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APPENDIX

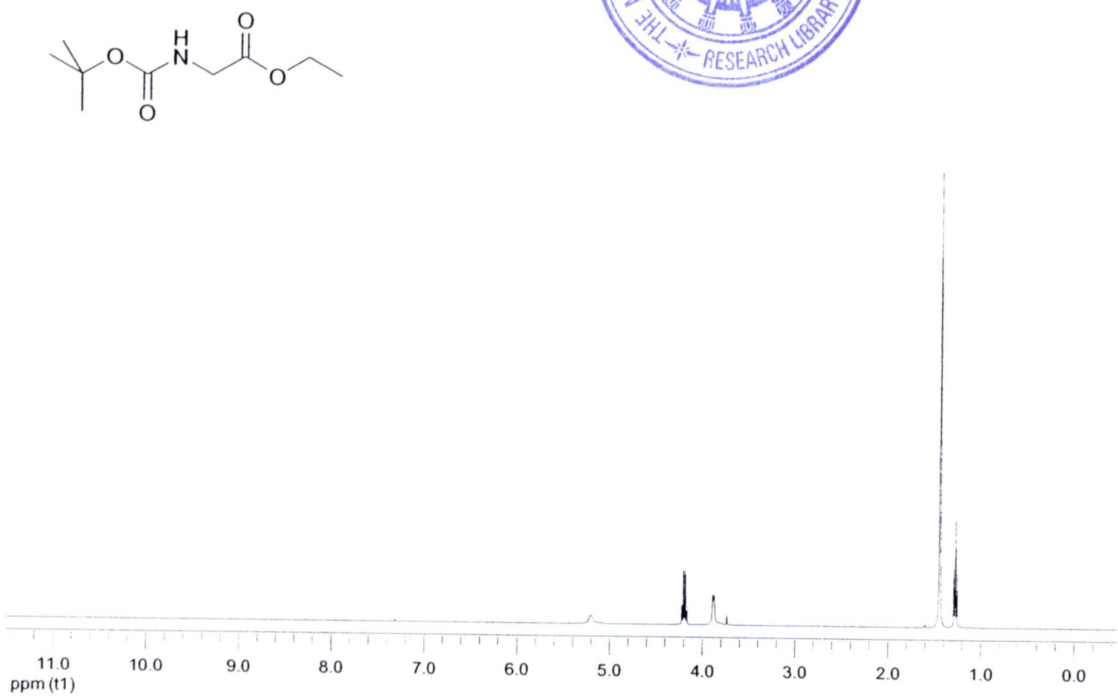


Figure 46 ^{1}H NMR spectrum of *N*-Boc glycine ethyl ester (2)

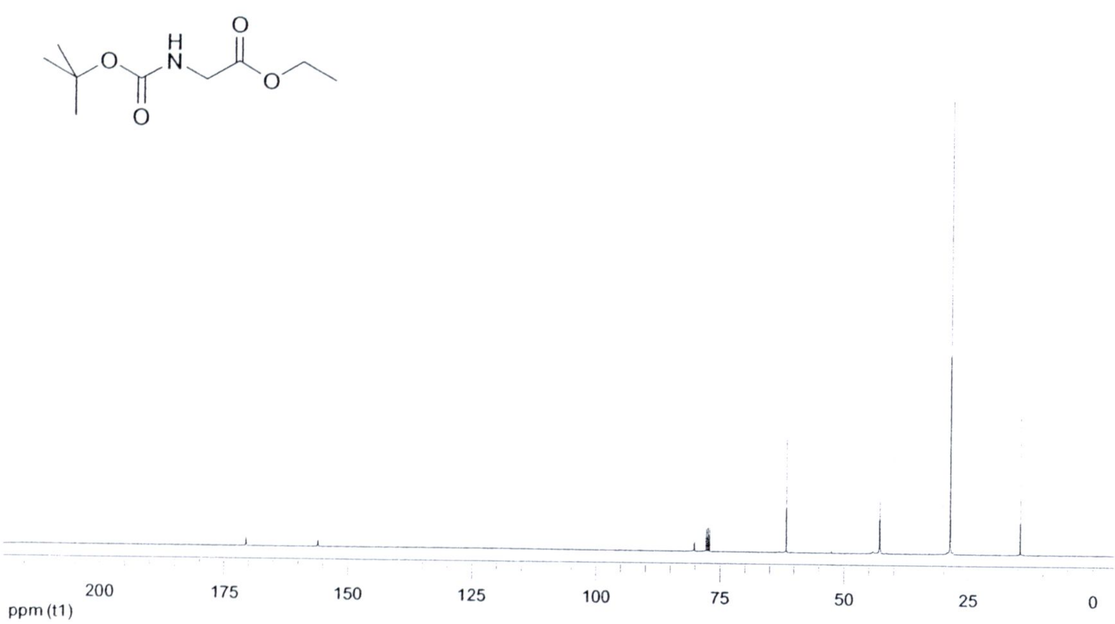


Figure 47 ^{13}C NMR spectrum of *N*-Boc glycine ethyl ester (2)

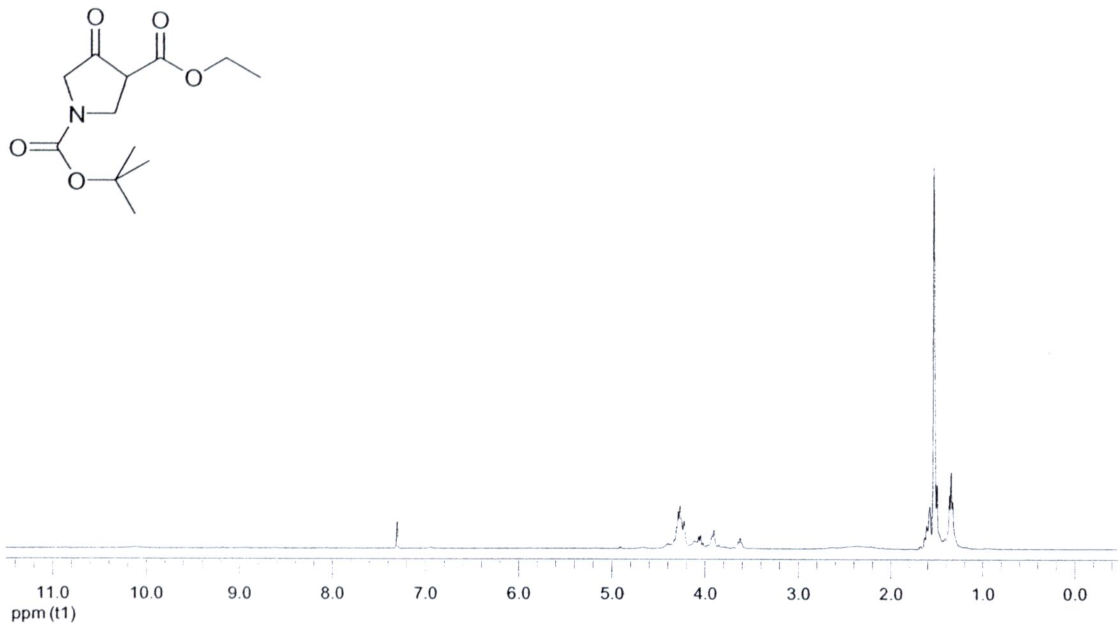


Figure 48 ^{1}H NMR spectrum of Ethyl 1-*tert*-butoxycarbonyl-3-oxopyrrolidine-4-carboxylate (3)

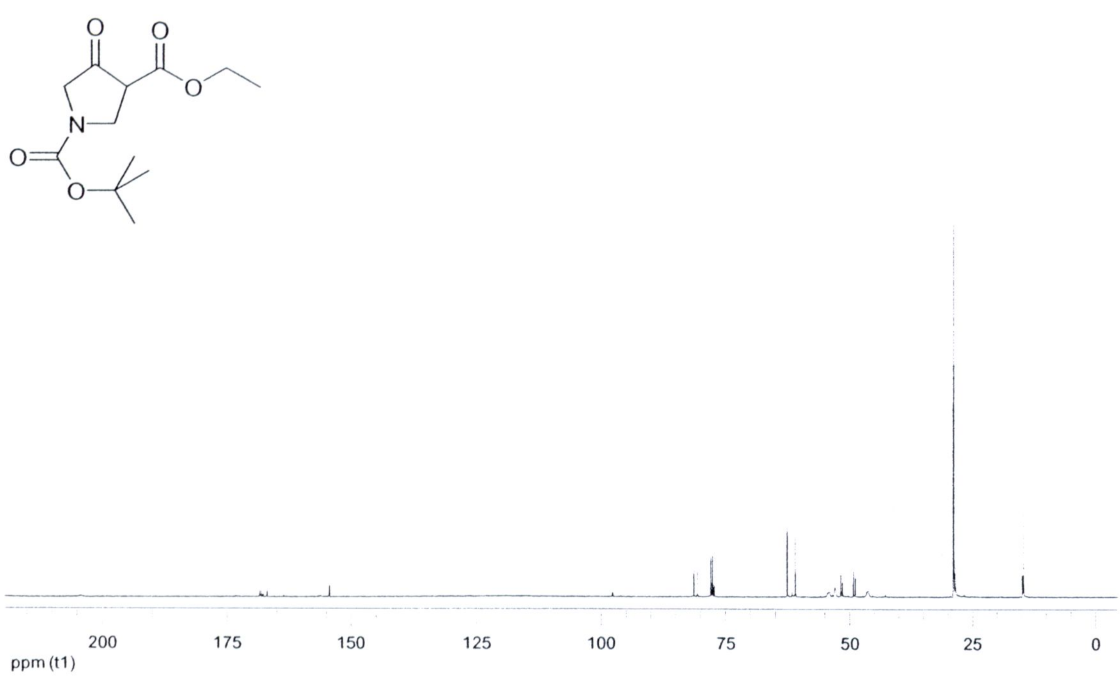


Figure 49 ^{13}C NMR spectrum of Ethyl 1-*tert*-butoxycarbonyl-3-oxopyrrolidine-4-carboxylate (3)

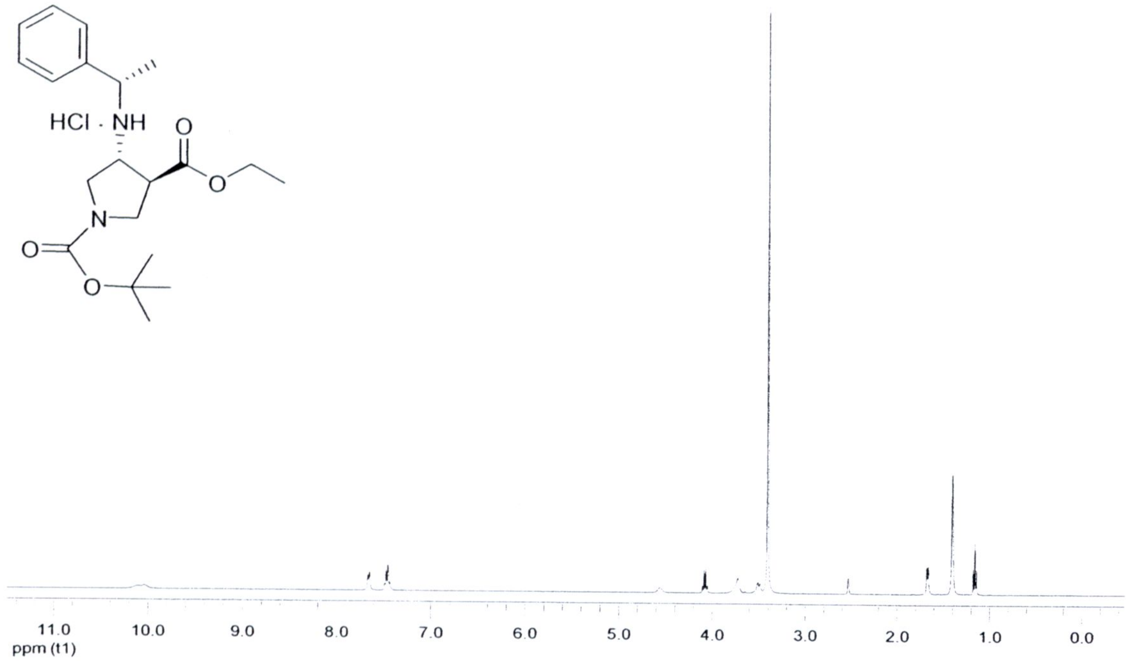


Figure 50 ^{1}H NMR spectrum of (3*R*,4*S*)-1-(*N*-*tert*-butoxycarbonyl)-3-[(1'*S*)-phenylethylamino]-4-ethoxycarbonylpyrrolidine hydrochloride (5)

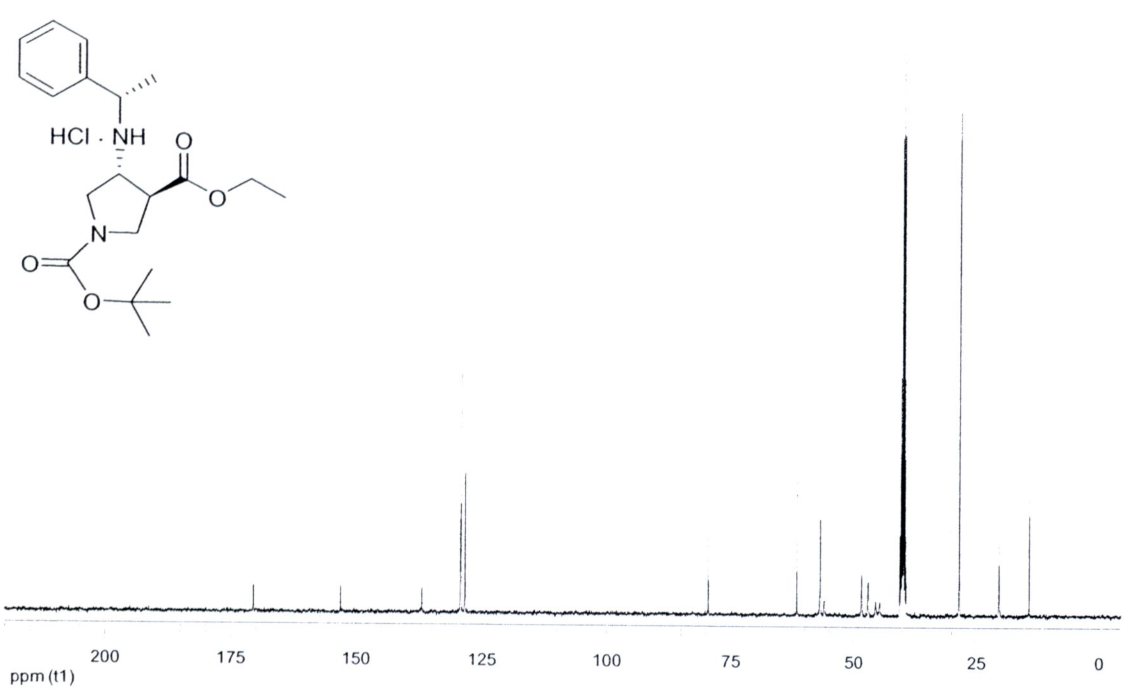


Figure 51 ^{13}C NMR spectrum of (3*R*,4*S*)-1-(*N*-*tert*-butoxycarbonyl)-3-[(1'*S*)-phenylethylamino]-4-ethoxycarbonylpyrrolidine hydrochloride (5)

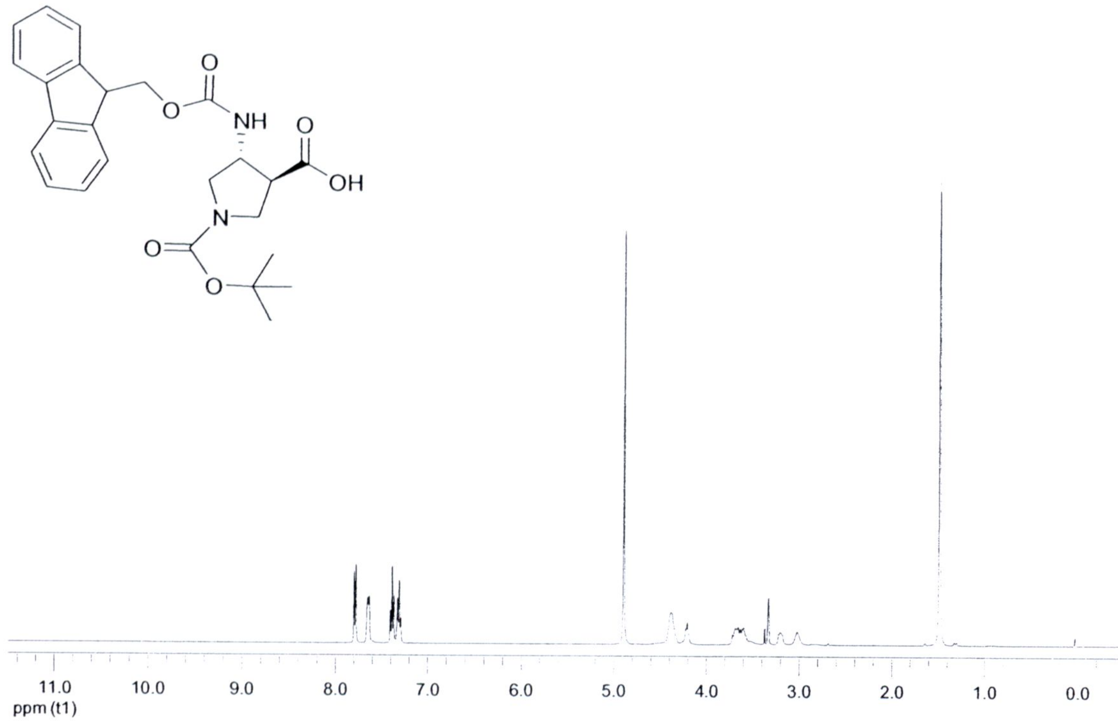


Figure 52 ^{1}H NMR spectrum of (3*R*,4*S*)-1-(*N-tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-carboxypyrrolidine (8)

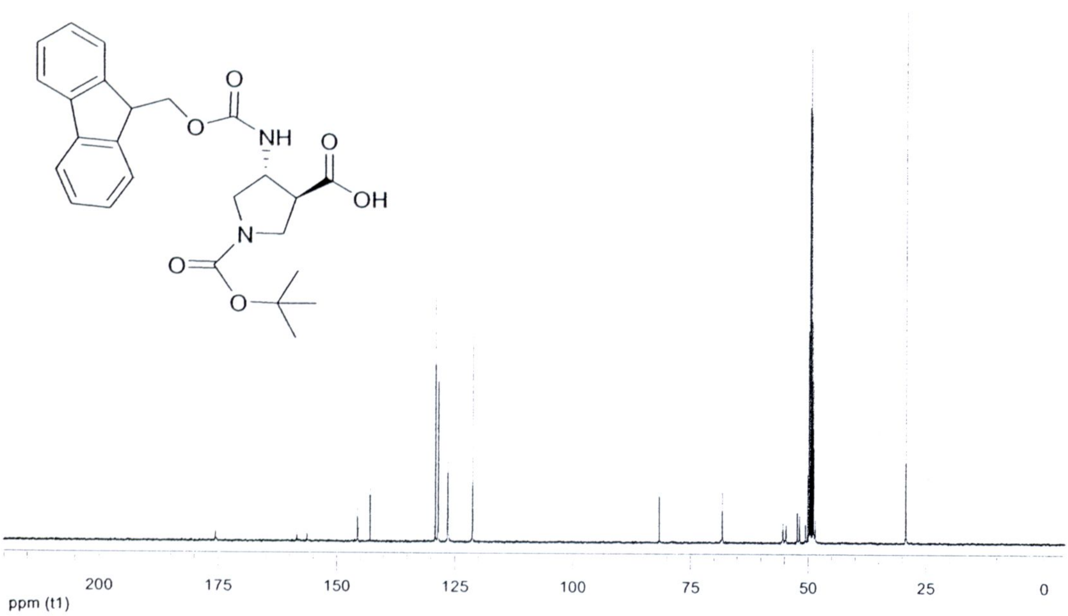


Figure 53 ^{13}C NMR spectrum of (3*R*,4*S*)-1-(*N-tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-carboxypyrrolidine (8)

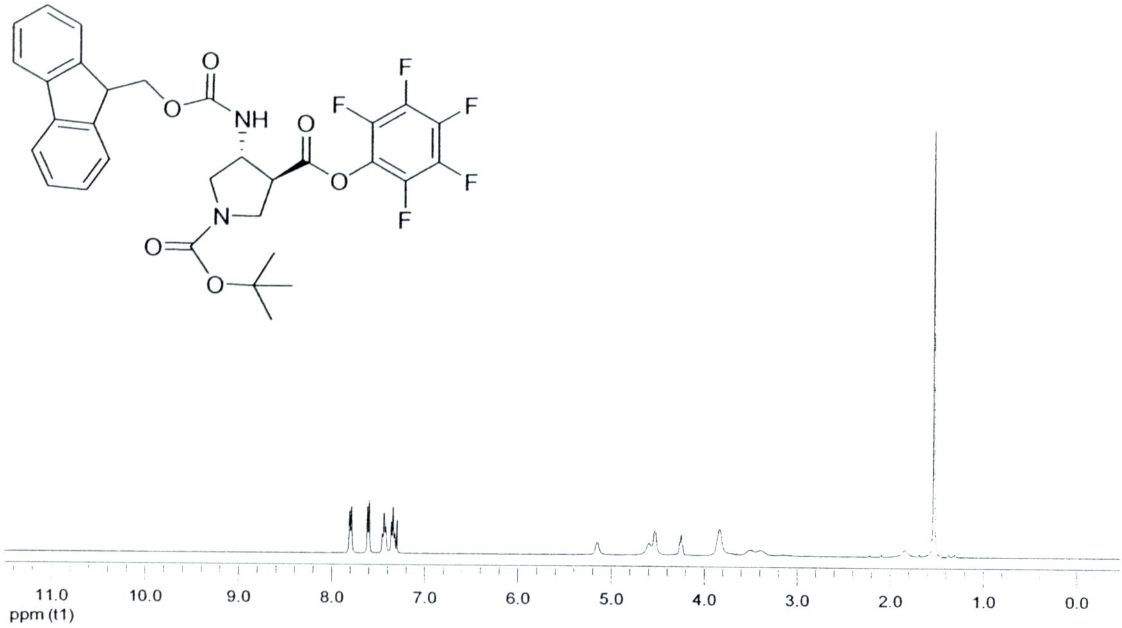


Figure 54 ^{1}H NMR spectrum of (3*R*,4*S*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-(pentafluorophenoxy) carbonyl) pyrrolidine (9)

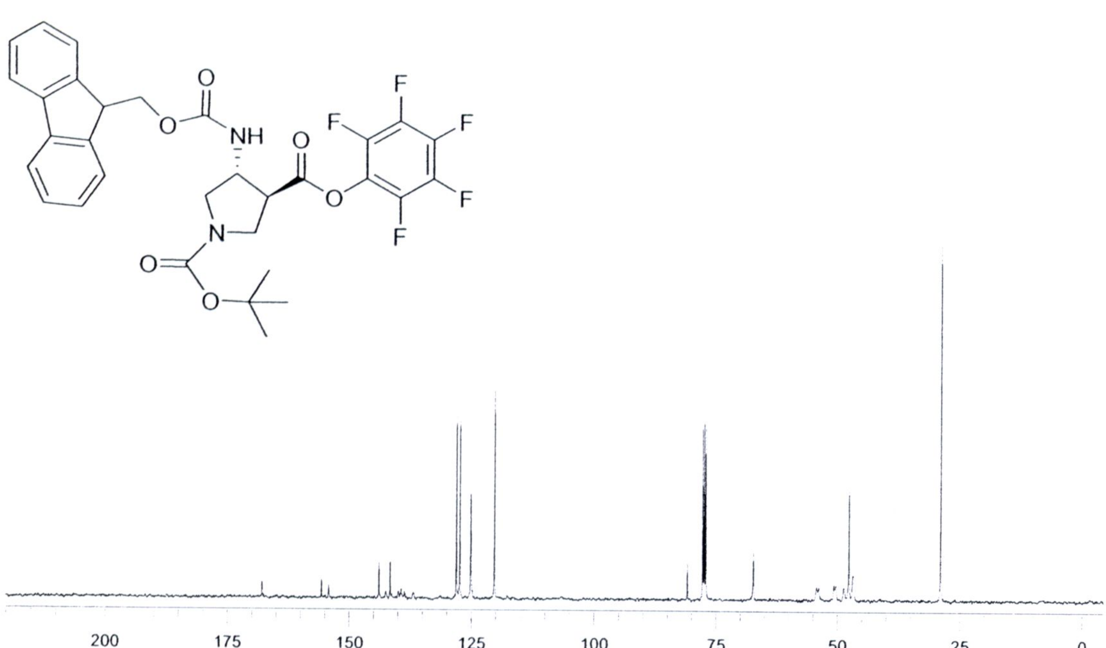
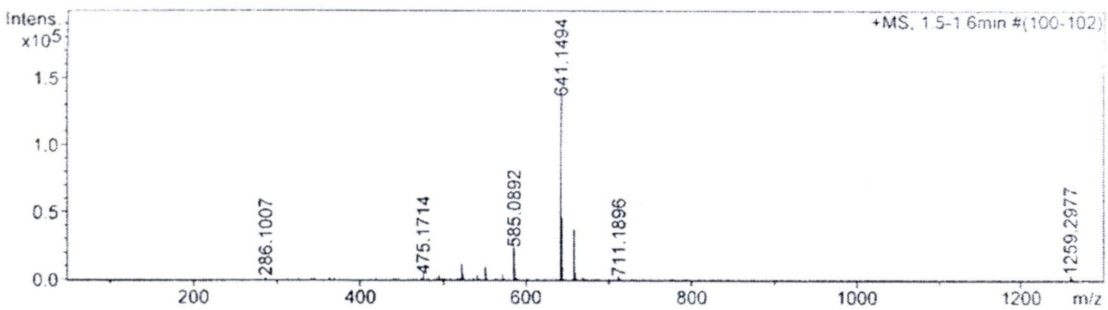


Figure 55 ^{13}C NMR spectrum of (3*R*,4*S*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-(pentafluorophenoxy) carbonyl) pyrrolidine (9)



#	m/z	Res.	S/N	I	FWHM
1	286.1007	6574	173.9	2265	0.0435
2	362.1051	7863	132.7	1939	0.0461
3	368.4161	7312	77.2	1177	0.0504
4	473.3113	7981	52.9	1282	0.0593
5	475.1714	8638	166.6	4010	0.0550
6	494.5537	7996	131.7	3391	0.0619
7	495.5549	8144	49.7	1298	0.0608
8	499.2498	8507	44.5	1179	0.0587
9	519.1221	7947	58.3	1636	0.0653
10	541.1001	8385	109.7	3256	0.0645
11	551.6162	8095	129.9	3966	0.0681
12	572.1860	8655	143.1	4371	0.0661
13	573.1878	8304	41.8	1292	0.0690
14	585.0892	8388	800.7	23589	0.0698
15	586.0915	8309	243.9	7187	0.0705
16	587.0932	8242	43.5	1300	0.0712
17	588.1566	8809	49.2	1464	0.0668
18	641.1494	8345	5360.7	136143	0.0768
19	642.1528	8450	1821.9	46154	0.0760
20	643.1564	8415	368.0	9316	0.0764
21	644.1572	8210	58.8	1506	0.0785
22	657.1238	8607	1527.0	37041	0.0763
23	658.1263	8722	529.0	12810	0.0755
24	659.1255	8681	210.6	5099	0.0759
25	660.1296	8669	54.7	1338	0.0761
26	669.1792	8315	84.5	1999	0.0805
27	711.1896	9023	118.4	2431	0.0788
28	712.1922	8543	72.0	1481	0.0834
29	1259.2977	8801	295.5	3980	0.1431
30	1260.3020	8510	192.2	2592	0.1481

Figure 56 Mass spectrum of (3*R*,4*S*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-(pentafluorophenoxy)carbonyl) pyrrolidine (9)

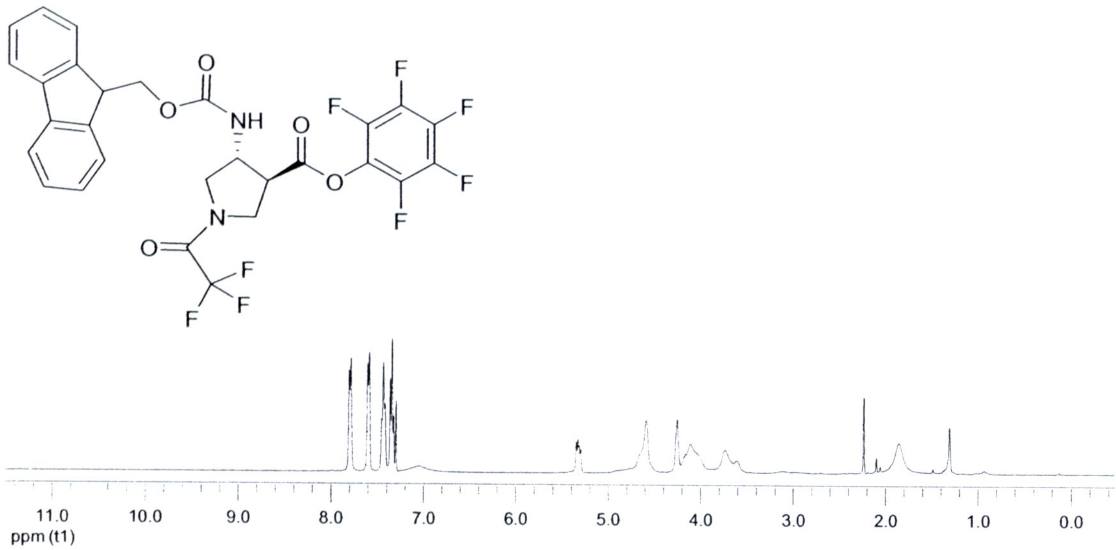


Figure 57 ^{1}**H NMR spectrum of (3*R*,4*S*)-1-(2,2,2-trifluoroacetyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy)carbonyl) pyrrolidine (10)**

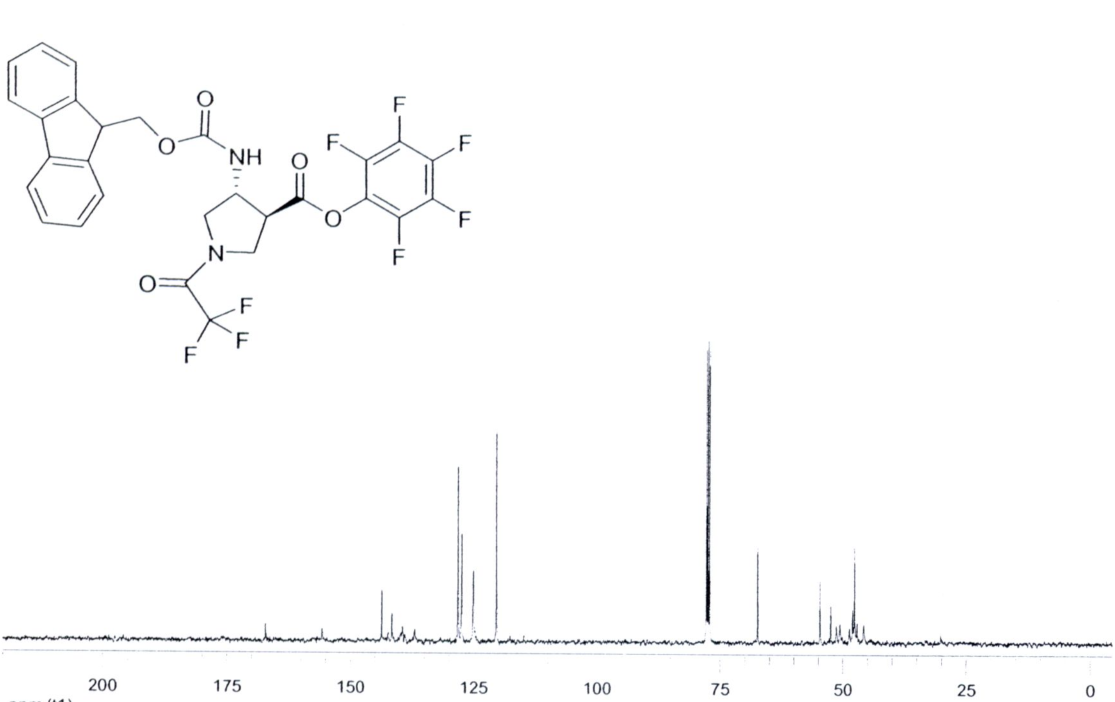
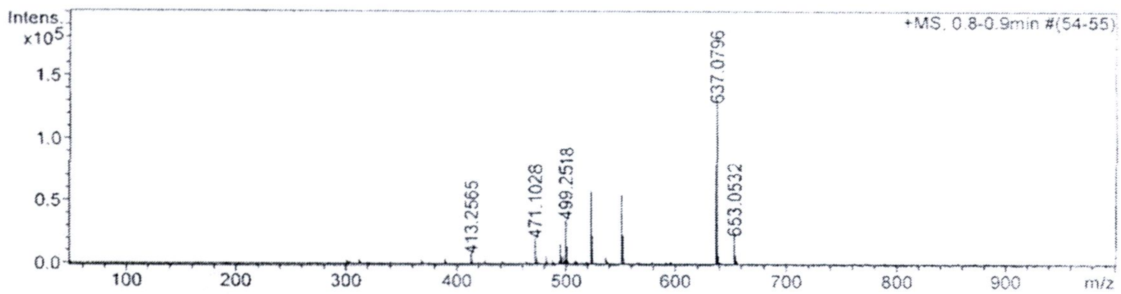


Figure 58 ^{13}**C NMR spectrum of (3*R*,4*S*)-1-(2,2,2-trifluoroacetyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy)carbonyl) pyrrolidine (10)**



#	m/z	Res.	S/N	I	FWHM
1	413.2565	7915	182.8	7528	0.0522
2	471.1028	8028	390.8	20066	0.0587
3	494.5540	8014	286.7	15933	0.0617
4	499.2518	8222	620.2	34915	0.0607
5	500.2548	8573	245.4	13889	0.0584
6	637.0796	8584	2336.9	128080	0.0742
7	638.0821	8556	733.8	40135	0.0746
8	639.0852	8519	127.6	7004	0.0750
9	653.0532	8850	419.7	21944	0.0738
10	654.0560	8405	131.6	6891	0.0778

Figure 59 Mass spectrum of (3*R*,4*S*)-1-(2,2,2-trifluoroacetyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy)carbonyl) pyrrolidine (10)

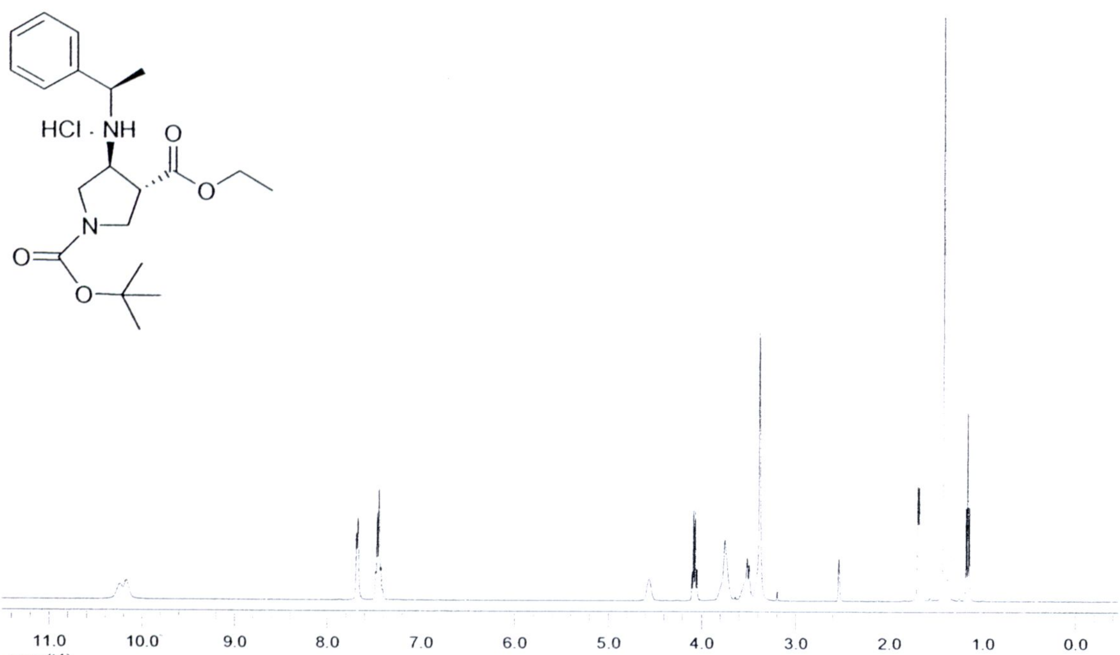


Figure 60 ^{1}H NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-butoxycarbonyl)-3-[(1'*S*)-phenylethylamino]-4-ethoxycarbonylpyrrolidine hydrochloride (12)

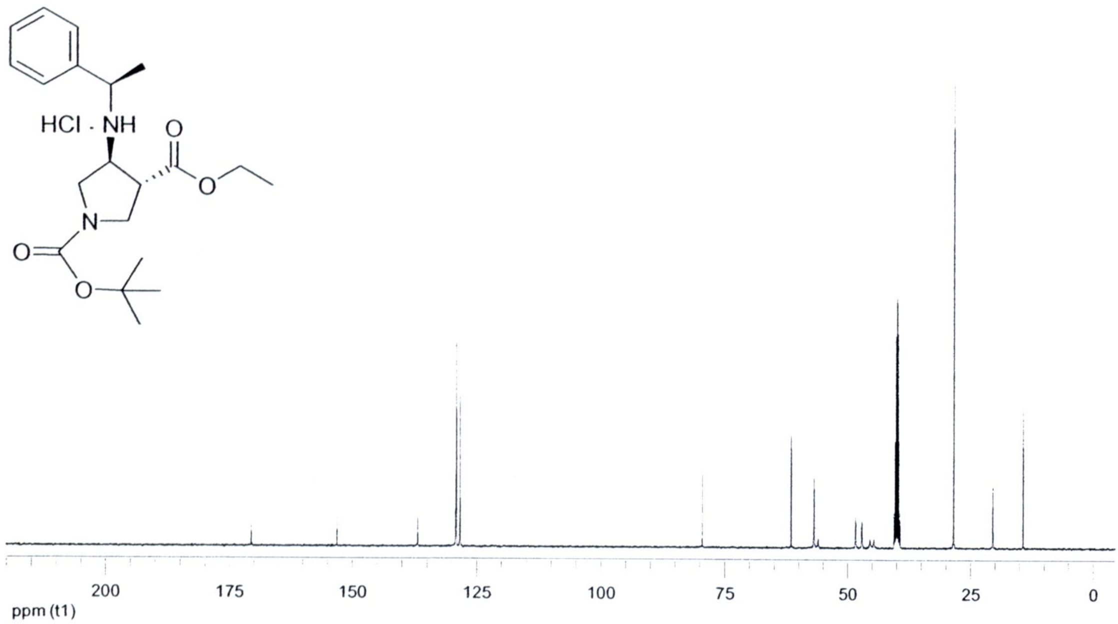


Figure 61 ^{13}C NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-butoxycarbonyl)-3-[(1'*S*)-phenylethylamino]-4-ethoxycarbonylpyrrolidine hydrochloride (12)

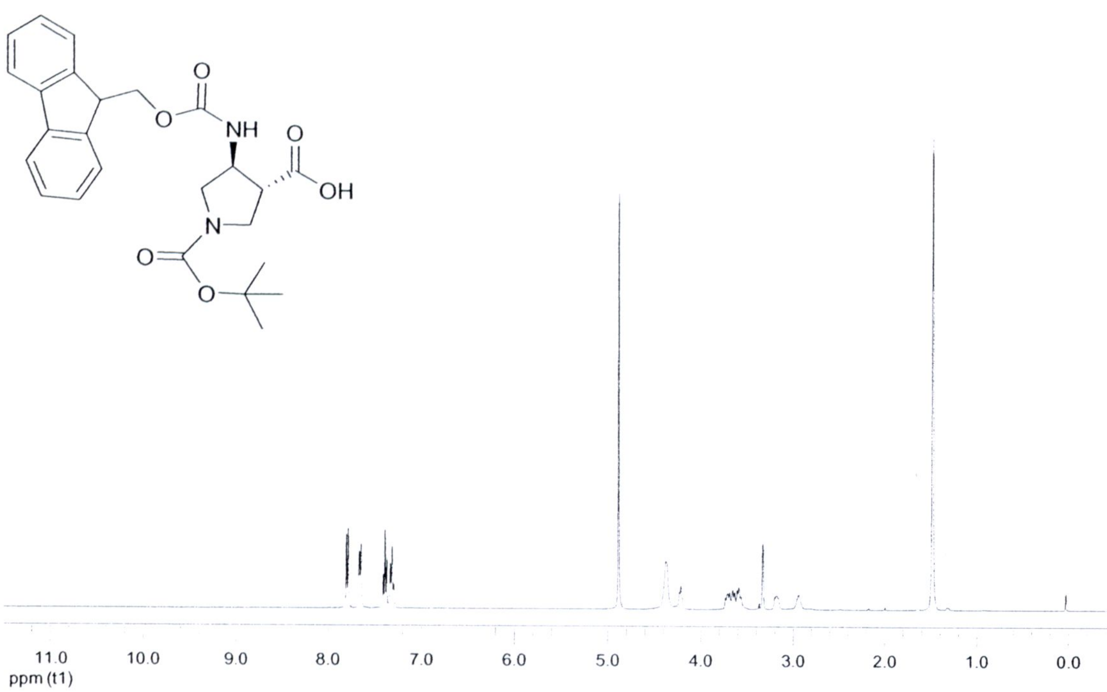


Figure 62 ^{1}H NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-carboxypyrrolidine (15)

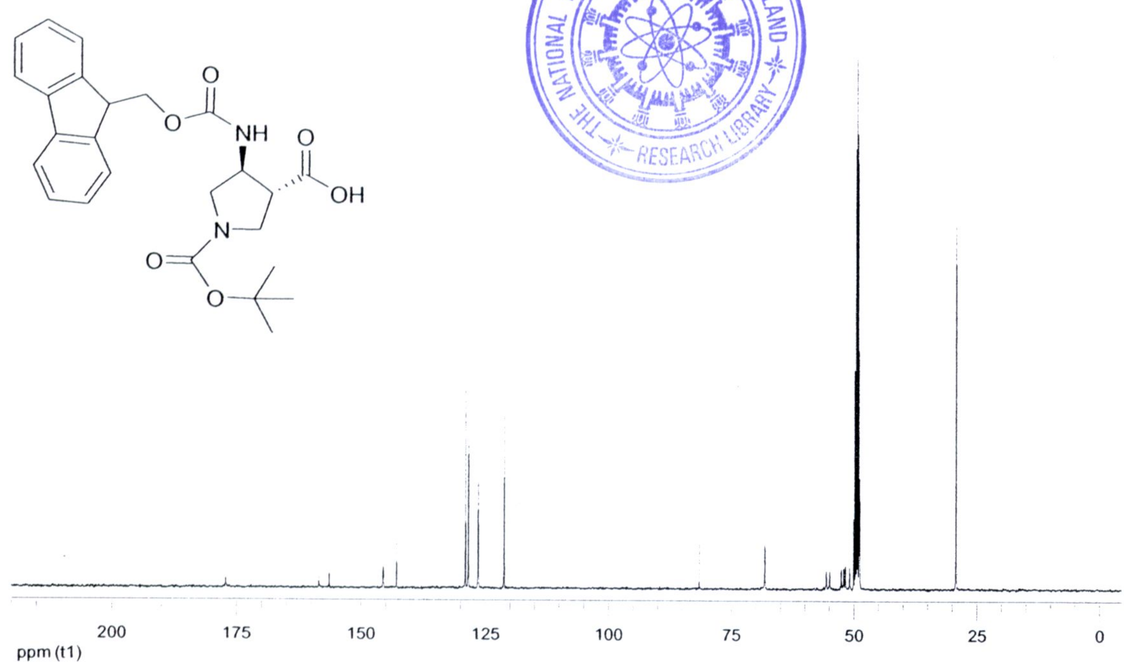


Figure 63 ^{13}**C NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonyl amino)-4-carboxypyrrolidine (15)**

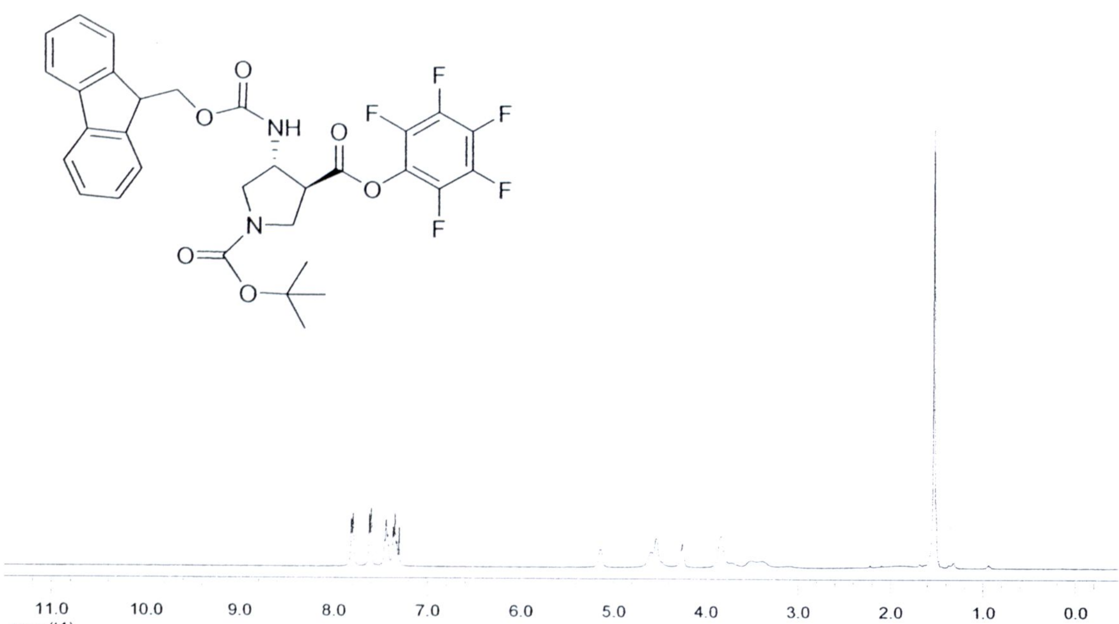


Figure 64 ^{1}**H NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy) carbonyl) pyrrolidine (17)**

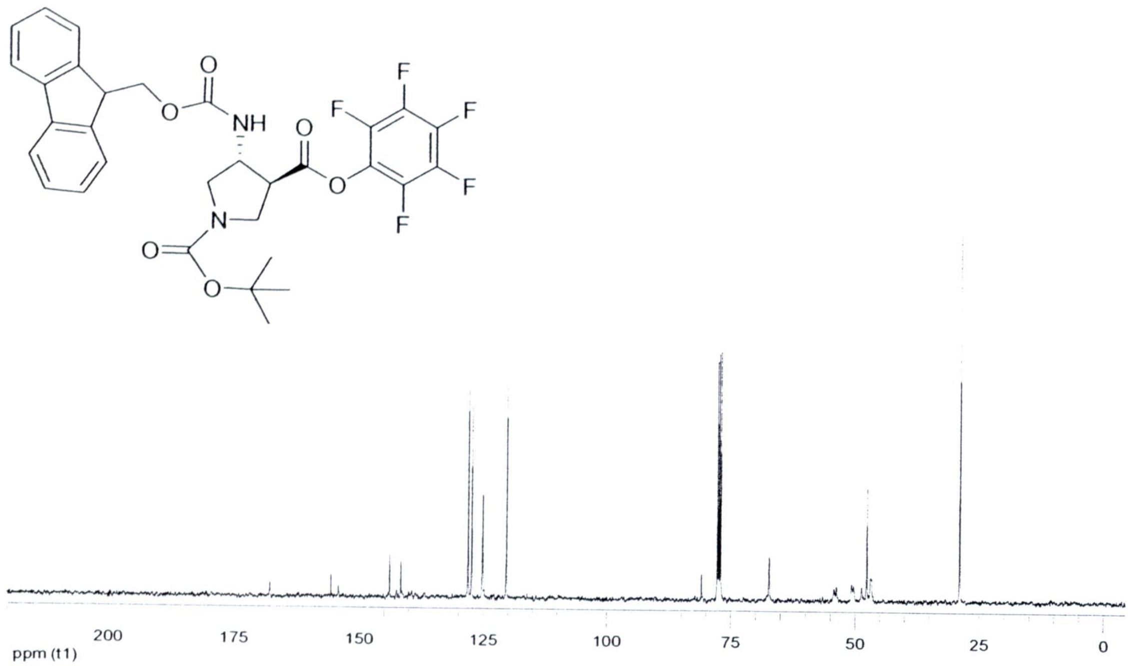
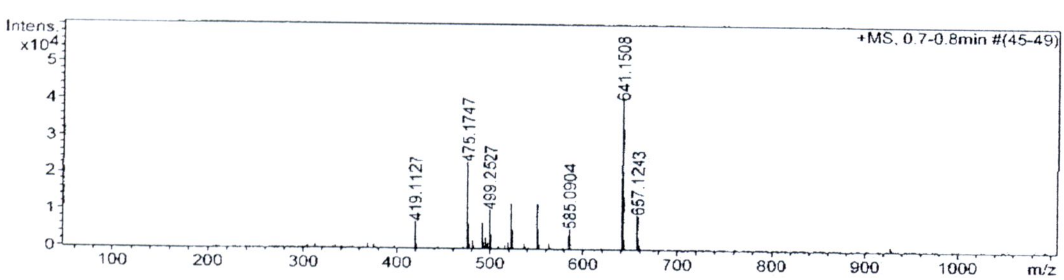


Figure 65 ^{13}C NMR spectrum of (3*S*,4*R*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy) carbonyl) pyrrolidine (17)



#	m/z	Res.	S/N	I	FWHM
1	419.1127	7985	618.9	7114	0.0525
2	475.1747	8039	1622.8	23254	0.0591
3	476.1774	8030	460.7	6638	0.0593
4	481.2433	8092	142.8	2106	0.0595
5	491.1484	8184	446.9	6780	0.0600
6	494.5556	7879	196.4	3024	0.0628
7	499.2527	8462	666.1	10371	0.0590
8	500.2570	7981	238.7	3740	0.0627
9	585.0904	8578	301.4	5287	0.0682
10	641.1508	8460	2755.4	40241	0.0758
11	642.1532	8662	980.4	14279	0.0741
12	643.1579	8742	191.9	2799	0.0736
13	657.1243	8660	662.6	9147	0.0759
14	658.1269	8959	228.0	3147	0.0735

Figure 66 Mass spectrum of (3*S*,4*R*)-1-(*N*-*tert*-Butoxycarbonyl)-3-(9*H*-fluoren-9-yl-methoxycarbonylamino)-4-((pentafluorophenoxy)carbonyl) pyrrolidine (17)

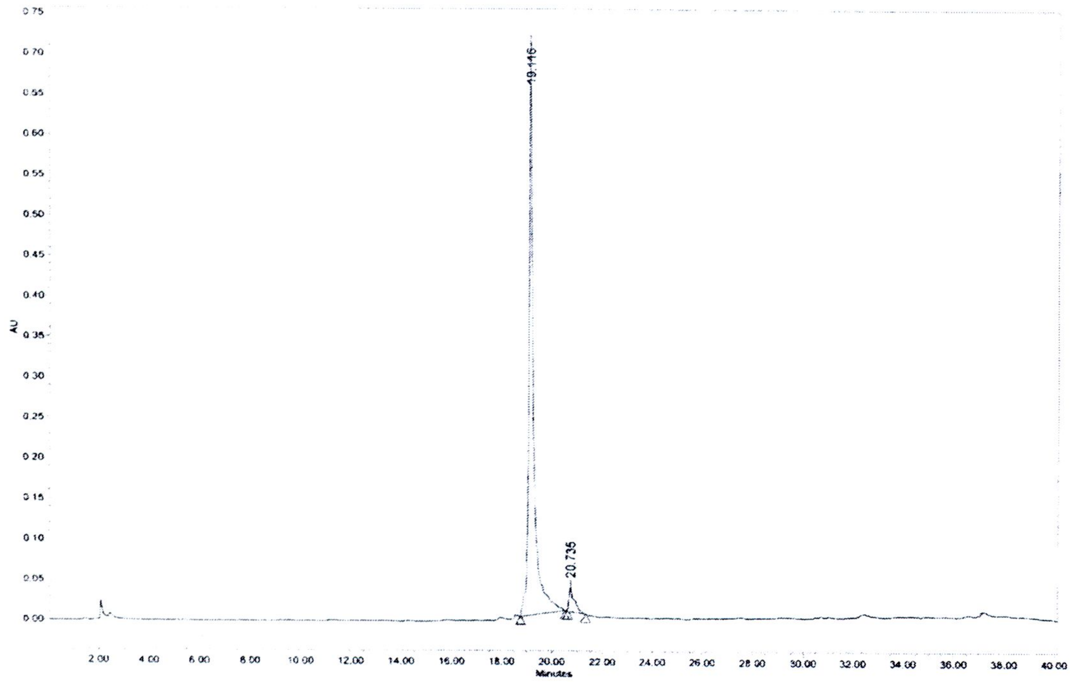


Figure 67 HPLC chromatogram of Bz-TTTTTTTTT-Lys-NH$_2$ (P2)

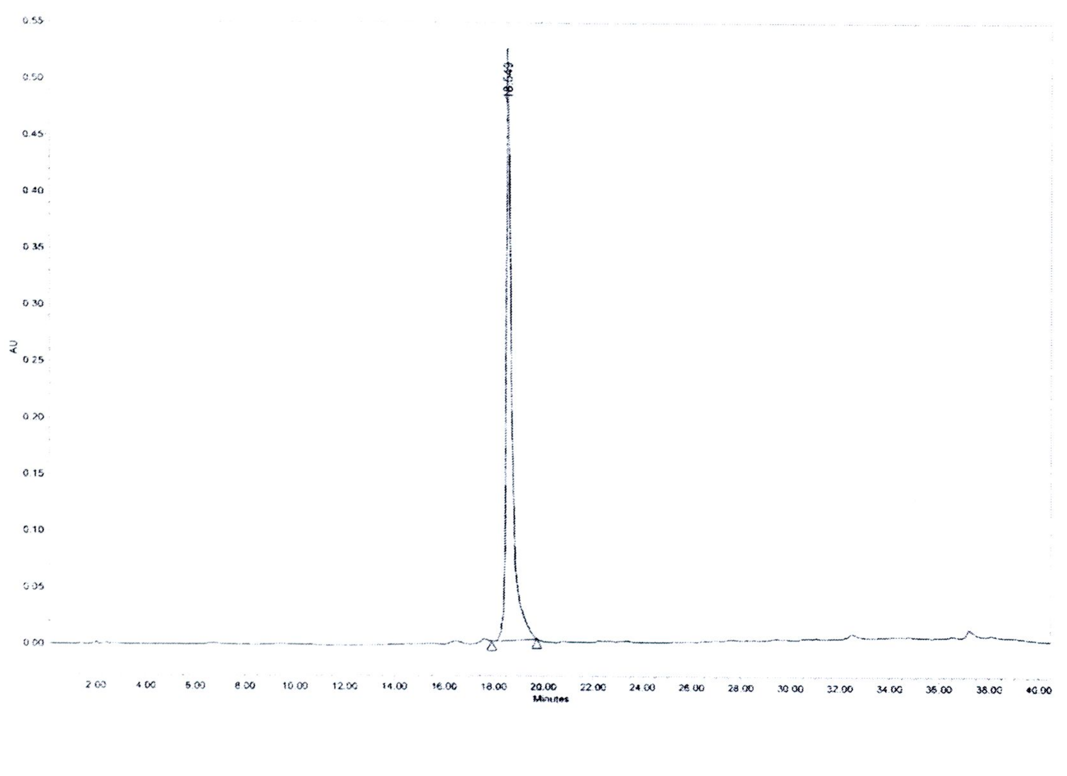


Figure 68 HPLC chromatogram of Bz-TTTTTTTTT -Lys-NH$_2$ (P3)

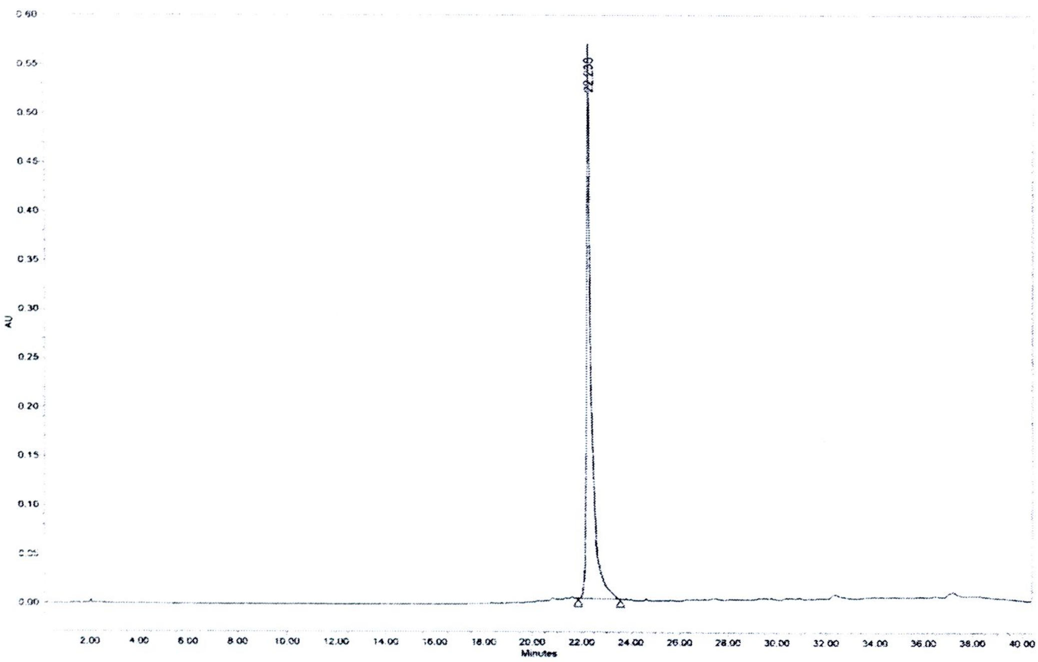


Figure 69 HPLC chromatogram of Bz-TTTT<u>T</u>TTTT-Lys-NH$_2$ (P4)

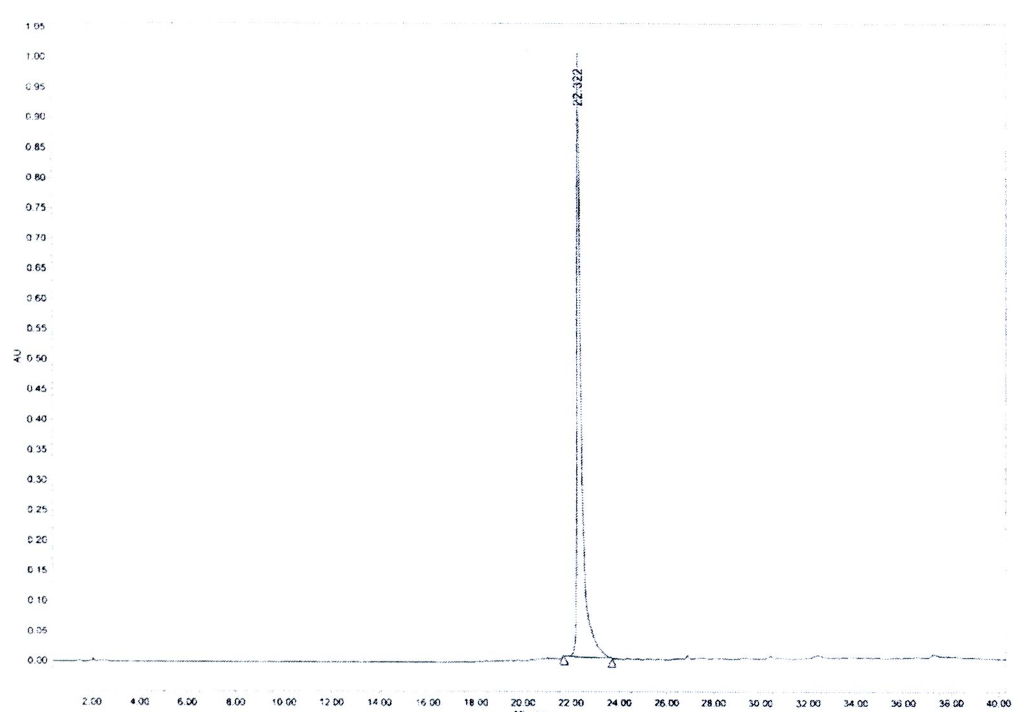


Figure 70 HPLC chromatogram of Bz-TTTT<u>T</u>TTTT-Lys-NH$_2$ (P5)

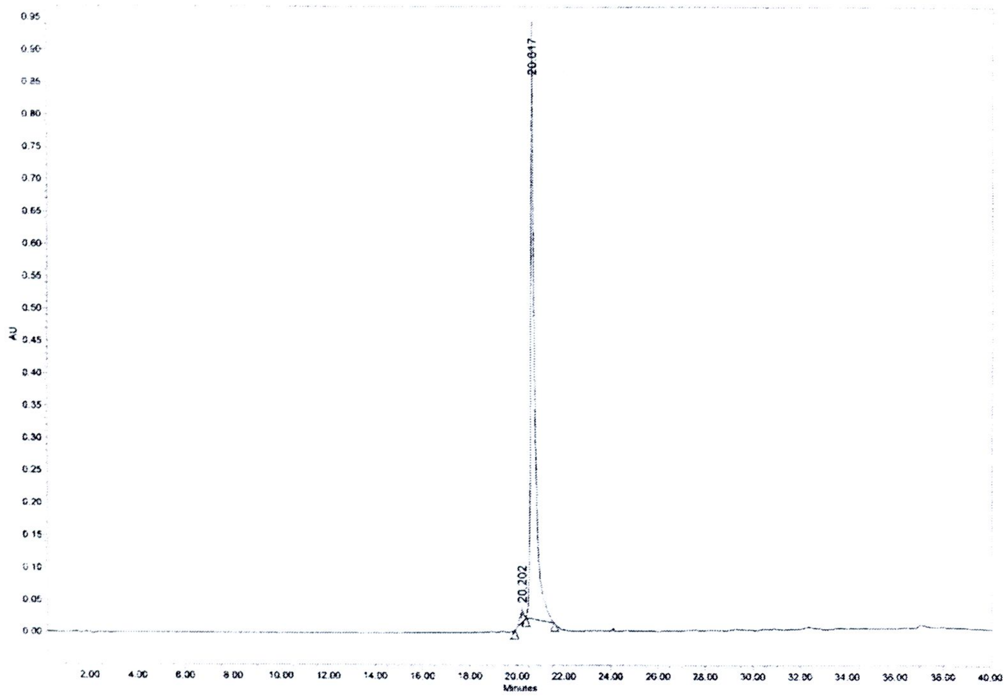


Figure 71 HPLC chromatogram of Bz-GTAGA<u>T</u>CAC T-Lys-NH_2 (P6)

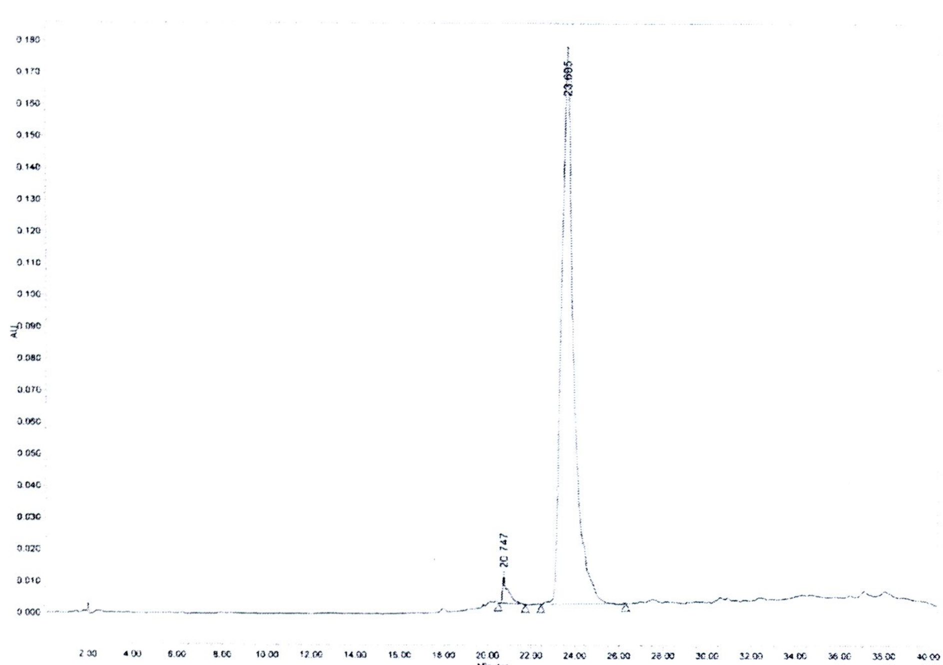


Figure 72 HPLC chromatogram of Ac-TTTT$^{(Py)}$<u>T</u>TTTT-Lys-NH_2 (P7)

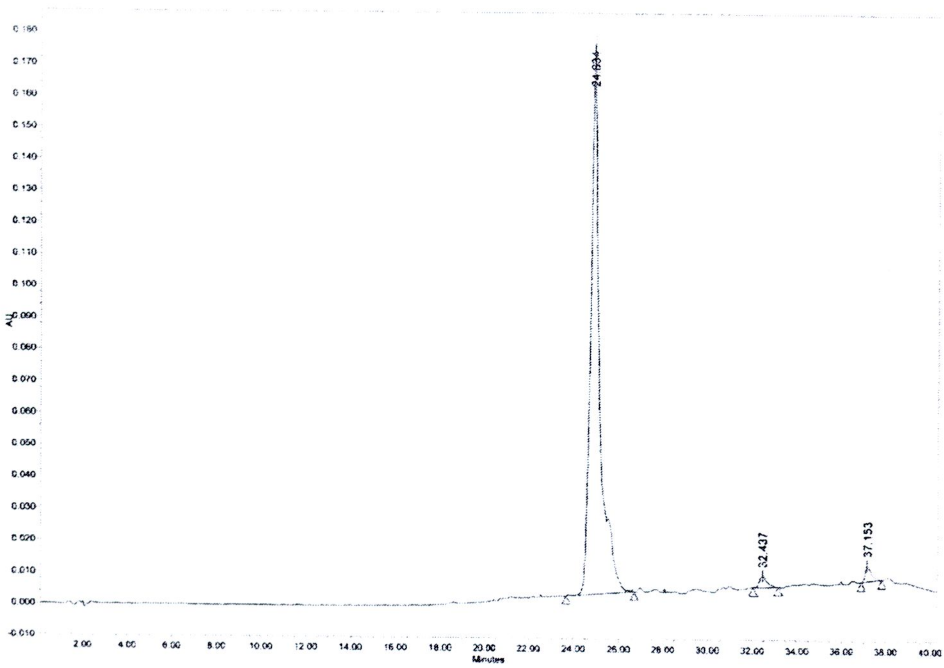


Figure 73 HPLC chromatogram of Ac-TTTT$^{(PyBu)}\underline{T}$TTTT-Lys-NH$_2$ (P8)

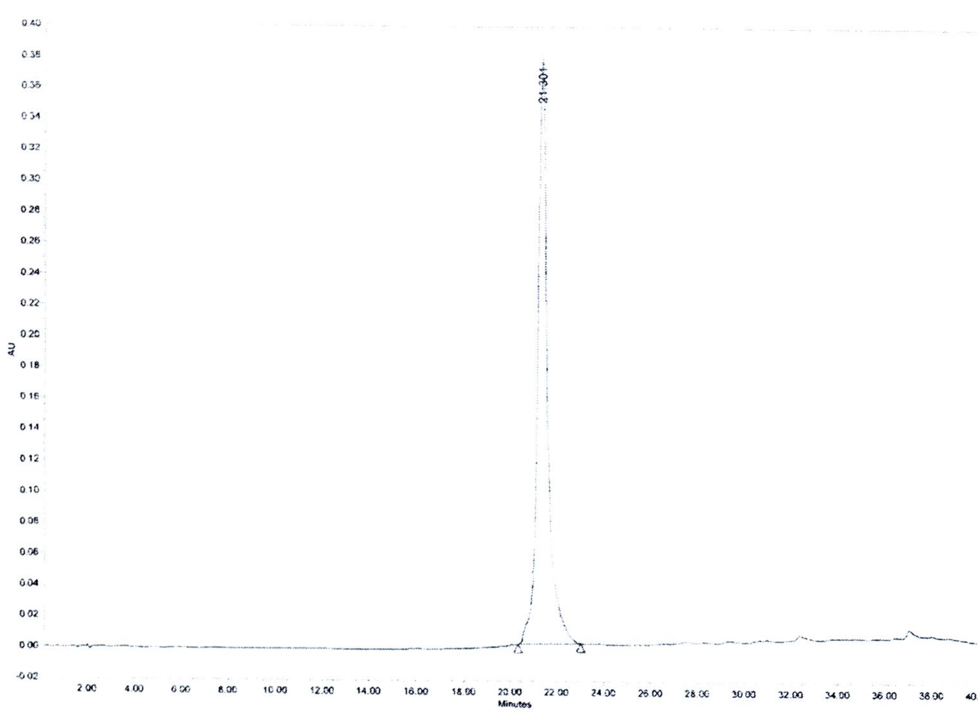


Figure 74 HPLC chromatogram of Ac-GTAGA$^{(Py)}\underline{T}$CAC T-Lys-NH$_2$ (P9)

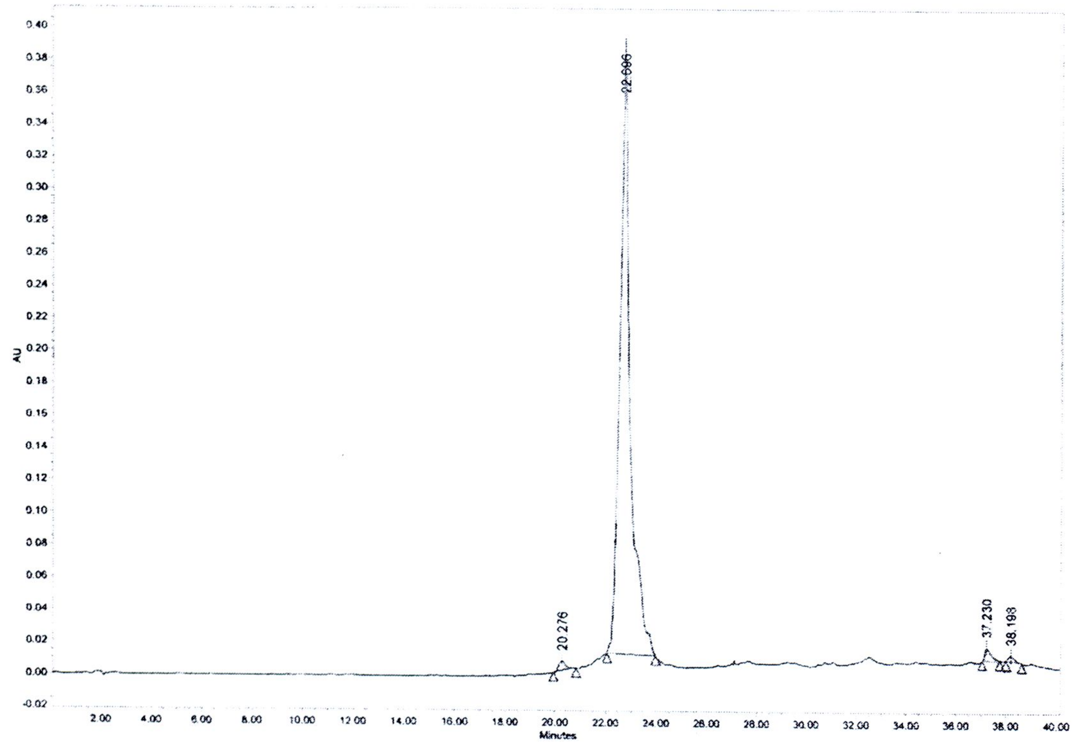


Figure 75 HPLC chromatogram of Bz-GTAGA$^{(PyBu)}$TCAC T-Lys-NH$_2$ (P10)

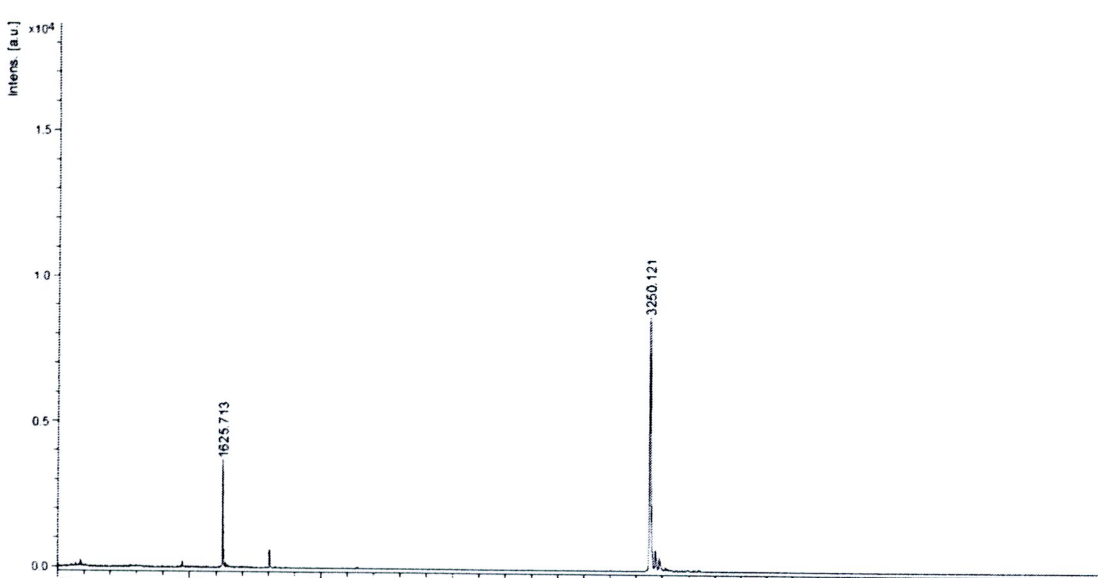


Figure 76 MALDI-TOF mass spectrum of Bz-TTTTTTTTT-Lys-NH$_2$ (P2)

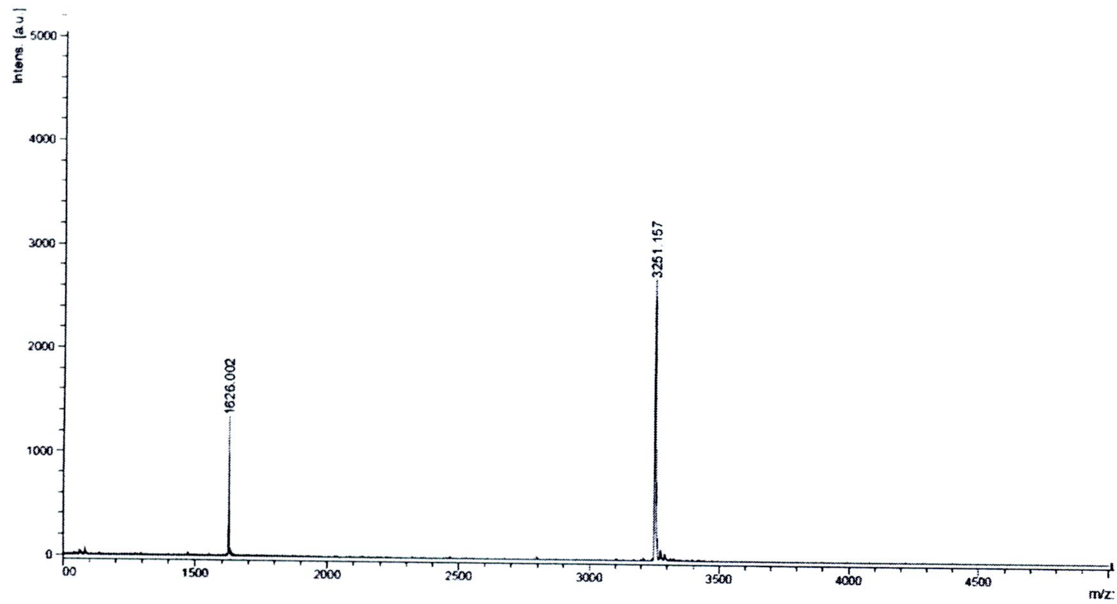


Figure 77 MALDI-TOF mass spectrum of Bz-TTTTTTTTT -Lys-NH_2 (P3)

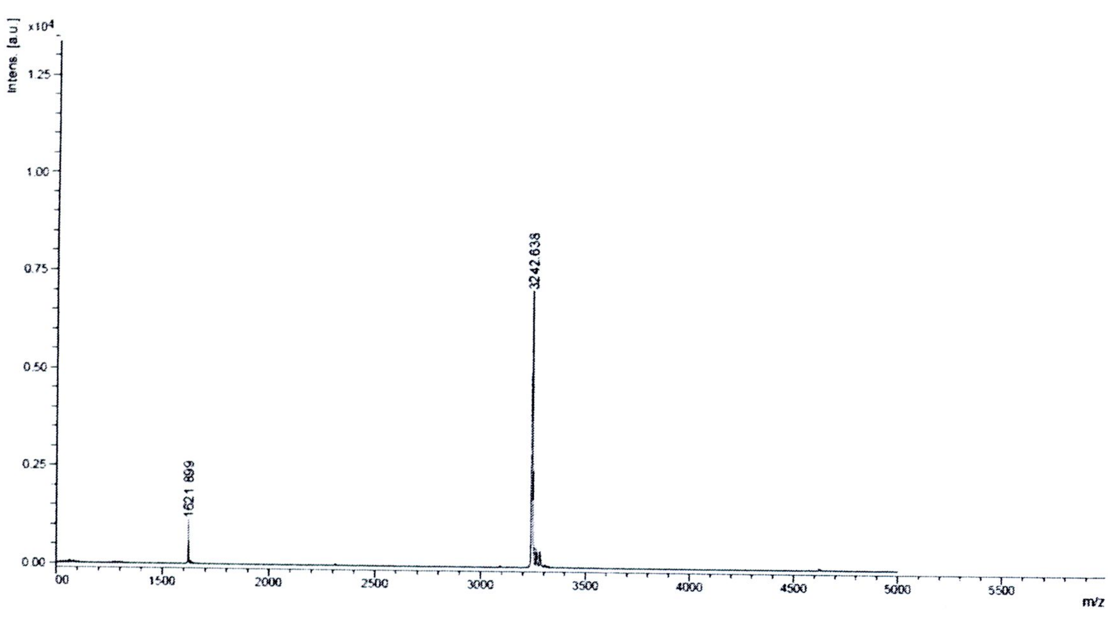


Figure 78 MALDI-TOF mass spectrum of Bz-TTTTTTTTT-Lys-NH_2 (P4)

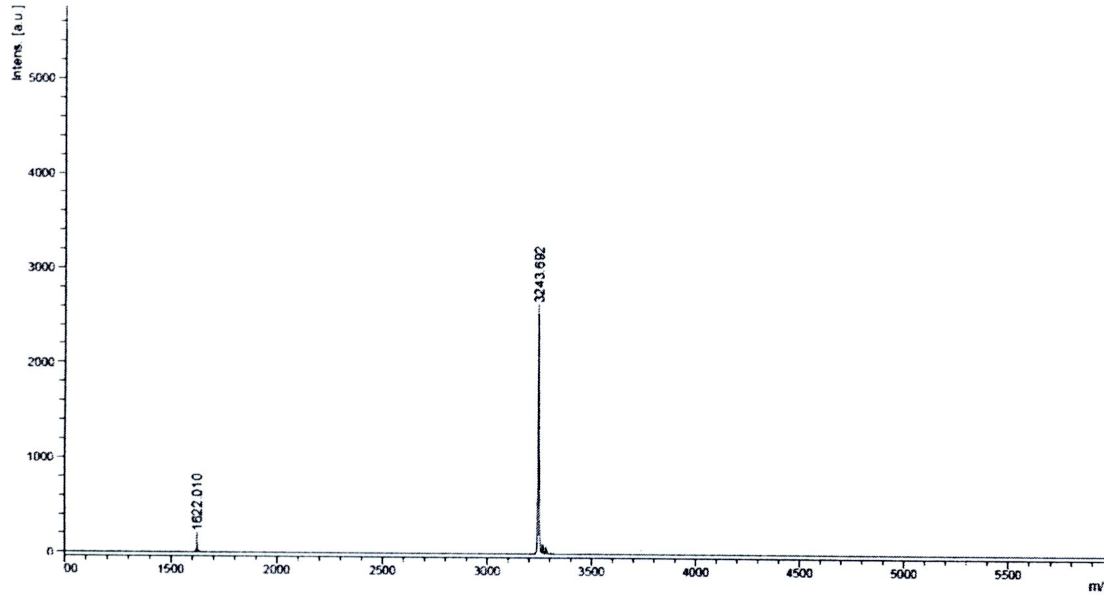


Figure 79 MALDI-TOF mass spectrum of Bz-TTTT<u>T</u>TTTT-Lys-NH_2 (P5)

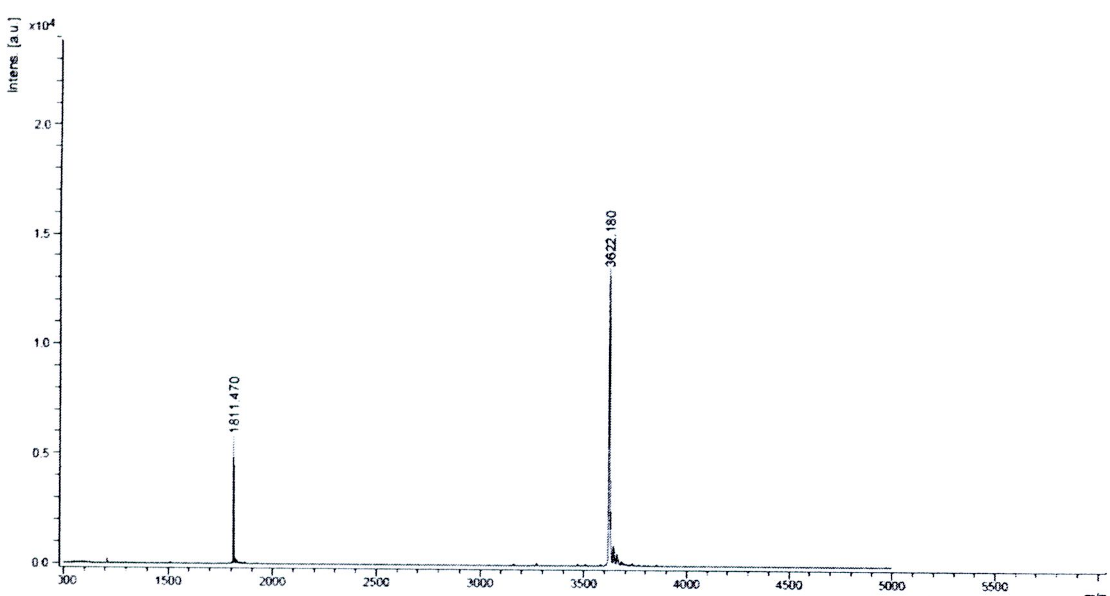


Figure 80 MALDI-TOF mass spectrum of Bz-GTAGA<u>T</u>CAC T-Lys-NH_2 (P6)

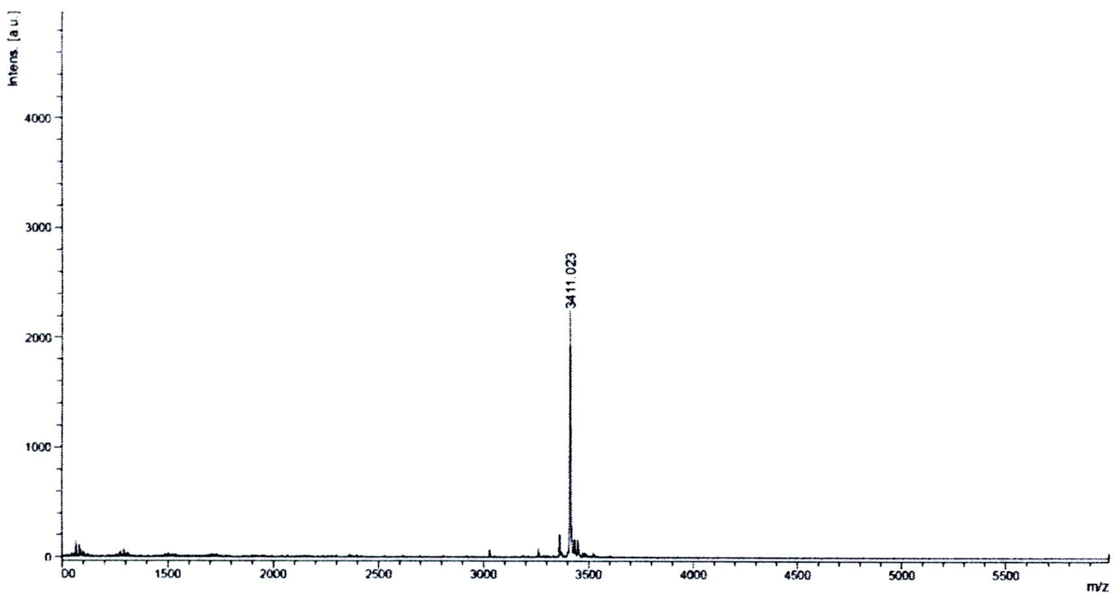


Figure 81 MALDI-TOF mass spectrum of Ac-TTTT$^{(Py)}$TTTTT-Lys-NH_2 (P7)

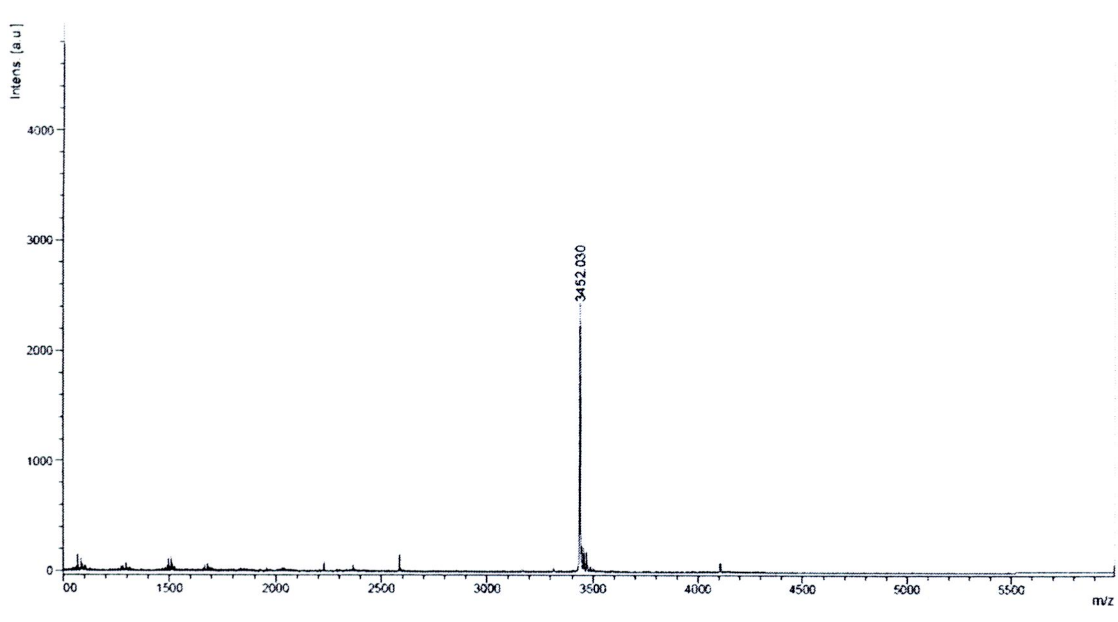


Figure 82 MALDI-TOF mass spectrum of Ac-TTTT$^{(PyBu)}$TTTTT-Lys-NH_2 (P8)

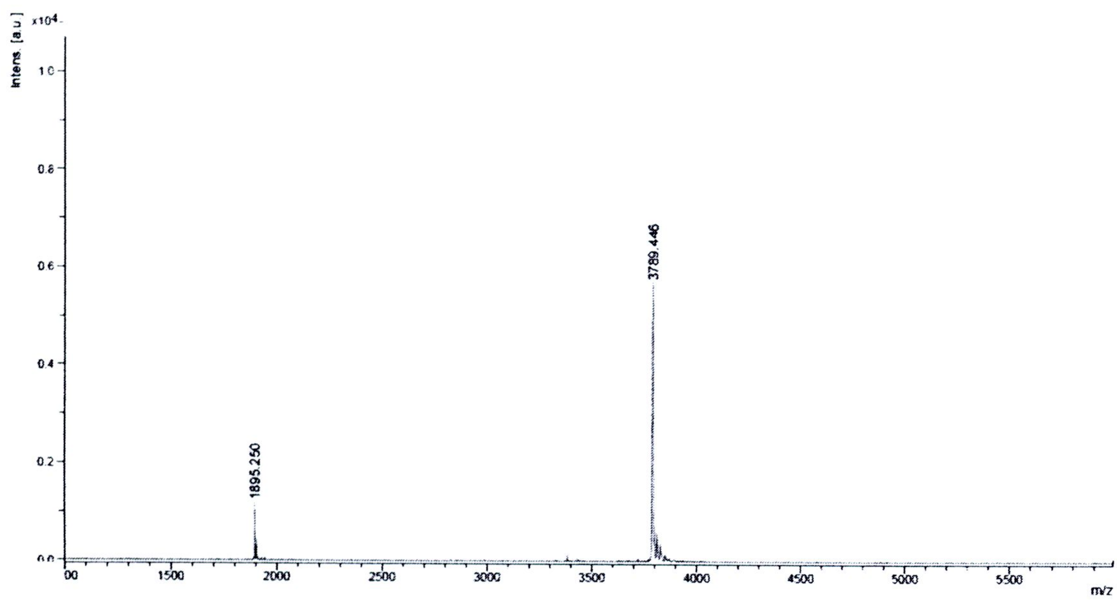


Figure 83 MALDI-TOF mass spectrum of Ac-GTAGA$^{(Py)}$<u>T</u>CAC T-Lys-NH_2 (P9)

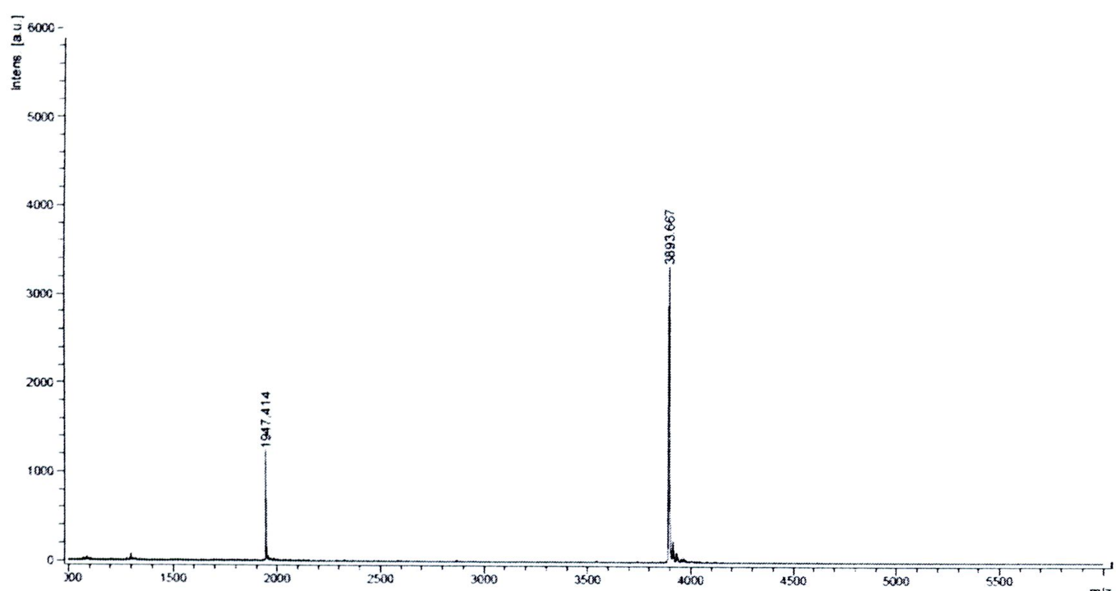


Figure 84 MALDI-TOF mass spectrum of Bz-GTAGA$^{(PyBu)}$<u>T</u>CAC T-Lys-NH_2 (P10)

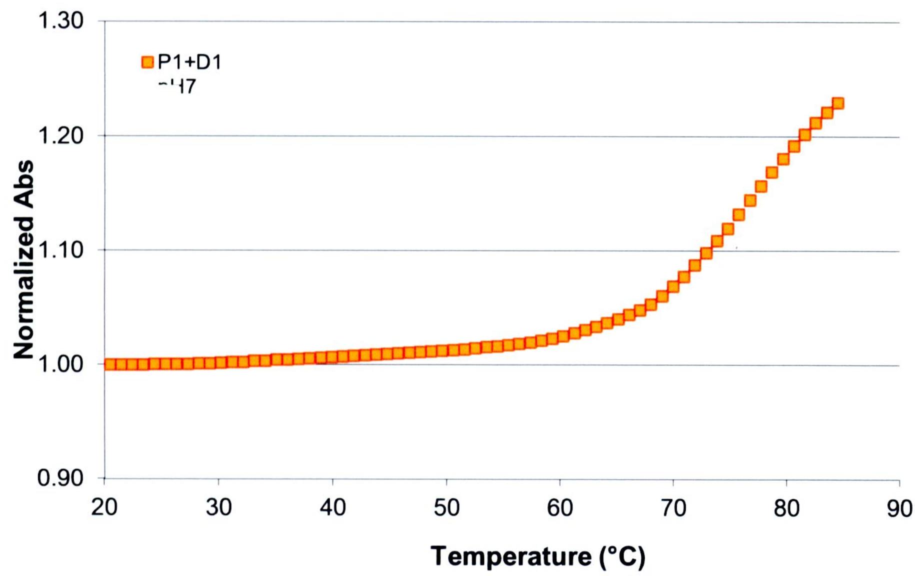


Figure 85 The melting curves of PNA P1 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

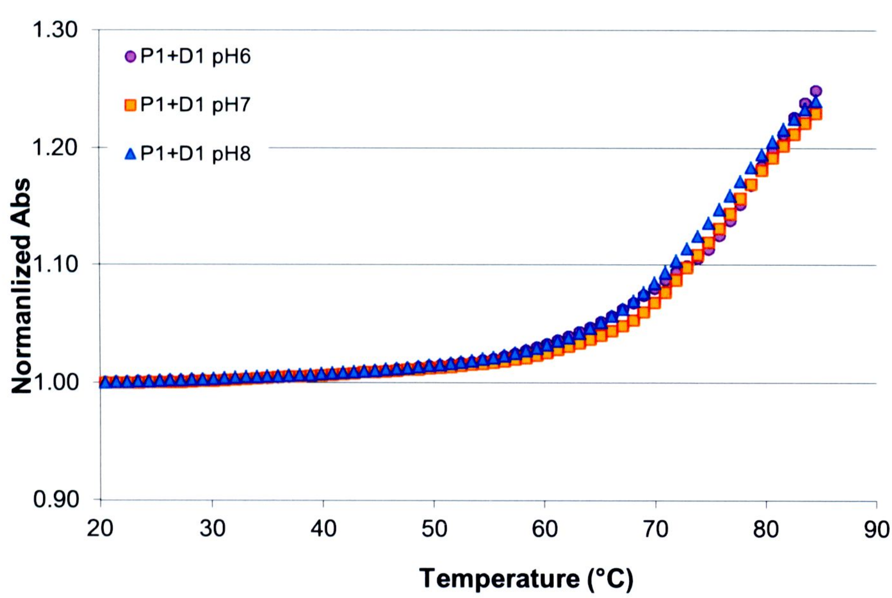


Figure 86 The melting curves of PNA P1 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 6.0-8.0, 100 mM NaCl.

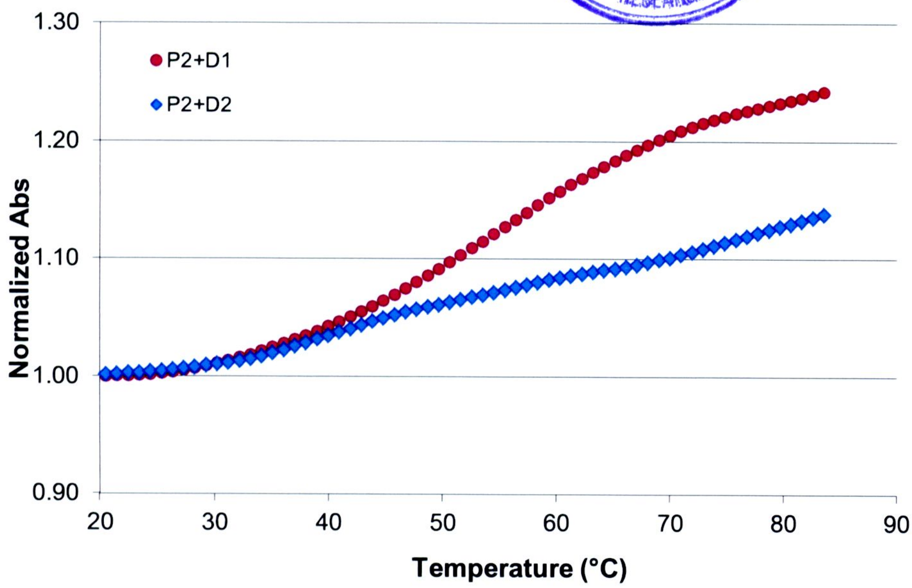


Figure 87 The melting curves of PNA P2 hybrid with DNA D1 and D2. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

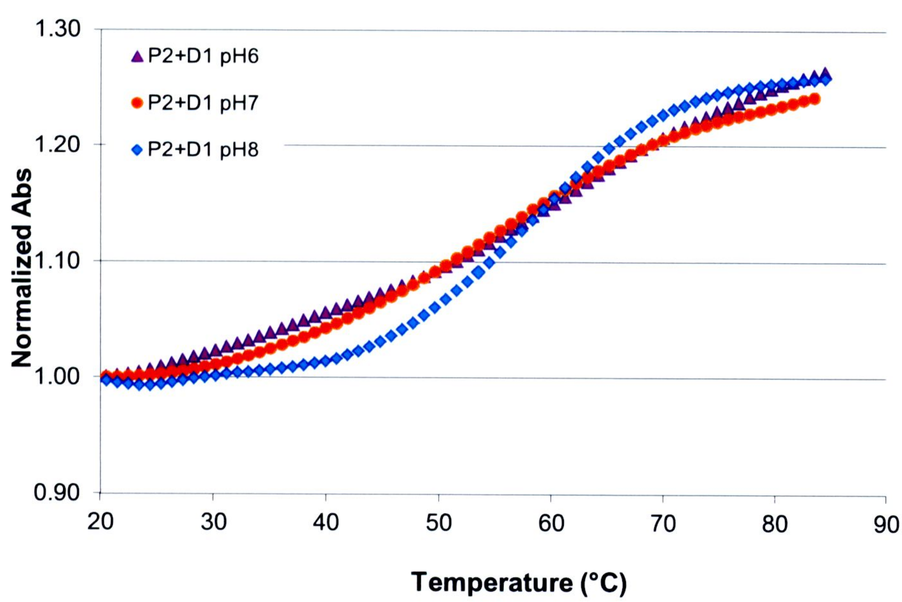


Figure 88 The melting curves of PNA P2 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 6.0-8.0, 100 mM NaCl.

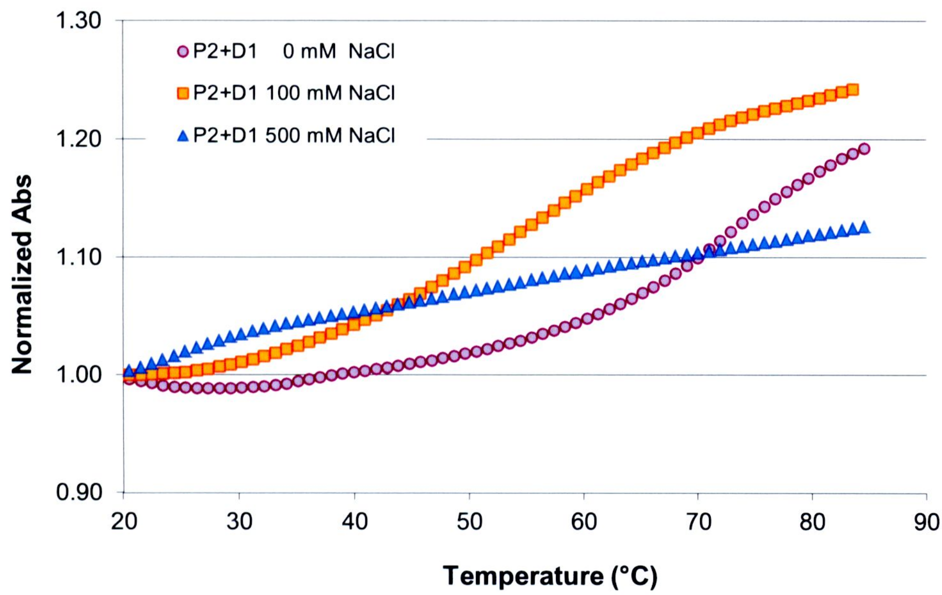


Figure 89 The melting curves of PNA P2 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 0, 100,500 mM NaCl.

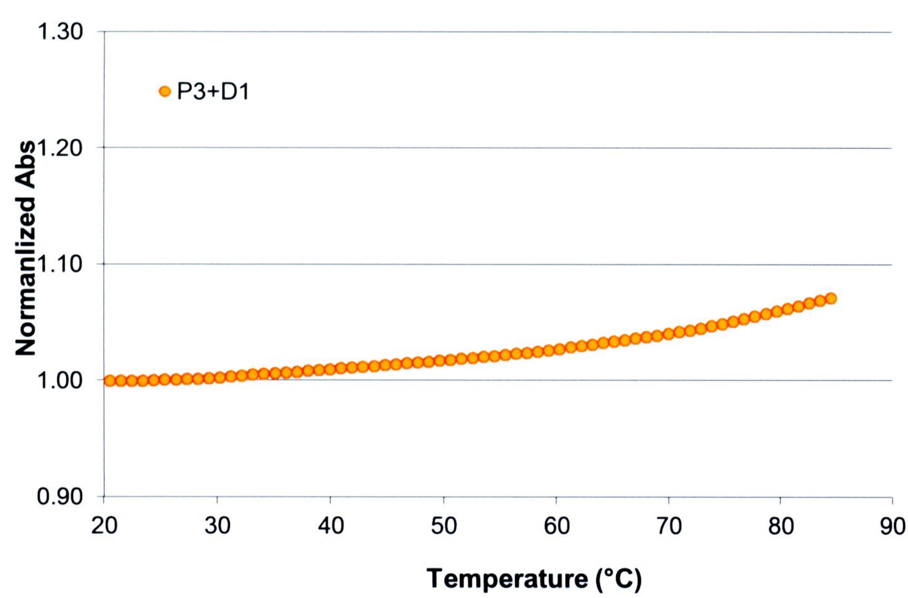


Figure 90 The melting curves of PNA P3 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

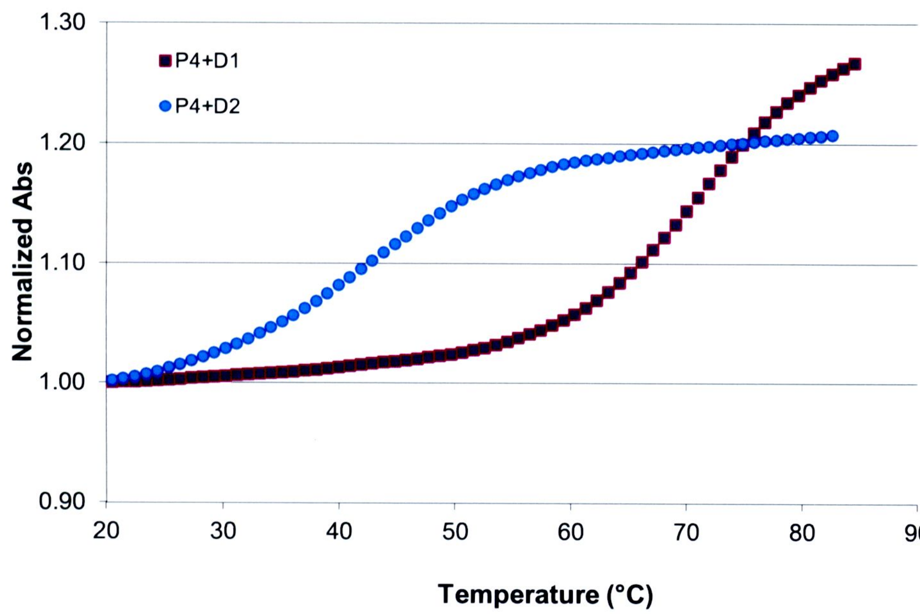


Figure 91 The melting curves of PNA P4 hybrid with DNA D1 and D2. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

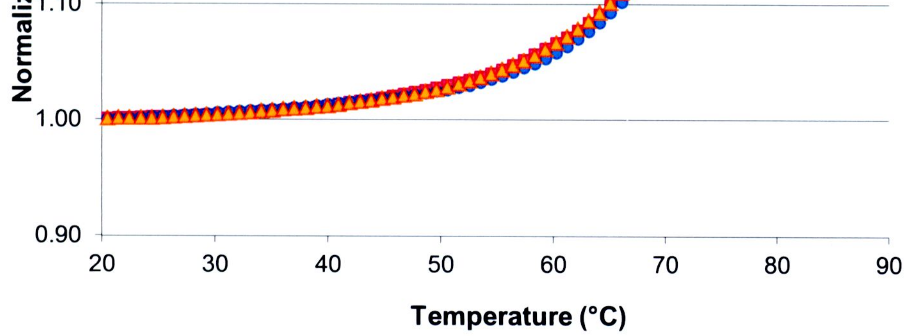


Figure 92 The melting curves of PNA P4 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 6.0-8.0, 100 mM NaCl.

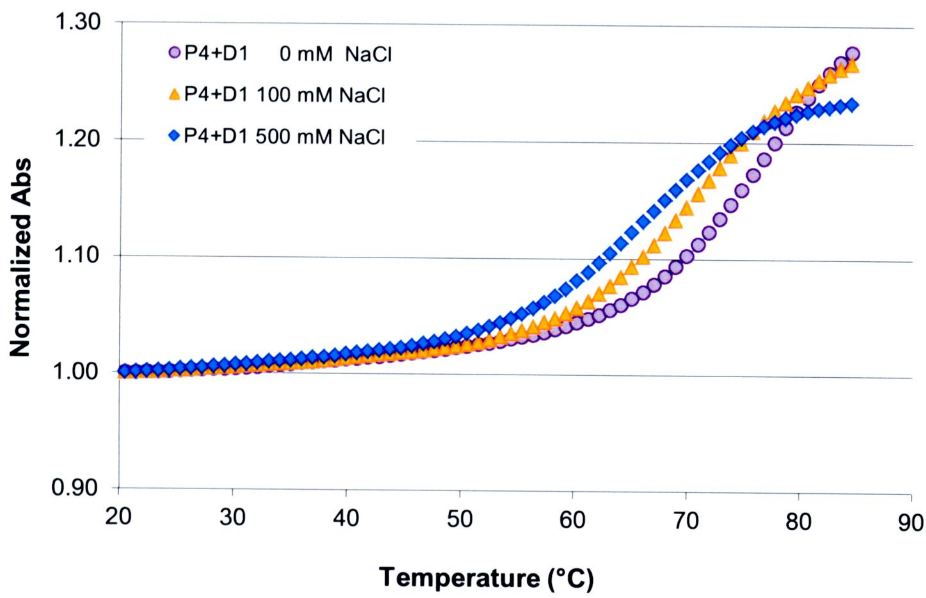


Figure 93 The melting curves of PNA P4 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 0, 100, 500 mM NaCl.

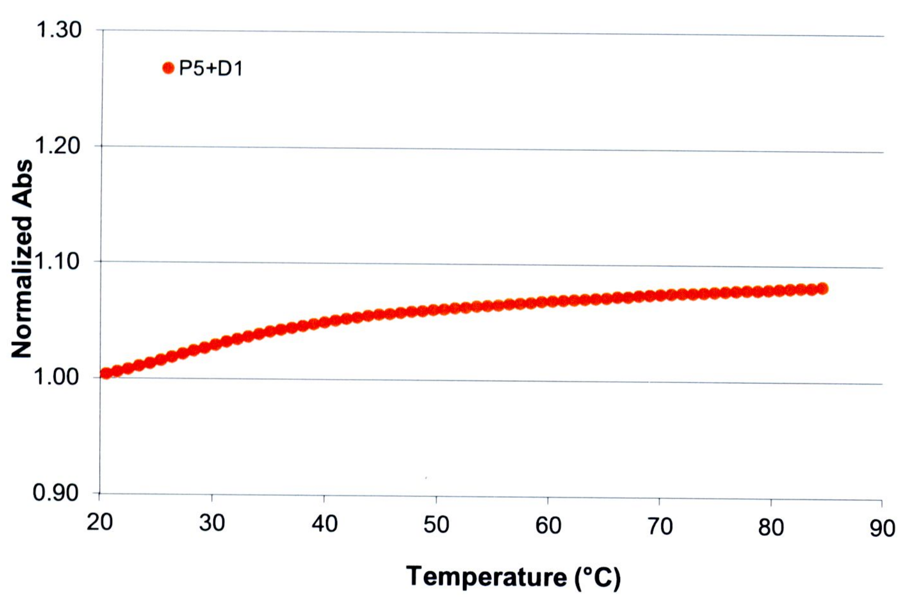


Figure 94 The melting curves of PNA P5 hybrid with DNA D1. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

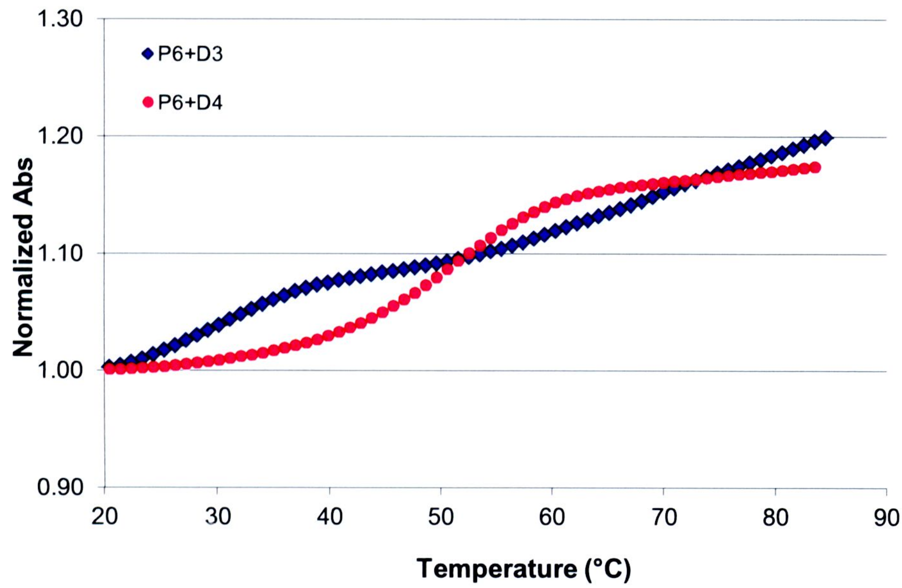


Figure 95 The melting curves of PNA P6 hybrid with DNA D3 and D4. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

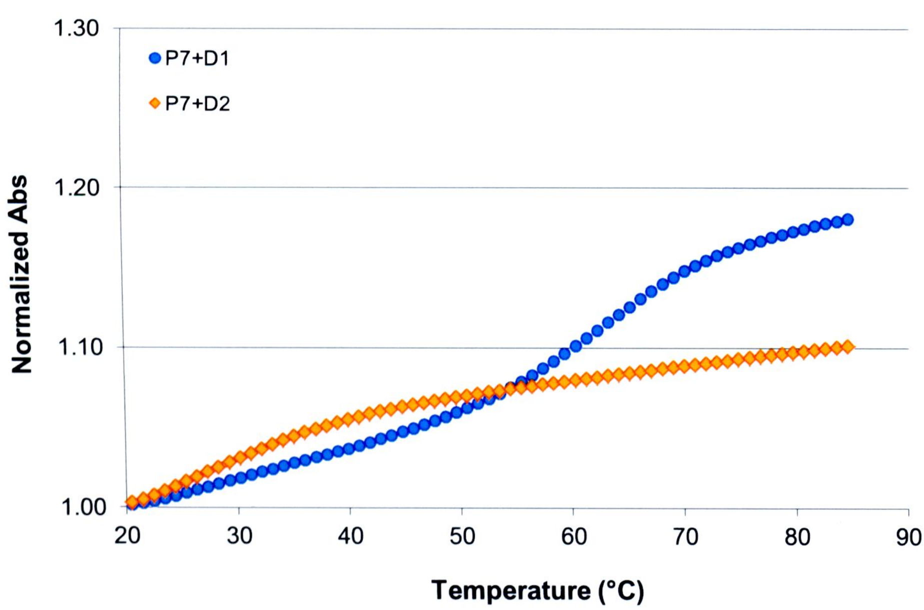


Figure 96 The melting curves of PNA P7 hybrid with DNA D3 and D4. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

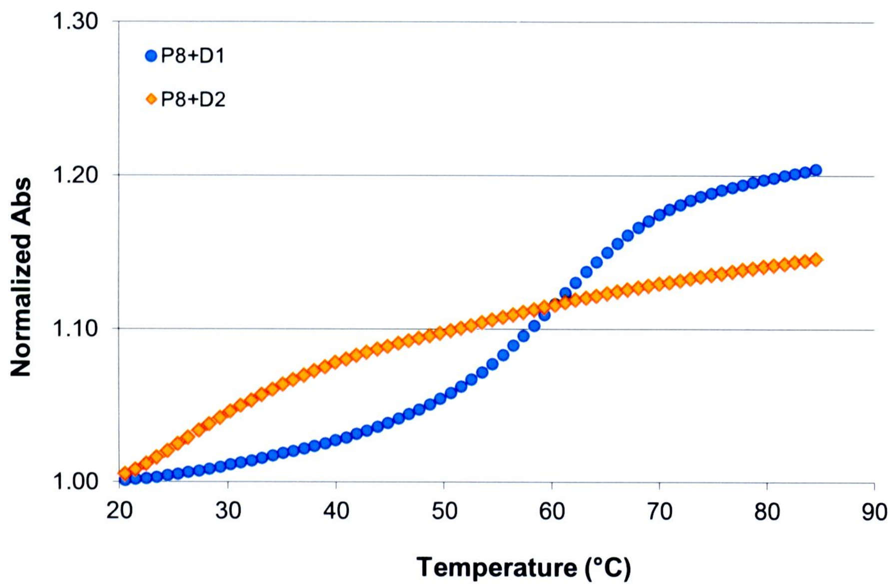


Figure 97 The melting curves of PNA P8 hybrid with DNA D3 and D4. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

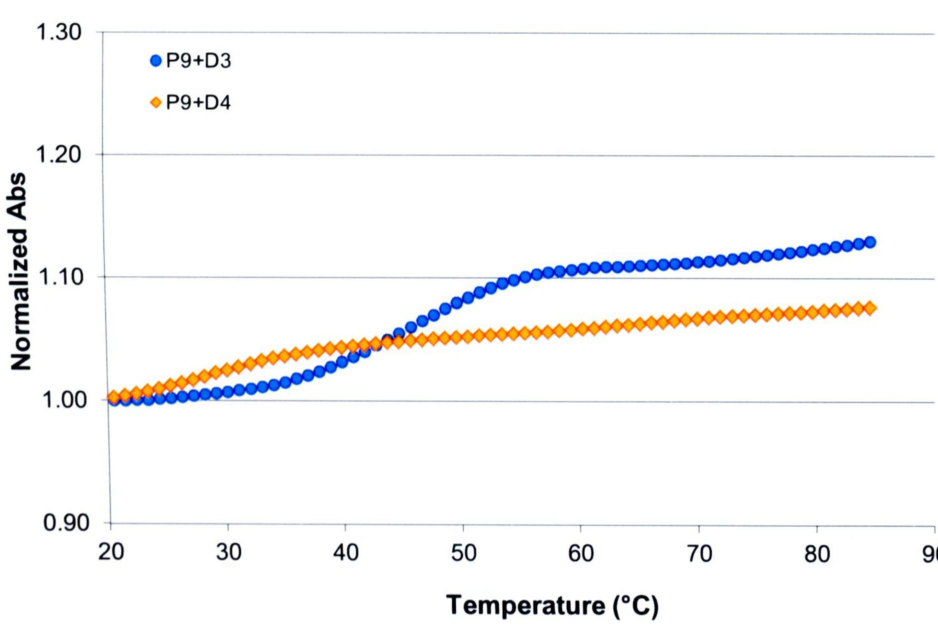


Figure 98 The melting curves of PNA P9 hybrid with DNA D3 and D4. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

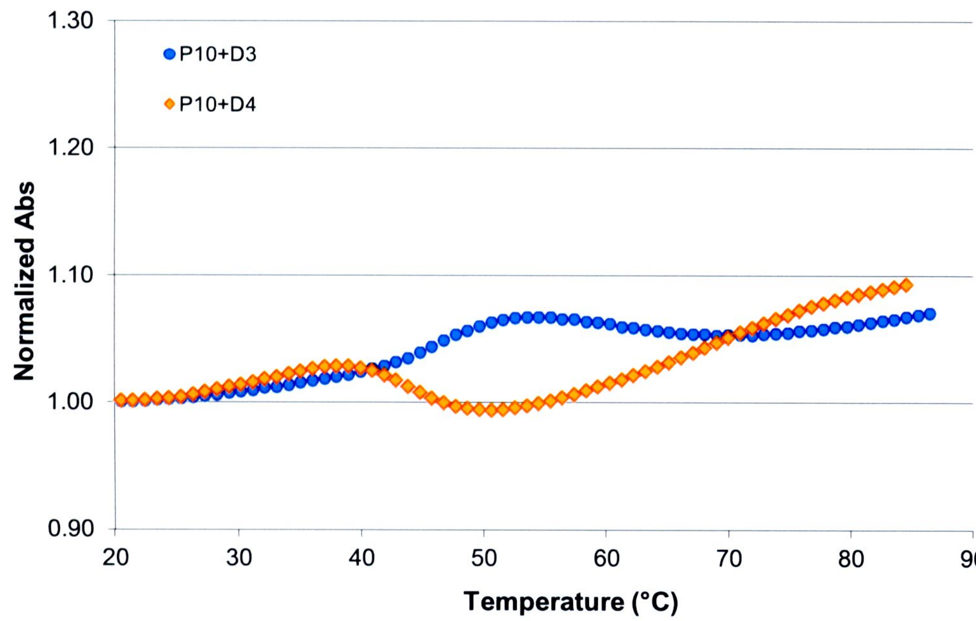


Figure 99 The melting curves of PNA P10 hybrid with DNA D3 and D4. The T_m measured at a ratio of PNA:DNA =1:1, [PNA] = 1.0 μM and [DNA] = 1.0 μM, 10 mM sodium phosphate buffer pH 7.0, 100 mM NaCl.

BIOGRAPHY

BIOGRAPHY

Name –Surname	Nisanath Reenabthue
Date of Birth	November 15, 1985
Address	House No.84/43, Village No.9, Thong Chai sub-district, Muang district, Phetchaburi province 76000 Thailand
Education Background	
2007	B.S. (Chemistry), Naresuan University, Phisanulok, Thailand