NMR evidence of the kinetic and thermodynamic products in the NIS promoted cyclization of 1-phenyl-4-pentenylamines. Synthesis and reactivity of *trans*-2-phenyl-5-iodopiperidines.

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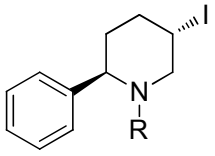
Table 1. ^{13}C NMR Chemical shifts of piperidines **2**[a]

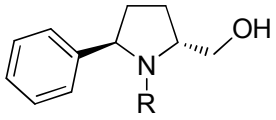


2a R = Me
2b Et
2c Pr
2d allyl
2e Bn
2f *i*Pr
2g *c*Hex

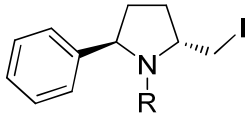
	2a	**2b**	**2c**	**2d**	**2e**	**2f**	**2g**
C-2	69.4	67.1	67.5	67.0	67.6	64.7	64.4
C-3	38.0	38.2	38.7	38.6	38.9	39.4	39.3
C-4	38.7	38.7	39.0	38.9	39.0	39.4	39.3
C-5	24.6	25.1	25.8	25.3	25.4	27.7	28.1
C-6	66.9	62.2	63.1	63.0	62.9	55.4	57.2
C-Ar	127.3	127.5	127.1	127.3	126.9	127.1	127.1
	128.5	128.6	127.5	127.4	127.3	127.4	127.4
	143.6	142.8	128.4	128.6	127.4	128.5	128.5
			144.0	143.6	128.2	144.0	144.0
					128.5		
					128.7		
					138.7		
					144.1		
Other	43.5[b]	10.5[b]	11.6[b]	57.3[c]	58.6[c]	12.5[b]	24.1[c]
		48.2[c]	19.0[c]	117.9[d]		21.3[b]	25.6[c]
			56.1[c]	134.4[e]		48.4[f]	26.2[c]
							26.3[c]
							31.4[c]
							58.0[f]

[a]Values were assigned on the basis of gCOSY and gHSQC spectra.
[b]CH_3, [c]CH_2, [d]CH_2=, [e]CH=, [f]CH.

Table 2. ^{13}C NMR Chemical shifts of pyrrolidines **3** and **4**[a]



4a R = Me
4b Et
4c Pr
4d allyl
4e Bn
4h *t*Bu

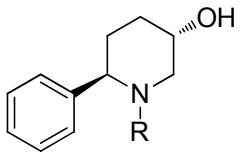


3a R = Me
3h *t*Bu

	4a	**4b**	**4c**	**4d**	**4e**	**4h**	**3a**[h]	**3h**
C-2	63.7	62.6	62.8	62.4	62.3	59.9	65.3	62.2
C-3	27.3	27.2	27.1	27.1	27.0	29.3	31.2	29.9
C-4	31.9	32.5	32.6	32.4	32.6	37.0	33.7	36.8
C-5	68.8	65.6	65.8	66.4	66.2	64.6	67.8	65.6
CH_2X[b]	61.6	62.1	62.1	62.4	62.4	65.1	11.4	14.6
C-Ar	127.0	126.8	126.7	126.9	126.8	126.1	127.8	125.9
	127.9	127.7	127.7	127.9	126.9	128.3	128.2	126.1
	128.3	128.3	128.3	128.2	127.9	149.0	129.3	128.1
	142.6	143.3	143.5	143.2	128.2		145.1	148.8
					128.3			
					139.9			
					143.3			
Other	35.1[c]	14.3[c]	11.8[c]	50.5[d]	51.6[d]	28.0[c]	34.7[c]	27.7[c]
		41.2[d]	21.9[d]	116.1[e]		55.4[g]		54.9[g]
			49.0[d]	136.7[f]				

[a]Values were assigned on the basis of gCOSY and gHSQC spectra.
[b]X = OH or I, [c]CH_3, [d]CH_2, [e]CH_2=, [f]CH=, [g]C, [h]Spectrum registered in C_6D_6.

Table 3. ^{13}C NMR Chemical shifts of piperidines **5**[a]



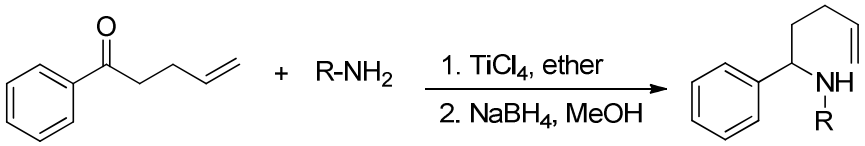
5a R = Me
5b Et
5c Pr
5d allyl
5e Bn
5f *i*Pr
5g *c*Hex

	5a	**5b**	**5c**	**5d**	**5e**	**5f**	**5g**
C-2	64.3	59.5	60.0	60.1	60.1	51.8	53.8
C-3	67.7	68.1	67.8	67.9	67.9	68.5	68.7
C-4	34.3	34.5	34.4	34.4	34.3	34.7	34.7
C-5	33.9	34.4	34.4	34.4	34.7	34.7	34.8
C-6	69.8	67.3	67.8	67.4	67.9	64.9	64.4
C-Ar	127.2	127.0	127.0	127.2	126.8	127.0	126.9
	127.5	127.5	127.6	127.5	127.1	127.5	127.5
	128.5	128.4	128.4	128.5	127.5	128.5	128.4
	143.6	144.1	144.0	143.8	128.1	143.9	144.2
					128.6		
					128.7		
					139.1		
					144.4		
Other	44.2[b]	10.7[b]	11.6[b]	58.0[c]	59.3[c]	12.2[b]	23.7[c]
		48.6[c]	18.8[c]	117.7[d]		21.1[b]	25.7[c]
			56.6[c]	134.7[e]		48.4[f]	26.4[c]
							26.5[c]
							31.5[c]
							57.8[f]

[a]Values were assigned on the basis of gCOSY and gHSQC spectra.
[b]CH_3, [c]CH_2, [d]CH_2=, [e]CH=, [f]CH.

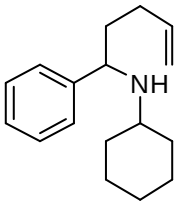
General procedures. ^{1}H and ^{13}C NMR spectra were recorded in $CDCl_3$ or C_6D_6 solution. Chemical shifts are reported as δ values (ppm) relative to internal Me_4Si. Infrared spectra were recorded on a Nicolet 320 FT-IR spectrophotometer. TLC was performed on SiO_2 (silica gel 60 F_{254}, Merck) or on Al_2O_3 (aluminium oxide 60 F254, Merck). The spots were located by UV light, a 1% $KMnO_4$ aqueous solution or a 1.5% K_2PtCl_6 aqueous solution. Chromatography refers to flash chromatography and was achieved on SiO_2 (silica gel 60, SDS, 230–400 mesh) or on Al_2O_3 (aluminium oxide activity II-III, 70-230 mesh). All reactions were carried out under an argon atmosphere with dry, freshly distilled solvents and under anhydrous conditions. Drying of the organic extracts during the work-up of reactions was performed over anhydrous Na_2SO_4.

I. Synthesis of 1-phenylpent-4-enamines (1c-h)[1]



Representative example, preparation of 1g: A solution of 1-phenylpent-4-en-1-one[2] (0.3 g, 1.87 mmol) and cyclohexylamine (0.85 ml, 7.48 mmol) in 10 mL of dry diethylether was cooled to 0°, and $TiCl_4$ (0.12 mL, 1.12 mmol) was added dropwise. The mixture was stirred overnight allowing the temperature to rise to rt then it was quenched with aqueous 0.5 M NaOH solution and extracted with ether. The combined organic layers were dried and concentrated. The residue was dissolved in MeOH (10 mL), cooled to 0º and then $NaBH_4$ (0.088 g, 2.24 mmol) was added portionwise. The mixture was stirred at rt for 1h then the solvent was removed under vacuum, water was added and the aqueous extracted with CH_2Cl_2. The organic layers were dried, concentrated and purified by chromatography (SiO_2, CH_2Cl_2-CH_2Cl_2/MeOH 95:5) to yield **1g** (0.35 g, 78%) as a colourless oil.

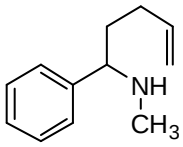
N-Cyclohexyl-1-phenylpent-4-en-1-amine (1g)



IR (NaCl, neat): 3321, 3062, 3024, 2926, 2851, 1640, 1492, 1450, 1366, 1124, 993, 909, 759, 700 cm^{-1}; ^{1}H NMR ($CDCl_3$, 400 MHz) δ 0.90-1.20 (m, 5H), 1.53 (brs, 1H), 1.60-1.84 (m, 5H), 1.96 (m, 3H), 2.23 (tt, 1H, *J* = 10, 3.6 Hz), 3.76 (t, 1H, *J* = 6.8 Hz), 4.95 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10.4, 6.4 Hz, =CH), 7.20-7.35 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 24.8 (CH_2), 25.2 (CH_2), 26.2 (CH_2), 30.6 (CH_2), 33.0 (CH_2), 34.7 (CH_2), 37.7 (CH_2), 53.5 (CH), 59.0 (CH), 114.6 ($=CH_2$), 126.7, 127.1, 128.3 (Ar-CH), 138.4 (=CH), 144.8 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{17}H_{26}N$ 244.2059 $[M+H]^+$, found 244.2064.

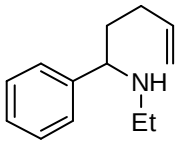
[1] G. Verniest, E. Van Hende, R. Surmont and N. De Kimpe, *Org. Lett.,* 2006, **8**, 4767. For the preparation of the imine in the synthesis of **1a** and **1b** see: J. S. M. Samec, A. H. Ell, J. B. Aaberg, T. Privalov, L. Eriksson, J.-E. Bäckvall, *J. Am. Chem. Soc.,* 2006, **128,** 14293.
[2] D. V. Gribkov, K. C. Hultzsch, F. Hampel, *J. Am. Chem. Soc.*, 2006, **128**, 3748.

N-Methyl-1-phenylpent-4-en-1-amine (1a)



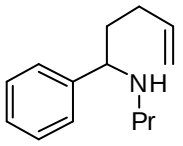
Yield: 47%; IR (NaCl, neat): 3330, 3077, 3063, 3025, 2973, 2933, 2848, 2788, 1640, 1492, 1475, 1450, 1354, 1133, 994, 911, 760, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.65-2.05 (m, 5H), 2.27 (s, 3H, CH_3), 3.47 (dd, 1H, *J* = 8, 6 Hz), 4.95 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10, 6.8 Hz, =CH), 7.22-7.36 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 30.5 (CH_2), 34.4 (CH_3), 36.8 (CH_2), 64.9 (CH), 114.7 ($=CH_2$), 127.0, 127.3, 128.4 (Ar-CH), 138.3 (=CH), 143.5 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{12}H_{18}N$ 176.1434 $[M+H]^+$, found 176.1432.

N-Ethyl-1-phenylpent-4-en-1-amine (1b)



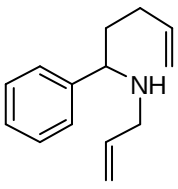
Yield : 30% ; IR (NaCl, neat): 3321, 3077, 3063, 3025, 2967, 2930, 2870, 2847, 1640, 1492, 1452, 1379, 1127, 993, 910, 760, 700 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.05 (t, 3H, *J* = 7.2 Hz, CH_3), 1.50 (brs, 1H, NH), 1.65-2.05 (m, 4H), 2.47 (m, 2H, CH_2), 3.60 (dd, 1H, *J* = 8, 5.6 Hz), 4.96 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10, 6.8 Hz, =CH), 7.21-7.35 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 15.4 (CH_3), 30.5 (CH_2), 37.1 (CH_2), 41.9 (CH_2), 62.8 (CH), 114.6 ($=CH_2$), 126.9, 127.3, 128.3 (Ar-CH), 138.4 (=CH), 144.1 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{13}H_{20}N$ 190.1590 $[M+H]^+$, found 190.1591.

1-Phenyl-*N*-propylpent-4-en-1-amine (1c)



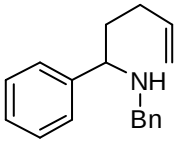
Yield: 75%; IR (NaCl, neat): 3327, 3079, 3063, 3025, 2958, 2930, 2872, 2802, 1640, 1492, 1453, 1379, 1357, 1125, 993, 910, 759, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.86 (t, 3H, *J* = 7.6 Hz, CH_3), 1.45 (m, 2H), 1.73 (m, 1H), 1.82 (m, 1H), 1.96 (m, 2H), 2.39 (m, 2H), 3.58 (dd, 1H, *J* = 8.0, 6.4 Hz), 4.96 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10.4, 6.4 Hz, =CH), 7.20-7.36 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 11.8 (CH_3), 23.3 (CH_2), 30.5 (CH_2), 37.2 (CH_2), 49.6 (CH_2), 62.9 (CH), 114.6 ($=CH_2$), 126.9, 127.3, 128.3 (Ar-CH), 138.4 (=CH), 144.2 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{22}N$ 204.1746 $[M+H]^+$, found 204.1746.

N-Allyl-1-phenylpent-4-en-1-amine (1d)



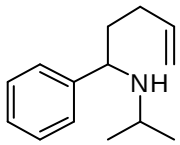
Yield: 72%; IR (NaCl, neat): 3328, 3077, 3025, 2977, 2924, 2844, 1640, 1492, 1452, 1357, 1114, 993, 913, 760, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.50 (brs, 1H, NH), 1.67-1.88 (m, 2H), 1.97 (m, 2H), 3.05 (m, 2H), 3.63 (dd, 1H, *J* = 8, 6.4 Hz), 4.90-5.15 (m, 4H, $=CH_2$), 5.72-5.92 (m, 2H, =CH), 7.21-7.35 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 30.5 (CH_2), 37.1 (CH_2), 50.1 (CH_2), 62.0 (CH), 114.7 ($=CH_2$), 115.7 ($=CH_2$), 127.0, 127.3, 128.4 (Ar-CH), 137.0 (=CH), 138.3 (=CH), 143.8 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{20}N$ 202.1590 $[M+H]^+$, found 202.1589.

N-Benzyl-1-phenylpent-4-en-1-amine (1e)



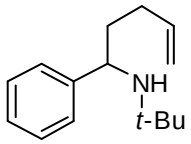
Yield: 71%; IR (NaCl, neat): 3326, 3062, 3026, 2975, 2924, 2844, 1639, 1601, 1492, 1452, 1115, 1026, 994, 910, 744, 699 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.60 (brs, 1H, NH), 1.68-1.88 (m, 2H), 1.98 (m, 2H), 3.53 (d, 1H, *J* = 13.2 Hz), 3.63 (t, 1H, *J* = 6.4 Hz), 3.64 (d, 1H, *J* = 13.2 Hz), 4.94 (m, 2H, $=CH_2$), 5.76 (ddt, 1H, *J* = 16.8, 10.4, 6.4 Hz, =CH), 7.20-7.38 (m, 10H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 30.5 (CH_2), 37.3 (CH_2), 51.5 (CH_2), 62.0 (CH), 114.6 ($=CH_2$), 126.8, 127.0, 127.4, 128.2, 128.3, 128.4 (Ar-CH), 138.4 (=CH), 140.6 (*ipso*-C), 144.0 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{18}H_{22}N$ 252.1746 $[M+H]^+$, found 252.1749.

N-Isopropyl-1-phenylpent-4-en-1-amine (1f)



Yield: 71%; IR (NaCl, neat): 3324, 3077, 3064, 3025, 2962, 2930, 2862, 1640, 1491, 1469, 1451, 1378, 1366, 1171, 1124, 994, 910, 760, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.96 (d, 3H, *J* = 6.4 Hz, CH_3), 1.00 (d, 3H, *J* = 6.4 Hz, CH_3), 1.28 (brs, 1H, NH), 1.69 (m, 1H), 1.79 (m, 1H), 1.95 (m, 2H), 2.58 (sept, 1H, *J* = 6.4 Hz), 3.69 (t, 1H, *J* = 7.2 Hz), 4.95 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10.0, 6.8 Hz, =CH), 7.20-7.35 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 22.0 (CH_3), 24.2 (CH_3), 30.6 (CH_2), 37.6 (CH_2), 45.4 (CH), 59.6 (CH), 114.6 ($=CH_2$), 126.8, 127.1, 128.3 (Ar-CH), 138.4 (=CH), 144.6 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{22}N$ 204.1746 $[M+H]^+$, found 204.1747.

N-(*tert*-Butyl)-1-phenylpent-4-en-1-amine (1h)

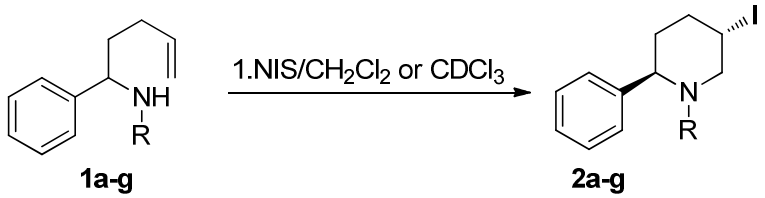


Yield: 64%; IR (NaCl, neat): 3341, 3077, 3024, 2962, 2929, 2864, 1640, 1480, 1452, 1388, 1363, 1228, 993, 910, 758, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.99 (s, 9H, CH_3), 1.17 (brs, 1H, NH), 1.68 (m, 2H), 1.84-2.04 (m, 2H), 3.72 (t, 1H, *J* = 6.8 Hz), 4.96 (m, 2H, $=CH_2$), 5.78 (ddt, 1H, *J* = 16.8, 10.0, 6.8 Hz, =CH), 7.16-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 30.2 (CH_3), 30.9 (CH_2), 39.6 (CH_2), 51.3 (C), 57.0 (CH), 114.6 ($=CH_2$), 126.4, 127.0, 128.1 (Ar-CH), 138.5 (=CH), 147.7 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{15}H_{24}N$ 218.1903 $[M+H]^+$, found 218.1903.

II. Iodoaminocyclization of alkenylamines 1a-h[3]

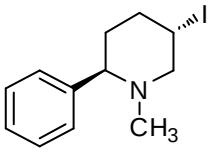
General procedure: To a solution of alkenylamine **1a**-**h** (0.28 mmol) in CH_2Cl_2 (3 mL) or $CDCl_3$ (1 mL) was added N-iodosuccinimide (0.28 mmol) and the mixture was stirred at room temperature for 10-15 min. The mixture was then purified on a short silicagel pad (CH_2Cl_2) to yield iododerivatives **2a**-**g** from **1a**-**g** and **3h** from **1h**.

[3] Iodocyclizations using $CDCl_3$ or C_6D_6 as solvent were carried out in an NMR tube.



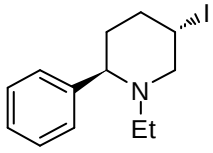
1a-g **2a-g**

(2*RS*,5*SR*)-5-Iodo-1-methyl-1-phenylpiperidine (2a)



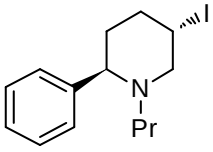
Yield: 75% ; IR (NaCl, neat): 3027, 2989, 2938, 2840, 2781, 1490, 1452, 1195, 1153, 1118, 1079, 1044, 1003, 980, 952, 890, 779, 759, 700, 537 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.62-1.76 (m, 2H, CH_2-3), 1.99 (s, 3H, CH_3), 2.01 (m, 1H, H-4ax), 2.48 (m, 1H, H-4eq), 2.59 (t, 1H, *J* = 11.2 Hz, H-6ax), 2.88 (dd, 1H, *J* = 10, 4.4, H-2), 3.43 (ddd, 1H, *J* = 11.2, 4, 2 Hz, H-6eq), 4.33 (tt, 1H, *J* = 12, 4 Hz, H-5), 7.22-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 24.6 (C-5), 38.0 (C-3), 38.7 (C-4), 43.5 (CH_3), 66.9 (C-6), 69.4 (C-2), 127.3, 128.5 (Ar-CH), 143.6 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{12}H_{17}IN$ 302.0400 $[M+H]^+$, found 302.0400.

(2*RS*,5*SR*)-1-Ethyl-5-iodo-1-phenylpiperidine (2b)



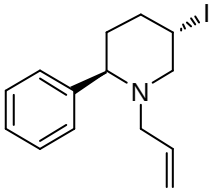
Yield: 70%; IR (NaCl, neat): 3027, 2967, 2937, 2796, 2717, 2660, 1491, 1452, 1383, 1187, 1151, 1120, 1080, 1014, 979, 758, 736, 701, 540 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.94 (t, 3H, *J* = 7.2 Hz, CH_3), 1.64-1.83 (m, 2H, CH_2-3), 2.03 (qd, 1H, *J* = 12.8, 4.8 Hz, H-4ax), 2.14 (m, 1H, CH_2), 2.50 (m, 2H), 2.64 (t, 1H, *J* = 10 Hz, H-6ax), 3.22 (brs, 1H, H-2), 3.57 (d, 1H, *J* = 10 Hz, H-6eq), 4.40 (brs, 1H, H-5), 7.22-7.36 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 10.5 (CH_3), 25.1 (C-5), 38.2 (C-3), 38.7 (C-4), 48.2 (CH_2), 62.2 (C-6), 67.1 (C-2), 127.5, 128.6 (Ar-CH), 142.8 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{13}H_{19}IN$ 316.0557 $[M+H]^+$, found 316.0555.

(2*RS*,5*SR*)-5-Iodo-2-phenyl-1-propylpiperidine (2c)



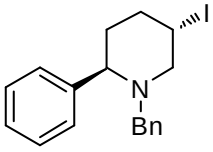
Yield: 69%; IR (NaCl, neat): 3081, 3060, 3027, 2958, 2973, 2869, 2798, 1491, 1453, 1385, 1339, 1307, 1190, 1148, 1120, 1078, 1027, 978, 893, 759, 700, 537 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.70 (t, 3H, *J* = 7.6 Hz, CH_3), 1.37 (m, 2H), 1.66 (m, 2H, CH_2-3), 1.95 (m, 1H), 2.00 (m, 1H, H-4ax), 2.31 (dt, 1H, *J* = 12.8, 8.4 Hz), 2.46 (m, 1H, H-4eq), 2.55 (t, 1H, *J* = 11.6 Hz, H-6ax), 3.12 (t, 1H, *J* = 6.8 Hz, H-2), 3.54 (dm, 1H, *J* = 11.2 Hz, H-6eq), 4.32 (tm, 1H, *J* = 11.6 Hz, H-5), 7.20-7.33 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 11.6 (CH_3), 19.0 (CH_2), 25.8 (C-5), 38.7 (C-3), 39.0 (C-4), 56.1 (CH_2), 63.1 (C-6), 67.5 (C-2), 127.1, 127.5, 128.4 (Ar-CH), 144.0 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{21}IN$ 330.0713 $[M+H]^+$, found 330.0713.

(2*RS*,5*SR*)-1-Allyl-5-iodo-2-phenylpiperidine (2d)



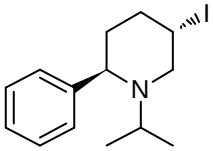
Yield: 66%; IR (NaCl, neat): 3062, 3026, 2939, 2793, 1641, 1601, 1490, 1451, 1360, 1332, 1189, 1147, 1100, 1080, 983, 920, 795, 758, 700, 537 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.68 (m, 2H, CH_2-3), 2.01 (m, 1H, H-4ax), 2.47 (dm, 1H, *J* = 12.8, H-4eq), 2.52 (m, 1H), 2.53 (t, 1H, *J* = 11.6 Hz, H-6ax), 3.08 (ddt, 1H, *J* = 14, 4.8, 1.6 Hz), 3.16 (t, 1H, *J* = 7 Hz, H-2), 3.52 (ddd, 1H, J = 11.6, 4, 2 Hz, H-6eq), 4.30 (tt, 1H, *J* = 12, 4 Hz, H-5), 5.07 (m, 2H, $=CH_2$), 5.72 (m, 1H, =CH), 7.20-7.33 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 25.3 (C-5), 38.6 (C-3), 38.9 (C-4), 57.3 (CH_2), 63.0 (C-6), 67.0 (C-2), 117.9 ($=CH_2$), 127.3, 127.4, 128.6 (Ar-CH), 134.4 (=CH), 143.6 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{19}IN$ 328.0556 $[M+H]^+$, found 328.0560.

(2*RS*,5*SR*)-1-Benzyl-5-iodo-2-phenylpiperidine (2e)



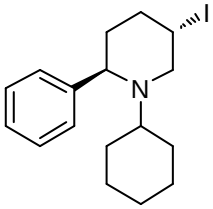
Yield: 79%; IR (NaCl, neat): 3060, 3027, 2939, 2793, 1492, 1451, 1376, 1336, 1306, 1190, 1148, 1104, 1077, 1027, 990, 910, 795, 758, 737, 698, 536 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.73 (m, 2H, CH_2-3), 2.03 (m, 1H, H-4ax), 2.45 (t, 1H, *J* = 11.6 Hz, H-6ax), 2.47 (m, 1H, H-4eq), 2.88 (d, 1H, *J* =13.6 Hz), 3.22 (m, 1H, H-2), 3.35 (ddd, 1H, *J* = 11.2, 4, 2 Hz, H-6eq), 3.70 (d, 1H, *J* = 13.6 Hz), 4.22 (tt, 1H, *J* = 12, 4 Hz, H-5), 7.18-7.43 (m, 10H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 25.4 (C-5), 38.9 (C-3), 39.0 (C-4), 58.6 (CH_2), 62.9 (C-6), 67.6 (C-2), 126.9, 127.3, 127.4, 128.2, 128.5, 128.7 (Ar-CH), 138.7 (*ipso*-C), 144.1 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{18}H_{21}IN$ 378.0713 $[M+H]^+$, found 378.0714.

(2*RS*,5*SR*)-5-Iodo-1-isopropyl-2-phenylpiperidine (2f)



Yield: 63%; IR (NaCl, neat): 3081, 3061, 3027, 2963, 2934, 2869, 2796, 1491, 1453, 1385, 1368, 1193, 1162, 1116, 1076, 1042, 1027, 971, 884, 759, 701, 540 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.77 (d, 3H, *J* = 6.4 Hz, CH_3), 0.97 (d, 3H, *J* = 6.8 Hz, CH_3), 1.66 (m, 2H, CH_2-3), 2.00 (m, 1H, H-4ax), 2.46 (brd, 1H, *J* = 11.6 Hz, H-4eq), 2.62 (t, 1H, *J* = 11.6 Hz, H-6ax), 2.74 (m, 1H), 3.38 (m, 2H, H-2 and H-6eq), 4.27 (brt, 1H, *J* = 11.6 Hz, H-5), 7.18-7.37 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 12.5 (CH_3), 21.3 (CH_3), 27.7 (C-5), 39.4 (C-3 and C-4), 48.4 (CH), 55.4 (C-6), 64.7 (C-2), 127.1, 127.4, 128.5 (Ar-CH), 144.0 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{21}IN$ 330.0713 $[M+H]^+$, found 330.0716.

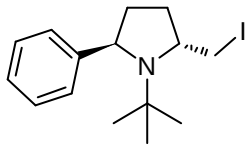
(2*RS*,5*SR*)-1-Cyclohexyl-5-iodo-2-phenylpiperidine (2g)



Yield: 55%; IR (NaCl, neat): 3061. 3027, 2930, 2853, 2795, 1491, 1450, 1188, 1141, 1116, 1077, 1010, 909, 758, 732, 700, 540 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.80-1.85 (m, 13H), 1.99 (brs, 1H, H-4ax), 2.25 (brs, 1H), 2.46 (brs, 1H, H-4eq), 2.73 (brs, 1H, H-6ax), 3.48 (brs, 2H, H-2 and H-6eq), 4.28 (brs, 1H, H-5), 7.15-7.45 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 24.1 (CH_2), 25.6 (CH_2), 26.2 (CH_2), 26.3 (CH_2), 28.1 (C-5), 31.4 (CH_2), 39.3 (C-3 and C-4), 57.2 (C-6), 58.0 (CH), 64.4 (C-2), 127.1, 127.4, 128.5 (Ar-CH), 144.0

(*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{17}H_{25}IN$ 370.1026 $[M+H]^+$, found 370.1024.

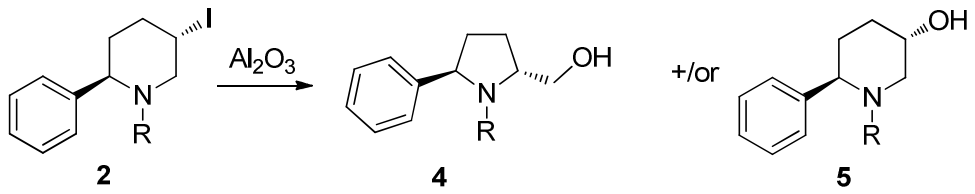
(2*RS*,5*RS*)-1-*tert*-Butyl-2-iodomethyl-5-phenyl-pyrrolidine (3h)



Yield: 50%; IR (NaCl, neat): 3059, 3023, 2966, 2870, 1489, 1450, 1422, 1392, 1366, 1222, 1200, 1160, 1100, 1031, 976, 944, 909, 757, 701, 580 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.97 (s, 9H, CH_3), 1.65 (m, 1H, H-4), 1.78 (m, 1H, H-3), 2.00 (m, 1H, H-3), 2.14 (m, 1H, H-4), 3.13 (dd, 1H, *J* = 11.6, 9.6 Hz, CH_2I), 3.25 (ddd, 1H, *J* = 9.6, 3.2, 1.6 Hz, CH_2I), 3.54 (m, 1H, H-2), 4.13 (dd, 1H, *J* = 9, 7 Hz, H-5), 7.10-7.50 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 14.6 (CH_2I), 27.7 (CH_3), 29.9 (C-3), 36.8 (C-4), 54.9 (C), 62.2 (C-2), 65.6 (C-5), 125.9, 126.1, 128.1 (Ar-CH), 148.8 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{15}H_{23}IN$ 344.0870 $[M+H]^+$, found 344.0873.

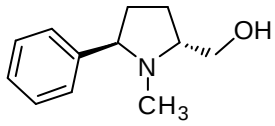
III. Evolution of 2a-g and 3h on alumina

General procedure: Iodo derivatives **2a**-**g** or **3h** (20-50 mg) were adsorbed on alumina (2 g) overnight then the formed alcohols were separated by chromatography on Al_2O_3 (CH_2Cl_2/NH_3-CH_2Cl_2/MeOH 99:1).[4]



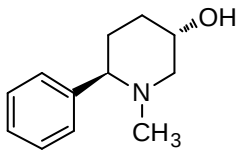
2 **4** **5**

(2*RS*,5*RS*)-1-Methyl-5-phenyl-2-pyrrolidinemethanol (4a)



IR (NaCl, neat): 3069, 3085, 3061, 3027, 2945, 2873, 2794, 1601, 1491, 1452, 1363, 1285, 1200, 1163, 1057, 1032, 974, 933, 855, 757, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.86 (m, 1H, H-4), 1.96 (m, 1H, H-3), 2.15 (s, 3H, CH_3), 2.19-2.34 (m, 2H, H-3 and H-4), 2.40 (brs, 1H, OH), 3.13 (m, 1H, H-2), 3.57 (dd, 1H, *J* = 10.8, 2.4 Hz, CH_2OH), 3.69 (dd, 1H, *J* = 10.8, 3.6 Hz, CH_2OH), 4.15 (dd, 1H, *J* = 7.6, 4 Hz, H-5), 7.18-7.36 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 27.3 (C-3), 31.9 (C-4), 35.1 (CH_3), 61.6 (CH_2OH), 63.7 (C-2), 68.8 (C-5), 127.0, 127.9, 128.3 (Ar-CH), 142.6 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{12}H_{18}NO$ 192.1383 $[M+H]^+$, found 192.1383.

(3*RS*,6*SR*)-1-Methyl-6-phenylpiperidin-3-ol (5a)

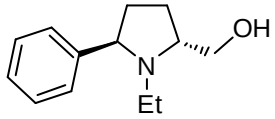


IR (NaCl, neat): 3327, 3061, 3028, 2938, 2854, 2781, 1492, 1451, 1251, 1199, 1126, 1103, 1076, 1011, 974, 962, 881, 759, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.36 (dddd, 1H, *J* = 13.3, 12.1, 11, 4 Hz, H-4ax), 1.60 (brs, 1H, OH), 1.66 (tdd, 1H, *J* = 13.6, 11.2, 3.6 Hz, H-5ax), 1.80 (ddt, 1H, *J* = 13.6, 4,

[4] For the yields of **4** and **5** obtained in each case see the article.

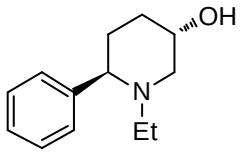
3.2 Hz, H-5eq), 2.02 (t, 1H, *J* = 10.4 Hz, H-2ax), 2.02 (s, 3H, CH_3), 2.11 (dm, 1H, *J* = 12,0 Hz, H-4eq), 2.76 (dd, 1H, *J* = 11.2, 3.2 Hz, H-6), 3.21 (ddd, 1H, *J* = 10.4, 4.4, 2 Hz, H-2eq), 3.93 (tt, 1H, *J* = 10.4, 4.4 Hz, H-3), 7.22-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 33.9 (C-5), 34.3 (C-4), 44.2 (CH_3), 64.3 (C-2), 67.7 (C-3), 69.8 (C-6), 127.2, 127.5, 128.5 (Ar-CH), 143.6 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{12}H_{18}NO$ 192.1383 $[M+H]^+$, found 192.1382.

(2*RS*,5*RS*)-1-Ethyl-5-phenyl-2-pyrrolidinemethanol (4b)



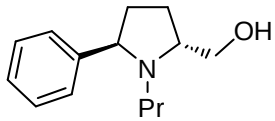
IR (NaCl, neat): 3367, 3084, 3061, 3026, 2966, 2874, 2834, 1600, 1491, 1452, 1385, 1306, 1196, 1067, 1033, 758, 701 cm^{-1}; ^{1}H NMR ($CDCl_3$, 400 MHz) δ 0.99 (t, 3H, *J* = 7.2 Hz, CH_3), 1.76 (m, 1H, H-4), 1.92 (m, 1H, H-3), 2.21-2.33 (m, 2H, H-3 and H-4), 2.41 (dq, 1H, *J* = 12.4, 7.2 Hz), 2.56 (dq, 1H, *J* = 12.4, 7.2 Hz), 2.65 (brs, 1H, OH), 3.34 (m, 1H, H-2), 3.52 (dd, 1H, *J* = 10.8, 2 Hz, CH_2OH), 3.67 (dd, 1H, *J* = 10.4, 4 Hz, CH_2OH), 4.31 (dd, 1H, *J* = 7.2, 2.8 Hz, H-5), 7.17-7.35 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 14.3 (CH_3), 27.2 (C-3), 32.5 (C-4), 41.2 (CH_2), 62.1 (CH_2OH), 62.6 (C-2), 65.6 (C-5), 126.8, 127.7, 128.3 (Ar-CH), 143.3 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{13}H_{20}NO$ 206.1539 $[M+H]^+$, found 206.1536.

(3*RS*,6*SR*)-1-Ethyl-6-phenylpiperidin-3-ol (5b)



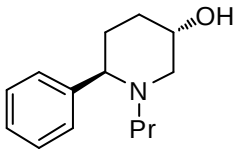
IR (NaCl, neat): 3343, 3061, 3027, 2968, 2935, 2872, 2800, 1601, 1492, 1452, 1382, 1233, 1184, 1130, 1103, 1075, 1060, 1022, 973, 860, 758, 701 cm^{-1}; ^{1}H NMR ($CDCl_3$, 400 MHz) δ 0,92 (t, 3H, *J* = 7.2 Hz, CH_3), 0.92 (t, 3H, *J* = 7.2 Hz, CH_3), 1.35 (dddd, 1H, *J* = 13.3, 12.2, 11, 4.4 Hz, H-4ax), 1.62 (tdd, 1H, *J* = 13.4, 11.2, 4 Hz, H-5ax), 1.63 (brs, 1H, OH), 1.79 (ddt, 1H, *J* = 13.6, 4.4, 3.2 Hz, H-5eq), 1.97 (t, 1H, *J* = 10.4 Hz, H-2ax), 2.06 (dq, 1H, *J* = 12.8, 7.2 Hz), 2.09 (m, 1H, H-4eq), 2.51 (dq, 1H, *J* = 13.2, 7.2 Hz), 3.01 (dd, 1H, *J* = 11.2, 3.2 Hz, H-6), 3.31 (ddd, 1H, *J* = 10.4, 4.4, 2 Hz, H-2eq), 3.89 (tt, 1H, *J* = 10.4, 4.4 Hz, H-3), 7.20-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 10.7 (CH_3), 34.4 (C-5), 34.5 (C-4), 48.6 (CH_2), 59.5 (C-2), 67.3 (C-6), 68.1 (C-3), 127.0, 127.5, 128.4 (Ar-CH), 144.1 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{13}H_{20}NO$ 206.1539 $[M+H]^+$, found 206.1537.

(2*RS*,5*RS*)-5-Phenyl-1-propyl-2-pyrrolidinemethanol (4c)



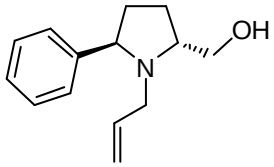
IR (NaCl, neat): 3380, 3083, 3061, 3027, 2958, 2934, 2872, 2829, 1491, 1454, 1384, 1284, 1222, 1189, 1071, 1032, 758, 701 cm^{-1}; ^{1}H NMR ($CDCl_3$, 400 MHz) δ 0.81 (t, 3H, *J* = 7.2 Hz, CH_3), 1.40 (m, 2H), 1.75 (m, 1H, H-4), 1.92 (m, 1H, H-3), 2.20-2.32 (m, 2H, H-3 and H-4), 2.39 (m, 2H), 3.32 (m, 1H, H-2), 3.51 (dd, 1H, *J* = 10.8, 1.6 Hz, CH_2OH), 3.67 (dd, 1H, *J* = 10.8, 3.6 Hz, CH_2OH), 4.28 (dd, 1H, *J* = 7.2, 2.4 Hz, H-5), 7.15-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 11.8 (CH_3), 21.9 (CH_2), 27.1 (C-3), 32.6 (C-4), 49.0 (CH_2), 62.1 (CH_2OH), 62.8 (C-2), 65.8 (C-5), 126.7, 127.7, 128.3 (Ar-CH), 143.5 (*ipso*-C), HRMS (ESI-TOF) calcd. for $C_{14}H_{22}NO$ 220.1696 $[M+H]^+$, found 220.1695.

(3*RS*,6*SR*)-6-Phenyl-1-propylpiperidin-3-ol (5c)



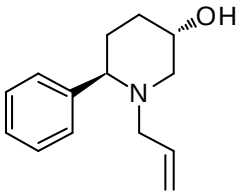
IR (NaCl, neat): 3295, 3062, 3028, 2959, 2935, 2871, 2798, 1492, 1452, 1378, 1237, 1179, 1102, 1059, 1015, 975, 759, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.72 (t, 3H, *J* = 7.2 Hz, CH_3), 1.35 (m, 1H, H-4ax), 1.41 (sext, 2H, *J* = 7.2 Hz, CH_2), 1.64 (qd, 1H, *J* = 13.6, 3.2 Hz, H-5ax), 1.79 (ddt, 1H, *J* = 13.6, 4, 3.2 Hz, H-5eq), 1.94 (m, 1H), 1.96 (t, 1H, *J* = 10.4 Hz, H-2ax), 2.09 (brd, 1H, *J* = 12.4 Hz, H-4eq), 2.37 (dt, 1H, *J* = 12.8, 8.4 Hz), 3.01 (dd, 1H, *J* = 11.6, 3.2 Hz, H-6), 3.35 (dm, 1H, *J* = 10.4 Hz, H-2eq), 3.90 (tt, 1H, *J* = 10.4, 4.8 Hz, H-3), 7.18-7.34 (m, 5H, Ar-H), ^{13}C NMR ($CDCl_3$, 100 MHz) δ 11.6 (CH_3), 18.8 (CH_2), 34.4 (C-5 and C-4), 56.6 (CH_2), 60.0 (C-2), 67.8 (C-3 and C-6), 127.0, 127.6, 128.4 (Ar-CH), 144.0 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{22}NO$ 220.1696 $[M+H]^+$, found 220.1696.

(2*RS*,5*RS*)-1-Allyl-5-phenyl-2-pyrrolidinemethanol (4d)



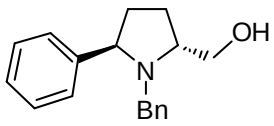
IR (NaCl, neat): 3395, 3078, 3027, 2953, 2876, 1491, 1452, 1418, 1356, 1285, 1149, 1070, 1032, 994, 916, 757, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.70 (brs, 1H, OH), 1.79 (m, 1H, H-4), 1.93 (m, 1H, H-3), 2.21-2.33 (m, 2H, H-3 and H-4), 3.02 (dd, 1H, *J* = 14.4, 6.8 Hz), 3.14 (ddt, 1H, *J* = 14.4, 5.6, 2 Hz), 3.35 (m, 1H, H-2), 3.54 (dd, 1H, *J* = 10.8, 2.4 Hz, CH_2OH), 3.68 (dd, 1H, *J* = 10.8, 4 Hz, CH_2OH), 4.27 (dd, 1H, *J* = 7.2, 3.2 Hz, H-5), 5.01 (m, 2H, $=CH_2$), 5.76 (m, 1H, =CH), 7.17-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 27.1 (C-3), 32.4 (C-4), 50.5 (CH_2), 62.4 (C-2 and CH_2OH), 66.4 (C-5), 116.1 ($=CH_2$), 126.9, 127.9, 128.2 (Ar-CH), 136.7 (=CH), 143.2 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{20}NO$ 218.1539 $[M+H]^+$, found 218.1537.

(3*RS*,6*SR*)-1-Allyl-6-phenylpiperidin-3-ol (5d)



IR (NaCl, neat): 3340, 3077, 3027, 2936, 2857, 2794, 1492, 1452, 1418, 1373, 1333, 1239, 1123, 1098, 1058, 1024, 996, 919, 759, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.35 (dddd, 1H, *J* = 13.4, 12.1, 11, 4.4 Hz, H-4ax), 1.60 (brs, 1H, OH), 1.63 (tdd, 1H, *J* = 14, 11, 3.6 Hz, H-5ax), 1.81 (ddt, 1H, *J* = 13.6, 4, 3.6 Hz, H-5eq), 1.94 (t, 1H, *J* = 10.8 Hz, H-2ax), 2.10 (dm, 1H, *J* = 12 Hz, H-4eq), 2.53 (dd, 1H, *J* = 13.6, 8 Hz), 3.02 (dd, 1H, *J* = 10.8, 3.2 Hz, H-6), 3.12 (ddt, 1H, *J* = 13.6, 4.8, 2 Hz), 3.31 (ddd, 1H, *J* = 10.8, 4.4, 2 Hz, H-2eq), 3.87 (tt, 1H, *J* = 10.4, 4.4 Hz, H-3), 5.06 (m, 2H, $=CH_2$), 5.76 (m, 1H, =CH), 7.21-7.34 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 34.4 (C-4 and C-5), 58.0 (CH_2), 60.1 (C-2), 67.4 (C-6), 67.9 (C-3), 117.7 ($=CH_2$), 127.2, 127.5, 128.5 (Ar-CH), 134.7 (=CH), 143.8 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{20}NO$ 218.1539 $[M+H]^+$, found 218.1538.

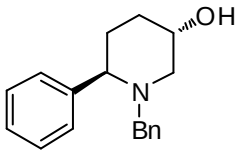
(2*RS*,5*RS*)-1-Benzyl-5-phenyl-2-pyrrolidinemethanol (4e)



IR (NaCl, neat): 3367, 3060, 3027, 2942, 2874, 1492, 1452, 1361, 1131, 1072, 1028, 757, 736, 699 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.76 (brs, 1H, OH), 1.80 (m, 1H,

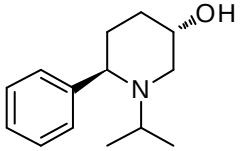
H-4), 1.97 (m, 1H, H-3), 2.29 (m, 2H, H-3 and H-4), 3.41 (m, 1H, H-2), 3.51 (d, 1H, *J* = 14 Hz, CH_2Ar), 3. 55 (dd, 1H, *J* = 10.8, 2 Hz, CH_2OH), 3.67 (dd, 1H, *J* = 10.8, 4 Hz, CH_2OH), 3.72 (d, 1H, *J* = 14 Hz, CH_2Ar), 4.18 (dd, 1H, *J* = 7.2, 3.2 Hz, H-5), 7.12-7.38 (m, 10H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 27.0 (C-3), 32.6 (C-4), 51.6 (CH_2Ar), 62.3 (C-2), 62.4 (CH_2OH), 66.2 (C-5), 126.8, 126.9, 127.9, 128.2, 128.3 (Ar-CH), 139.9 (*ipso*-C), 143.3 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{18}H_{22}NO$ 268.1696 $[M+H]^+$, found 268.1696.

(3*RS*,6*SR*)-1-Benzyl-6-phenylpiperidin-3-ol (5e)



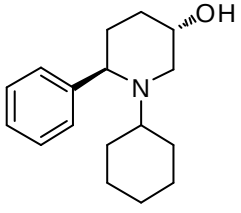
IR (NaCl, neat): 3324, 3060, 3027, 2933, 2857, 2791, 1492, 1451, 1376, 1273, 1179, 1123, 1101, 1074, 1022, 759, 740, 699 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.38 (m, 2H, H-4ax and OH), 1.67 (tdd, 1H, *J* = 13.8, 11, 4 Hz, H-5ax), 1.84 (t, 1H, *J* = 10.4 Hz, H-2ax), 1.86 (m, 1H, H-5eq), 2.09 (dm, 1H, *J* = 11.6 Hz, H-4eq), 2.86 (d, 1H, *J* = 13.2 Hz, CH_2Ar), 3.11 (m, 2H, H-2eq and H-6), 3.75 (d, 1H, *J* = 13.6 Hz, CH_2Ar), 3.79 (brs, 1H, H-3), 7.18-7.46 (m, 10H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 34.3 (C-4), 34.7 (C-5), 59.3 (CH_2Ar), 60.1 (C-2), 67.9 (C-3 and C-6), 126.8, 127.1, 127.5, 128.1, 128.6, 128.7 (Ar-CH), 139.1 (*ipso*-C), 144.4 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{18}H_{22}NO$ 268.1696 $[M+H]^+$, found 268.1696.

(3*RS*,6*SR*)-1-Isopropyl-6-phenylpiperidin-3-ol (5f)



IR (NaCl, neat): 3324, 3061, 3027, 2965, 2934, 2869, 2794, 1492, 1452, 1362, 1242, 1187, 1162, 1122, 1062, 1007, 972, 879, 760, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.77 (d, 3H, *J* = 6.4 Hz, CH_3), 0.98 (d, 3H, *J* = 6.8 Hz, CH_3), 1.32 (tdd, 1H, *J* = 13.6, 12.4, 4.4 Hz, H-4ax), 1.47 (brs, OH), 1.60 (m, 1H, H-5ax), 1.77 (ddt, 1H, *J* = 13.6, 4, 3.2 Hz, H-5eq), 2.03 (t, 1H, *J* = 10.4 Hz, H-2ax), 2.08 (m, 1H, H-4eq), 2.77 (sept, 1H, *J* = 6.8 Hz), 3.15 (ddd, 1H, *J* = 10.4, 4.4, 2 Hz, H-2eq), 3.25 (dd, 1H, *J* = 10.8, 2.8 Hz, H-6), 3.81 (brt, 1H, *J* = 10 Hz, H-3), 7.20-7.33 (m, 5H, Ar-H), ^{13}C NMR ($CDCl_3$, 100 MHz) δ 12.2 (CH_3), 21.1 (CH_3), 34.7 (C-5 and C-4), 48.4 (CH), 51.8 (C-2), 64.9 (C-6), 68.5 (C-3), 127.0, 127.5, 128.5 (Ar-CH), 143.9 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{14}H_{22}NO$ 220.1696 $[M+H]^+$, found 220.1695.

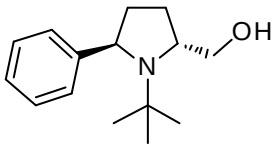
(3*RS*,6*SR*)-1-Cyclohexyl-6-phenylpiperidin-3-ol (5g)



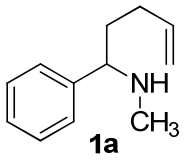
IR (NaCl, neat): 3308, 3027, 2930, 2854, 2793, 1492, 1451, 1265, 1126, 1073, 1057, 1019, 973, 758, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 0.79 (qt, 1H, *J* = 12.8, 3.2 Hz), 0.98 (m, 2H), 1.09 (qd, 1H, *J* = 12, 3.2 Hz), 1.31 (m, 1H, H-4ax), 1.37-1.76 (m, 8H), 1.77 (ddt, 1H, *J* = 13.6, 4.4, 3.2 Hz, H-5eq), 2.08 (m, 1H, H-4eq), 2.14 (t, 1H, *J* = 10.4 Hz, H-2ax), 2.29 (tt, 1H, *J* = 11.6, 3.2 Hz), 3.24 (ddd, 1H, *J* = 10.4, 4.4, 2 Hz, H-2eq), 3.39 (dd, 1H, *J* = 10.8, 2.8 Hz, H-6), 3.84 (tt, 1H, *J* = 10.8, 4.4 Hz, H-3), 7.21-7.33 (m, 5H, Ar-H), ^{13}C NMR ($CDCl_3$, 100 MHz) δ 23.7 (CH_2), 25.7 (CH_2), 26.4 (CH_2), 26.5 (CH_2), 31.5 (CH_2), 34.7 (C-4), 34.8 (C-5), 53.8 (C-2), 57.8 (CH), 64.4 (C-6), 68.7 (C-3),

126.9, 127.5, 128.4 (Ar-CH), 144.2 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{17}H_{26}NO$ 260.2008 $[M+H]^+$, found 260.2016.

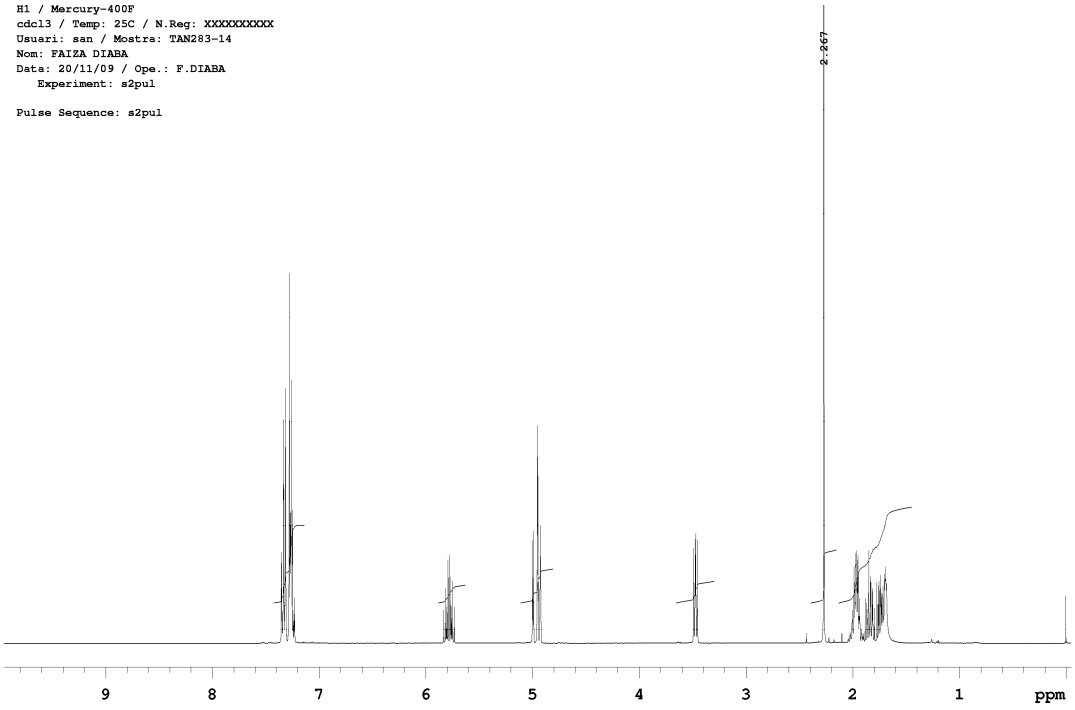
(2*RS*,5*RS*)-1-*tert*-Butyl-5-phenyl-2-pyrrolidinemethanol (4h)

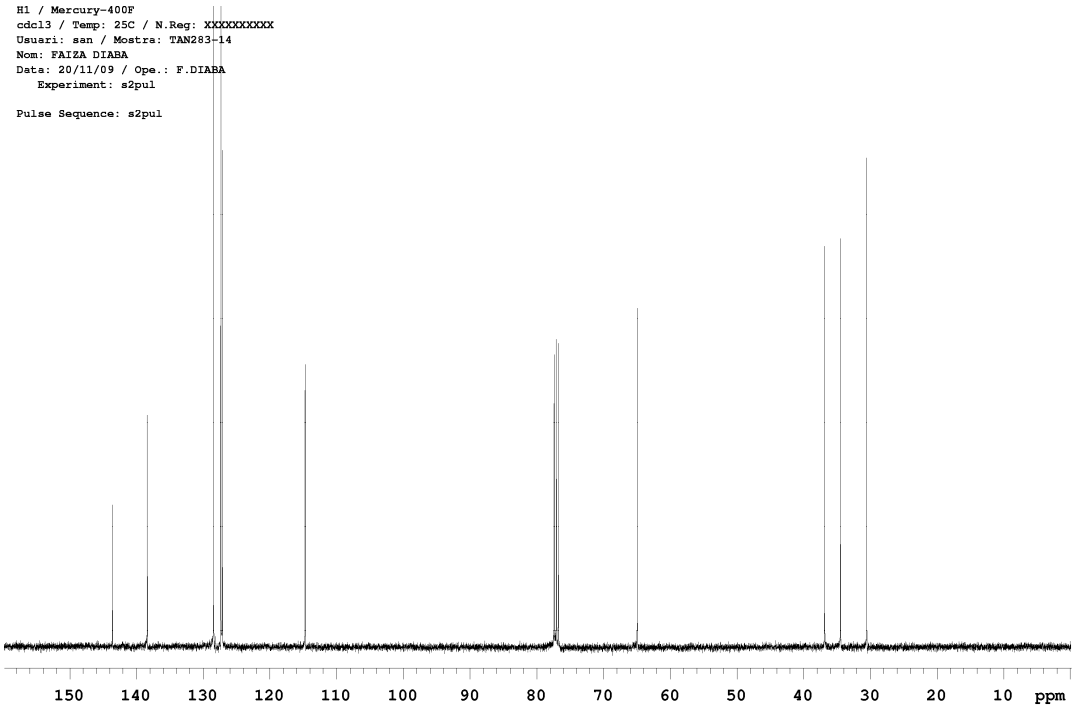


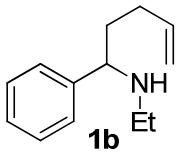
IR (NaCl, neat): 3355, 3059, 3023, 2964, 2870, 1491, 1470, 1451, 1391, 1366, 1223, 1122, 1073, 1027, 757, 701 cm^{-1}; ^1H NMR ($CDCl_3$, 400 MHz) δ 1.02 (s, 9H, CH_3), 1.66 (m, 2H, H-3 and H-4), 1.79 (m, 1H, H-3), 2.19 (m, 1H, H-4), 3.38 (dd, 1H, *J* = 8.8, 7.6 Hz, CH_2OH), 3.44 (dt, 1H, *J* = 6.8, 6.4 Hz, H-2), 3.55 (dd, 1H, *J* = 8.8, 6.4 Hz, CH_2OH), 4.19 (t, 1H, *J* = 8.4 Hz, H-5), 7.14-7.38 (m, 5H, ArH); ^{13}C NMR ($CDCl_3$, 100 MHz) δ 28.0 (CH_3), 29.3 (C-3), 37.0 (C-4), 55.4 (C), 59.9 (C-2), 64.6 (C-5), 65.1 (CH_2OH), 126.1, 128.3 (Ar-CH), 149.0 (*ipso*-C). HRMS (ESI-TOF) calcd. for $C_{15}H_{24}NO$ 234.1852 $[M+H]^+$, found 234.1854.


NH
CH3

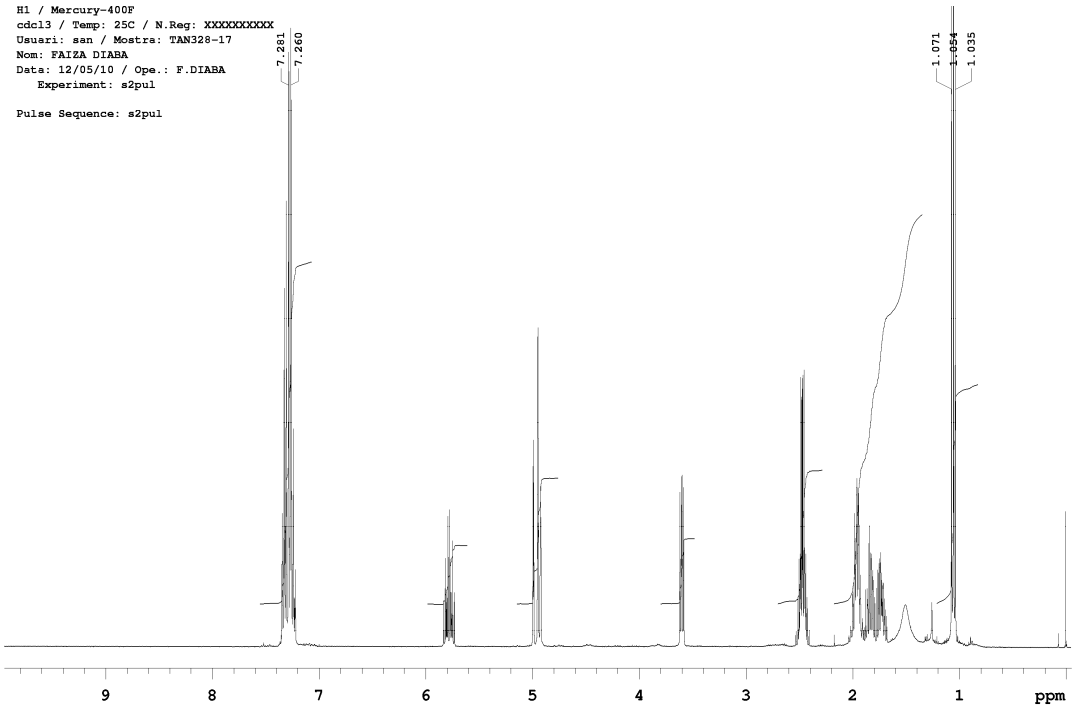
1a

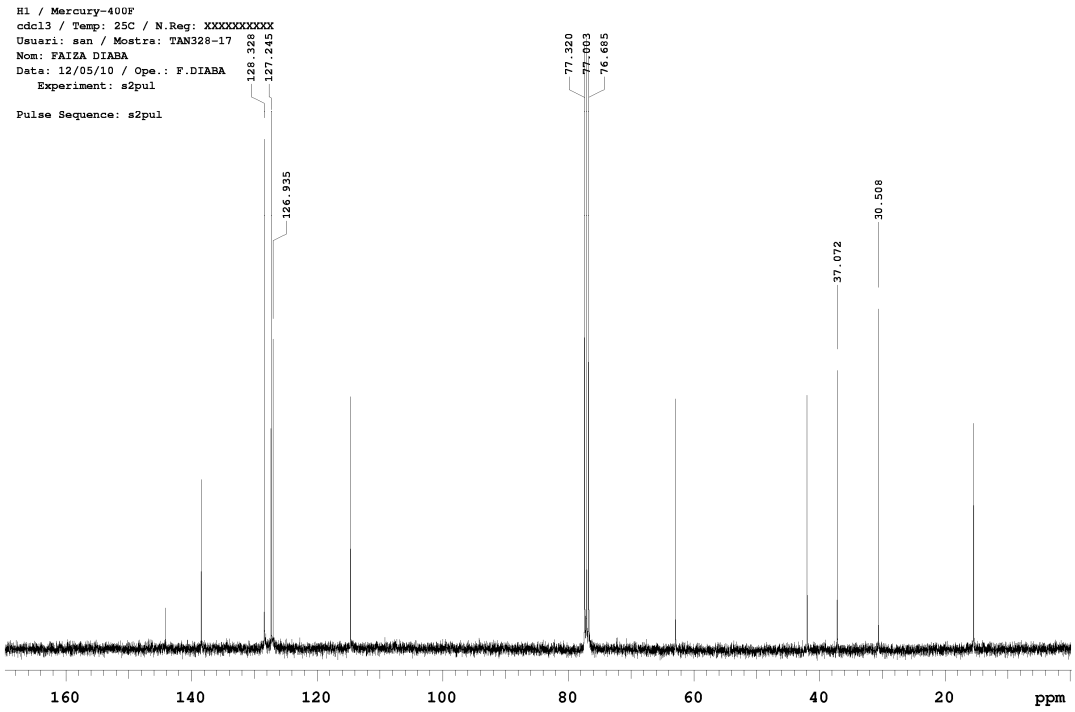

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN283-14
Nom: FAIZA DIABA
Data: 20/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
2.267
9
8
7
6
5
4
3
2
1
ppm

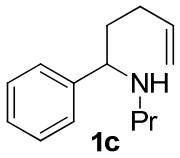

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN283-14
Nom: FAIZA DIABA
Data: 20/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
ppm


NH
Et

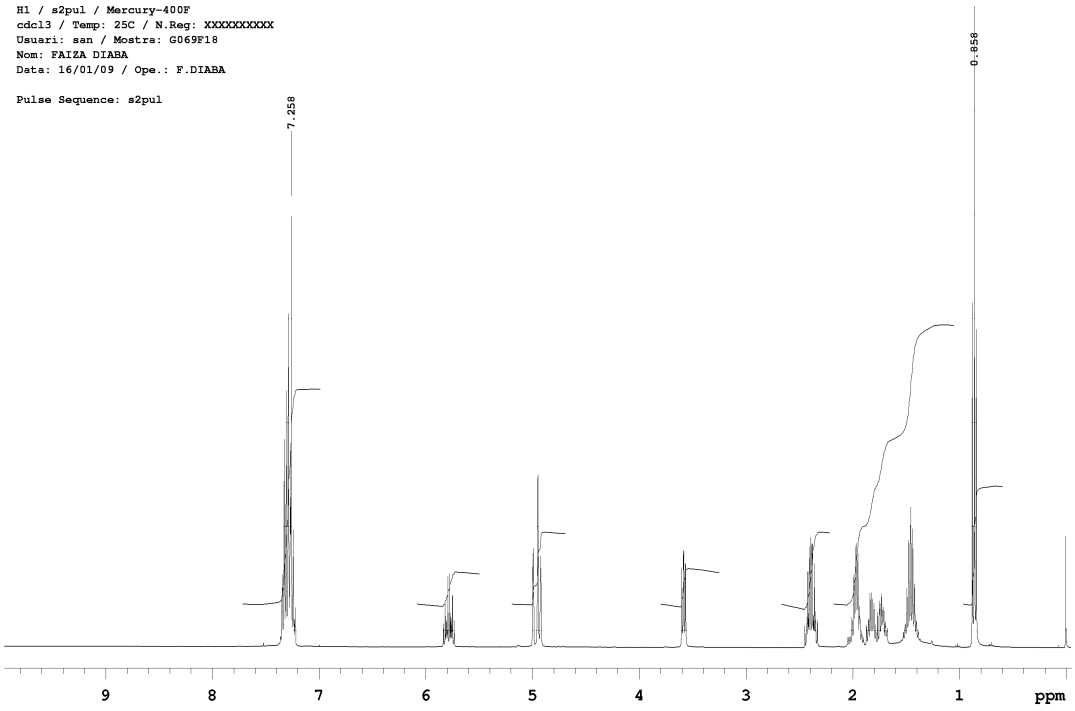
1b

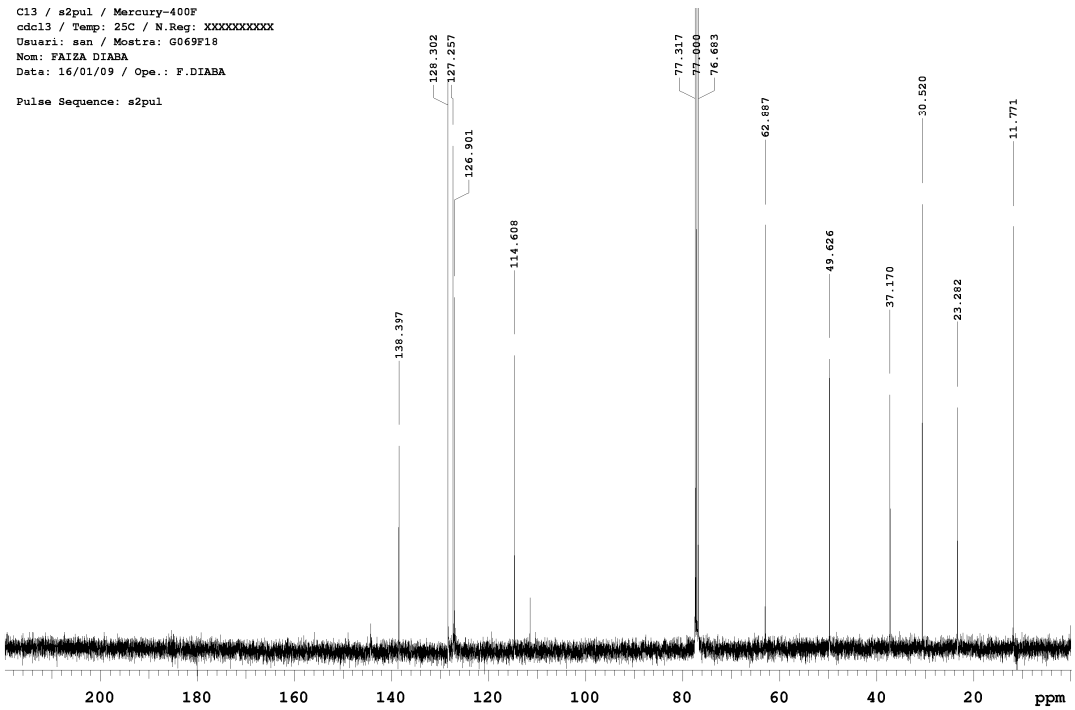

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN328-17
Nom: FAIZA DIABA
Data: 12/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.281
7.260
1.071
1.054
1.035
9
8
7
6
5
4
3
2
1
ppm

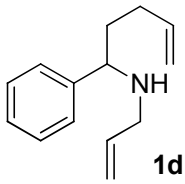

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN328-17
Nom: FAIZA DIABA
Data: 12/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.328
127.245
126.935
77.320
77.003
76.685
37.072
30.508
160
140
120
100
80
60
40
20
ppm


NH
Pr

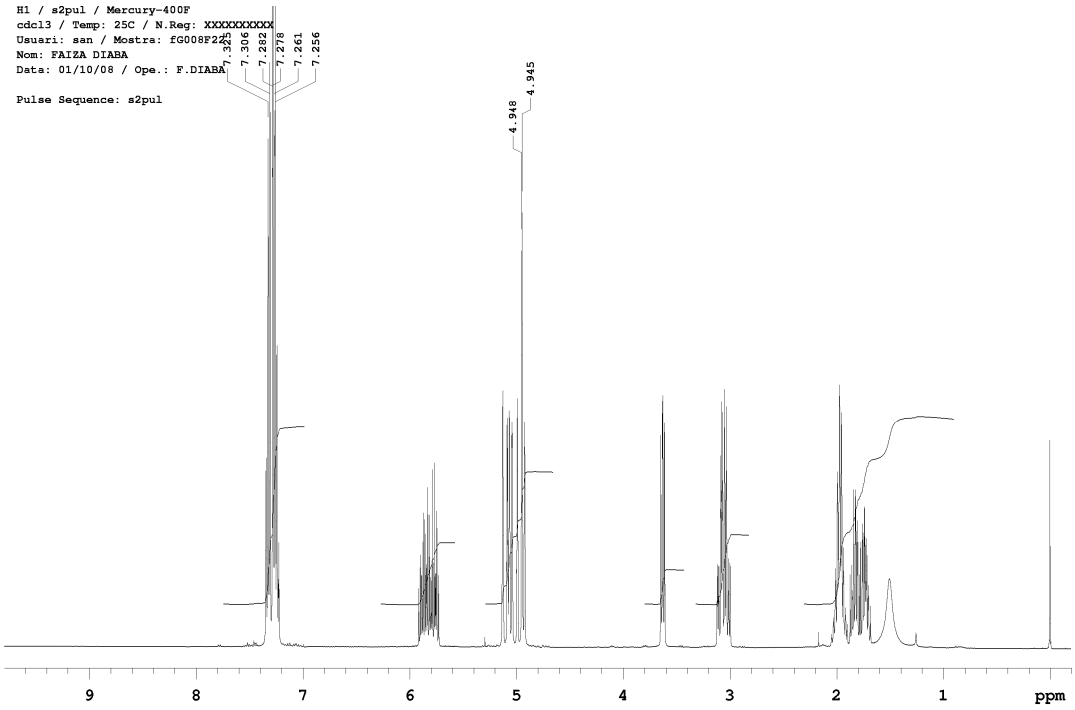
1c

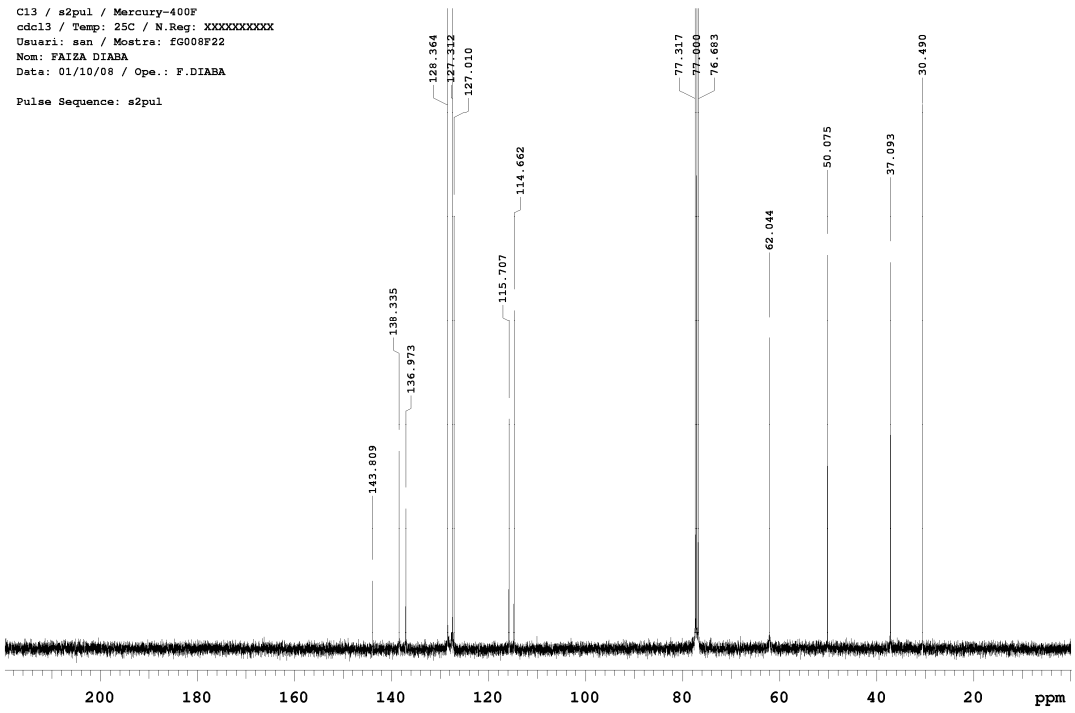

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: G069F18
Nom: FAIZA DIABA
Data: 16/01/09 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.258
0.858
9
8
7
6
5
4
3
2
1
ppm

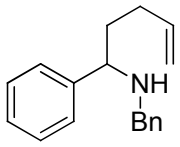

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: G069F18
Nom: FAIZA DIABA
Data: 16/01/09 / Ope.: F.DIABA
Pulse Sequence: s2pul
128.302
127.257
126.901
114.608
138.397
77.317
77.000
76.683
62.887
49.626
37.170
30.520
23.282
11.771
200
180
160
140
120
100
80
60
40
20
ppm


NH

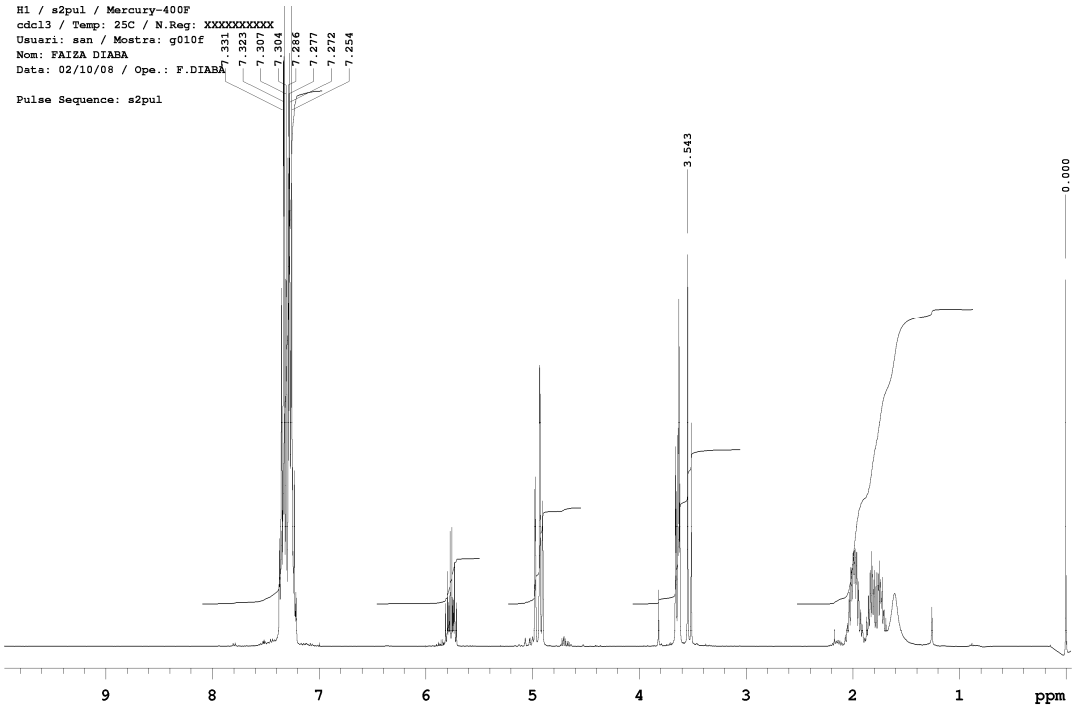
1d

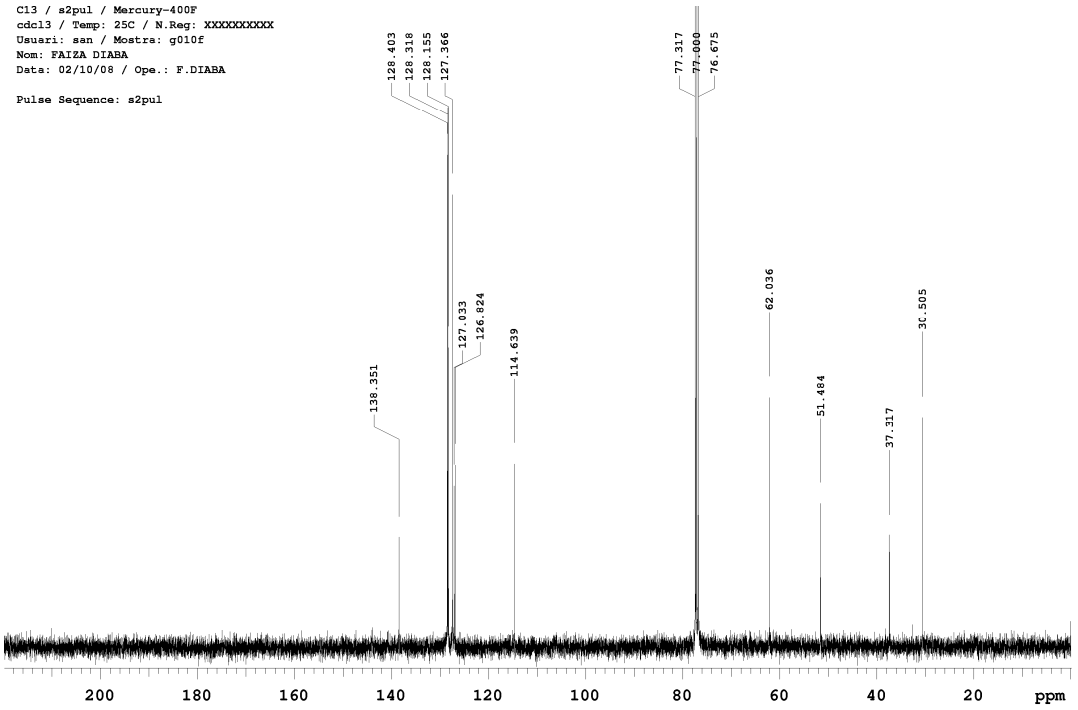

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: fG008F22
Nom: FAIZA DIABA
Data: 01/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.325
7.306
7.282
7.278
7.261
7.256
4.948
4.945
9
8
7
6
5
4
3
2
1
ppm

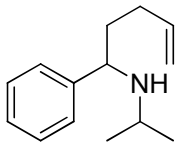

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: fG008F22
Nom: FAIZA DIABA
Data: 01/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
143.809
138.335
136.973
128.364
127.312
127.010
115.707
114.662
77.317
77.000
76.683
62.044
50.075
37.093
30.490
200
180
160
140
120
100
80
60
40
20
ppm


NH
Bn

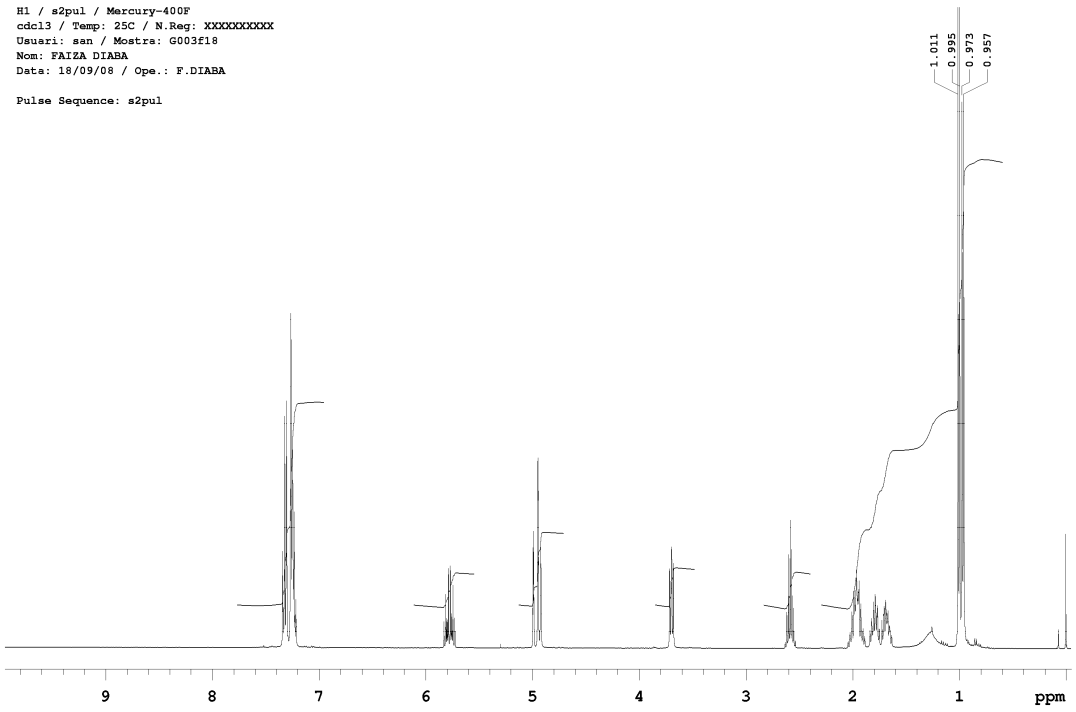
1e

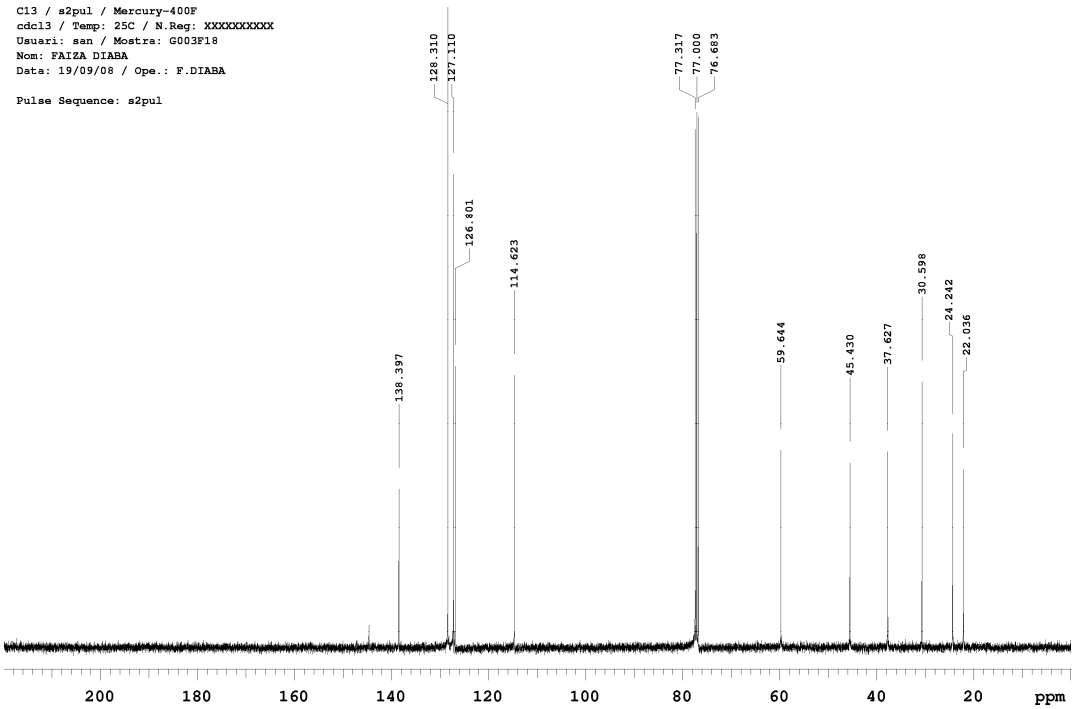

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: g010f
Nom: FAIZA DIABA
Data: 02/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.331
7.323
7.307
7.304
7.286
7.277
7.272
7.254
3.543
0.000
9
8
7
6
5
4
3
2
1
ppm

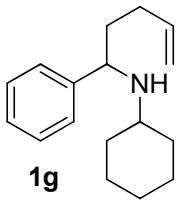

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: g010f
Nom: FAIZA DIABA
Data: 02/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
128.403
128.318
128.155
127.366
127.033
126.824
114.639
138.351
77.317
77.000
76.675
62.036
51.484
37.317
30.505
200
180
160
140
120
100
80
60
40
20
ppm


NH

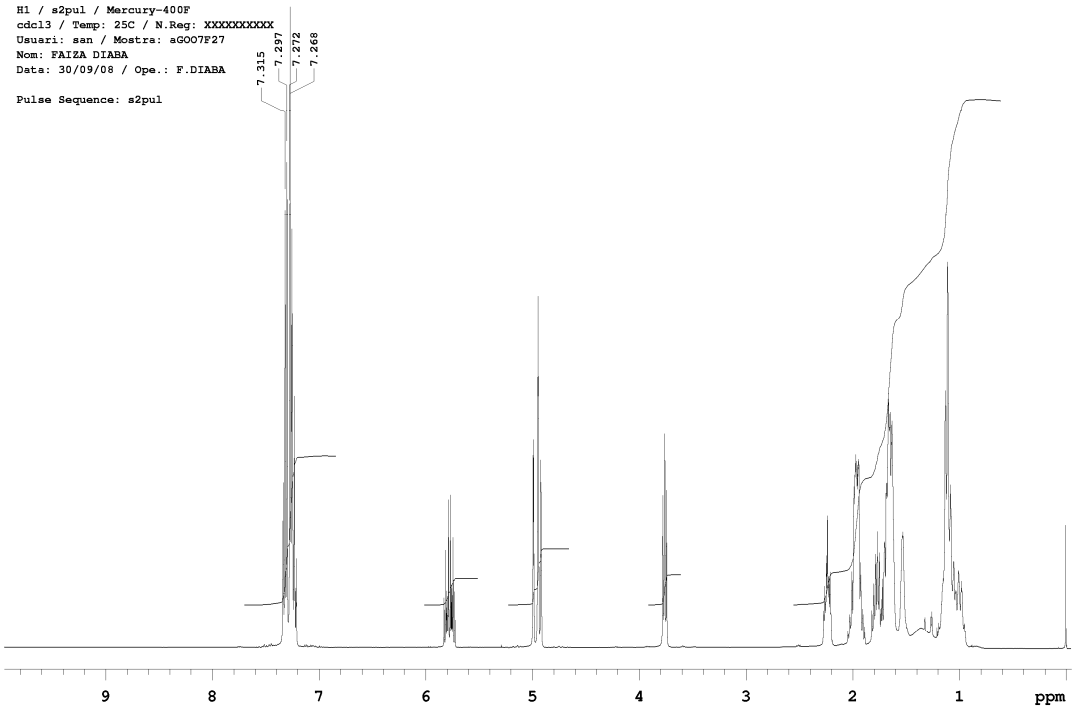
1f

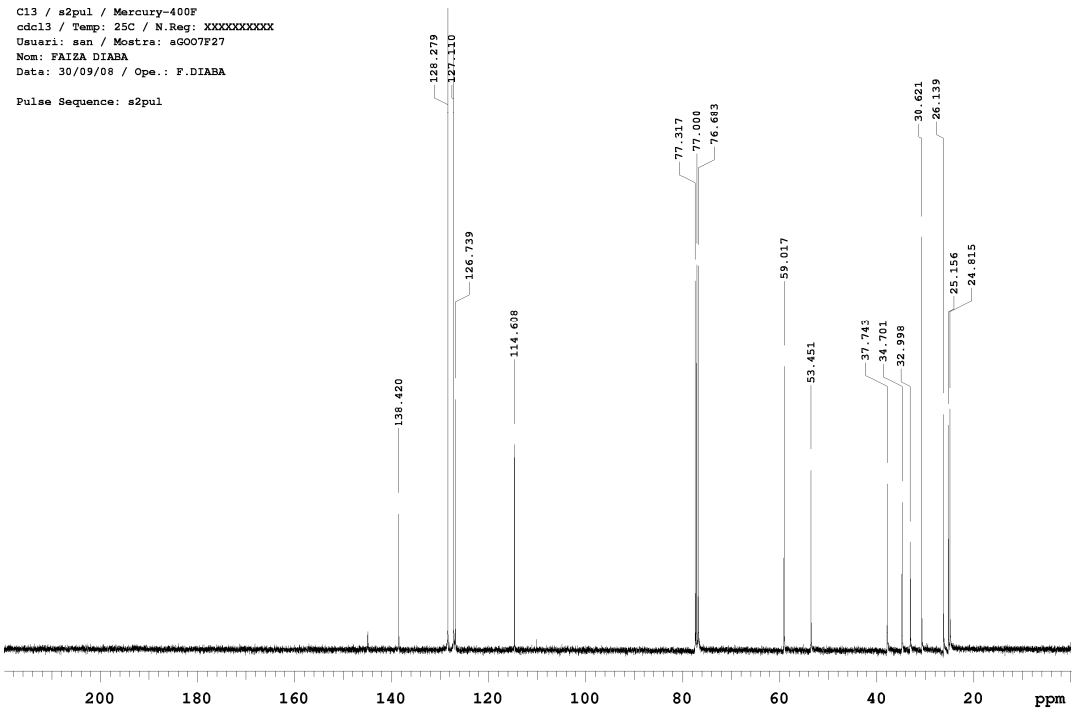

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: G003f18
Nom: FAIZA DIABA
Data: 18/09/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
1.011
0.995
0.973
0.957
9
8
7
6
5
4
3
2
1
ppm

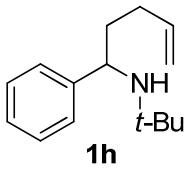

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: G003F18
Nom: FAIZA DIABA
Data: 19/09/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
128.310
127.110
126.801
114.623
138.397
77.317
77.000
76.683
59.644
45.430
37.627
30.598
24.242
22.036
200
180
160
140
120
100
80
60
40
20
ppm


NH

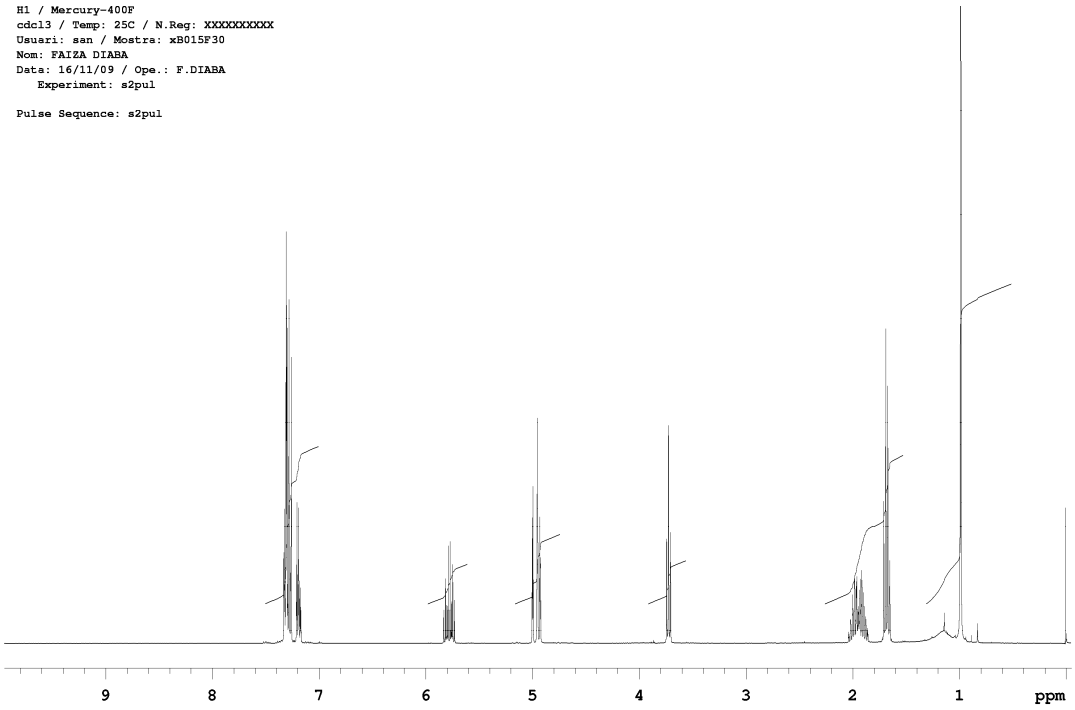
1g

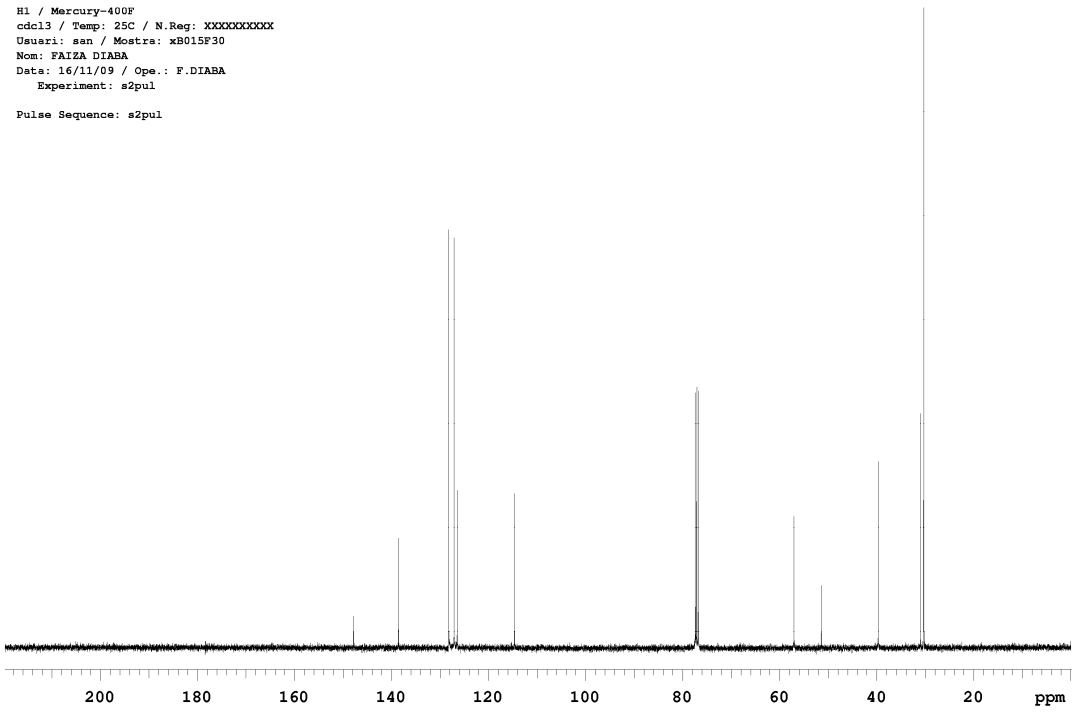

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: aGOO7F27
Nom: FAIZA DIABA
Data: 30/09/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.315
7.297
7.272
7.268
9
8
7
6
5
4
3
2
1
ppm

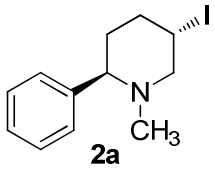

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: aGOO7F27
Nom: FAIZA DIABA
Data: 30/09/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
138.420
128.279
127.110
126.739
114.638
77.317
77.000
76.683
59.017
53.451
37.743
34.701
32.998
30.621
26.139
25.156
24.815
200
180
160
140
120
100
80
60
40
20
ppm


NH
t-Bu

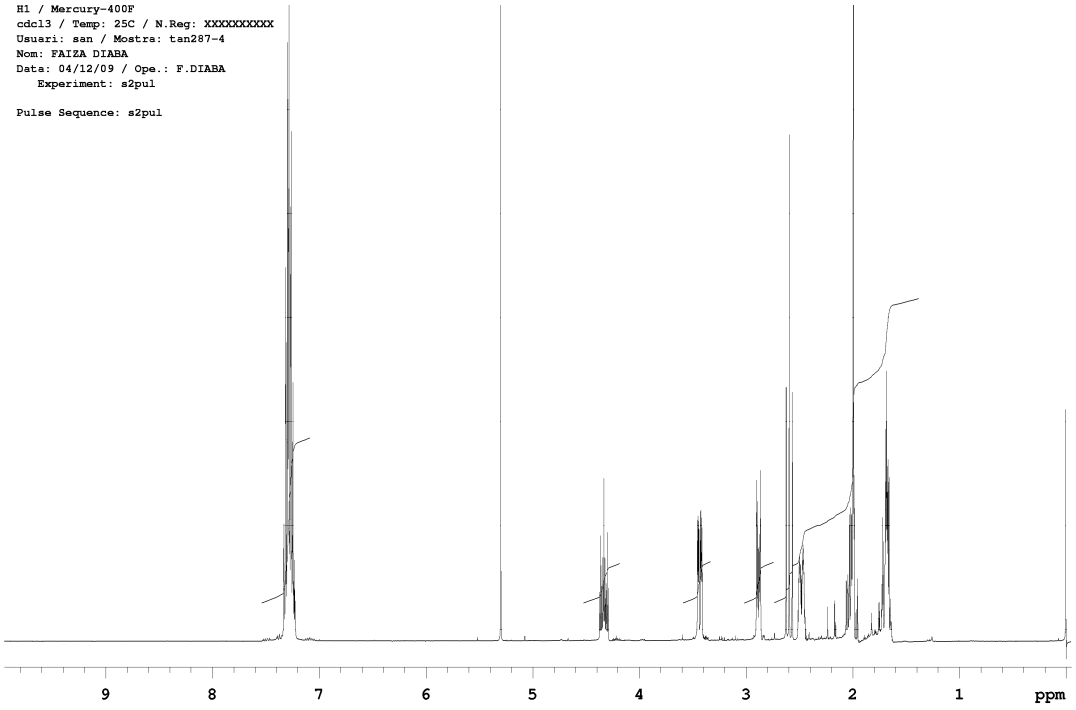
1h

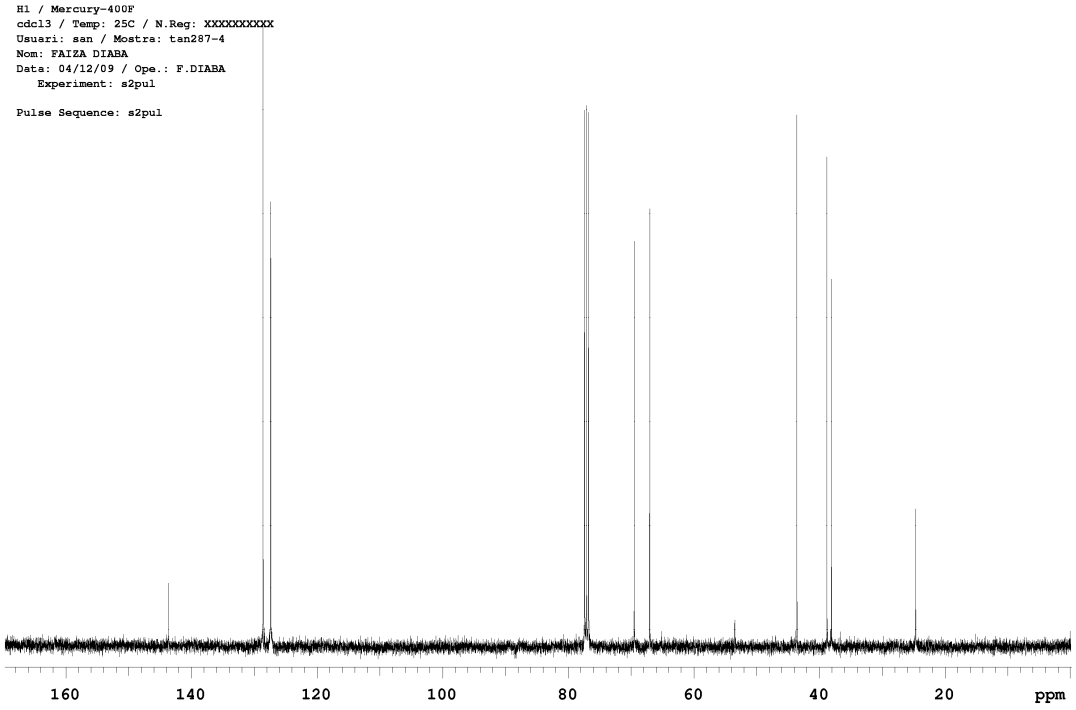

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xB015F30
Nom: FAIZA DIABA
Data: 16/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
9
8
7
6
5
4
3
2
1
ppm

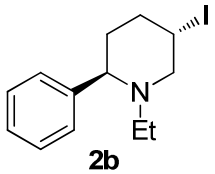

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xB015F30
Nom: FAIZA DIABA
Data: 16/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
200
180
160
140
120
100
80
60
40
20
ppm


I
N
CH3

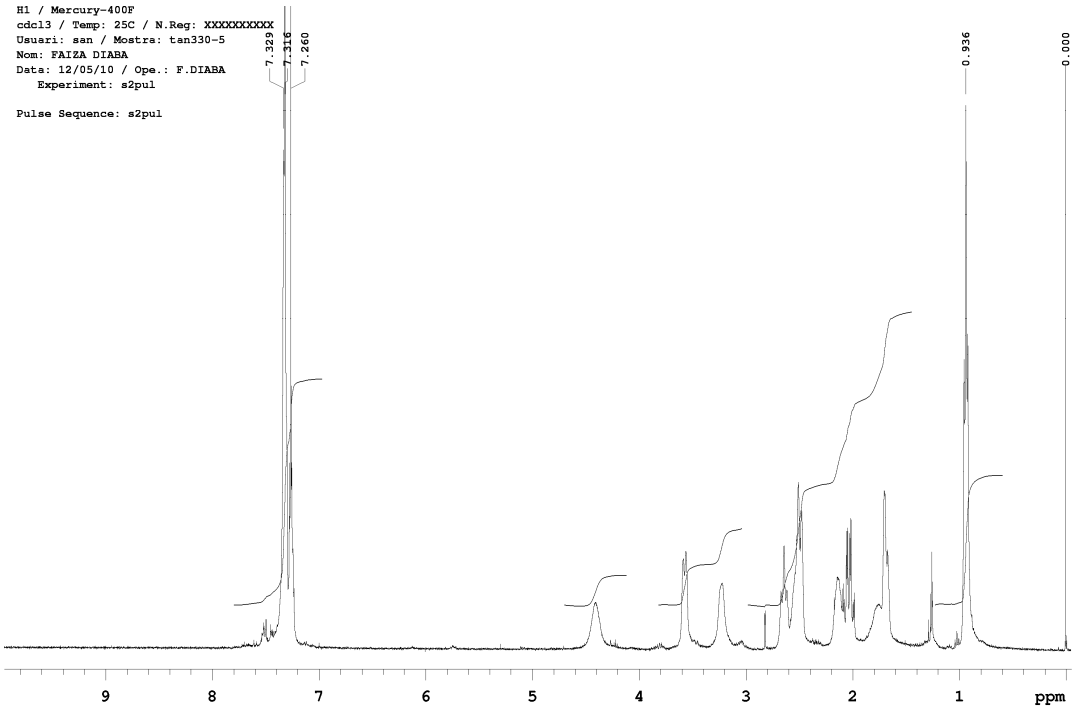
2a

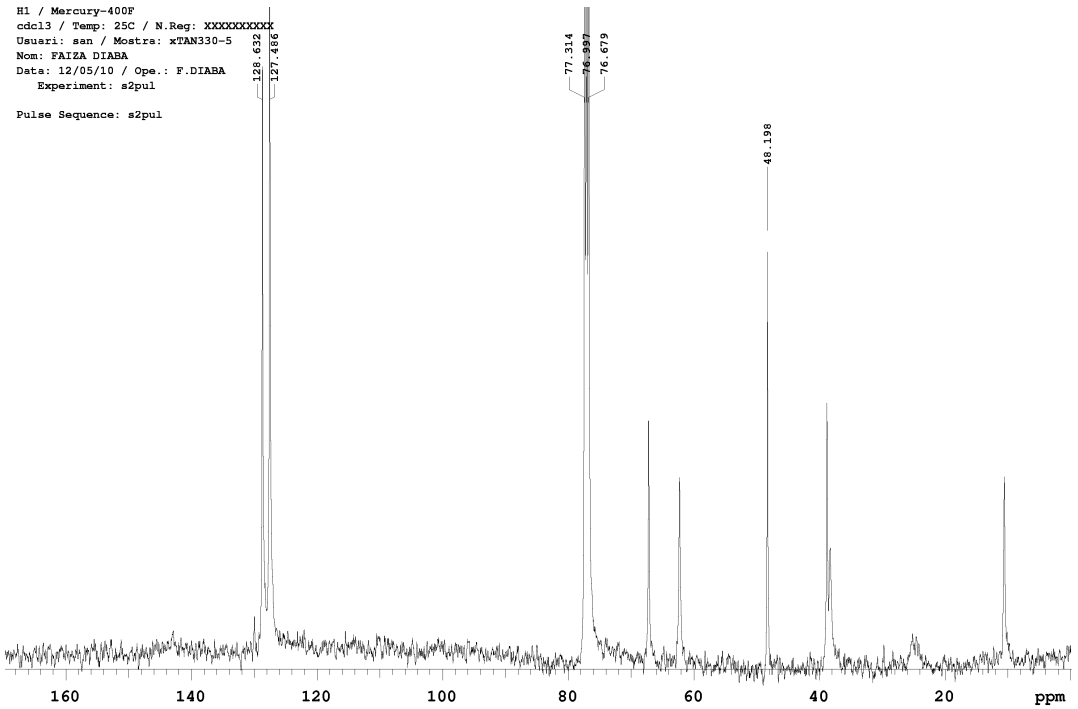

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tan287-4
Nom: FAIZA DIABA
Data: 04/12/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
9
8
7
6
5
4
3
2
1
ppm

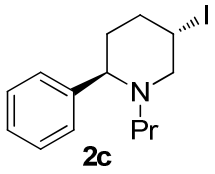

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tan287-4
Nom: FAIZA DIABA
Data: 04/12/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
160
140
120
100
80
60
40
20
ppm


N
Et

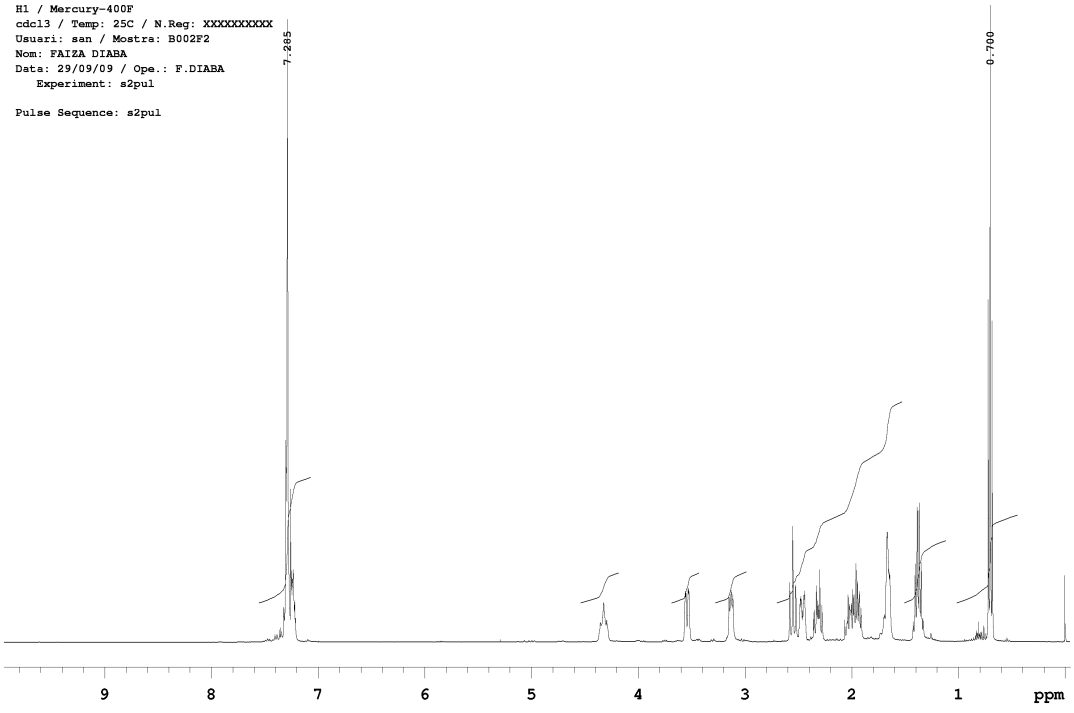
2b

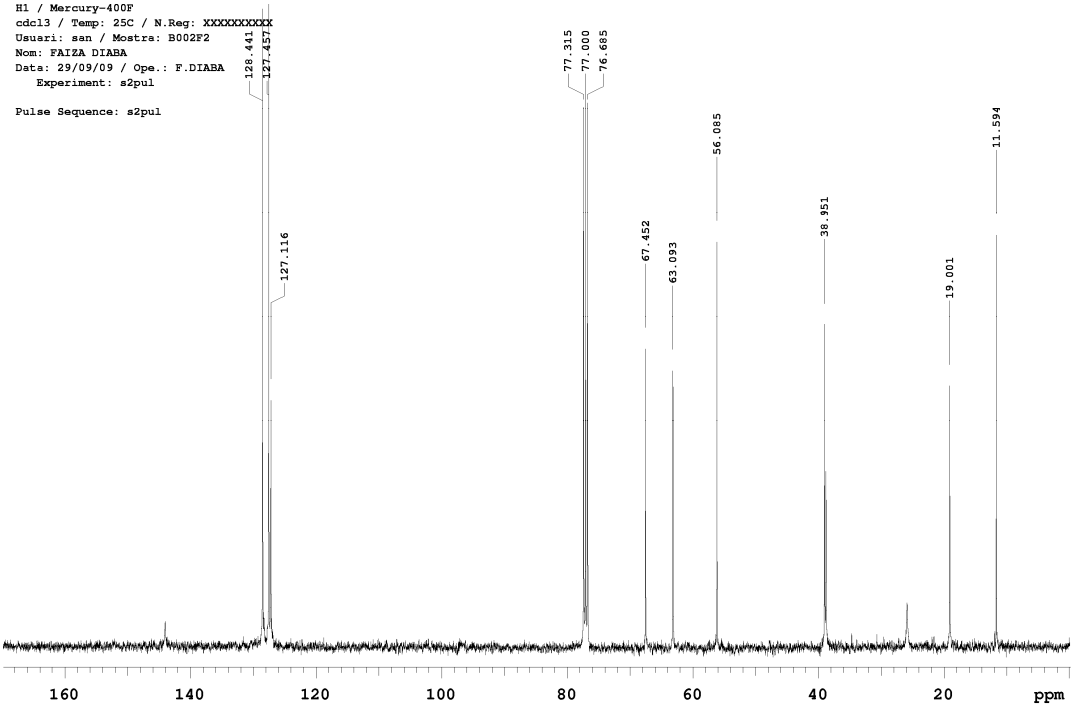

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tan330-5
Nom: FAIZA DIABA
Data: 12/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.329
7.316
7.260
0.936
0.000
9
8
7
6
5
4
3
2
1
ppm

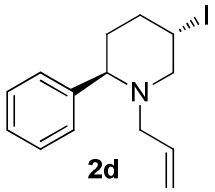

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xTAN330-5
Nom: FAIZA DIABA
Data: 12/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.632
127.486
77.314
76.997
76.679
48.198
160
140
120
100
80
60
40
20
ppm


I
N
Pr

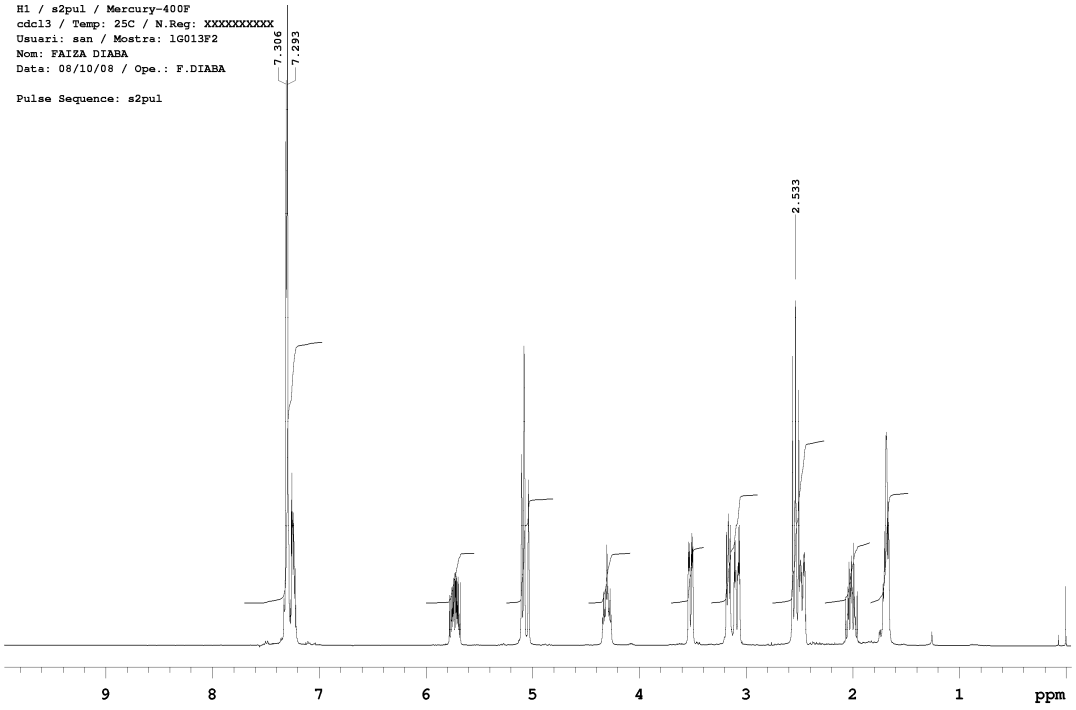
2c

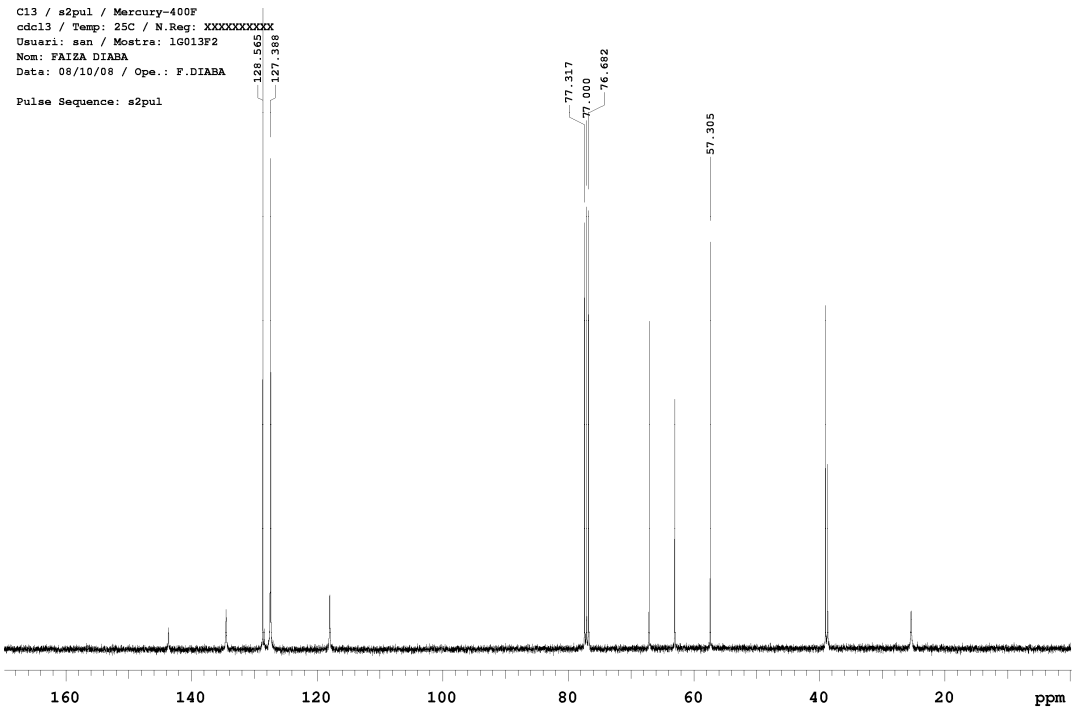

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B002F2
Nom: FAIZA DIABA
Data: 29/09/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.285
0.700
9
8
7
6
5
4
3
2
1
ppm

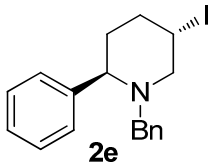

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B002F2
Nom: FAIZA DIABA
Data: 29/09/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.441
127.457
127.116
77.315
77.000
76.685
67.452
63.093
56.085
38.951
19.001
11.594
160
140
120
100
80
60
40
20
ppm


I
N

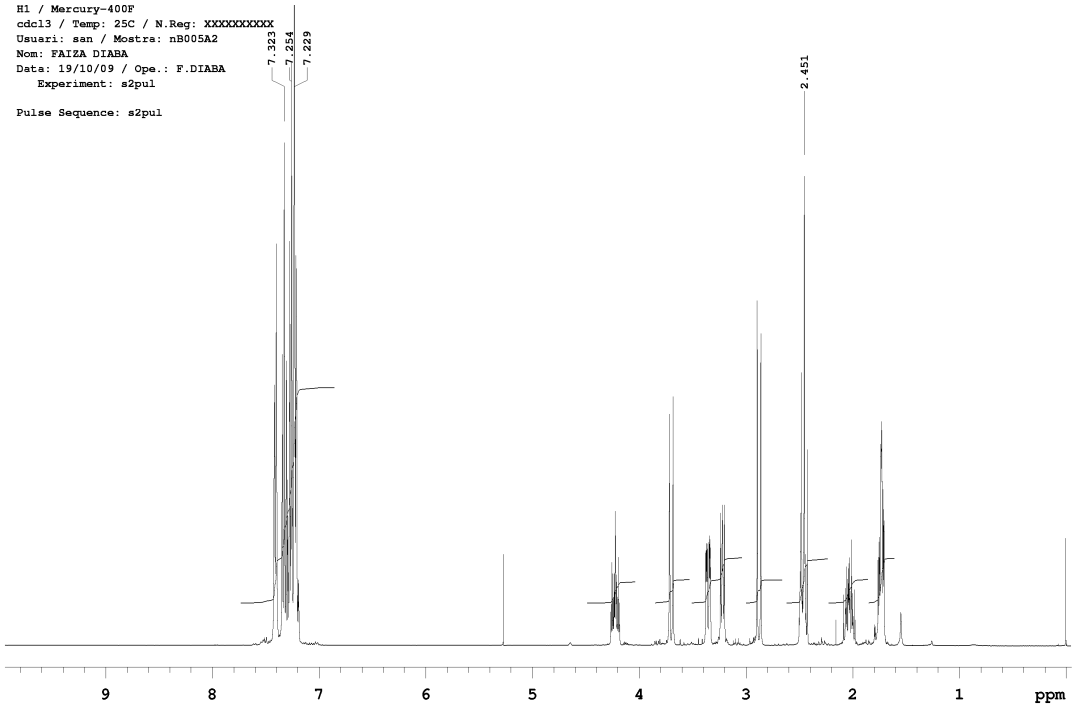
2d

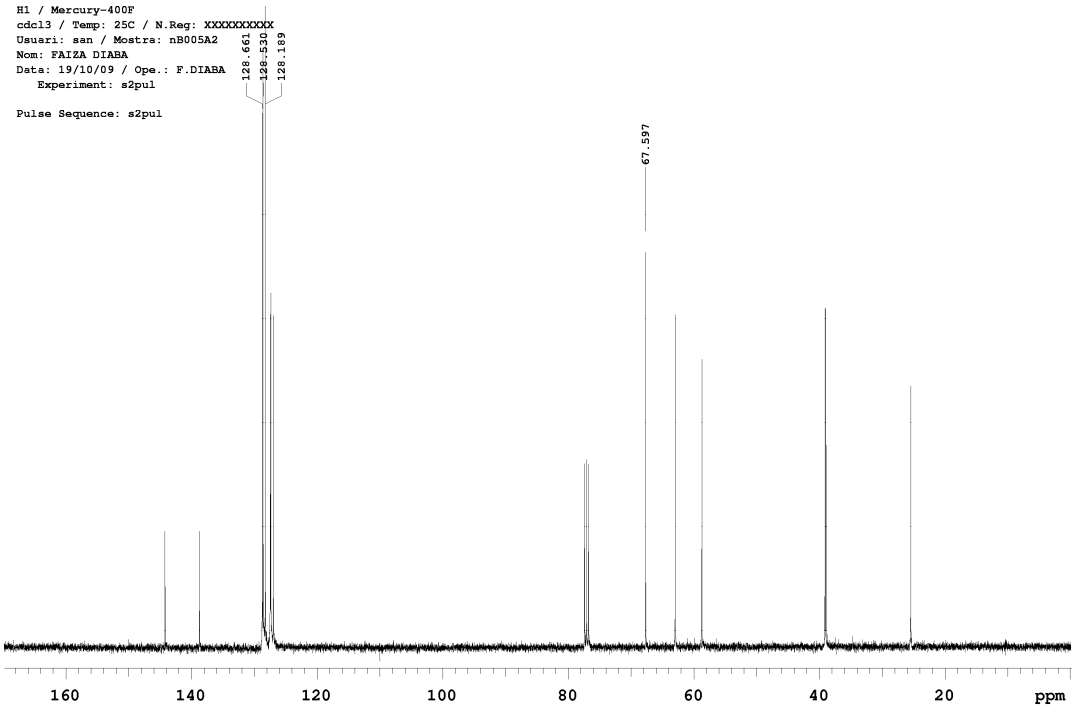

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: 1G013F2
Nom: FAIZA DIABA
Data: 08/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.306
7.293
2.533
9
8
7
6
5
4
3
2
1
ppm

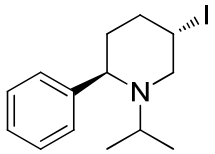

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: 1G013F2
Nom: FAIZA DIABA
Data: 08/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
128.565
127.388
77.317
77.000
76.682
57.305
160
140
120
100
80
60
40
20
ppm


I
N
Bn

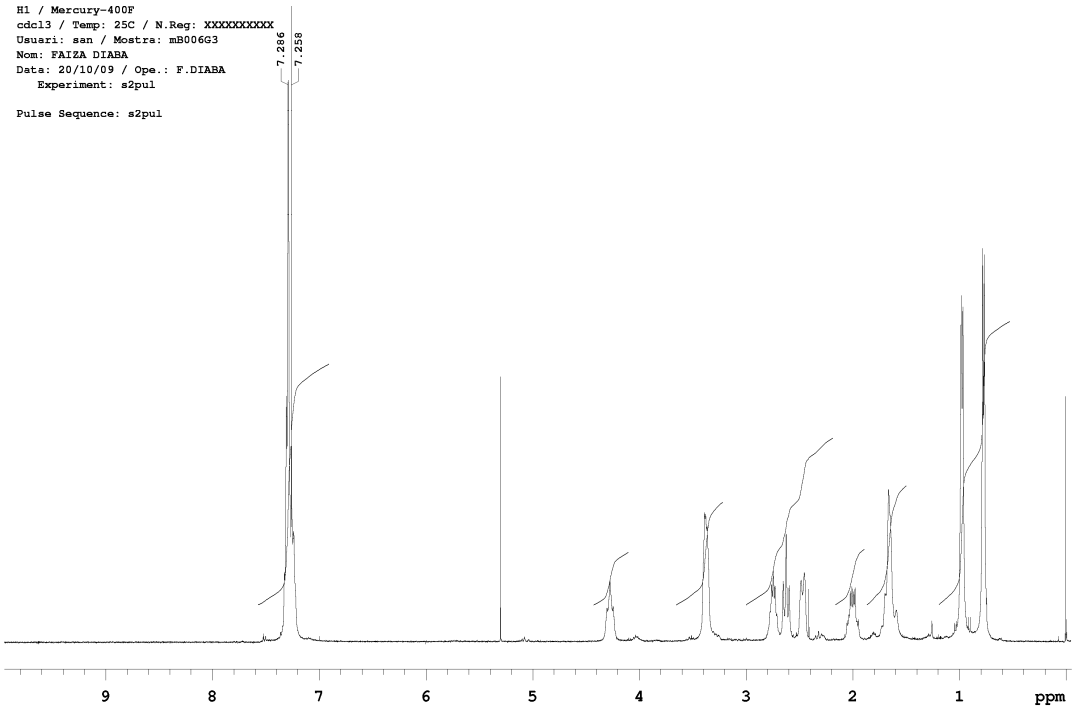
2e

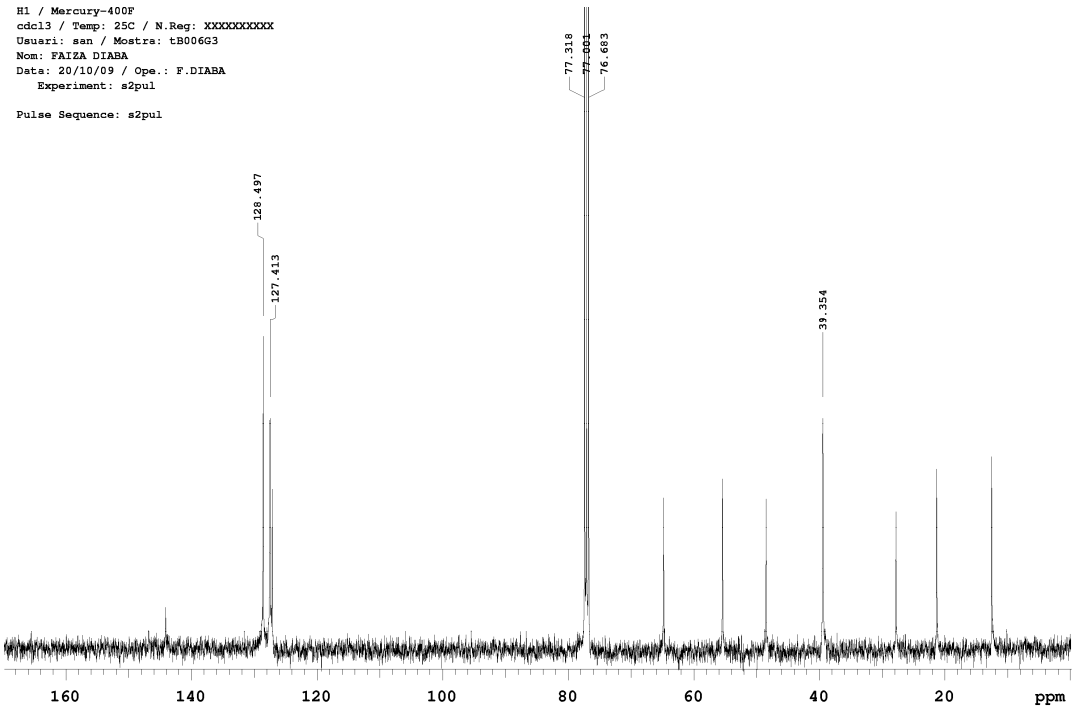

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: nB005A2
Nom: FAIZA DIABA
Data: 19/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.323
7.254
7.229
2.451
9
8
7
6
5
4
3
2
1
ppm

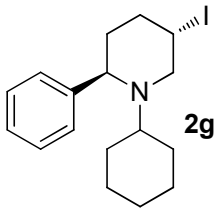

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: nB005A2
Nom: FAIZA DIABA
Data: 19/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.661
128.530
128.189
67.597
160
140
120
100
80
60
40
20
ppm



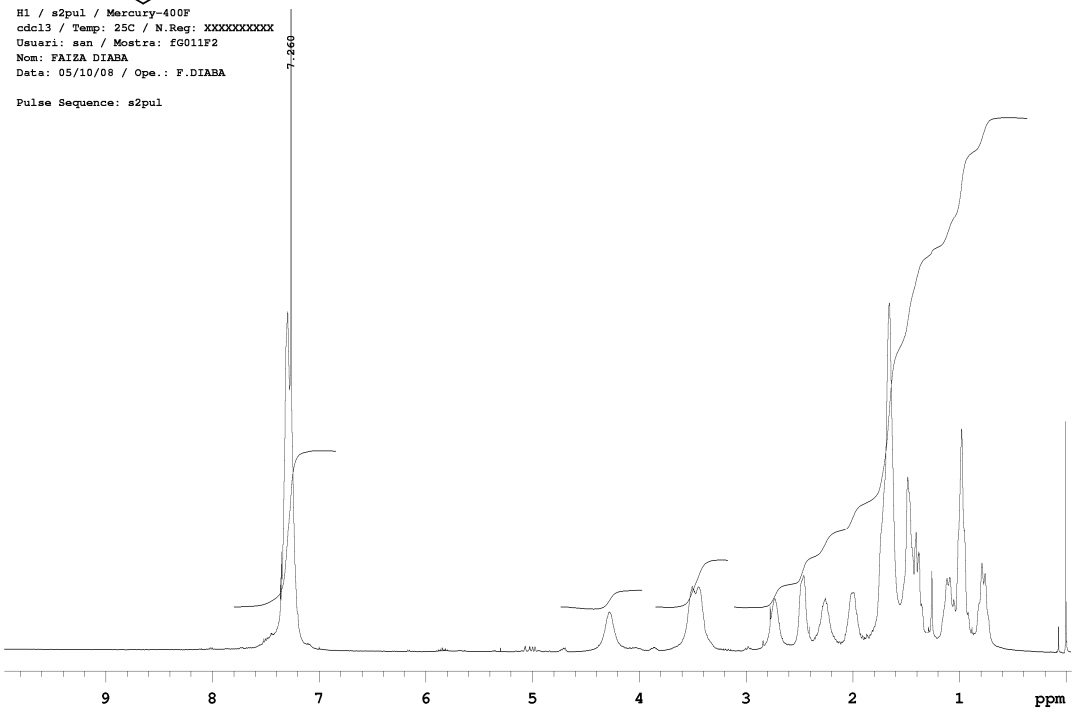
2f

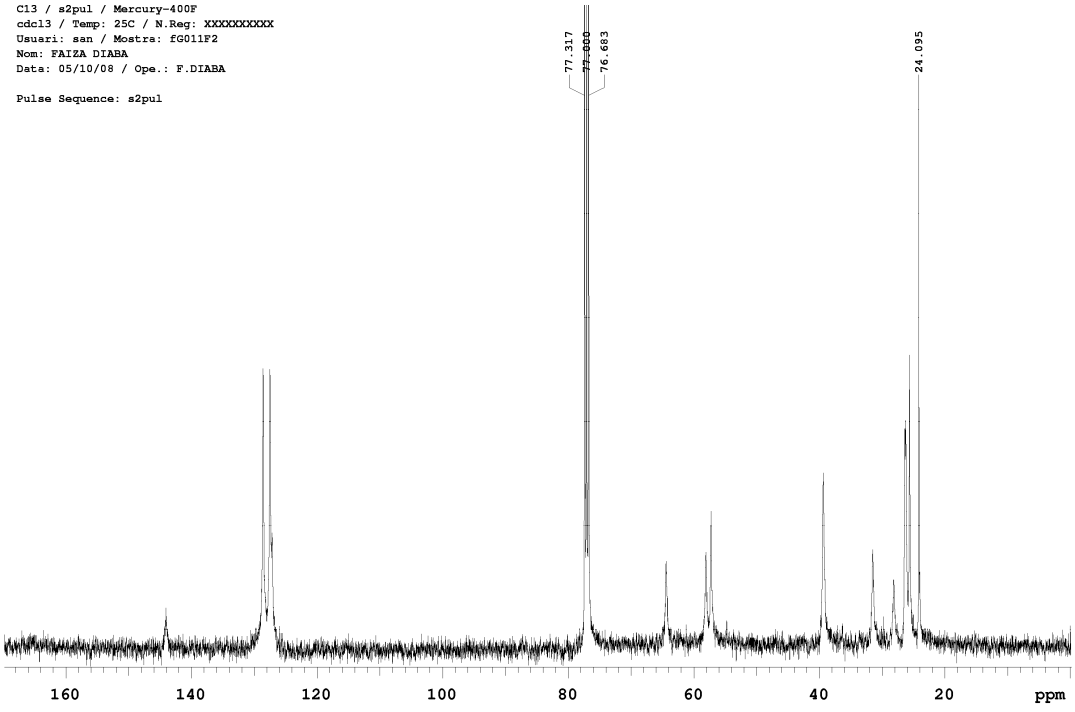

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: mB006G3
Nom: FAIZA DIABA
Data: 20/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.286
7.258
9
8
7
6
5
4
3
2
1
ppm

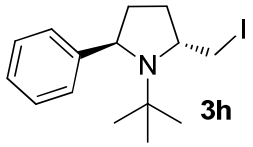

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tB006G3
Nom: FAIZA DIABA
Data: 20/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.497
127.413
77.318
77.001
76.683
39.354
160
140
120
100
80
60
40
20
ppm


I
N

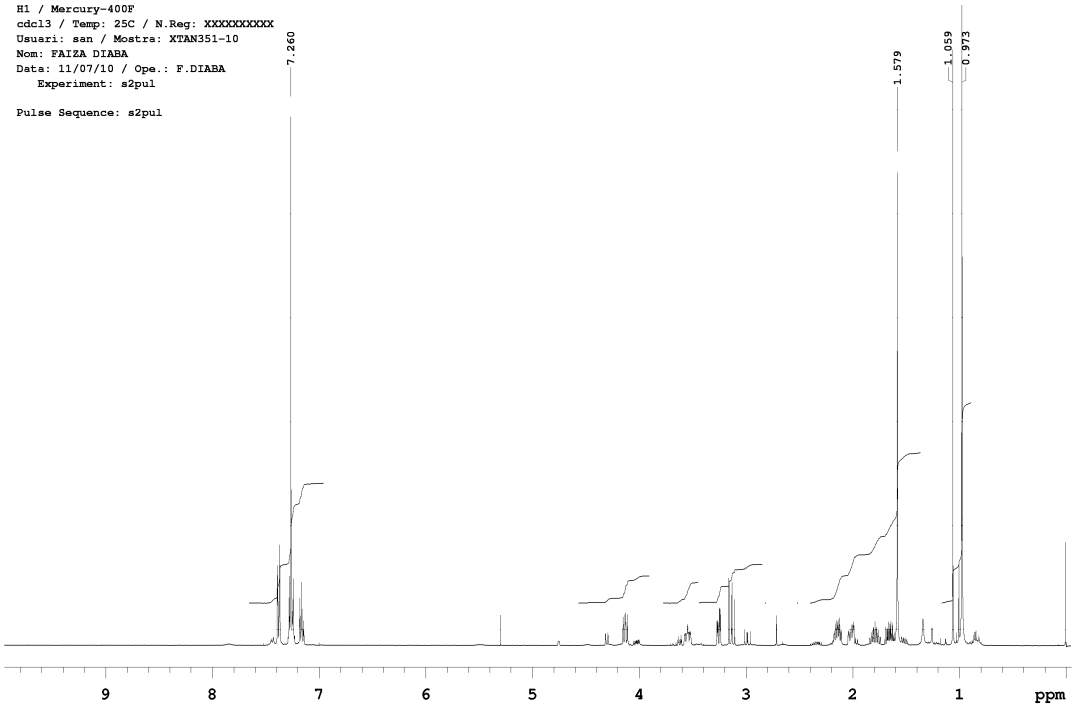
2g

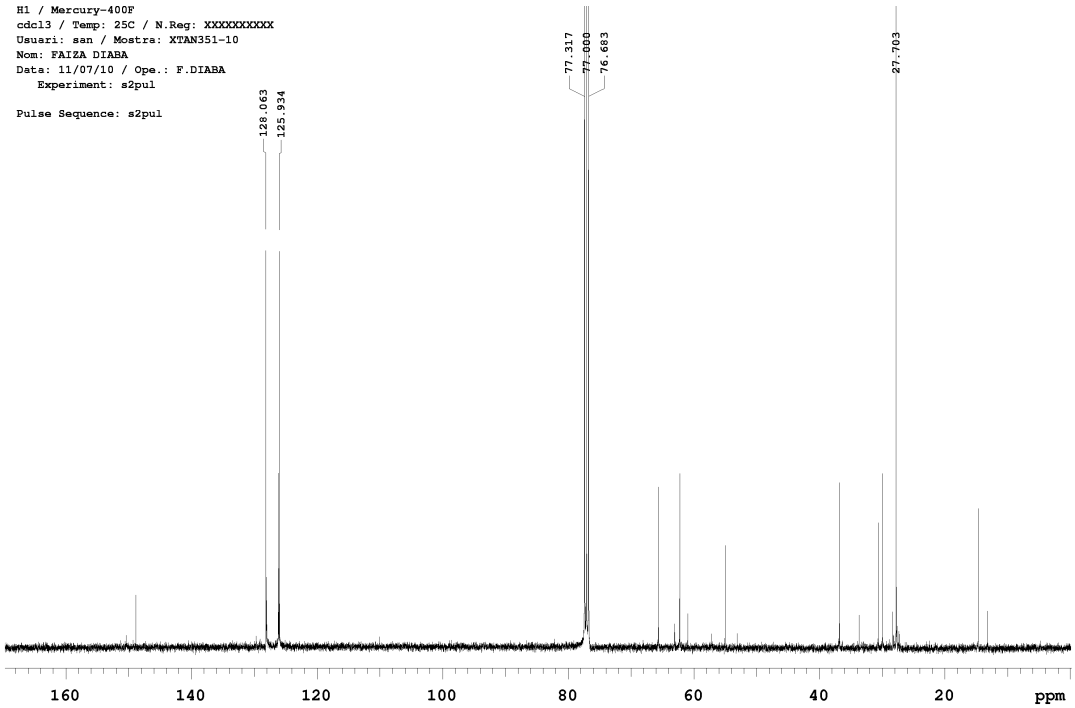

H1 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: fG011F2
Nom: FAIZA DIABA
Data: 05/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
7.260
9
8
7
6
5
4
3
2
1
ppm

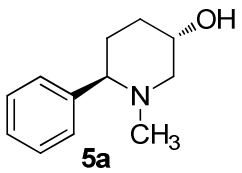

C13 / s2pul / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: fG011F2
Nom: FAIZA DIABA
Data: 05/10/08 / Ope.: F.DIABA
Pulse Sequence: s2pul
77.317
77.000
76.683
24.095
160
140
120
100
80
60
40
20
ppm


I
N

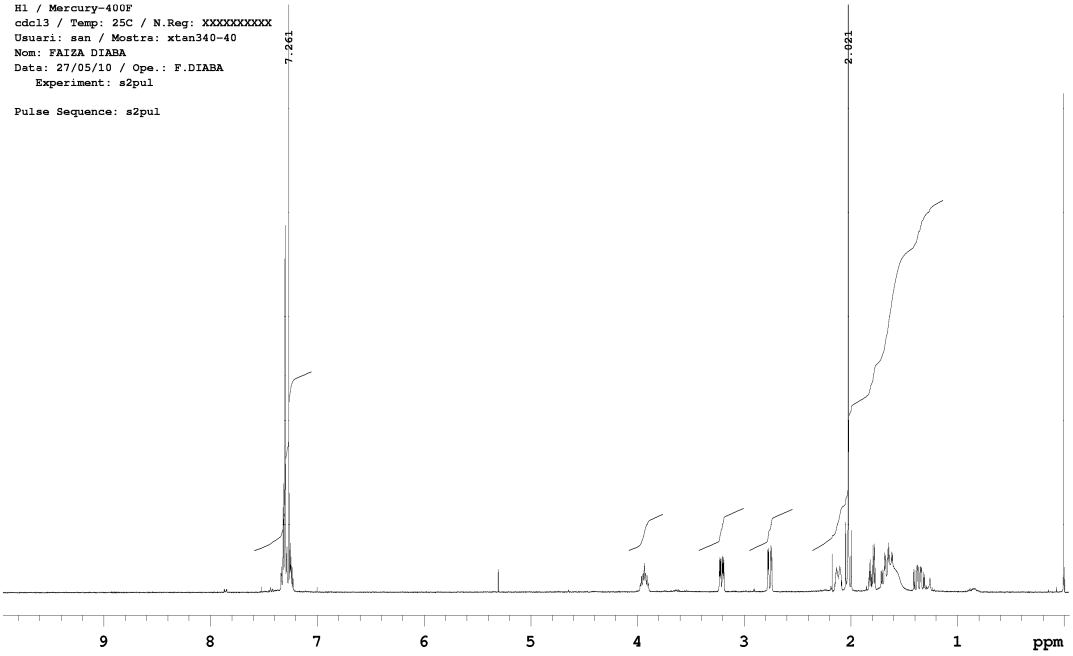
3h

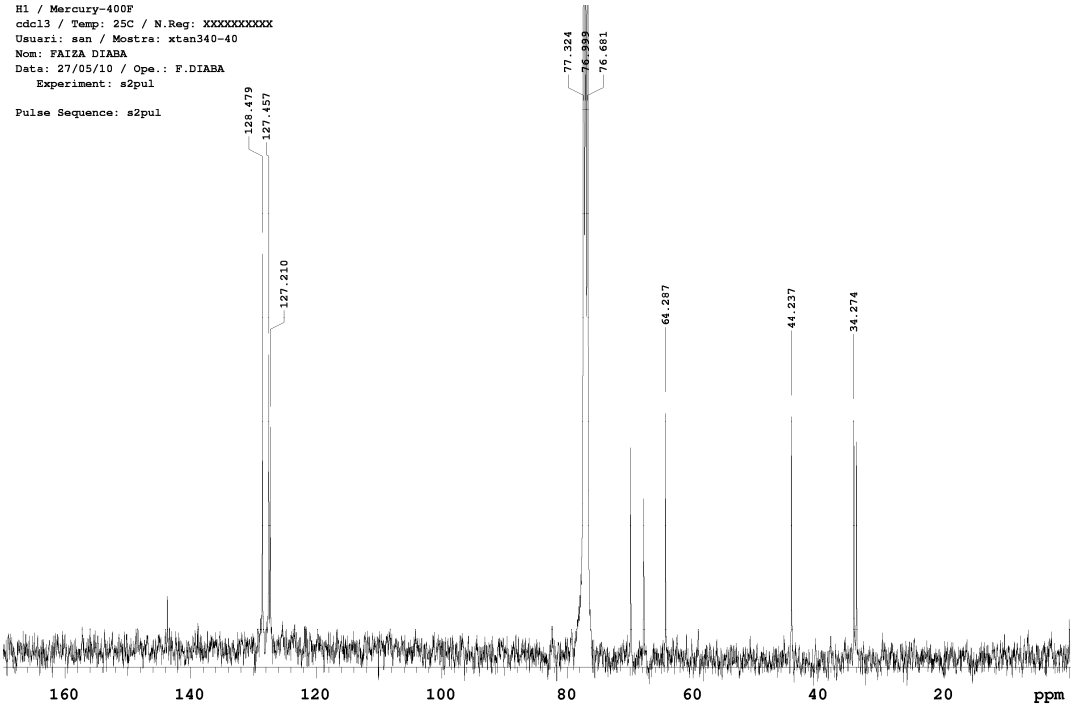

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: XTAN351-10
Nom: FAIZA DIABA
Data: 11/07/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.260
1.579
1.059
0.973
9
8
7
6
5
4
3
2
1
ppm

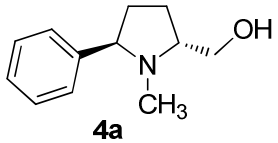

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: XTAN351-10
Nom: FAIZA DIABA
Data: 11/07/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.063
125.934
77.317
77.000
76.683
27.703
160
140
120
100
80
60
40
20
ppm


OH
N
CH3

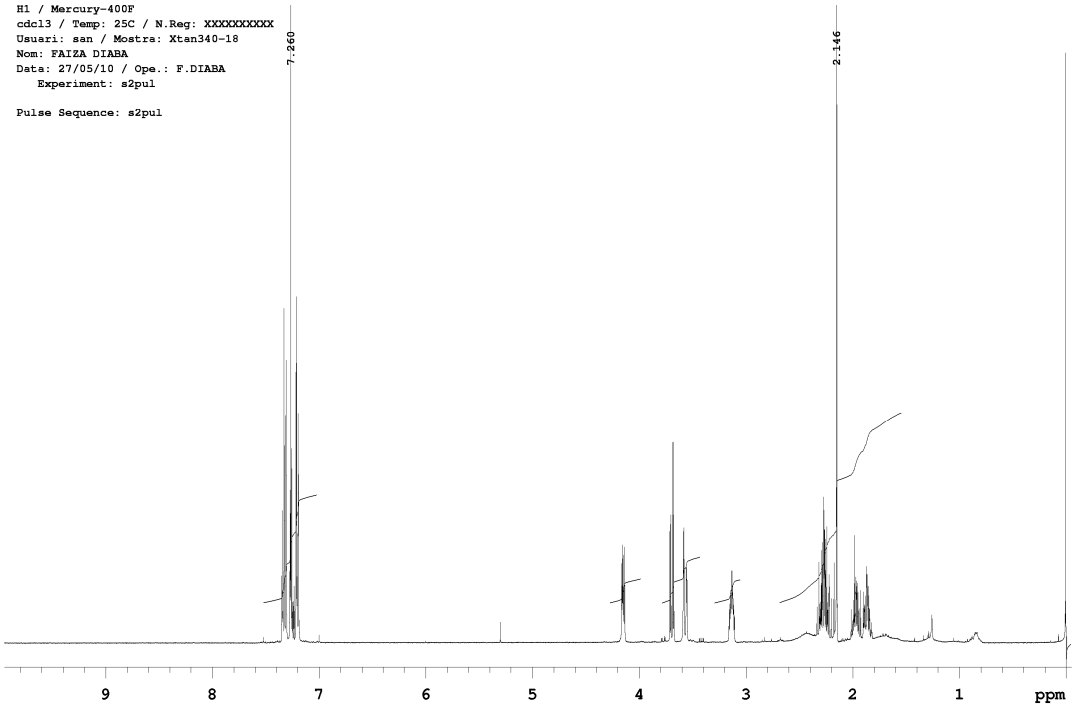
5a

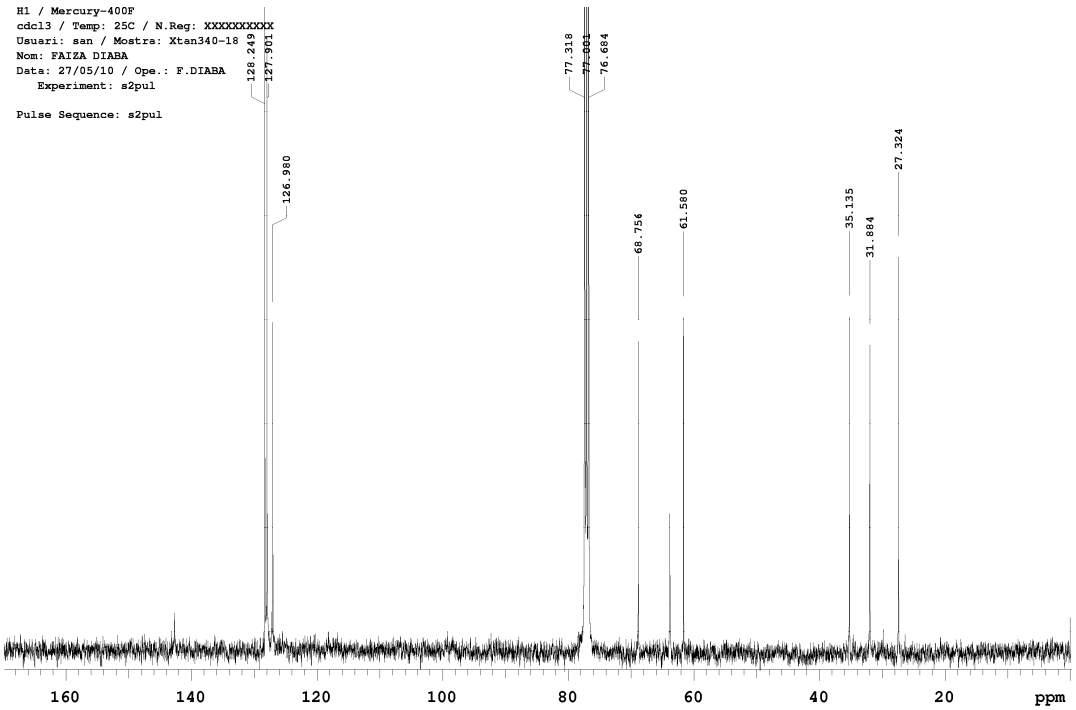

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xtan340-40
Nom: FAIZA DIABA
Data: 27/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.261
2.021
9
8
7
6
5
4
3
2
1
ppm

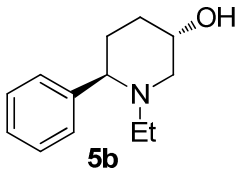

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xtan340-40
Nom: FAIZA DIABA
Data: 27/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.479
127.457
127.210
77.324
76.999
76.681
64.287
44.237
34.274
160
140
120
100
80
60
40
20
ppm


OH
N
CH3

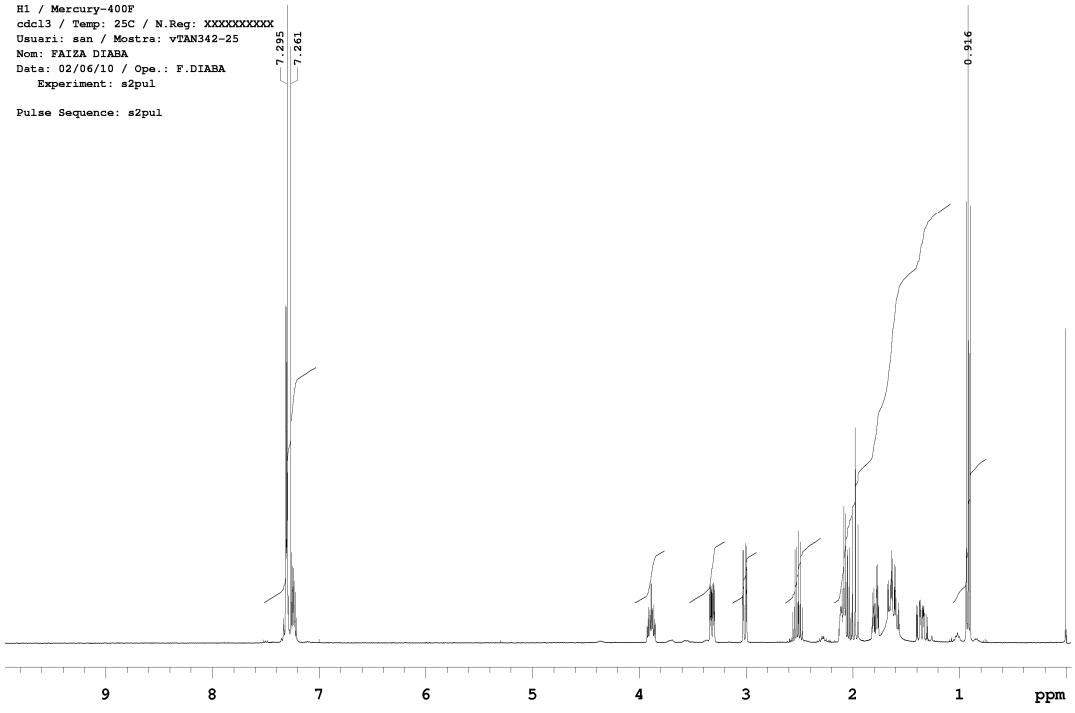
4a

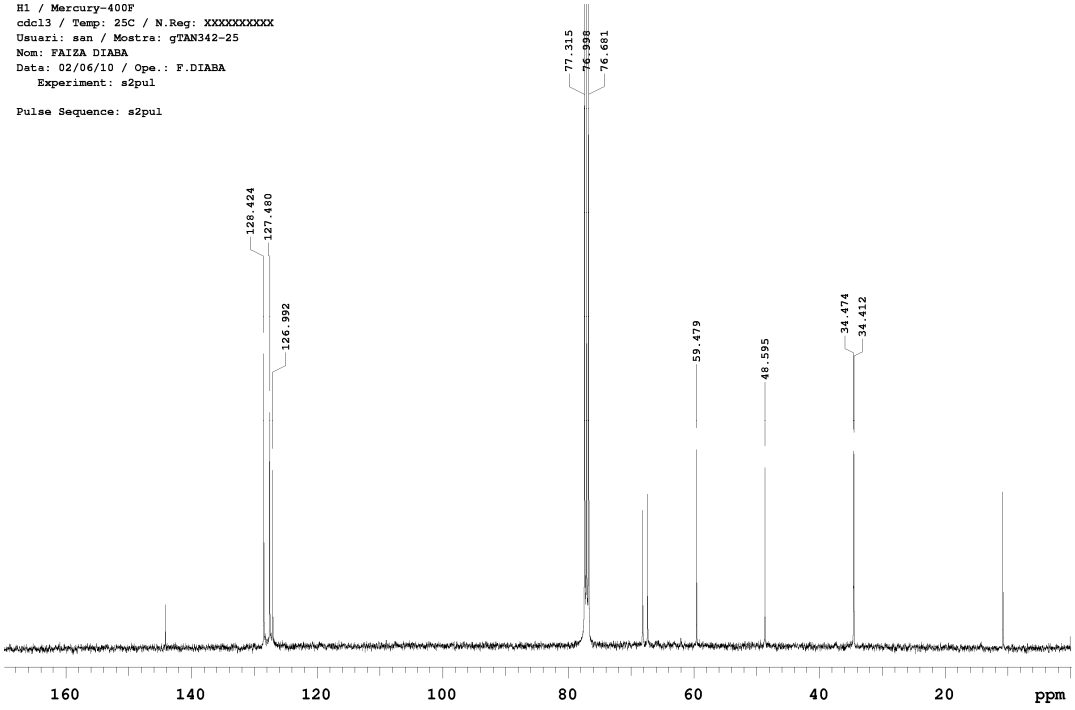

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: Xtan340-18
Nom: FAIZA DIABA
Data: 27/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.260
2.146
9
8
7
6
5
4
3
2
1
ppm

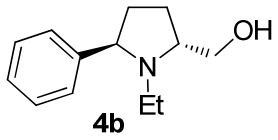

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: Xtan340-18
Nom: FAIZA DIABA
Data: 27/05/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.249
127.901
126.980
77.318
77.001
76.684
68.756
61.580
35.135
31.884
27.324
160
140
120
100
80
60
40
20
ppm


OH
N
Et

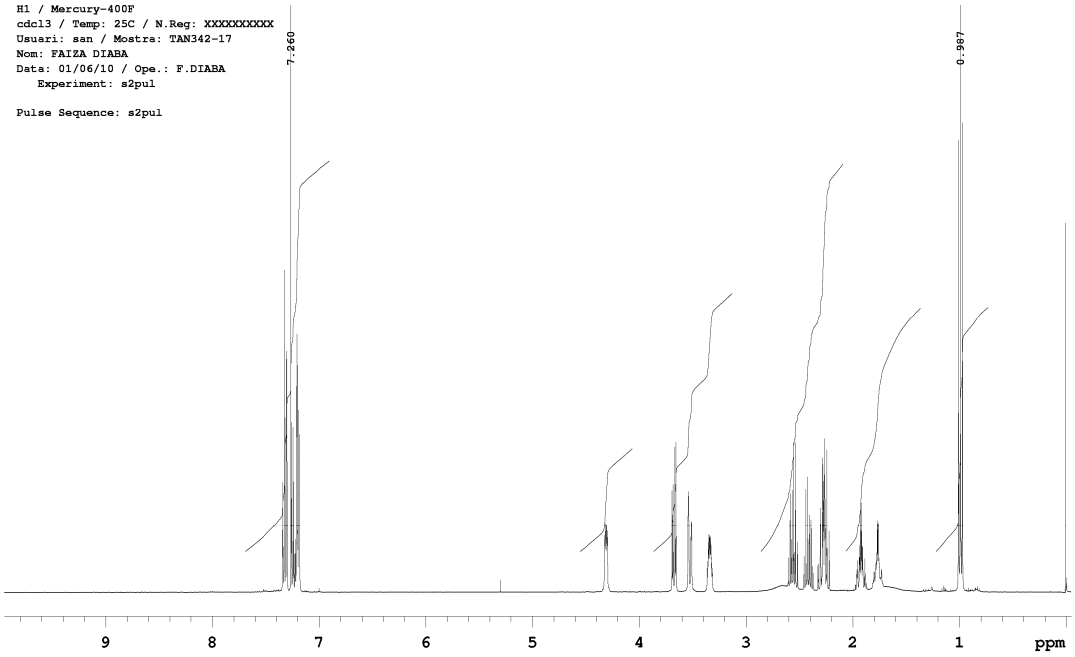
5b

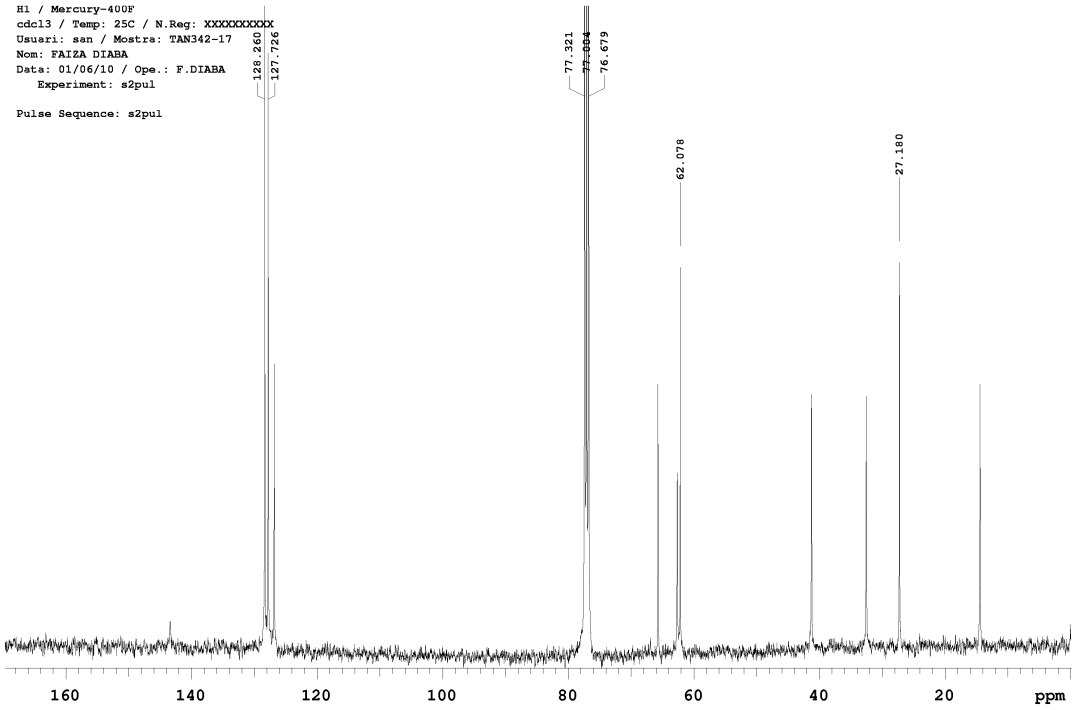

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: vTAN342-25
Nom: FAIZA DIABA
Data: 02/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.295
7.261
0.916
9
8
7
6
5
4
3
2
1
ppm

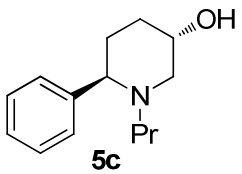

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: gTAN342-25
Nom: FAIZA DIABA
Data: 02/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
77.315
76.998
76.681
128.424
127.480
126.992
59.479
48.595
34.474
34.412
160
140
120
100
80
60
40
20
ppm


OH
N
Et

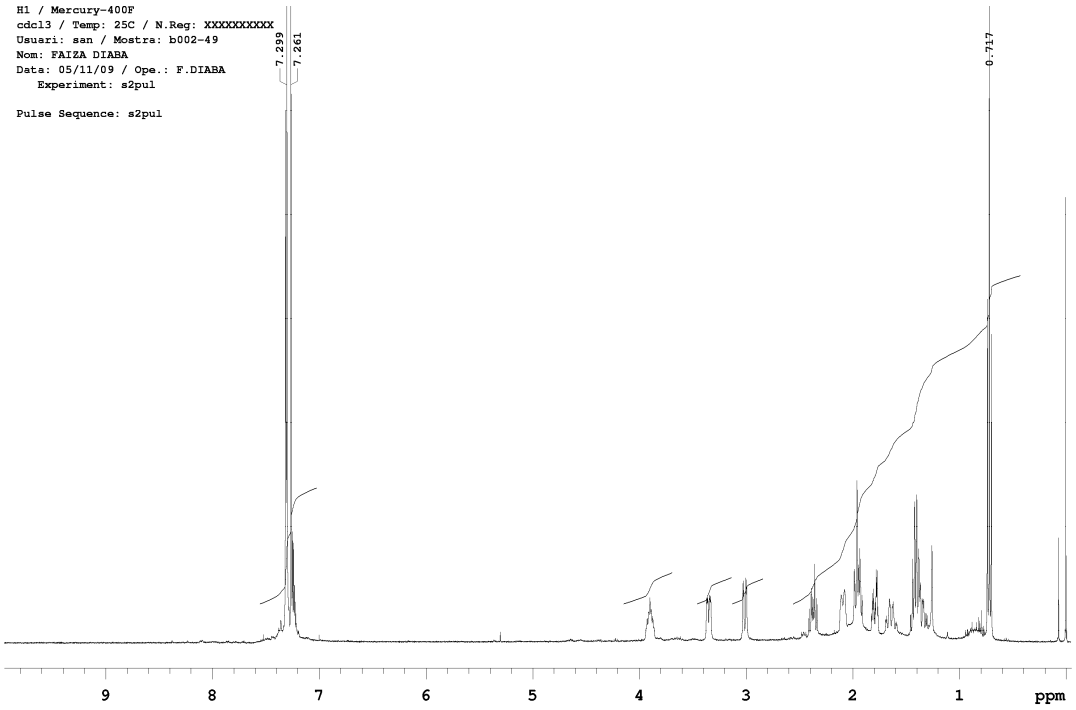
4b

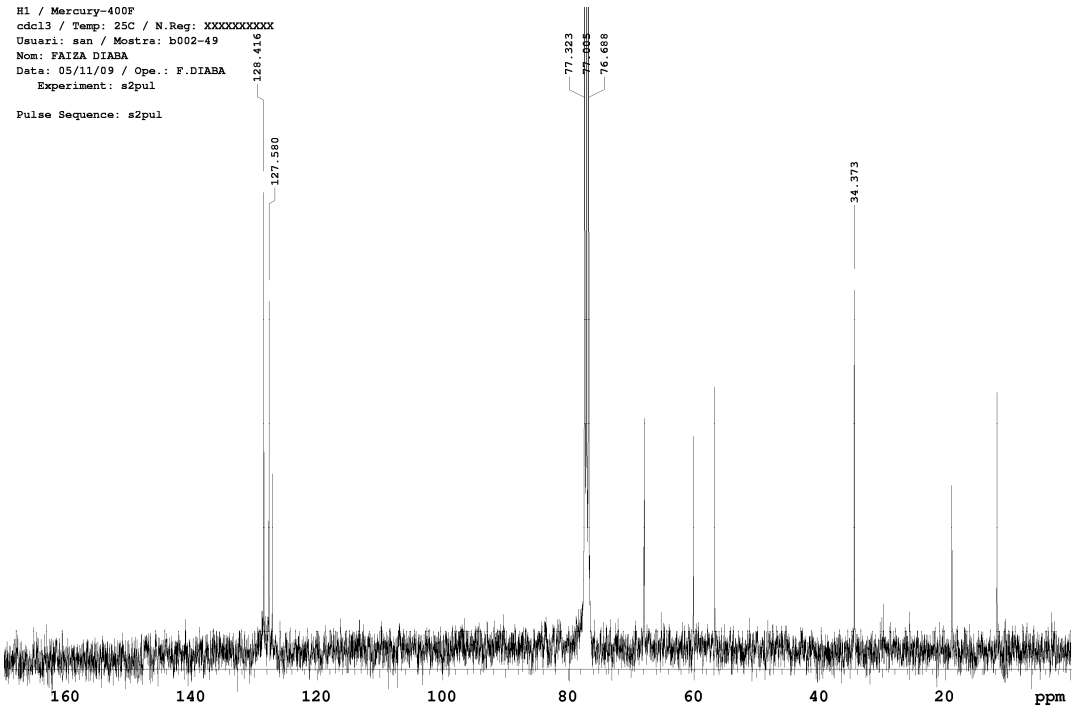

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN342-17
Nom: FAIZA DIABA
Data: 01/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.260
0.987
9
8
7
6
5
4
3
2
1
ppm

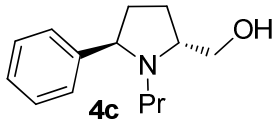

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: TAN342-17
Nom: FAIZA DIABA
Data: 01/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.260
127.726
77.321
77.004
76.679
62.078
27.180
160
140
120
100
80
60
40
20
ppm


OH
N
Pr

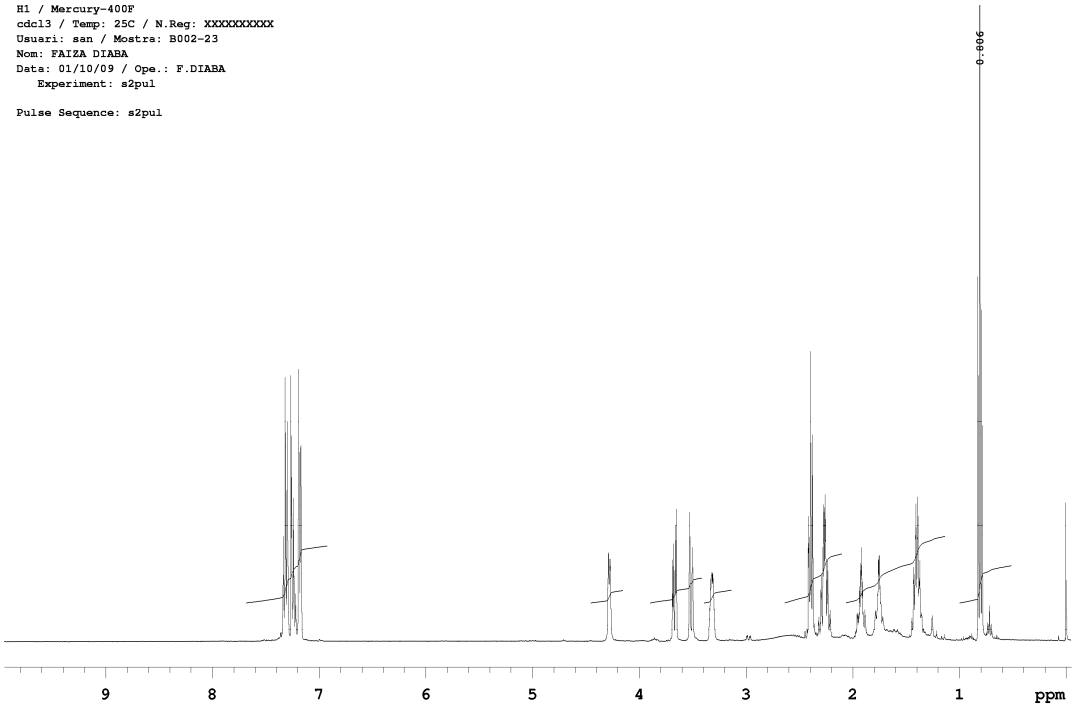
5c

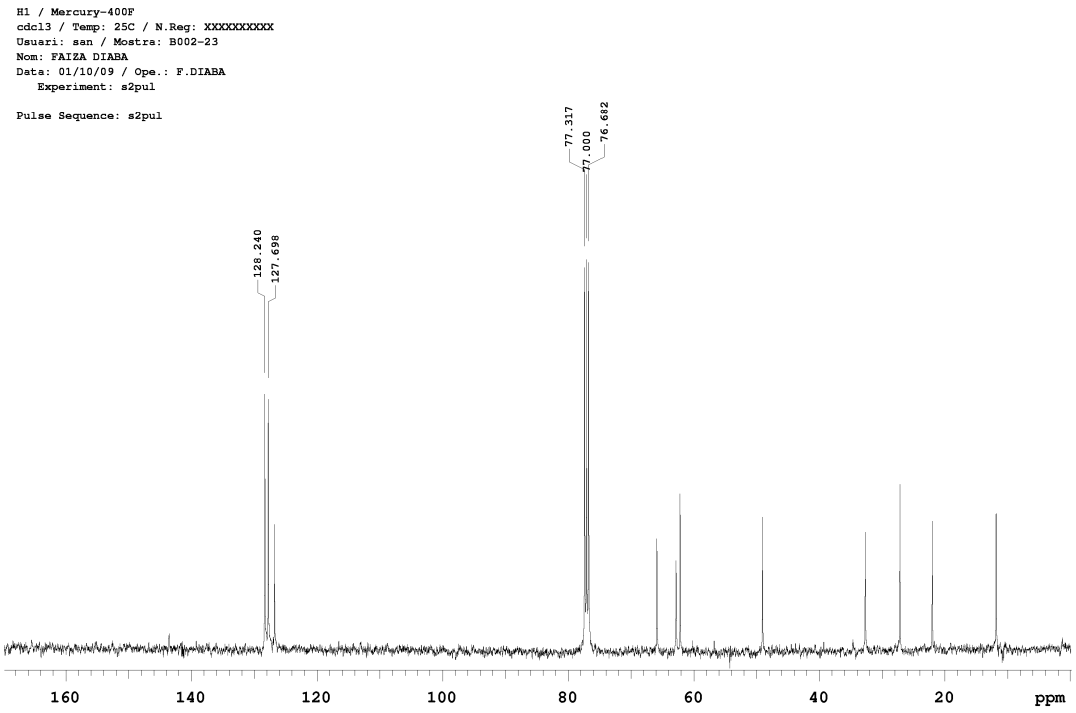

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: b002-49
Nom: FAIZA DIABA
Data: 05/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.299
7.261
0.717
9
8
7
6
5
4
3
2
1
ppm

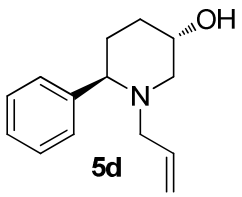

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: b002-49
Nom: FAIZA DIABA
Data: 05/11/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.416
127.580
77.323
77.005
76.688
34.373
160
140
120
100
80
60
40
20
ppm


OH
N
Pr

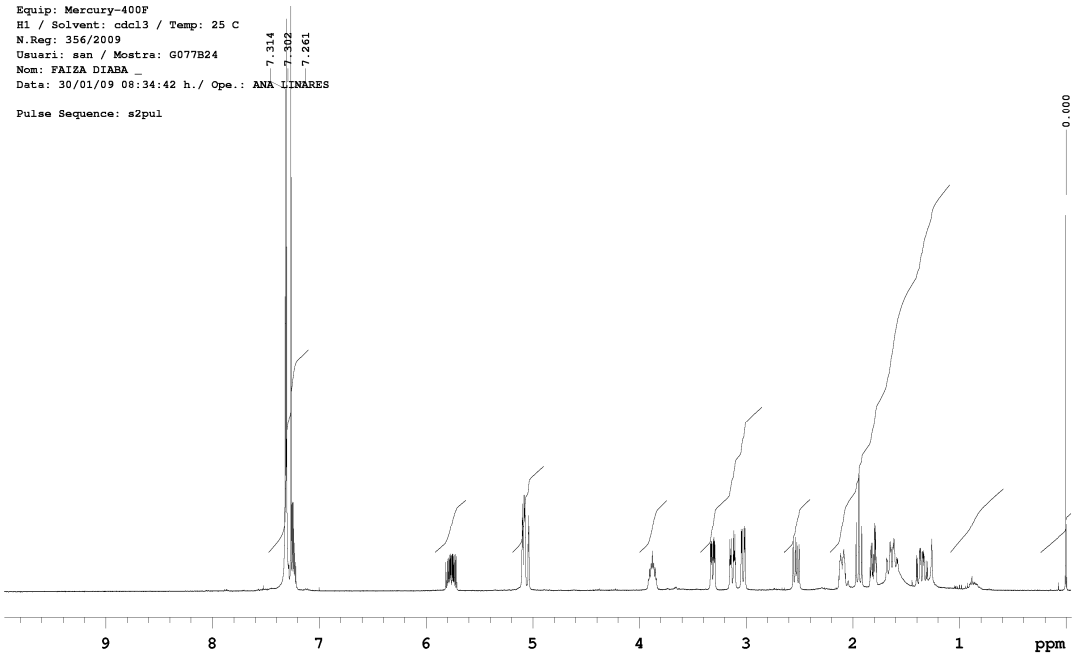
4c

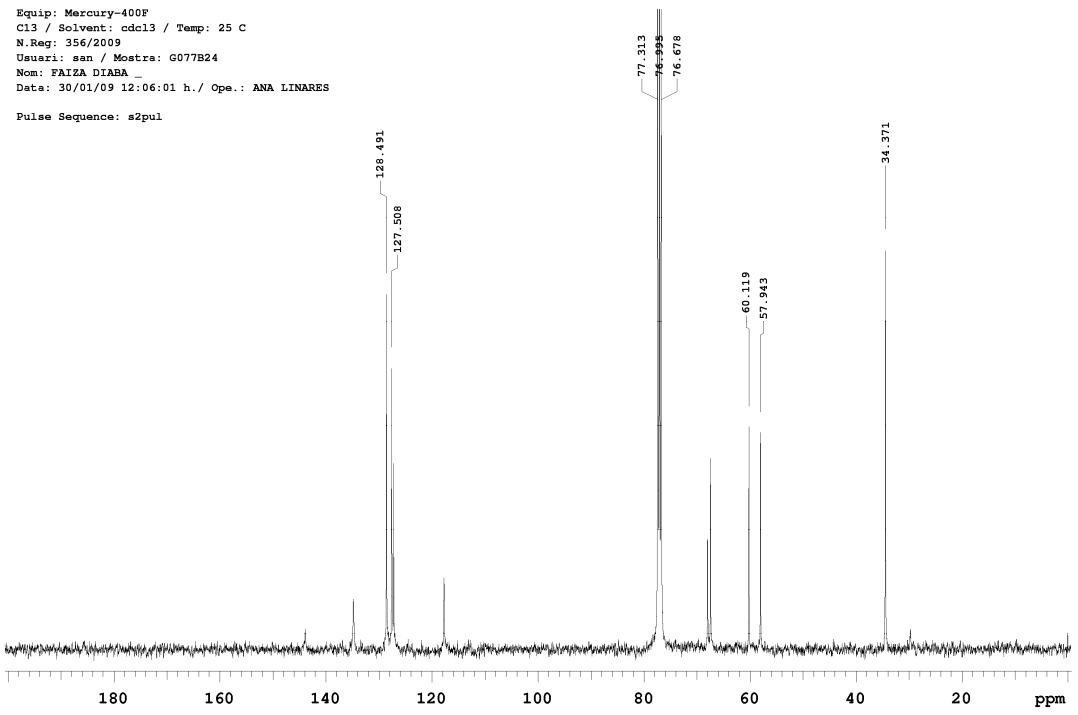

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B002-23
Nom: FAIZA DIABA
Data: 01/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
0.806
9
8
7
6
5
4
3
2
1
ppm

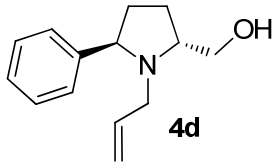

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B002-23
Nom: FAIZA DIABA
Data: 01/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
77.317
77.000
76.682
128.240
127.698
160
140
120
100
80
60
40
20
ppm


OH
N

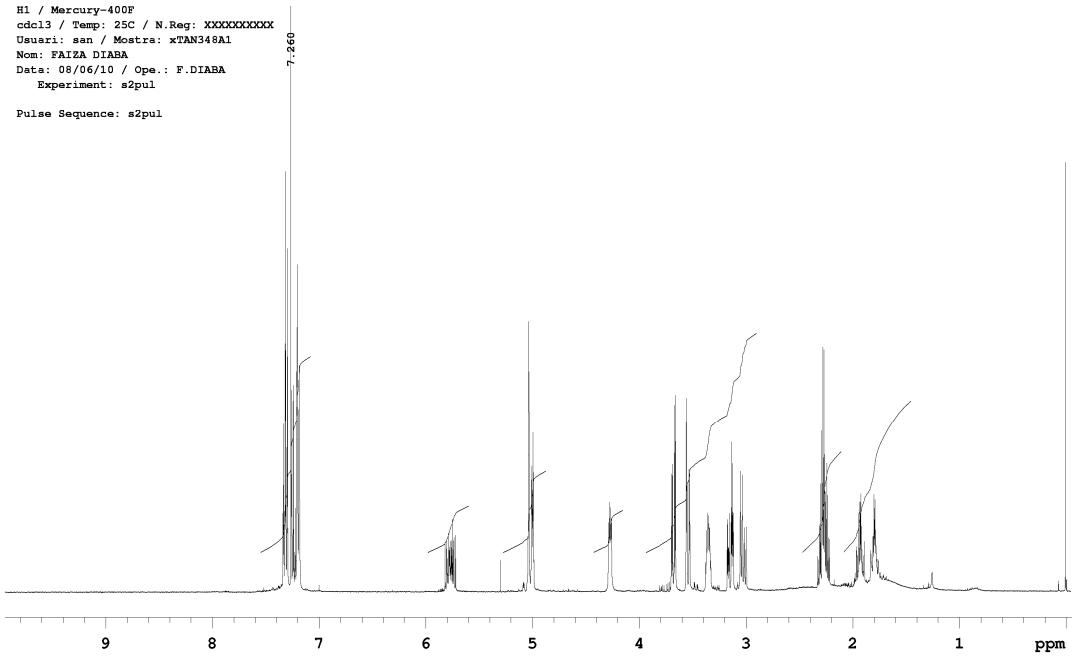
5d

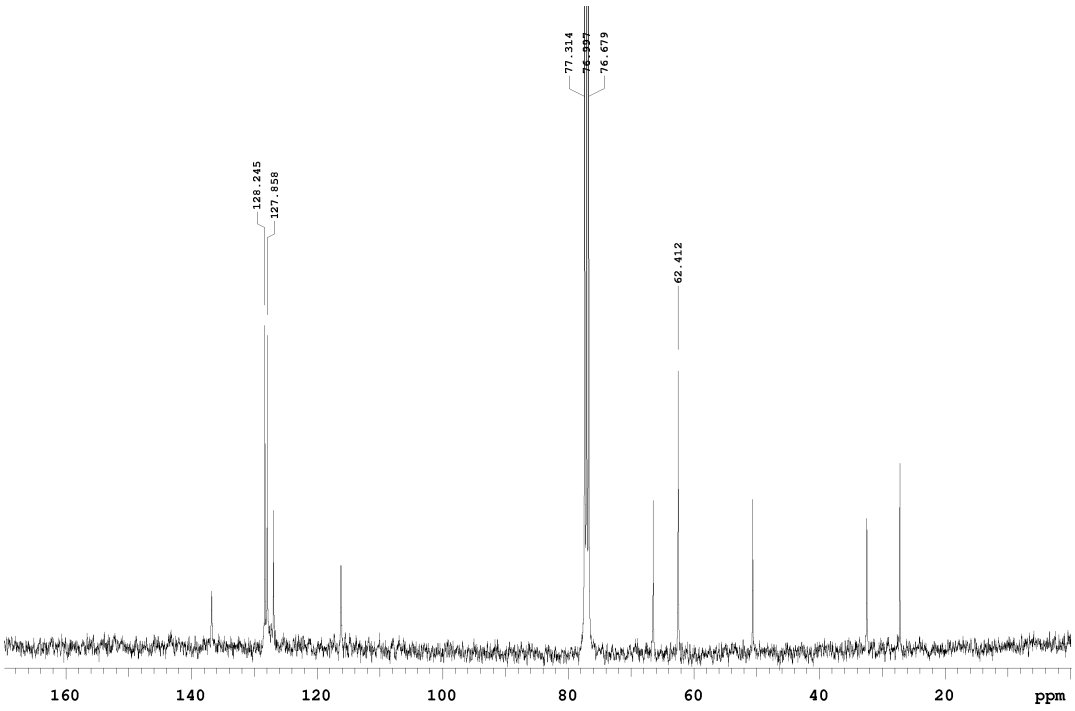

Equip: Mercury-400F
H1 / Solvent: cdcl3 / Temp: 25 C
N.Reg: 356/2009
Usuari: san / Mostra: G077B24
Nom: FAIZA DIABA _
Data: 30/01/09 08:34:42 h./ Ope.: ANA LINARES
Pulse Sequence: s2pul
7.314
7.302
7.261
0.000
9
8
7
6
5
4
3
2
1
ppm

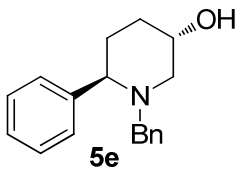

Equip: Mercury-400F
C13 / Solvent: cdcl3 / Temp: 25 C
N.Reg: 356/2009
Usuari: san / Mostra: G077B24
Nom: FAIZA DIABA _
Data: 30/01/09 12:06:01 h./ Ope.: ANA LINARES
Pulse Sequence: s2pul
128.491
127.508
77.313
76.995
76.678
60.119
57.943
34.371
180
160
140
120
100
80
60
40
20
ppm


OH
N

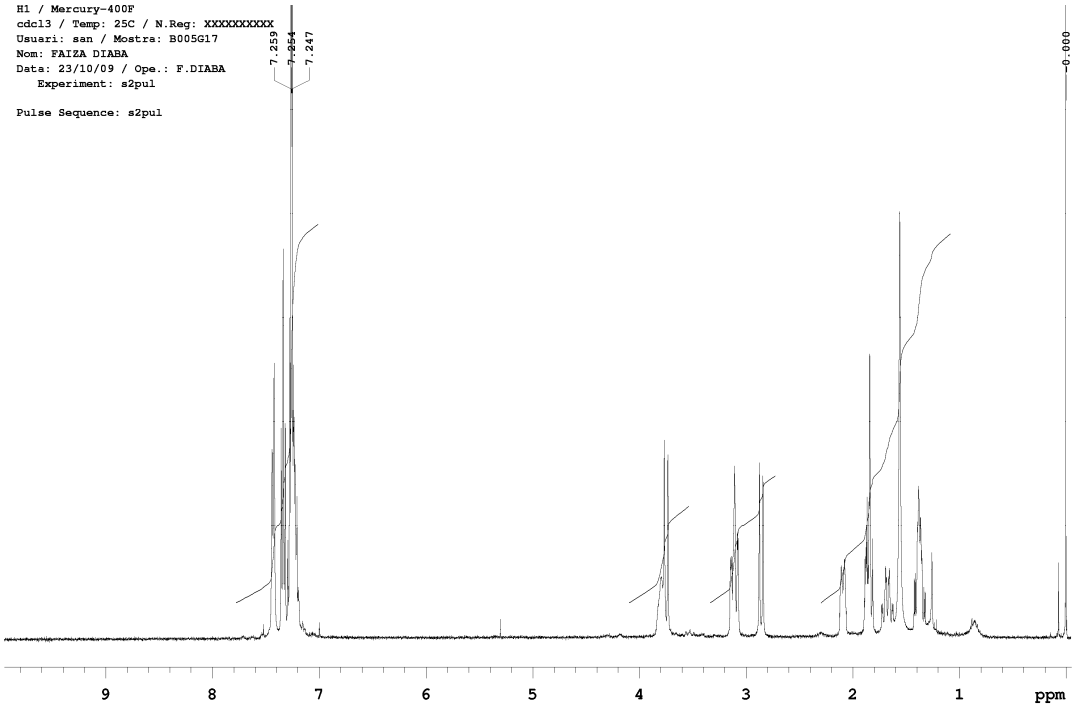
4d

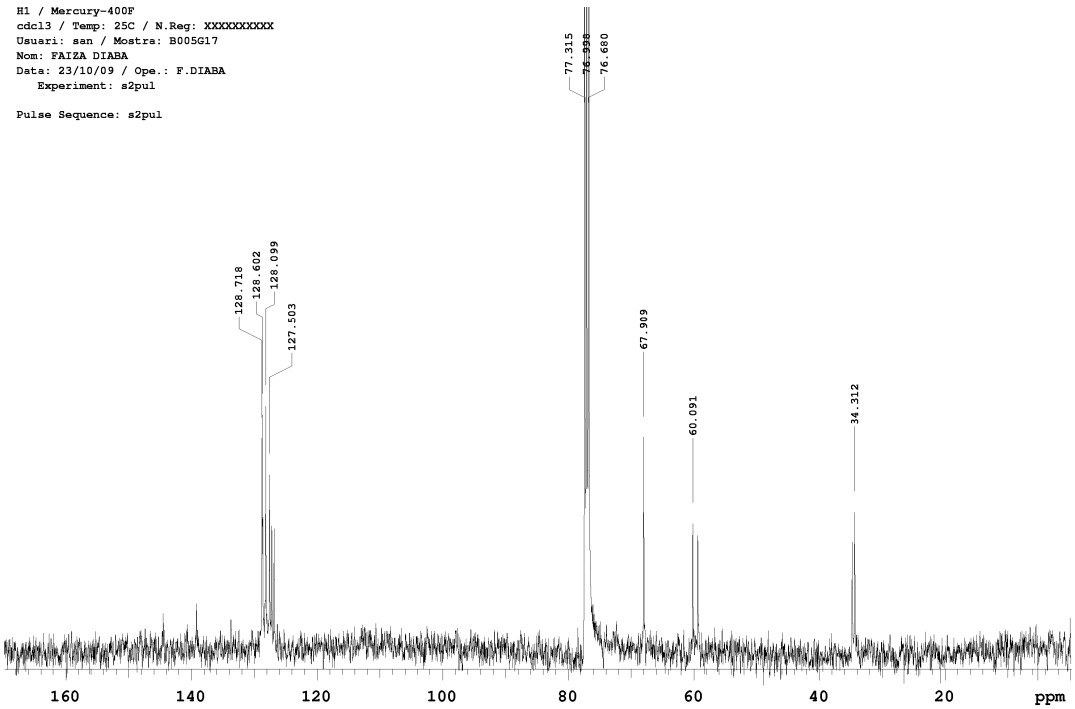

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xTAN348A1
Nom: FAIZA DIABA
Data: 08/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.260
9
8
7
6
5
4
3
2
1
ppm

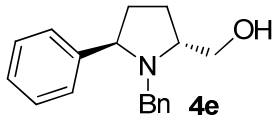

77.314
76.997
76.679
128.245
127.858
62.412
160
140
120
100
80
60
40
20
ppm


OH
N
Bn

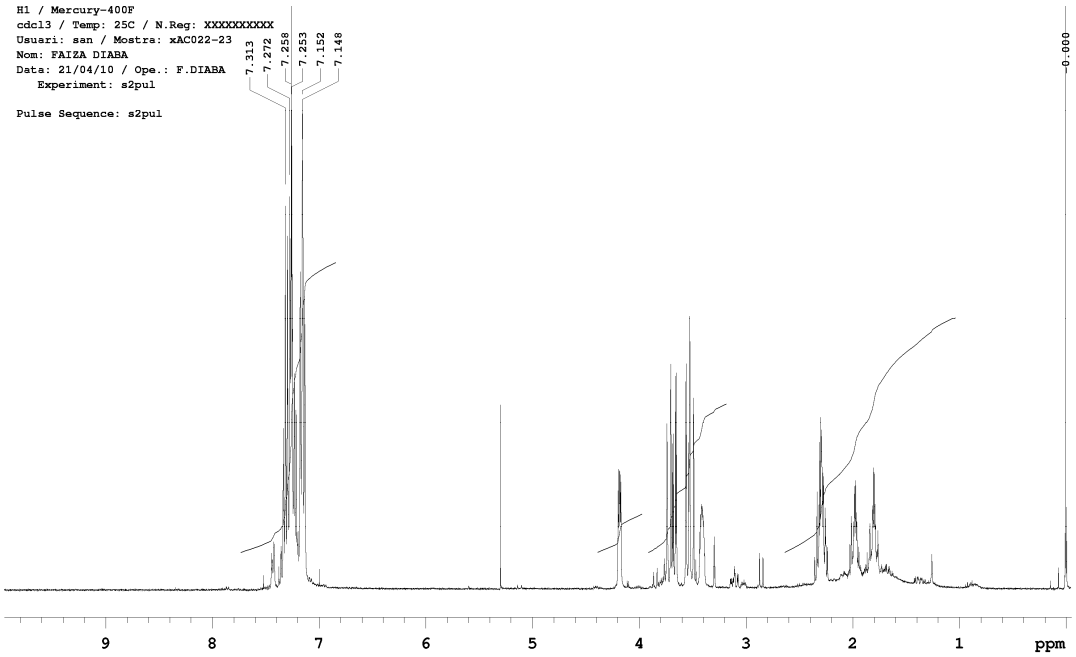
5e

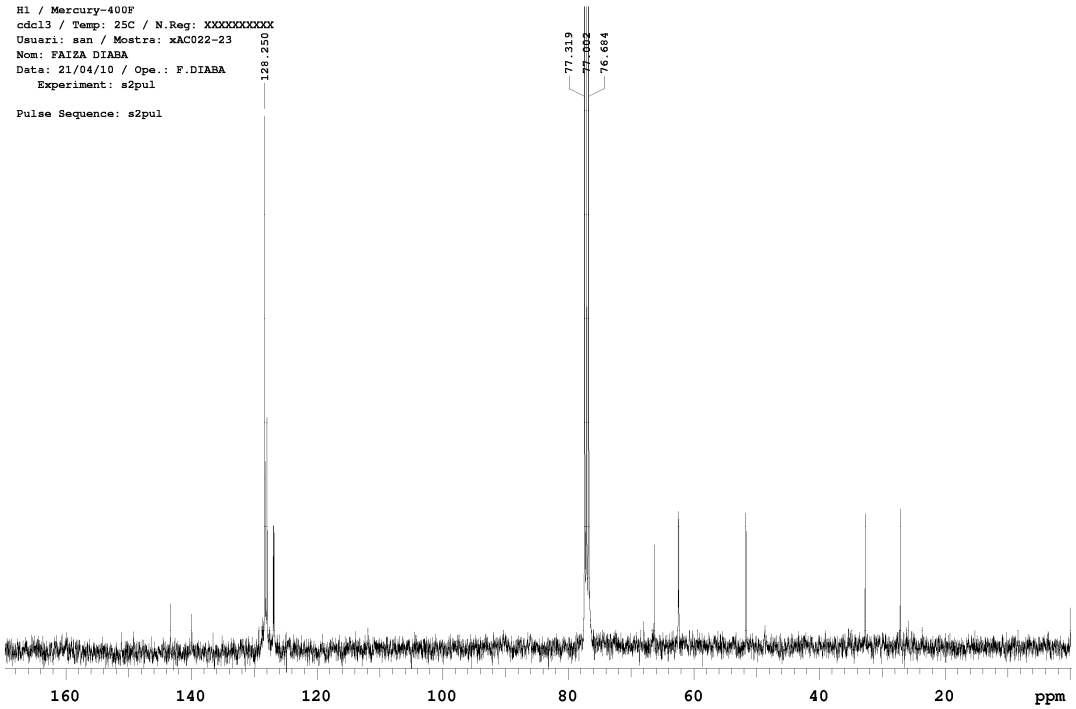

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B005G17
Nom: FAIZA DIABA
Data: 23/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.259
7.254
7.247
0.000
9
8
7
6
5
4
3
2
1
ppm

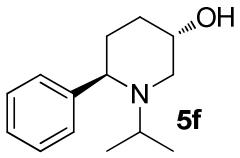

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B005G17
Nom: FAIZA DIABA
Data: 23/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
77.315
76.998
76.680
128.718
128.602
128.099
127.503
67.909
60.091
34.312
160
140
120
100
80
60
40
20
ppm


OH
N
Bn

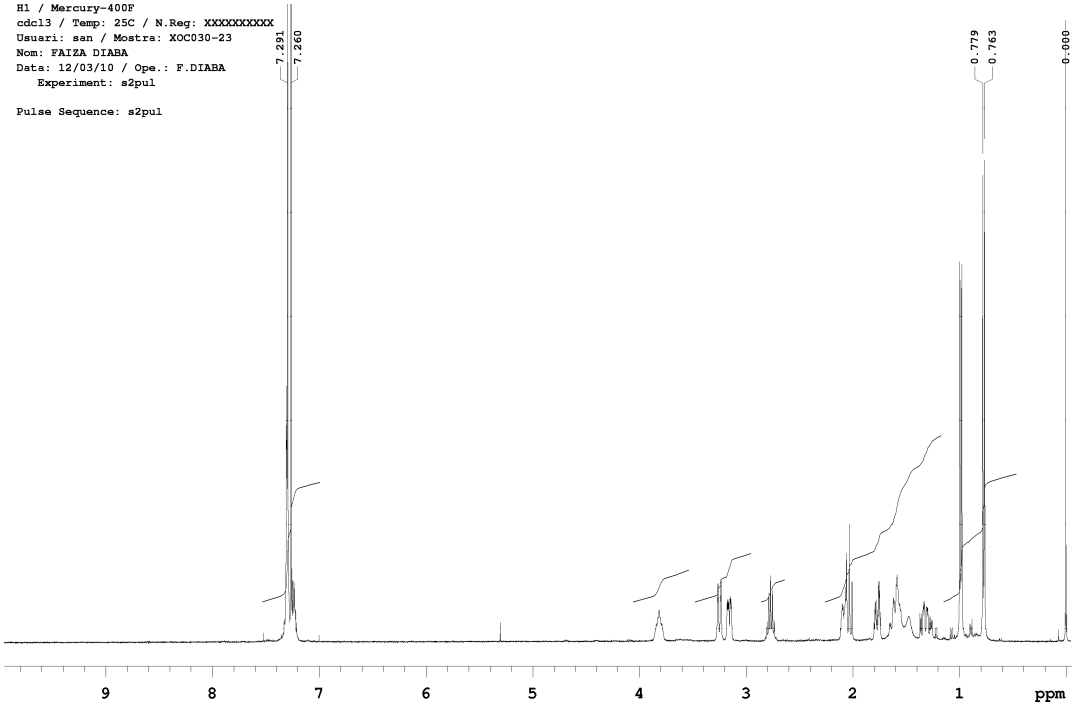
4e

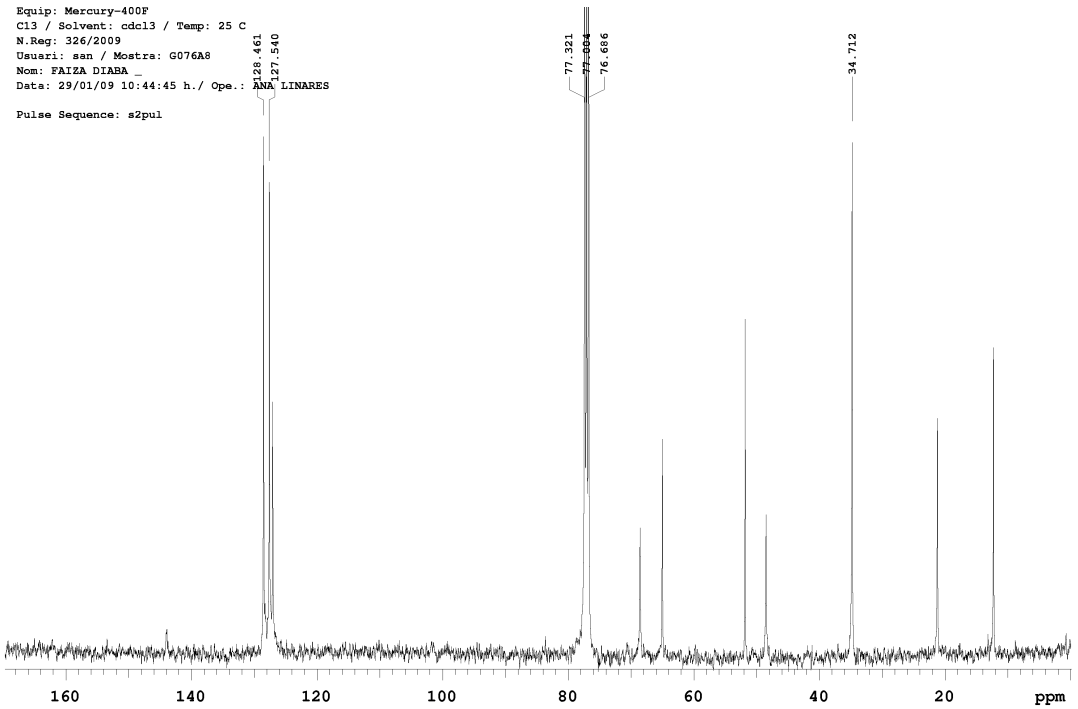

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xAC022-23
Nom: FAIZA DIABA
Data: 21/04/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.313
7.272
7.258
7.253
7.152
7.148
0.000
9
8
7
6
5
4
3
2
1
ppm

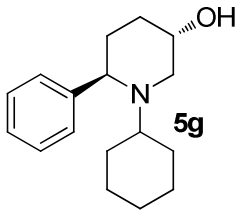

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: xAC022-23
Nom: FAIZA DIABA
Data: 21/04/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.250
77.319
77.002
76.684
160
140
120
100
80
60
40
20
ppm


OH
N

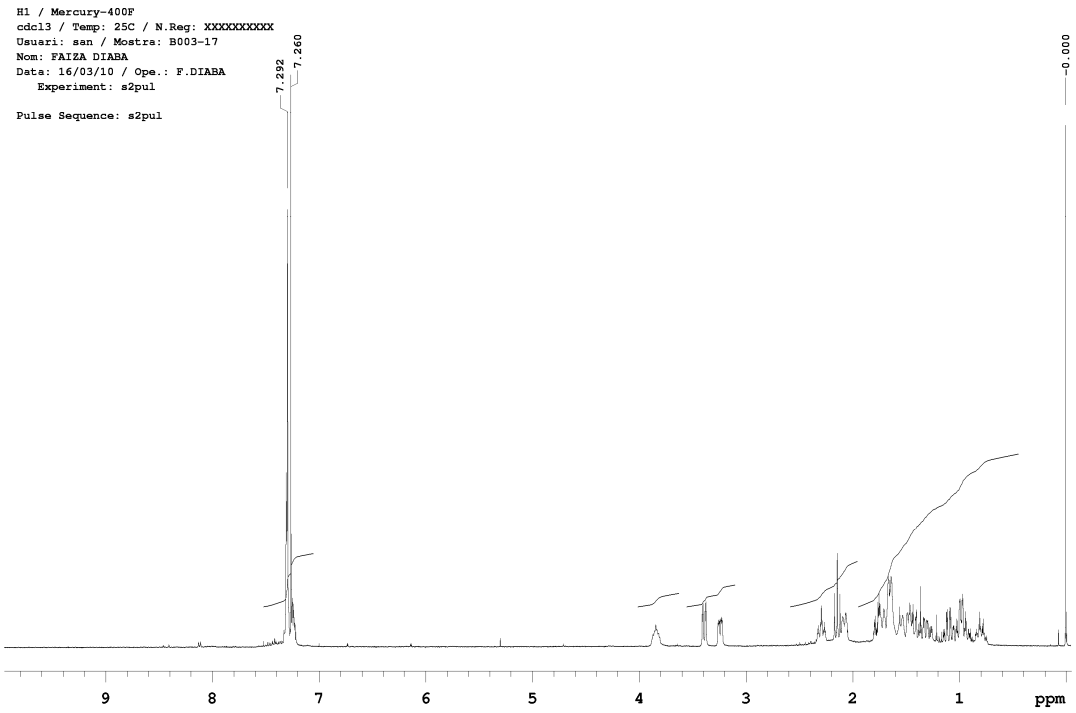
5f

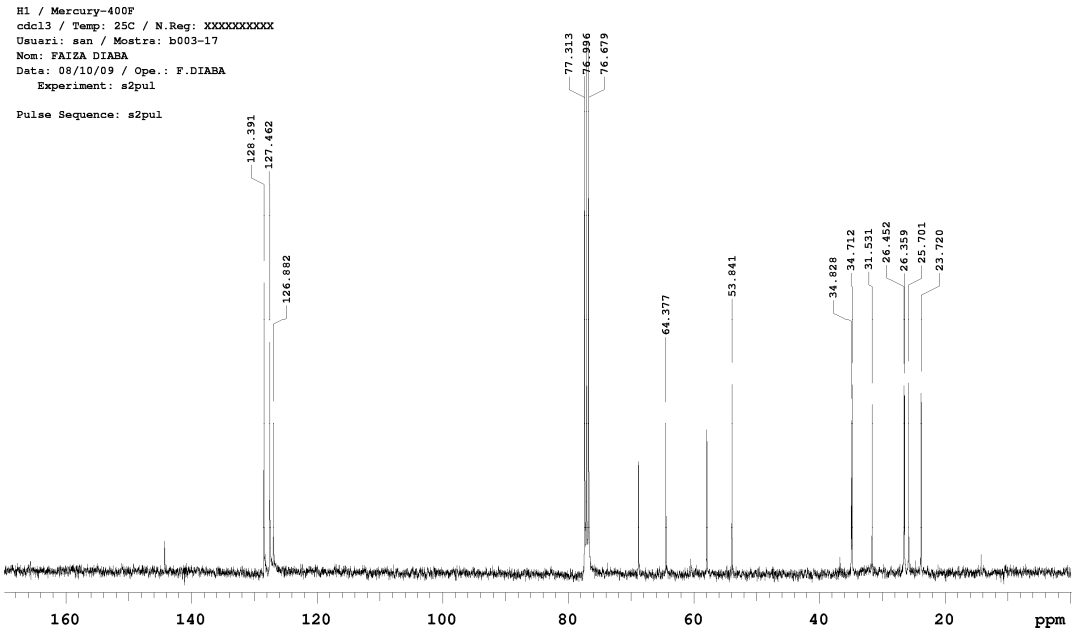

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: XOC030-23
Nom: FAIZA DIABA
Data: 12/03/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.291
7.260
0.779
0.763
0.000
9
8
7
6
5
4
3
2
1
ppm

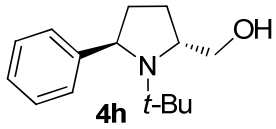

Equip: Mercury-400F
C13 / Solvent: cdcl3 / Temp: 25 C
N.Reg: 326/2009
Usuari: san / Mostra: G076A8
Nom: FAIZA DIABA _
Data: 29/01/09 10:44:45 h./ Ope.: ANA LINARES
Pulse Sequence: s2pul
128.461
127.540
77.321
77.004
76.686
34.712
160
140
120
100
80
60
40
20
ppm


OH
N

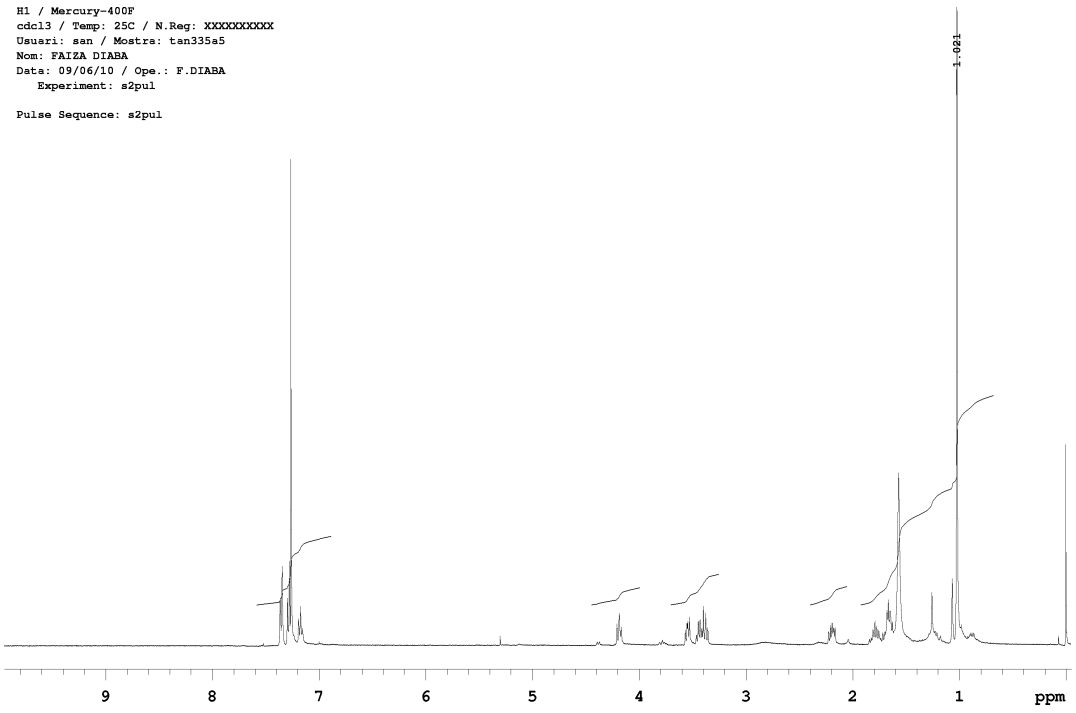
5g

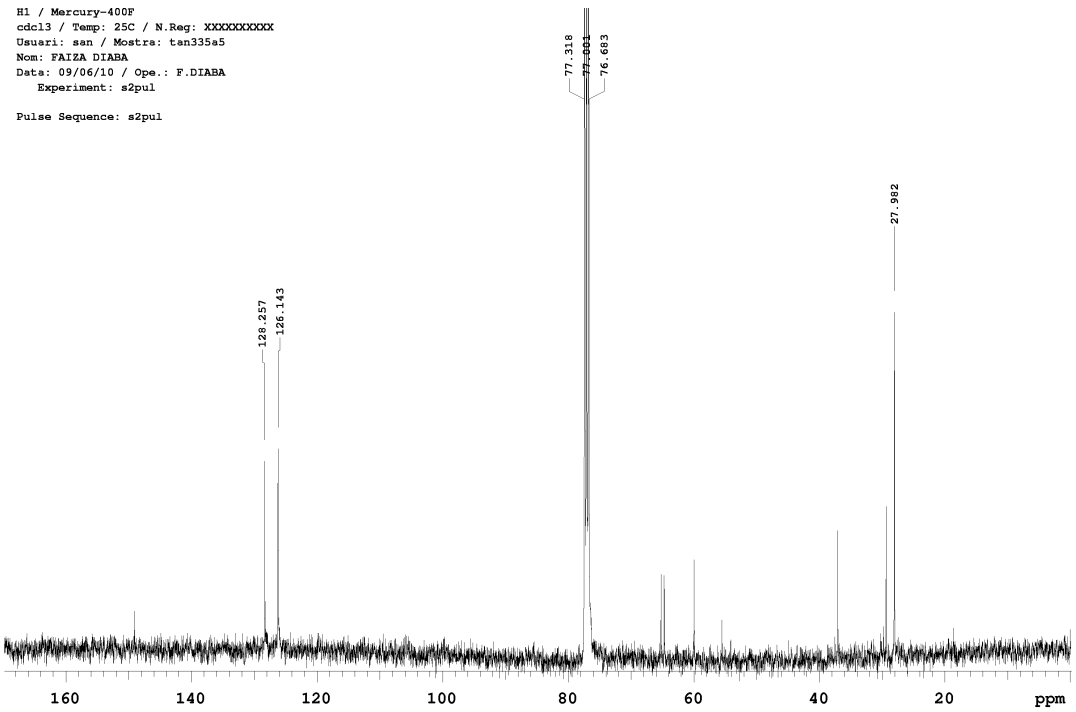

H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: B003-17
Nom: FAIZA DIABA
Data: 16/03/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
7.292
7.260
0.000
9
8
7
6
5
4
3
2
1
ppm


H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: b003-17
Nom: FAIZA DIABA
Data: 08/10/09 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
128.391
127.462
126.882
77.313
76.996
76.679
64.377
53.841
34.828
34.712
31.531
26.452
26.359
25.701
23.720
160
140
120
100
80
60
40
20
ppm


OH
N
t-Bu

4h


H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tan335a5
Nom: FAIZA DIABA
Data: 09/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
1.021
9
8
7
6
5
4
3
2
1
ppm


H1 / Mercury-400F
cdcl3 / Temp: 25C / N.Reg: XXXXXXXXXX
Usuari: san / Mostra: tan335a5
Nom: FAIZA DIABA
Data: 09/06/10 / Ope.: F.DIABA
Experiment: s2pul
Pulse Sequence: s2pul
77.318
77.001
76.683
27.982
128.257
126.143
160
140
120
100
80
60
40
20
ppm