SUPPLEMENTARY INFORMATION

The first C-glycosidic analogue of a novel galactosyltransferase inhibitor

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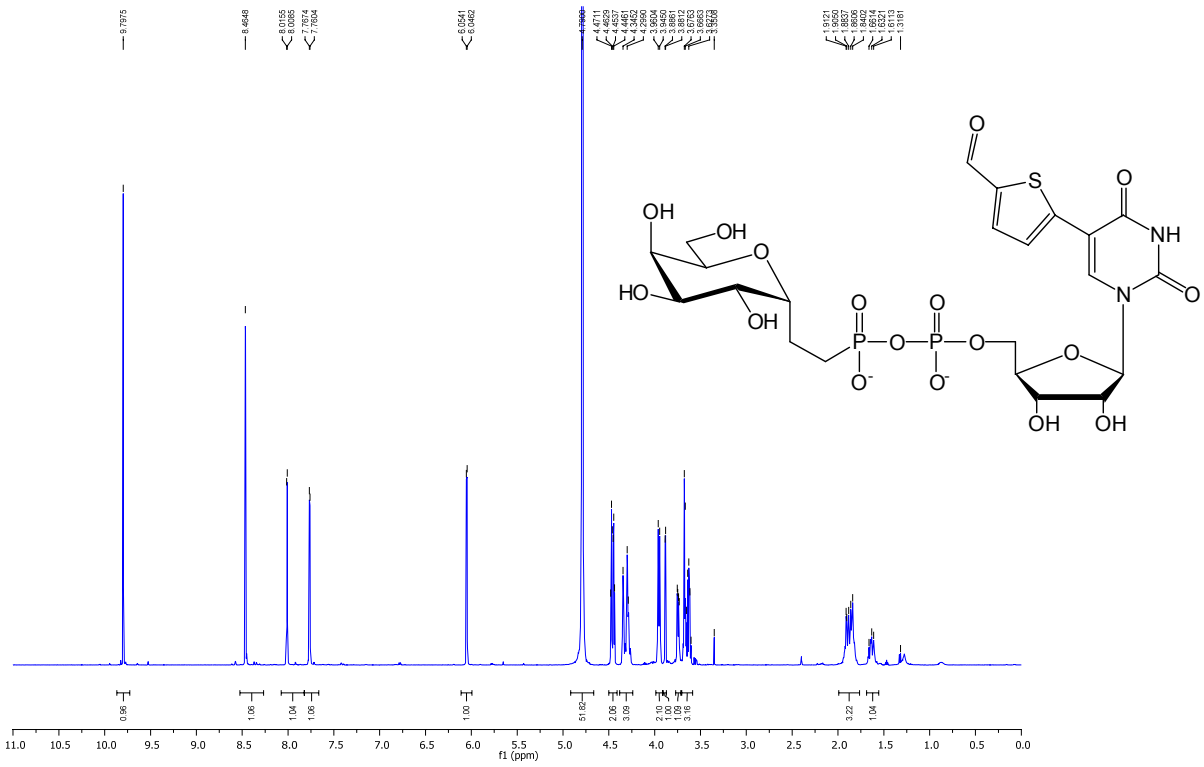
Galactose pentaacetate and galactosyl bromide **4** were prepared, with modifications, as described by M.L. Wolfrom and A. Thompson in: "Methods in Carbohydrate Chemistry Vol. II", R.L. Whistler, M.L. Wolfrom and J.N. BeMiller (Eds), Academic Press, New York, 1963, pp. 211–215:

1,2,3,4,6-penta-*O*-acetyl-(α,β)-D-galactopyranose. Acetic anhydride acetic (70 mL, 740.5 mmol) was added dropwise to a solution of α-D-galactose (5.0 g, 27.8 mmol) in anhydrous pyridine (70 mL). The reaction was stirred under nitrogen for 20 hours at room temperature, at which point TLC showed the complete disappearance of starting material. The mixture was concentrated under reduced pressure, and volatiles were removed by repeated co-evaporation with toluene. The residue was purified by column chromatography (cyclohexane/EtOAc, 6:4) to give a mixture of anomers (α:β = 3:1) of the title compound as a colourless oil (10.5 g, 97%): R_f 0.6 (cyclohexane/EtOAc 1:1); δ_H (400 MHz, $CDCl_3$) 6.34 (d, $1H_\alpha$, $J_{1,2}$ 1.6 Hz, H-1α), 5.66 (d, $1H_\beta$, $J_{1,2}$ 1.6 Hz, H-1β), 5.46 (dd, $1H_\alpha$, $J_{3,4}$ < 1.0 Hz, $J_{4,5}$ 1.2 Hz, H-4α), 5.46 (dd, $1H_\beta$, $J_{3,4}$ 3.4 Hz, $J_{4,5}$ < 1.0 Hz, H-4β), 5.33-5.27 (m, $2H_\alpha$.and $1H_\beta$, H-2α, H-3α, H-2β), 5.04 (dd, $1H_\beta$, $J_{2,3}$ 10.4 Hz, H-3β), 4.31 (dt, $1H_\alpha$, $J_{5,6}$ 6.6 Hz, H-5α), 4.15-4.00 (m, $2H_\alpha$.and $3H_\beta$, H-6aα, H-6bα, H-5β, H-6aβ, H-6bβ), 2.12, 2.08, 2.00, 1.98, 1.96, 1.95 (all s, $5H_\alpha$ and $5H_\beta$, 10× C(O)C$\underline{H}_3$); δ_C (100 MHz, $CDCl_3$) 170.6, 170.4, 170.1, 169.2, 167.2 (5× C=O), 92.3 (C-1β), 89.9 (C-1α), 71.8 (C-5β), 71.0 (C-3β), 68.9 (C-5α), 67.9 (C-2β), 67.5 (C-3α and C4α), 66.9 (C-4β), 66.6 (C-2α), 61.4 (C-6α), 61.2(C-6β), 21.1, 21.0, 20.9, 20.9, 20.8 (5× C(O)$\underline{C}H_3$).

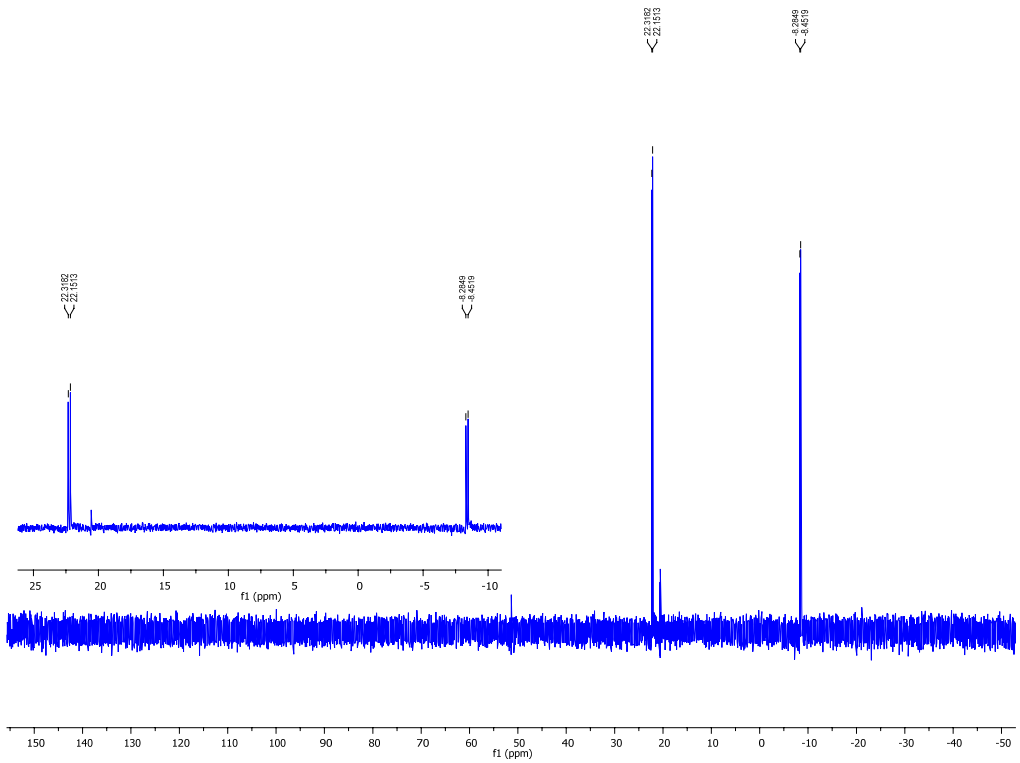
2,3,4,6-tetra-*O*-acetyl-α-D-galactopyranosyl bromide (4). At 0 ºC, a solution of hydrogen bromide in acetic acid (33%, 5 mL) was added dropwise to 1,2,3,4,6-penta-*O*-acetyl-(α,β)-D-galactopyranose (500 mg, 1.28 mmol). After stirring for 2 hours at room temperature, dichloromethane (30 mL) was added to the reaction. The solution was carefully washed with ice-cold water, and the organic layer was dried over $MgSO_4$. The solvent was evaporated under vacuum to afford 1.04 g (98%) of galactosyl bromide **3**: R_f 0.45 (cyclohexane/EtOAc 2:1); δ_H (400 MHz, $CDCl_3$) 6.70 (d, 1H, $J_{1,2}$ 3.6 Hz, H-1), 5.52 (dd, 1H, $J_{3,4}$ 3.2 Hz, $J_{4,5}$ 1.2 Hz, H-4), 5.41 (dd, 1H, $J_{2,3}$ 10.4 Hz, H-3), 5.05 (dd, 1H, H-2), 4.49 (m, 1H, H-5), 4.19 (dd, 1H, $J_{6a,6b}$ 11.6 Hz, $J_{5,6}$ 6.0 Hz, H-6a), 4.04 (dd, 1H, $J_{5,6b}$ 6.8 Hz, H-6b), 2.15, 2.12, 2.06, 2.02 (all s, 12H, 4× C(O)C$\underline{H}_3$); δ_C (100 MHz, $CDCl_3$) 167.2 (4× C=O), 88.3 (C-1), 71.2 (C-5), 68.2, 67.9 (C-3/C-4), 67.2 (C-2), 61.0 (C-6), 20.9, 20.8 (4× C(O)$\underline{C}H_3$).

Bis(sodium) [2-(α-D-galactopyranosyl)-ethylphosphono]-5-(5-formylthien-2-yl) uridin-5'-yl phosphate (2)

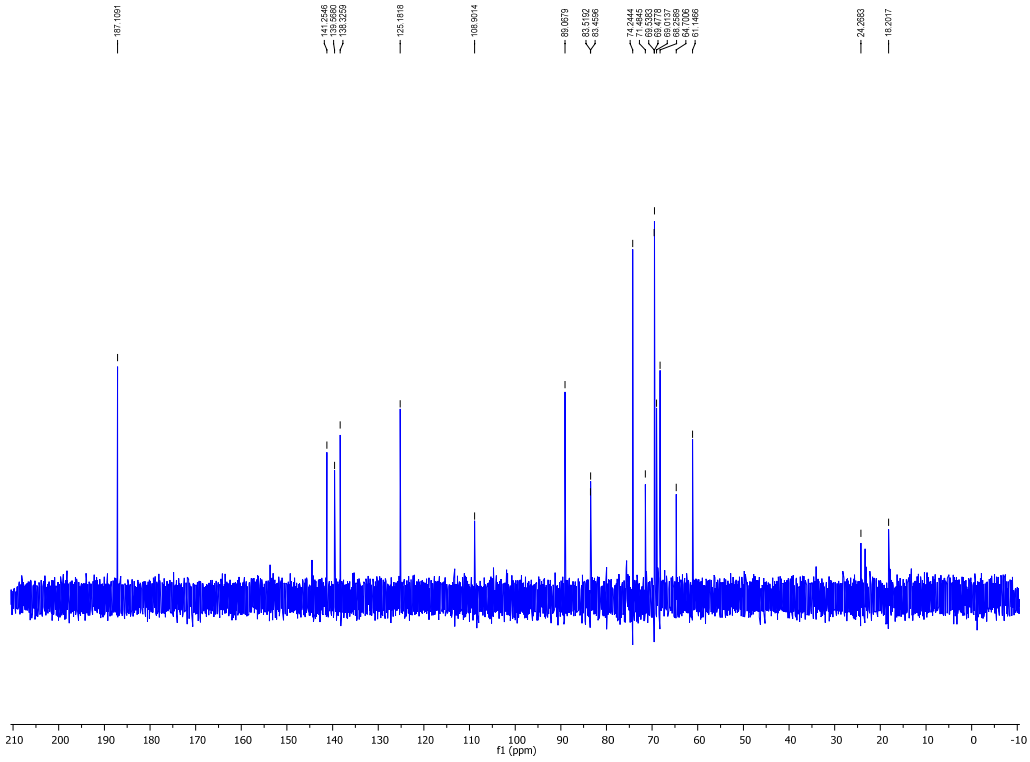
^{1}H NMR (D_2O):



^{31}P NMR (D_2O):



^{13}C NMR (D_2O):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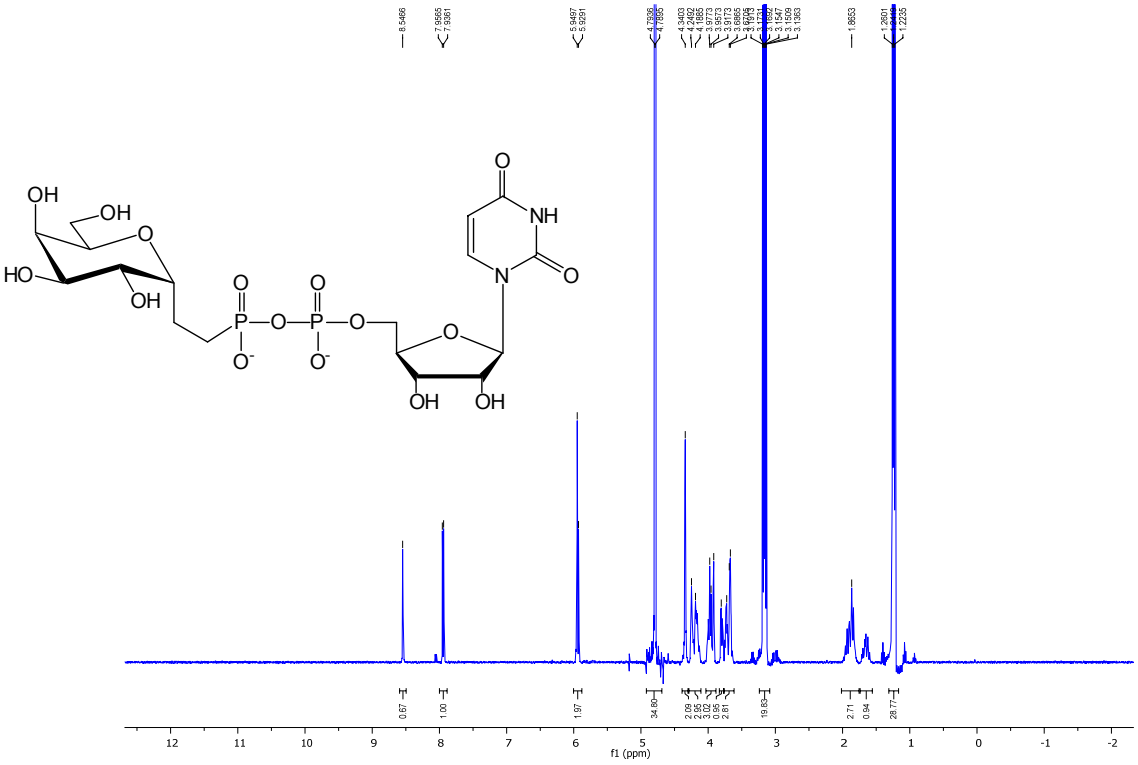
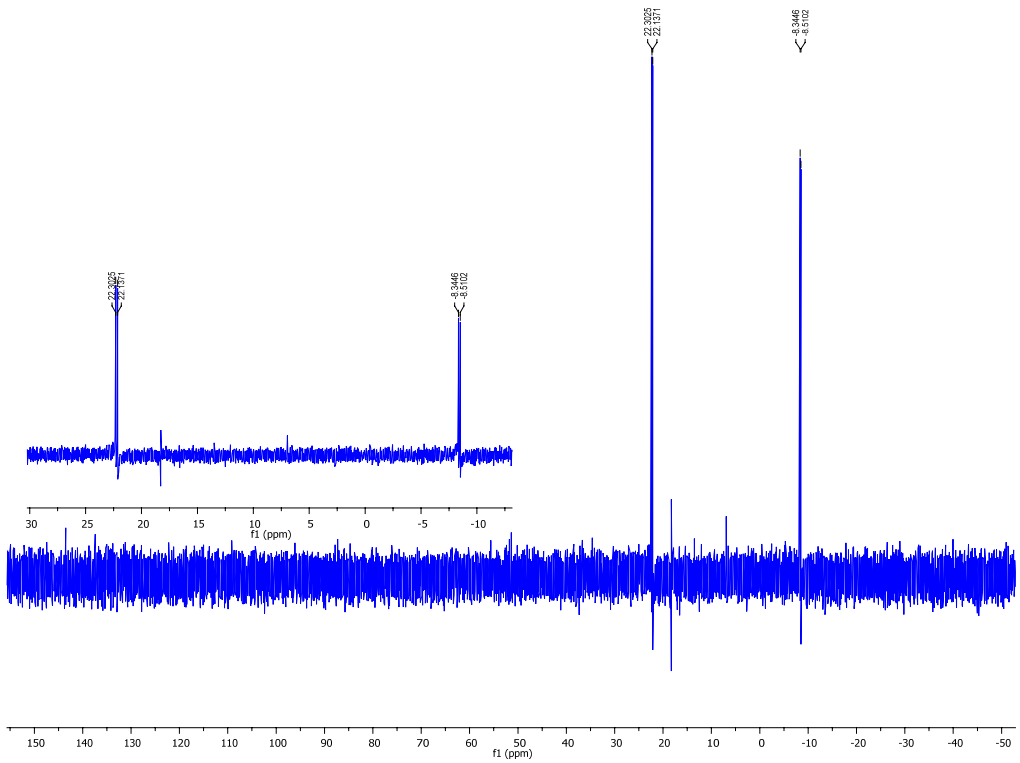
138.3259
125.1818
108.9014
89.0679
83.5192
83.4596
74.2444
71.4845
69.5383
69.4778
69.0137
68.2588
64.7006
61.1466
24.2683
18.2017
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

Bis(triethylammonium) [2-(α-D-galactopyranosyl)-ethylphosphono]uridin-5'-yl phosphate (3)

^{1}H NMR (D_2O):

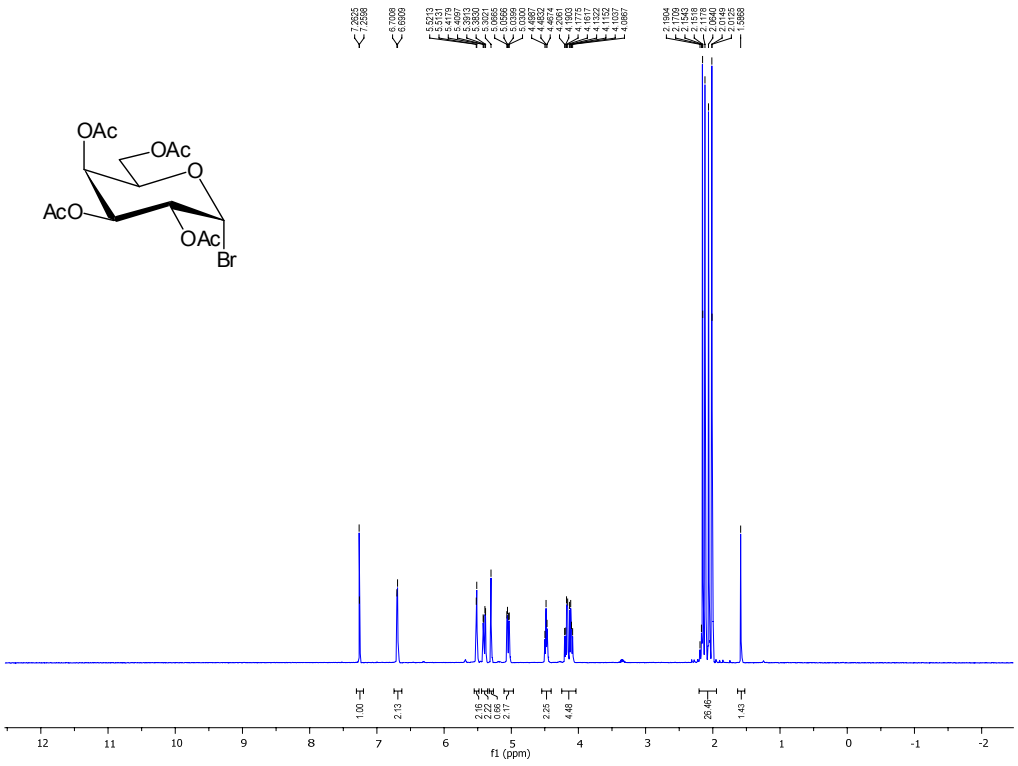


^{31}P NMR (D_2O):

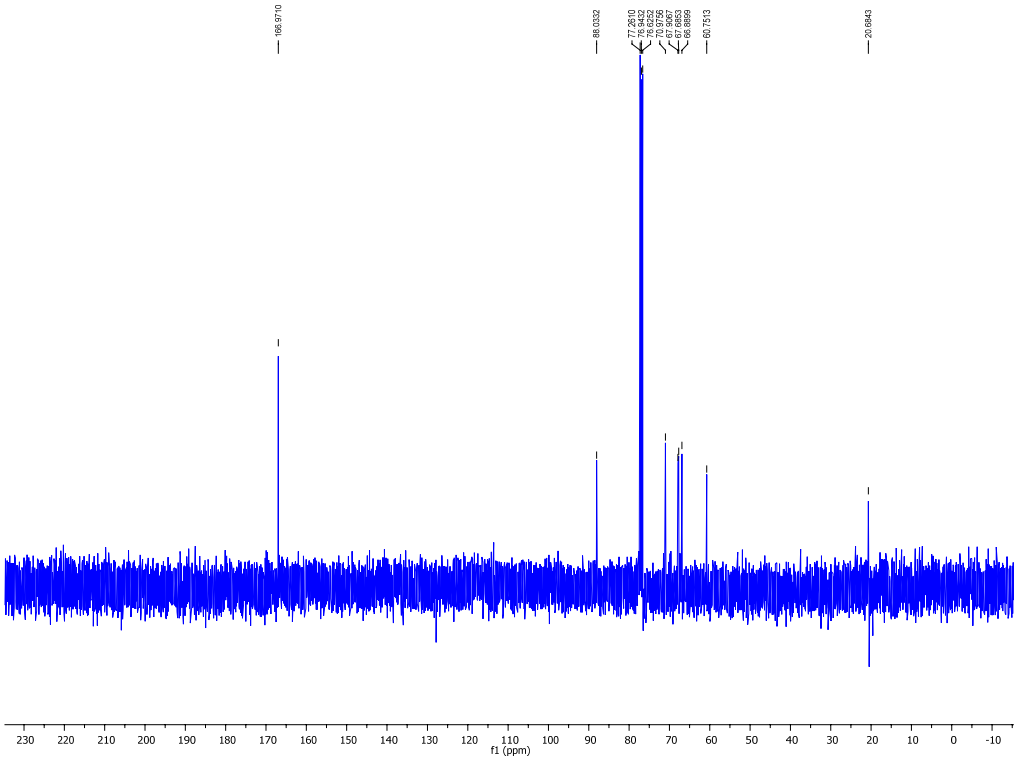


2,3,4,6-Tetra-*O*-acetyl-α-D-galactopyranosyl bromide (4)

^{1}H NMR ($CDCl_3$):

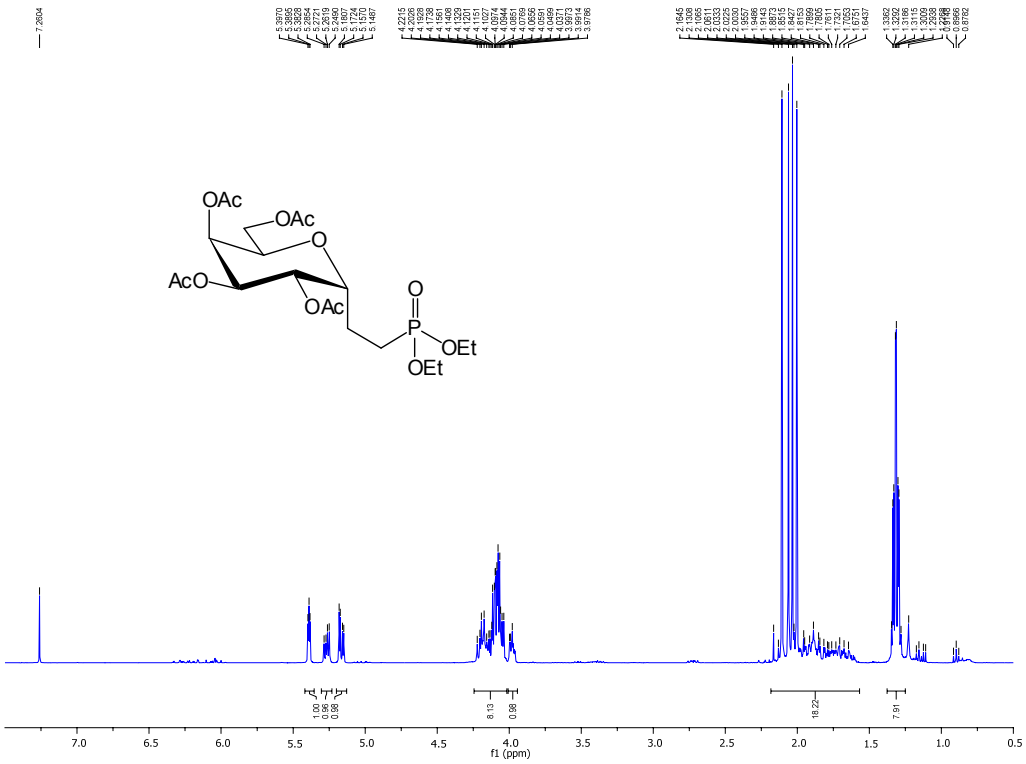


^{13}C NMR ($CDCl_3$):

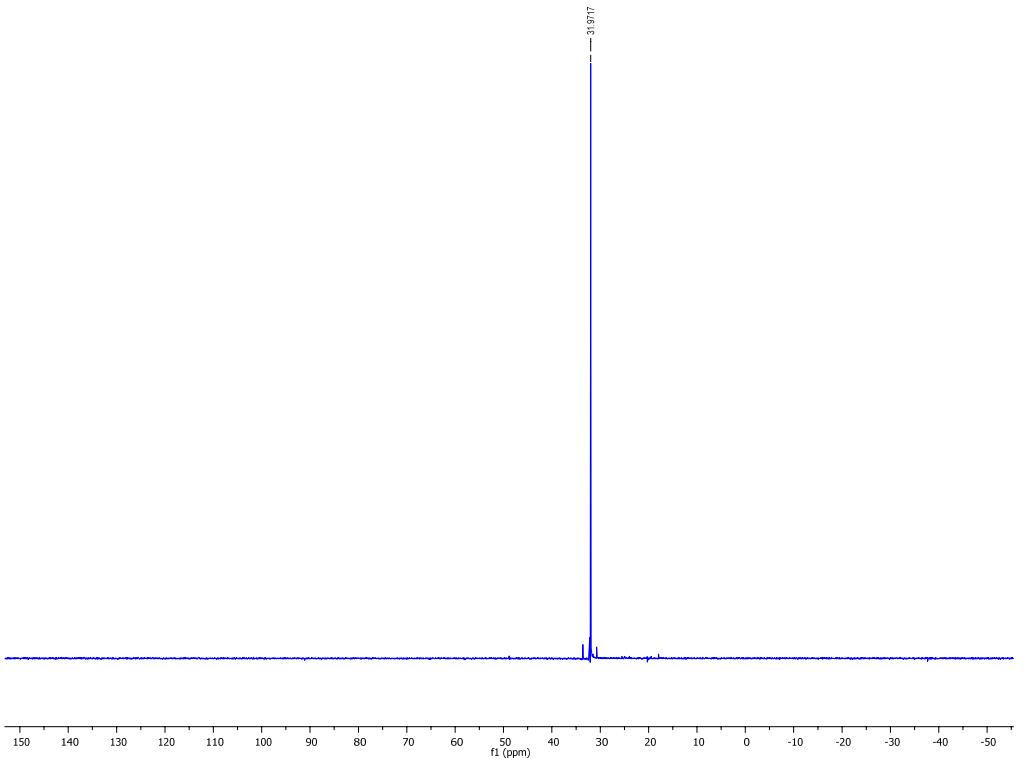


Diethyl 2-(2,3,4,6-tetra-*O*-acetyl-α-D-galactopyranosyl)-ethylphosphonate (5a)

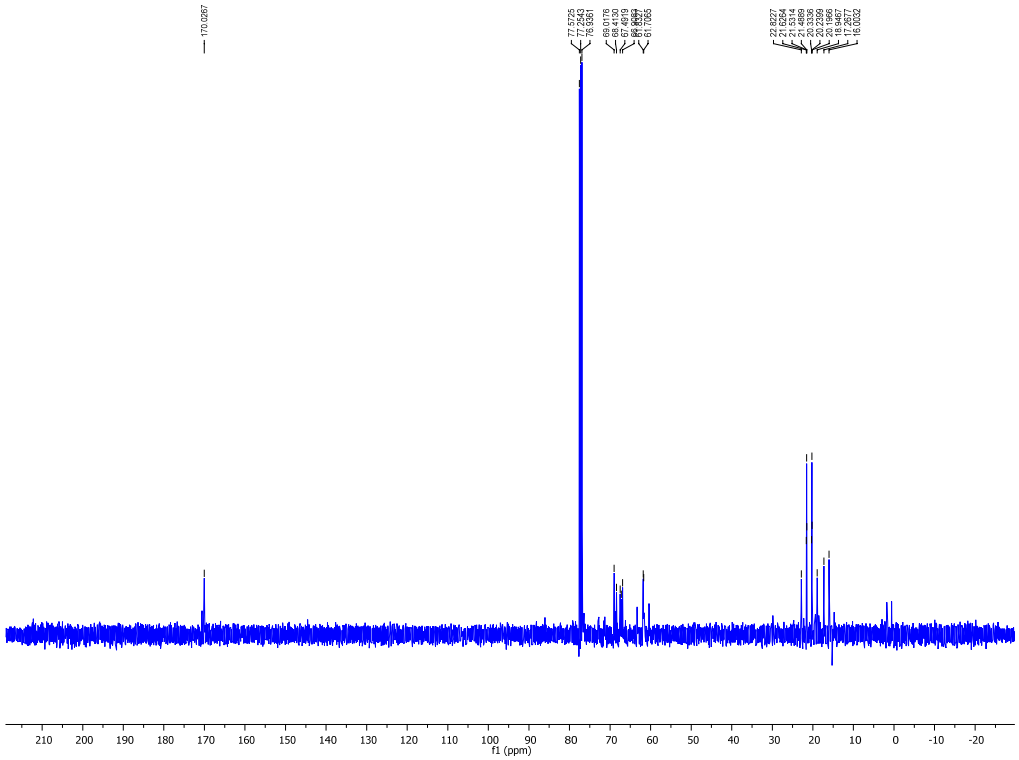
^{1}H NMR ($CDCl_3$):



^{31}P NMR ($CDCl_3$):

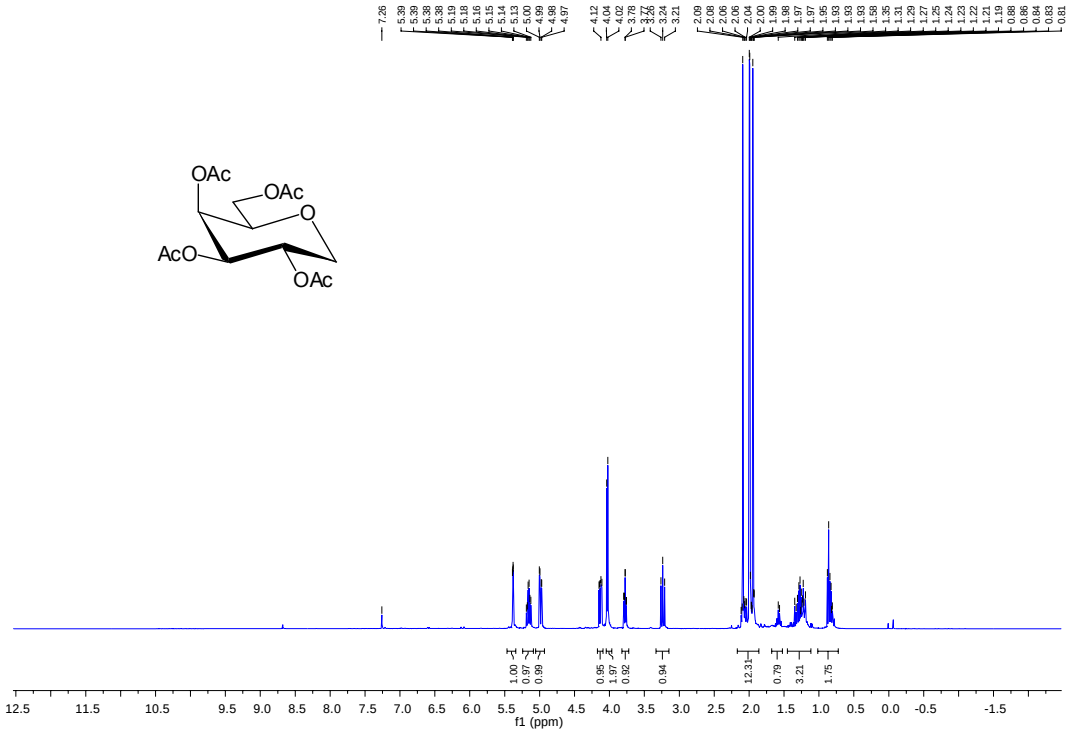


^{13}C NMR ($CDCl_3$):

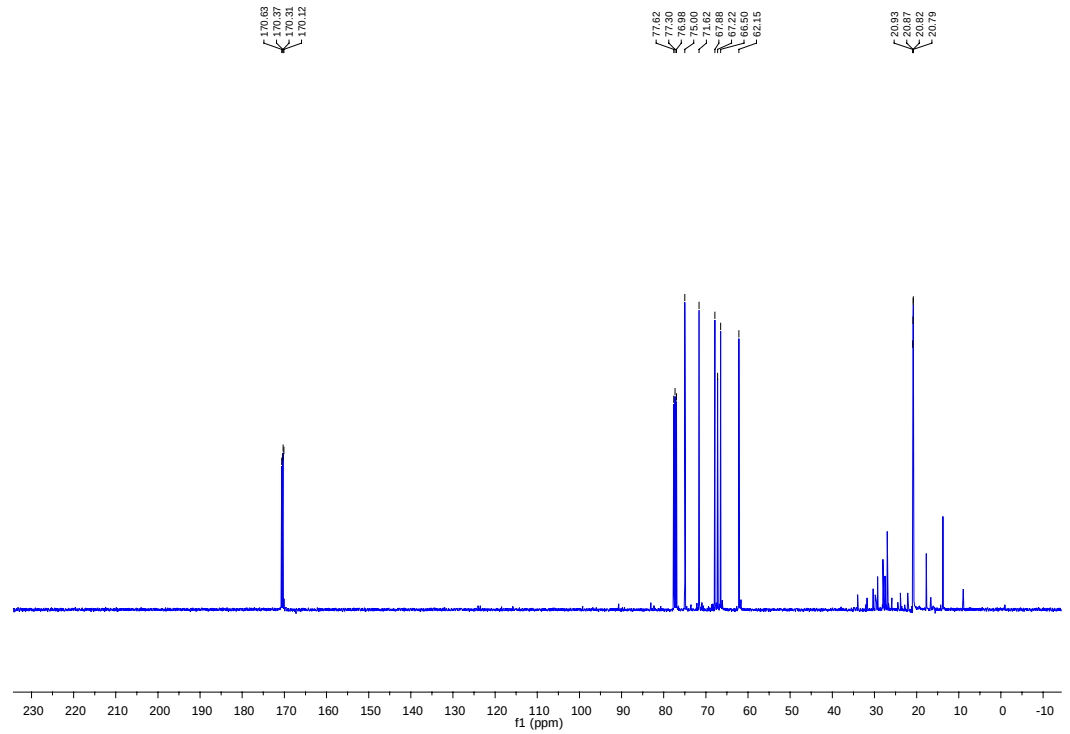


2,3,4,6-Tetra-O-acetyl-α-D-glucopyranose (5b)

^{1}H NMR ($CDCl_3$):

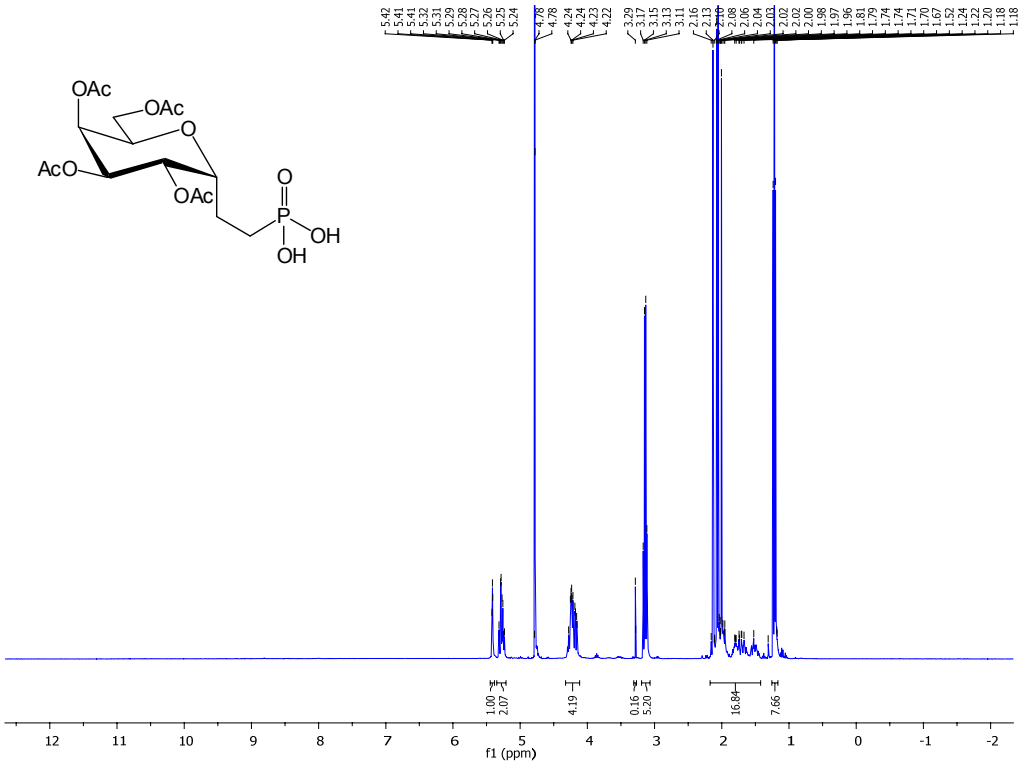


^{13}C NMR ($CDCl_3$):

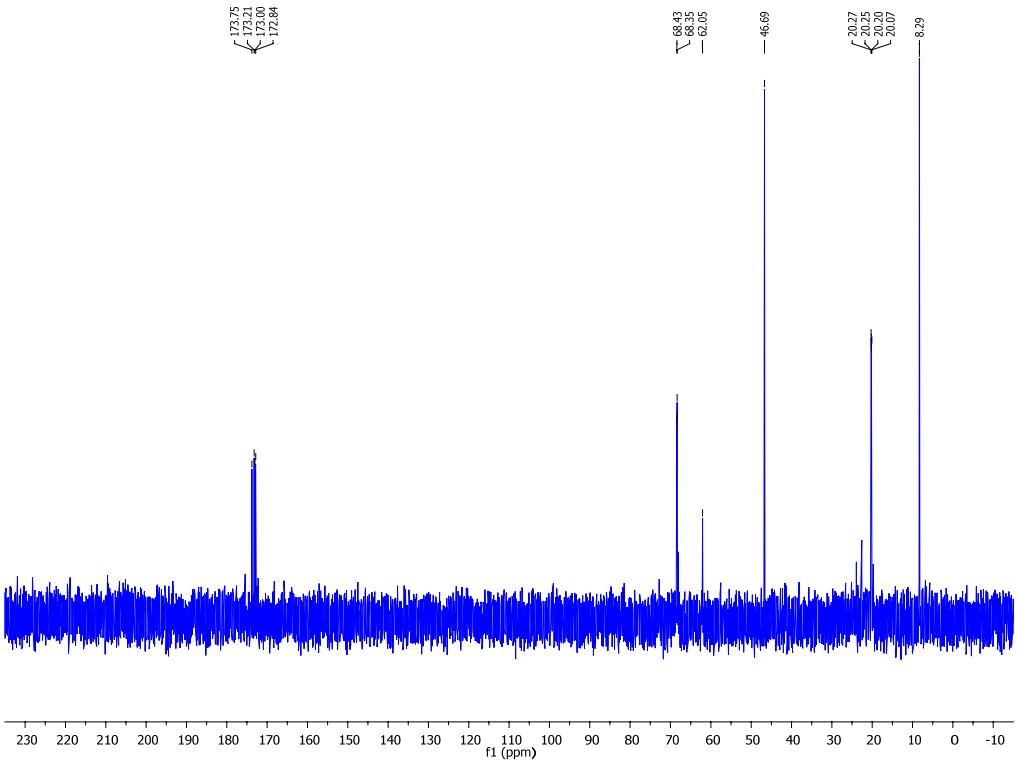


Bis(triethylammonium) 2-(2,3,4,6-tetra-*O*-acetyl-α-D-galactopyranosyl)-ethylphosphonate (6)

^{1}H NMR (D_2O):

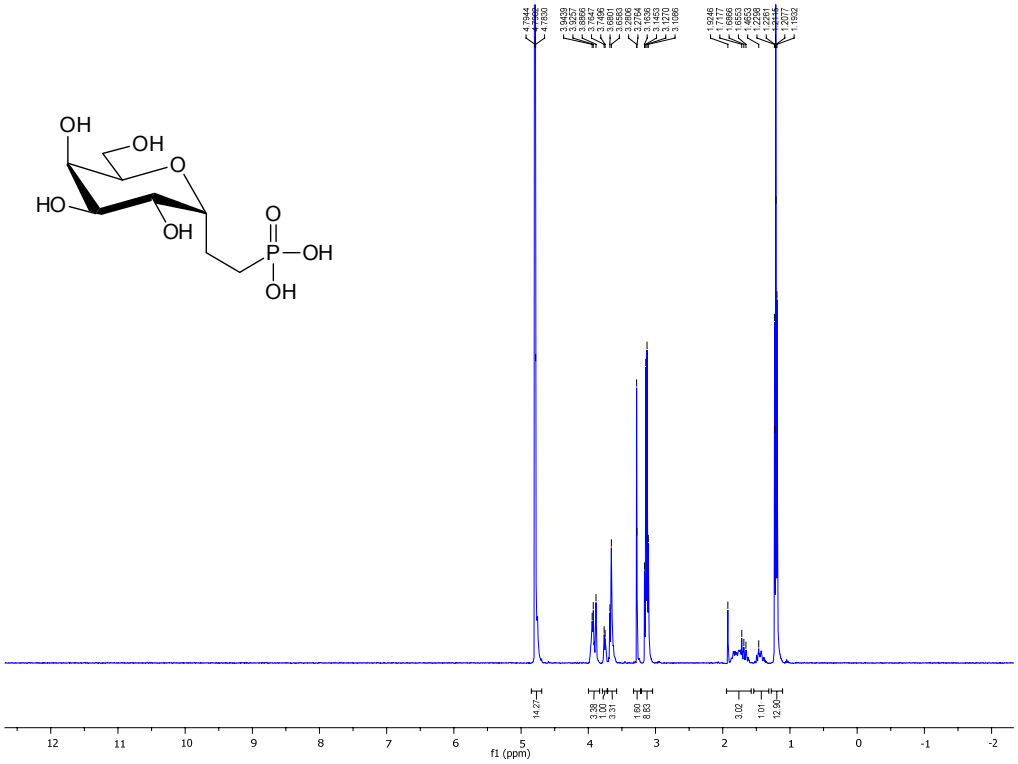


^{13}C NMR (D_2O):

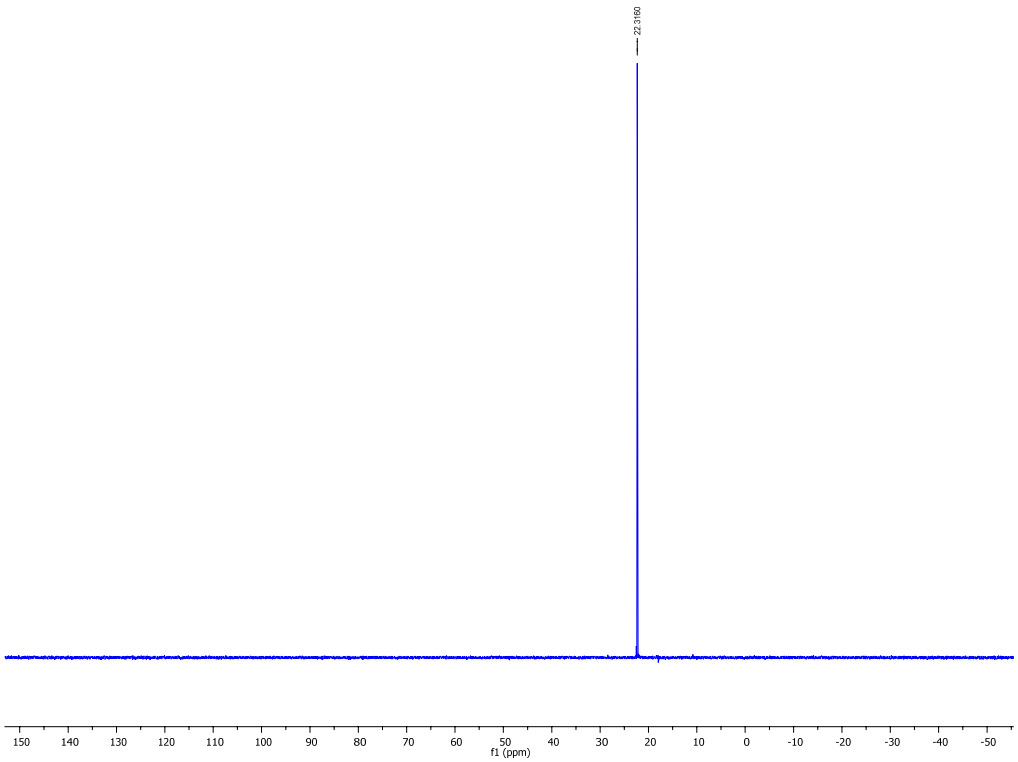


Bis(triethylammonium) 2-(α-D-galactopyranosyl)-ethylphosphonate (7)

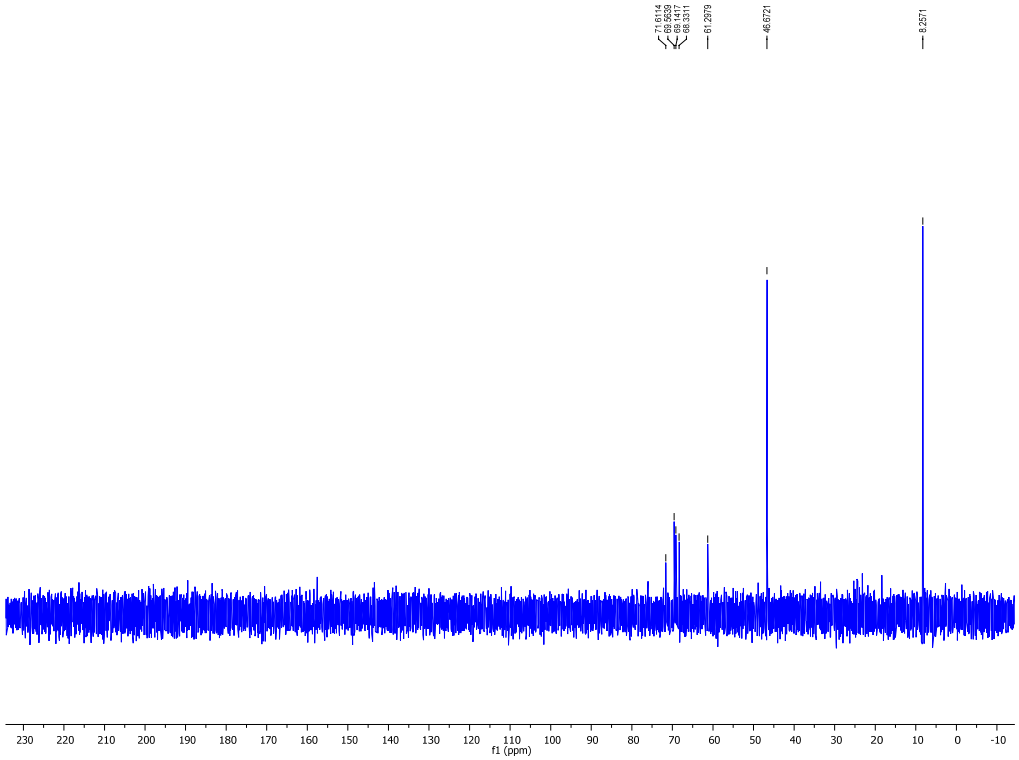
^{1}H NMR (D_2O):



^{31}P NMR (D_2O):

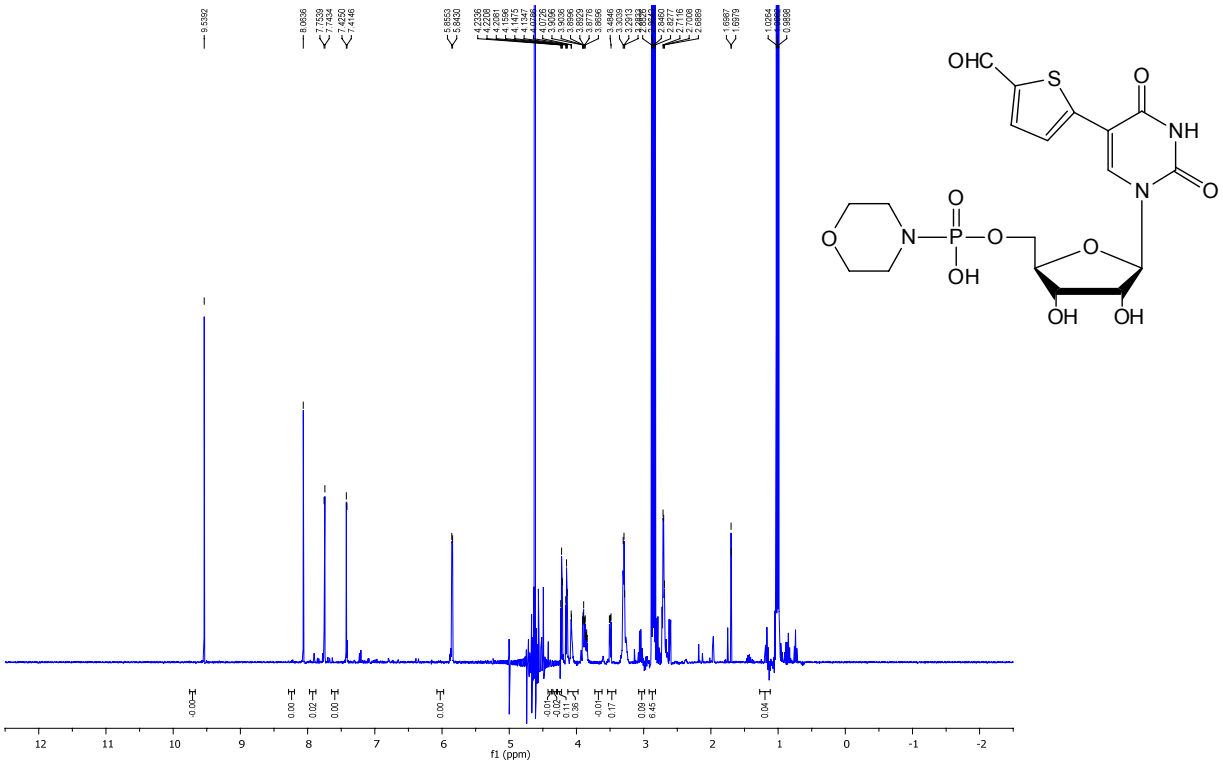


^{13}C NMR (D_2O):

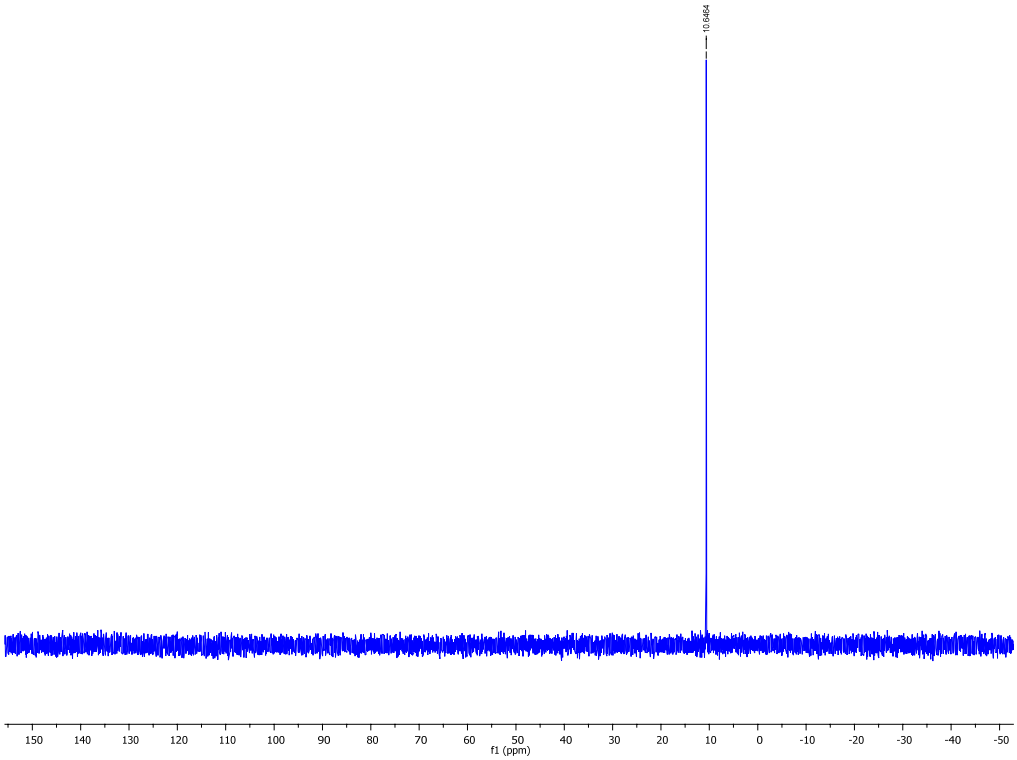

71.6114
69.5569
69.1417
68.3311
61.2979
46.6721
9.2571
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

5-(5-Formylthien-2-yl) UMP phosphoromorpholidate (9)

^{1}H NMR (D_2O):

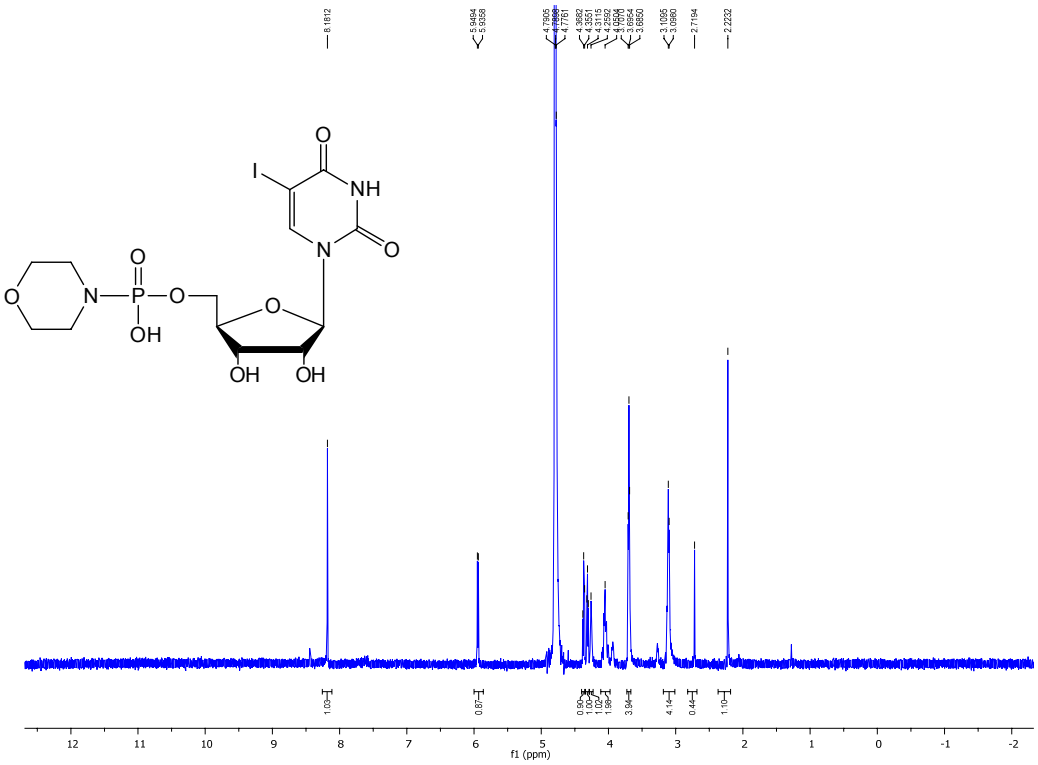


^{31}P NMR (D_2O):

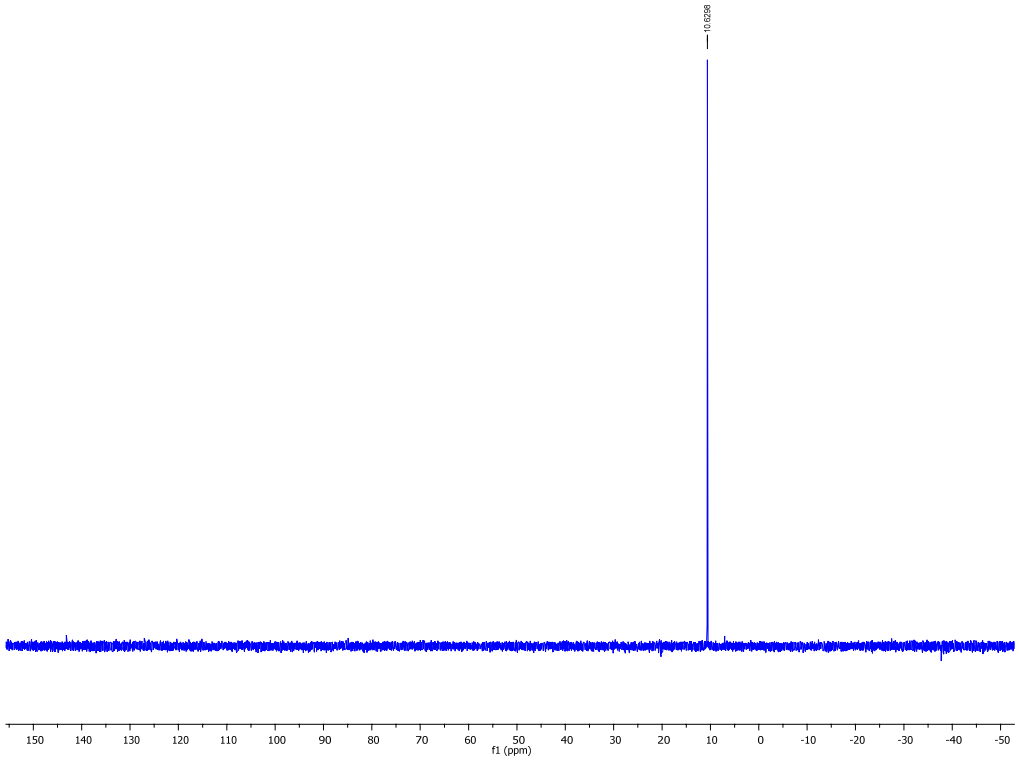


5-Iodo UMP phosphoromorpholidate (11)

^{1}H NMR (D_2O):

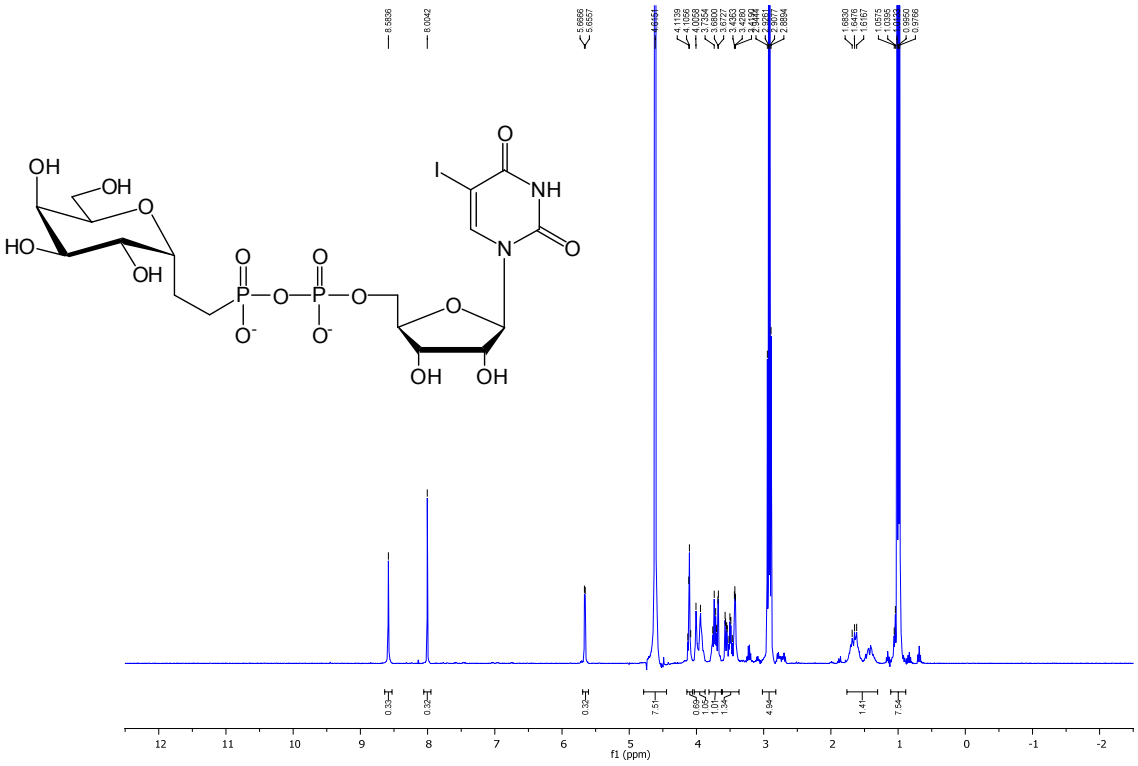


^{31}P NMR (D_2O):

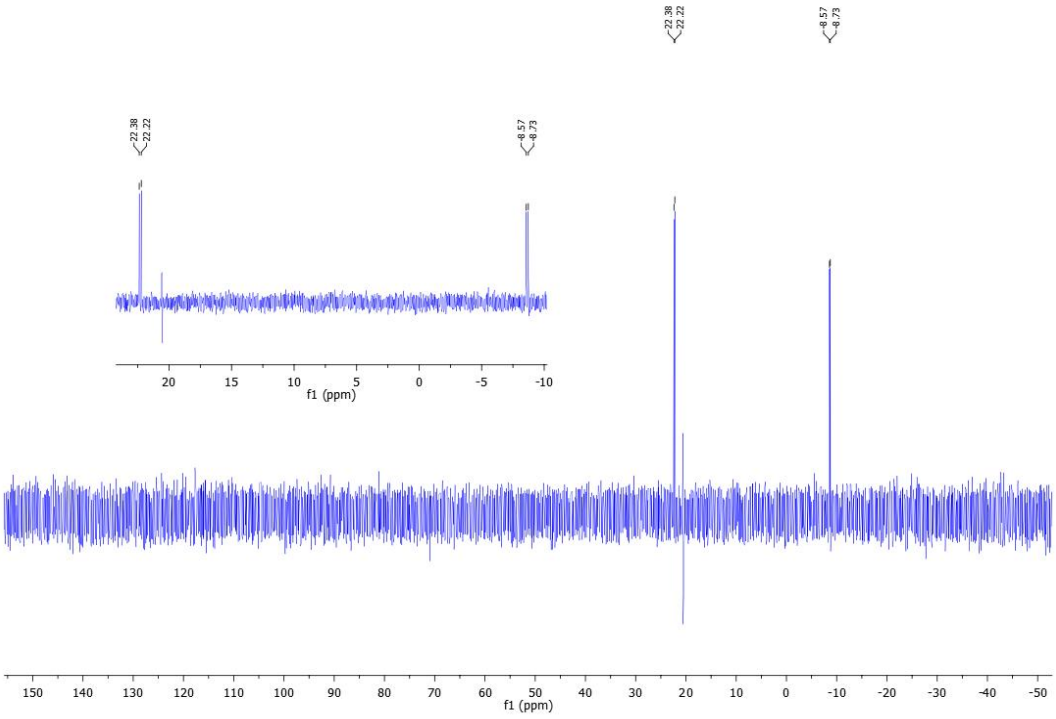


Bis(triethylammonium) [2-(α-D-glucopyranosyl)-ethylphosphono]-5-iodouridin-5'-yl phosphate (12)

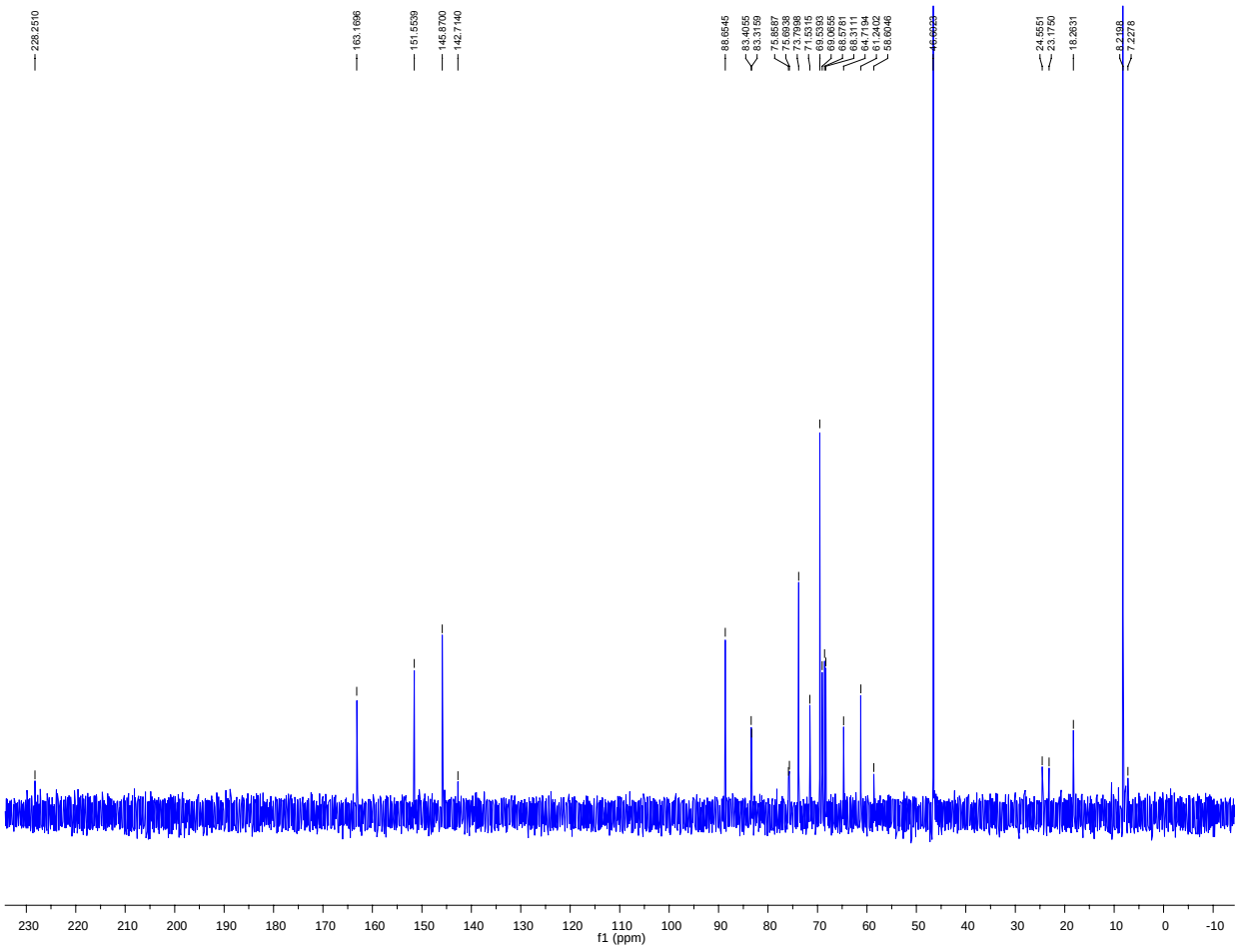
^{1}H NMR (D_2O):



^{31}P NMR (D_2O):



^{13}C NMR (D_2O):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83.3159
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73.7998
71.5315
69.8593
69.0585
68.5781
68.3111
64.7194
61.2402
61.2072
58.6046
46.6925
24.5551
23.1750
18.2631
8.2198
7.2278
230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)