An Alternative Pathway to Ribonucleoside β-Hydroxy-Phosphonate Analogues and Related Prodrugs

Audrey Hospital, Maïa Meurillon, Suzanne Peyrottes & Christian Périgaud*

Institut des Biomolécules Max Mousseron (IBMM), UMR5247 CNRS-UM1-UM2, Nucleosides and Phosphorylated Effectors Team, University Montpellier 2, cc 1705, place Eugène Bataillon, 34095 Montpellier cedex 5, France
suzanne.peyrottes@univ-montp2.fr

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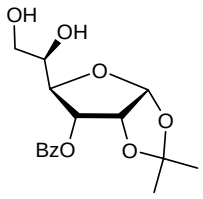
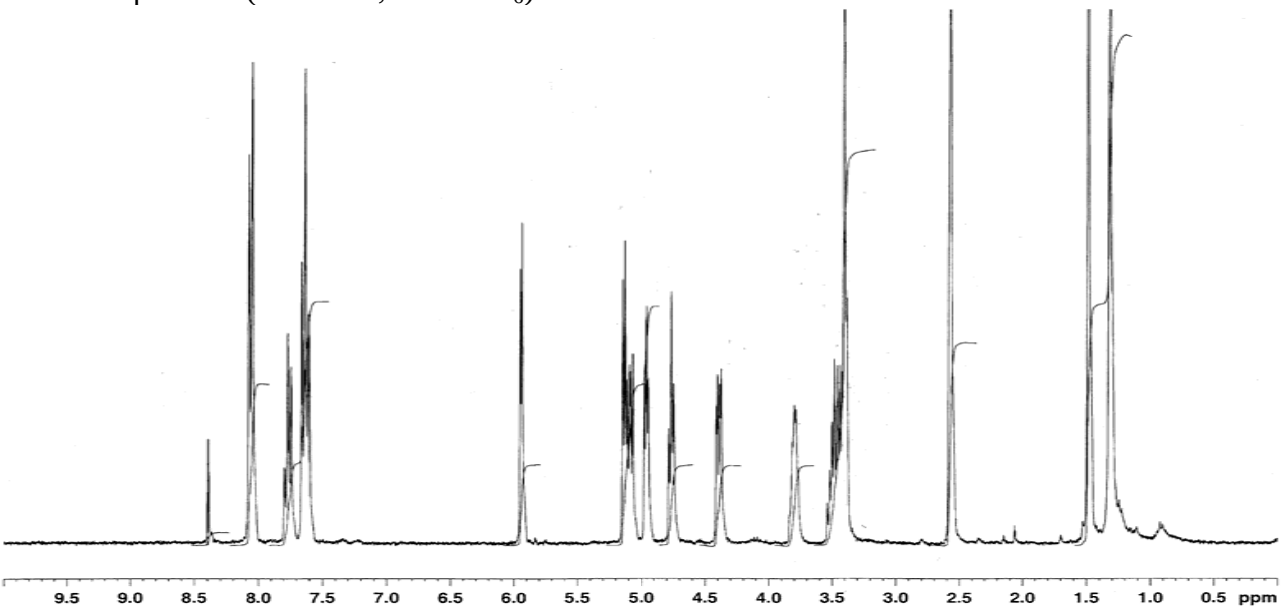
SPECTRAL DATA

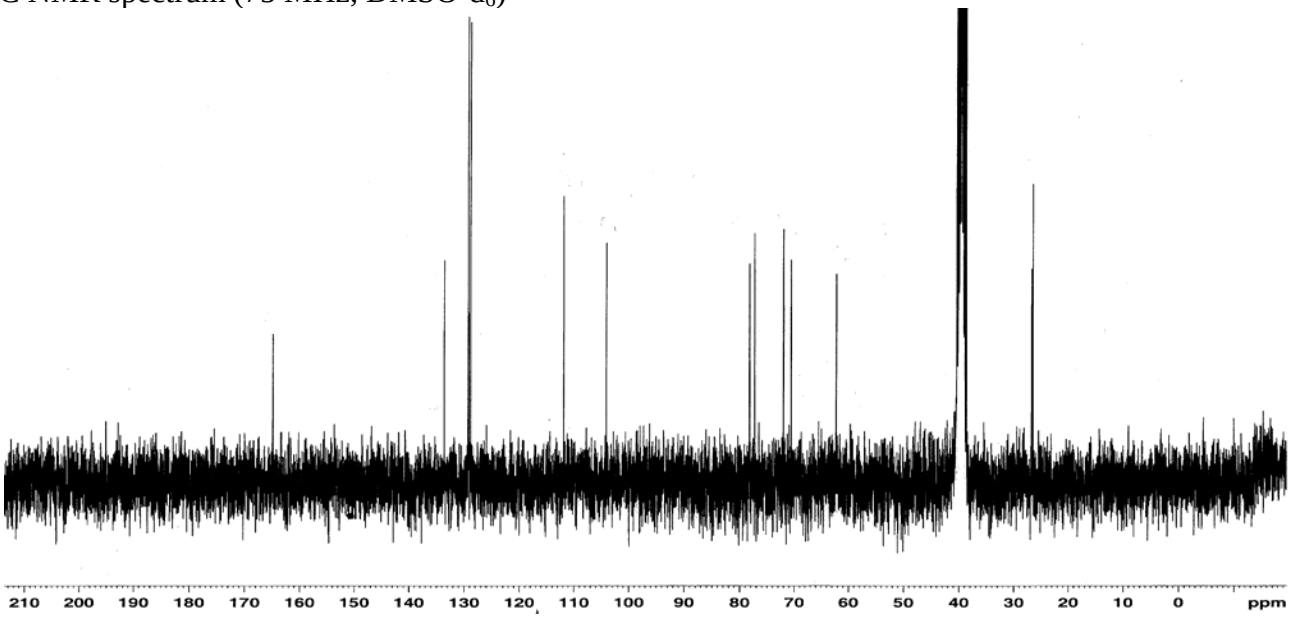


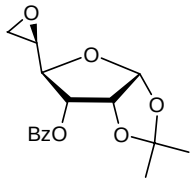
3-*O*-Benzoyl-1,2-*O*-isopropylidene-D-allofuranose (1)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



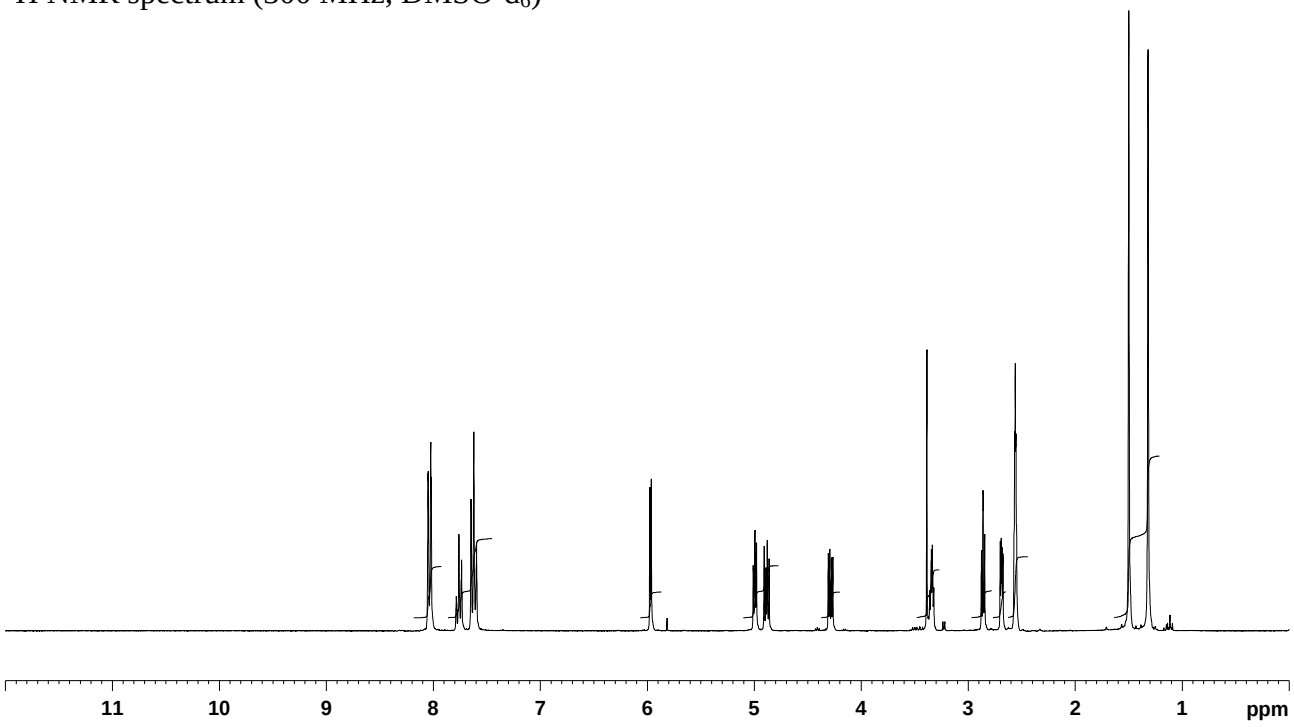
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



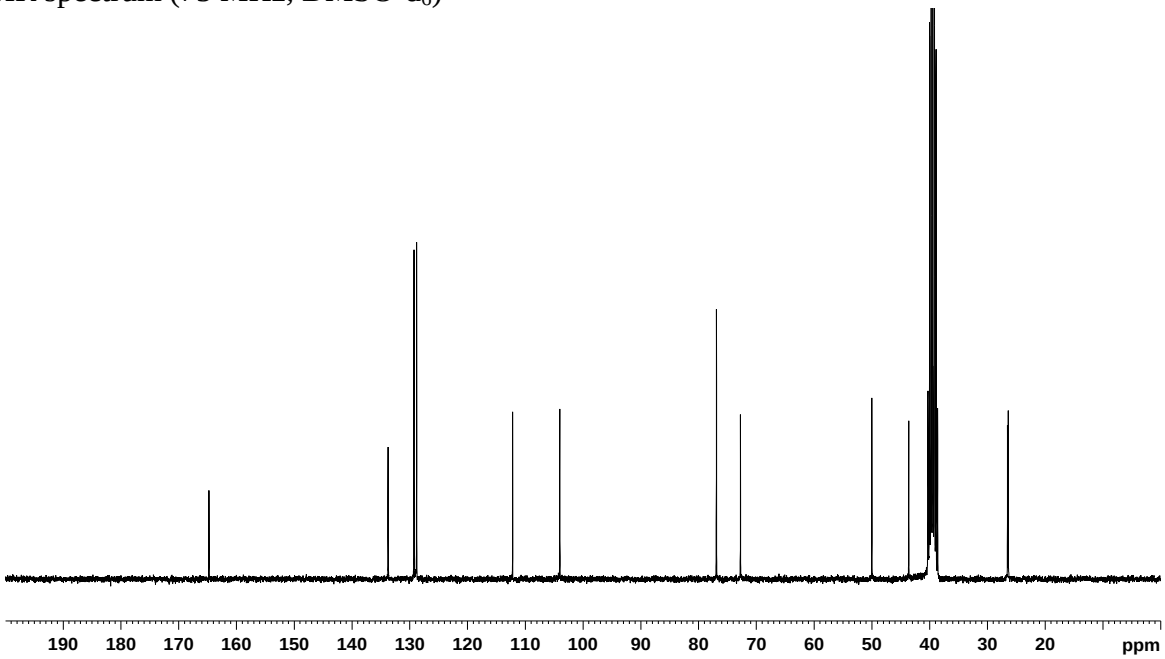


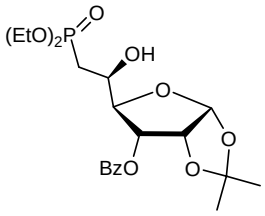
3-*O*-Benzoyl-1,2-*O*-isopropylidene-5,6-oxiran-D-allofuranose (2)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



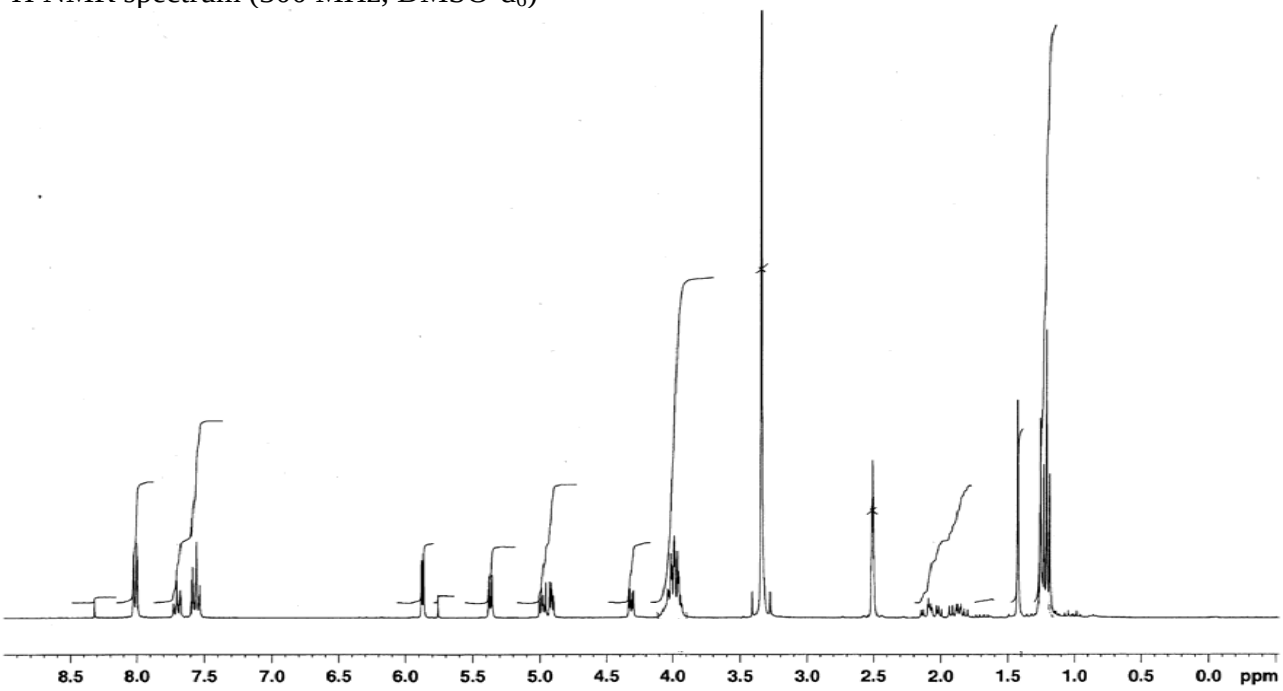
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



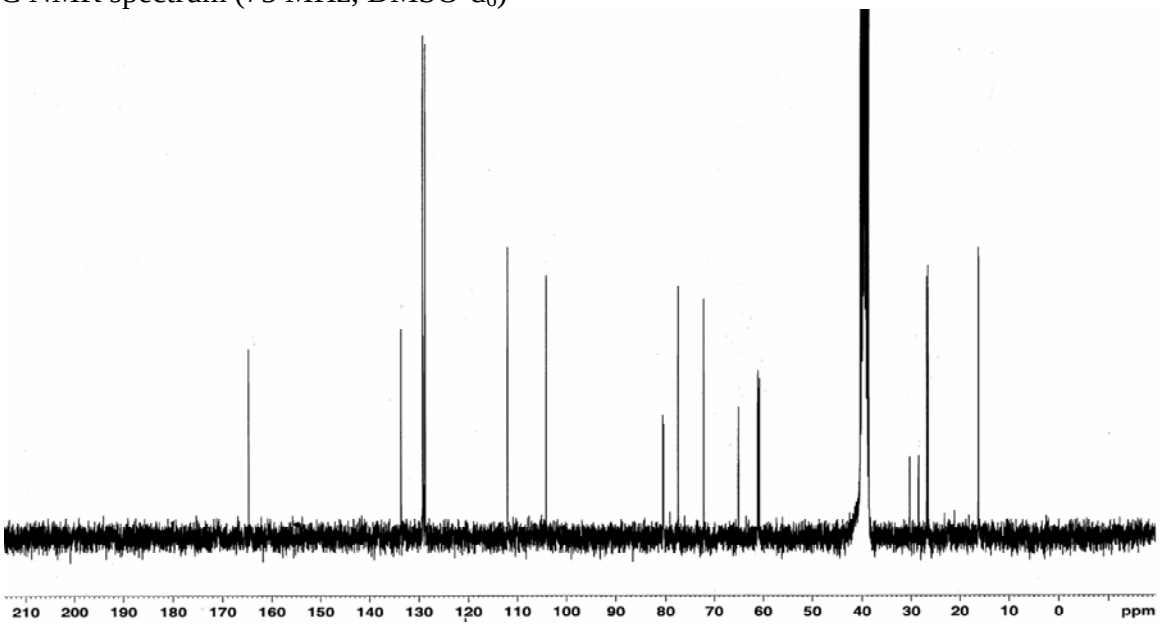


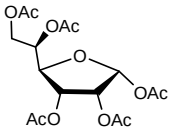
3-*O*-Benzoyl-6-deoxy-6-diethylphosphono-1,2-*O*-isopropylidene-D-allofuranose (3)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



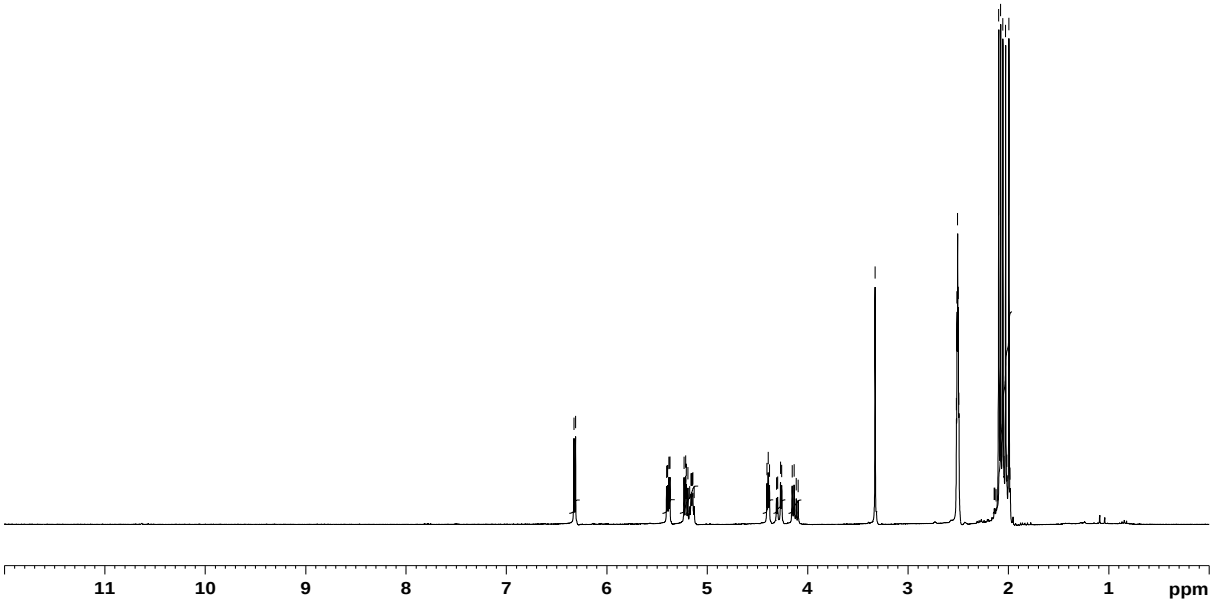
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



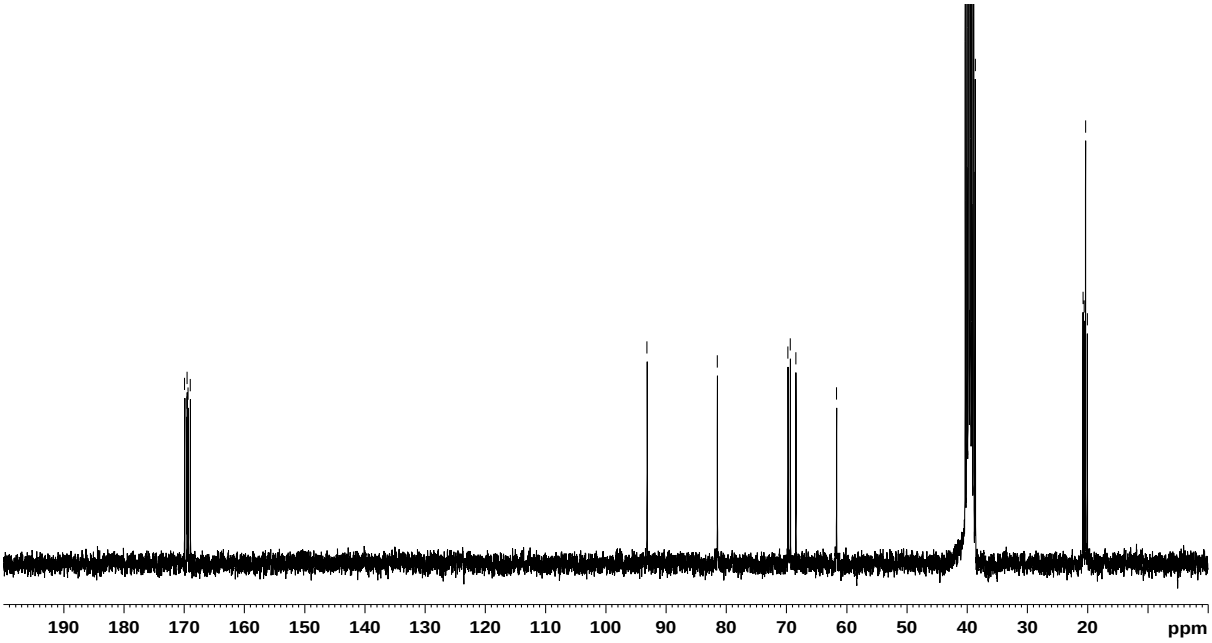


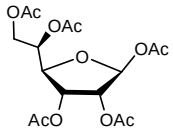
1,2,3,5,6-penta-*O*-Acetyl-(*α*,*β*)-D-allofuranose (4) **α-anomer**

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



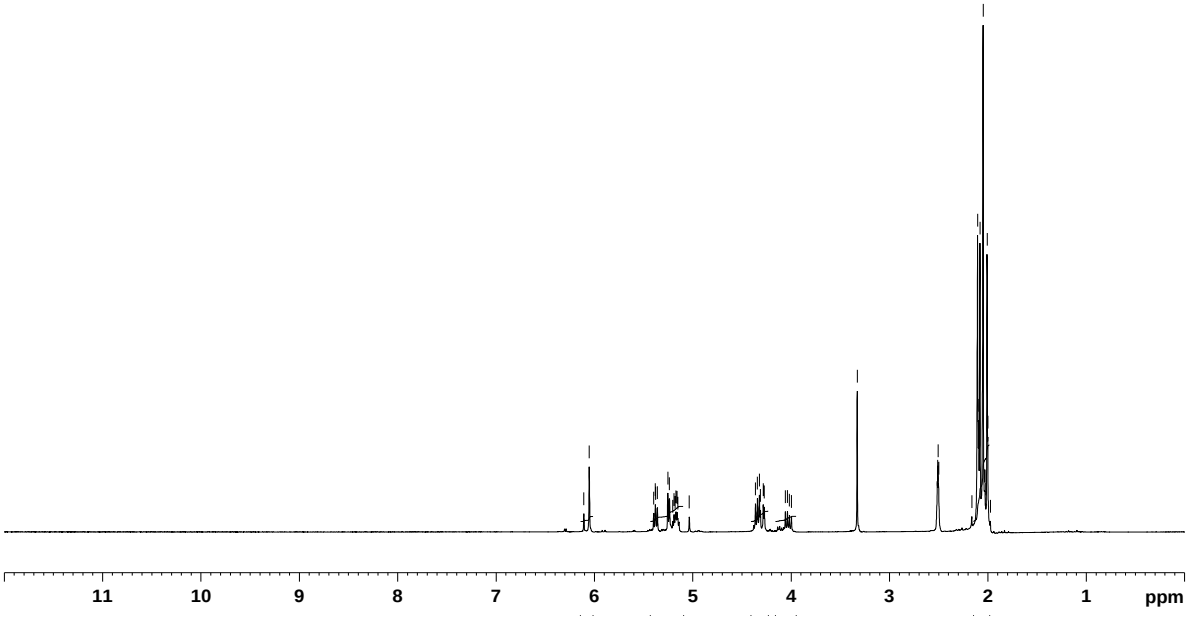
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



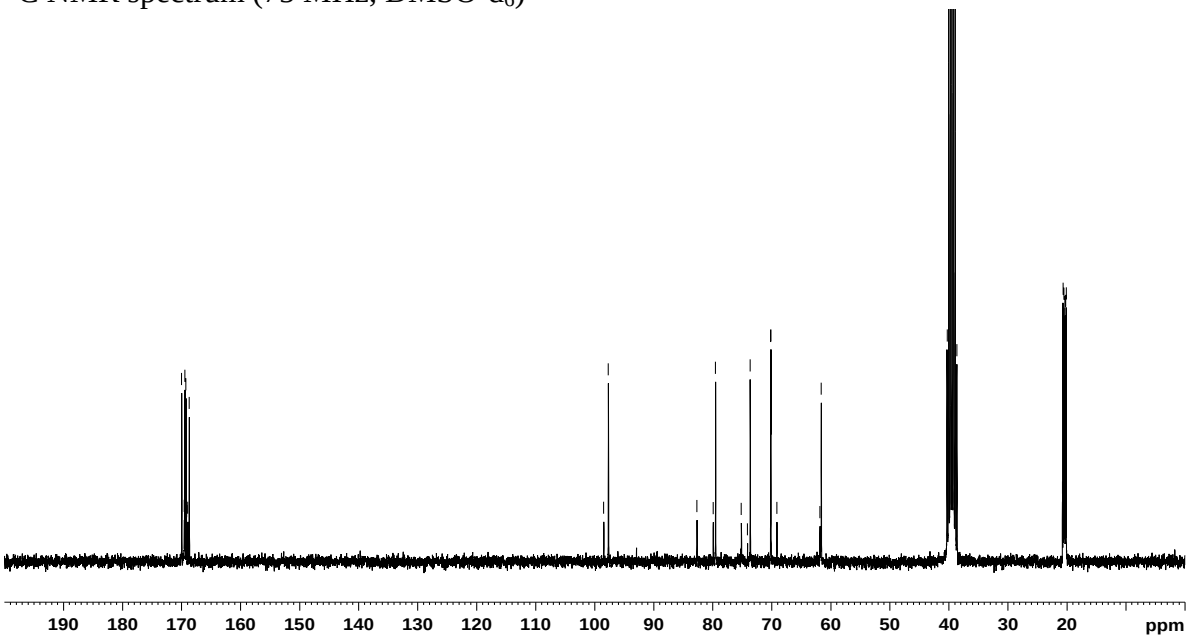


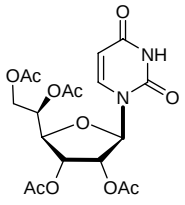
1,2,3,5,6-penta-*O*-Acetyl-(*α,β*)-D-allofuranose (4) β-anomer (contaminated by α)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



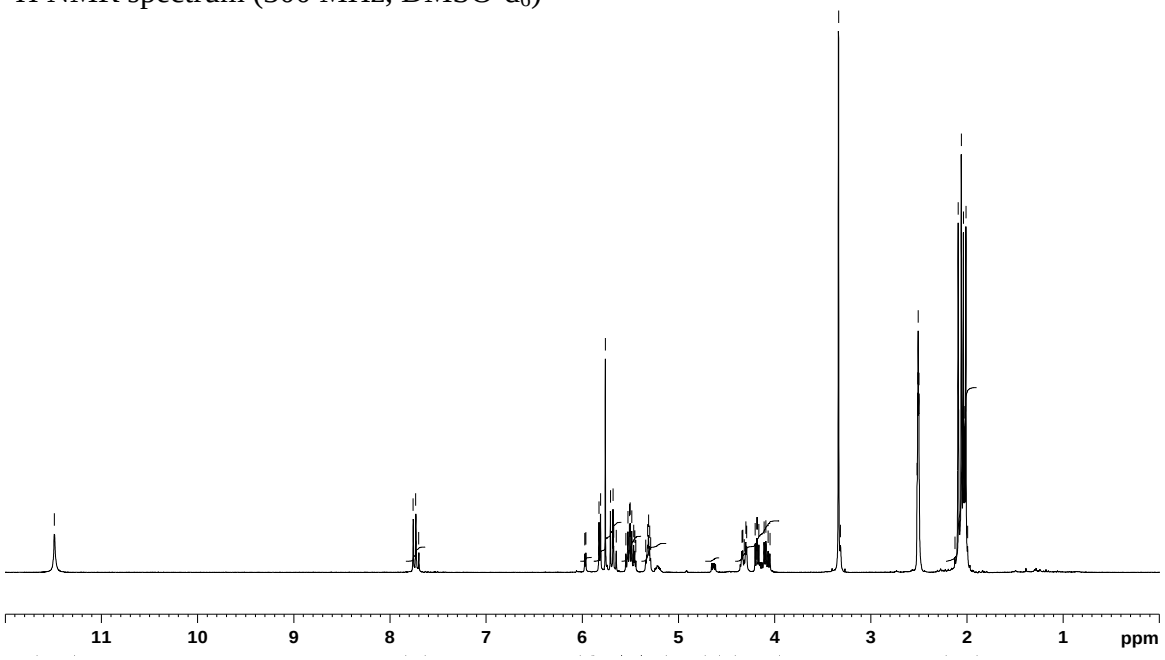
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



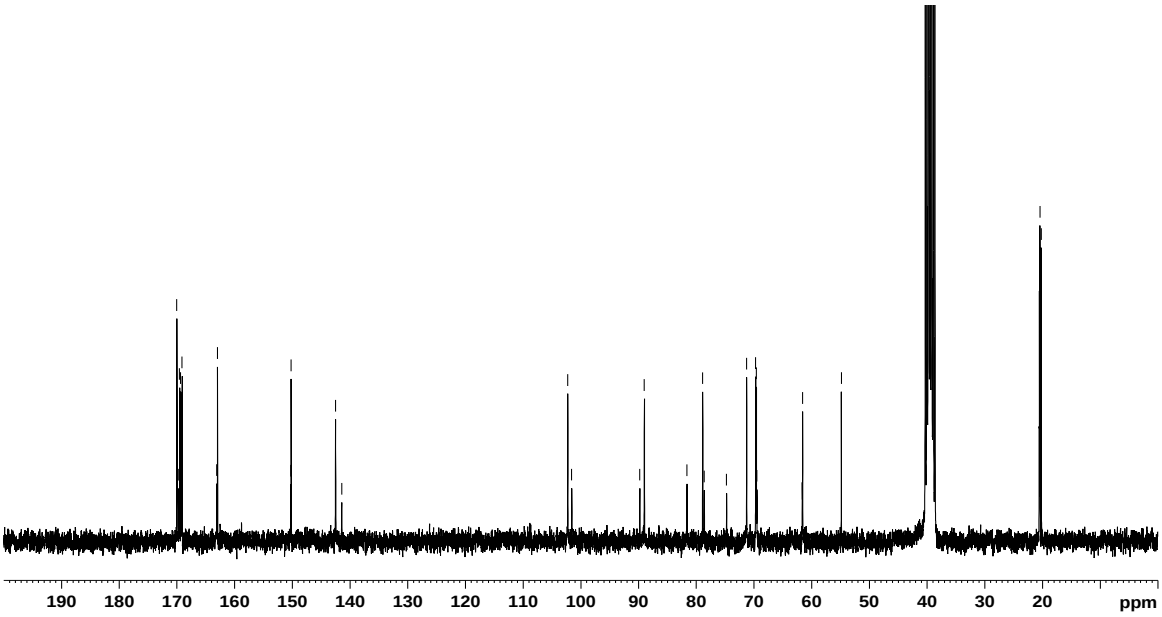


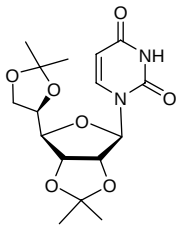
1-(2,3,5,6-tetra-*O*-Acetyl-*α,β*-D-ribo-(5*R*)-hexofuranosyl) uracil (5)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



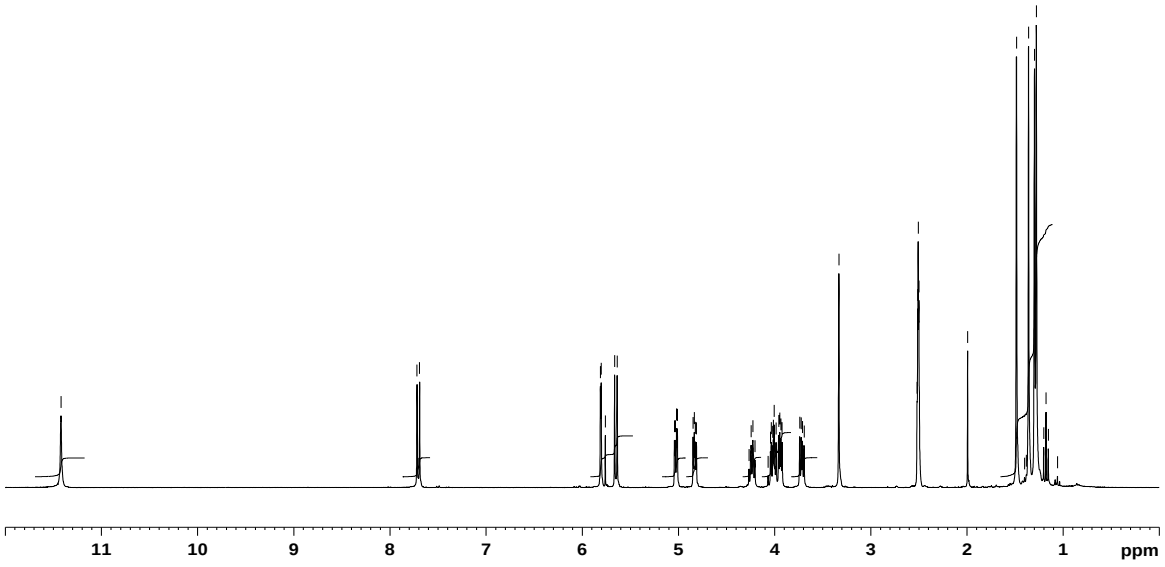
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



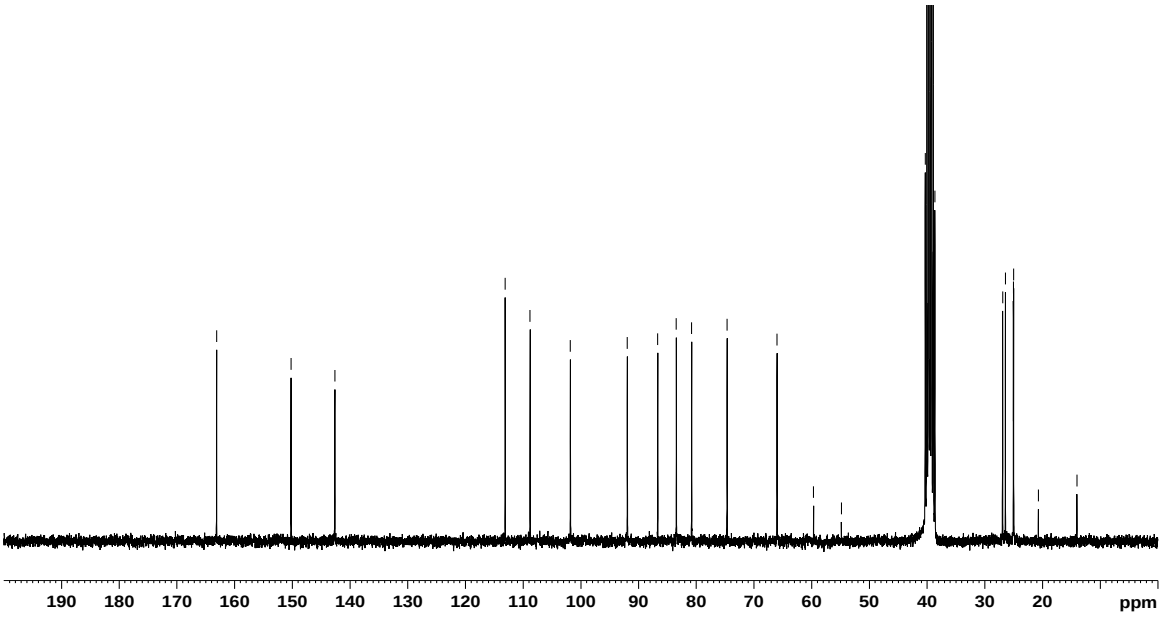


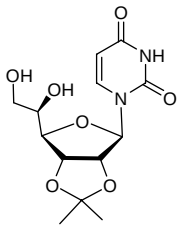
1-(2,3:5,6-di-*O*-Isopropylidene-*β*-D-ribo-(5'*R*)-hexofuranosyl) uracil (6)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



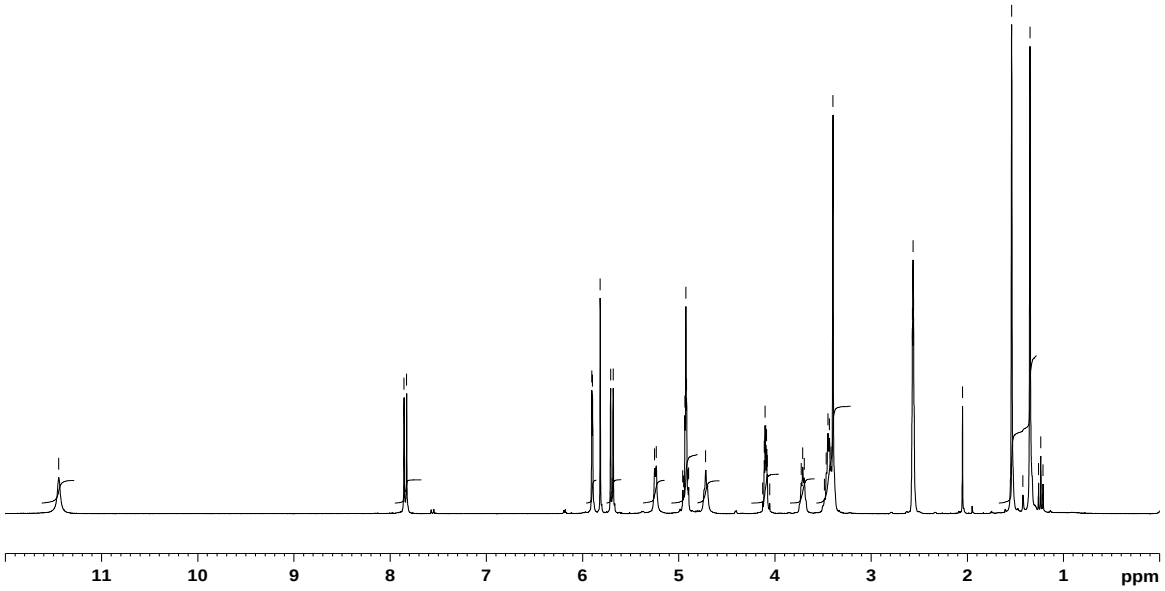
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



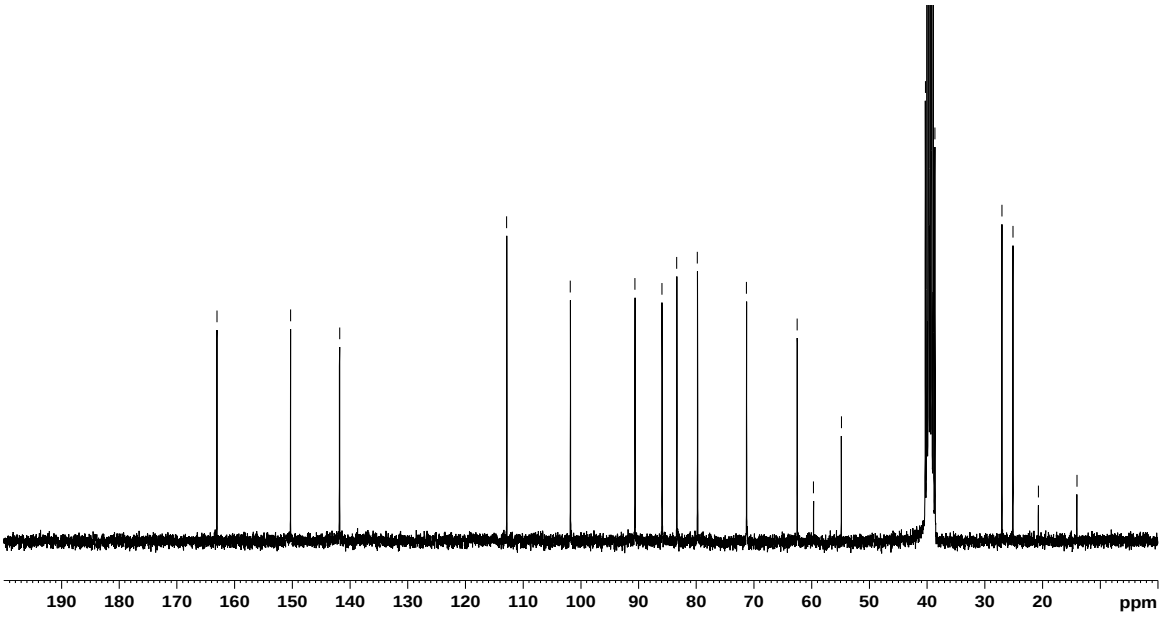


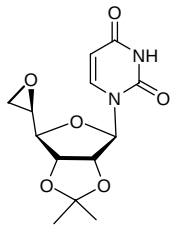
1-(2,3-*O*-Isopropylidene-*β*-D-ribo-(5*R*)-hexofuranosyl) uracil (7)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



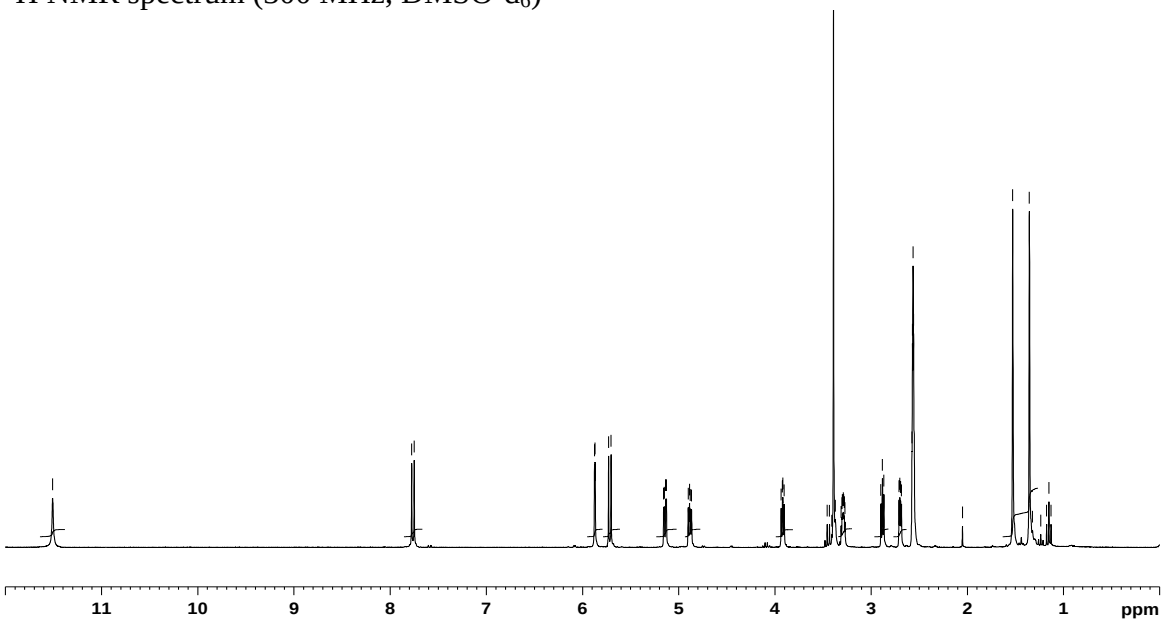
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



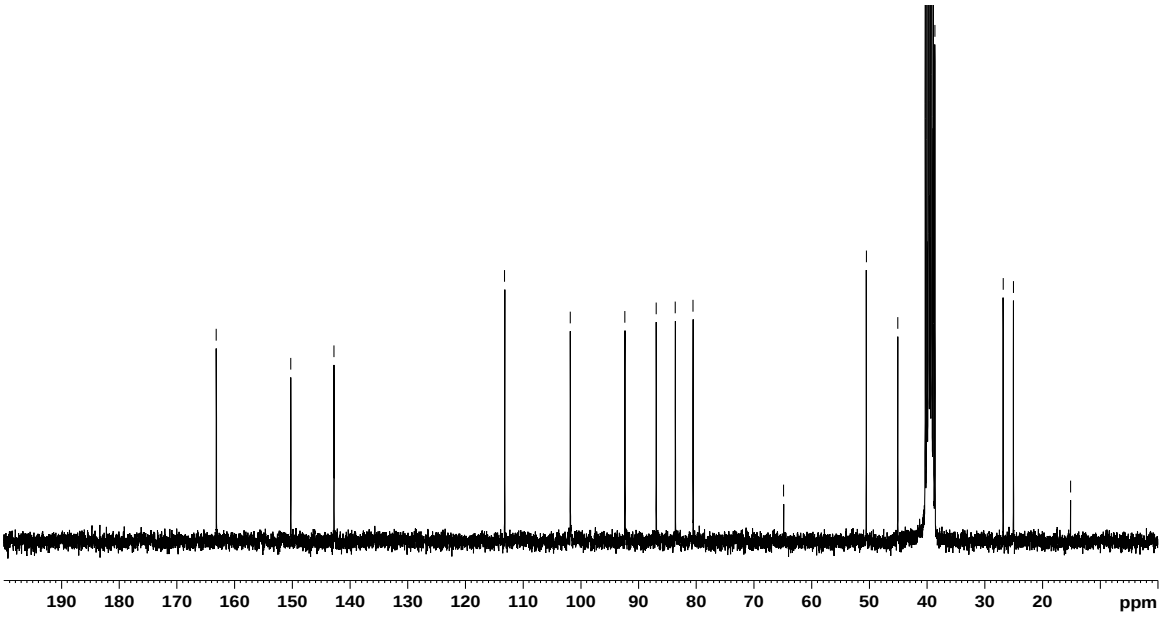


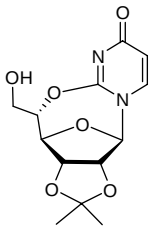
1-(2,3-*O*-Isopropylidene-5,6-oxiran-*β*-D-ribo-(5*R*)-hexofuranosyl) uracil (8)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



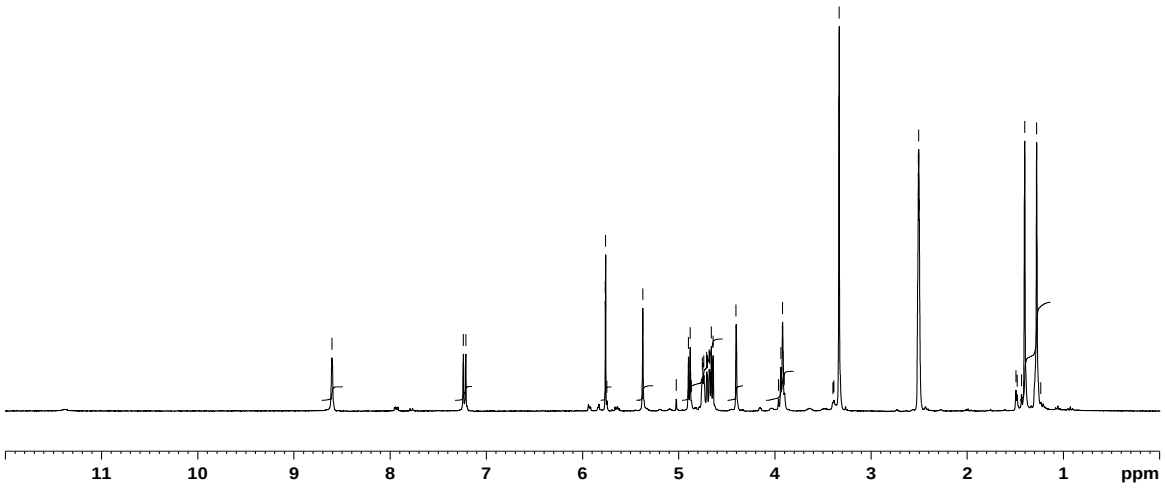
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



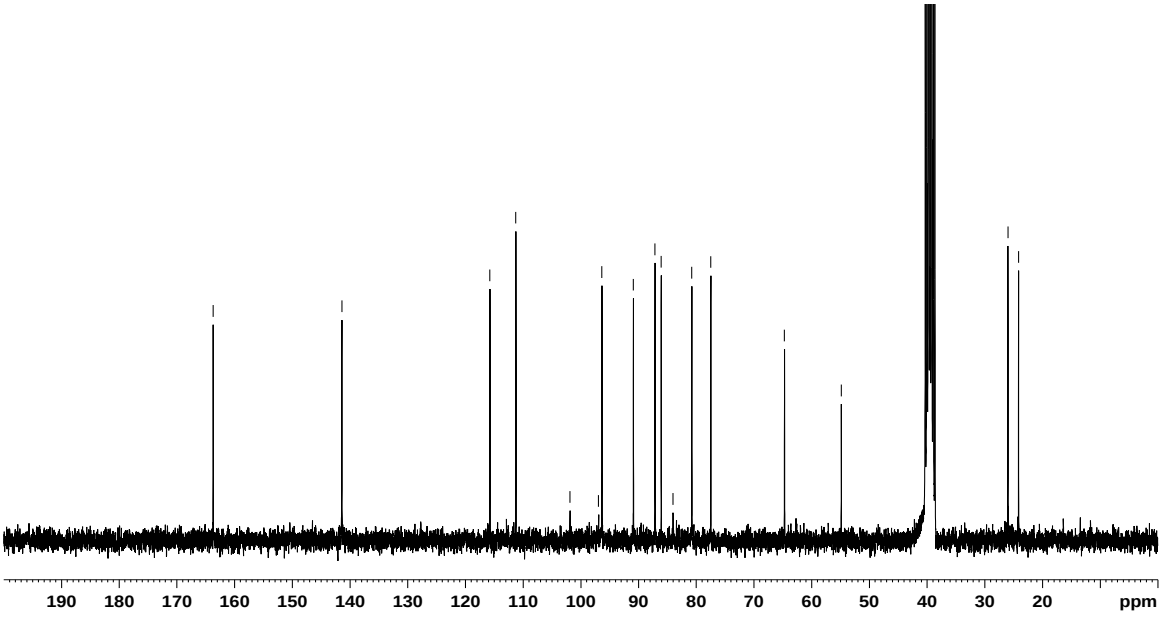


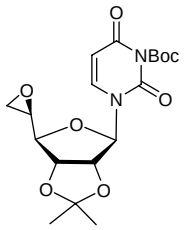
2,5'-Anhydro-1-(2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl) uracil (9)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



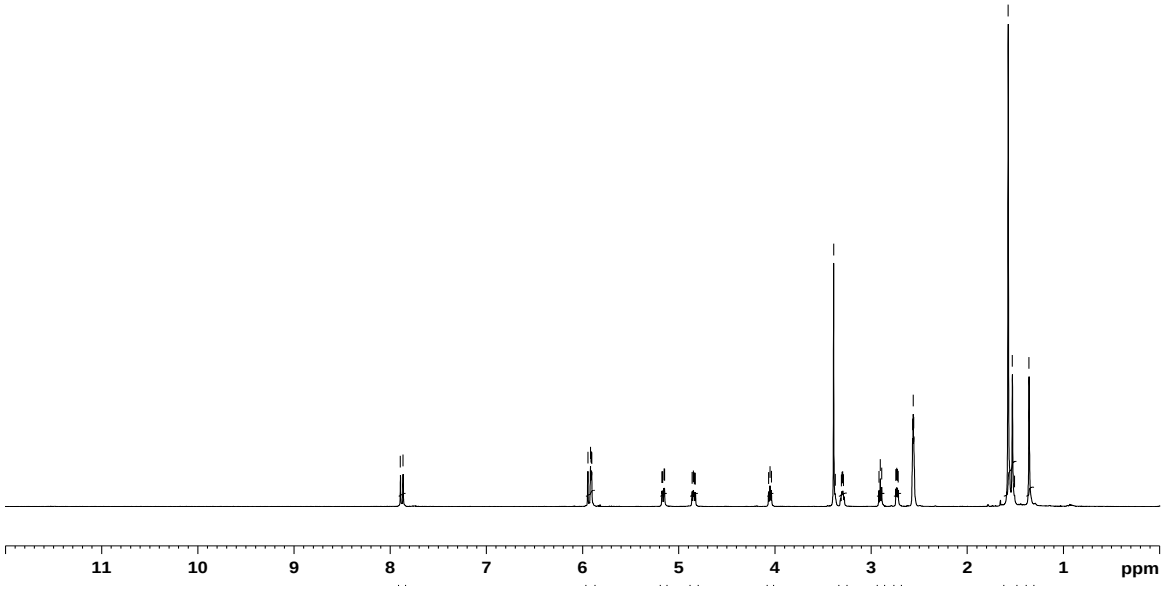
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



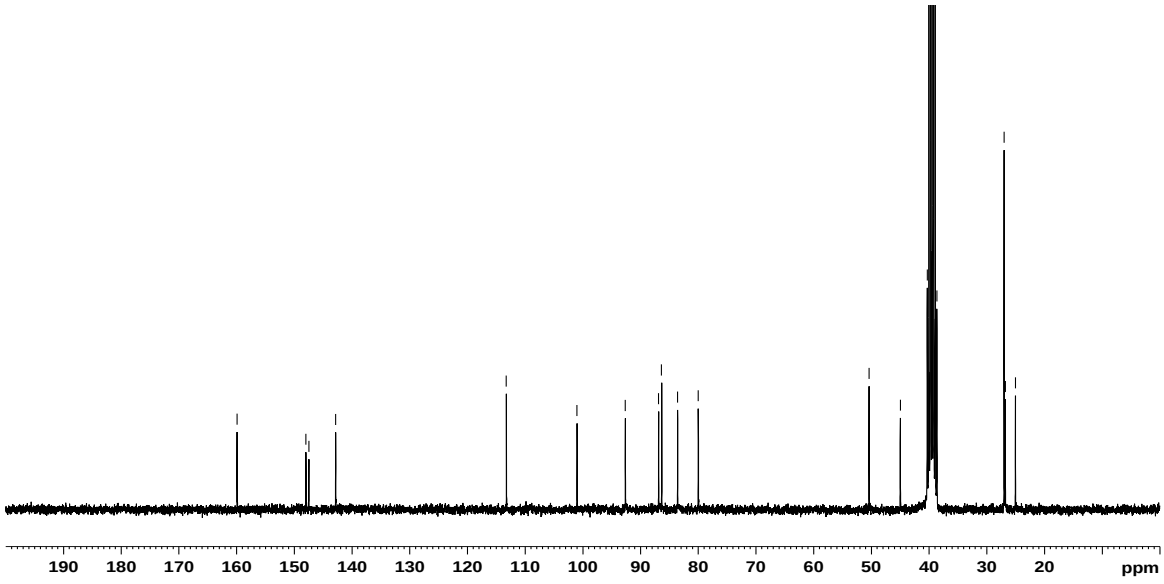


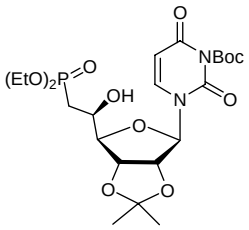
***N-3-tert*-Butyloxycarbonyl-1-(2,3-*O*-isopropylidene-5,6-oxiran-*β*-D-ribo-(5*R*)-hexofuranosyl) uracil (10)**

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



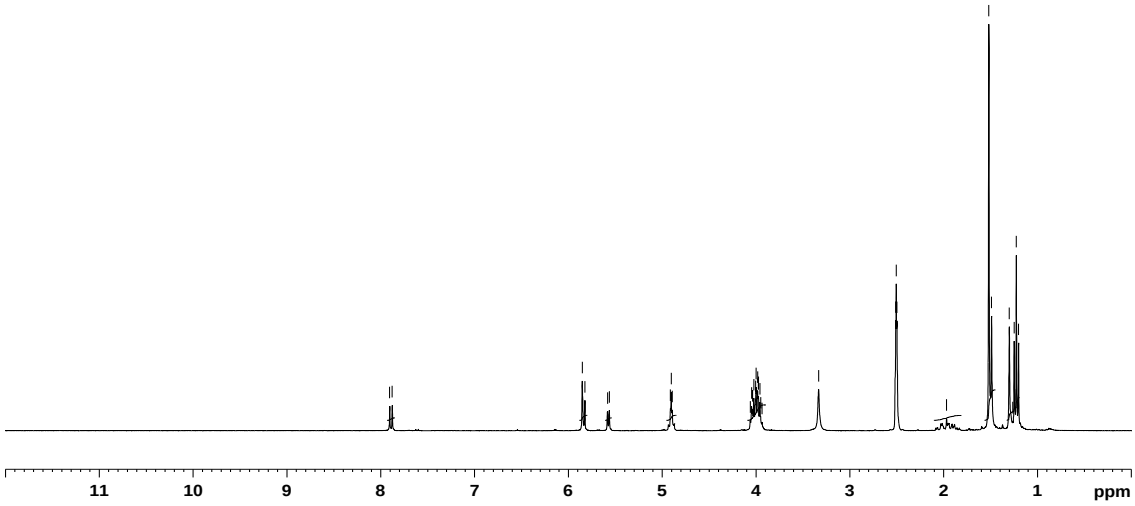
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



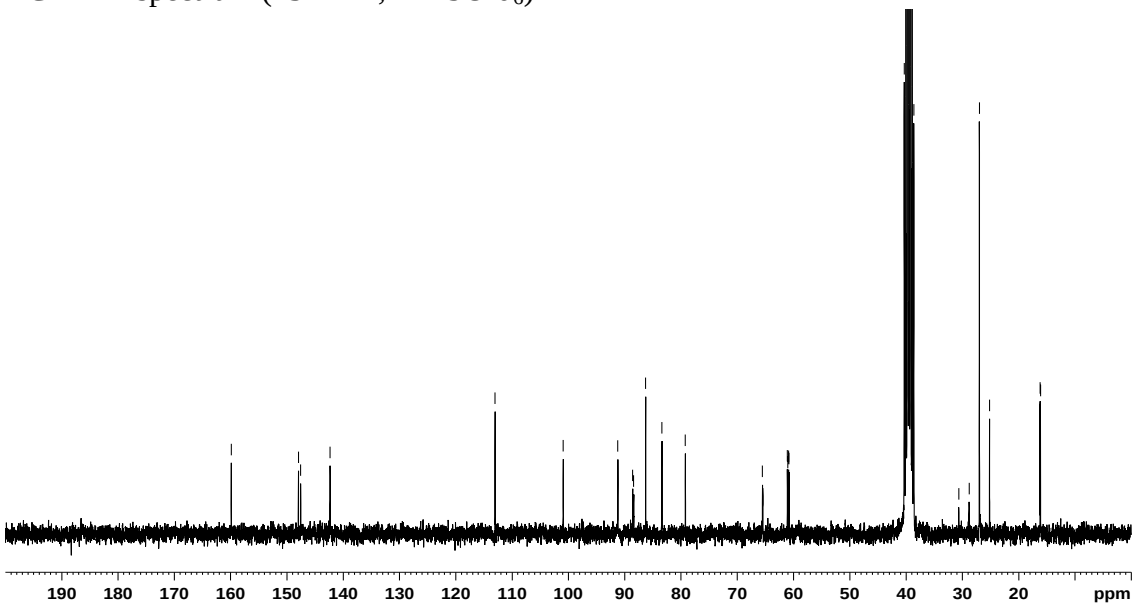


***N-3-tert*-Butyloxycarbonyl-1-(6-deoxy-6-diethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexo furanosyl) uracil (11)**

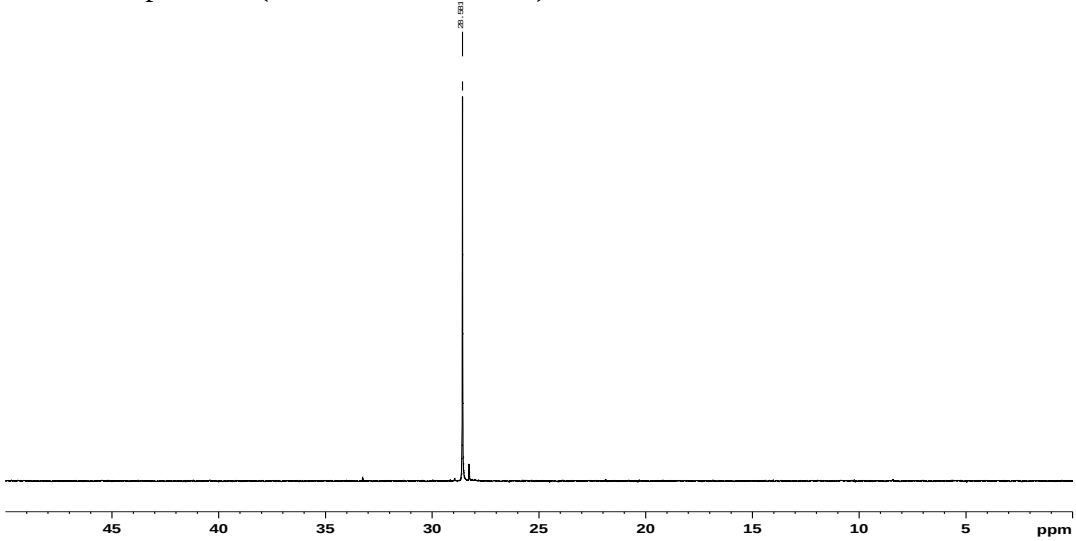
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

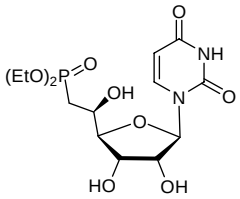


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



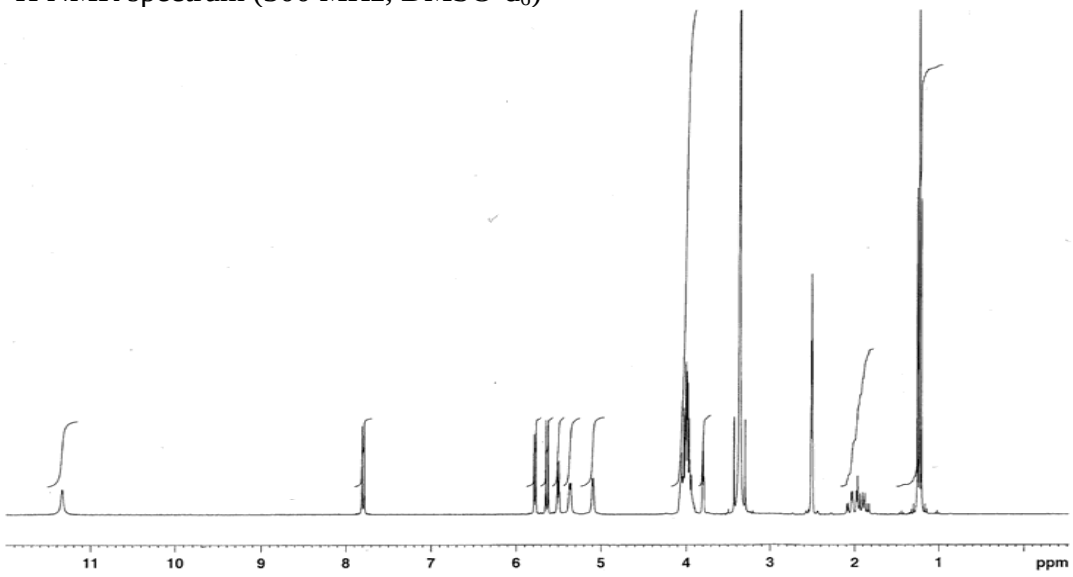
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



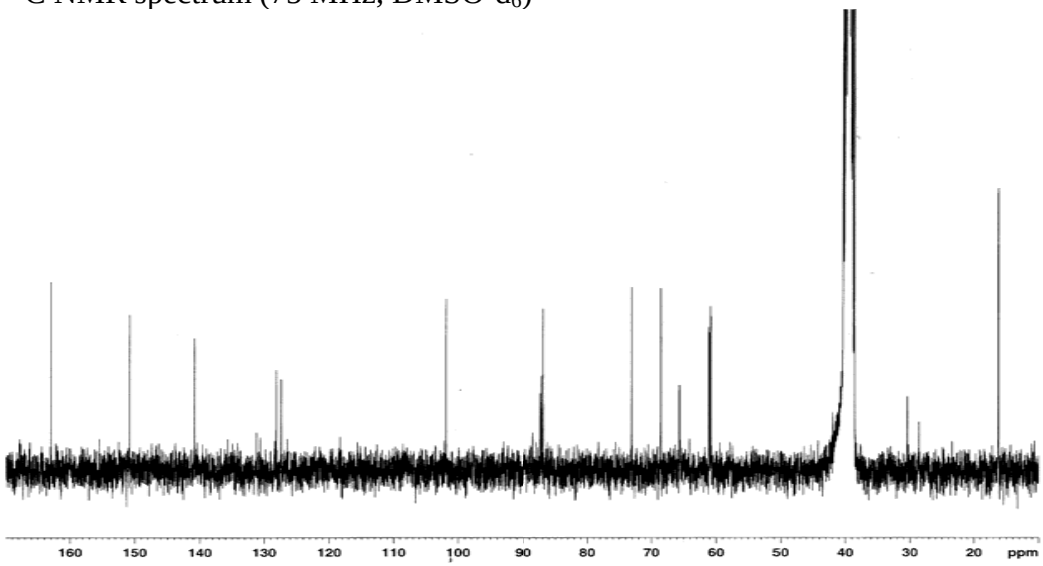


1-(6-Deoxy-6-diethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) uracil (12)

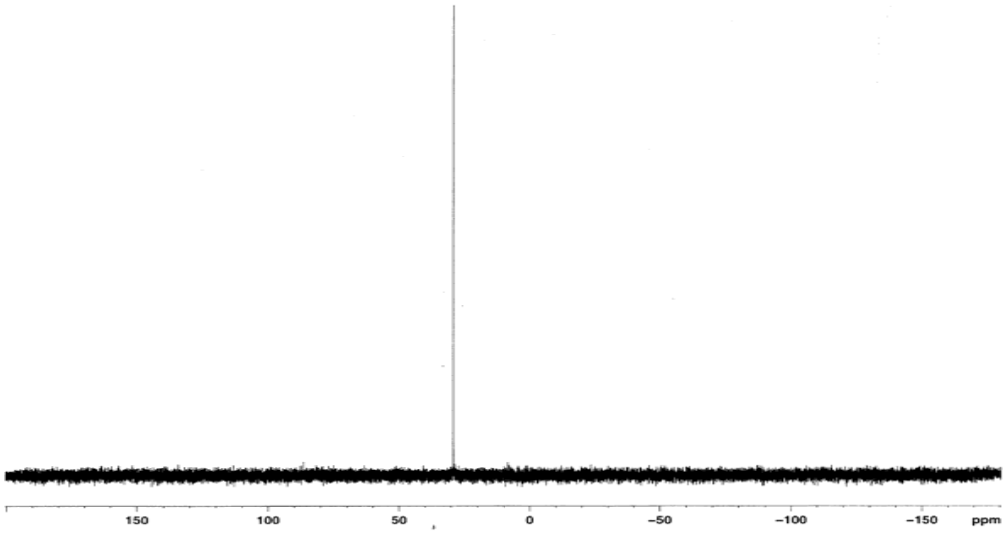
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

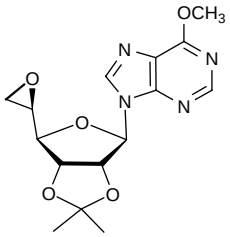


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



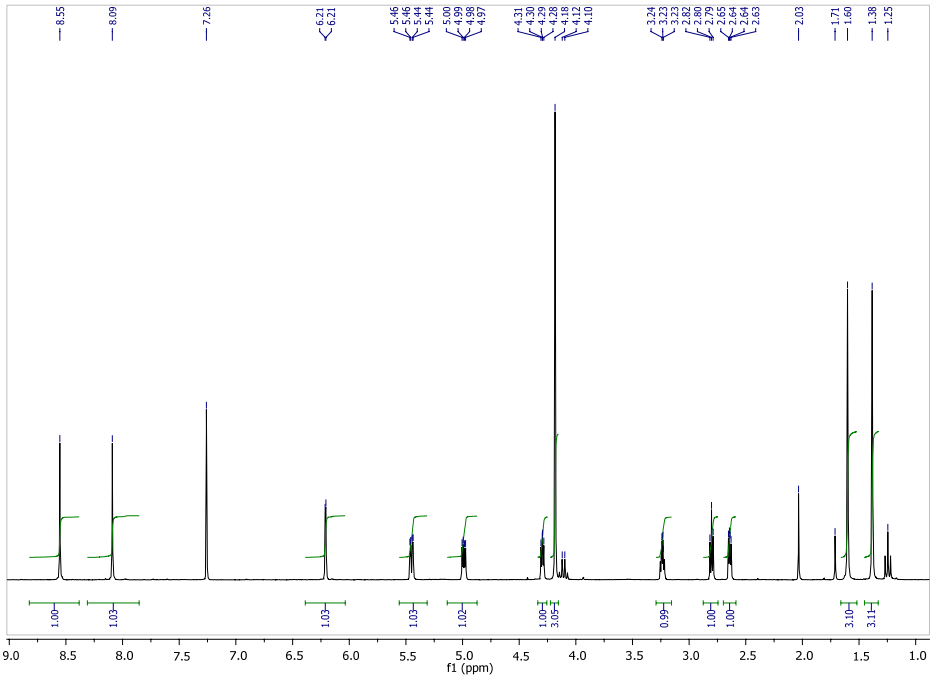
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



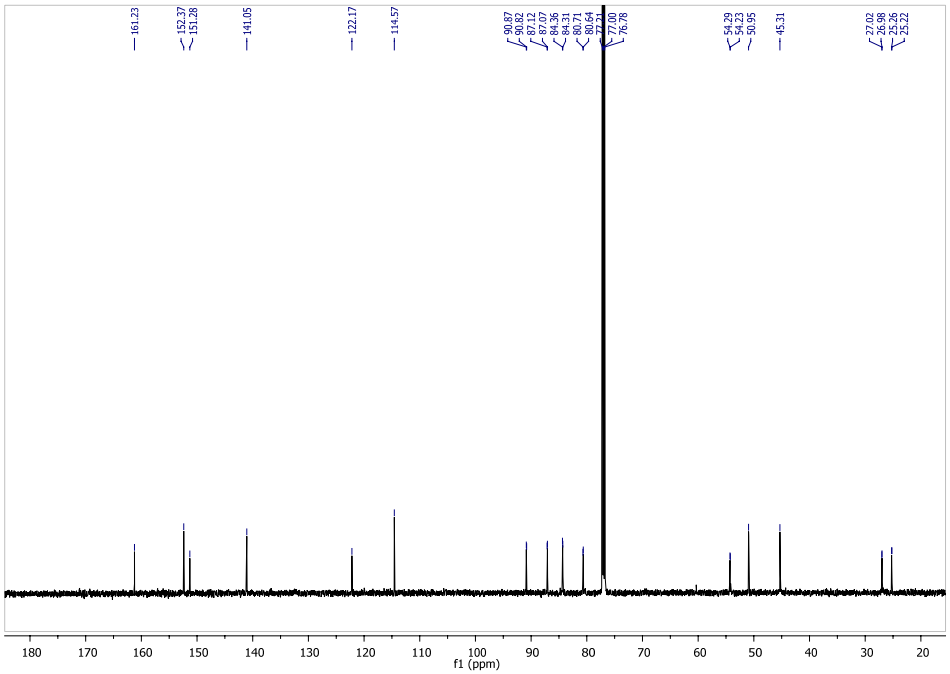


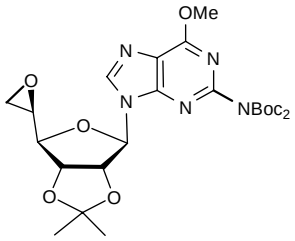
9-(2,3-*O*-Isopropylidene-5,6-oxiran-*β*-D-ribo-(5*R*)-hexofuranosyl)-6-*O*-methyl-purine (13a)

^{1}H NMR spectrum (300 MHz, $CDCl_3$)



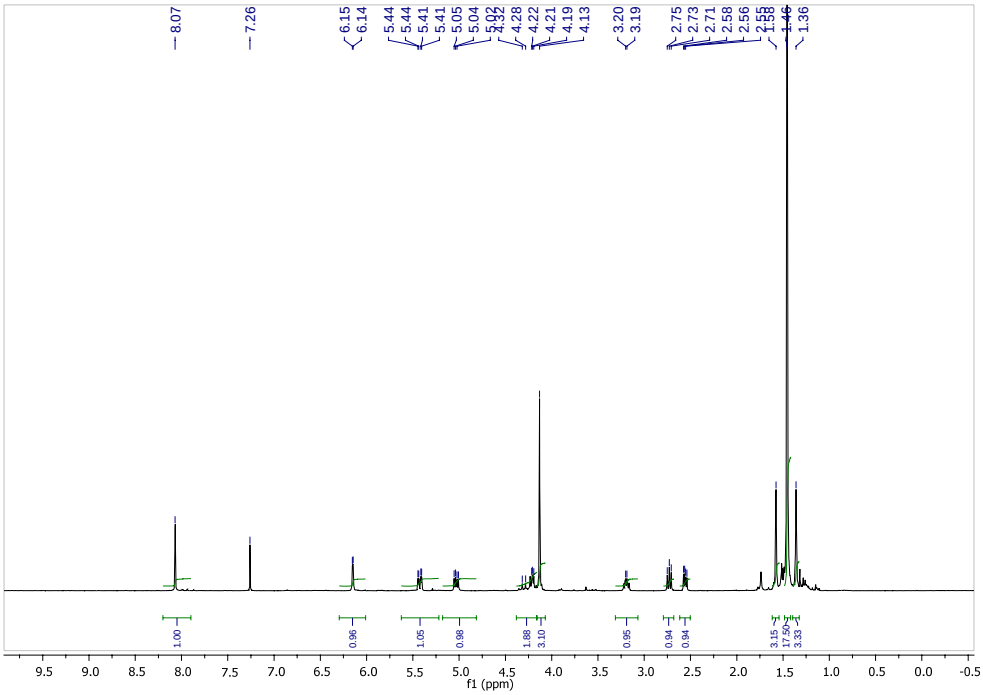
^{13}C NMR spectrum (75 MHz, $CDCl_3$)



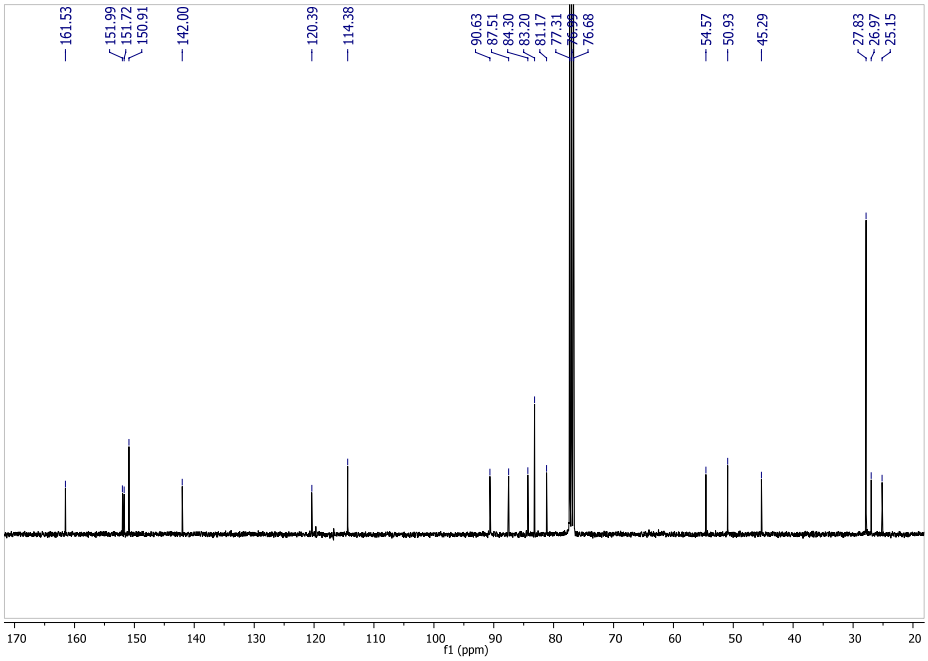


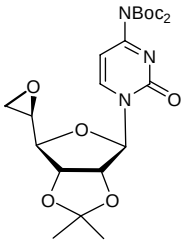
***N,N-2*(di*tert*-Butyloxycarbonyl)-9-(2,3-*O*-isopropylidene-5,6-oxiran-*β*-D-ribo-(5*R*)-hexofuran-osyl)-6-*O*-methyl-purine (13b)**

^{1}H NMR spectrum (300 MHz, $CDCl_3$)



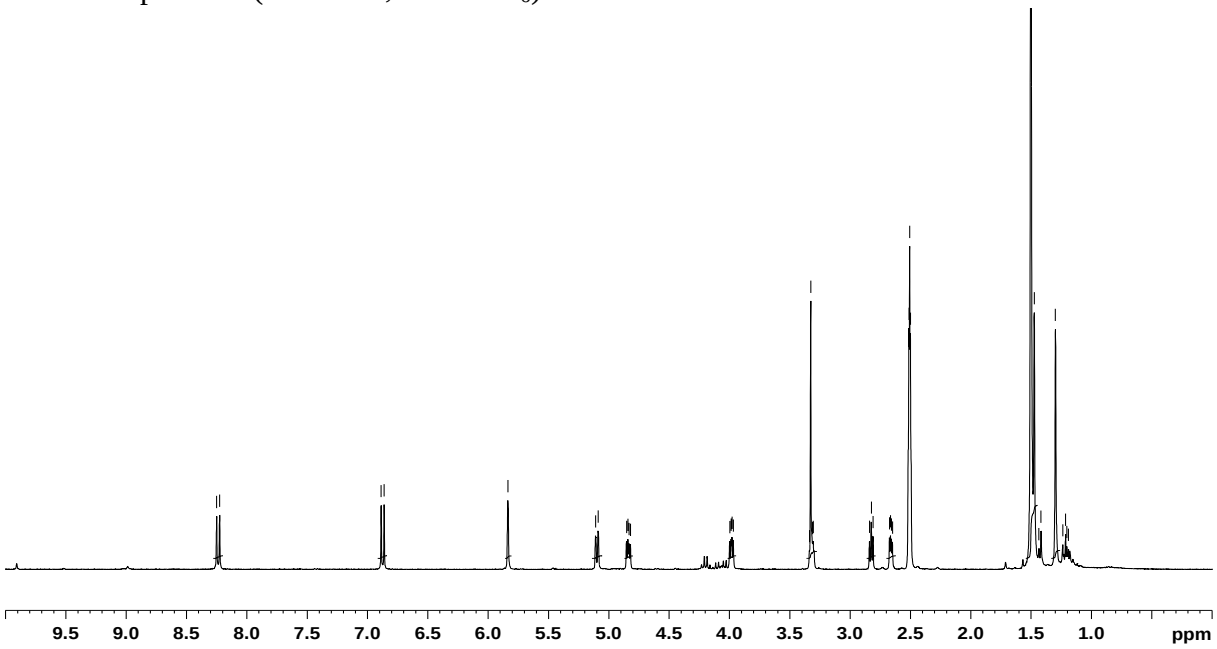
^{13}C NMR spectrum (75 MHz, $CDCl_3$)



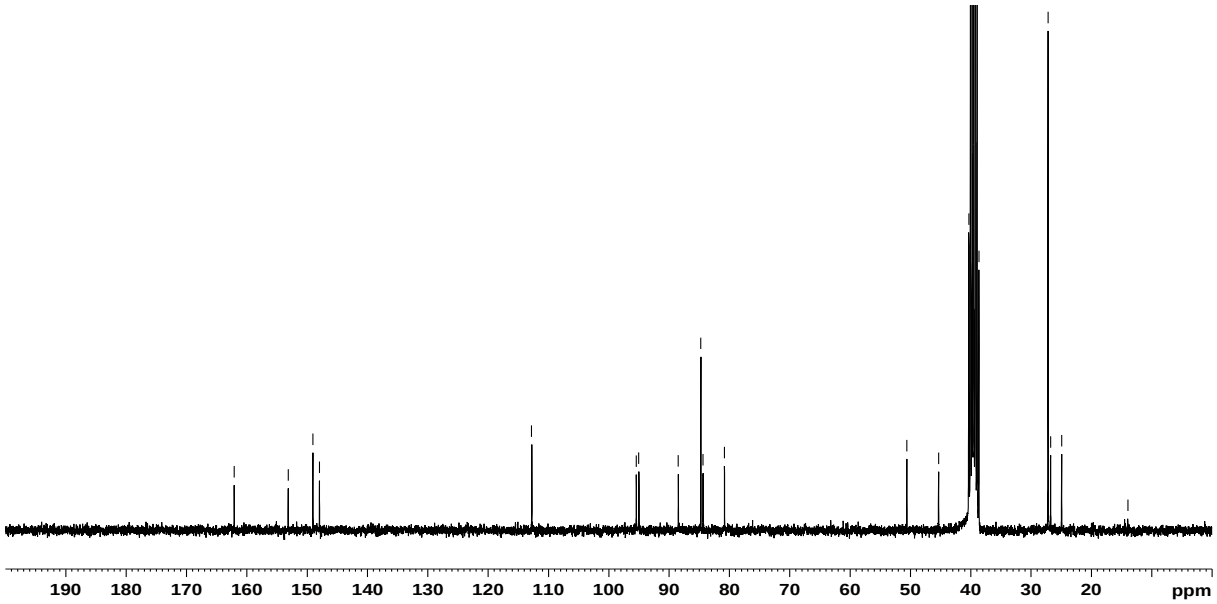


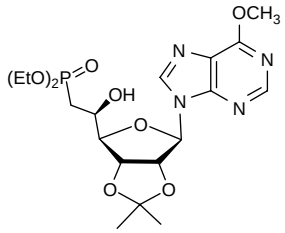
***N,N-4*(di*tert*-Butyloxycarbonyl)-1-(2,3-*O*-isopropylidene-5,6-oxiran-*β*-D-ribo-(5*R*)-hexofuran-osyl) cytosine (13c)**

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



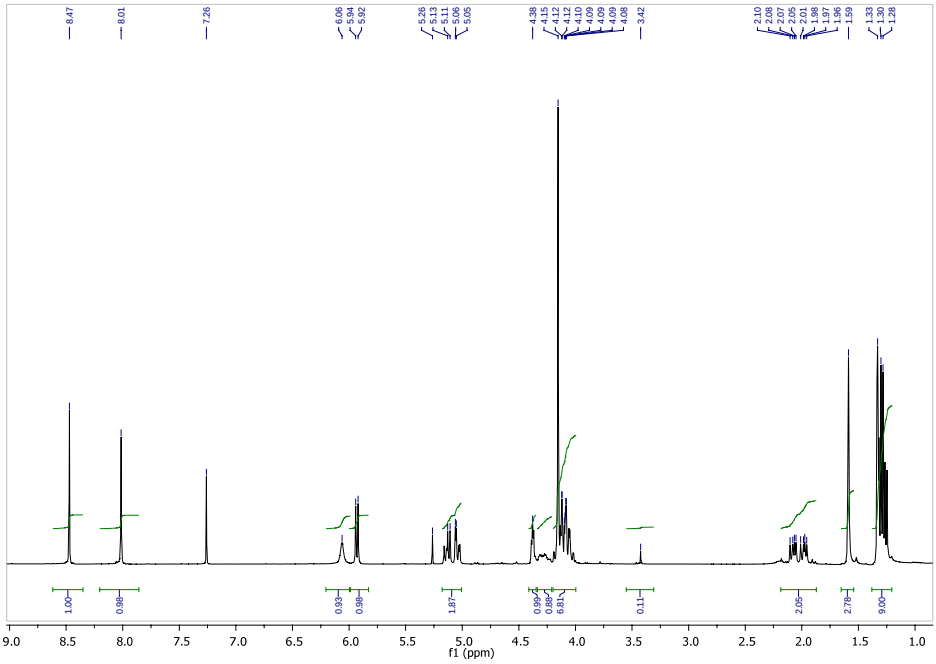
^{13}C NMR spectrum (75 MHz, DMSO-d_6)



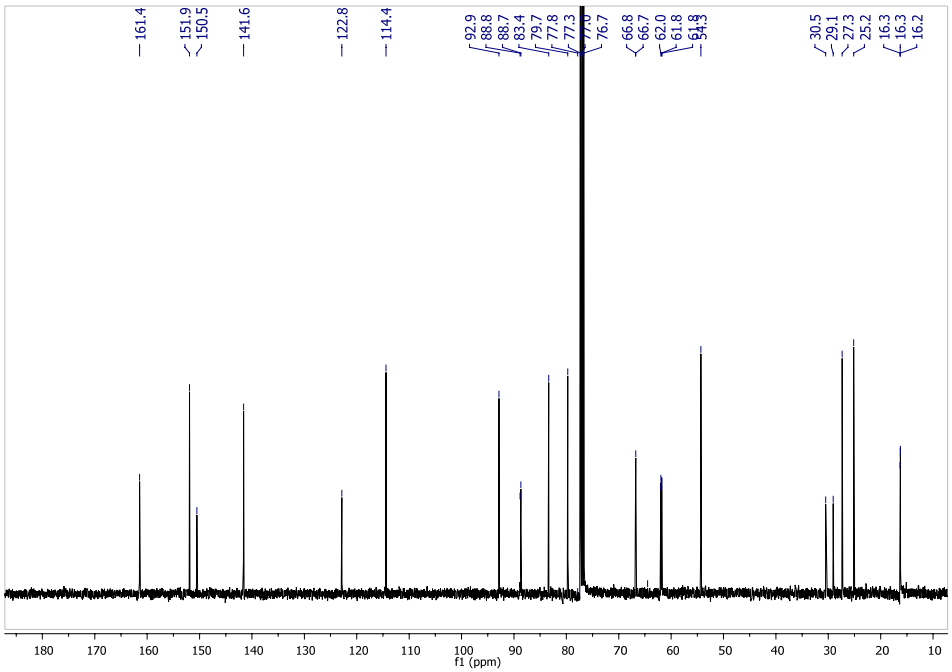


9-(6-Deoxy-6-diethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl)-6-*O*-methyl-purine (14a)

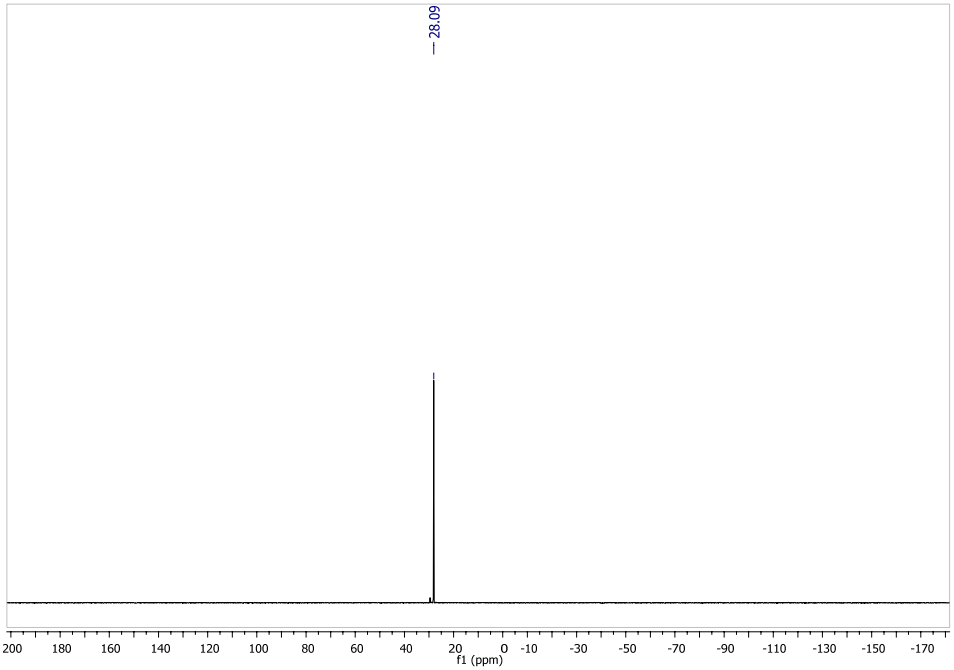
^{1}H NMR spectrum (300 MHz, $CDCl_3$)

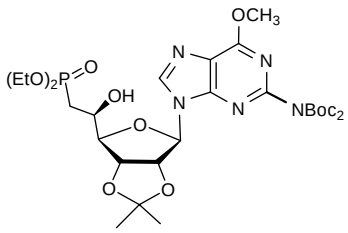


^{13}C NMR spectrum (75 MHz, $CDCl_3$)



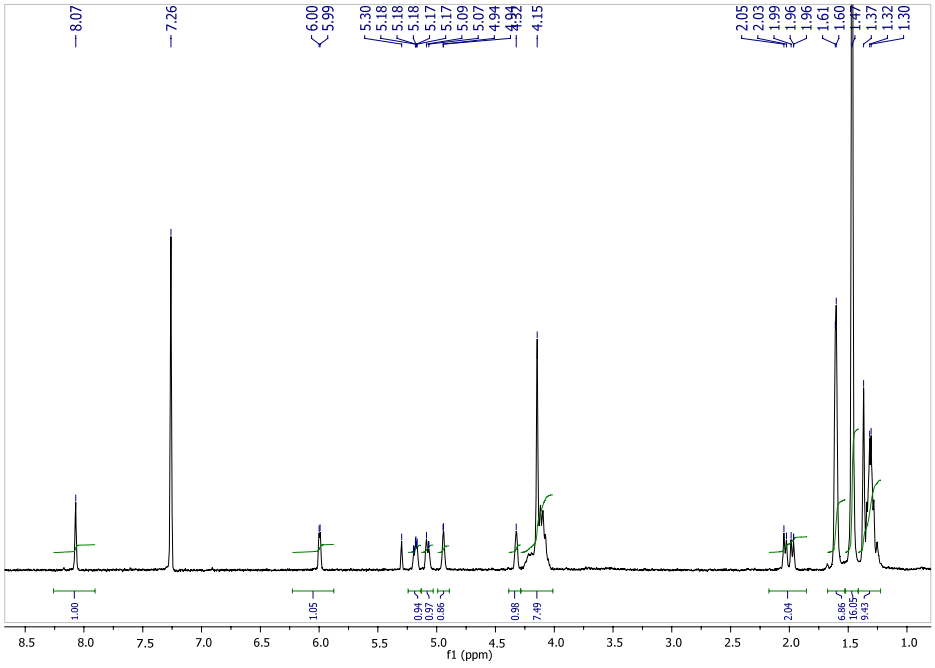
^{31}P NMR spectrum (121 MHz, $CDCl_3$)



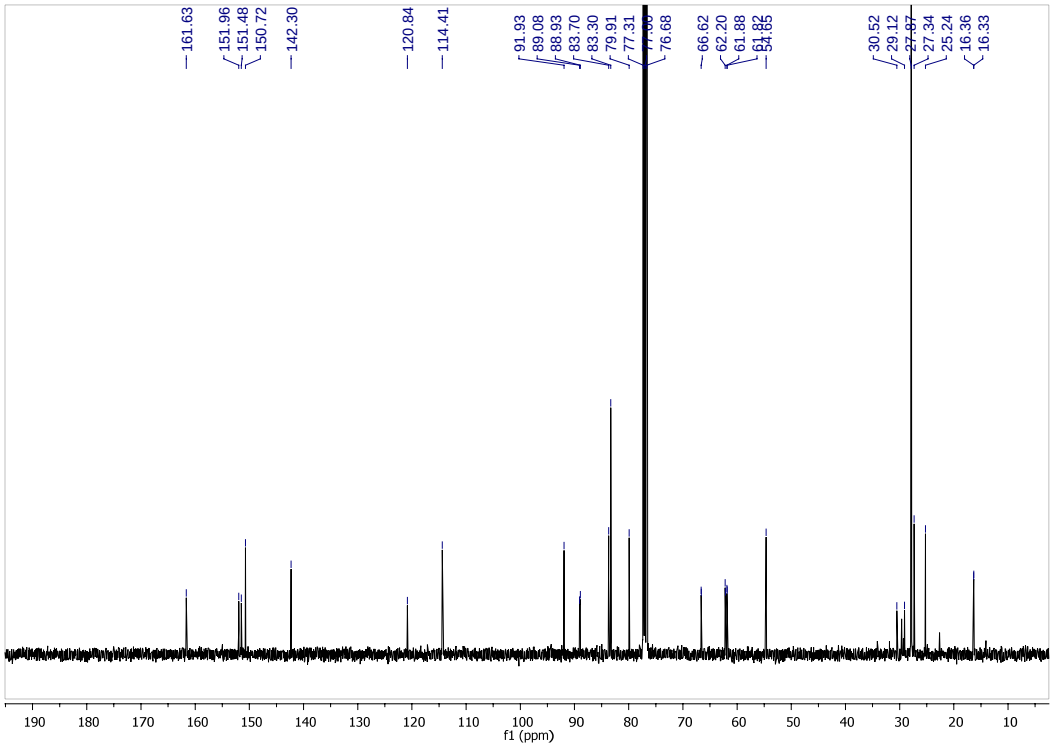


***N,N-2*(di*tert*-Butyloxycarbonyl)-9-(6-deoxy-6-diethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl)-6-*O*-methyl-purine (14b)**

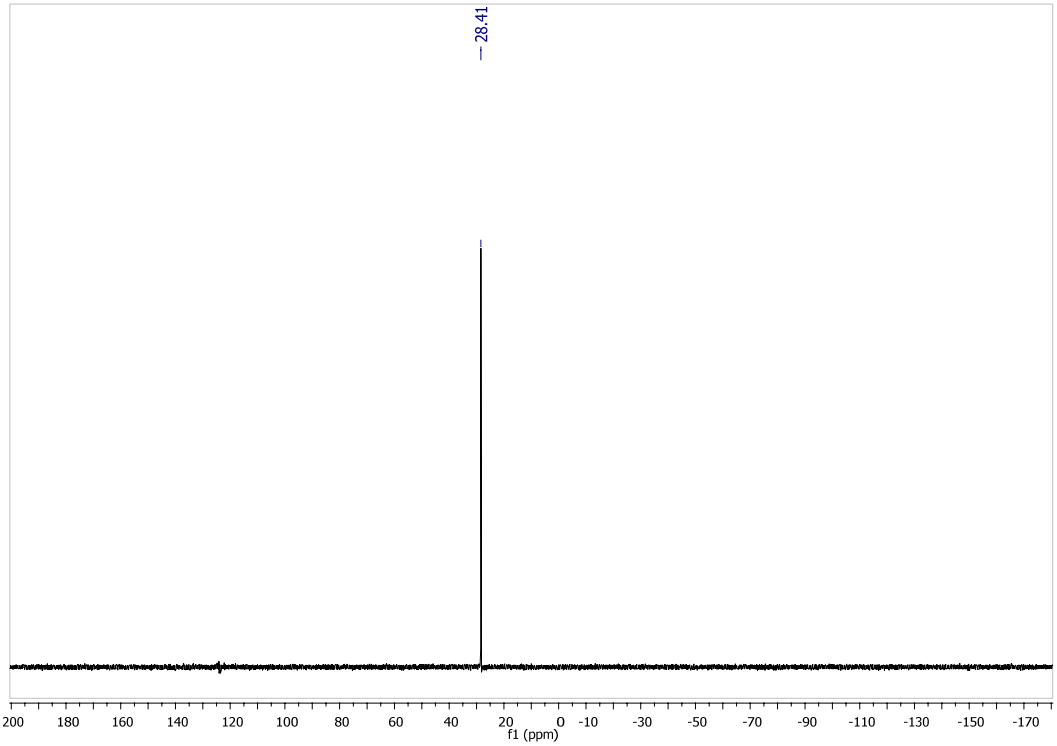
^{1}H NMR spectrum (300 MHz, $CDCl_3$)

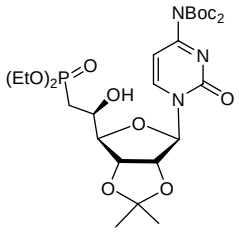


^{13}C NMR spectrum (75 MHz, $CDCl_3$)



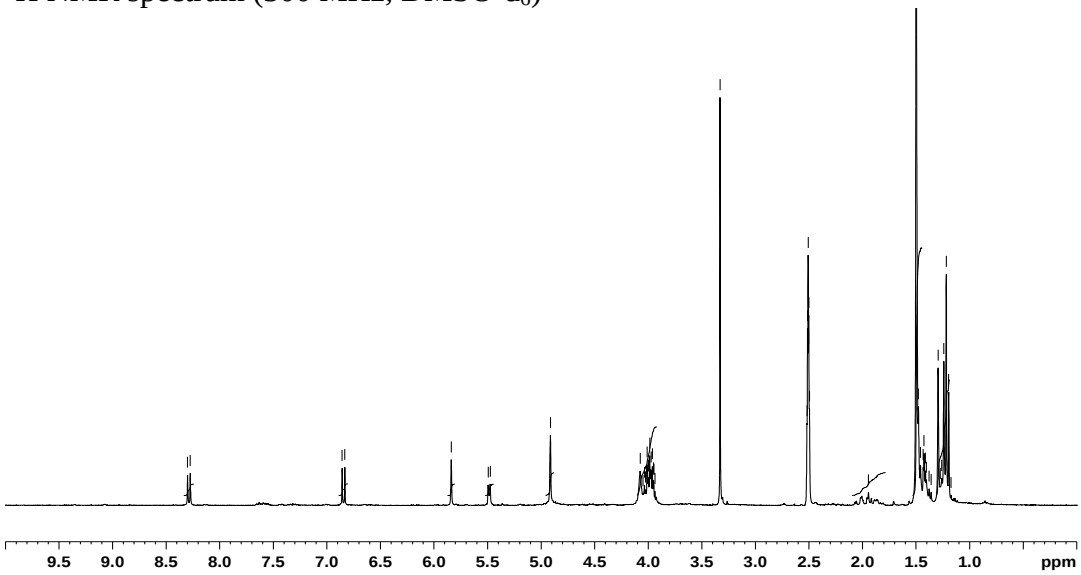
^{31}P NMR spectrum (121 MHz, $CDCl_3$)



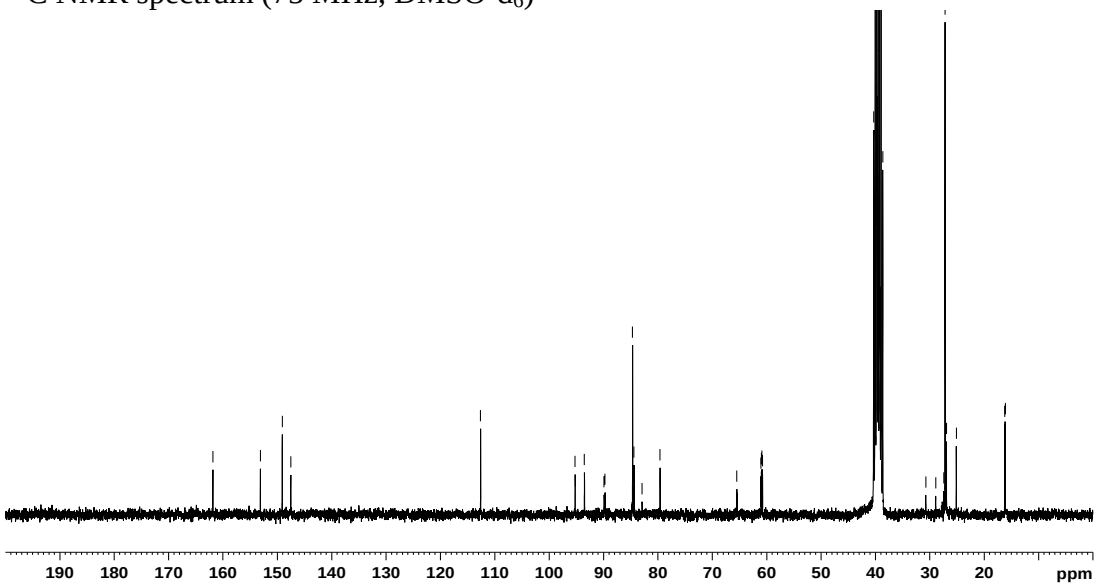


***N,N-4*(di*tert*-Butyloxycarbonyl)-1-(6-deoxy-6-diethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl) ytosine (14c)**

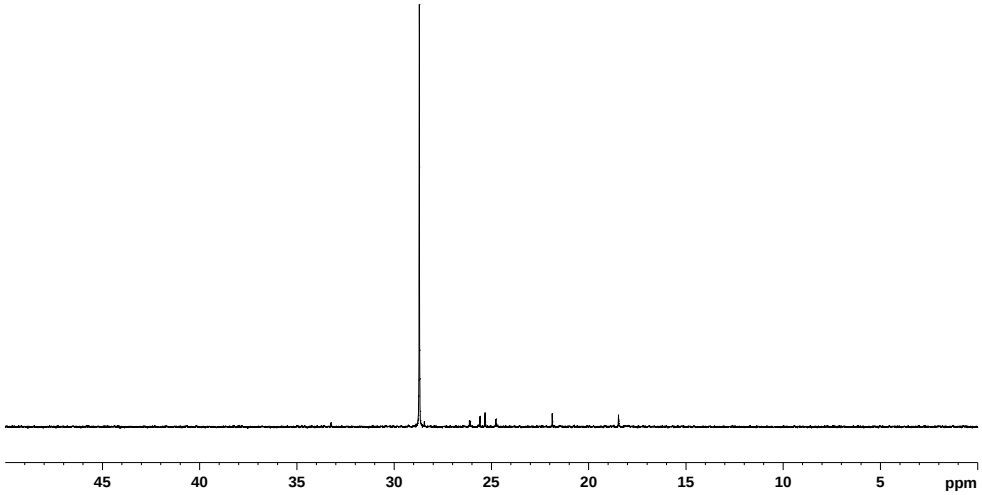
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

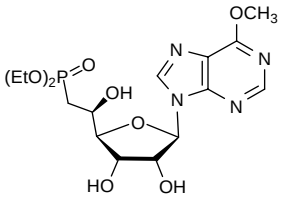


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



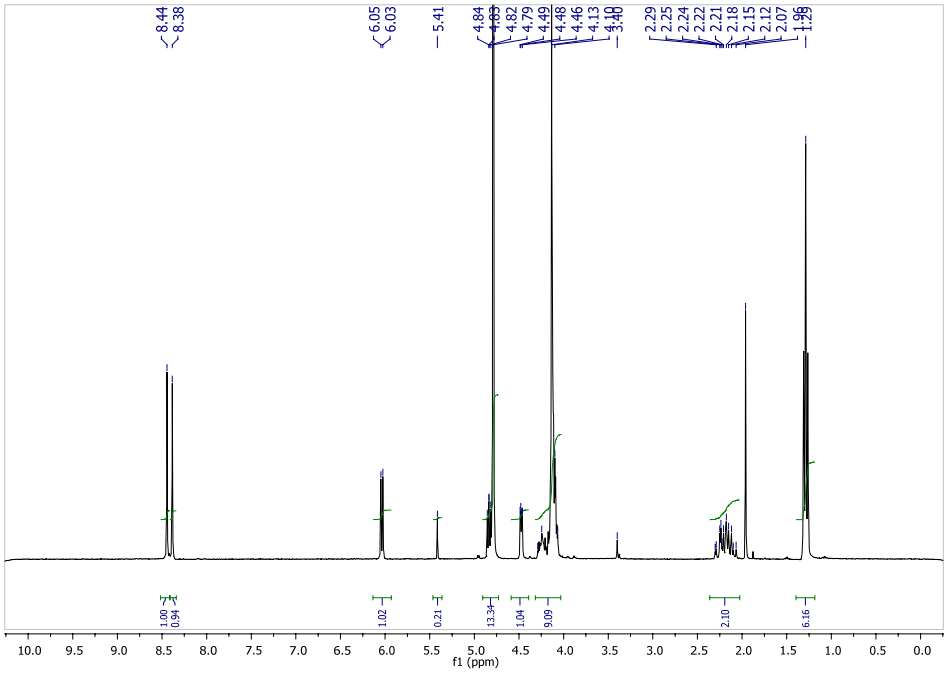
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



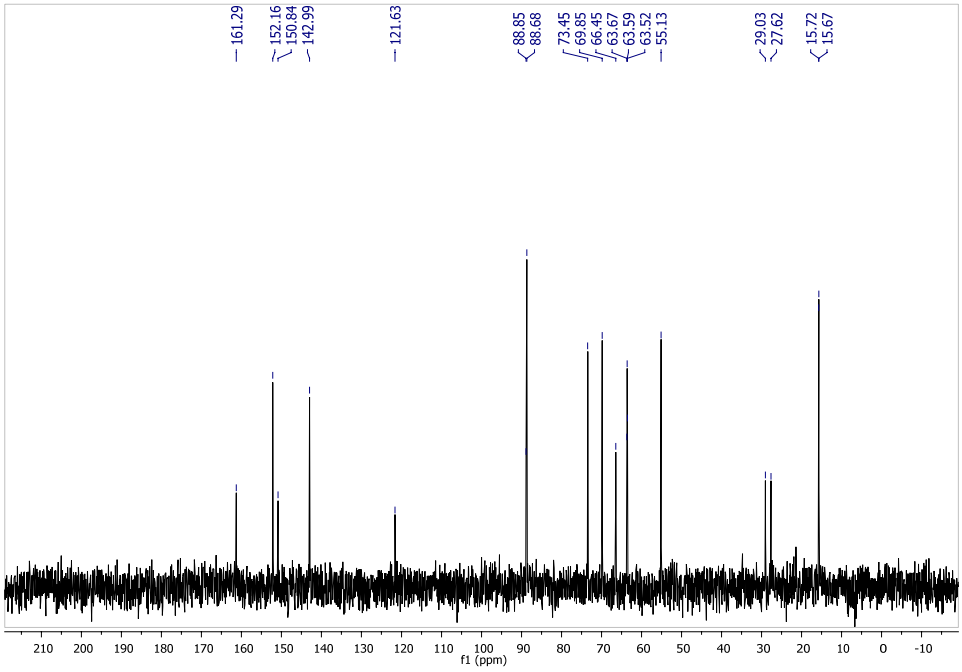


9-(6-Deoxy-6-diethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl)-6-*O*-methyl-purine (15a)

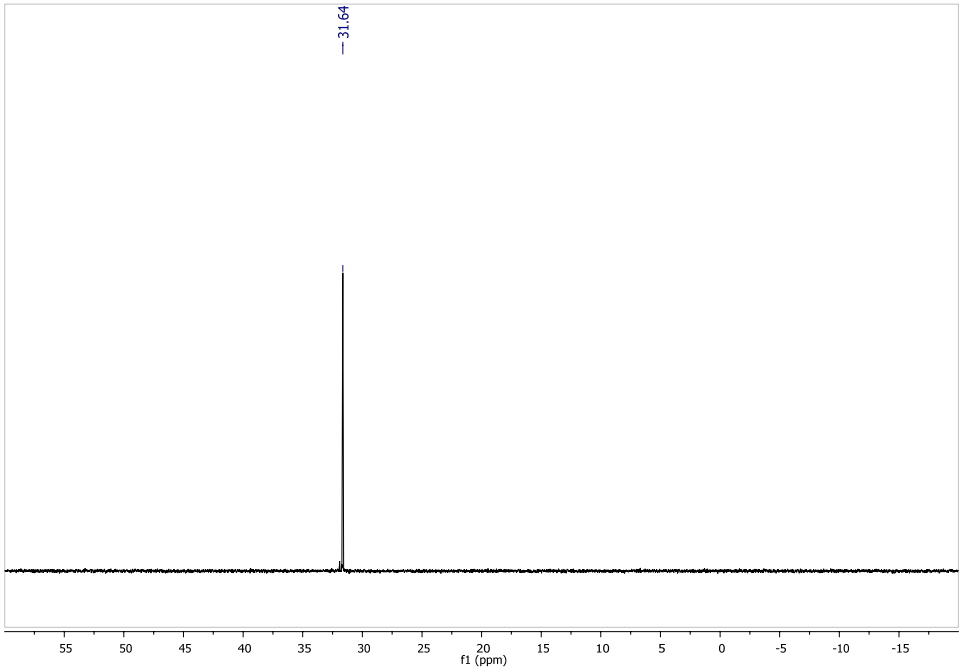
^{1}H NMR spectrum (300 MHz, D_2O)

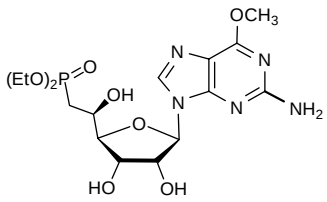


^{13}C NMR spectrum (75 MHz, D_2O)



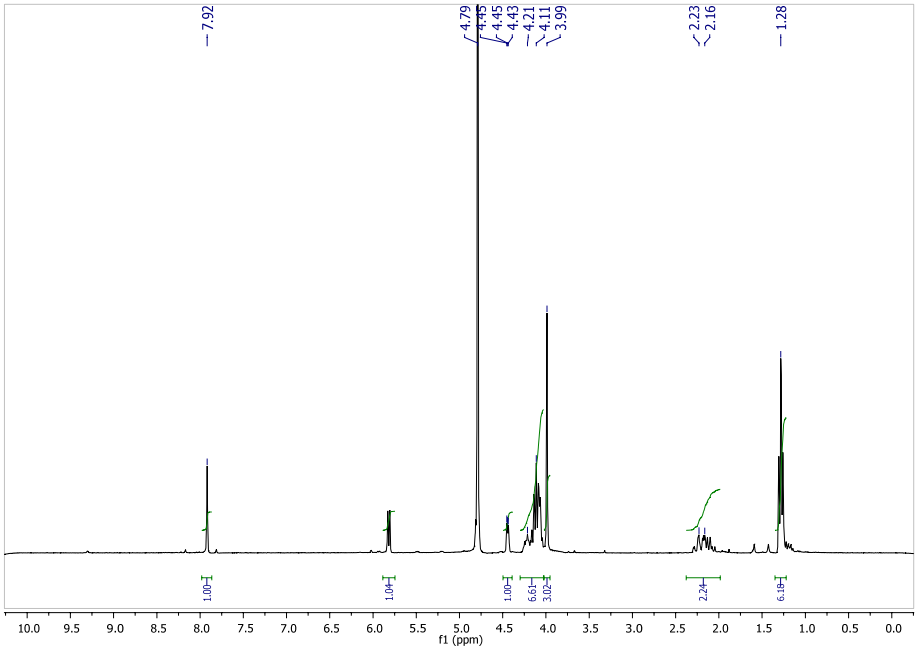
^{31}P NMR spectrum (121 MHz, D_2O)



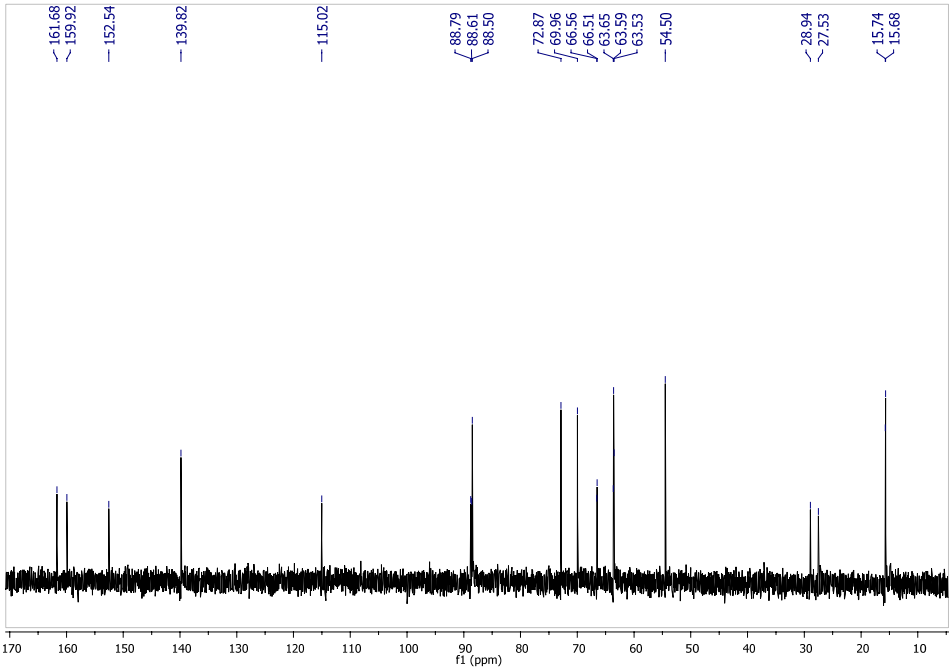


2-Amino-9-(6-deoxy-6-diethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl)-6-*O*-methyl-purine (15b)

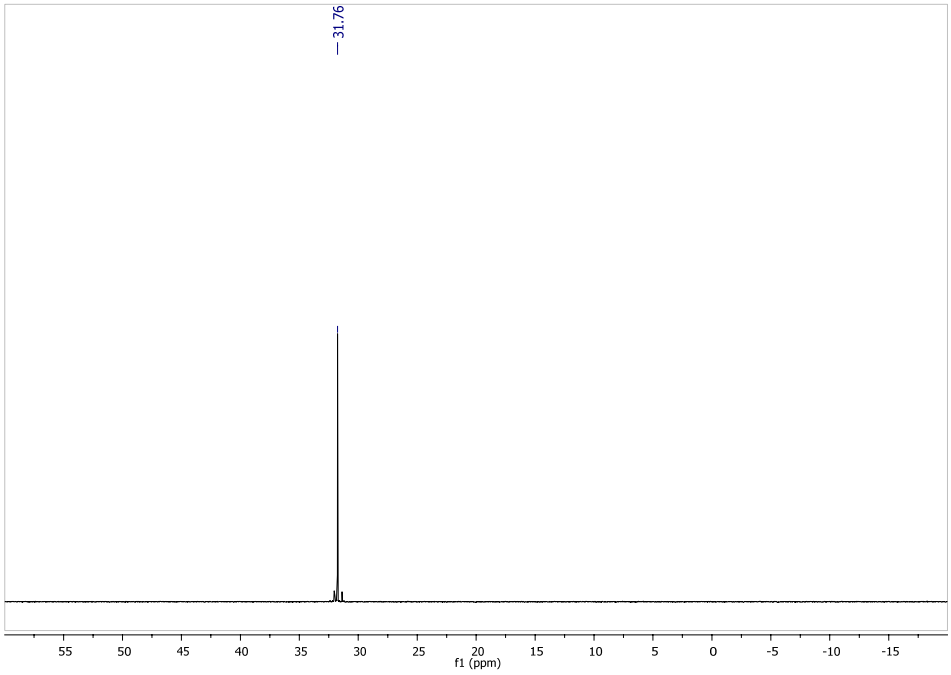
^{1}H NMR spectrum (300 MHz, D_2O)

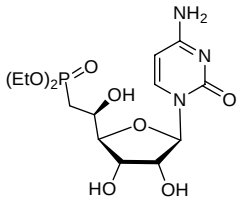


^{13}C NMR spectrum (75 MHz, D_2O)



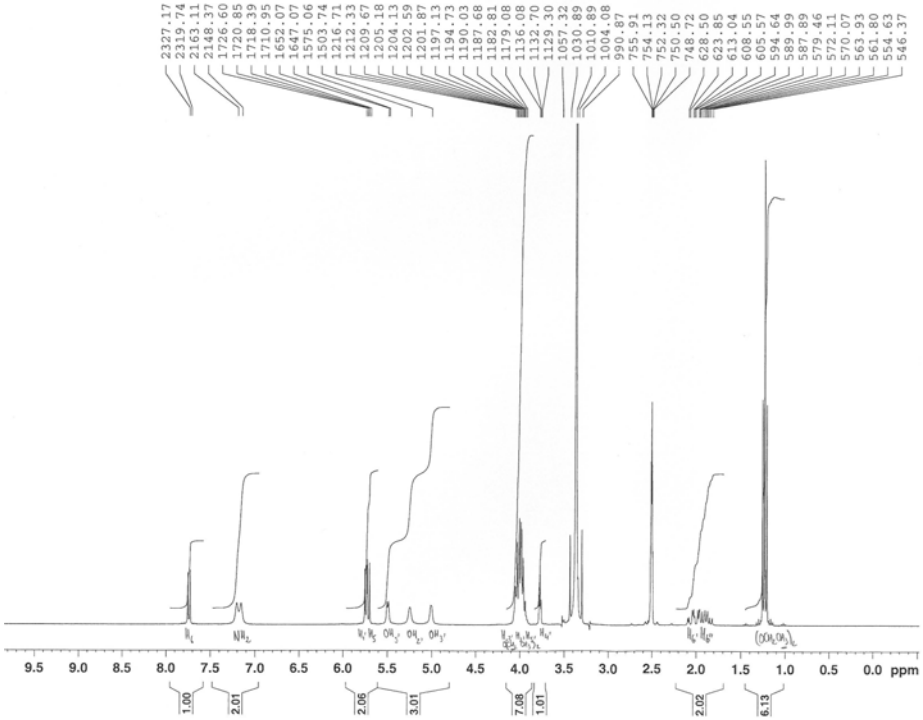
^{31}P NMR spectrum (121 MHz, D_2O)



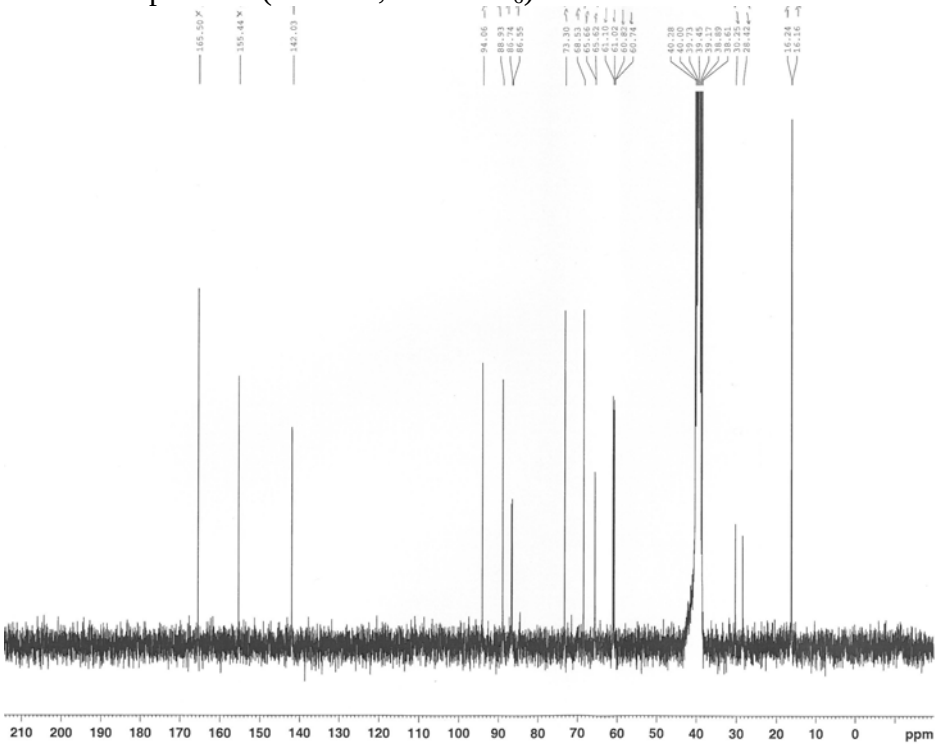


1-(6-Doxy-6-diethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) cytosine (15c)

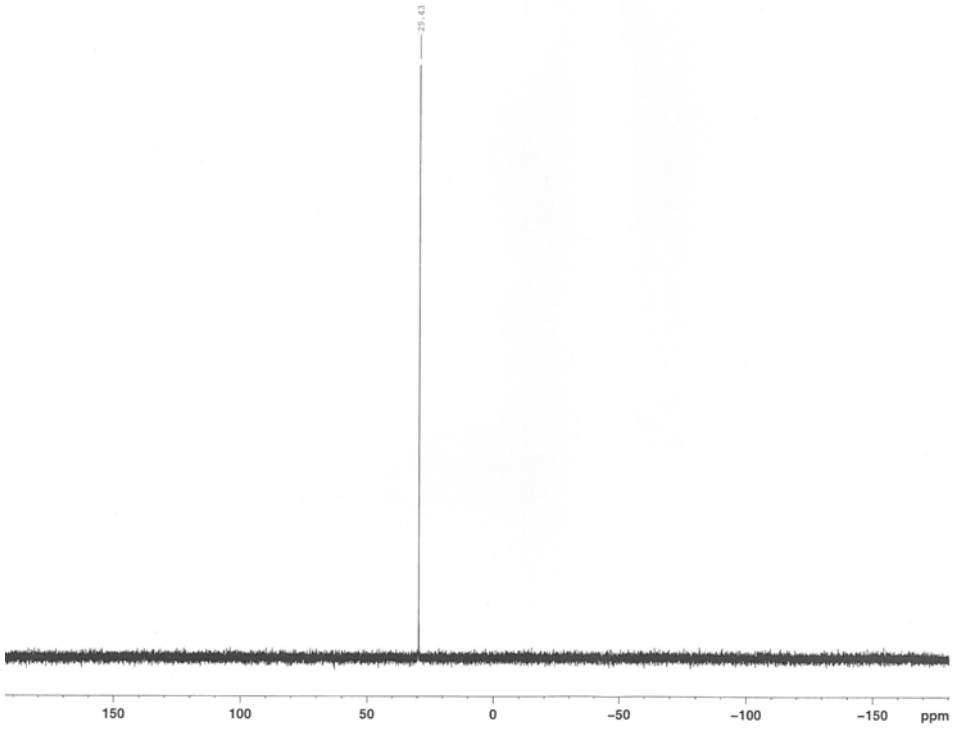
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

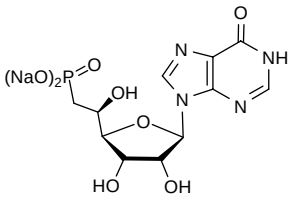


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



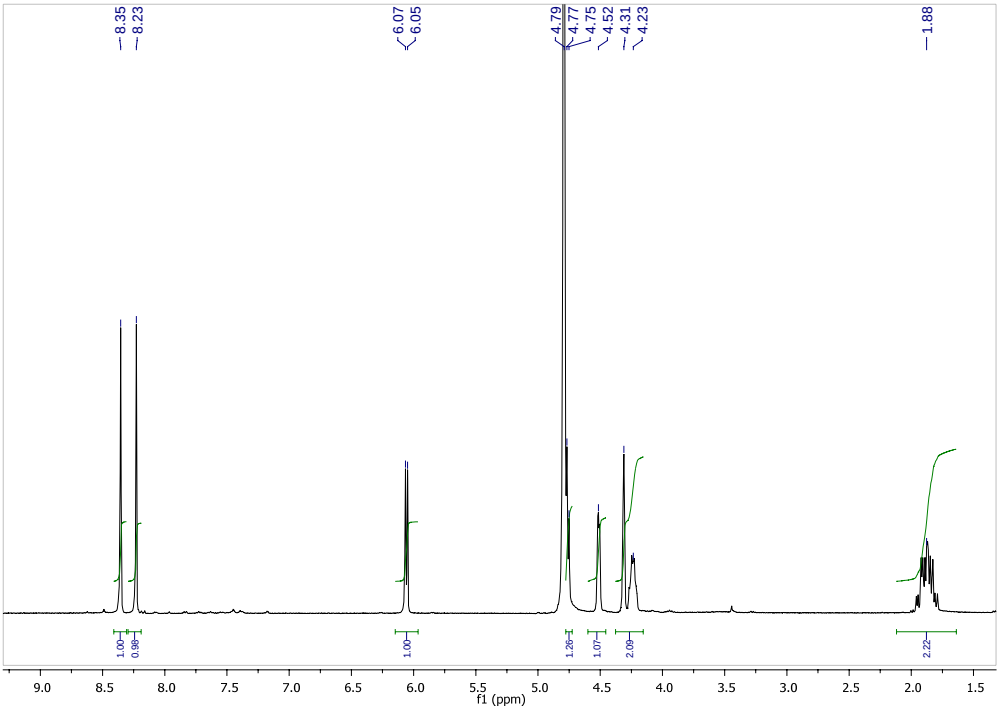
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



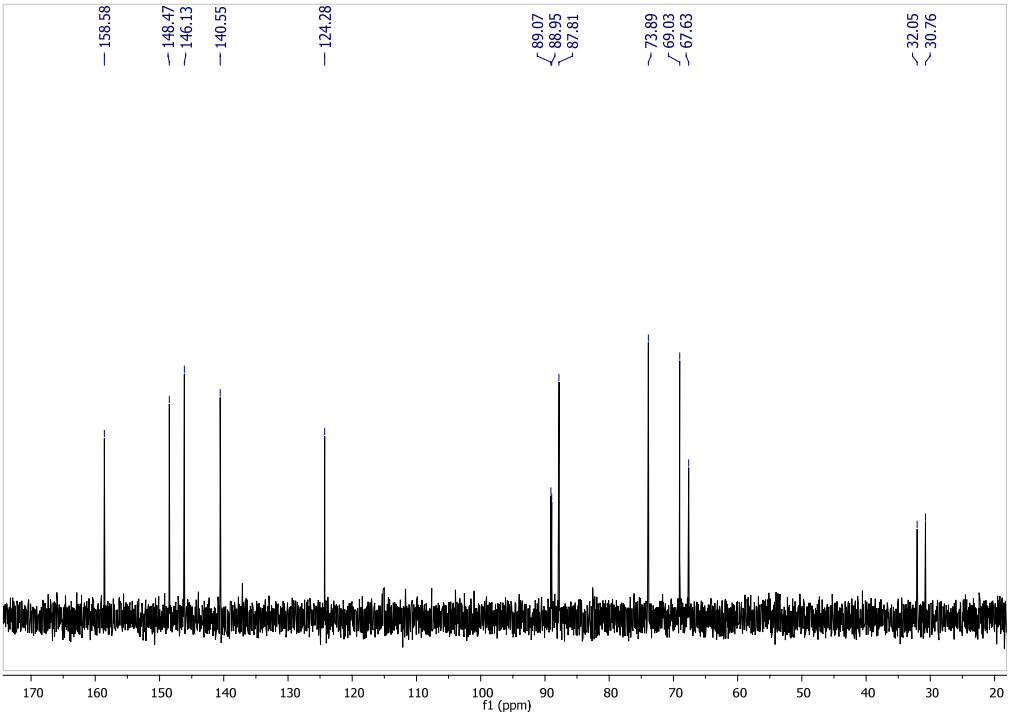


9-(6-Deoxy-6-phosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) hypoxanthine, sodium salt (16a)

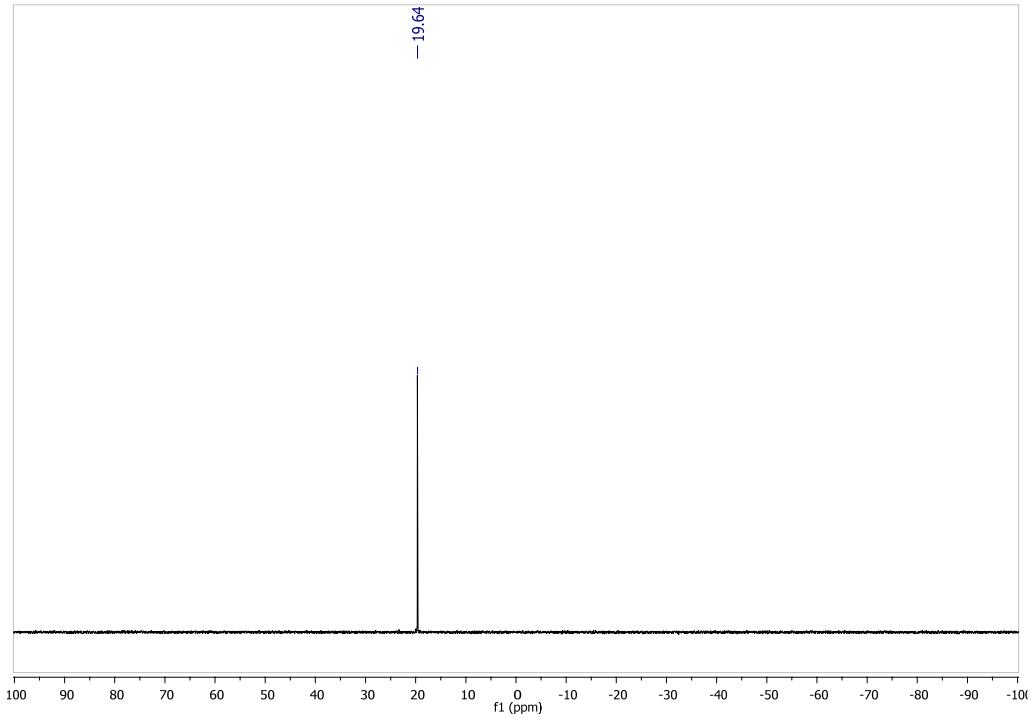
^{1}H NMR spectrum (300 MHz, D_2O)

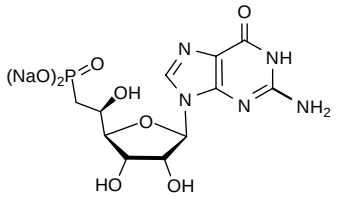


^{13}C NMR spectrum (75 MHz, D_2O)



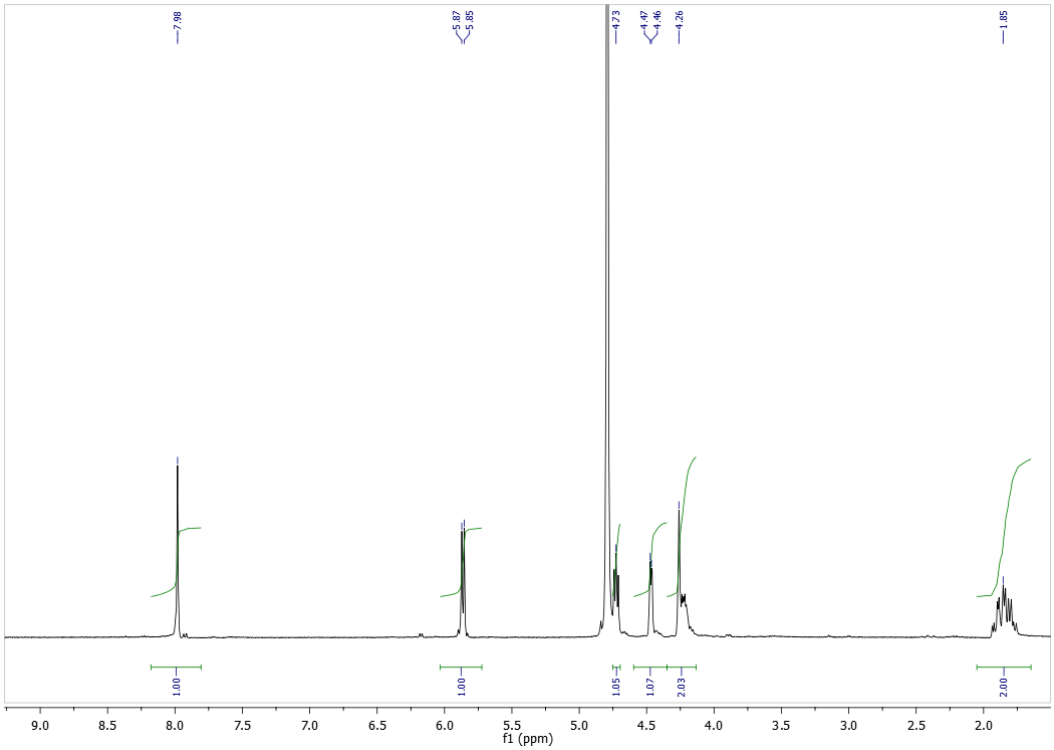
^{31}P NMR spectrum (121 MHz, D_2O)



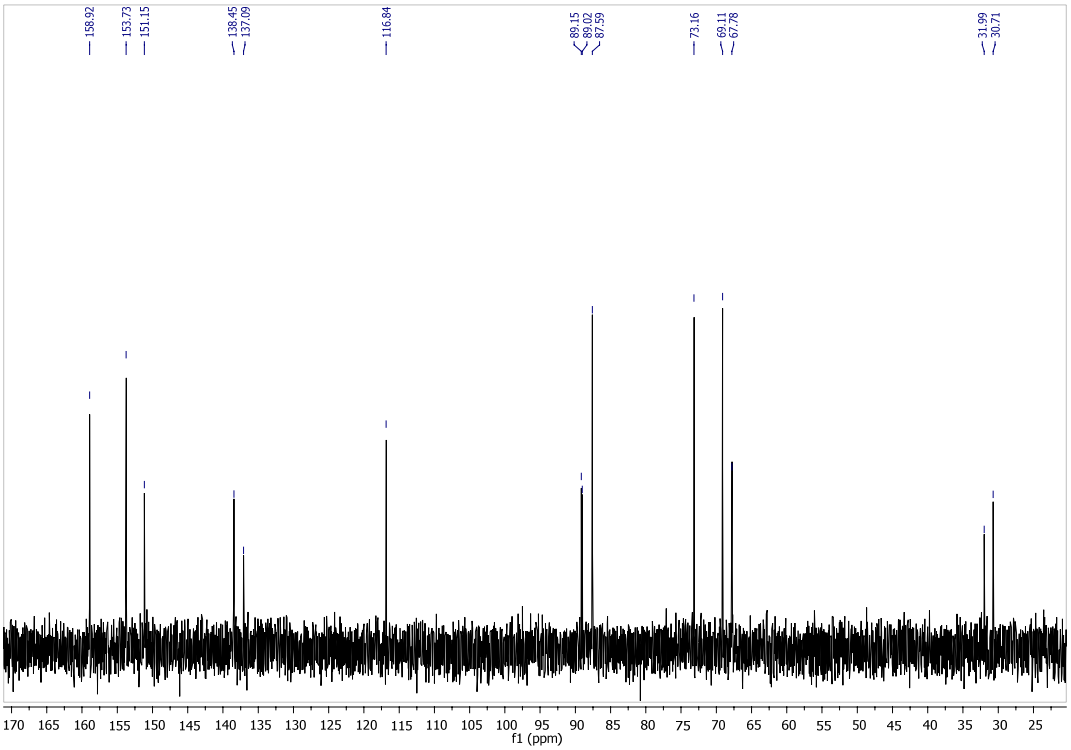


9-(6-Deoxy-6-phosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) guanine, sodium salt (16b)

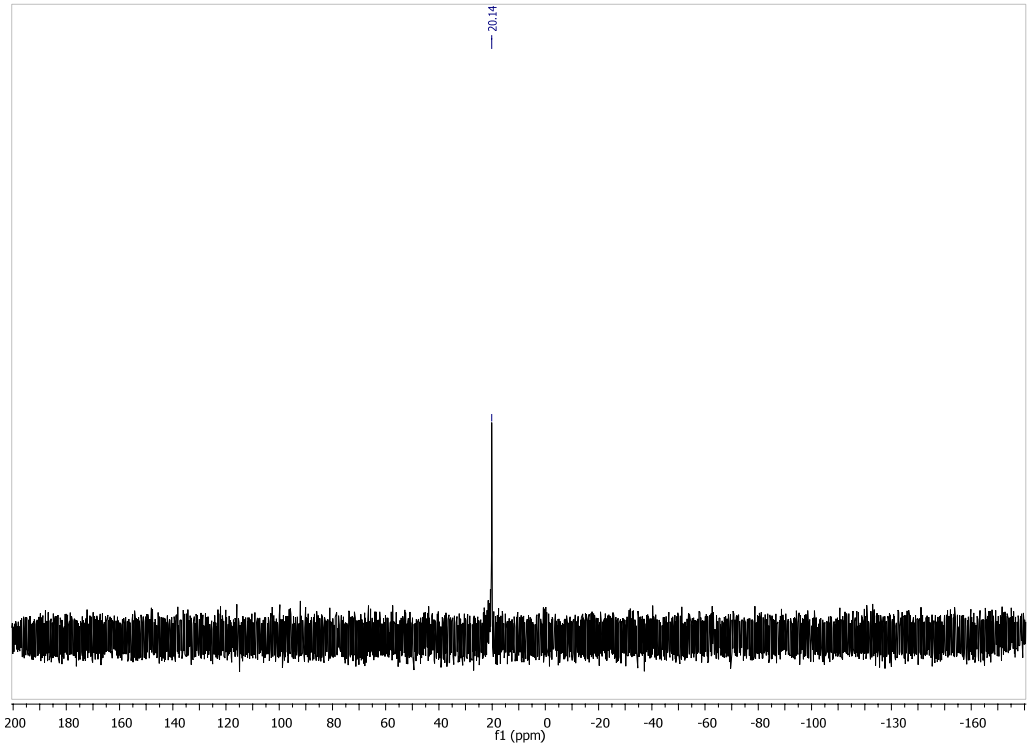
^{1}H NMR spectrum (300 MHz, D_2O)

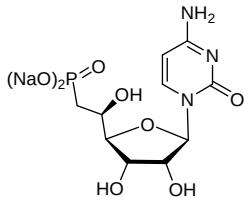


^{13}C NMR spectrum (75 MHz, D_2O)



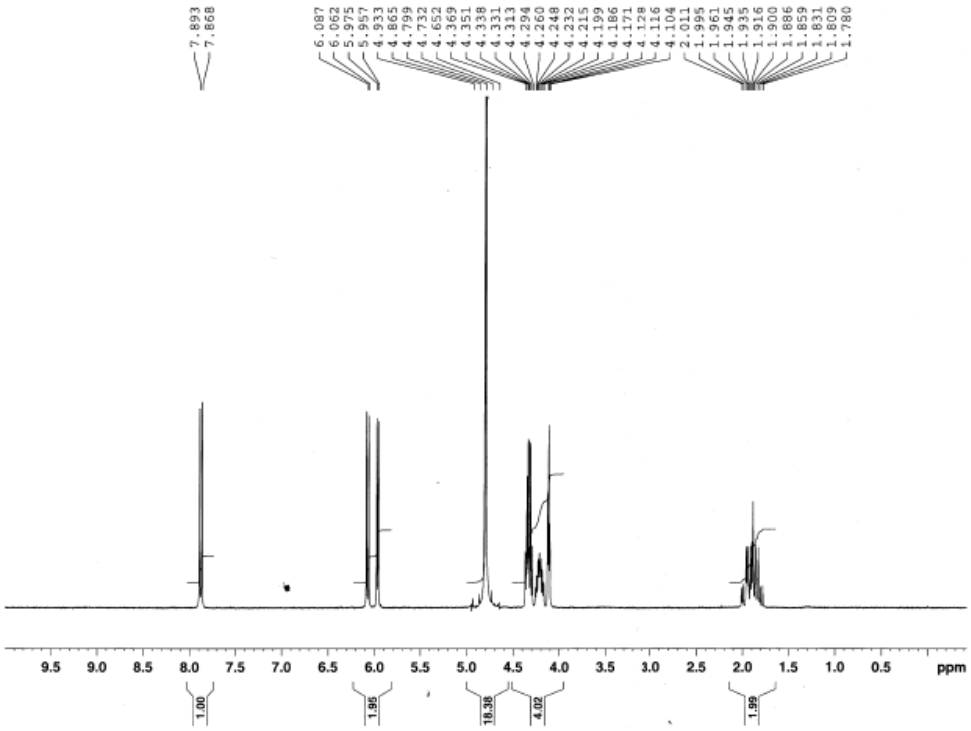
^{31}P NMR spectrum (121 MHz, D_2O)



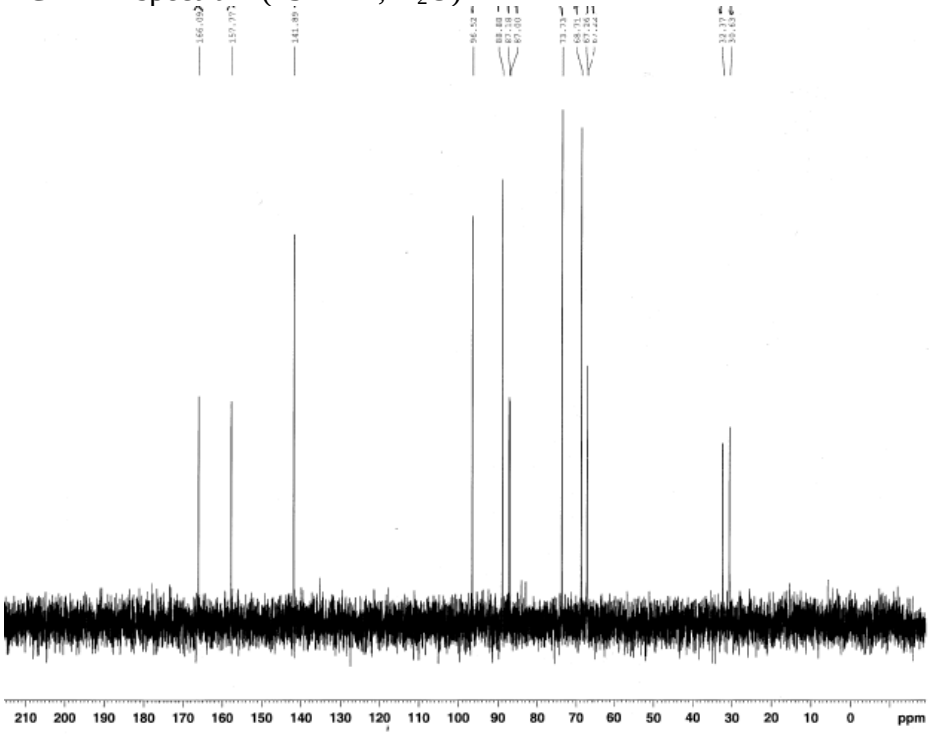


1-(6-Deoxy-6-phosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) cytosine, sodium salt (16c)

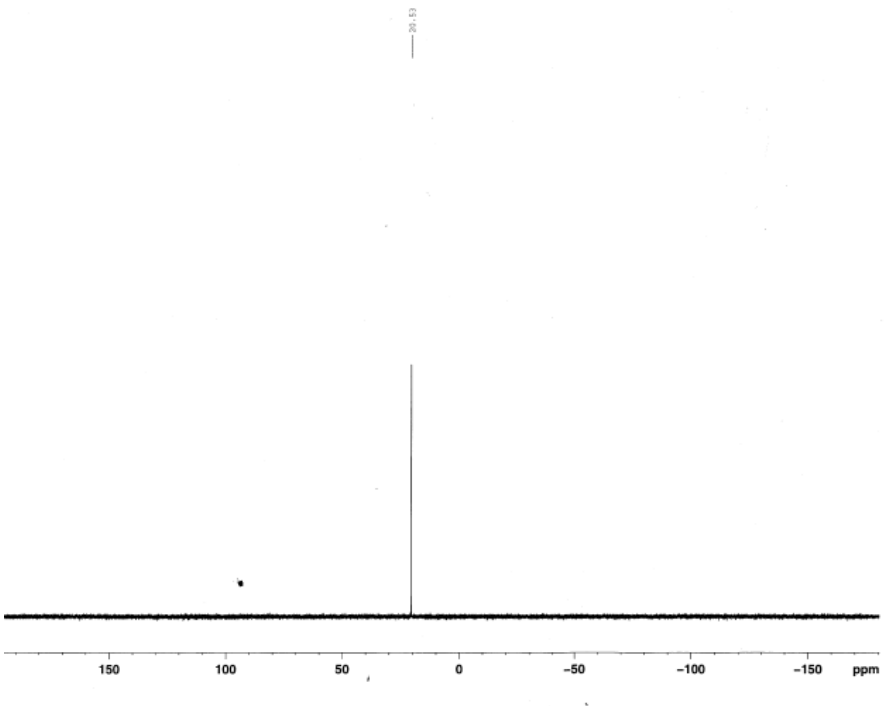
^{1}H NMR spectrum (300 MHz, D_2O)

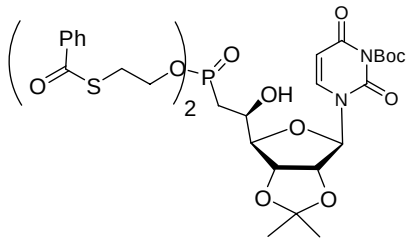


^{13}C NMR spectrum (75 MHz, D_2O)



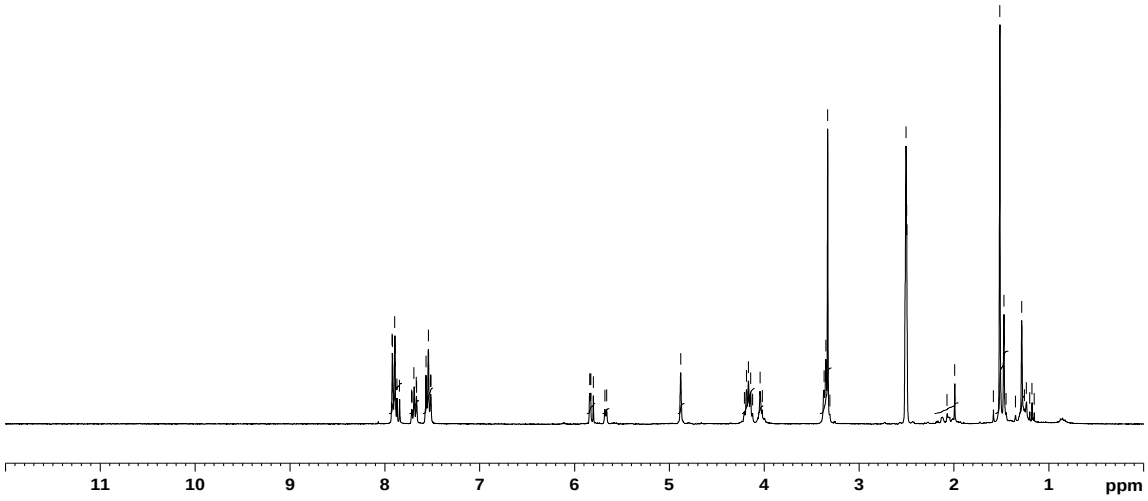
^{31}P NMR spectrum (121 MHz, D_2O)



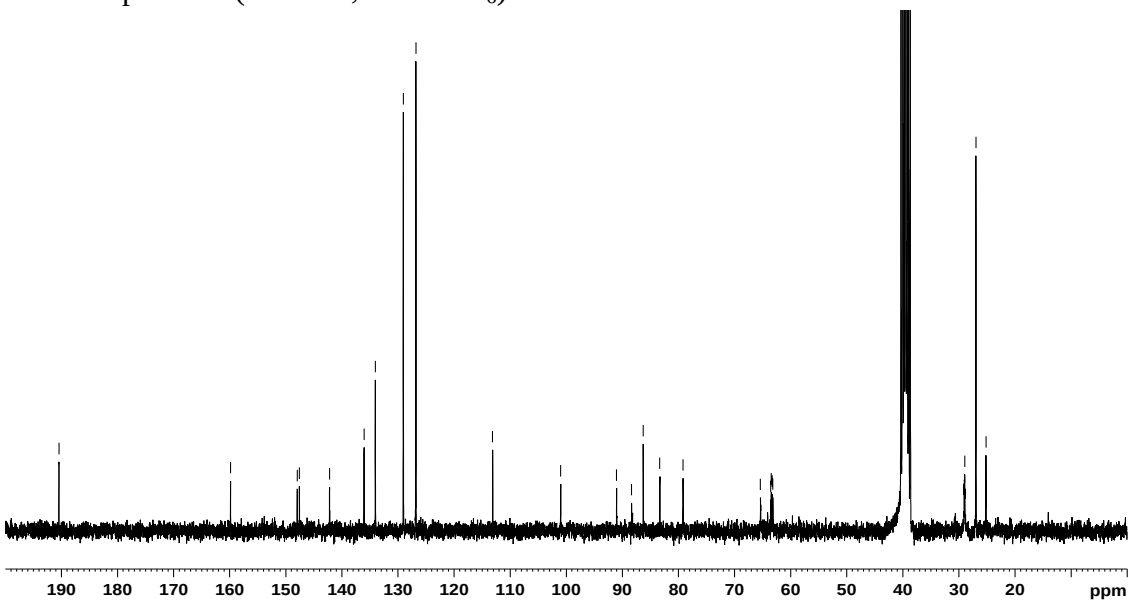


***N*-*3*-*tert*-Butyloxycarbonyl-1-(6-deoxy-6-di(*S*-benzoylthio)ethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl) uracil (17)**

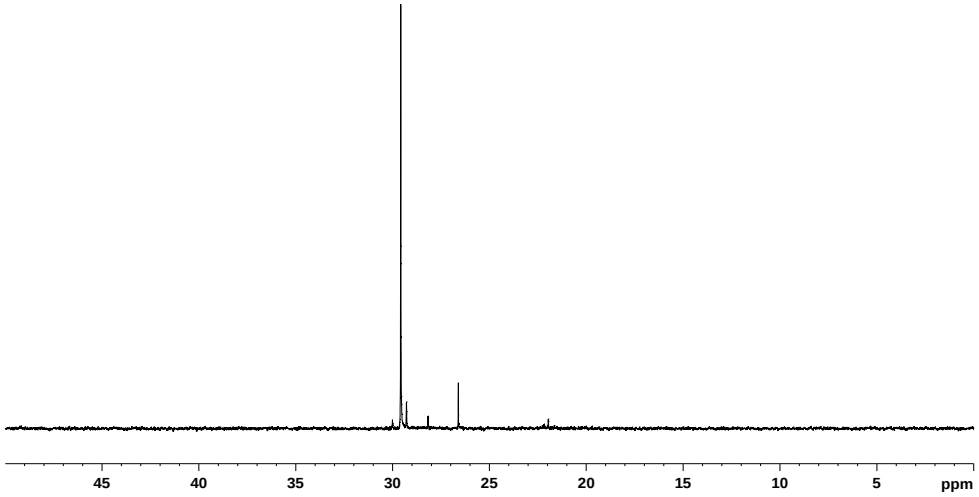
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

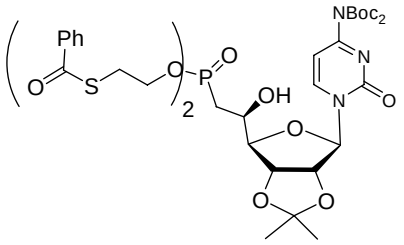


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



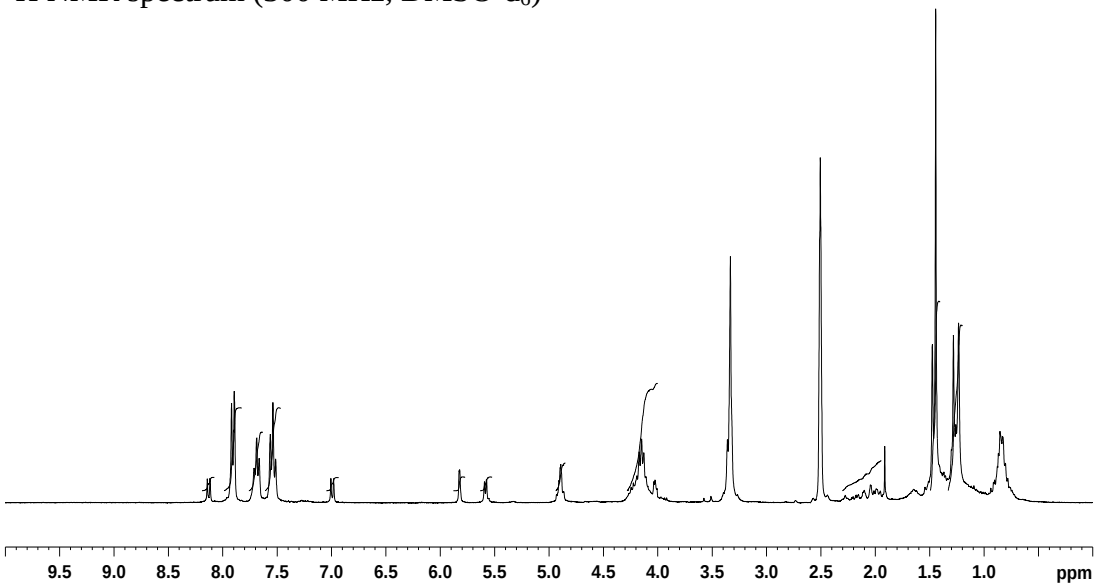
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



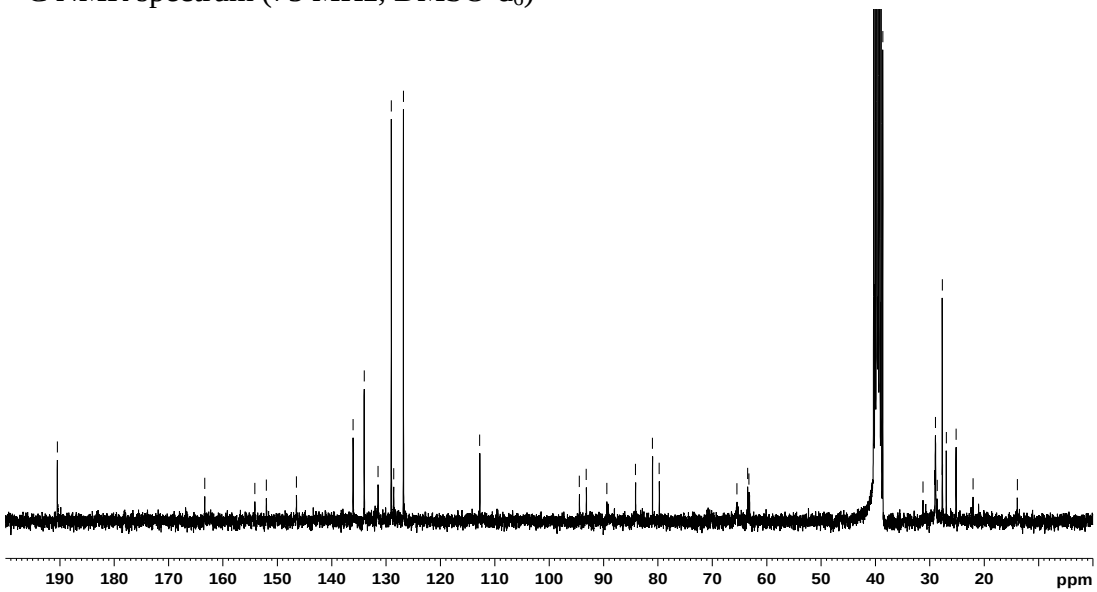


***N*-4(*tert*-Butyloxycarbonyl)-1-(6-deoxy-6-di-(*S*-benzoylthio)ethylphosphono-2,3-*O*-isopropylidene-*β*-D-ribo-(5*S*)-hexofuranosyl) cytosine (18)**

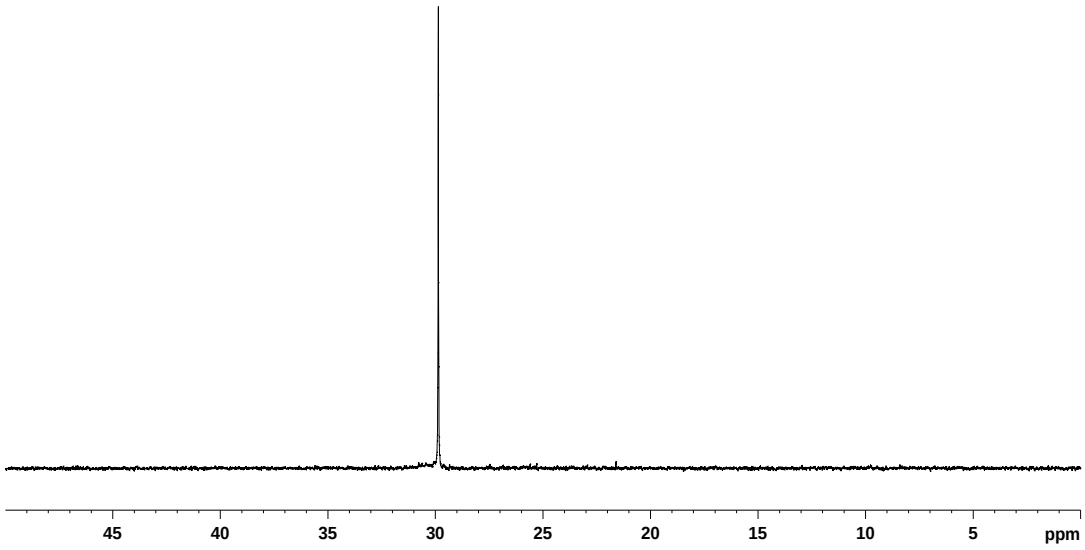
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

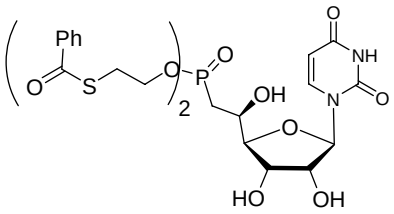


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



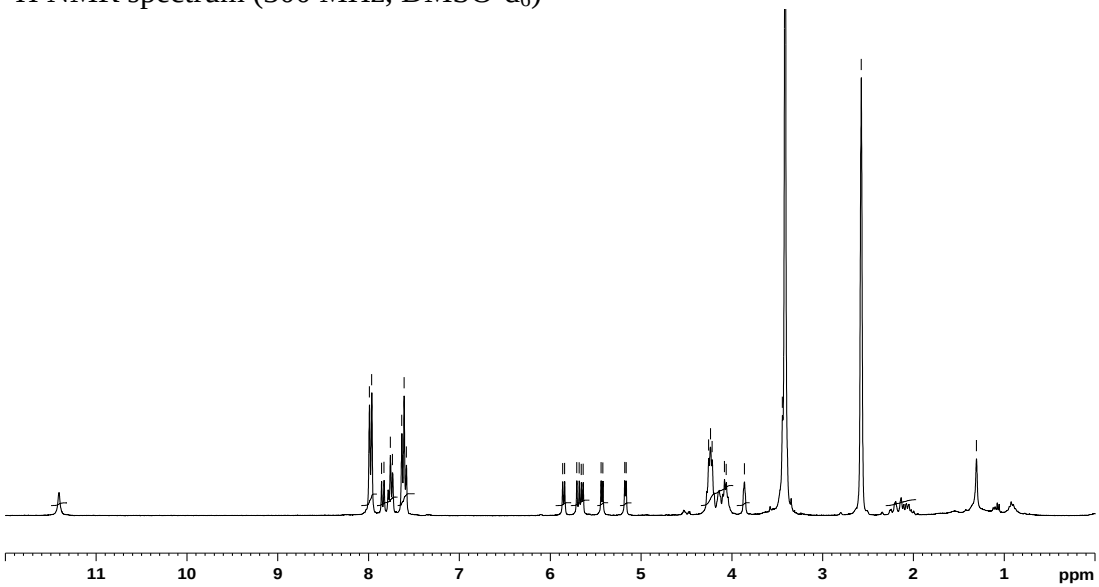
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



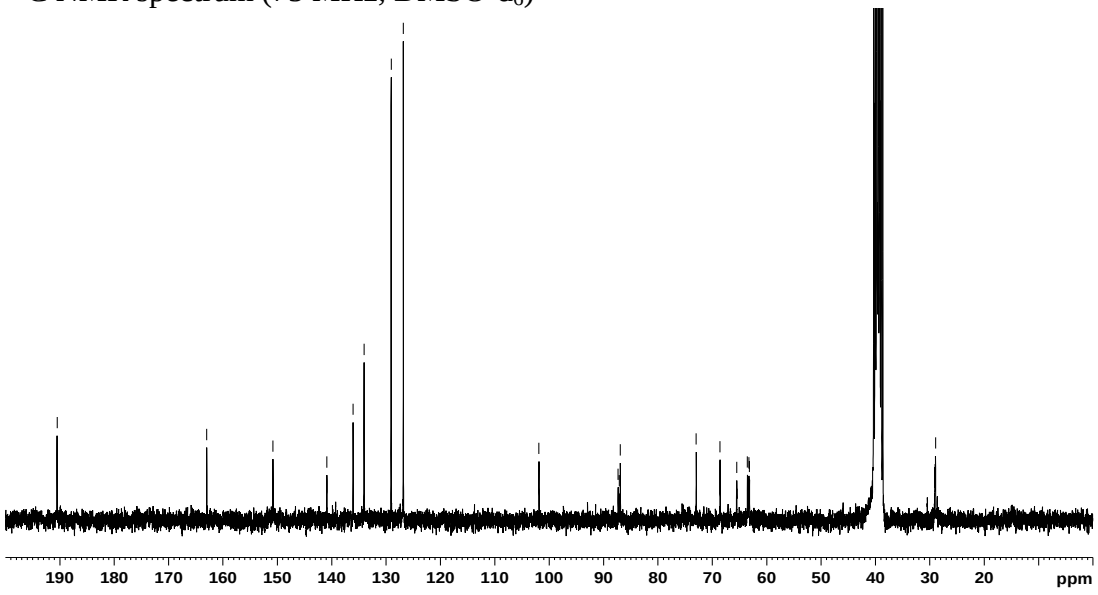


1-(6-Deoxy-6- di(*S*-benzoylthio)ethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) uracil (19)

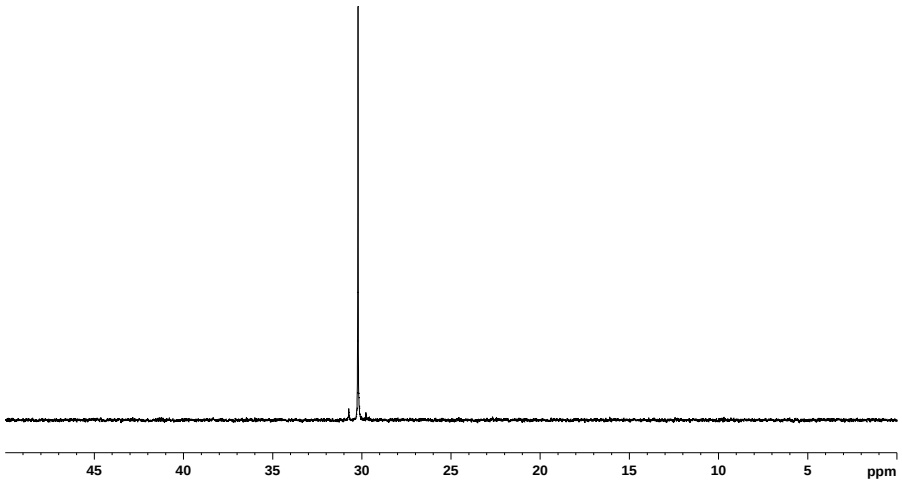
^{1}H NMR spectrum (300 MHz, DMSO-d_6)

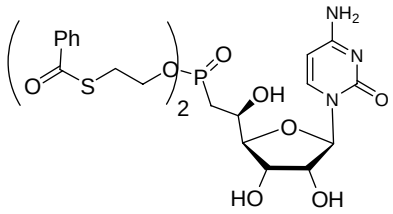


^{13}C NMR spectrum (75 MHz, DMSO-d_6)



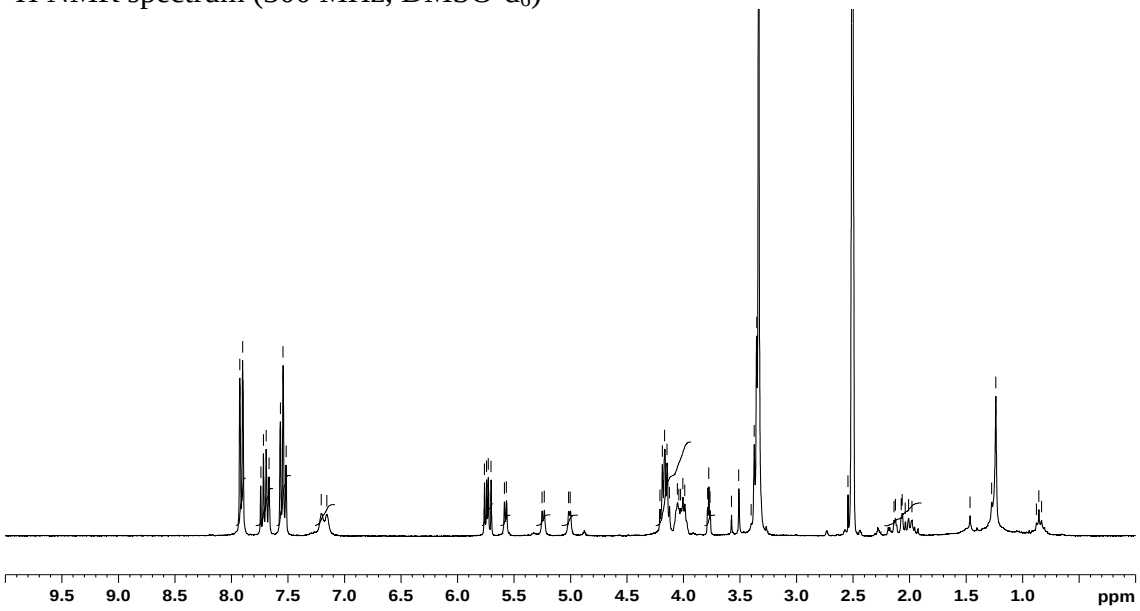
^{31}P NMR spectrum (121 MHz, DMSO-d_6)



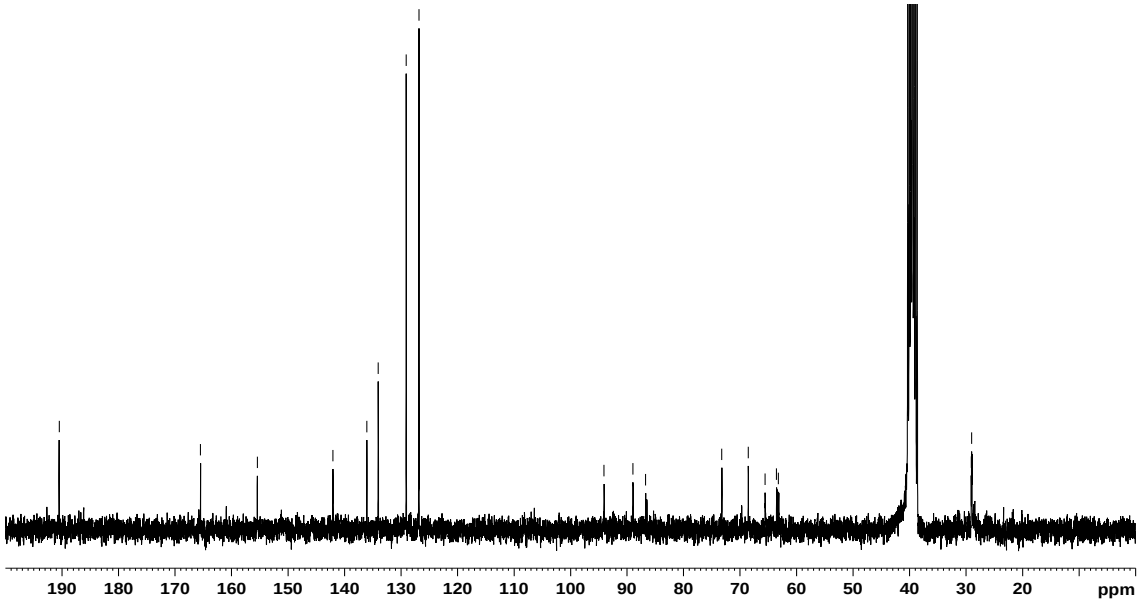


1-(6-Deoxy-6-di(*S*-benzoylthio)ethylphosphono-*β*-D-ribo-(5*S*)-hexofuranosyl) cytosine (20)

^{1}H NMR spectrum (300 MHz, DMSO-d_6)



^{13}C NMR spectrum (75 MHz, DMSO-d_6)



^{31}P NMR spectrum (121 MHz, DMSO-d_6)