Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information

A novel, rapid and green method of phosphorylation under ultrasound irradiation and catalyst free conditions

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1. General:

All chemicals and solvents were purchased from common commercial sources and were used as received without any further purification. All reactions were monitored by TLC on silica Merck 60 F_{254} percolated aluminum plates and were developed by spraying with ninhydrin solution. Column chromatography was performed with Merck silica gel (230-400 mesh). Proton nuclear magnetic resonance (^{1}H NMR) spectra were recorded on a Brücker spectrometer at 250, 300 or 400 MHz. Chemical shifts is reported in δ units (ppm) with TMS as reference (δ 0.00). All coupling constants (*J*) are reported in Hertz. Multiplicity is indicated by one or more of the following: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet). Carbon nuclear magnetic resonance (^{13}C NMR) spectra were recorded on a Brücker at 60, 75 or 100 MHz. Chemical shifts are reported in δ units (ppm) relative to $CDCl_3$ (δ 77.0). Phosphorus nuclear magnetic resonance (^{31}P NMR) spectra were recorded on a Brücker at 160 MHz. Chemical shifts are reported in δ units (ppm) relative to CDCl3 (δ 00.0). Infrared spectra were recorded on a SHIMADZU FT-IR 8000 spectrometer. Elemental analyses were recorded on a EURO E.A 3700. Melting points were recorded on a Büchi B-545 apparatus in open capillary tubes. Ultrasound assisted reactions were carried out using a FUNGILAB ultrasonic bath with a frequency of 40 kHz and a nominal power of 250 W. The reactions were carried out in an open glass tube (diameter: 25 mm; thickness: 1 mm; volume: 20 mL) at 90°.

2. Typical experimental procedure for the phosphorylation:

In a 10 ml round bottom flask taken *N*-acylsulfonamide (1 mmol) and triethylphosphite or trimethylphosphite (1 mmol) was added. Then reaction mixture was subjected to the ultrasonication for appropriate time. After completion of the reaction, as indicated by TLC, silica gel; dichloromethane:methanol (9,5:0.5).

Surplus reactants were removed by column chromatography eluted with dichloromethane

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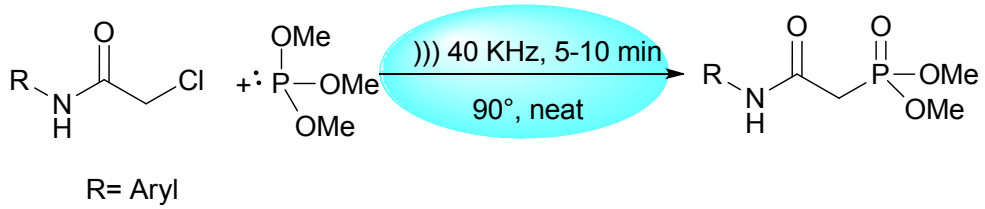
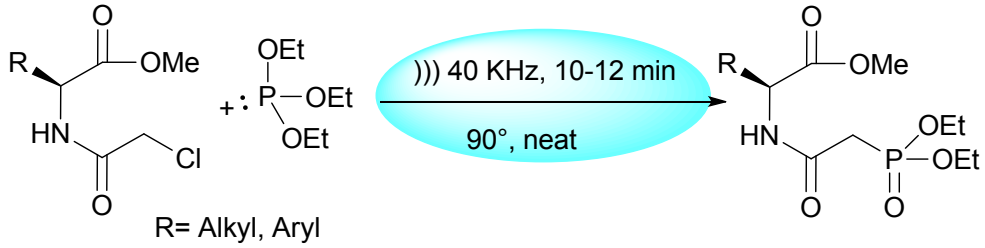
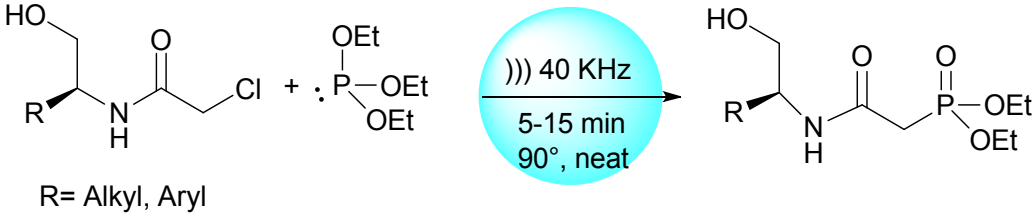


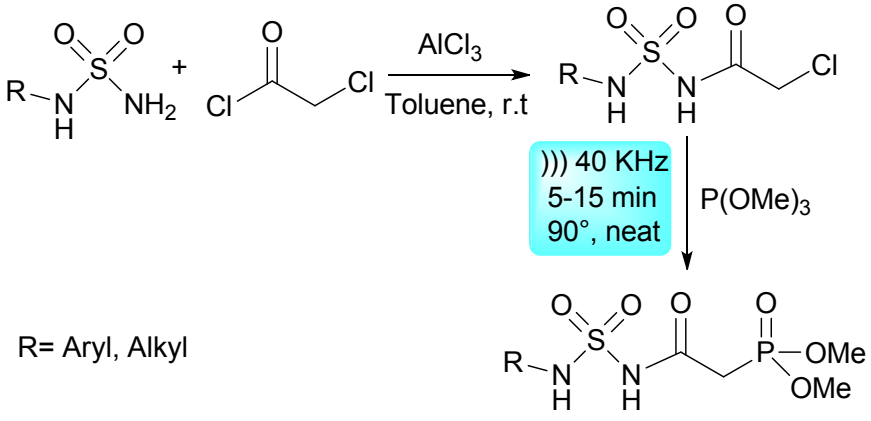
Scheme 1: Ultrasound assisted phosphorylation of various structurally *N*-acylamines.



Scheme 2: Ultrasound assisted phosphorylation of various structurally *N*-acylaminoesters.

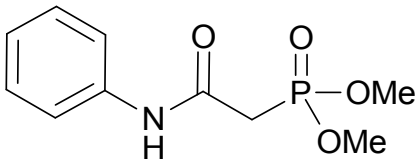


Scheme 3: Ultrasound assisted phosphorylation of various structurally *N*-acylaminoalcohols.



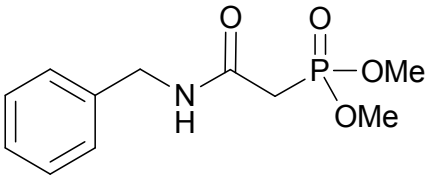
Scheme 4: Ultrasound assisted phosphorylation of various structurally *N*-acylsulfonamides**.**

3. Spectral data:



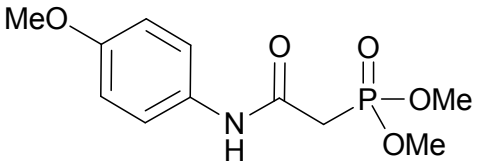
Dimethyl (2-oxo-2-(phenylamino)ethyl)phosphonate (Table 1, Entry 1a)

Yellow oil. Yield 90%. R_f = 0.42 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3280.62, 1674.25, 1510.15, 1319.00, 1231.25, 1039.67.δ_P(100 $CDCl_3$) 27.4. δ_H (250 MHz, $CDCl_3$) 2.85 (s, 1H, CH_2-CO), 2.95 (s, 1H, CH_2-CO),3.72 (s, 3H, CH_3-O), 3.78 (s, 3H, CH_3-O), 4.44 (s, 1H,NH), 7.30 (m, 5H, H-Ar).δ_C (62 MHz, $CDCl_3$) 33,34, 42.7, 52.1,126.9, 127.1, 136.2, 162.4.Anal. Calc. for $C_{10}H_{15}NO_4P$:C49.39, H 5.80, N 5.76. Found: C 49.35, H 5.85, N 5.75%. M=243.



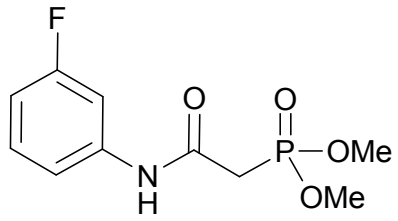
Dimethyl (2-(benzylamino)-2-oxoethyl)phosphonate (Table 1, Entry 2a)

Yellow oil. Yield 89%. R_f = 0.40 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1}3284.73, 1660, 1555.42, 1314.19, 1247.25, 1034.23. δ_P(100 $CDCl_3$) 27.6.δ_H (250 MHz, $CDCl_3$) 1.45 (s, 1H, CH_2-NH),1.54 (s, 1H, CH_2-NH),3.08 (s, 1H, CH_2-CO),3.13 (s, 1H, CH_2-CO),3.85 (2d, 6H,$J_1$11.02, $J_2$11.20, 2CH_3-O), 7.10 (m, 1H, H-Ar), 7.31 (t, 2H,*J* 7.02 H-Ar), 7.54 (d, 2H, *J* 8.32, H-Ar), 9.32 (s, 1H, NH-CO).δ_C (62 MHz, $CDCl_3$) 34.35,36.42, 53.55, 53.65,120.49, 124.63, 129.05, 133.3, 162.2.Anal. Calc. for $C_{11}H_{16}NO_4P$:C 51.36, H 6.27, N 5.45. Found: C 51.35, H 6.30, N 5.48%. M=257.



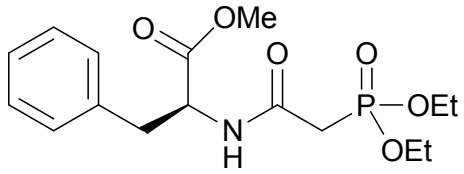
Dimethyl (2-((4-methoxyphenyl)amino)-2-oxoethyl)phosphonate (Table 1, Entry 3a)

Yellow oil. Yield 84%. R_f = 0.48 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3274.05, 1684.16, 1498, 1234.15, 1046.δ_P(100 $CDCl_3$) 27.4. δ_H (250 MHz, $CDCl_3$) 2.85 (s, 1H, CH_2-CO), 2.97 (s, 1H, CH_2-CO),3.64 (s, 3H, CH_3-O), 3.68 (s, 3H, CH_3-O),3.74 (s, 3H, CH_3-O),5.20 (s, 1H, NH), 7.21(m, 5H, H-Ar).δ_C (62 MHz, $CDCl_3$) 33, 35, 39, 44.16, 56.06,125.4, 126.8,137.3, 139.1, 164.2.δ_C (62 MHz, $CDCl_3$) 41,51.1, 51.7, 52.5,120.9, 125.3, 140.4, 156.7, 164.2.Anal. Calc. for $C_{11}H_{16}NO_5P$: C 48.36, H 5.90, N 5.13. Found: C 48.29, H 5.85, N 5.15%. M=273.



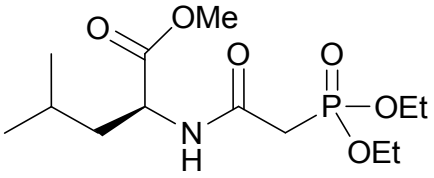
Dimethyl (2-((3-fluorophenyl)amino)-2-oxoethyl)phosphonate (Table 1, Entry 4a)

Yellow oil. Yield 86%. R_f = 0.43 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3290, 1684.14, 1512.98, 1239.34, 1067.25.δ_P(100 $CDCl_3$) 27.4. δ_H (250 MHz, $CDCl_3$) 2.78 (s, 1H, CH_2-CO), 2.85 (s, 1H, CH_2-CO),3.71 (s, 3H, CH_3-O), 3.79 (s, 3H, CH_3-O), 6.90 (m, 1H, H-Ar), 7.12-7.18 (m, 2H, H-Ar),7.21 (m, 1H, H-Ar),9.12 (s, 1H, NH-CO).δ_C (62 MHz, $CDCl_3$) 41.15,41.92, 50.93, 120.16, 121.8, 123.69,125.10, 134.41, 139.4, 161.28.Anal. Calc. for $C_{10}H_{13}NO_4FP$: C 45.99, H 5.02, N 5.36. Found: C 46.05, H 5.05, N 5.39%. M=261.



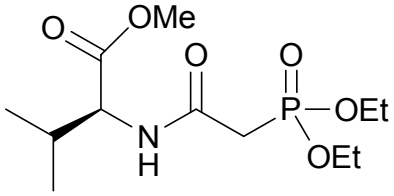
(S)-Methyl 2-(2-(diethoxyphosphoryl)acetamido)-3-phenylpropanoate (Table 2, Entry 1b)

Oil. Yield 80%. R_f = 0.57 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3264, 1745, 1663, 1245, 1161.δ_P(160 $CDCl_3$) 16.4. δ_H (400 MHz, $CDCl_3$)1.25 (2t, 6H, $J_1$7.01, $J_2$5.30 Hz, 2CH_3-P), 2.8 (s, 1H,CH_2-CO), 2.95(s, 1H,CH_2-CO),3.05-3.25 (2dd, 2H, J_1 7.09, $J_2$5.45 Hz, CH_2-Ph), 3.75 (s, 3H, CH_3-O), 4.15 (m, 4H, CH_2-O-P), 4.8 (m, 1H, *CH), 7.26 (d,1H, J2.2, NH).δ_C (100 MHz, $CDCl_3$) 16.29, 16.31,34.41, 37.77, 52.35, 53.83, 62.76, 62.85, 127.19, 128.58, 129.26, 135.95, 161, 173.Anal. Calc. for $C_{16}H_{24}NO_6P$:C 53.78, H 6.77, N 3.92. Found: C 53.75, H 6.82, N 3.90%. M=357.



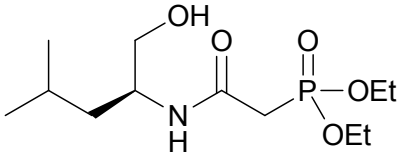
(S)-Methyl 2-(2-(diethoxyphosphoryl)acetamido)-4-methylpentanoate (Table 2, Entry 2b)

Oil. Yield 82%. R_f = 0.6 (CH_2Cl_2/MeOH:95/05). ν_{max}(KBr)/cm^{-1} 3274, 1743, 1674, 1245, 1161.δ_P(160 $CDCl_3$) 16.33. δ_H (400 MHz, $CDCl_3$)0.95 (2d, 6H, *J*8.01 Hz, $2CH_3$-iBu), 1.3 (t, 6H,*J* 7.05 Hz,CH_3-CH_2O), 1.5-1.7 (m, 3H, CH-iBu,CH_2-iBu), 2.82 (d, 1H,CH_2-CO), 2.95 (s, 1H, CH_2-CO), 3.7 (s, 3H, CH_3-O), 4.1 (m, 4H, CH_2-O-P), 4.54 (m, 1H, *CH), 7.1 (d,1H, *J*7.81, NH).δ_C (100 MHz, $CDCl_3$) 16.27,16.31,21.6, 22.79, 24.65, 34.23, 40.96, 51.05, 52.19, 62.5, 62.50, 163.95, 173.Anal. Calc. for $C_{13}H_{26}NO_6P$: C 41.29, H 8.11, N 4.33. Found: C 41.25, H 8.19, N 4.25%. M=323.



(S)-methyl 2-(2-(diethoxyphosphoryl)acetamido)-3-methylbutanoate (Table 2, Entry 3b)

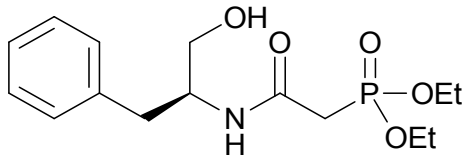
Oil. Yield 88%. R_f = 0.67 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3280.69, 1731, 1651, 1250, 1155.δ_P(160 $CDCl_3$) 16.31. δ_H (400 MHz, $CDCl_3$)0.95 (2d, 6H, *J* 6.90 Hz, $2CH_3$-iPr), 1.4 (t, 6H, *J* 7.07 Hz,CH_3-CH_2), 2.2 (m, 1H, CH-iPr), 2.83 (s, 1H, CH_2-CO), 2.98 (d, 1H, CH_2-CO), 3.75 (s, 3H, CH_3-O), 4.15 (m, 4H, $2CH_2$-O), 4.5 (m, 1H,*CH), 7.15 (d,1H, *J*8.1Hz, NH).δ_C (100 MHz, $CDCl_3$) 16.21, 16.23,18.50, 19.25, 29.71, 34.23, 50.96, 52, 62.61, 62.62, 163.8, 171.9. Anal. Calc. for $C_{12}H_{24}NO_6P$: C 46.60, H 7.82, N 4.53. Found: C 46.55, H 7.72, N 4.61%. M=309.



(S)-Diethyl (2-((1-hydroxy-4-methylpentan-2-yl)amino)-2-oxoethyl)phosphonate (Table 3, Entry 1c)

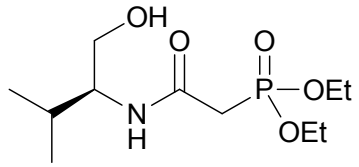
Oil. Yield 79%. R_f = 0.62 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3490, 3180, 1650, 1230, 1112.δ_P(160 $CDCl_3$) 16.33. δ_H (400 MHz, $CDCl_3$)0.98 (2d, 6H, *J*2.75 Hz , $2CH_3$-iBu), 1.4 (m,

8H,2CH_3-CH_2,CH_2-iBu), 1.65 (m, 1H, CH-iBu), 2.45 (s, 1H, OH), 2.85 (s, 1H, CH_2-CO), 2.99 (s, 1H, CH_2-CO),3.50 (dd, 1H, *J* 5.37 Hz, CH_2-OH), 3.75 (dd, 1H, *J* 3.37 Hz, CH_2-OH), 4.2 (m, 5H,2CH_2-O, *CH), 6.8 (d, 1H, *J* 7.89 Hz, NH).δ_C (100 MHz, $CDCl_3$) 16.3, 16.35, 21.98, 23.12, 24.74, 35, 39.86, 50.75, 62.69, 62.74, 65.76, 164.79.Anal. Calc. for $C_{12}H_{26}NO_5P$:C 41.29, H 8.11, N 4.33. Found: C 41.25, H 8.19, N 4.25%. M=295.



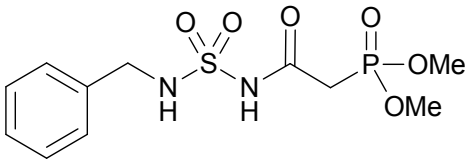
(S)-Diethyl (2-((1-hydroxy-3-phenylpropan-2-yl)amino)-2-oxoethyl)phosphonate (Table 3, Entry 2c)

Oil. Yield 75%. R_f = 0.55 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3880, 3580, 3190, 1650, 1296, 1112.δ_P(160 $CDCl_3$) 16.36. δ_H (400 MHz, $CDCl_3$)1.4 (t, 6H, *J* 7.18 Hz, 2CH_3-CH_2), 2.82 (m, 4H, CH_2-CO,CH_2-Ph), 3.05 (s, 1H, OH), 3.55 (dd, 1H,*J* 4.68 Hz, CH_2-OH), 3.75 (dd, 1H,*J* 3.47 Hz, CH_2-OH), 4.2 (m, 5H, CH_3-CH_2, *CH), 7.05 (d, 1H, *J* 8.07, NH), 7.3 (m, 5H, H-Ar).δ_C (100MHz, $CDCl_3$) 16.3, 16.34, 35.48, 38.54, 52.74, 53.80, 62.80, 127.22, 128.68, 129.55, 135.98, 164.79.Anal. Calc. for $C_{12}H_{26}NO_5P$: C 54.71, H 7.35, N 4.25. Found: C 54.65, H 7.30, N 4.29%. M=329.



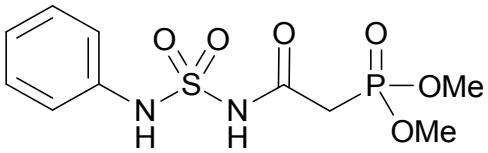
(S)-Diethyl (2-((1-hydroxy-3-methylbutan-2-yl)amino)-2-oxoethyl)phosphonate (Table 3, Entry 3c)

Oil. Yield 83%. R_f = 0.45 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1}3484, 3298, 1650, 1240, 1151.δ_P(160 $CDCl_3$) 16.34. δ_H (400 MHz, $CDCl_3$)0.94 (2d, 6H, *J* 6.56 Hz, 2CH_3-iPr), 1.05 (t, 3H, *J* 6.6 Hz, CH_3-CH_2), 1.25 (t, 3H, *J* 5.24 Hz,CH_3-CH_2), 1.95 (m, 1H, CH-iPr), 2.88 (d, 1H, CH_2-CO), 2.97 (d, 1H, CH_2-CO),3.55-3.75 (m, 2H, CH_2-OH), 4.15 (m, 4H, 2CH_2-O), 4.16 (m, 1H, *CH), 6.80 (d, 1H, *J* 9.64 Hz, NH).δ_C (100 MHz, $CDCl_3$) 16.21, 16.23, 18.14, 19.12, 28.98, 34.99, 50.20, 62.22, 62.30, 64, 163.79.Anal. Calc. for $C_{11}H_{24}NO_5P$: C 46.97, H 8.60, N 4.98. Found: C 46.92, H 8.67, N 4.94%. M=281.



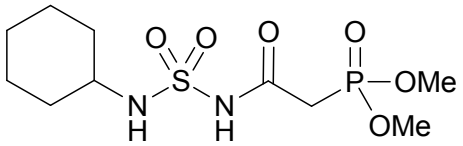
N-benzyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 1d)

Yellow oil. Yield85%. R_f = 0.42 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3350, 1725, 1658, 1364, 1249,1159.δ_P(160 $CDCl_3$) 27.9. δ_H(400 MHz, $CDCl_3$) 2.95 (s, 1H, CH_2-CO), 3.09 (s, 1H, CH_2-CO), 3.75 (s, 1H,CH_2-Ar), 3.66 (s, 1H,CH_2-Ar), 3.82 (2s, 6H, $2CH_3$-O), 7.25 (m, 5H, H-Ar),8.82 (s, 1H, NH-CO).δ_C(100 MHz, $CDCl_3$)35, 41.2, 52, 126.6, 126.9, 128.6, 141.2, 165.1.Anal. Calc. for $C_{11}H_{17}N_2O_6SP$: C 41.25, H 5.35, N 8.75. Found: C 41.35, H 5.25, N 8.85%. M=336.



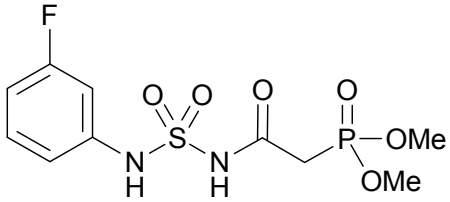
N-phenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 2d)

Yellow oil. Yield 90%. R_f = 0.44 (CH_2Cl_2/MeOH:95/05). ν_{max}(KBr)/cm^{-1}3320, 1715, 1610, 1361, 1234, 1149.δ_P(160 $CDCl_3$) 27.3. δ_H (400 MHz, $CDCl_3$) 2.97 (s, 1H, CH_2-CO), 3.02 (s, 1H, CH_2-CO), 3.82 (2s, 6H, $2CH_3$-O), 6.90 (m,1H, H-Ar),7.12-7.50 (2m, 4H, H-Ar),9.32 (s, 1H, NH-CO). δ_C(100MHz, $CDCl_3$) 36,52, 120.9, 125.3, 129.6, 139.2, 160.4.Anal. Calc. for $C_{10}H_{15}N_2O_6SP$:C 37.26, H 4.96, N 8.69. Found: C 37.35, H 4.85, N 8.75%. M=322.



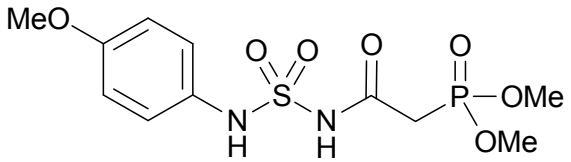
N-cyclohexyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 3d)

Yellow oil. Yield 80%. R_f = 0.50 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3269, 1700, 1614, 1368,1249, 1150.δ_P(100 $CDCl_3$) 29.8. δ_H(250 MHz, $CDCl_3$) 1.28 (m, 4H, $2CH_2$-cyc), 1.35 (m, 2H, CH_2-cyc), 1.55 (m,2H, CH_2-cyc), 8.5 (m, 2H, CH_2-cyc), 2.80 (s, 1H, CH_2-CO), 2.91 (s, 1H, CH_2-CO), 3.66 (m, 1H, CH-NH), 3.91 (2s, 6H, $2CH_3$-O),8.65 (s, 1H, NH-CO). δ_C (62 MHz, $CDCl_3$)24, 25, 32, 42.9, 43, 52, 170.Anal. Calc. for $C_{10}H_{21}N_2O_6SP$:C 36.58, H 3.45, N 8.53. Found: C 36.65, H 3.25, N 8.85%. M=328.



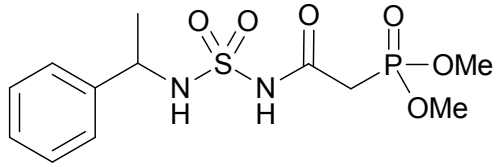
N-3-fluorophenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 4d)

Yellow oil. Yield 90%. R_f = 0.45 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3368, 1720, 1650, 1364,1245,1159.δ_P(100 $CDCl_3$) 28.4. δ_H(250 MHz, $CDCl_3$) 3.03 (s, 1H, CH_2-CO),3.11 (s, 1H, CH_2-CO),3.92 (2s, 6H, $2CH_3$-O),6.9 (m, 1H, H-Ar), 7.35 (m, 2H, H-Ar),7.65 (m, 1H, H-Ar),9.02 (s, 1H, NH-CO). δ_C (62 MHz, $CDCl_3$) 41.2,52, 105.9, 110.4, 115, 129.6, 139.4, 163, 170.Anal. Calc. for $C_{10}H_{14}N_2O_6FSP$:C 35.30, H 4.15, N 8.26. Found: C 35.45, H 4.05, N 8.35%. M=340.



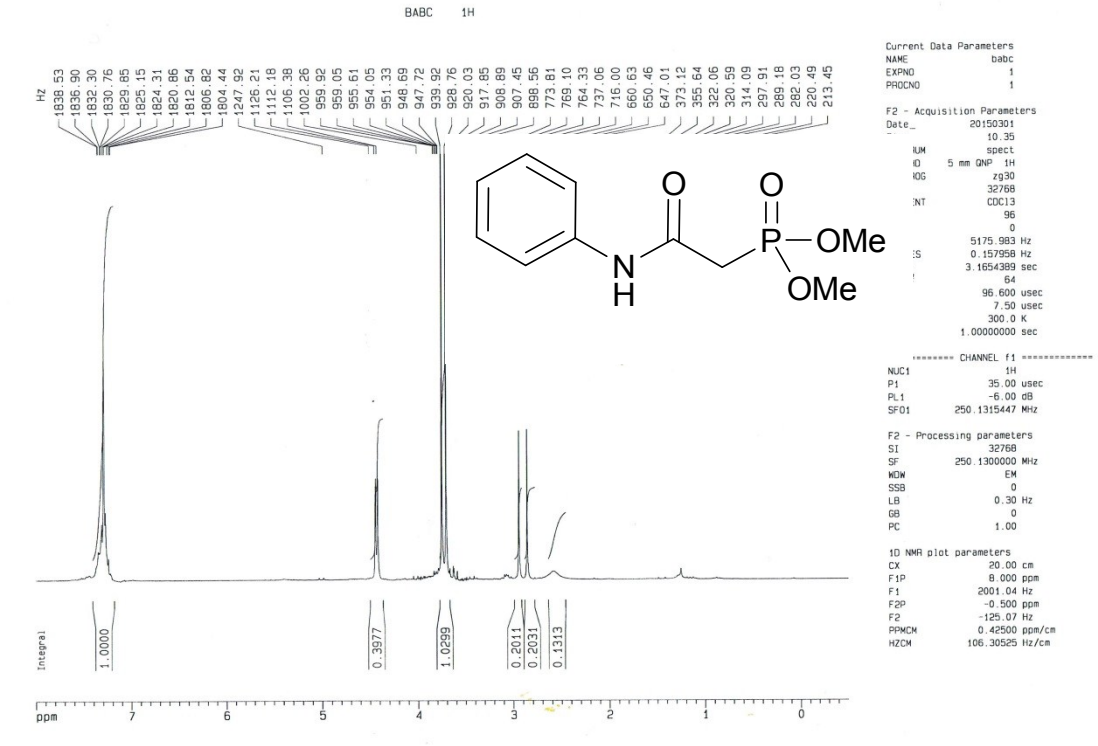
N-4-methoxyphenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 5d)

Yellow oil. Yield 88%. R_f = 0.48 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3310, 1714, 1590, 1364,1260, 1151.δ_P(100 $CDCl_3$) 28.1. δ_H(250 MHz, $CDCl_3$) 2.94 (s, 1H, CH_2-CO),2.99 (s, 1H, CH_2-CO),3.90 (3s, 9H, $3CH_3$-O),6.9-7.35 (2d, 4H,J_1=J_2 7.36, H-Ar),8.82 (s, 1H, NH-CO). δ_C(62 MHz, $CDCl_3$) 41.2, 52, 105.9, 110.4, 115, 129.6, 139.4, 163, 170.Anal. Calc. for $C_{11}H_{17}N_2O_7SP$:C 37.50, H 4.85, N 7.96. Found: C 37.55, H 4.98, N 7.85%. M=352.

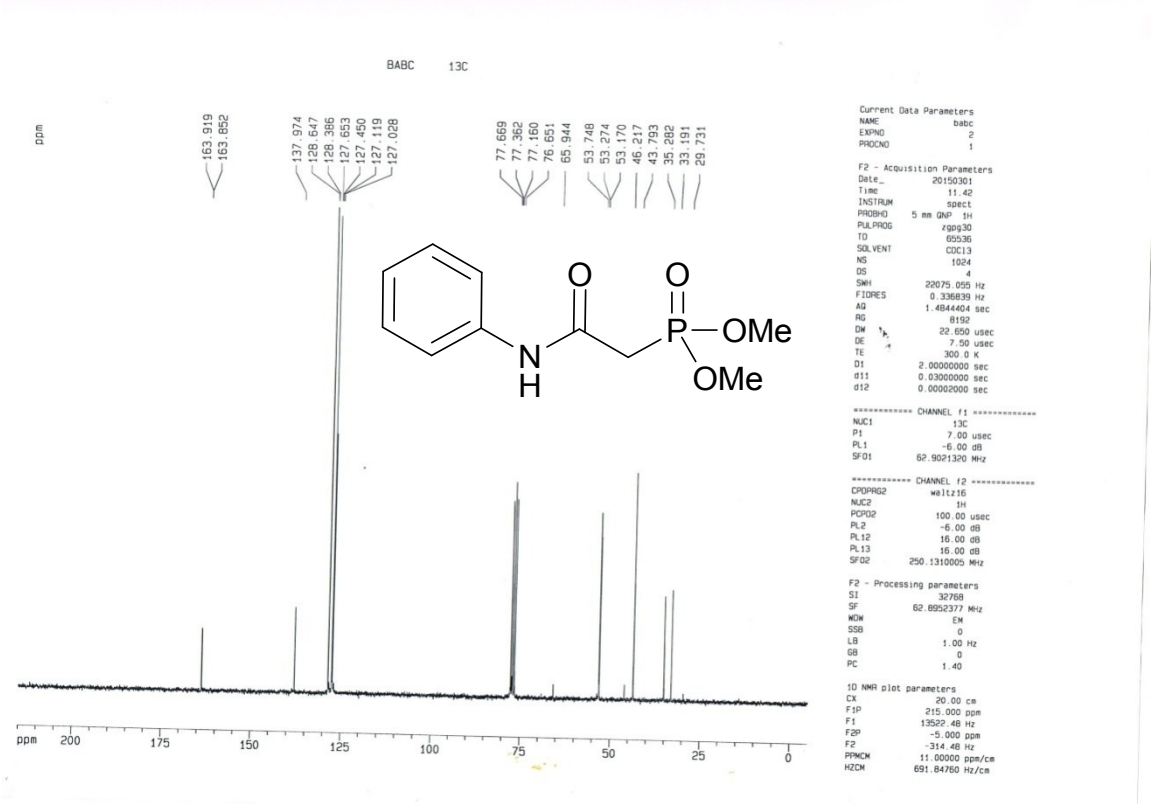


N-1-phenylethyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide (Table 4, Entry 6d)

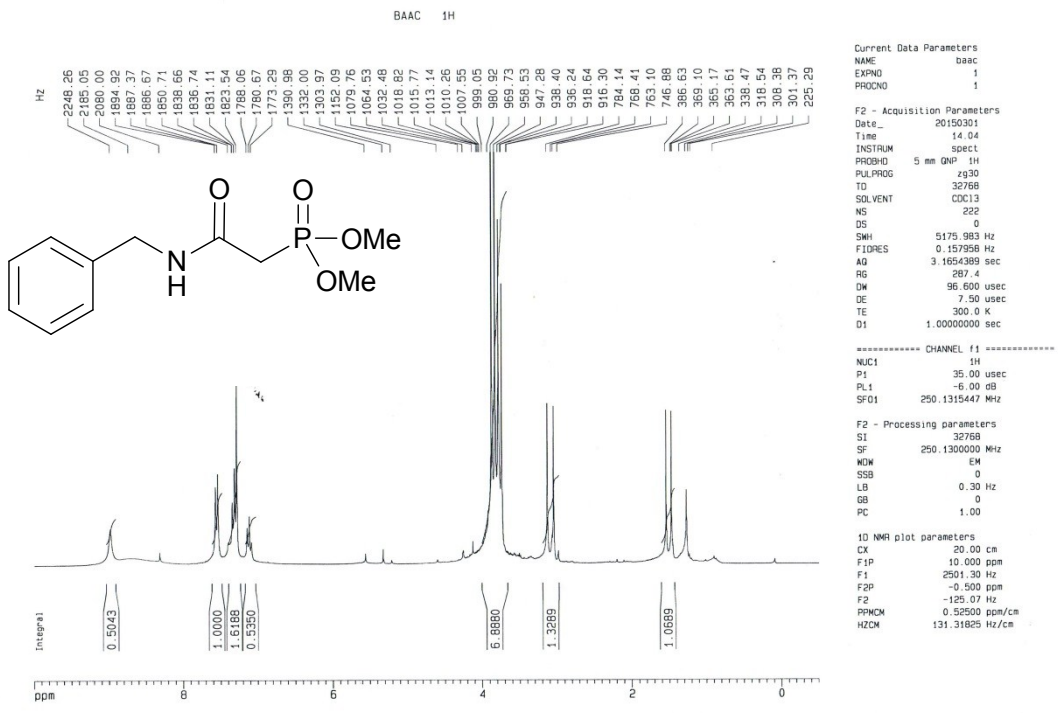
Yellow oil. Yield 75%. R_f = 0.42 (CH_2Cl_2/MeOH:95/05). ν_{max} (KBr)/cm^{-1} 3260, 1710, 1612, 1361,1250, 1158.δ_P(160 $CDCl_3$) 27.9. δ_H (400 MHz, $CDCl_3$) 1.28 (d, 3H, *J* 6.93 Hz, CH_3), 2.92 (s, 1H, CH_2-CO), 3.01 (s, 1H, CH_2-CO), 3.80 (2s, 6H, $2CH_3$-O), 4.35 (m, 1H, CH*),5.55 (d, 1H, *J*6.20Hz, NH-CH),7.50 (m, 5H, H-Ar),8.62 (s, 1H, NH-CO). δ_C (100 MHz, $CDCl_3$) 19,41, 42, 46, 52, 126.5, 128.1, 143.6, 170.Anal. Calc. for $C_{12}H_{19}N_2O_6SP$:C 41.14, H 4.15, N 8.00. Found: C 41.25, H 4.19, N 8.05%. M=350.



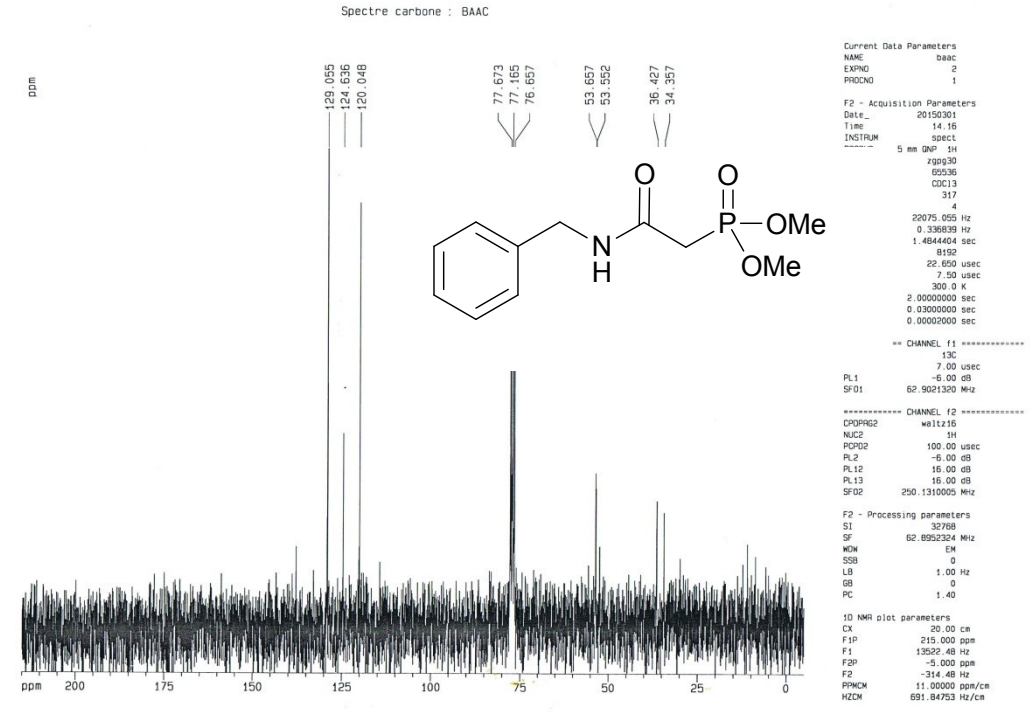
^{1}H NMR spectrum: Dimethyl (2-oxo-2-(phenylamino)ethyl)phosphonate



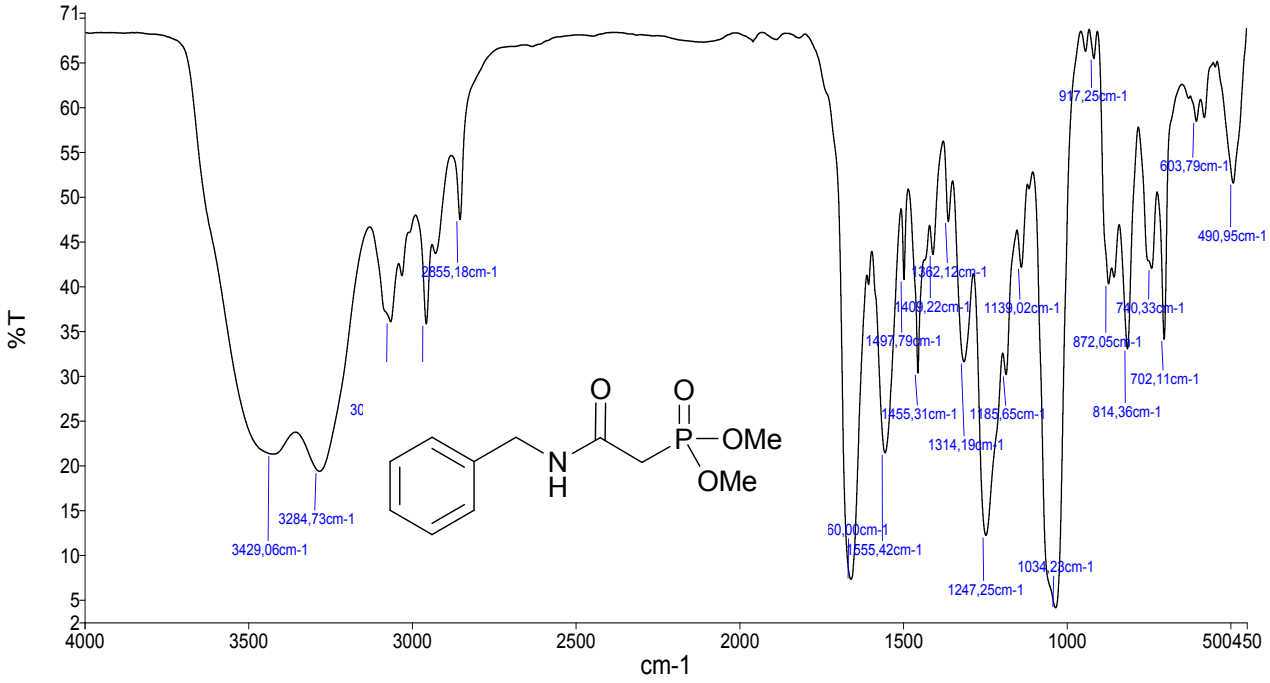
^{13}C NMRspectrum: Dimethyl (2-oxo-2-(phenylamino)ethyl)phosphonate



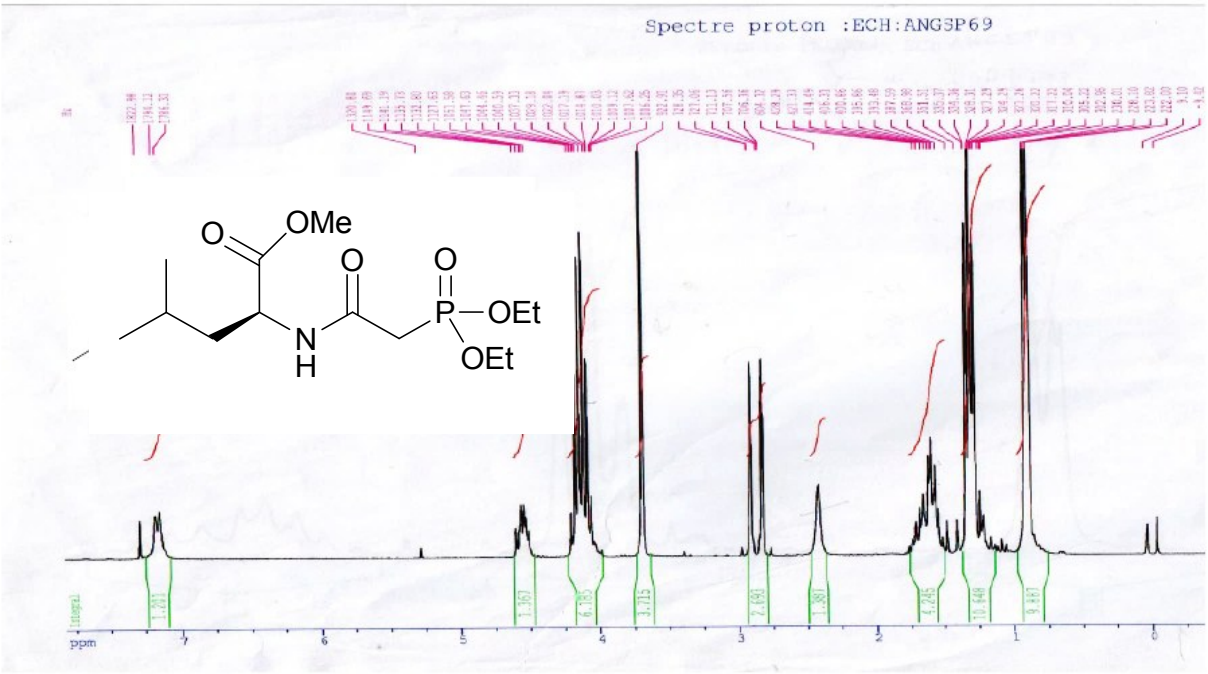
^{1}H NMR spectrum:Dimethyl (2-(benzylamino)-2-oxoethyl)phosphonate



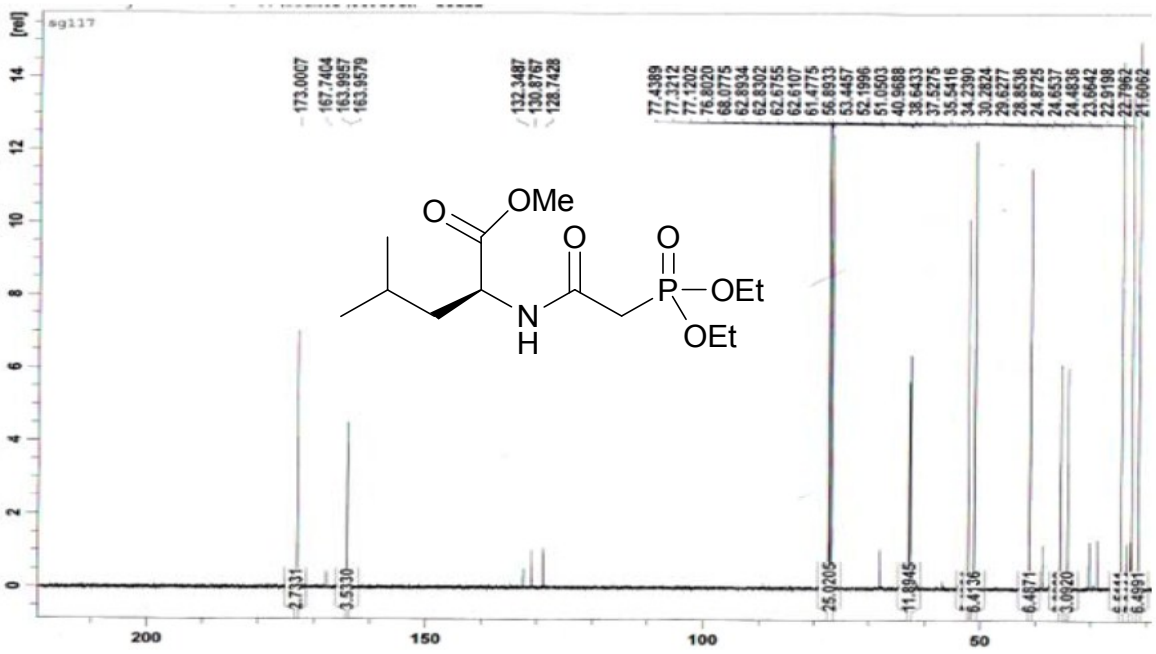
^{13}C NMRspectrum:Dimethyl (2-(benzylamino)-2-oxoethyl)phosphonate



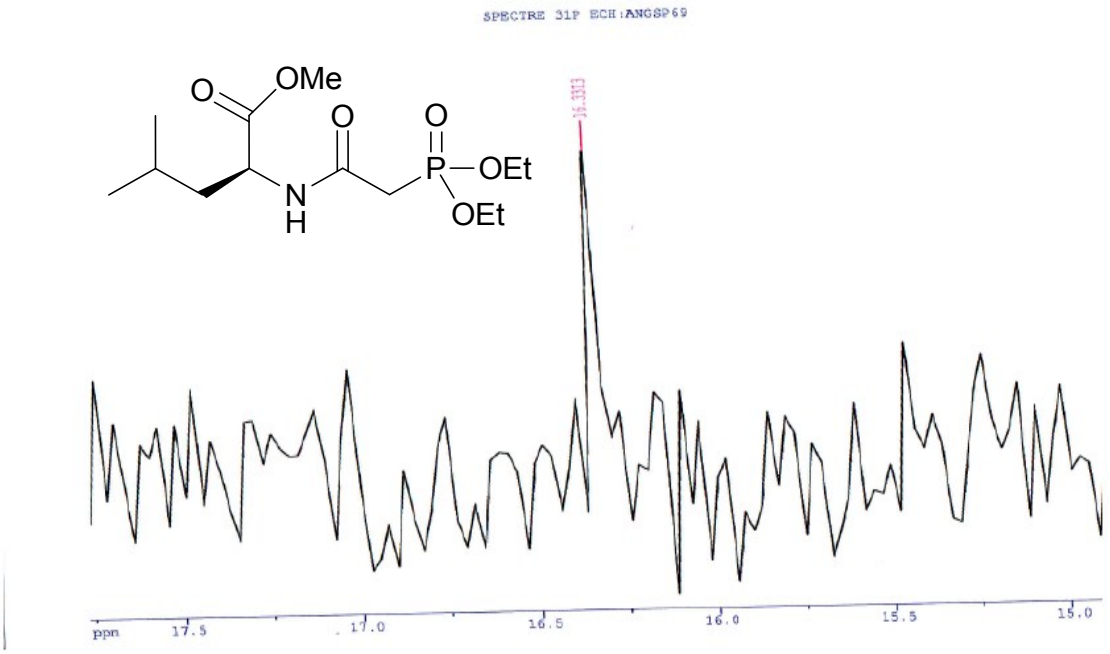
IR spectrum:Dimethyl (2-oxo-2-(benzylamino)ethyl)phosphonate



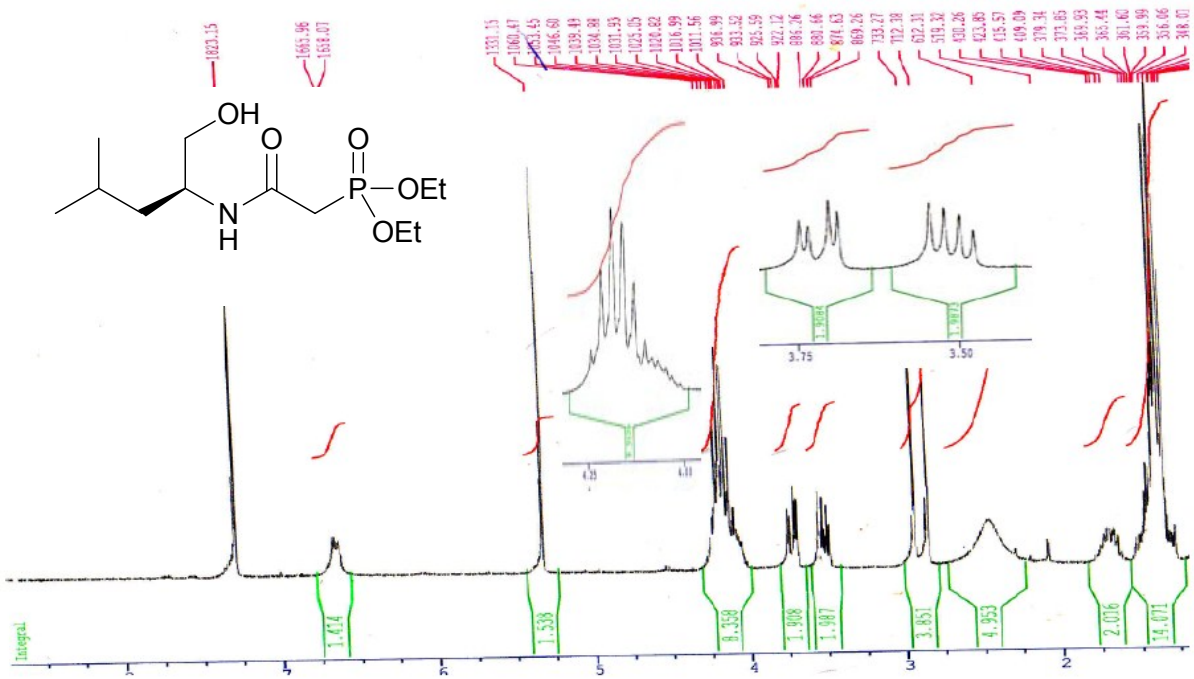
^{1}H NMR spectrum: (S)-Methyl 2-(2-(diethoxyphosphoryl)acetamido)-4-methylpentanoate



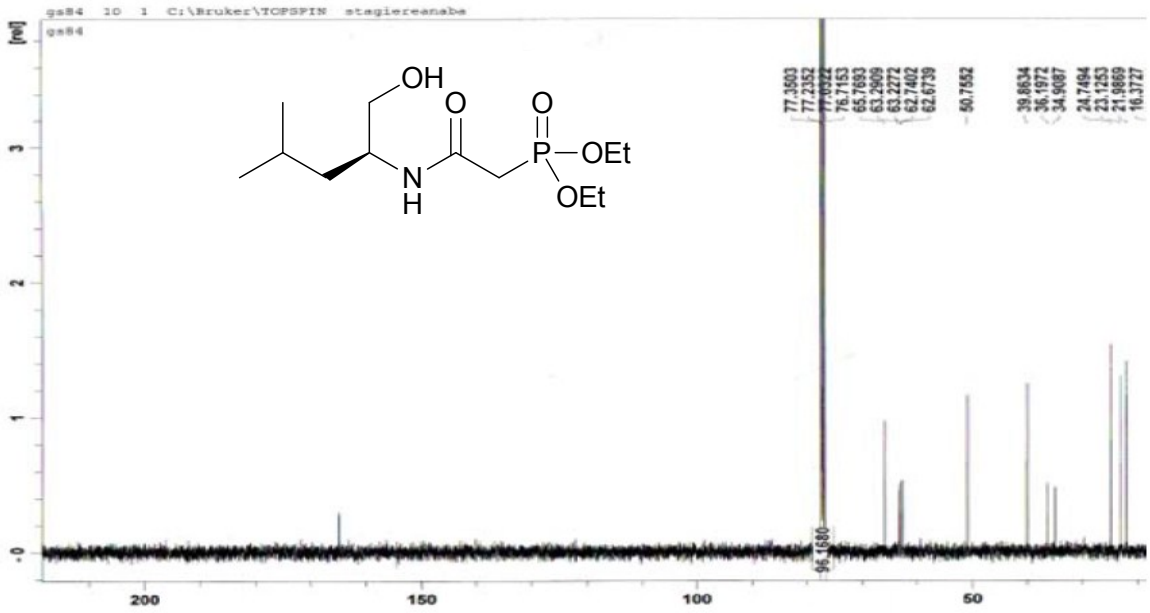
^{13}C NMR spectrum: (S)-Methyl 2-(2-(diethoxyphosphoryl)acetamido)-4-methylpentanoate



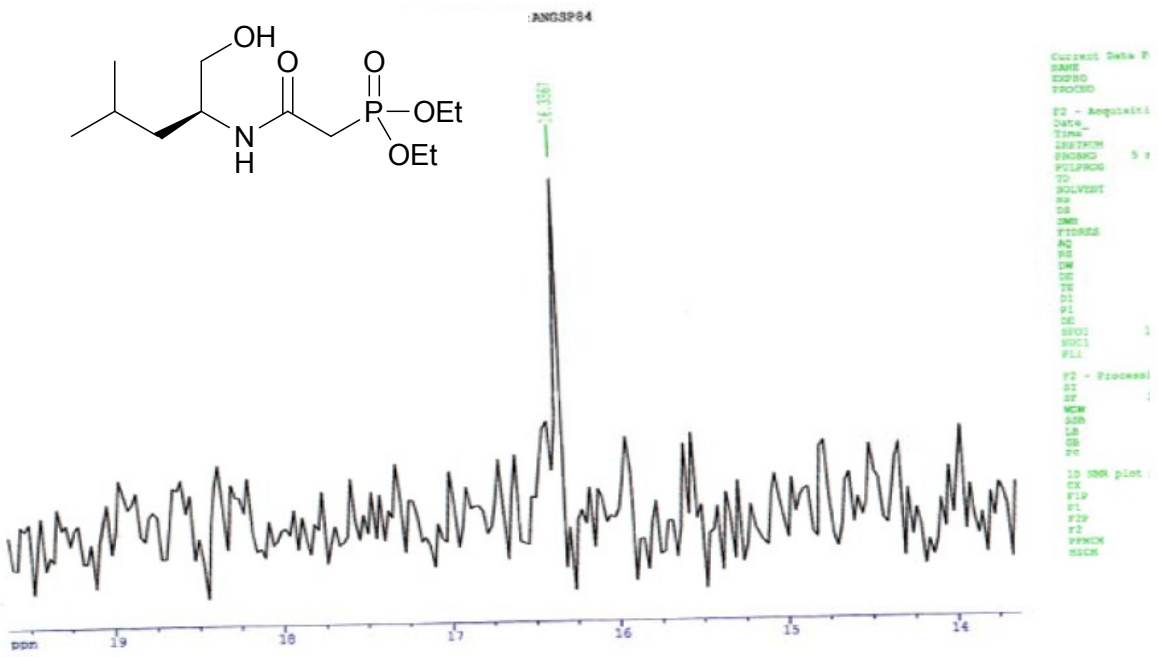
^{31}P NMR spectrum: (S)-Methyl 2-(2-(diethoxyphosphoryl)acetamido)-4-methylpentanoate



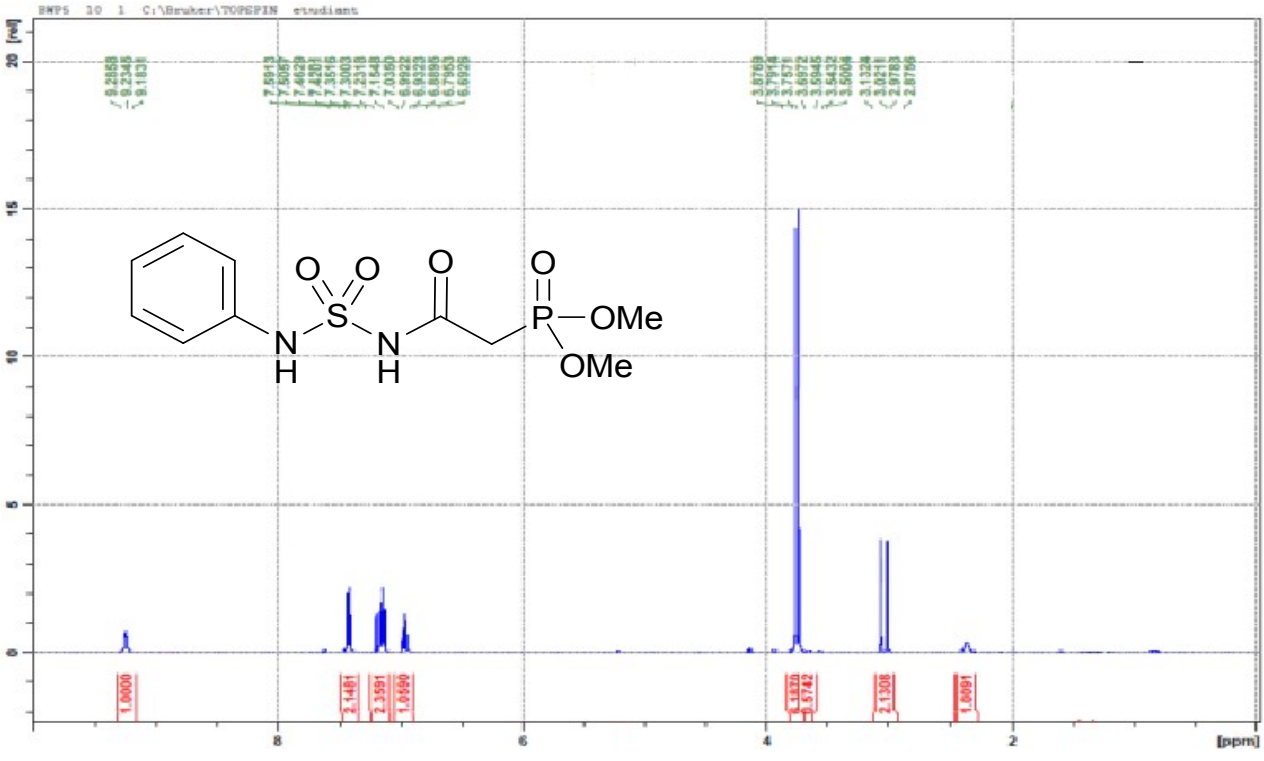
1H NMR spectrum: (S)-Diethyl (2-((1-hydroxy-4-methylpentan-2-yl)amino)-2-oxoethyl)phosphonate



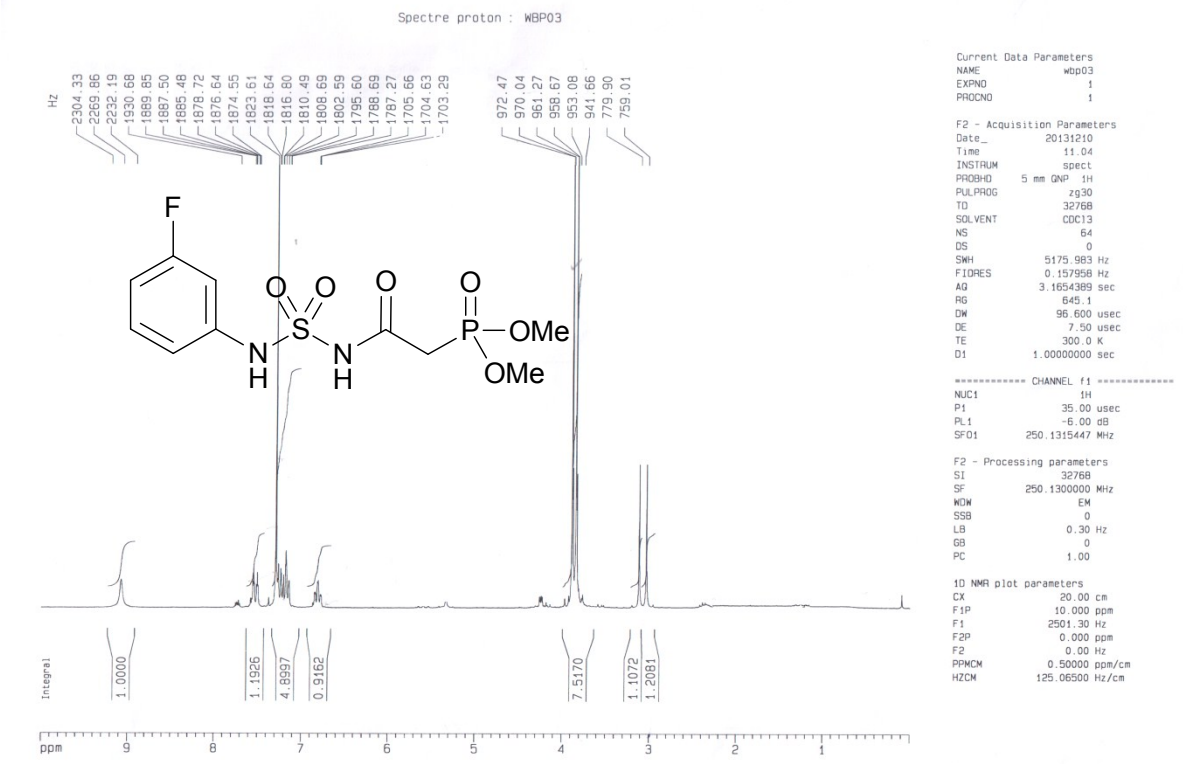
^{13}C NMR spectrum: (S)-Diethyl (2-((1-hydroxy-4-methylpentan-2-yl)amino)-2-oxoethyl)phosphonate



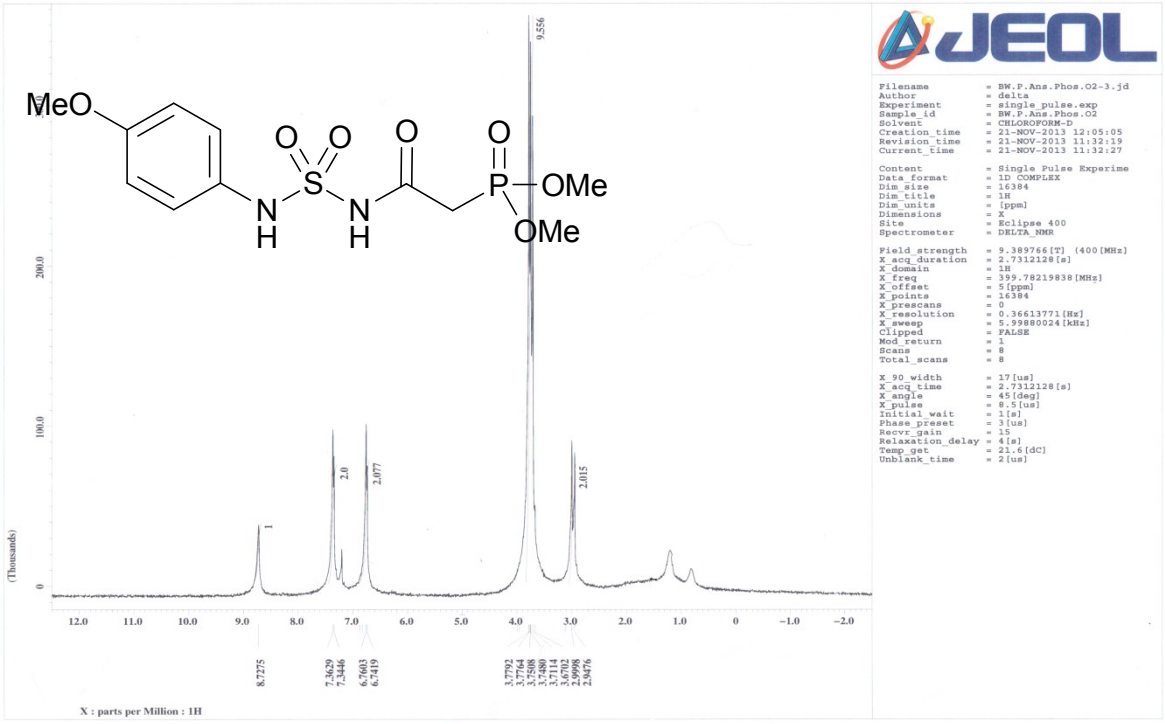
^{31}P NMR spectrum: (S)-Diethyl (2-((1-hydroxy-4-methylpentan-2-yl)amino)-2-oxoethyl)phosphonate



^{1}H NMR spectrum: N-phenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide



^{1}H NMR spectrum: N-3-fluorophenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide



^{1}H NMR spectrum: N-4-methoxyphenyl-(1-(2-dimethoxyphosphoryl) acetamide) sulfamide