1511, 1224, 1128, 1036, 825, 733, 697 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{53}H_{47}F_2O_{10}$ $[M+H]^+$ 881.3137, found 881.3141.



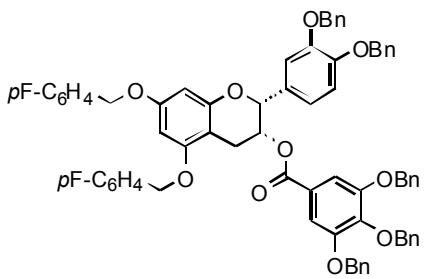
***Cis*-2-(4-benzyloxy-3-methoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)benzoate (5aed)**

Yield mg; Purity 9%; Retention Time 10.83 minutes; HRMS (ESI-TOF) calcd for $C_{58}H_{49}F_2O_9$ $[M+H]^+$ 927.3, found 927.1.



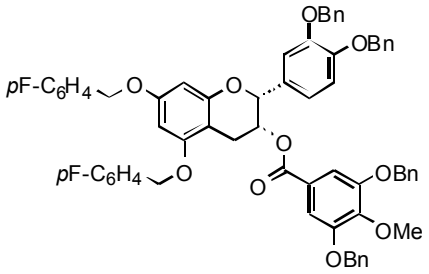
***Cis*-2-(4-benzyloxy-3-methoxyphenyl)-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5aee)**

Yield 9.0 mg; Purity 25%; Retention Time 9.07 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.25-7.40 (m, 15H, aromatic-H), 7.15 (d, J = 1.4 Hz, 1H), 7.02-7.07 (m, 4H), 6.96 (d, J = 1.9 Hz, 1H), 6.89 (dd, J = 8.7, 1.4 Hz, 1H), 6.79 (d, J = 8.7 Hz, 1H), 6.35 (d, J = 2.4 Hz, 1H), 6.26 (d, J = 2.4 Hz, 1H), 5.62 (dd, J = 4.3, 2.9 Hz, 1H), 4.98-5.10 (m, 9H), 3.88 (s, 3H), 3.81 (s, 3H), 3.56 (s, 3H), 3.10 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.04 (dd, J_{gem} = 17.9 Hz, J = 2.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.1, 162.6 ($J_{C,F}$ = 247 Hz), 162.5 ($J_{C,F}$ = 246 Hz), 158.7, 158.0, 155.9, 153.2, 151.8, 149.6, 148.2, 143.2, 137.1, 136.6, 132.6x2 ($J_{C,F}$ = 3.0 Hz), 130.8, 129.4 ($J_{C,F}$ = 8.4 Hz), 129.1 ($J_{C,F}$ = 7.6 Hz), 128.7, 128.6, 128.2, 127.9, 127.8, 127.3, 124.9, 119.2, 115.6x2 ($J_{C,F}$ = 21.3 Hz), 113.8, 110.6, 109.1, 107.4, 101.2, 94.8, 94.0, 77.8, 71.1, 71.0, 69.6, 69.4, 68.7, 61.0, 56.3, 55.8, 26.2; FT-IR (solid) 3030, 2936, 1713, 1592, 1512, 1223, 1143, 1116, 1002, 821, 738, 698 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{53}H_{47}F_2O_{10}$ $[M+H]^+$ 881.3137, found 881.3142.



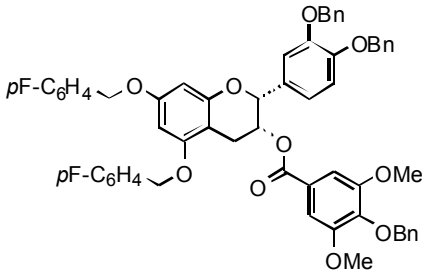
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5afa)**

Yield 3.6 mg; Purity 11%; Retention Time 11.35 minutes; HRMS (ESI-TOF) calcd for $C_{71}H_{59}F_2O_{10}$ $[M+H]^+$ 1109.4076, found 1109.4076.



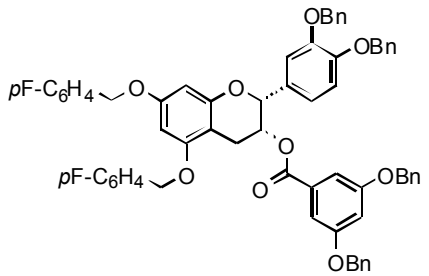
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5afb)**

Yield 10.4 mg; Purity 25%; Retention Time 11.28 minutes; HRMS (ESI-TOF) calcd for $C_{65}H_{50}F_2O_{10}$ $[M+H]^+$ 1033.3763, found 1033.3767.



***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5afc)**

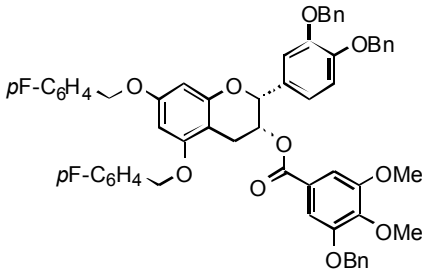
Yield 8.0 mg; Purity 15%; Retention Time 10.55 minutes; HRMS (ESI-TOF) calcd for $C_{59}H_{51}F_2O_{10}$ $[M+H]^+$ 957.3450, found 957.3464.



***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3,5-bis(benzyloxy)benzoate (5afd)**

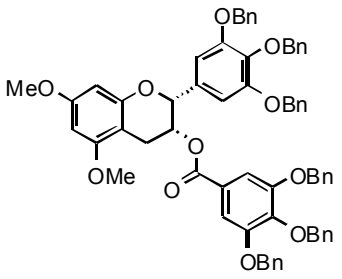
Yield 3.3 mg; Purity 20%; Retention Time 11.85 minutes;

MS (ESI-TOF) calcd for $C_{64}H_{53}F_2O_9$ $[M+H]^+$ 1103.4, found 1103.2.



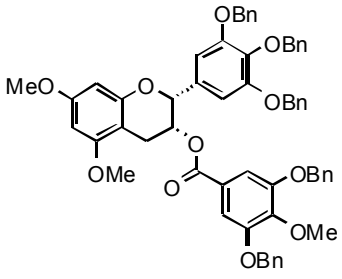
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-bis(4-fluorobenzyloxy)chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5afe)**

Yield 9.4 mg; Purity 18%; Retention Time 10.20 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27-7.42 (m, 19H), 7.16 (d, J = 1.9 Hz, 1H), 7.02-7.07 (m, 6H), 6.94 (dd, J = 1.9, 8.2 Hz, 1H), 6.85 (d, J = 8.2 Hz, 1H), 6.34 (d, J = 2.4 Hz, 1H), 6.26 (d, J = 2.4 Hz, 1H), 5.60 (s, 1H), 5.11 (s, 1H), 4.98-5.09 (m, 8H), 4.81 (d, J_{gem} = 11.6 Hz, 1H), 4.70 (d, J_{gem} = 11.6 Hz, 1H), 3.83 (s, 3H), 3.79 (s, 3H), 3.10 (dd, J_{gem} = 17.9, 4.4 Hz, 1H), 3.03 (dd, J_{gem} = 17.9, 2.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.1, 162.6 ($J_{C,F}$ = 247 Hz), 162.5 ($J_{C,F}$ = 246 Hz), 158.7, 158.0, 155.8, 153.2, 151.8, 149.1, 143.1, 137.2, 137.1, 136.6, 132.6x2 ($J_{C,F}$ = 3.0 Hz), 131.1, 129.4 ($J_{C,F}$ = 8.4 Hz), 129.1 ($J_{C,F}$ = 8.4 Hz), 128.7, 128.5, 128.4, 128.2, 127.8x2, 127.5, 127.3, 124.9, 121.3, 120.1, 115.6x2 ($J_{C,F}$ = 21.3 Hz), 114.8, 113.9, 109.1, 107.4, 101.1, 94.8, 94.0, 77.7, 71.4, 71.3, 71.1, 69.6, 69.4, 68.6, 61.0, 56.3, 26.1; FT-IR (solid) 3032, 2936, 1716, 1592, 1511, 1422, 1224, 1112, 1015, 824, 755, 697, 628 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{59}H_{51}F_2O_{10}$ $[M+H]^+$ 957.3450, found 957.3430.



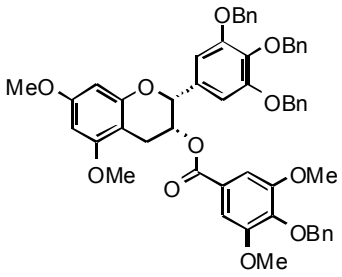
***Cis*-5,7-dimethoxy -2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5baa)**

Yield 11.6 mg; Purity 25%; Retention Time 11.88 minutes; HRMS (ESI-TOF) calcd for $C_{66}H_{59}O_{11}$ $[M+H]^+$ 1027.4057, found 1027.4050.



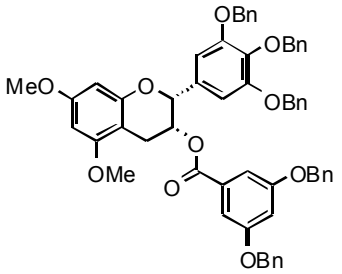
***Cis*-5,7-dimethoxy -2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5bab)**

Yield 9.0 mg; Purity 27%; Retention Time 10.62 minutes; MS (ESI-TOF) calcd for $C_{60}H_{55}O_{11}$ $[M+H]^+$ 951.4, found 951.4.



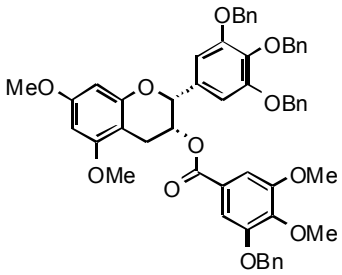
***Cis*-5,7-dimethoxy -2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bac)**

Yield 6.1 mg; Purity 11%; Retention Time 9.80 minutes; HRMS (ESI-TOF) calcd for $C_{54}H_{51}O_{11}$ $[M+H]^+$ 875.3431, found 875.3434.



***Cis*-5,7-dimethoxy-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3,5-bis(benzyloxy)benzoate (5bad)**

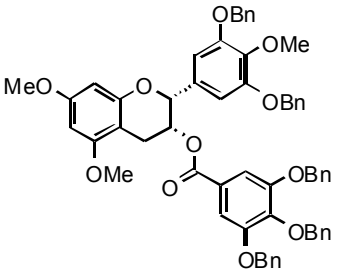
Yield 4.0 mg; Purity 18%; Retention Time 11.32 minutes; HRMS (ESI-TOF) calcd for $C_{59}H_{53}O_{10}$ $[M+H]^+$ 921.3639, found 921.3639.



***Cis*-5,7-dimethoxy-2-[3,4,5-tris(benzyloxy)phenyl]chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bae)**

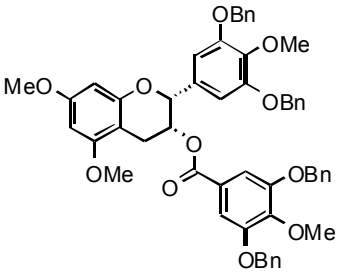
Yield 13.4 mg; Purity 41%; Retention Time 9.50 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.18-7.39 (m, 22H), 6.76 (s, 2H), 6.28 (d, J = 2.4 Hz, 1H), 6.16 (d, J = 2.4 Hz, 1H), 5.66 (br s, 1H), 4.97-5.05 (m, 5H), 4.86 (d, J_{gem} = 11.6 Hz, 2H), 4.72 (d, J_{gem} = 11.6 Hz, 2H), 3.80x2 (s, 3H), 3.79 (s, 3H), 3.77 (s, 3H), 3.06 (dd, J_{gem} = 17.9 Hz, J = 4.3 Hz, 1H), 3.00 (dd, J_{gem} = 17.9 Hz, J = 3.9 Hz 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.0, 159.9, 159.0, 155.6, 153.2, 153.0, 151.8, 143.3, 138.6, 137.9, 137.0, 136.5, 133.4, 128.7, 128.6x2, 128.5, 128.2, 127.9, 127.8x2, 127.6, 127.5, 125.0, 109.2, 107.5, 106.9, 100.3, 93.4, 92.1, 77.9, 75.2, 71.6, 71.4, 71.1, 68.5, 60.9, 56.4, 55.5x2, 26.0; FT-IR (solid) 3434, 2939, 1712, 1590, 1498, 1334, 1205, 1118, 1001, 812, 733, 696, 505 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{54}H_{51}O_{11}$ $[M+H]^+$

875.3431, found 875.3423.



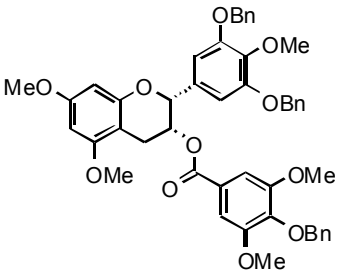
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-dimethoxychroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5bba)**

Yield mg; Purity 8%; Retention Time 10.65 minutes; HRMS (ESI-TOF) calcd for $C_{60}H_{55}O_{11}$ $[M+H]^+$ 951.3744, found 951.3745.



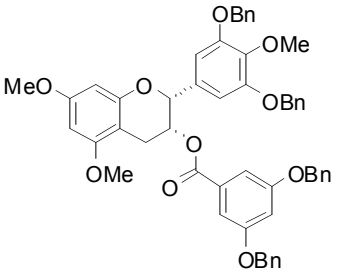
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5bbb)**

Yield 10.2 mg; Purity 22%; Retention Time 9.25 minutes; HRMS (ESI-TOF) calcd for $C_{54}H_{51}O_{11}$ $[M+H]^+$ 875.3431, found 875.3439.



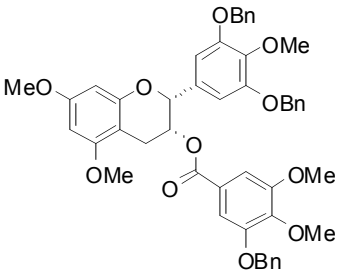
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-dimethoxychroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bbc)**

Yield 10.1 mg; Purity 40%; Retention Time 8.42 minutes; MS (ESI-TOF) calcd for $C_{48}H_{47}O_{11}$ $[M+H]^+$ 799.3, found 799.3.



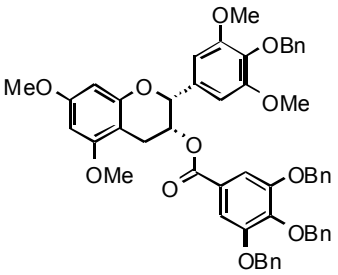
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)benzoate (5bbd)**

Yield 4.6 mg; Purity 23%; Retention Time 10.00 minutes; HRMS (ESI-TOF) calcd for $C_{53}H_{49}O_{10}$ $[M+H]^+$ 845.3326, found 845.3321.



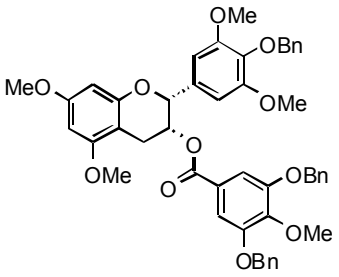
***Cis*-2-[3,5-bis(benzyloxy)-4-methoxyphenyl]-5,7-dimethoxychroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bbe)**

Yield 16.1 mg; Purity 47%; Retention Time 8.12 minutes; HRMS (ESI-TOF) calcd for $C_{48}H_{47}O_{11}$ $[M+H]^+$ 799.3118, found 799.3121.



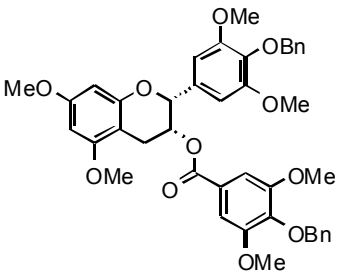
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5bca)**

Yield mg; Purity 8%; Retention Time 9.67 minutes; HRMS (ESI-TOF) calcd for $C_{54}H_{51}O_{11}$ $[M+H]^+$ 875.3431, found 875.3430.



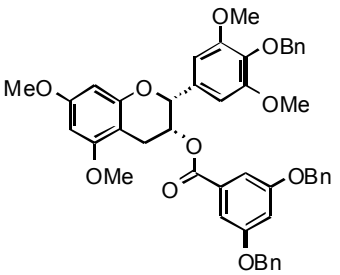
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5bcb)**

Yield 7.5 mg; Purity 41%; Retention Time 8.28 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27-7.42 (m, 15H), 7.26 (s, 2H, a), 6.61 (s, 2H), 6.33 (d, J = 2.4 Hz, 1H), 6.17 (d, J = 2.4 Hz, 1H), 5.66 (br t, J = 2.9 Hz, 1H), 5.05-5.07 (m, 5H), 4.93 (s, 3H), 3.88 (s, 3H), 3.81 (s, 3H), 3.80 (s, 3H), 3.51 (s, 6H), 3.06 (dd, J_{gem} = 17.9 Hz, J = 3.9 Hz, 1H), 3.00 (dd, J_{gem} = 17.9 Hz, J = 2.4 Hz 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 164.9, 159.9, 159.1, 155.7, 153.5, 152.1, 143.9, 137.9, 137.0, 136.6, 133.5, 128.7, 128.5, 128.2, 127.8x2, 127.6, 124.9, 109.4, 104.1, 100.3, 93.4, 92.1, 78.1, 75.0, 71.1, 68.5, 61.1, 56.0, 55.5x2, 26.2; FT-IR (solid) 3429, 3006, 2939, 1714, 1591, 1427, 1217, 1098, 1001, 847, 742, 698 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{48}H_{47}O_{11}$ $[M+H]^+$ 799.3118, found 799.3119.



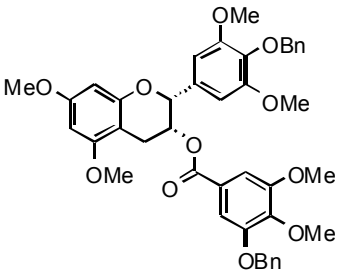
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-dimethoxychroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bcc)**

Yield mg; Purity 6%; Retention Time 7.33 minutes; MS (ESI-TOF) calcd for $C_{42}H_{43}O_{11}$ $[M+H]^+$ 723.2805, found 723.2798.



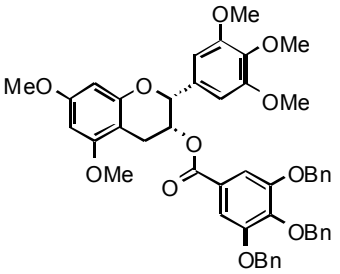
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)benzoate (5bcd)**

Yield mg; Purity 5%; Retention Time 8.93 minutes; HRMS (ESI-TOF) calcd for $C_{47}H_{45}O_{10}$ $[M+H]^+$ 769.3013, found 769.3013.



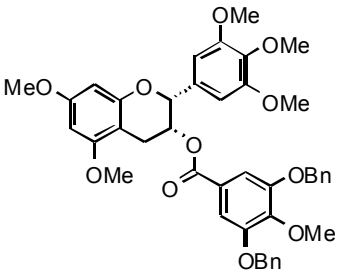
***Cis*-2-(4-benzyloxy-3,5-dimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bce)**

Yield mg; Purity 6%; Retention Time 7.13 minutes; HRMS (ESI-TOF) calcd for $C_{42}H_{43}O_{11}$ $[M+H]^+$ 723.2805, found 273.2791.



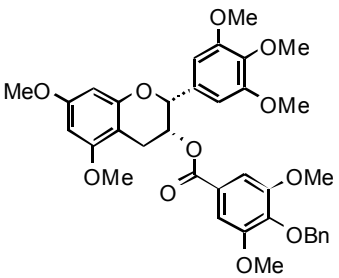
***Cis*-5,7-dimethoxy -2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5bda)**

Yield mg; Purity 16%; Retention Time 8.27 minutes; HRMS (ESI-TOF) calcd for $C_{48}H_{47}O_{11}$ $[M+H]^+$ 799.3118, found 799.3123.



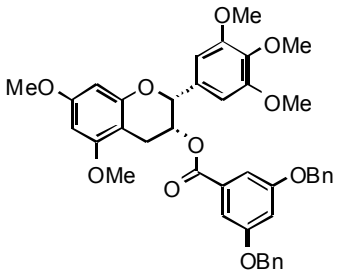
***Cis*-5,7-dimethoxy-2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5bdb)**

Yield mg; Purity 16%; Retention Time 6.95 minutes; HRMS (ESI-TOF) calcd for $C_{42}H_{42}O_{11}$ $[M+H]^+$ 723.3, found 723.3.



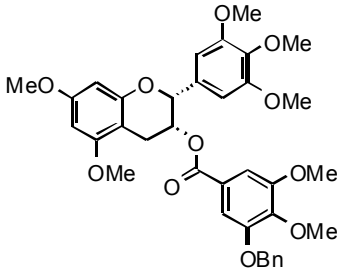
***Cis*-5,7-dimethoxy -2-(3,4,5-trimethoxyphenyl)chroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bdc)**

Yield 11.3 mg; Purity 45%; Retention Time 6.23 minutes; δ 7.28-7.44 (m, 5H), 7.16 (s, 2H), 6.69 (s, 2H), 6.25 (d, J = 2.4 Hz, 1H), 6.13 (d, J = 2.4 Hz, 1H), 5.66 (br s, 1H), 5.08 (s, 1H), 5.50 (s, 2H), 3.70-3.80 (m, 21H), 3.04-3.10 (m, 2H); HRMS (ESI-TOF) calcd for $C_{36}H_{39}O_{11}$ $[M+H]^+$ 647.2492, found 647.2480.



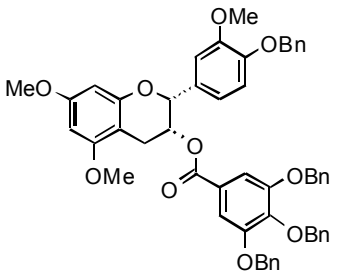
***Cis*-5,7-dimethoxy -2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3,5-bis(benzyloxy)benzoate (5bdd)**

Yield 9.7 mg; Purity 33%; Retention Time 7.60 minutes; HRMS (ESI-TOF) calcd for $C_{41}H_{41}O_{10}$ $[M+H]^+$ 693.2690, found 693.2700.



***Cis*-5,7-dimethoxy -2-(3,4,5-trimethoxyphenyl)chroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bde)**

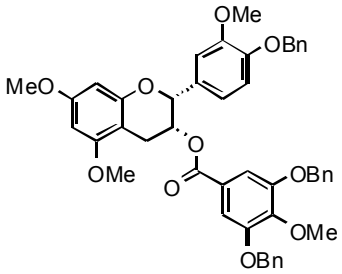
Yield 10.3 mg; Purity 59%; Retention Time 6.08 minutes; HRMS (ESI-TOF) calcd for $C_{36}H_{39}O_{11}$ $[M+H]^+$ 647.2492, found 647.2490.



***Cis*-2-(4-benzyloxy-3-trimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5bea)**

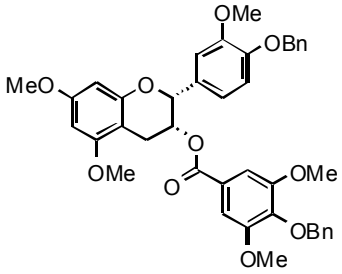
Yield 6.0 mg; Purity 23%; Retention Time 9.71 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.25-7.36 (m, 22H, aromatic-H), 6.93 (d, J = 1.5 Hz, 1H), 6.86 (dd, J = 1.5 Hz, 8.2 Hz, 1H), 6.77 (s, J = 8.2 Hz, 1H), 6.29 (d, J = 1.9 Hz, 1H), 6.15 (d, J = 1.9 Hz, 1H), 5.61 (br s, 1H), 5.09 (s, 1H), 5.00-5.07 (m, 8H), 3.80 (s, 3H), 3.79 (s, 3H, h), 3.47 (s, 3H), 3.05 (dd, J_{gem} = 17.9 Hz, J = 3.9 Hz, 1H), 3.04 (br d, J_{gem} = 17.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.1, 159.8, 159.1, 155.8, 152.4, 149.6, 148.2, 142.5, 137.5, 137.1, 136.6, 131.0, 128.7, 128.6, 128.3, 128.1x2, 127.9, 127.8,

127.3, 125.1, 119.2, 113.8, 110.6, 109.2, 100.3, 93.3, 92.0, 77.8, 75.2, 71.1, 71.0, 68.7, 55.8, 55.5x2, 26.1; FT-IR (solid) 3031, 2937, 1715, 1593, 1429, 1217, 1145, 1116, 815, 753, 697, 474 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{53}H_{49}O_{10}$ $[M+H]^+$ 845.3326, found 845.3328.



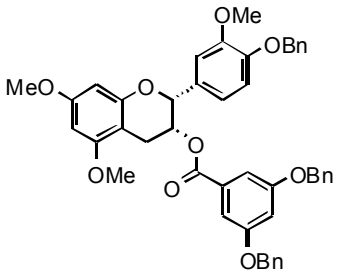
***Cis*-2-(4-benzyloxy-3-trimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5beb)**

Yield 10.8 mg; Purity 32%; Retention Time 8.23 minutes; HRMS (ESI-TOF) calcd for $C_{47}H_{45}O_{10}$ $[M+H]^+$ 769.3013, found 769.3012.



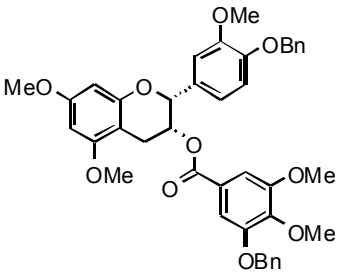
***Cis*-2-(4-benzyloxy-3-trimethoxyphenyl)-5,7-dimethoxychroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bec)**

Yield 2.1 mg; Purity 25%; Retention Time 7.37 minutes; HRMS (ESI-TOF) calcd for $C_{41}H_{41}O_{10}$ $[M+H]^+$ 693.3, found 693.2.



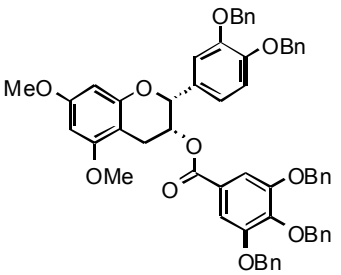
***Cis*-2-(4-benzyloxy-3-trimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)benzoate (5bed)**

Yield 3.5 mg; Purity 26%; Retention Time 8.92 minutes; HRMS (ESI-TOF) calcd for $C_{46}H_{43}O_9$ $[M+H]^+$ 739.2907, found 739.2903.



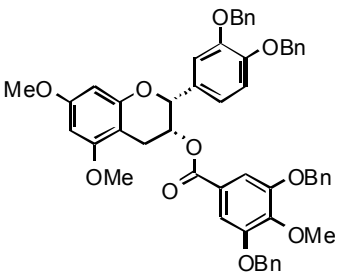
***Cis*-2-(4-benzyloxy-3-trimethoxyphenyl)-5,7-dimethoxychroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bee)**

Yield 10.4 mg; Purity 37%; Retention Time 7.13 minutes; HRMS (ESI-TOF) calcd for $C_{41}H_{41}O_{10}$ $[M+H]^+$ 693.2700, found 693.2676.



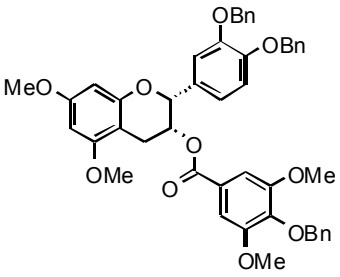
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-dimethoxychroman-3-yl 3,4,5-tris(benzyloxy)benzoate (5bfa)**

Yield 20.3 mg; Purity 25%; Retention Time 10.82 minutes; HRMS (ESI-TOF) calcd for $C_{59}H_{53}O_{10}$ $[M+H]^+$ 921.3639, found 921.3638.



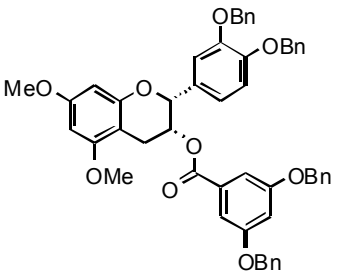
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)-4-methoxybenzoate (5bfb)**

Yield 12.2 mg; Purity 25%; Retention Time 9.43 minutes; HRMS (ESI-TOF) calcd for $C_{53}H_{49}O_{10}$ $[M+H]^+$ 845.3326, found 845.3323.



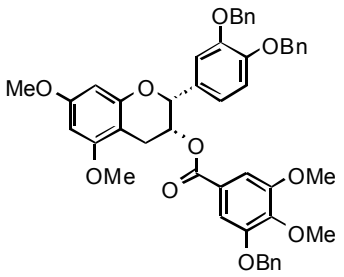
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-dimethoxychroman-3-yl 4-benzyloxy-3,5-dimethoxybenzoate (5bfc)**

Yield 12.2 mg; Purity 29%; Retention Time 8.58 minutes; HRMS (ESI-TOF) calcd for $C_{47}H_{45}O_{10}$ $[M+H]^+$ 769.3013, found 769.3021.



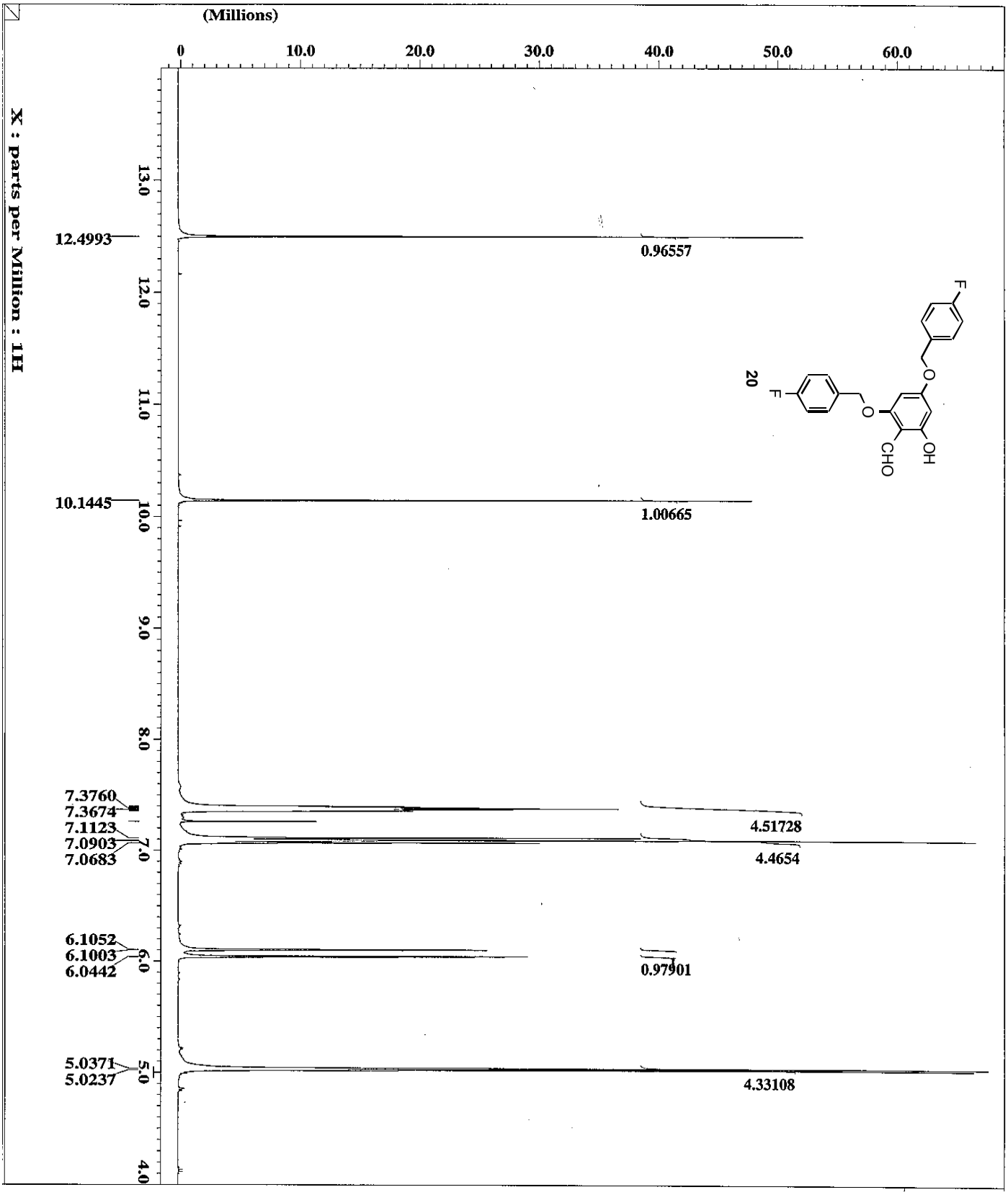
***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-dimethoxychroman-3-yl 3,5-bis(benzyloxy)benzoate (5bfd)**

Yield 5.5 mg; Purity 24%; Retention Time 10.13 minutes; HRMS (ESI-TOF) calcd for $C_{52}H_{47}O_9$ $[M+H]^+$ 815.3220, found 815.3205.



***Cis*-2-[3,4-bis(benzyloxy)phenyl]-5,7-dimethoxychroman-3-yl 3-benzyloxy-4,5-dimethoxybenzoate (5bfe)**

Yield 15.6 mg; Purity 25%; Retention Time 8.25 minutes; ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.25-7.38 (m, 16H, aromatic-H), 7.16 (d, J = 1.4 Hz, 1H), 7.07 (d, J = 1.9 Hz, 1H), 6.95 (dd, J = 1.9, 8.2 Hz, 1H), 6.85 (s, J = 8.2 Hz, 1H), 6.25 (d, J = 2.4 Hz, 1H), 6.13 (d, J = 2.4 Hz, 1H), 5.59 (br t, J = 2.9 Hz 1H), 5.04-5.09 (m, 5H), 4.82 (d, J_{gem} = 11.6 Hz, 1H), 4.70 (d, J_{gem} = 11.6 Hz, 1H), 3.82 (s, 3H), 3.78 (s, 9H), 3.04 (dd, J_{gem} = 17.4 Hz, J = 4.3 Hz, 1H), 2.99 (dd, J_{gem} = 17.4 Hz, J = 2.9 Hz, 1H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 165.2, 159.8, 159.0, 155.7, 153.1, 151.8, 149.1, 149.0, 143.1, 137.1, 136.6, 131.3, 128.7, 128.5, 128.4, 128.2, 127.8x2, 127.6, 127.4, 127.3, 125.0, 120.1, 114.9, 113.8, 109.1, 107.3, 100.3, 93.3, 92.0, 77.6, 71.4, 71.3, 71.0, 68.6, 60.9, 56.3, 55.5x2, 25.9; FT-IR (solid) 3447, 3008, 2939, 1715, 1596, 1455, 1220, 1118, 1025, 1006, 815, 752, 698 cm^{-1}; HRMS (ESI-TOF) calcd for $C_{47}H_{45}O_{10}$ $[M+H]^+$ 769.3013, found 769.3026.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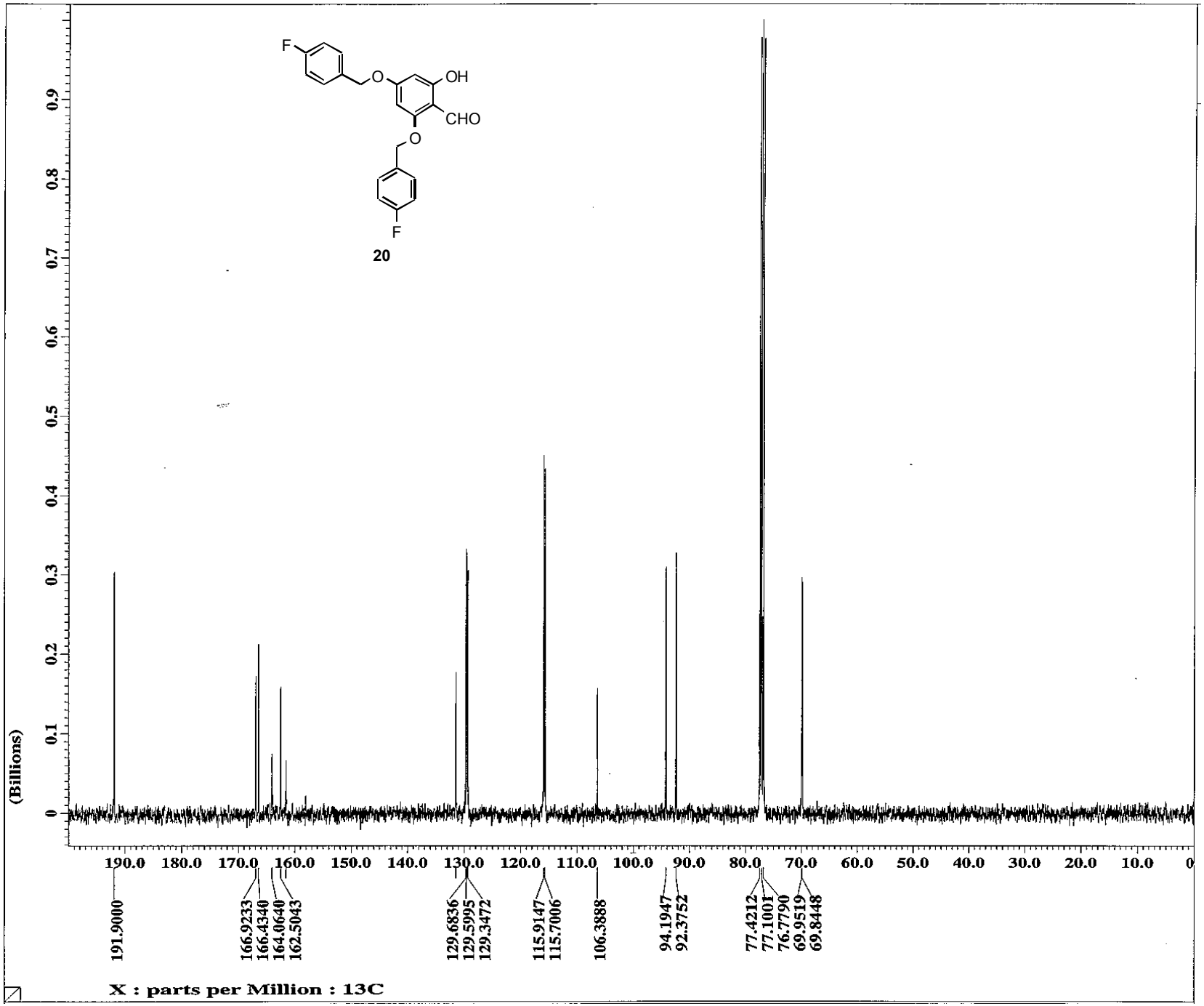
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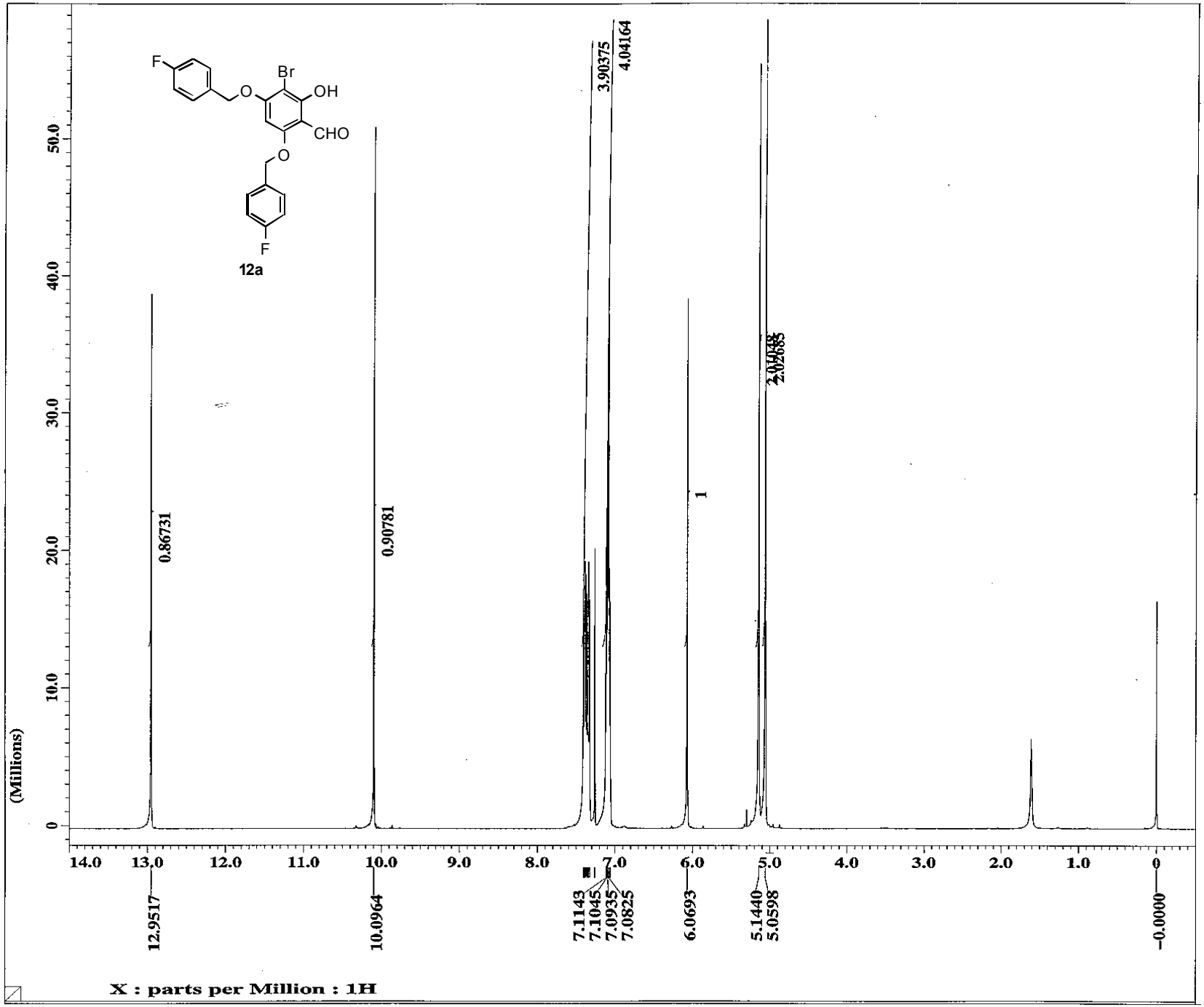
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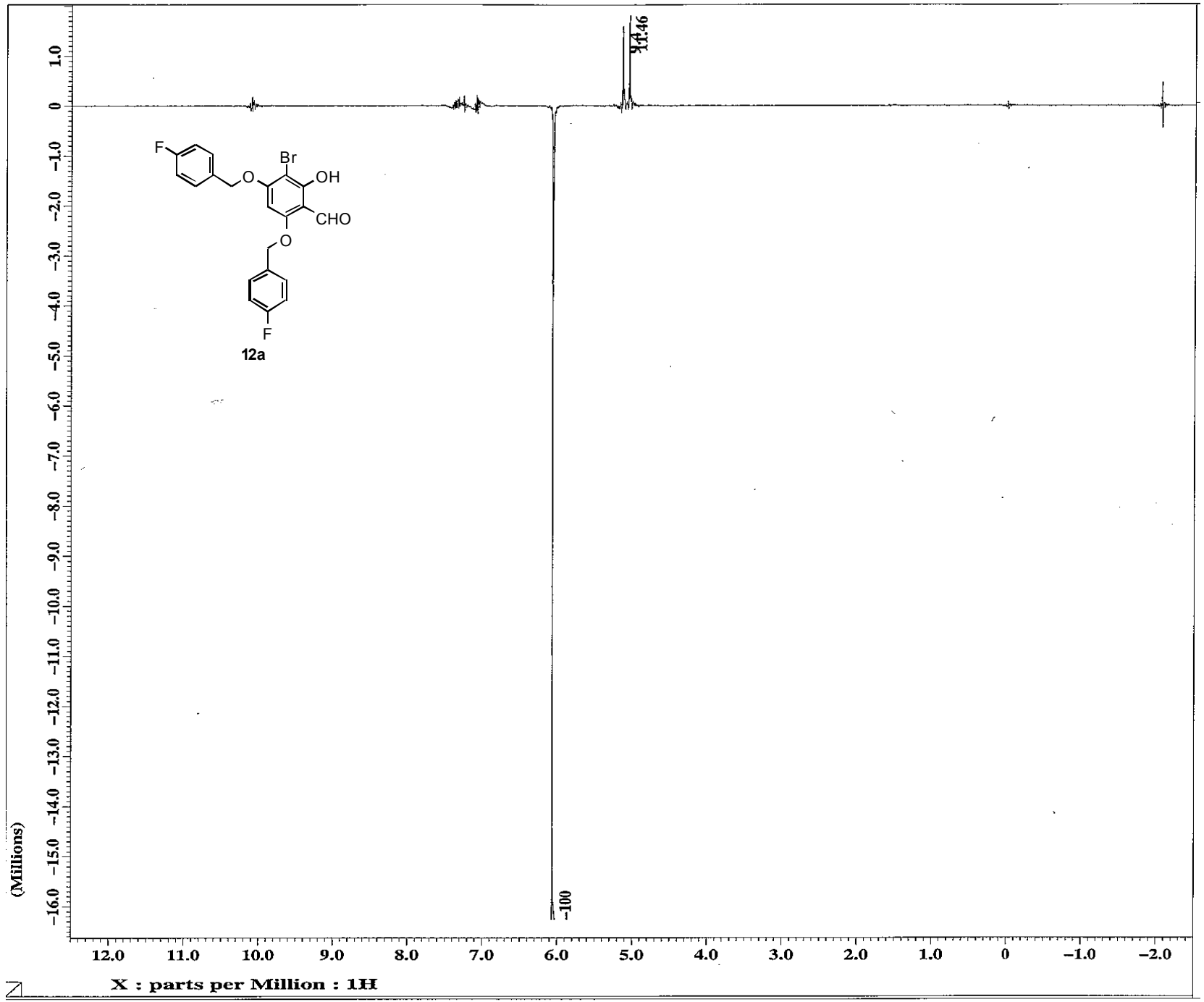
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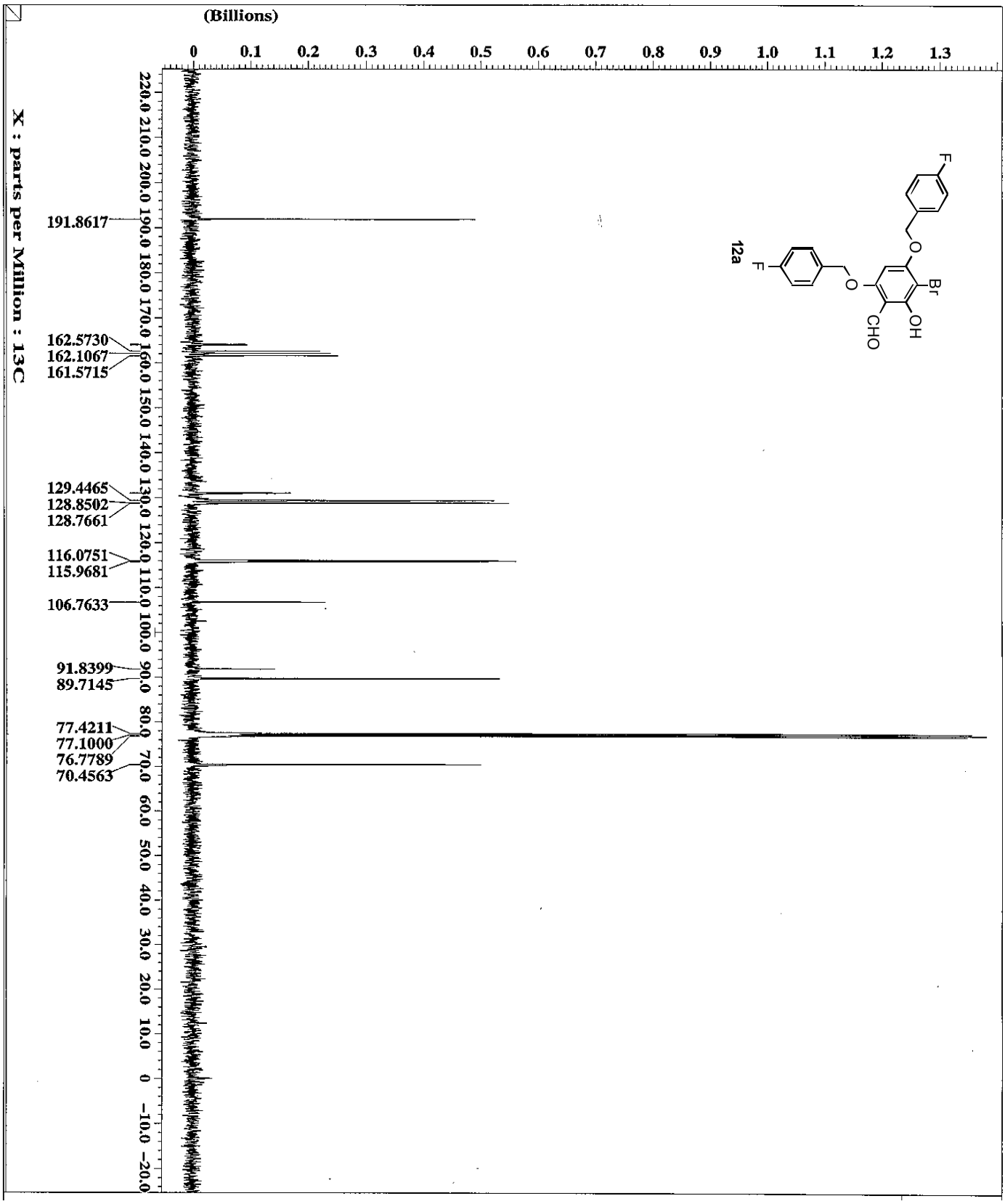
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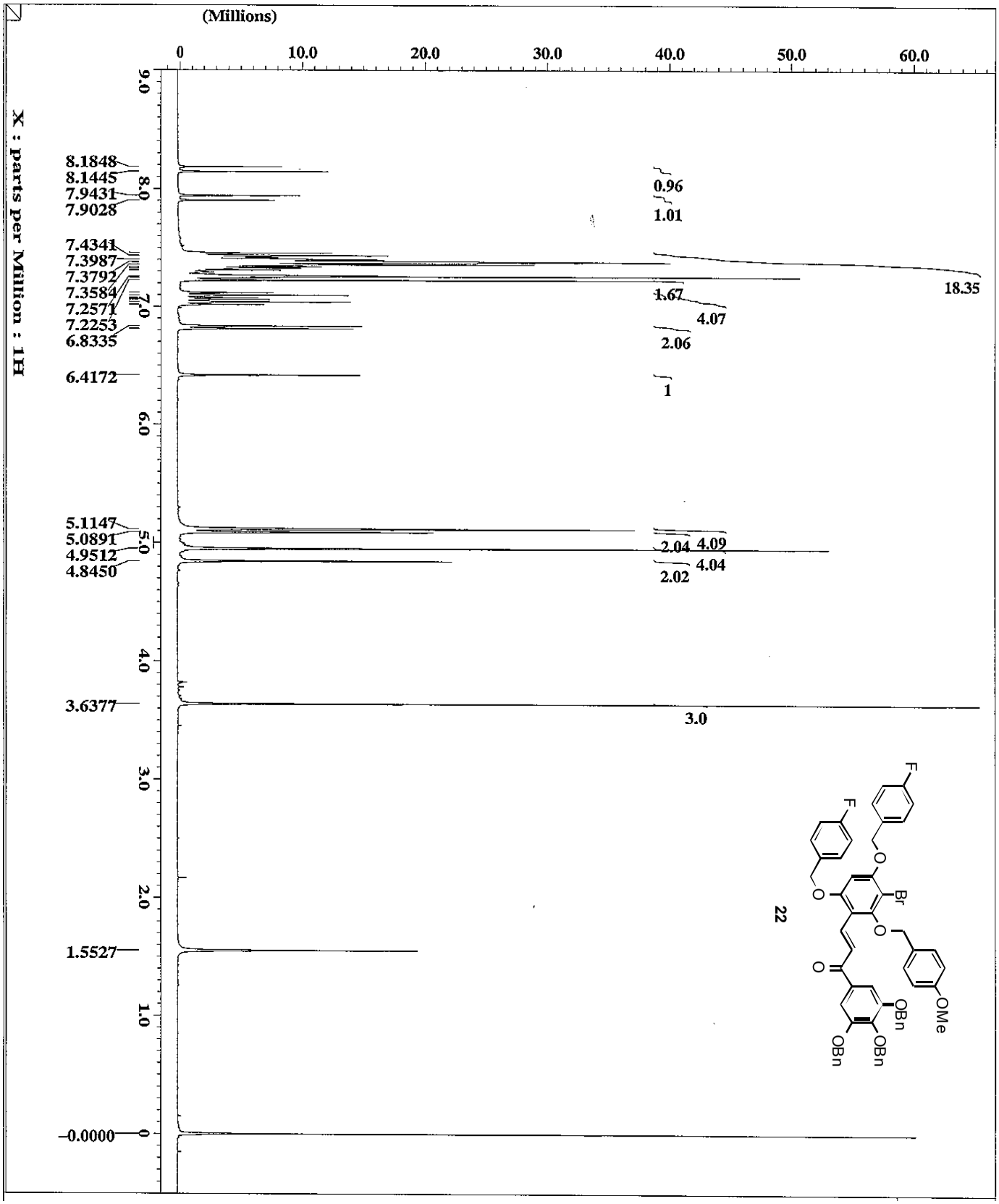
CHO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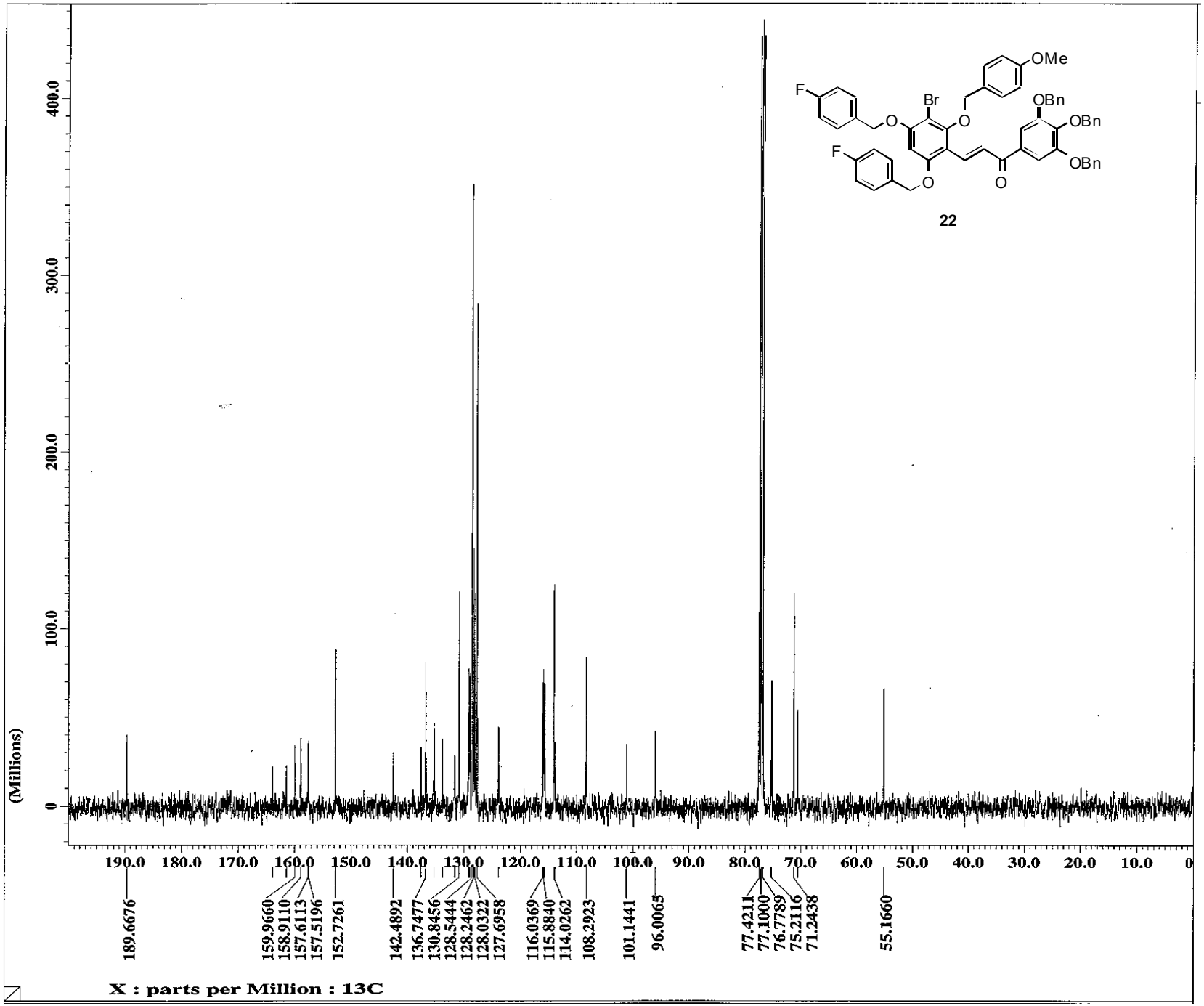
OBn
OBn
OMe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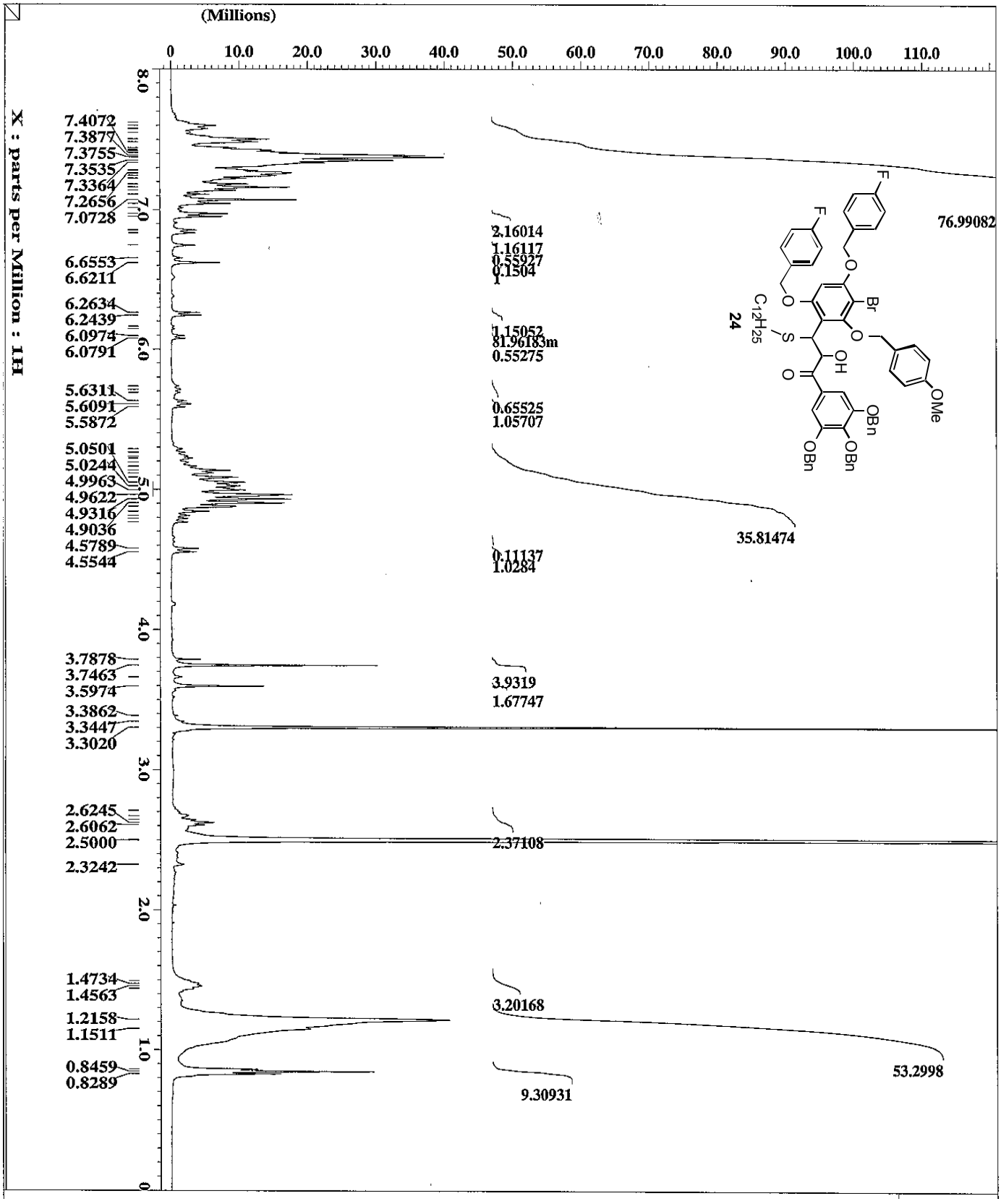
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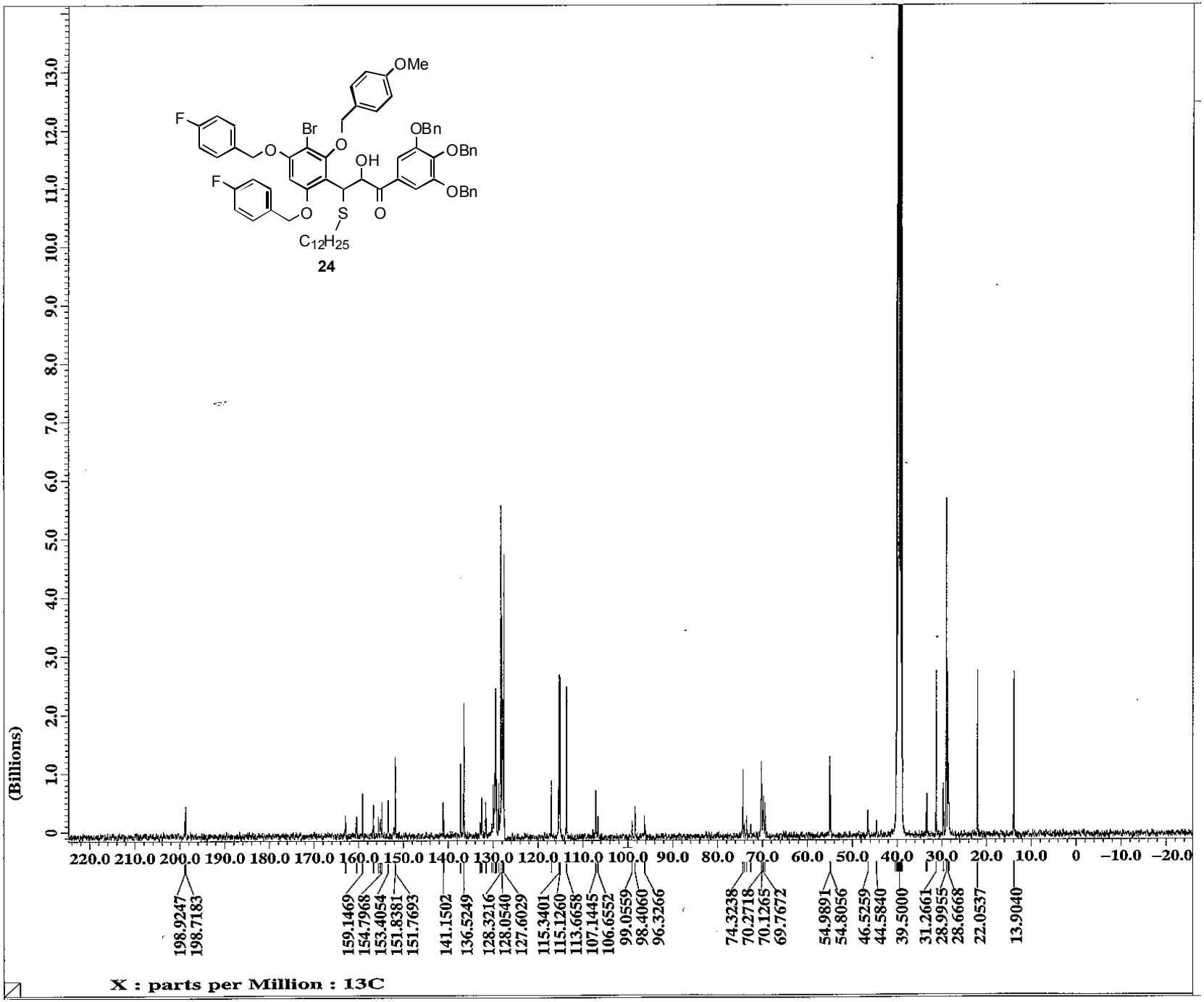
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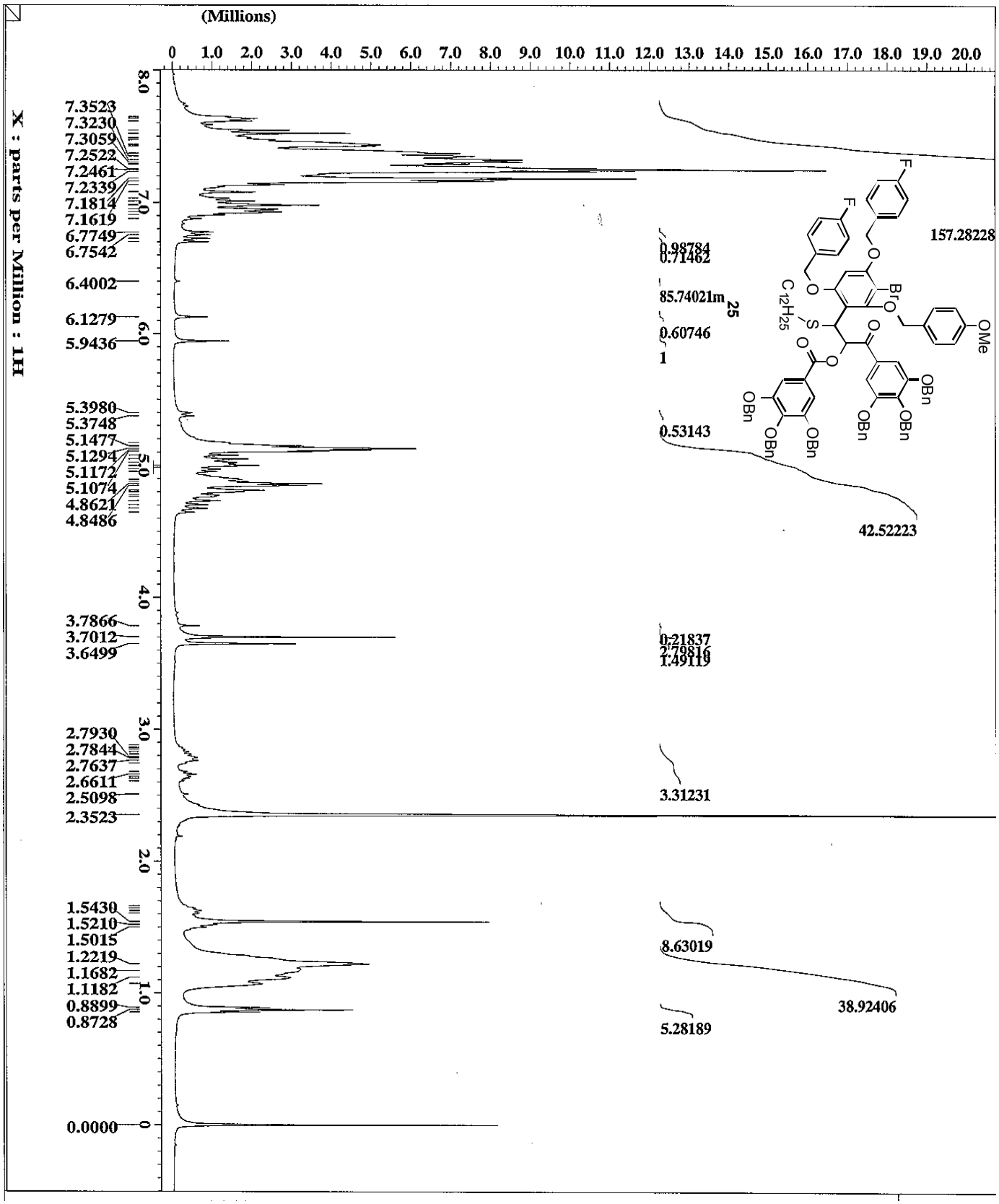
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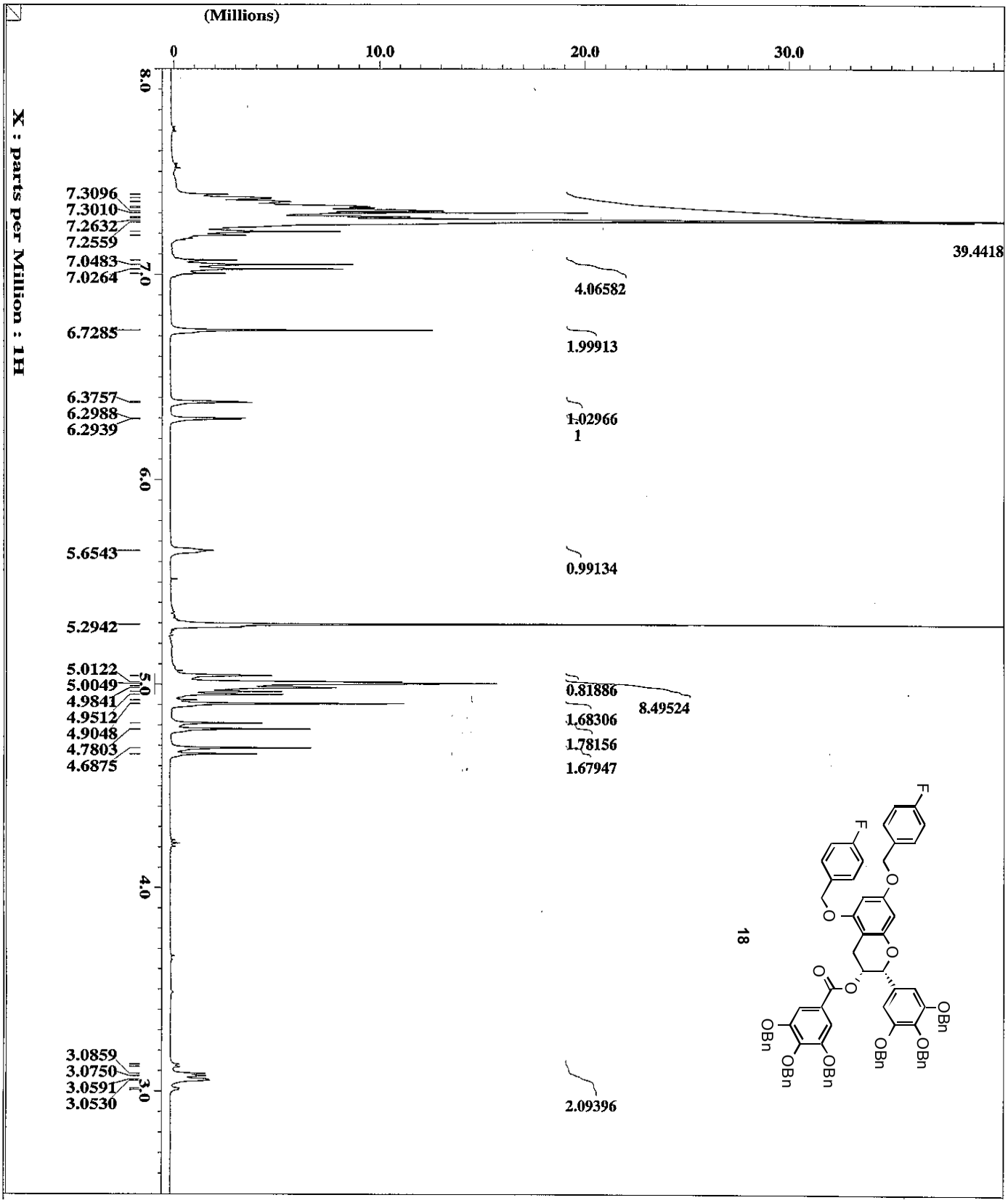
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X : parts per Million : 1H
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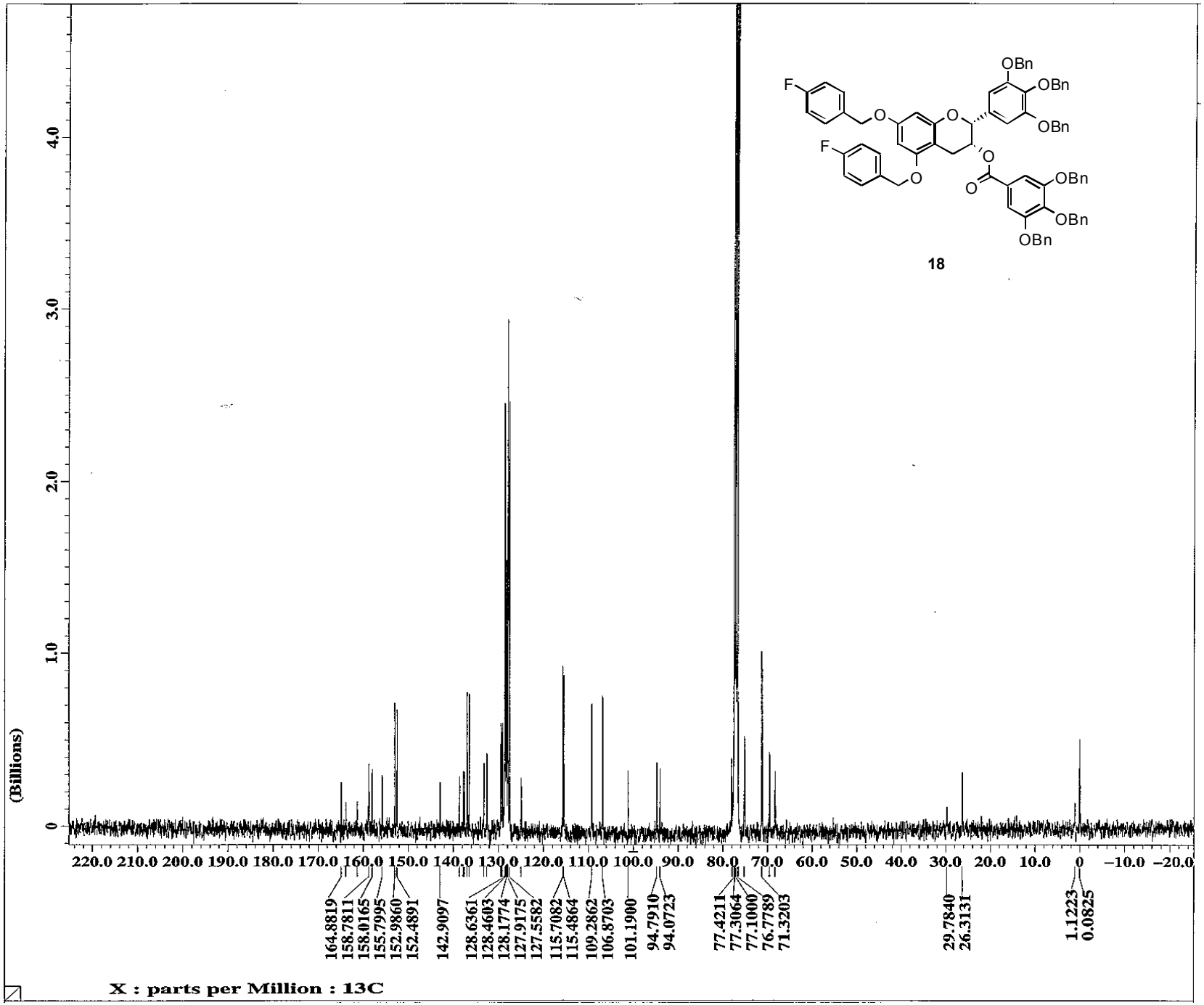
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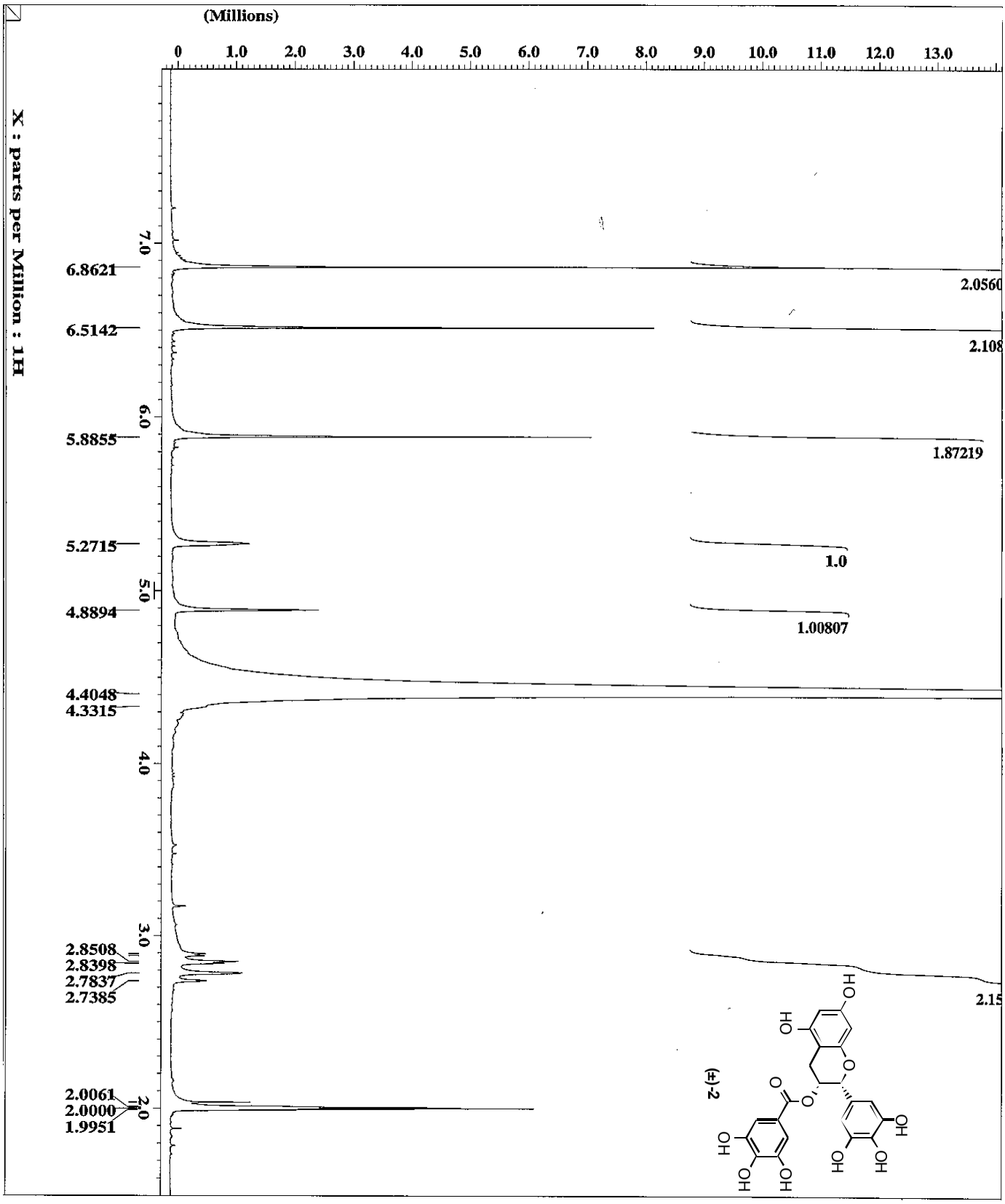
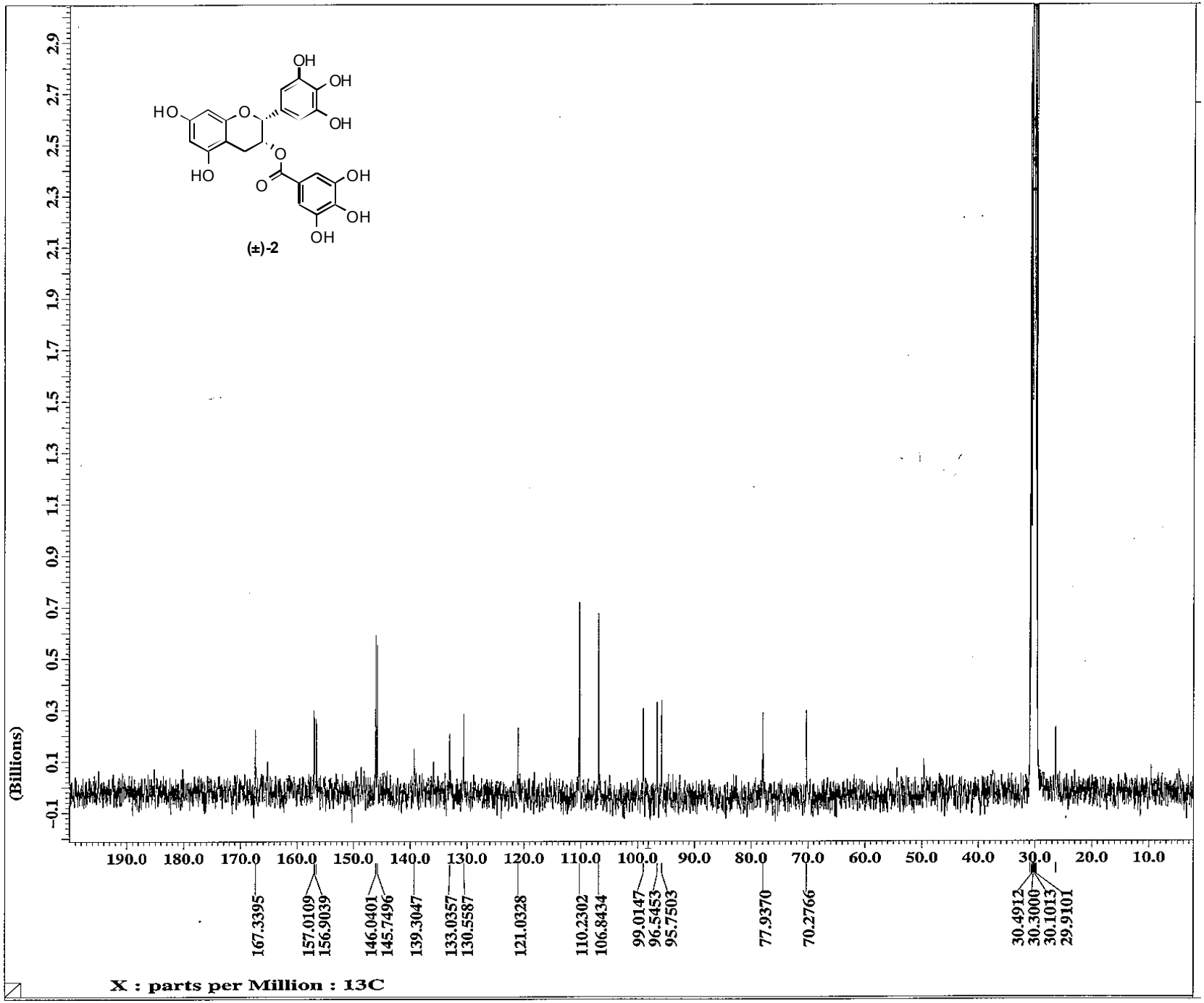
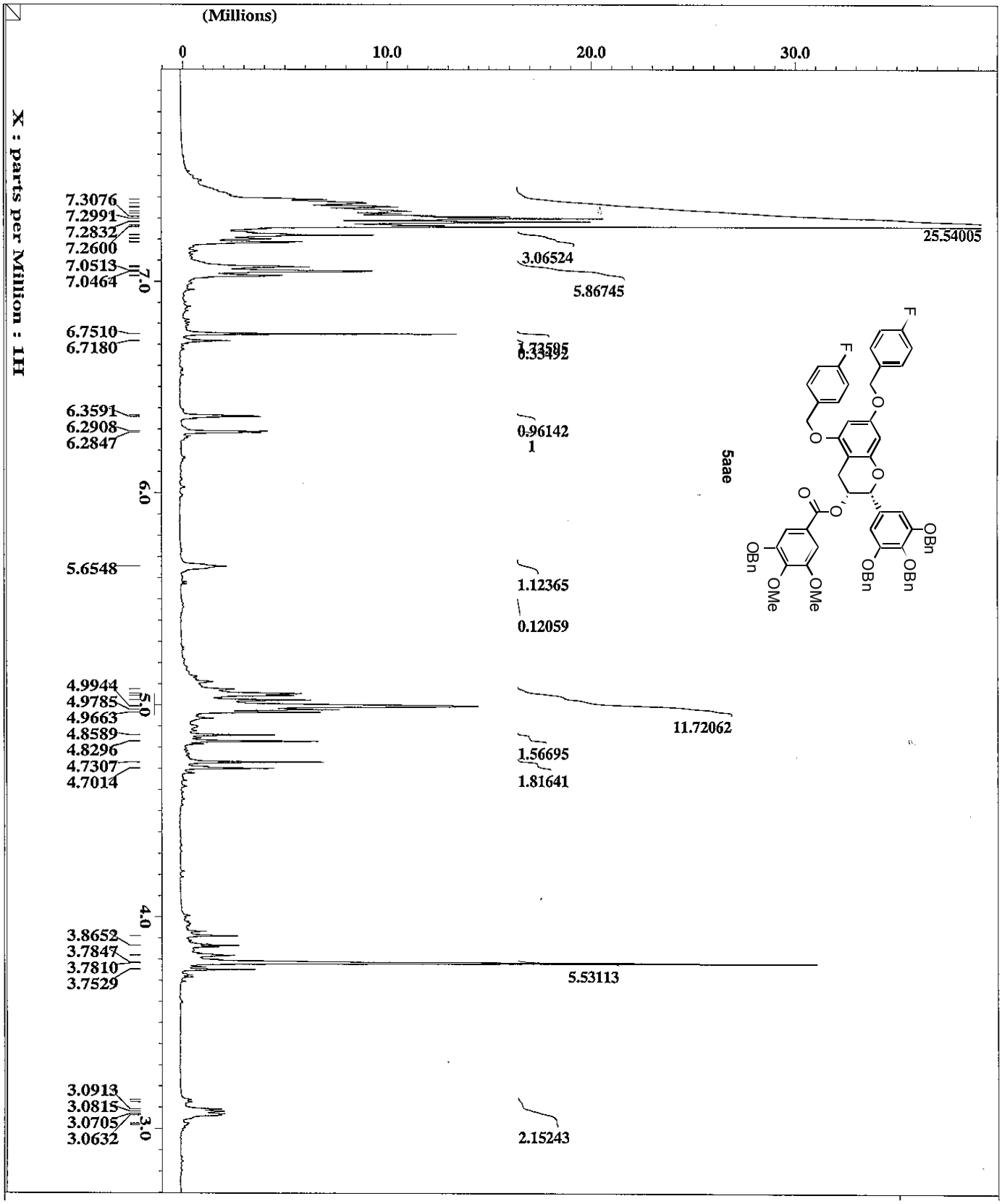
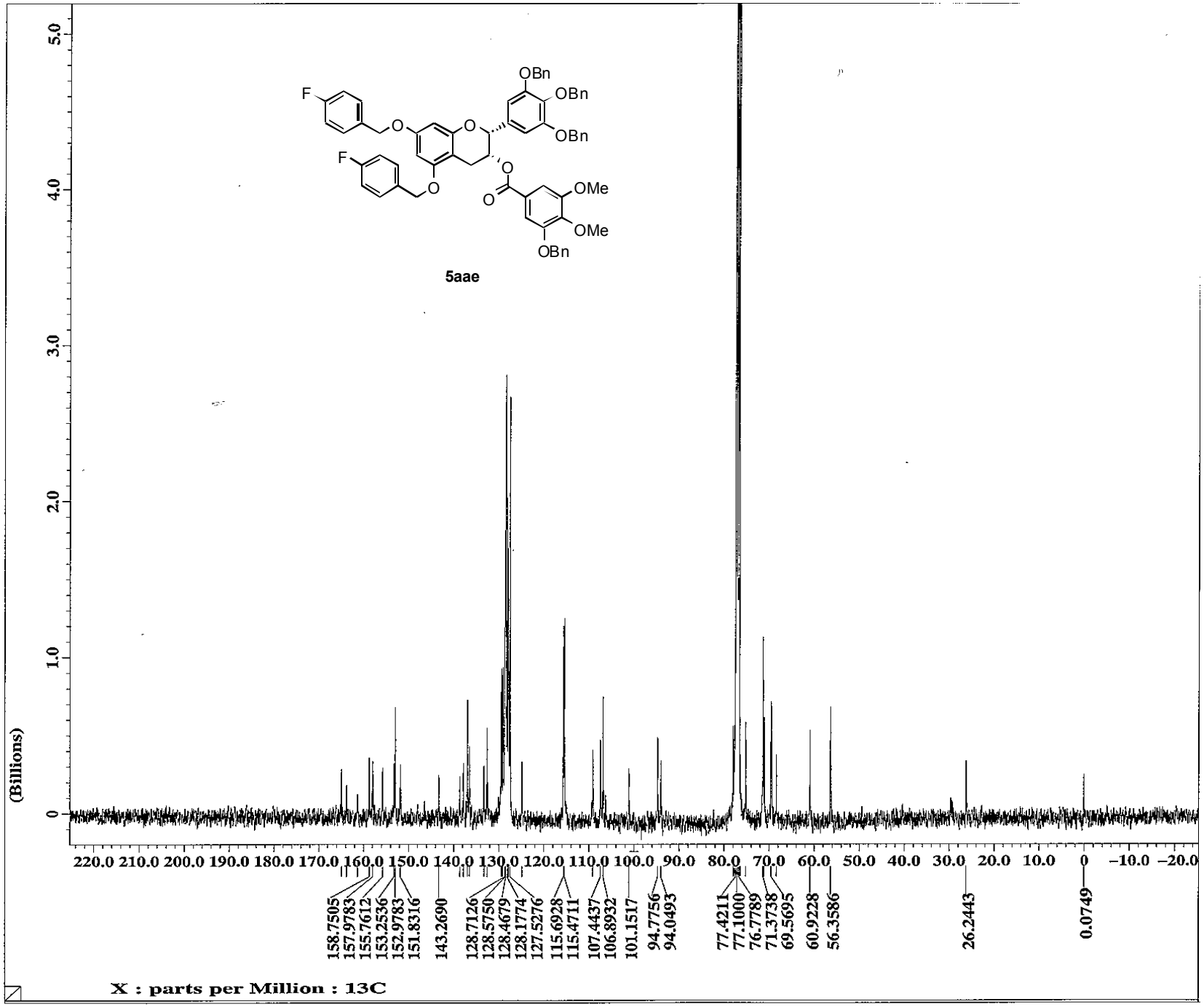
OBn
OBn
OBn
OBn

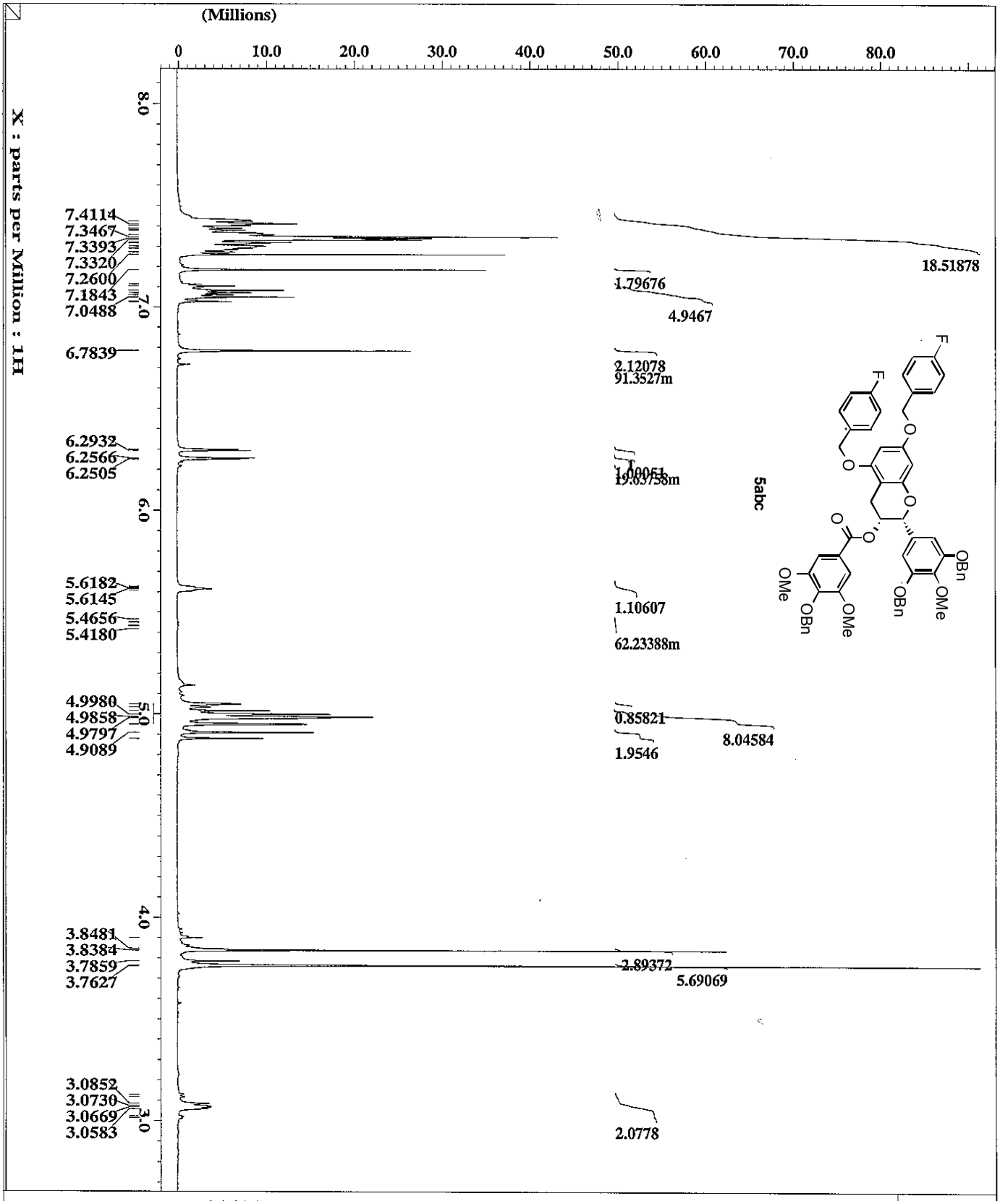
18

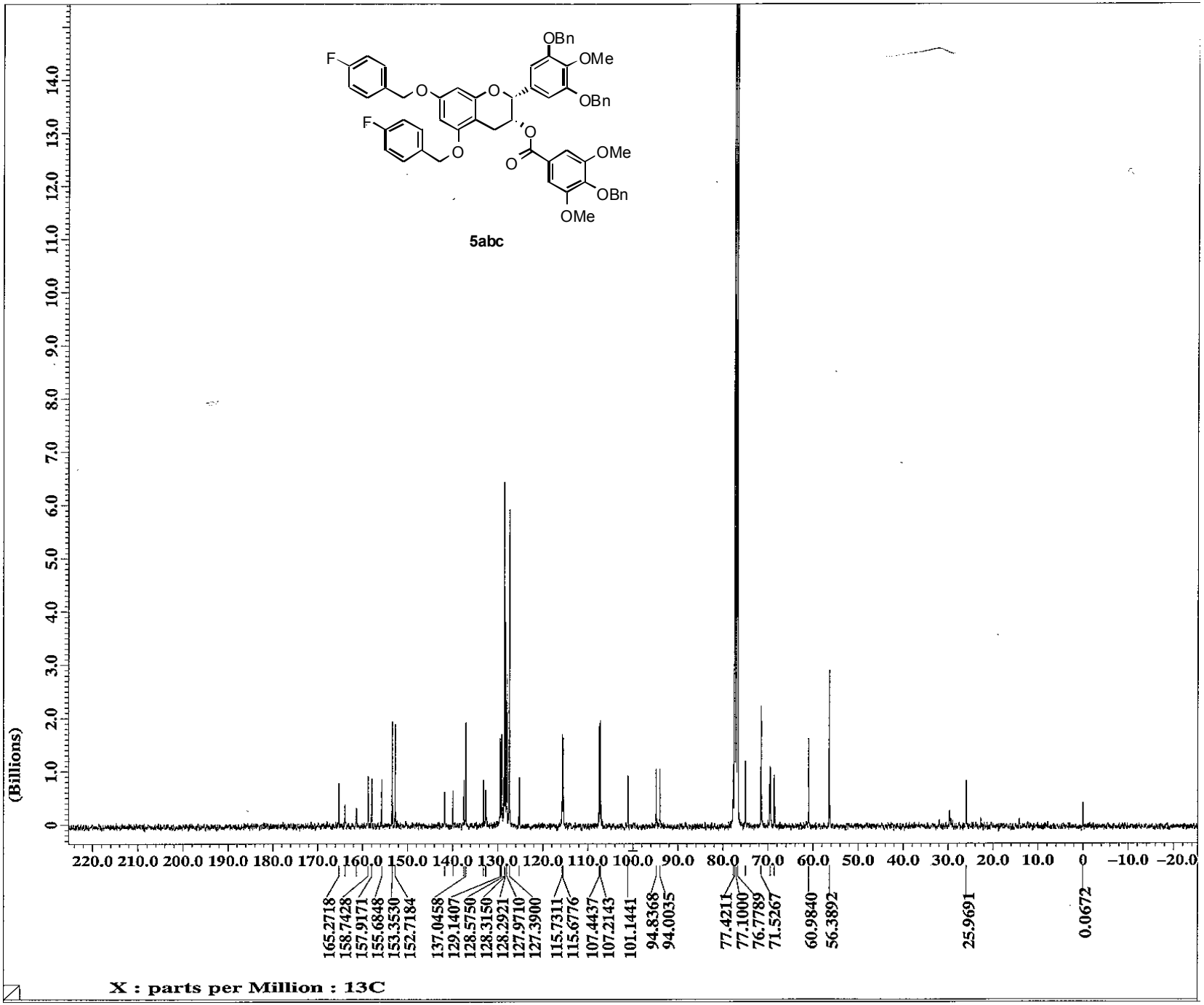

(Millions)
0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0
X : parts per Million : 1H
7.0
6.0
5.0
4.0
3.0
2.0
6.8621
6.5142
5.8855
5.2715
4.8894
4.4048
4.3315
2.8508
2.8398
2.7837
2.7385
2.0061
2.0000
1.9951
2.0560
2.108
1.87219
1.0
1.00807
2.15
(±)-2
OH
HO
O

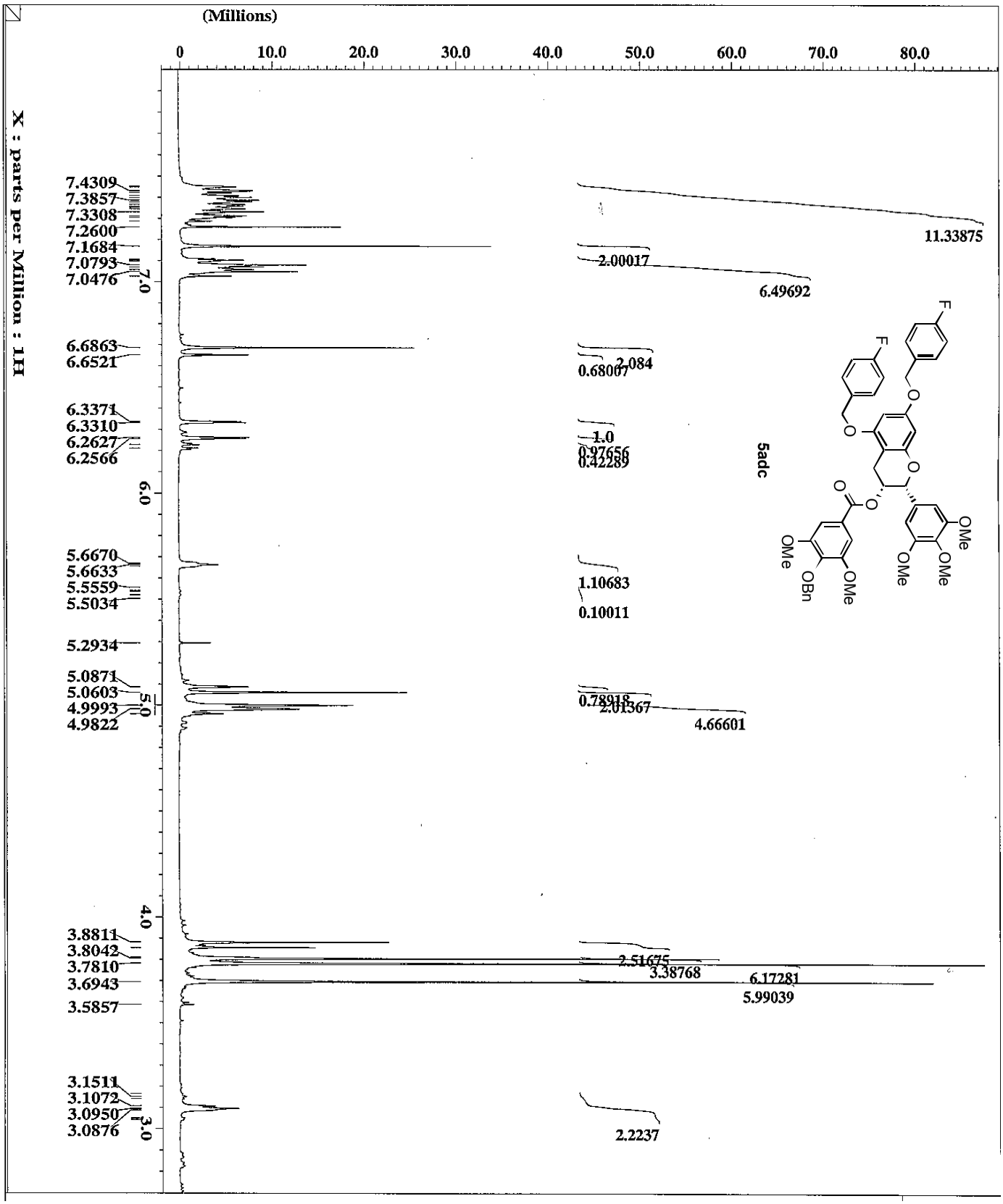

(±)-2
(Billions)
2.9
2.7
2.5
2.3
2.1
1.9
1.7
1.5
1.3
1.1
0.9
0.7
0.5
0.3
0.1
-0.1
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
167.3395
157.0109
156.9039
146.0401
145.7496
139.3047
133.0357
130.5587
121.0328
110.2302
106.8434
99.0147
96.5453
95.7503
77.9370
70.2766
30.4912
30.3000
30.1013
29.9101
X : parts per Million : 13C

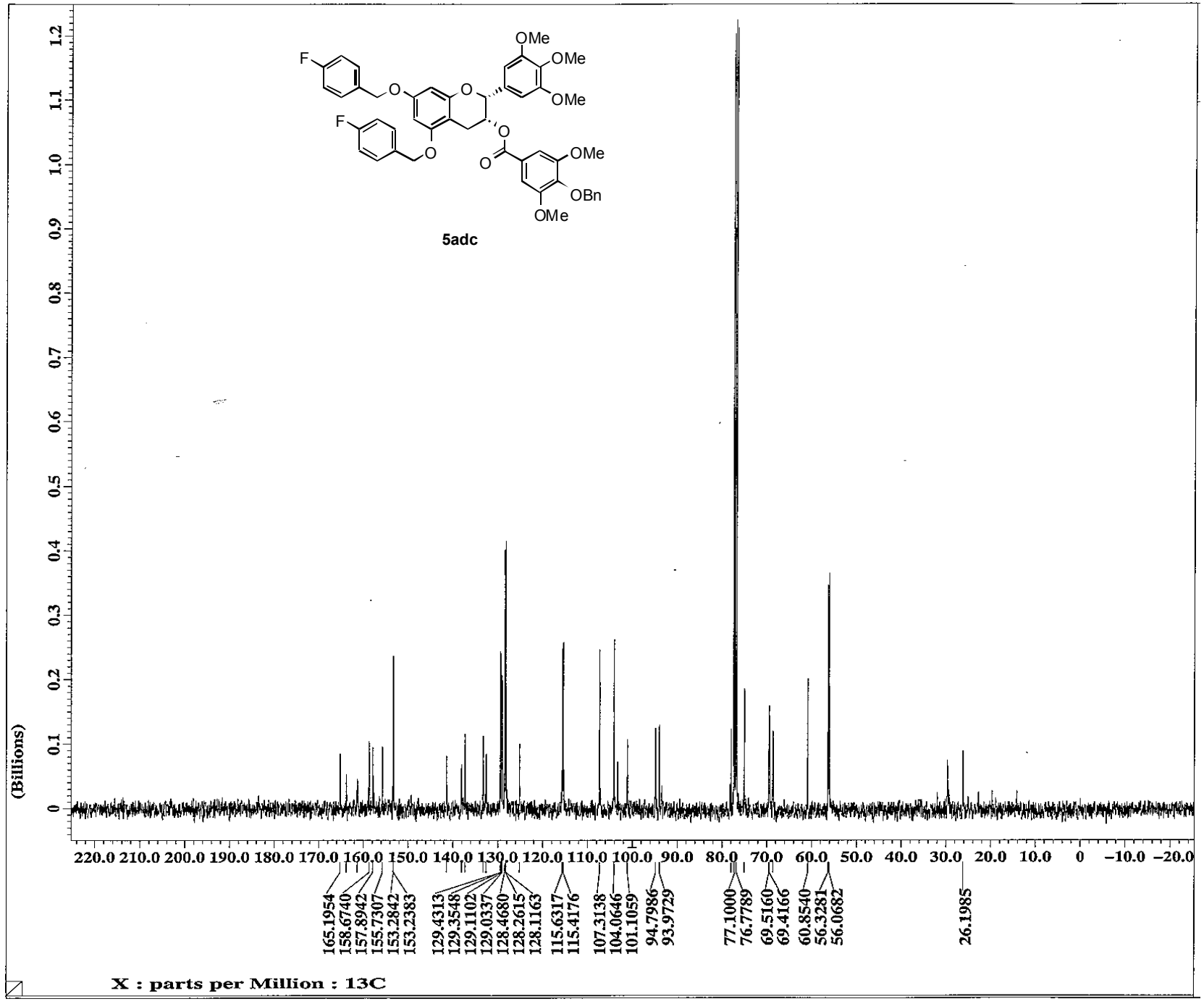

(Millions)
0
10.0
20.0
30.0
X : parts per Million : 1H
7.3076
7.2991
7.2832
7.2600
7.0513
7.0464
6.7510
6.7180
6.3591
6.2908
6.2847
5.6548
4.9944
4.9785
4.9663
4.8589
4.8296
4.7307
4.7014
3.8652
3.7847
3.7810
3.7529
3.0913
3.0815
3.0705
3.0632
25.54005
3.06524
5.86745
1.73585
0.33492
0.96142
1
1.12365
0.12059
11.72062
1.56695
1.81641
5.53113
2.15243
5aae
F
F
O
O
O
O
O
OBn
OBn
OBn
OBn
OMe
OMe

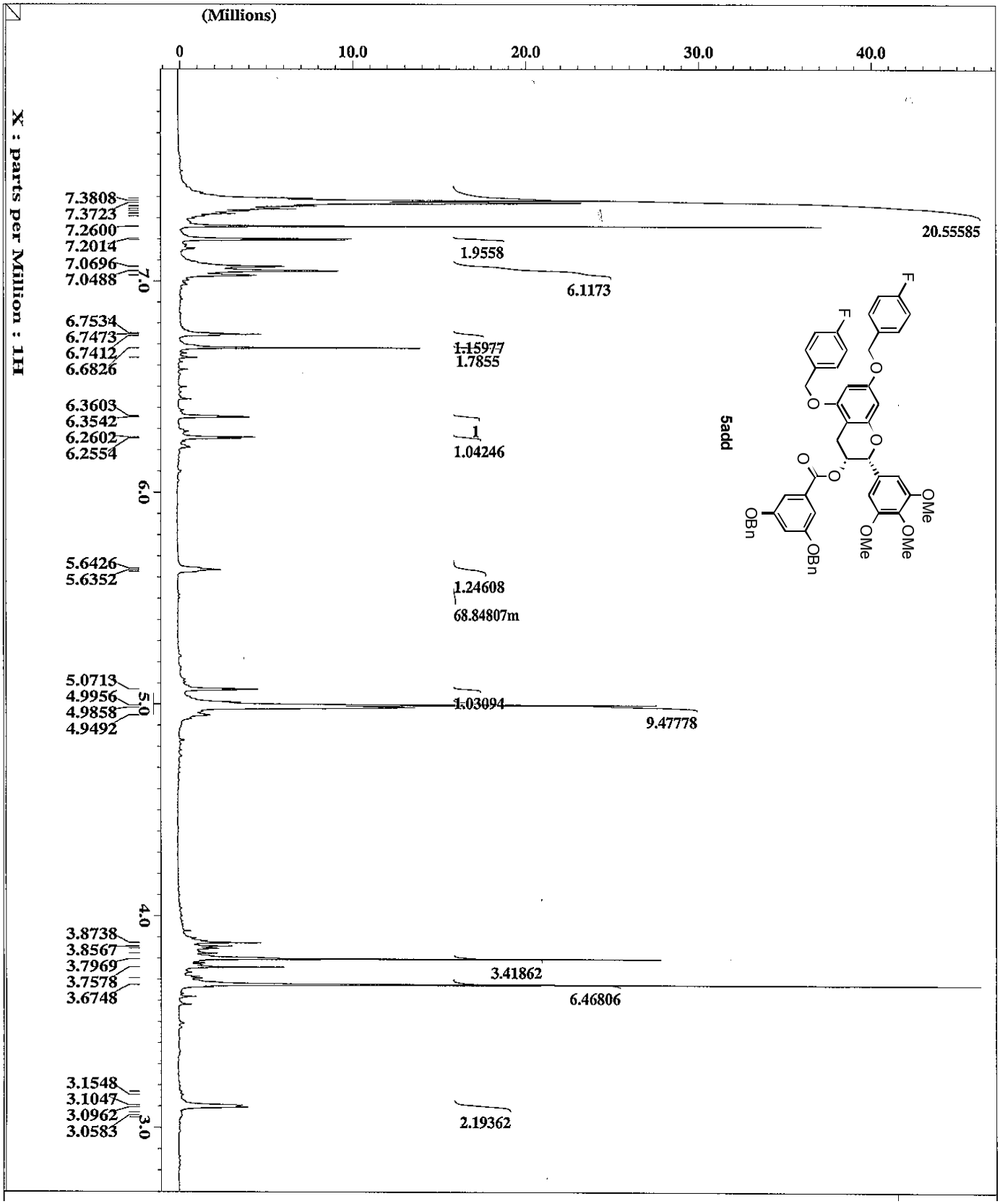

OBn
OBn
OBn
F
O
O
F
O
O
OMe
OMe
OBn
5aae
(Billions)
5.0
4.0
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
158.7505
157.9783
155.7612
153.2536
152.9783
151.8316
143.2690
128.7126
128.5750
128.4679
128.1774
127.5276
115.6928
115.4711
107.4437
106.8932
101.1517
94.7756
94.0493
77.4211
77.1000
76.7789
71.3738
69.5695
60.9228
56.3586
26.2443
0.0749
X : parts per Million : 13C

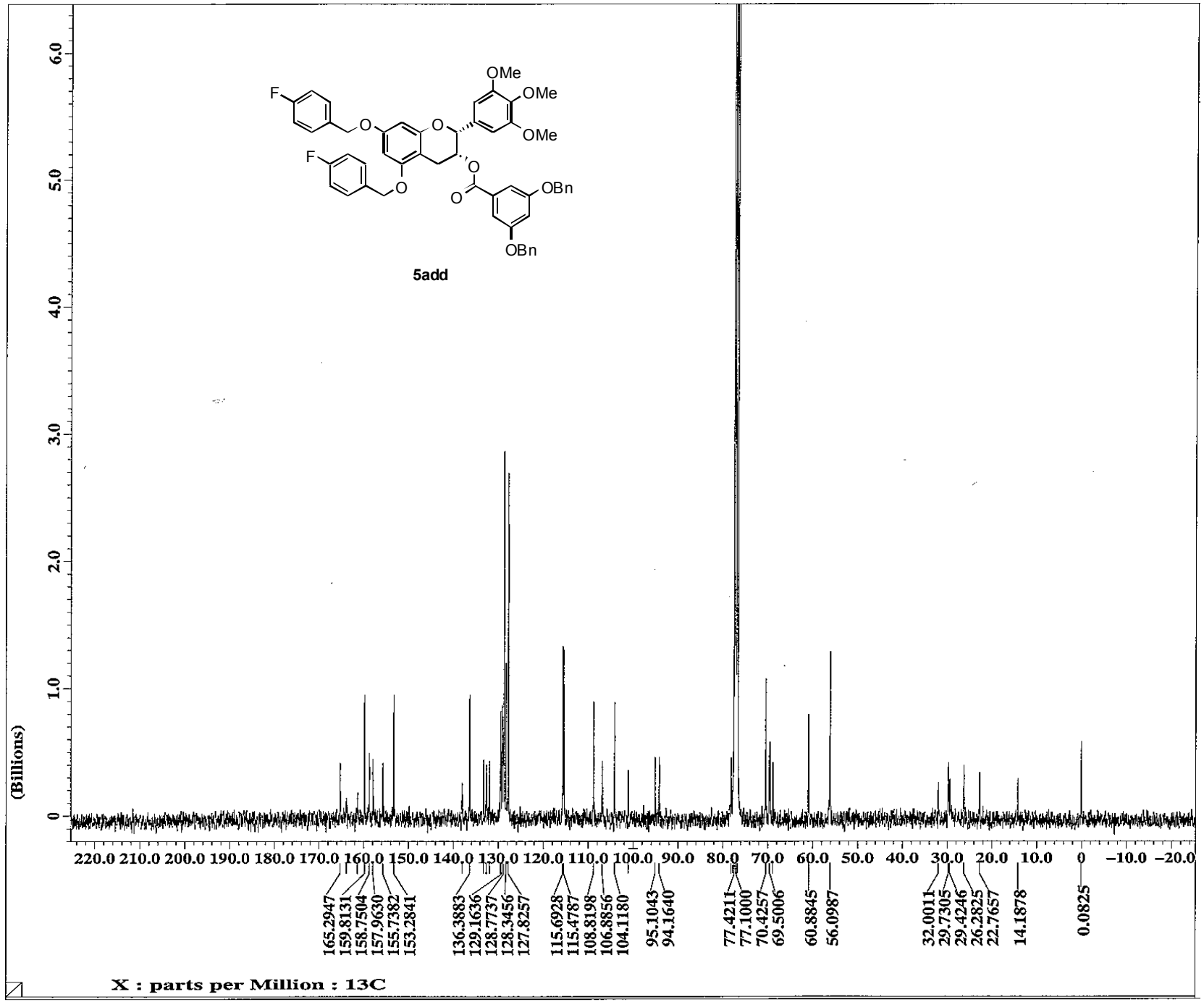

(Millions)
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
X : parts per Million : 1H
8.0
7.0
6.0
5.0
4.0
3.0
7.4114
7.3467
7.3393
7.3320
7.2600
7.1843
7.0488
6.7839
6.2932
6.2566
6.2505
5.6182
5.6145
5.4656
5.4180
4.9980
4.9858
4.9797
4.9089
3.8481
3.8384
3.7859
3.7627
3.0852
3.0730
3.0669
3.0583
18.51878
1.79676
4.9467
2.12078
91.3527m
1.00061
19.63758m
1.10607
62.23388m
0.85821
8.04584
1.9546
2.89372
5.69069
2.0778
5abc
F
F
O
O
O
O
O
O
OBn
OMe
OBn
OMe
OBn
OMe

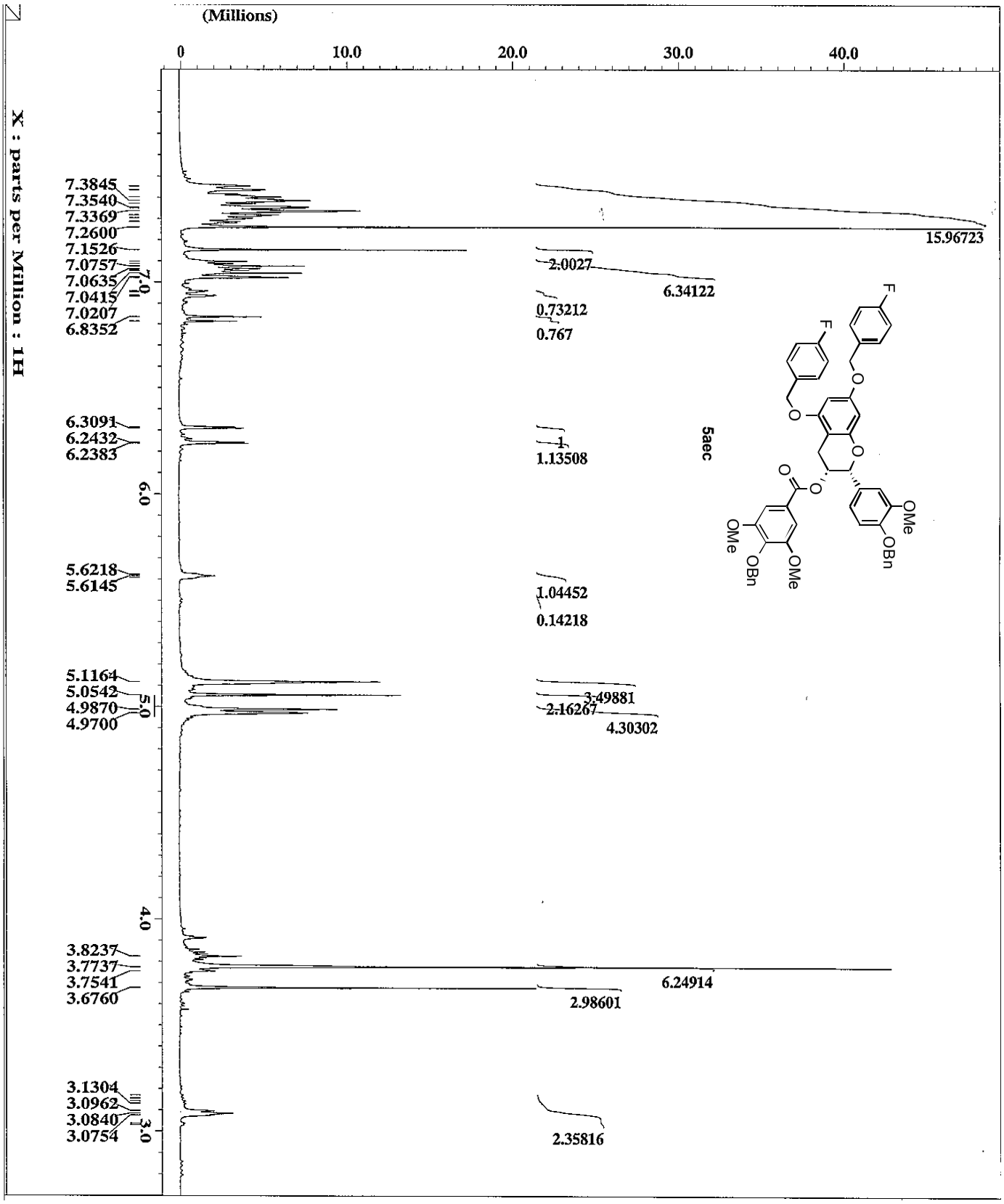

OBn
OMe
OBn
F
O
O
O
F
O
O
OMe
OBn
OMe
5abc
(Billions)
0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
165.2718
158.7428
157.9171
155.6848
153.3530
152.7184
137.0458
129.1407
128.5750
128.3150
128.2921
127.9710
127.3900
115.7311
115.6776
107.4437
107.2143
101.1441
94.8368
94.0035
77.4211
77.1000
76.7789
71.5267
60.9840
56.3892
25.9691
0.0672
X : parts per Million : 13C

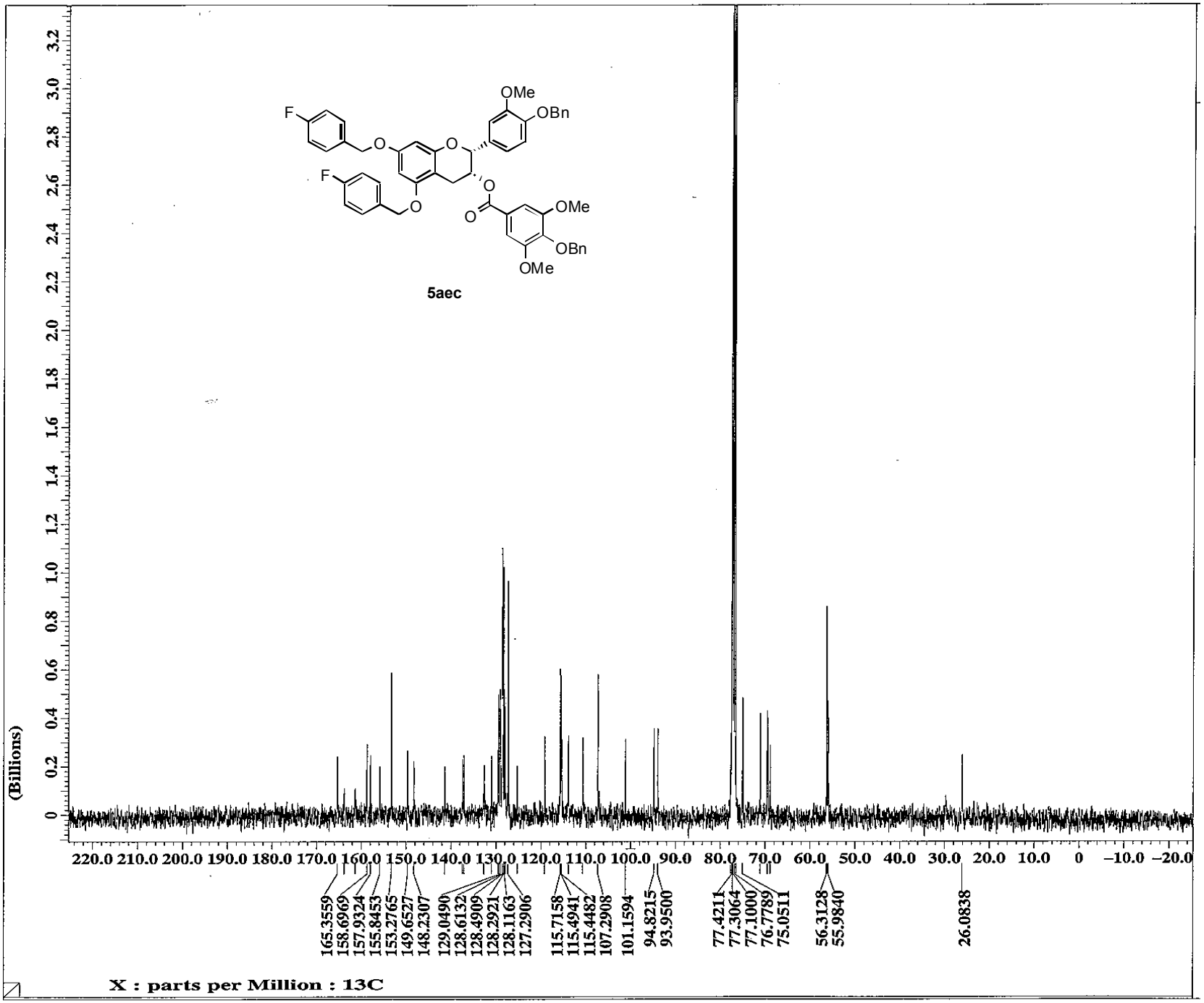

(Millions)
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
X : parts per Million : 1H
7.4309
7.3857
7.3308
7.2600
7.1684
7.0793
7.0476
6.6863
6.6521
6.3371
6.3310
6.2627
6.2566
5.6670
5.6633
5.5559
5.5034
5.2934
5.0871
5.0603
4.9993
4.9822
3.8811
3.8042
3.7810
3.6943
3.5857
3.1511
3.1072
3.0950
3.0876
11.33875
2.00017
6.49692
2.084
0.68067
1.0
0.97656
0.42289
1.10683
0.10011
0.78918
2.01367
4.66601
2.51675
3.38768
6.17281
5.99039
2.2237
5adc
F
F
O
O
O
O
O
O
OMe
OMe
OMe
OMe
OMe
OBn

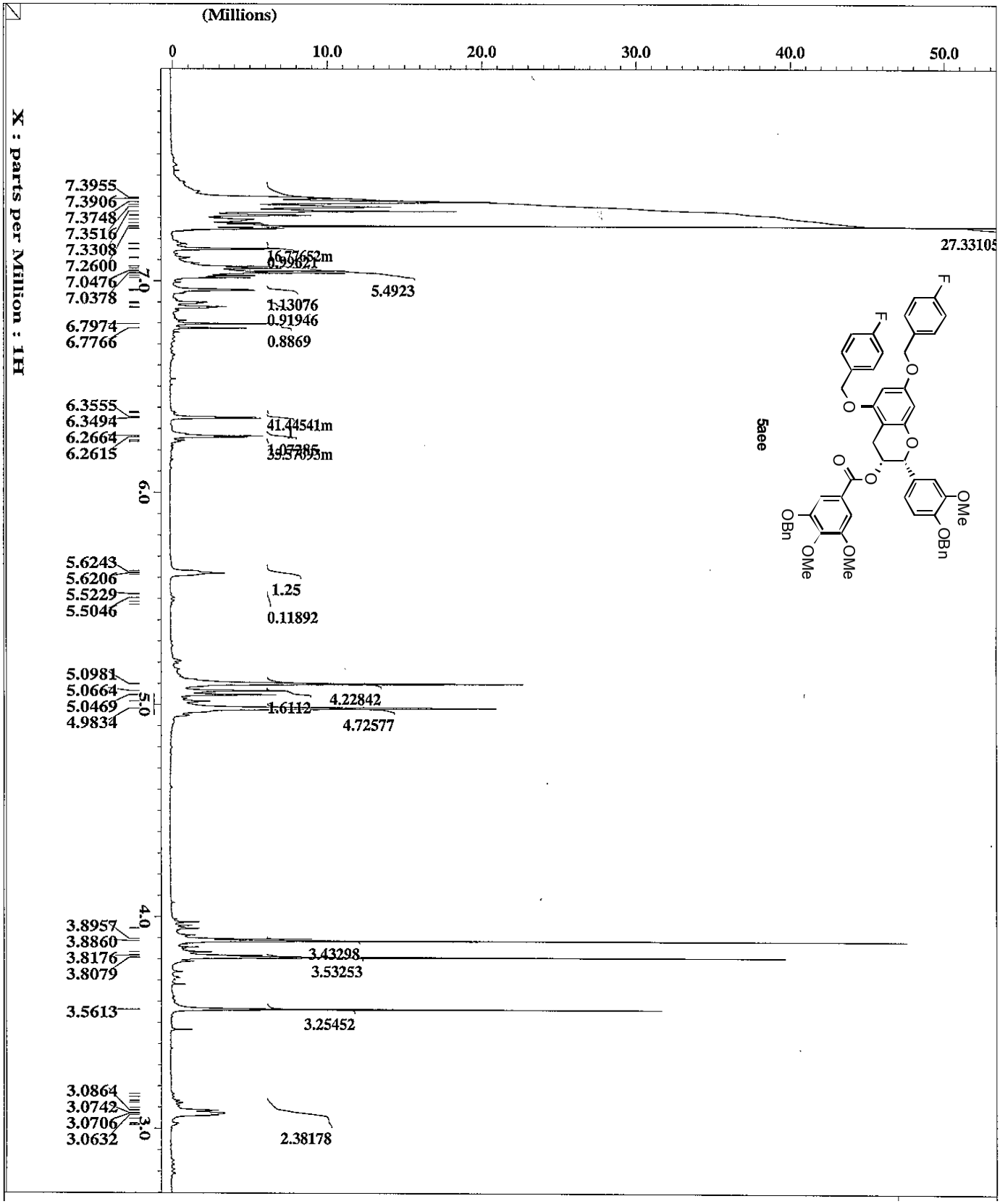

F
F
O
O
O
O
O
O
OMe
OMe
OMe
OMe
OBn
OMe
5adc
(Billions)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1
1.2
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
165.1954
158.6740
157.8942
155.7307
153.2842
153.2383
129.4313
129.3548
129.1102
129.0337
128.4680
128.2615
128.1163
115.6317
115.4176
107.3138
104.0646
101.1059
94.7986
93.9729
77.1000
76.7789
69.5160
69.4166
60.8540
56.3281
56.0682
26.1985
X : parts per Million : 13C

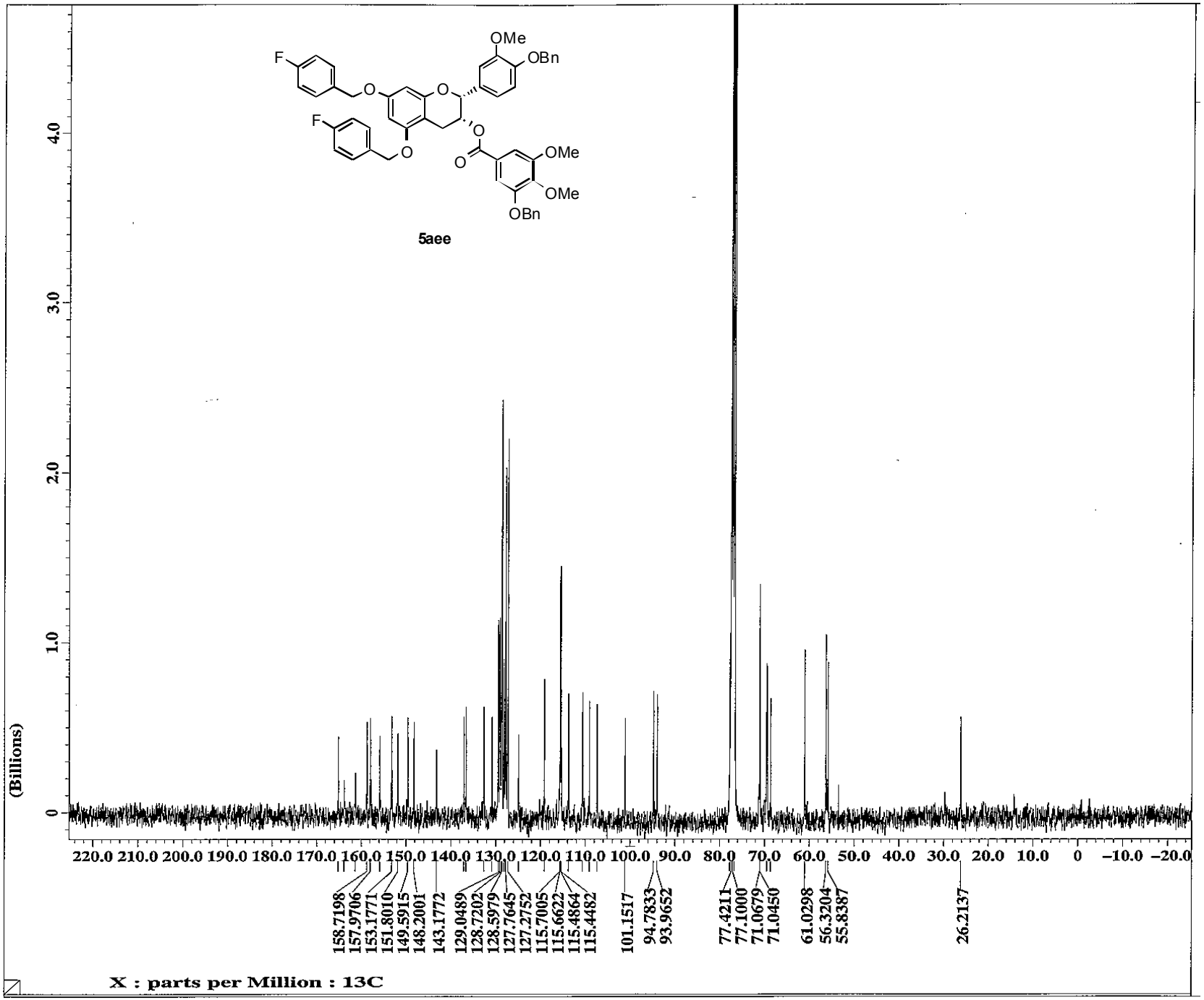

(Millions)
0
10.0
20.0
30.0
40.0
X : parts per Million : 1H
7.3808
7.3723
7.2600
7.2014
7.0696
7.0488
7.0
6.7534
6.7473
6.7412
6.6826
6.3603
6.3542
6.2602
6.2554
6.0
5.6426
5.6352
5.0713
4.9956
4.9858
4.9492
5.0
4.0
3.8738
3.8567
3.7969
3.7578
3.6748
3.1548
3.1047
3.0962
3.0583
3.0
20.55585
1.9558
6.1173
1.15977
1.7855
1
1.04246
1.24608
68.84807m
1.03094
9.47778
3.41862
6.46806
2.19362
5add
F
F
O
O
O
O
O
O
OBn
OBn
OMe
OMe
OMe

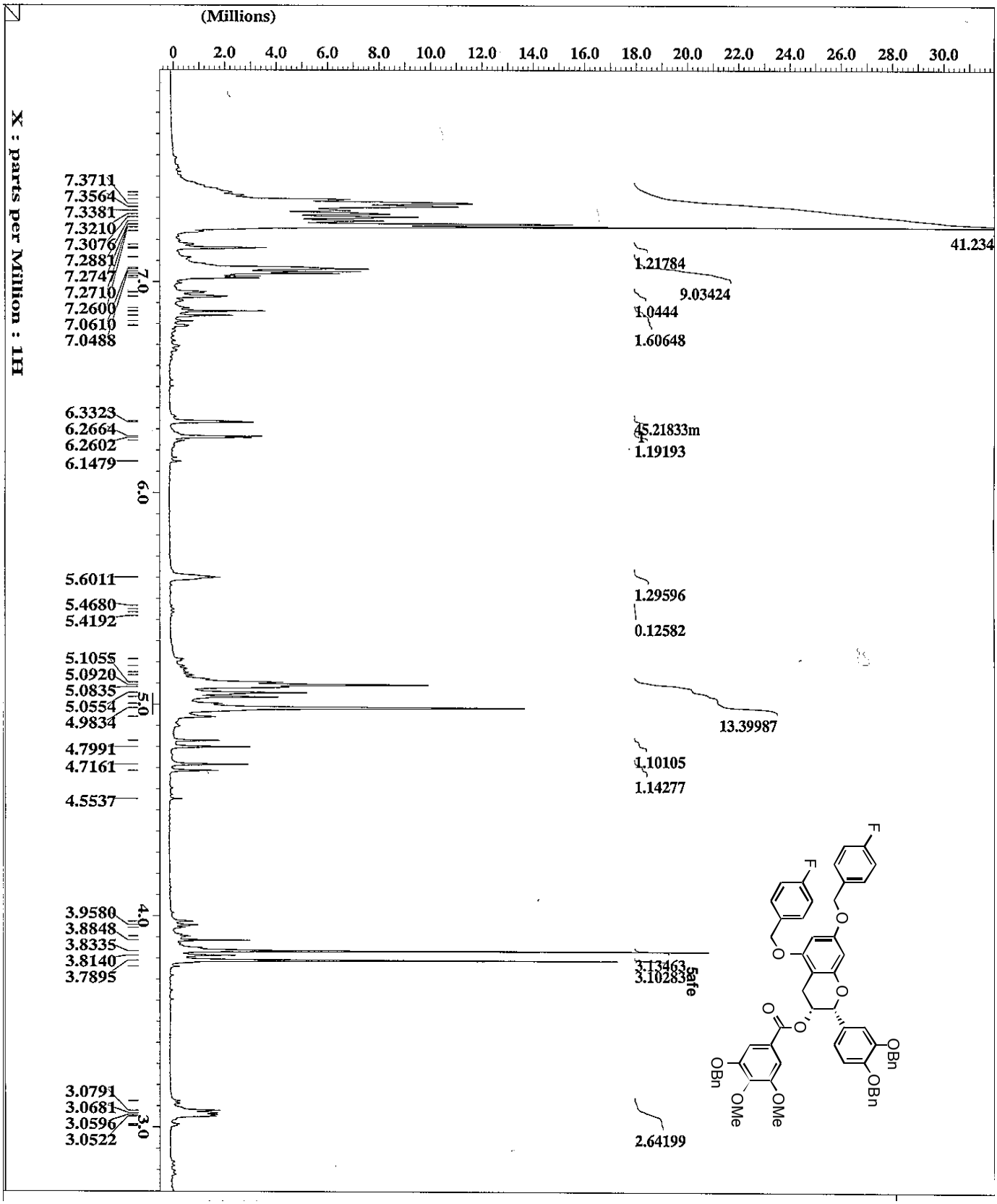

OMe
OMe
OMe
F
O
O
O
F
O
O
OBn
OBn
5add
(Billions)
6.0
5.0
4.0
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
165.2947
159.8131
158.7504
157.9630
155.7382
153.2841
136.3883
129.1636
128.7737
128.3456
127.8257
115.6928
115.4787
108.8198
106.8856
104.1180
95.1043
94.1640
77.4211
77.1000
70.4257
69.5006
60.8845
56.0987
32.0011
29.7305
29.4246
26.2825
22.7657
14.1878
0.0825
X : parts per Million : 13C

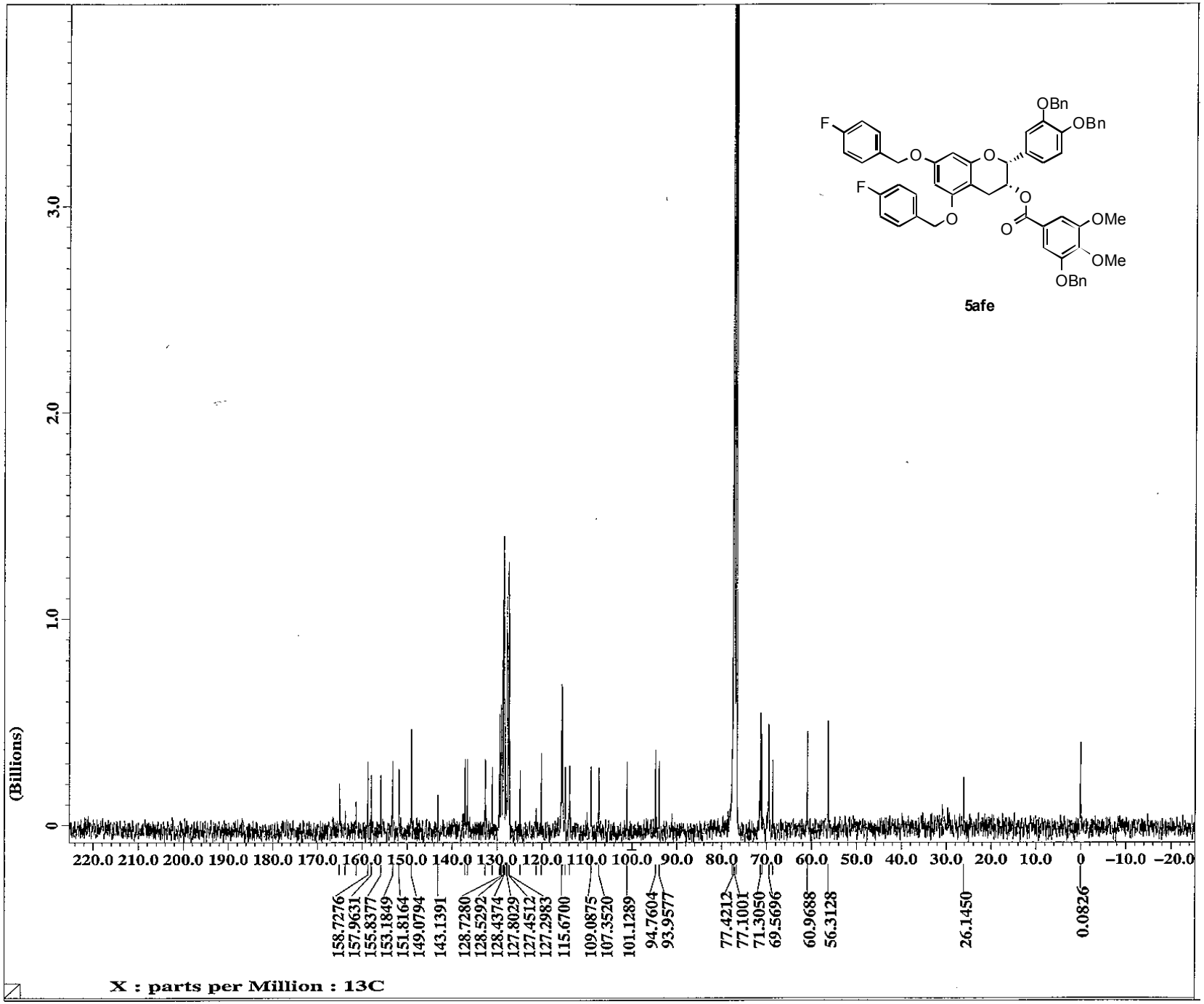

X : parts per Million : 1H
(Millions)
0
10.0
20.0
30.0
40.0
7.3845
7.3540
7.3369
7.2600
7.1526
7.0757
7.0635
7.0415
7.0207
6.8352
6.3091
6.2432
6.2383
5.6218
5.6145
5.1164
5.0542
4.9870
4.9700
3.8237
3.7737
3.7541
3.6760
3.1304
3.0962
3.0840
3.0754
7.0
6.0
5.0
4.0
3.0
15.96723
2.0027
6.34122
0.73212
0.767
1
1.13508
1.04452
0.14218
3.49881
2.16267
4.30302
6.24914
2.98601
2.35816
5aec
F
F
O
O
O
O
O
O
OMe
OBn
OMe
OBn
OMe

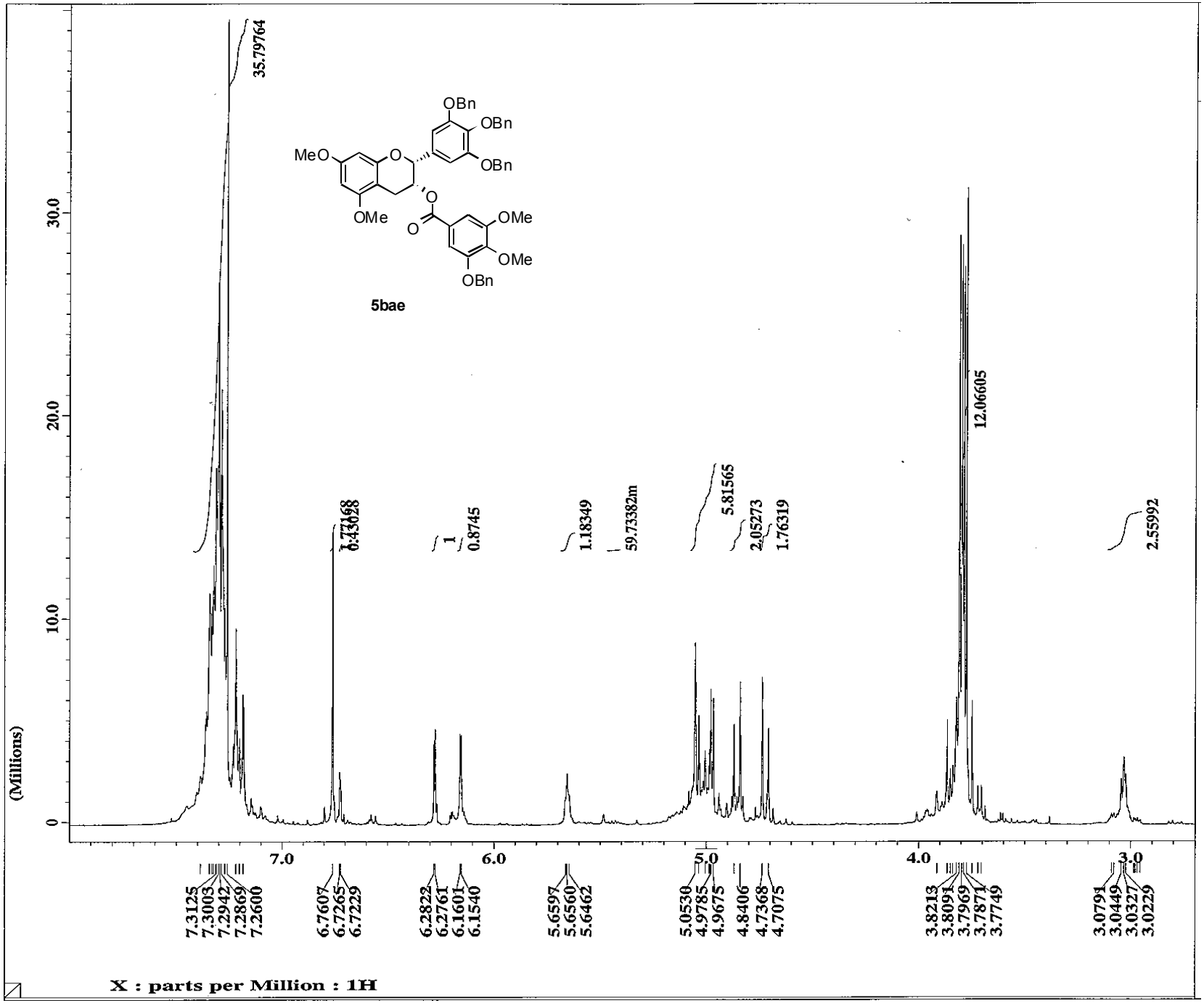

OMe
OBn
F
O
O
F
O
O
OMe
OBn
OMe
5aec
(Billions)
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
2.8
3.0
3.2
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
165.3559
158.6969
157.9324
155.8453
153.2765
149.6527
148.2307
129.0490
128.6132
128.4909
128.2921
128.1163
127.2906
115.7158
115.4941
115.4482
107.2908
101.1594
94.8215
93.9500
77.4211
77.3064
77.1000
76.7789
75.0511
56.3128
55.9840
26.0838
X : parts per Million : 13C

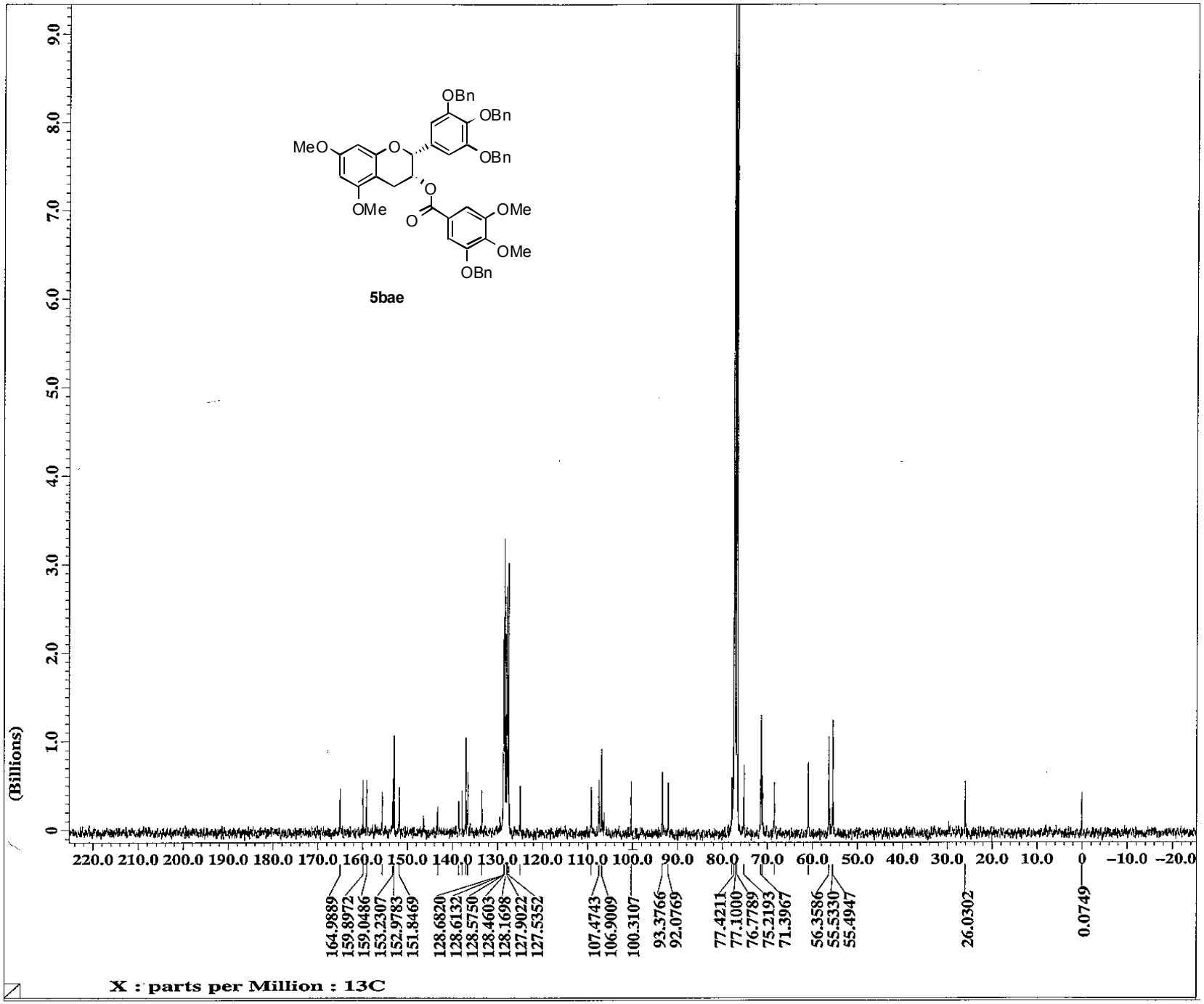

(Millions)
0
10.0
20.0
30.0
40.0
50.0
X : parts per Million : 1H
7.3955
7.3906
7.3748
7.3516
7.3308
7.2600
7.0476
7.0378
6.7974
6.7766
6.3555
6.3494
6.2664
6.2615
5.6243
5.6206
5.5229
5.5046
5.0981
5.0664
5.0469
4.9834
3.8957
3.8860
3.8176
3.8079
3.5613
3.0864
3.0742
3.0706
3.0632
7.0
6.0
5.0
4.0
3.0
27.33105
16.77652m
0.99621
5.4923
1.13076
0.91946
0.8869
41.44541m
39.57093m
1.25
0.11892
4.22842
1.6112
4.72577
3.43298
3.53253
3.25452
2.38178
5aee
F
F
O
O
O
O
O
OMe
OBn
OBn
OMe
OMe

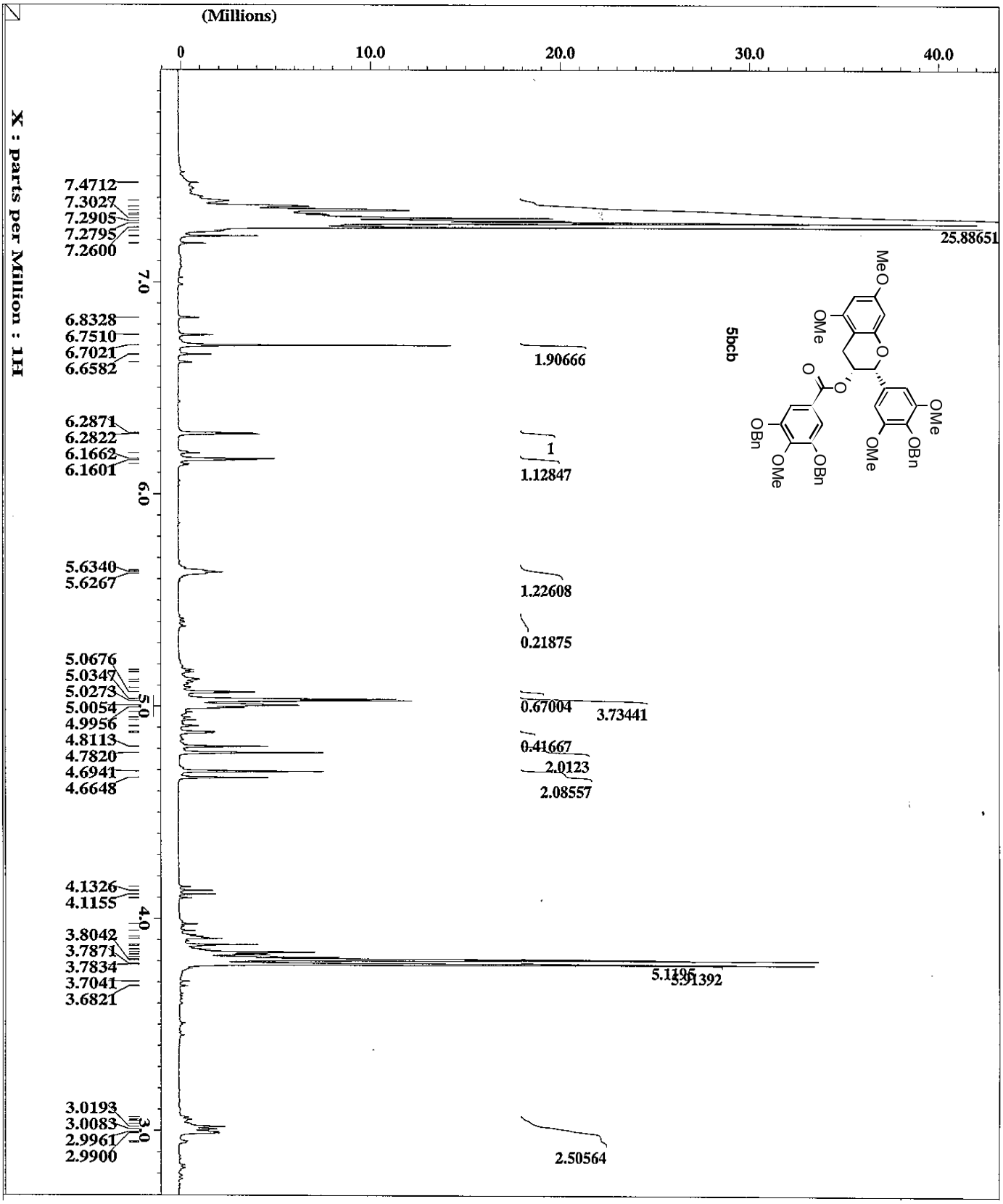

OMe
OBn
F
O
O
F
O
O
OMe
OMe
OBn
5aee
(Billions)
4.0
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
158.7198
157.9706
153.1771
151.8010
149.5915
148.2001
143.1772
129.0489
128.7202
128.5979
127.7645
127.2752
115.7005
115.6622
115.4864
115.4482
101.1517
94.7833
93.9652
77.4211
77.1000
71.0679
71.0450
61.0298
56.3204
55.8387
26.2137
X : parts per Million : 13C

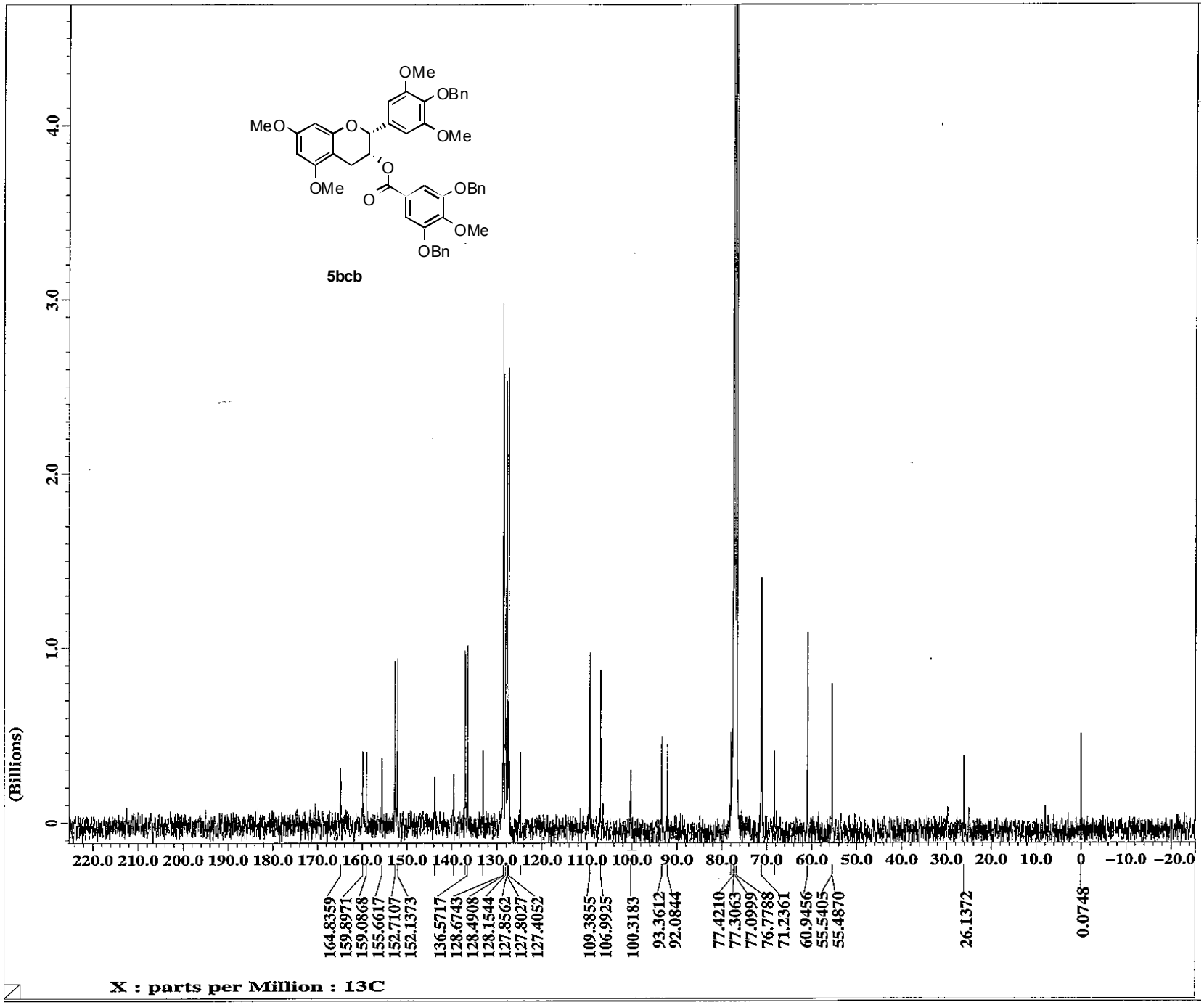

(Millions)
0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0 22.0 24.0 26.0 28.0 30.0
X : parts per Million : 1H
7.3711
7.3564
7.3381
7.3210
7.3076
7.2881
7.2747
7.2710
7.2600
7.0610
7.0488
7.0
6.3323
6.2664
6.2602
6.1479
6.0
5.6011
5.4680
5.4192
5.1055
5.0920
5.0835
5.0554
4.9834
5.0
4.7991
4.7161
4.5537
3.9580
3.8848
3.8335
3.8140
3.7895
4.0
3.0791
3.0681
3.0596
3.0522
3.0
41.234
1.21784
9.03424
1.0444
1.60648
5.21833m
1.19193
1.29596
0.12582
13.39987
1.10105
1.14277
3.13463
3.10283
5afe
2.64199
F
F
O
O
O
O
O
O
OBn
OBn
OBn
OMe
OMe

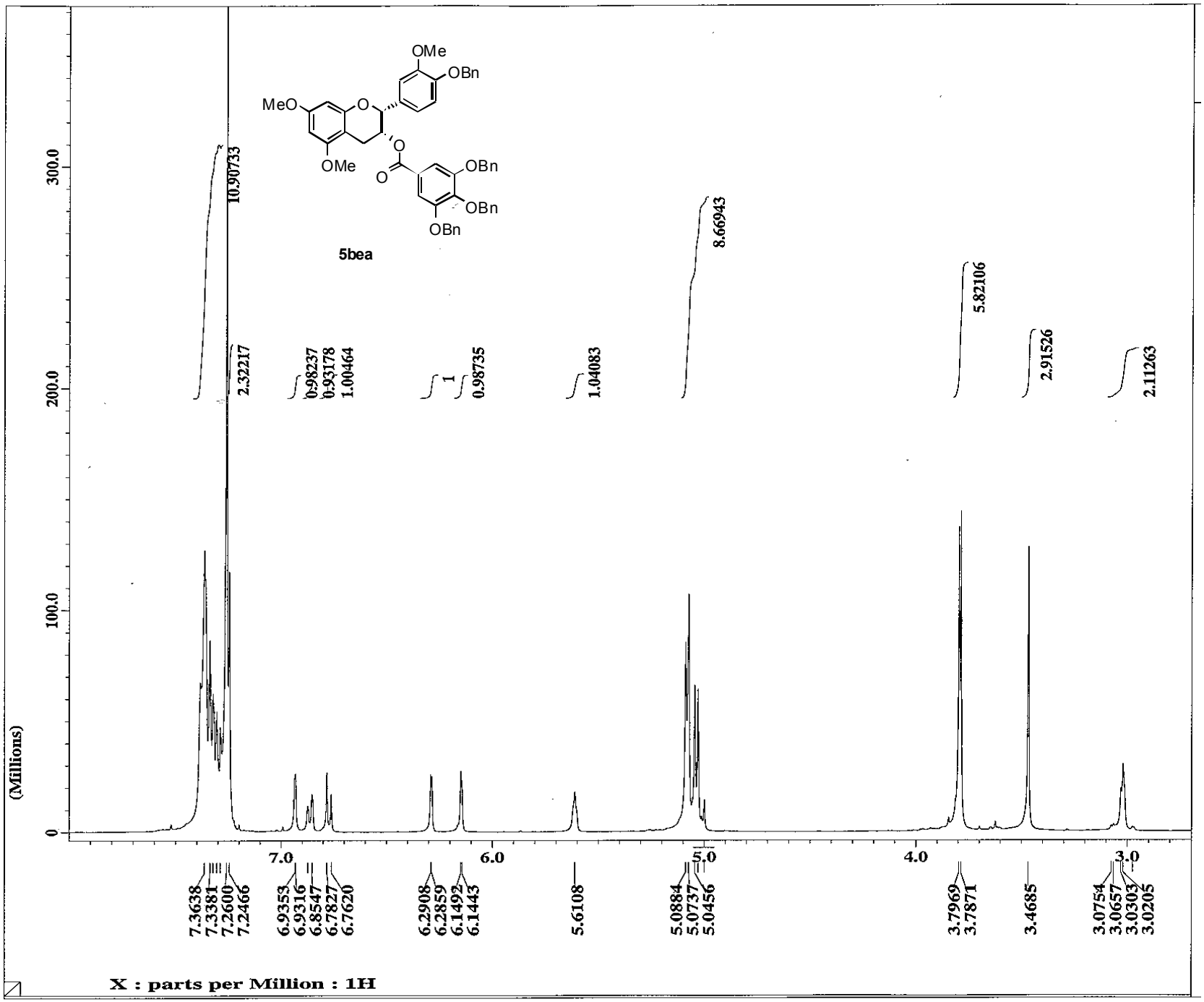

(Billions)
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
158.7276
157.9631
155.8377
153.1849
151.8164
149.0794
143.1391
128.7280
128.5292
128.4374
127.8029
127.4512
127.2983
115.6700
109.0875
107.3520
101.1289
94.7604
93.9577
77.4212
77.1001
71.3050
69.5696
60.9688
56.3128
26.1450
0.0826
X : parts per Million : 13C
OBn
OBn
F
O
O
F
O
O
O
OMe
OMe
OBn
5afe

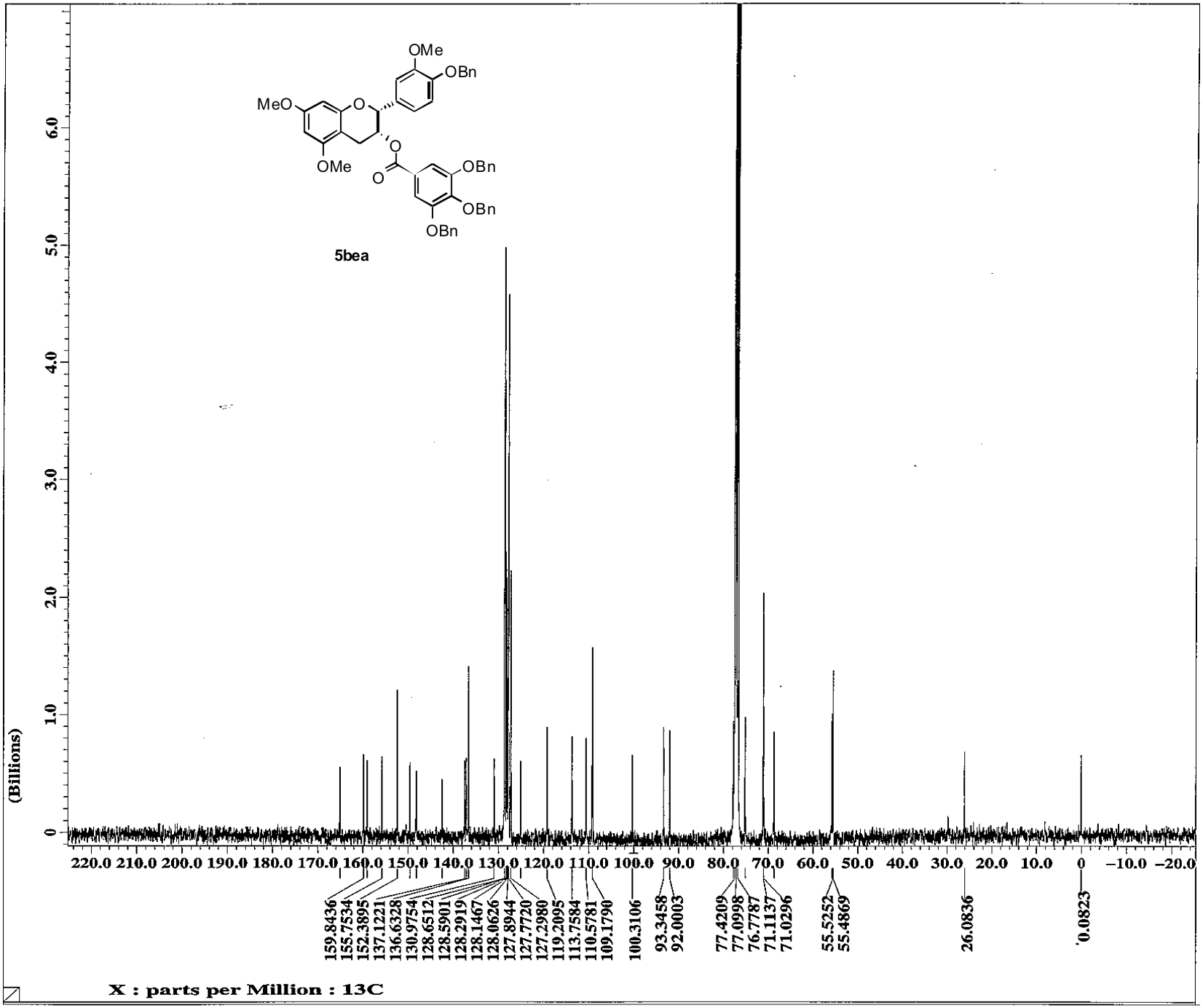

OBn
OBn
OBn
MeO
O
OMe
O
O
OMe
OMe
OBn
5bae
35.79764
12.06605
5.81565
2.05273
1.76319
1.18349
59.73382m
0.8745
2.55992
(Millions)
30.0
20.0
10.0
0
7.0
6.0
5.0
4.0
3.0
7.3125
7.3003
7.2942
7.2869
7.2600
6.7607
6.7265
6.7229
6.2822
6.2761
6.1601
6.1540
5.6597
5.6560
5.6462
5.0530
4.9785
4.9675
4.8406
4.7368
4.7075
3.8213
3.8091
3.7969
3.7871
3.7749
3.0791
3.0449
3.0327
3.0229
X : parts per Million : 1H

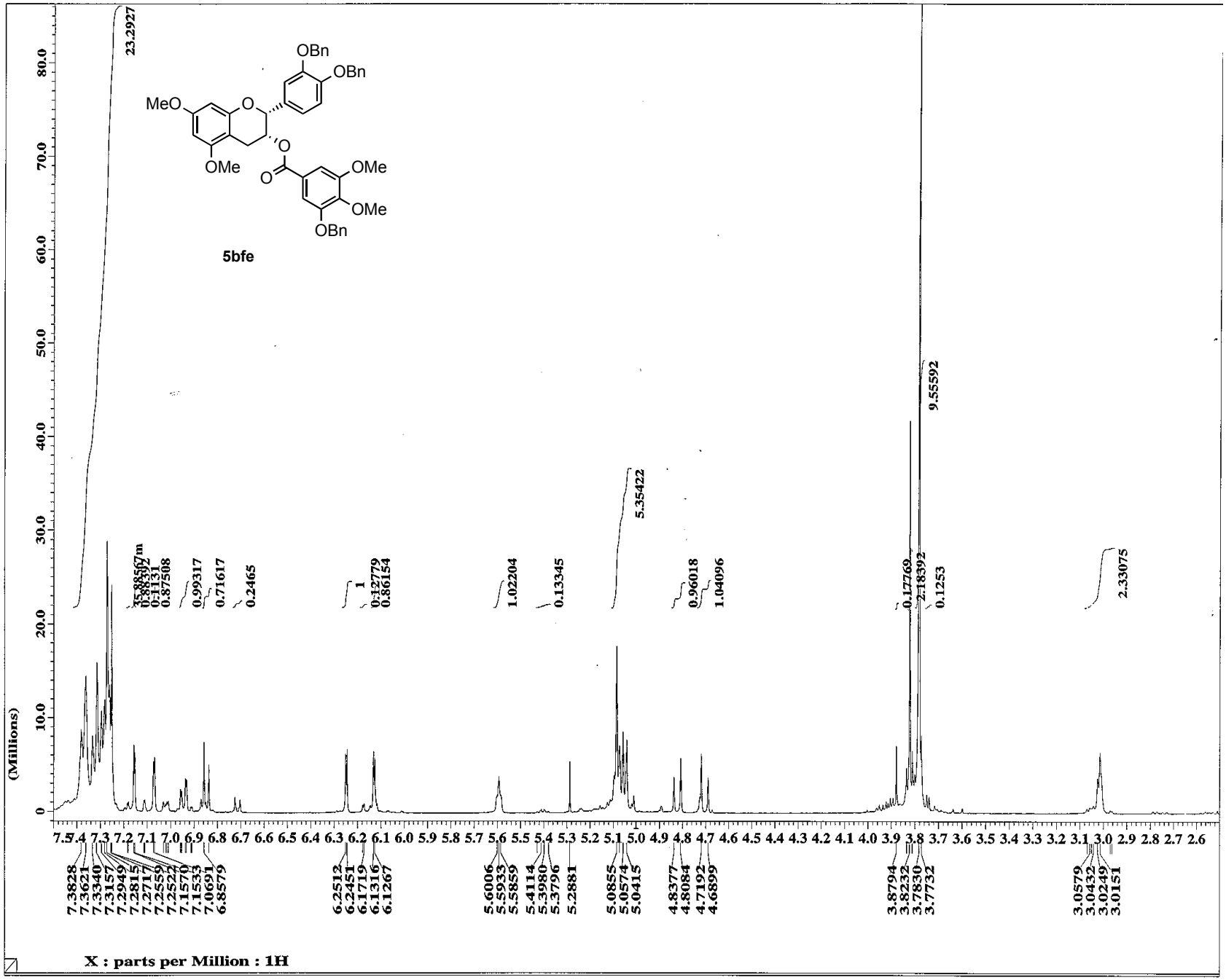

OBn
OBn
OBn
MeO
O
OMe
O
O
OMe
OMe
OBn
5bae
(Billions)
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
164.9889
159.8972
159.0486
153.2307
152.9783
151.8469
128.6820
128.6132
128.5750
128.4603
128.1698
127.9022
127.5352
107.4743
106.9009
100.3107
93.3766
92.0769
77.4211
77.1000
76.7789
75.2193
71.3967
56.3586
55.5330
55.4947
26.0302
0.0749
X : parts per Million : 13C


(Millions)
0
10.0
20.0
30.0
40.0
X : parts per Million : 1H
7.4712
7.3027
7.2905
7.2795
7.2600
25.88651
6.8328
6.7510
6.7021
6.6582
1.90666
6.2871
6.2822
6.1662
6.1601
1
1.12847
5.6340
5.6267
1.22608
0.21875
5.0676
5.0347
5.0273
5.0054
4.9956
4.8113
4.7820
4.6941
4.6648
0.67004
3.73441
0.41667
2.0123
2.08557
4.1326
4.1155
3.8042
3.7871
3.7834
3.7041
3.6821
5.1195
5.11392
3.0193
3.0083
2.9961
2.9900
2.50564
5bcb
MeO
OMe
OBn
OMe
OBn
OMe
OBn
OMe


OMe
OBn
MeO
O
OMe
OMe
O
O
OBn
OMe
OBn
5bcb
(Billions)
4.0
3.0
2.0
1.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
164.8359
159.8971
159.0868
155.6617
152.7107
152.1373
136.5717
128.6743
128.4908
128.1544
127.8562
127.8027
127.4052
109.3855
106.9925
100.3183
93.3612
92.0844
77.4210
77.3063
77.0999
76.7788
71.2361
60.9456
55.5405
55.4870
26.1372
0.0748
X : parts per Million : 13C


OMe
OBn
MeO
O
OMe
O
O
OBn
OBn
OBn
5bea
(Millions)
300.0
200.0
100.0
0
10.90733
2.32217
0.98237
0.93178
1.00464
1
0.98735
1.04083
8.66943
5.82106
2.91526
2.11263
7.0
6.0
5.0
4.0
3.0
7.3638
7.3381
7.2600
7.2466
6.9353
6.9316
6.8547
6.7827
6.7620
6.2908
6.2859
6.1492
6.1443
5.6108
5.0884
5.0737
5.0456
3.7969
3.7871
3.4685
3.0754
3.0657
3.0303
3.0205
X : parts per Million : 1H


OMe
OBn
MeO
O
O
OMe
O
OBn
OBn
OBn
5bea
(Billions)
0
1.0
2.0
3.0
4.0
5.0
6.0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
159.8436
155.7534
152.3895
137.1221
136.6328
130.9754
128.6512
128.5901
128.2919
128.1467
128.0626
127.8944
127.7720
127.2980
119.2095
113.7584
110.5781
109.1790
100.3106
93.3458
92.0003
77.4209
77.0998
76.7787
71.1137
71.0296
55.5252
55.4869
26.0836
0.0823
X : parts per Million : 13C


OBn
OBn
MeO
O
O
OMe
O
OMe
OMe
OBn
5bfe
(Millions)
X : parts per Million : 1H

OBn
OBn
MeO
O
O
OMe
O
OMe
OMe
OBn
5bfe
(Millions)
600.0
500.0
400.0
300.0
200.0
100.0
0
220.0 210.0 200.0 190.0 180.0 170.0 160.0 150.0 140.0 130.0 120.0 110.0 100.0 90.0 80.0 70.0 60.0 50.0 40.0 30.0 20.0 10.0 0 −10.0 −20.0
165.1648
159.8284
159.0104
155.6695
149.0793
143.0626
137.2599
128.6973
128.5062
128.4144
128.1545
127.8257
127.7646
127.4435
127.2982
100.2572
93.3078
91.9546
77.1000
76.7789
71.4120
71.3050
56.2898
55.5024
55.4718
25.9232
X : parts per Million : 13C