Reference Data

^{13}C NMR of Some Iodinated Methoxyamphetamines

BRIAN A. DAWSON (to whom correspondence should be addressed), D. B. BLACK, W.-W. SY and K. GRAHAM
Pharmaceutical Chemistry Division,
Bureau of Drug Research,
Health Canada,
Ottawa,
Ontario, K1A 0L2
Canada

^{13}C NMR chemical shift assignments for 14 iodinated methoxyamphetamines were measured and interpreted. Chemical shift assignments for these compounds have not been reported previously. Data are based on a number of one- and two-dimensional experiments performed at 9.4 T.

KEY WORDS ^{13}C NMR Iodination Methoxyamphetamines

INTRODUCTION

Because of the appearance of a number of 'designer' amphetamines during the past few years, there has been renewed interst in our laboratories in the identification and spectroscopic characterization of these compounds and their precursors.[1] The iodomethoxyamphetamines are simple derivatives easily prepared from the corresponding methoxyamphetamines, as described previously.[2] As part of our studies in this area, a number of iodomethoxyamphetamines have been examined and we report here the ^{13}C NMR chemical shift data for 14 of these compounds, the complete series of the major products from iodination of amphetamines with one, two and three arylmethoxy groups, with the exception of the 2,4,5-trimethoxy analogue, for which the iodination procedure failed to yield the desired product.

RESULTS AND DISCUSSION

The structures and numbering scheme for the iodomethoxyamphetamines studied are presented in Scheme 1 and the determined ^{13}C NMR chemical shift assignments for the hydrochloride salts and free base forms (in parentheses) are presented in Table 1. The experiments used to arrive at the shift assignments were the same for all of the compounds studied, viz. high-resolution ^{1}H and ^{13}C spectra, followed by DEPT[3] and ^{13}C–^{1}H HETCOR (short- and long-range) experiments.[3]

The 400 MHz proton spectra for most of the iodomethoxyamphetamines studied were at least partially assignable by simple inspection. The ^{13}C assignments were then made using short- and long-range heteronuclear correlation experiments. The iodination procedure established previously[2] did not work for the parent compound (amphetamine), so that the chemical shifts of iodoamphetamine are not available for comparison.

EXPERIMENTAL

The iodinated methoxyamphetamines were synthesized as reported previously.[2] All compounds were pure (>98%) by gas and thin-layer chromatograph and ^{1}H NMR spectroscopy.

Spectra

Spectra were recorded for *ca.* 20 mg of the hydrochloride salts of the iodomethoxyamphetamines in 0.5 ml of D_2O and for the free bases in 0.5 ml of $CDCl_3$ at 300 K on a Bruker AM400 spectrometer equipped with an Aspect 3000 computer and process controller, using DISRVK01 version standard microprograms from the Bruker Software Library.

The ^{1}H spectra (400.13 MHz) were acquired with a sweep width of 5618 Hz, with 32K data points, giving a final resolution of 0.343 Hz per point. Sixteen scans were accumulated, using a pulse width of approximately 30°, with an acquisition time of 2.9 s and a relaxation delay of 3.0 s. The ^{13}C spectra (100.61 MHz) were acquired with a sweep width of 25000 Hz, with 64K data points, giving a resolution of 0.763 Hz per point. Thirty-two scans were accumulated, using a pulse width of approximately 16°, with an acquisition time of 1.3 s and a relaxation delay of 5.0 s.

The ^{1}H–^{13}C HETCOR spectra were obtained using composite pulse decoupling with polarization transfer from proton to carbon-13. The FIDs for most 2D experiments were acquired with sufficient data points and numbers of evolution times to resolve all the proton and carbon chemical shifts. The raw data were zero-filled in F_1 prior to Fourier transformation and the sine-bell window function was applied in both F_1 and F_2. For long-range proton–carbon coupling correlations, the delays were chosen to emphasize values of *ca.* 7.5 Hz.

References

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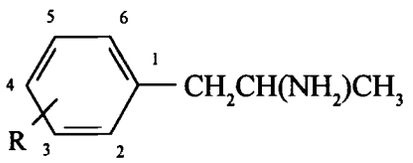
Received 24 May 1944; accepted 4 June 1994



Compound Number	Substituent* C2	C3	C4	C5	C6
1	M	H	H	I	H
2	I	H	H	M	H
3	H	I	M	H	H
4	M	M	H	H	I
5	M	H	M	I	H
6	M	H	I	M	H
7	M	I	H	H	M
8	I	H	M	M	H
9	I	M	H	M	H
10	M	M	M	I	H
11	I	M	H	M	M
12	M	I	H	M	M
13	M	I	M	H	M
14	I	M	M	M	H

* M = methoxy , I = iodine , H = hydrogen

Scheme 1

Table 1. ^{13}C chemical shifts for the iodinated methoxyamphetamines from Scheme 1[a]

Compound	C-1	C-2	C-3	C-4	C-5	C-6	C-α	C-β	C-γ	Methoxy[b]
1	129.28	160.00	116.16	140.26	84.91	142.16	36.40	50.50	20.05	57.98 [2]
	(131.00)	(157.62)	(112.66)	(136.16)	(82.64)	(139.32)	(40.64)	(46.69)	(23.50)	(55.34 [2])
2	142.64	91.68	143.35	117.93	162.19	119.66	47.14	50.49	19.99	58.22 [5]
	(143.40)	(89.62)	(140.01)	(114.02)	(159.83)	(116.62)	(50.76)	(46.97)	(23.28)	(55.32 [5])
3	133.28	142.58	88.02	159.54	114.64	133.58	41.30	51.67	19.96	59.11 [4]
	(130.20)	(139.96)	(85.96)	(156.62)	(110.80)	(133.93)	(45.01)	(48.19)	(23.31)	(56.36 [4])
4	135.42	155.58	149.72	117.02	138.31	92.19	41.52	50.72	20.26	63.52 [2], 58.62 [3]
	(134.50)	(153.13)	(147.70)	(112.55)	(136.43)	(90.41)	(44.81)	(47.32)	(23.70)	(60.50 [2], 55.75 [3])
5	121.52	160.89	99.60	161.86	75.93	143.16	36.64	50.87	20.17	59.30 [2], 58.33 [4]
	(122.80)	(157.69)	(95.90)	(159.10)	(73.88)	(140.28)	(39.98)	(46.90)	(23.43)	(56.52 [2], 55.50 [4])
6	128.27	154.99[c]	124.88	86.36	154.66[c]	117.73	37.69	50.67	20.24	58.78 [2],[d] 59.80 [5][d]
	(129.53)	(152.53[c])	(121.60)	(82.52)	(152.32[c])	(114.22)	(41.13)	(46.70)	(23.53)	(56.06 [2],[d] 57.07 [5][d]
7	121.74	161.65	82.48	141.14	112.69	160.46	31.72	50.69	20.15	63.83 [2], 58.41 [6]
	(123.46)	(159.33)	(80.86)	(136.93)	(108.91)	(158.83)	(35.40)	(47.03)	(23.80)	(60.98 [2], 56.74 [6])
8	134.30	91.15	124.89	150.49	151.31	116.32	46.69	50.80	19.97	58.67 [4], 58.43 [5]
	(134.84)	(88.69)	(121.89)	(148.08)	(149.20)	(113.29)	(50.14)	(47.27)	(23.25)	(56.15 [4], 55.96 [5])
9	143.28	83.91	162.99	100.27	161.37	111.40	47.25	50.13	19.83	59.04 [3], 58.10]5]
	(144.49)	(82.38)	(160.72)	(96.88)	(158.99)	(107.90)	(51.20)	(47.05)	(23.45)	(56.42 [3], 55.46 [5])
10	130.77	154.94[c]	148.77	155.04[c]	87.89	137.42	36.85	50.88	20.03	63.95 [2],[d] 63.91 [3],[d] 63.87 [4][d]
	(131.09)	(152.28[c])	(146.61)	(152.91[c])	(84.79)	(133.89)	(40.24)	(47.48)	(23.59)	(60.87 [2],[d] 60.87 [3],[d] 60.79 [4][d])
11	135.99	83.68	157.93[a]	100.34	156.12[c]	143.82	44.51	50.71	20.25	59.84 [3],[d] 58.76 [5],[d] 63.61 [6]
	(137.30)	(82.37)	(154.83[a])	(95.59)	(153.35[c])	(141.72)	(44.57)	(47.31)	(23.63)	(56.92 [3],[d] 55.93 [5],[d] 60.63 [6])
12	126.93	154.41[c]	87.12	124.73	152.73	150.51[c]	32.61	51.02	20.22	64.11 [2],[d] 58.97 [5], 63.59 [6][d]
	(128.22)	(152.79[c])	(83.94)	(120.28)	(150.17)	(148.67[c])	(36.21)	(47.65)	(24.00)	(61.15 [2],[d] 56.17 [5], 60.62 [6][d])
13	114.19	161.52	74.83	161.49	96.31	162.82	31.64	51.05	20.28	64.03 [2], 59.42 [4], 58.67 [6]
	(115.69)	(160.01)	(73.39)	(158.31)	(92.43)	(160.25)	(35.26)	(47.41)	(23.95)	(61.18 [2], 56.79 [4], 55.96 [6])
14[e]	134.94	88.61	152.58	140.56	153.24	111.03	44.11	46.89	17.87	60.37 [3], 60.44 [4], 56.10 [5]
	(138.15)	(88.81)	(153.16)	(140.60)	(153.34)	(109.91)	(46.91)	(50.73)	(23.28)	(60.65 [3], 60.89 [4], 56.13 [5])

[a] HCl salts run in D_2O, using external DSS at 0.00 ppm as reference; free bases (in parentheses) run in $CDCl_3$, using its central line at 77.00 ppm for reference.
[b] Nunmbers in square brackets refer to positions of the methoxy substituent.
[c,d] Values may be interchanged.
[e] HCl salt not soluble in D_2O; spectra acquired in DMSO-d_6.