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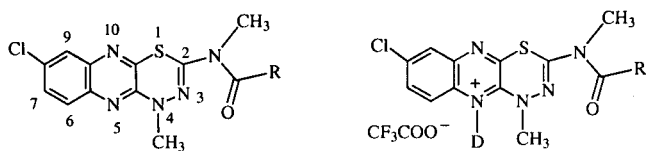
The reaction of 2-acylamino-8-chloro-4-methyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalines **2a-d** with methyl iodide/base gave the 8-chloro-4,10-dimethyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalin-10-ium-2-acylamidates **4a-d**, respectively. Comparison of the nmr spectral data between compounds **2a-d** and **4a-d** in deuteriodimethyl sulfoxide or in deuteriotrifluoroacetic acid established that compounds **2a-d** existed as the zwitterionic tautomers **2'a-d** in solution.

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Introduction.

In previous papers, we reported the synthesis of the 2-(*N*-methyl)acylamino-4*H*-1,3,4-thiadiazino[5,6-*b*]quinoxalines **1a,b** (Chart 1) and their related compounds [1], and the nmr study of compounds **1a,b** in deuteriodimethyl sulfoxide or deuteriotrifluoroacetic acid supported the formation of the N₅-deuterized species **1a,b-D⁺** (Chart 1) in deuteriotrifluoroacetic acid [2]. Thereafter, we

Chart 1



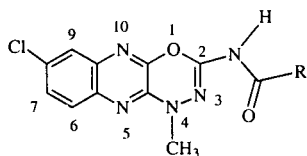
1a,b R: **a** - CH₃, **b** - CF₃

1a,b-D⁺ in deuteriotrifluoroacetic acid

data of the aromatic protons between compounds **1a,b** and **2a-d**. Namely, the C₇-H and C₉-H protons of compounds **1a,b** and **2a-d** were observed in similar magnetic fields both in deuteriodimethyl sulfoxide and in deuteriotrifluoroacetic acid, but the C₆-H proton signals of compounds **2a-d** in deuteriodimethyl sulfoxide (δ 9.53-9.41 ppm) were observed at much lower magnetic fields than those of compounds **1a,b** in deuteriodimethyl sulfoxide (δ 7.61-7.57 ppm) (Table 1). The C₆-H proton signals of compounds **2a-d** in deuteriotrifluoroacetic acid (δ 8.43-7.97 ppm) or the N₄-methyl proton signals of compounds **2a-d** in deuteriodimethyl sulfoxide (δ 4.30-4.20 ppm) and in deuteriotrifluoroacetic acid (δ 4.77-4.50 ppm) were also observed at lower magnetic fields than those of compounds **1a,b** [C₆-H in deuteriotrifluoroacetic acid (δ 7.32-7.29 ppm); N₄-methyl in deuteriodimethyl sulfoxide (δ 3.37-3.36 ppm); N₄-methyl in deuteriotrifluoroacetic acid

further reported the synthesis of the 2-acylamino-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalines **2a-d** (Chart 2) and their related compounds **3a-c** (Chart 3) [3]. In the course of the nmr study for compounds **2a-d**, we have found that there are remarkable differences in the ¹H-nmr spectral

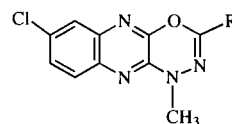
Chart 2



2a-d

R: **a** - OC₂H₅, **b** - OC₄H₉(*n*), **c** - CF₃, **d** - CH₃

Chart 3



3a R = COOC₂H₅
3b R = CONHNH₂
3c R = NH₂

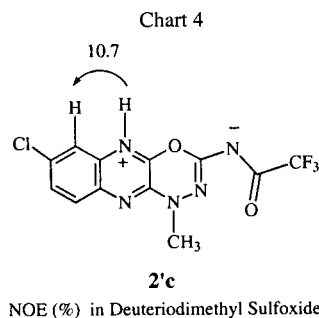
Chemical Shift (δ ppm) in Deuteriodimethyl Sulfoxide

Compound	C ₆ -H	C ₇ -H	C ₉ -H
3a	7.46	7.41	7.48
3b	7.44	7.39	7.47
3c	7.32	7.39	7.32

Table 1
Selected Proton Chemical Shifts for Compounds **1a,b** and **2a-d** in Deuteriodimethyl Sulfoxide and in Deuteriotrifluoroacetic Acid

Compound	Solvent	Chemical Shift (δ ppm)			
		C ₆ -H	C ₇ -H	C ₉ -H	N ₄ -CH ₃
1a	deuteriodimethyl sulfoxide	7.57	7.52	7.69	3.36
	deuteriotrifluoroacetic acid	7.29	7.34	7.50	3.53
1b	deuteriodimethyl sulfoxide	7.61	7.57	7.72	3.37
	deuteriotrifluoroacetic acid	7.32	7.37	7.52	3.53
2a	deuteriodimethyl sulfoxide	9.53	7.42	7.30	4.20
	deuteriotrifluoroacetic acid	8.42	7.68	7.76	4.77
2b	deuteriodimethyl sulfoxide	9.52	7.42	7.30	4.20
	deuteriotrifluoroacetic acid	8.43	7.69	7.77	4.77
2c	deuteriodimethyl sulfoxide	9.41	7.51	7.38	4.30
	deuteriotrifluoroacetic acid	7.97	7.47	7.50	4.59
2d	deuteriodimethyl sulfoxide	9.51	7.34	7.30	4.24
	deuteriotrifluoroacetic acid	8.02	7.39	7.47	4.50

(δ 3.53 ppm)]. Such an extraordinary down field shift for the C₆-H proton signals of compounds **2a-d** in deuteriodimethyl sulfoxide (δ 9.53-9.41 ppm) was not observed for the C₂-ester, C₂-hydrazinocarbonyl, and C₂-amino derivatives **3a-c** [C₆-H in deuteriodimethyl sulfoxide (δ 7.46-7.32 ppm)] (Chart 3). These results tempted us to study the structure of compounds **2a-d** in solution. Accordingly, we initially tried to measure the NOE spectra of compounds **2a-d** in deuteriodimethyl sulfoxide by irradiation at the NH proton signal. Among compounds **2a-d**, the NOE spectrum was successfully obtained in compound **2c**, showing the NOE between the N₁₀-H and C₉-H protons (Chart 4). Thus, compound **2c** was found to occur as the zwitterionic tautomer **2'c** in dimethyl sulfoxide (Chart 4). Moreover, the methylation of compounds **2a-d** gave the zwitterionic compounds **4a-d** (Scheme 1), and the ¹³C-nmr spectral data of compounds **2a-d** and **4a-d** in



deuteriodimethyl sulfoxide (Table 2) or in deuteriotrifluoroacetic acid (Table 3) further ascertained that compounds **2a-d** existed as the zwitterionic tautomers **2'a-d** in deuteriodimethyl sulfoxide (Chart 8). The methylation of compounds **2a-d** to the N₁₀-methyl derivatives **4a-d** is described below together with the structural elucidation of

Table 2
Selected Carbon Chemical Shifts for Compounds **2a-d** and **4a-d** in Deuteriodimethyl Sulfoxide

Carbon	Chemical Shift (δ ppm)							
	N ₁₀ -H Series			N ₁₀ -Methyl Series				
	2a	2b	2c	2d	4a	4b	4c	4d
C ₂	155.0	155.0	152.8	154.4	154.8	154.8	152.7	153.5
C _{4a}	131.3	131.4	133.1	131.3	130.3	130.4	133.1	130.5
C _{5a}	120.7	120.7	120.0	121.5	120.8	120.9	120.1	120.9
C ₆	120.3	120.3	120.3	120.0	120.1	120.1	120.3	120.3
C ₇	122.7	122.8	123.7	126.7	123.5	123.5	124.5	123.5
C ₈	131.7	131.6	132.5	134.2	132.0	132.0	132.3	132.0
C ₉	115.6	115.8	115.8	117.7	115.6	115.6	116.3	115.6
C _{9a}	131.2	131.3	130.8	131.6	131.6	131.6	131.9	132.0
C _{10a}	149.8	149.8	149.1	149.3	149.1	149.2	149.1	149.2
C=O	159.3	159.5	159.7	175.3	159.2	159.3	159.7	175.6
N ₁₀ -CH ₃	-----	-----	-----	-----	29.4	29.4	29.6	29.4
N ₄ -CH ₃	38.3	38.3	38.7	38.2	38.6	38.6	39.0	38.6

Table 3
Selected Carbon Chemical Shifts for Compounds **2a-d** and **4a-d** in Deuteriotrifluoroacetic Acid

Carbon	N ₁₀ -H Series			Chemical Shift (δ ppm)				
	2a	2b	2c	2d	N ₁₀ -CH ₃ Series 4a	4b	4c	4d
C ₂	142.8	142.9	140.5	142.3	142.2	142.1	140.1	141.6
C _{4a}	136.5	136.6	137.1	136.8	136.0	135.8	136.6	136.1
C _{5a}	117.5	117.5	117.0	117.4	117.6	117.5	117.3	117.2
C ₆	118.2	118.3	117.6	118.1	118.6	118.4	118.1	118.3
C ₇	127.3	127.3	127.3	127.3	126.6	126.4	126.7	126.5
C ₈	139.3	139.1	139.5	139.2	139.4	139.3	139.8	139.3
C ₉	118.3	118.4	118.3	118.2	117.5	117.3	117.5	117.2
C _{9a}	129.1	129.2	129.0	129.0	131.8	131.7	131.9	131.6
C _{10a}	148.7	148.8	148.4	148.7	148.1	148.0	147.9	147.9
C = O	155.0	155.2	158.4	176.2	155.1	155.1	158.1	176.2
N ₁₀ -CH ₃	-----	-----	-----	-----	29.9	29.7	29.9	29.7
N ₄ -CH ₃	40.4	40.5	40.5	40.4	40.5	40.4	40.8	40.4

the zwitterionic tautomers **2'a-d** and compounds **4a-d** by nmr spectroscopy.

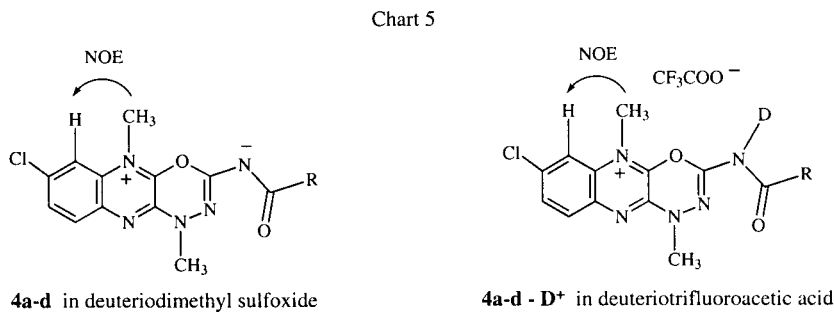
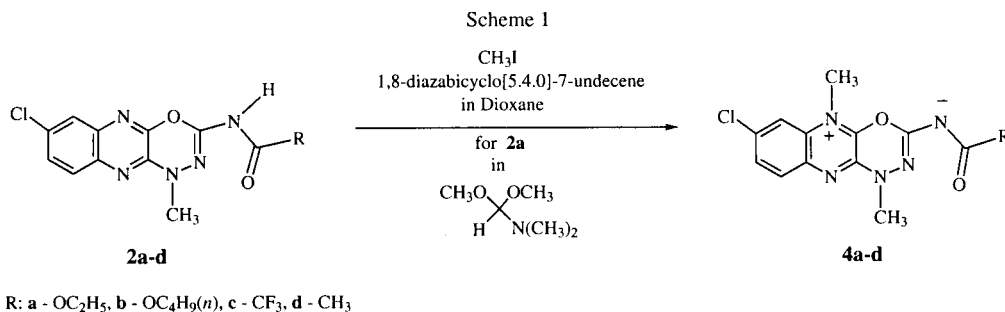
Synthesis of the N₁₀-Methyl Derivatives **4a-d**.

The reaction of compounds **2a-d** with methyl iodide/base gave the N₁₀-methyl derivatives **4a-d**, respectively (Scheme 1). The N₁₀-methyl structure of compounds **4a-d** was supported by the NOE between the C₉-H and N₁₀-methyl protons (Chart 5). The reaction of compound **2a** with *N,N*-dimethylformamide dimethyl

acetal also produced the N₁₀-methyl derivative **4a**, while the reaction of the *N*-(pyrazino[2,3-*e*][1,3,4]thiadiazin-2-yl) carbamate **5** with *N,N*-dimethylformamide dimethyl acetal resulted in the side-chain *N*-methylation to afford the *N*-(pyrazino[2,3-*e*][1,3,4]thiadiazin-2-yl)-*N*-methyl carbamate **6** (Chart 6) [4].

NMR Spectroscopy.

From the above NOE spectral data for compound **2c** (Chart 4) and compounds **4a-d** (Chart 5), compounds **2c**



4a-d	NOE (%)	
	deuteriodimethyl sulfoxide	deuteriotrifluoroacetic acid
a : R = OC ₂ H ₅	11.0	11.4
b : R = OC ₄ H _{9-n}	17.1	10.7
c : R = CF ₃	20.0	10.8
d : R = CH ₃	20.0	10.4

Chart 6

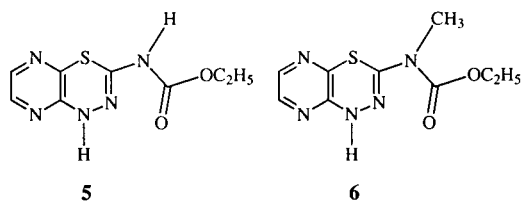
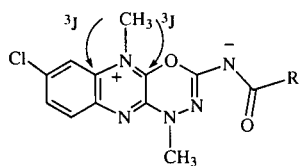


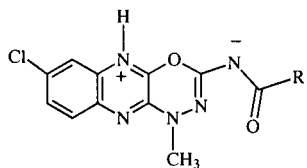
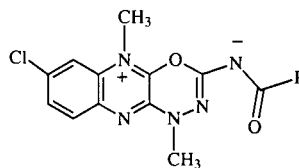
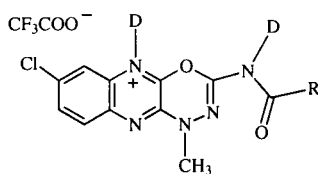
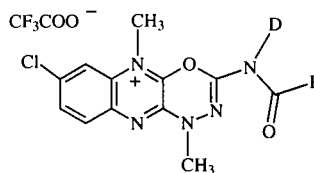
Chart 7

**4a-d** in deuteriodimethyl sulfoxide

and **4a-d** were supported to exist as the zwitterionic form. The HMQC and HMBC spectral data for compounds **4a-d** further secured the zwitterionic structure, showing the 3J coupling between the N_{10} -methyl protons and C_{9a} carbon and between the N_{10} -methyl protons and C_{10a} carbon (Chart 7). The assignment of the annular carbons together with the $C=O$, N_{10} -methyl, and N_4 -methyl carbons for compounds **2a-d** and **4a-d** in deuteriodimethyl sulfoxide (Table 2) or in deuteriotrifluoroacetic

acid (Table 3) indicated that the chemical shifts for the individual carbons of compounds **2a-d** and **4a-d** had similar values in the respective solvents. Especially, the chemical shifts for the C_{9a} and C_{10a} carbons of the zwitterionic tautomers **2'a-d** and compounds **4a-d** in deuteriodimethyl sulfoxide were similar to those in deuteriotrifluoroacetic acid (Chart 8), indicating the formation of a coordinate bond at the N_{10} atom in the zwitterionic tautomers **2'a-d** and compounds **4a-d**. However, the chemical shifts for the C_2 -carbons of the zwitterionic tautomers **2'a-d** and compounds **4a-d** in deuteriodimethyl sulfoxide were observed at a lower magnetic field by 12 ppm in comparison with those in deuteriotrifluoroacetic acid, presumably due to the difference between the C_2 -amidate anion structure in deuteriodimethyl sulfoxide and the C_2 -(N -deuterio)acylamino structure in deuteriotrifluoroacetic acid. This structural difference due to the solvent change might influence the C_8 -carbon chemical shifts. Namely, the chemical shifts for the C_8 carbon of the zwitterionic tautomers **2'a-d** and compounds **4a-d** in deuteriodimethyl sulfoxide were observed in a higher magnetic field by 7.6-5 ppm than those in deuteriotrifluoroacetic acid. The difference in the values for other carbons was less than 5 ppm when comparing the chemical shifts in deuteriodimethyl sulfoxide with those in deuteriotrifluoroacetic acid.

Chart 8

**2'a-d** in deuteriodimethyl sulfoxide**4a-d** in deuteriodimethyl sulfoxide**2'a-d - D⁺** in deuteriotrifluoroacetic acid**4a-d - D⁺** in deuteriotrifluoroacetic acid

R : a - OC_2H_5 , b - $OC_4H_9(n)$, c - CF_3 , d - CH_3

Carbon	Chemical Shift (δ ppm)			Chemical Shift (δ ppm)		
	in deuteriodimethyl sulfoxide	in deuteriotrifluoroacetic acid	Difference in δ ppm	in deuteriodimethyl sulfoxide	in deuteriotrifluoroacetic acid	Difference in δ ppm
C_{9a}	131.6-130.8	129.2-129.0	less than 2.6	132.0-131.6	131.9-131.6	less than 2.6
C_{10a}	149.8-149.1	148.8-148.4	less than 1.3	149.2-149.1	148.1-147.9	less than 1.3
C_2	155.0-152.8	142.9-140.5	ca. 12	154.8-152.7	142.2-140.1	ca. 12
C_8	134.2-131.6	139.5-139.1	7.6-5	132.3-132.0	139.8-139.3	7.6-5

Conclusion.

The 2-acylamino-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalines **2a-d** were shown to occur as the zwitterionic tautomers **2'a-d** in a dimethyl sulfoxide solution. The chemical shifts due to the C₆-H protons of the zwitterionic tautomers **2'a-d** in deuteriodimethyl sulfoxide were observed at a much lower magnetic field than those in deuteriotrifluoroacetic acid, presumably due to the difference between the C₂-amidate anion structure in deuteriodimethyl sulfoxide and the C₂-(*N*-deuterio)acylamino structure in deuteriotrifluoroacetic acid. This tendency was also observed in compounds **4a-d** (Table 4).

in the δ scale. The mass spectra (ms) were determined with a JEOL JMS-01S spectrometer. Elemental analyses were performed on a Perkin-Elmer 240B instrument.

8-Chloro-4,10-dimethyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalin-10-ium-2-ethoxycarbonylamidate **4a**.

Method 1.

A solution of compound **2a** (2 g, 6.22 mmoles), 1,8-diazabicyclo[5.4.0]-7-undecene (1.13 g, 7.46 mmoles), methyl iodide (971 mg, 6.84 mmoles) in dioxane (50 ml) was refluxed in an oil bath for 1 hour. The solution was allowed to stand overnight to precipitate colorless needles, which were removed by filtration. The filtrate was evaporated *in vacuo* to give colorless crystals **4a**, which were recrystallized from ethanol/water to give colorless needles

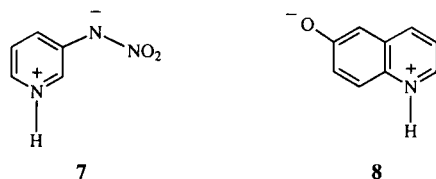
Table 4

Selected Proton Chemical Shifts for Compounds **4a-d** in Deuteriodimethyl Sulfoxide and in Deuteriotrifluoroacetic Acid

Compound	Solvent	Chemical Shift (d ppm)			
		C ₆ -H	C ₇ -H	C ₉ -H	N ₄ -CH ₃
4a	deuteriodimethyl sulfoxide	9.69	7.58	7.68	4.23
	deuteriotrifluoroacetic acid	8.22	7.42	7.55	4.49
4b	deuteriodimethyl sulfoxide	9.70	7.54	7.69	4.23
	deuteriotrifluoroacetic acid	8.22	7.41	7.57	4.49
4c	deuteriodimethyl sulfoxide	9.57	7.61	7.79	4.33
	deuteriotrifluoroacetic acid	8.01	7.42	7.58	4.53
4d	deuteriodimethyl sulfoxide	9.81	7.57	7.69	4.23
	deuteriotrifluoroacetic acid	8.08	7.41	7.56	4.51

Thus, we have provided direct data supporting that compounds **2a-d** exist as the zwitterionic tautomers **2'a-d** in solution. Similar examples of the zwitterionic heterocycles have been reported by some researchers, as follows. The zwitterionic tautomer of 3-nitraminopyridine **7** in the solid state was confirmed by ir spectroscopy [5] (Chart 9), and the zwitterionic tautomer of 6-hydroxyquinoline **8** in solution was indicated by the study on the D-H exchange rate at the 5-position of compound **8** [6] (Chart 9).

Chart 9



EXPERIMENTAL

All melting points were determined on a Yazawa micro melting point BY-2 apparatus and are uncorrected. The ir spectra (potassium bromide) were recorded with a JASCO IRA-1 spectrophotometer. The nmr spectra were measured with a Varian XL-400 spectrometer at 400 MHz. The chemical shifts are given

(950 mg, 45%), mp 253-254°; ir: ν cm⁻¹ 1695, 1665, 1550; ms: *m/z* 335 (M⁺), 337 (M⁺ + 2); pmr (deuteriodimethyl sulfoxide): 9.69 (d, *J* = 9.0 Hz, 1H, C₆-H), 7.68 (d, *J* = 2.0 Hz, 1H, C₉-H), 7.58 (dd, *J* = 2.0, 9.0 Hz, 1H, C₇-H), 4.23 (s, 3H, N₄-CH₃), 3.96 (q, *J* = 7.0 Hz, 2H, CH₂), 3.59 (s, 3H, N₁₀-CH₃), 1.17 (t, *J* = 7.0 Hz, 3H, CH₃); pmr (deuteriotrifluoroacetic acid): 8.22 (d, *J* = 9.0 Hz, 1H, C₆-H), 7.55 (d, *J* = 2.0 Hz, 1H, C₉-H), 7.42 (dd, *J* = 2.0, 9.0 Hz, 1H, C₇-H), 4.49 (s, 3H, N₄-CH₃), 4.28 (q, *J* = 7.0 Hz, 2H, CH₂), 3.69 (s, 3H, N₁₀-CH₃), 1.21 (t, *J* = 7.0 Hz, 3H, CH₃).

Anal. Calcd. for C₁₄H₁₄ClN₅O₃: C, 50.08; H, 4.20; Cl, 10.56; N, 20.86. Found: C, 49.85; H, 4.27; Cl, 10.69; N, 20.71.

Method 2.

A suspension of compound **2a** (1 g) in *N,N*-dimethylformamide dimethyl acetal (10 ml) was refluxed in an oil bath for 5 hours to precipitate crystals **4a**, which were collected by suction filtration and washed with *n*-hexane to give an analytically pure sample (0.70 g, 67%).

8-Chloro-4,10-dimethyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalin-10-ium-2-(*n*-butoxycarbonyl)amidate **4b**.

A solution of methyl iodide (670 mg, 4.72 mmoles) in dioxane (10 ml) was added to a refluxing solution of compound **2b** (1.5 g, 4.29 mmoles), 1,8-diazabicyclo[5.4.0]-7-undecene (783 mg, 5.15 mmoles) in dioxane (20 ml), and the solution was refluxed for 1 hour. The solvent was evaporated *in vacuo* to give an oily product, which was crystallized from ethanol/water to provide colorless needles **4b** (450 mg, 29%), mp 220-221°; ir: ν cm⁻¹ 1690, 1660; ms: *m/z* 363 (M⁺), 365 (M⁺ + 2); pmr (deuteriodimethyl sulfoxide): 9.70 (d, *J* = 9.0 Hz, 1H, C₆-H), 7.69 (d, *J* = 2.0 Hz, 1H, C₉-H), 7.54 (dd, *J* =

2.0, 9.0 Hz, 1H, C₇-H), 4.23 (s, 3H, N₄-CH₃), 3.92 (t, J = 7.0 Hz, 2H, CH₂), 3.59 (s, 3H, N₁₀-CH₃), 1.55 (tt, J = 7.0, 7.0 Hz, 2H, CH₂), 1.35 (qt, J = 7.0, 7.5 Hz, 2H, CH₂), 0.90 (t, J = 7.5 Hz, 3H, CH₃); pmr (deuteriotrifluoroacetic acid): 8.22 (d, J = 9.0 Hz, 1H, C₆-H), 7.57 (d, J = 2.0 Hz, 1H, C₉-H), 7.41 (dd, J = 2.0, 9.0 Hz, 1H, C₇-H), 4.49 (s, 3H, N₄-CH₃), 4.24 (t, J = 7.0 Hz, 2H, CH₂), 3.69 (s, 3H, N₁₀-CH₃), 1.57 (tt, J = 7.0, 7.0 Hz, 2H, CH₂), 1.25 (qt, J = 7.0, 7.0 Hz, 2H, CH₂), 0.79 (t, J = 7.0 Hz, 3H, CH₃).

Anal. Calcd. for C₁₆H₁₈ClN₅O₃: C, 52.82; H, 4.99; Cl, 9.74; N, 19.25. Found: C, 52.53; H, 4.93; Cl, 9.83; N, 19.27.

8-Chloro-4,10-dimethyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalin-10-ium-2-trifluoroacetamidate **4c**.

A solution of compound **2c** (1 g, 2.81 mmoles), 1,8-diazabicyclo[5.4.0]-7-undecene (527 mg, 3.47 mmoles), methyl iodide (452 mg, 3.18 mmoles) in dioxane (20 ml) was refluxed in an oil bath for 1 hour. The reaction mixture was allowed to stand overnight to precipitate colorless crystals, which were removed by filtration. The filtrate was evaporated *in vacuo* to provide an oily product, which was crystallized from ethanol/water to give colorless needles **4c** (860 mg, 83%), mp 260-261°; ir: ν cm⁻¹ 1690, 1660; ms: m/z 359 (M⁺), 361 (M⁺ + 2); pmr (deuteriodimethyl sulfoxide): 9.57 (d, J = 9.0 Hz, 1H, C₆-H), 7.79 (d, J = 2.0 Hz, 1H, C₉-H), 7.61 (dd, J = 2.0, 9.0 Hz, 1H, C₇-H), 4.33 (s, 3H, N₄-CH₃), 3.65 (s, 3H, N₁₀-CH₃); pmr (deuteriotrifluoroacetic acid): 8.01 (d, J = 8.0 Hz, 1H, C₆-H), 7.58 (d, J = 2.0 Hz, 1H, C₉-H), 7.42 (dd, J = 2.0, 8.0 Hz, 1H, C₇-H), 4.53 (s, 3H, N₄-CH₃), 3.70 (s, 3H, N₁₀-CH₃).

Anal. Calcd. for C₁₃H₉ClF₃N₅O₂: C, 43.41; H, 2.52; N, 19.47. Found: C, 43.69; H, 2.74; N, 19.55.

8-Chloro-4,10-dimethyl-4*H*-1,3,4-oxadiazino[5,6-*b*]quinoxalin-10-ium-2-acetamidate **4d**.

A solution of methyl iodide (535 mg, 3.77 mmoles) in dioxane (10 ml) was added to a refluxing solution of compound **2d** (1 g, 3.43 mmoles), 1,8-diazabicyclo[5.4.0]-7-undecene (626 mg, 4.12 mmoles) in dioxane (20 ml), and the solution was refluxed in an oil bath for 1 hour. The solvent was evaporated *in vacuo* to give colorless crystals **4d**, which were recrystallized from ethanol to afford colorless needles (270 mg, 26%), mp 272-273°; ir: ν cm⁻¹ 1685, 1610; ms: m/z 305 (M⁺), 307 (M⁺ + 2); pmr (deuteriodimethyl sulfoxide): 9.81 (d, J = 9.0 Hz, 1H, C₆-H), 7.69 (d, J = 2.0 Hz, 1H, C₉-H), 7.57 (dd, J = 2.0, 9.0 Hz, 1H, C₇-H), 4.23 (s, 3H, N₄-CH₃), 3.59 (s, 3H, N₁₀-CH₃), 2.03 (s, 3H, COCH₃); pmr (deuteriotrifluoroacetic acid): 8.08 (d, J = 9.0 Hz, 1H, C₆-H), 7.56 (d, J = 2.0 Hz, 1H, C₉-H), 7.41 (dd, J = 2.0, 9.0 Hz, 1H, C₇-H), 4.51 (s, 3H, N₄-CH₃), 3.70 (s, 3H, N₁₀-CH₃), 2.40 (s, 3H, COCH₃).

Anal. Calcd. for C₁₃H₁₂ClN₅O₂: C, 51.07; H, 3.96; Cl, 11.60; N, 22.91. Found: C, 50.79; H, 4.08; Cl, 11.72; N, 22.63.

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