Turkish Journal of Chemistry

Volume 24 | Number 4 Article 4

1-1-2000

A Convenient Synthesis of Some 4-(Alkylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones

BAHİTTİN KAHVECİ

AYKUT İKİZLER

Turk J Chem
24 (2000) , 343 – 351.

A Convenient Synthesis of Some 4-(Alkylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones

Bahittin KAHVECİ, Aykut A. İKİZLER
Department of Chemistry, Karadeniz Technical University,
61080 Trabzon - TURKEY

Received 25.04.2000

A series of 3-alkyl-4-(arylidenamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones, **6-10,** was obtained from the reaction of the corresponding 3-alkyl-4-amino-4,5-dihydro-1H-1,2,4-triazol-5-ones, **1,** with the appropriate aldehydes. 3-alkyl-4-(alkylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones of type **11-16** were synthesized from the selective reduction of compounds **5-10** with $NaBH_4$ in diglyme or DMSO medium as a general and convenient method.

Introduction

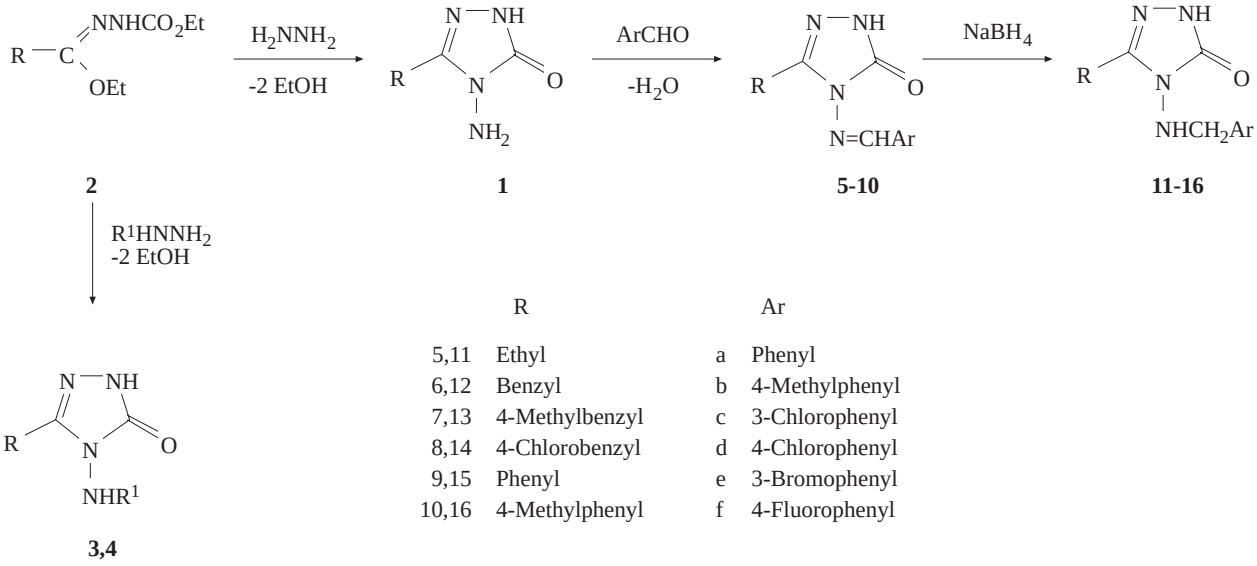
In order to synthesize 3-alkyl-4-amino-4,5-dihydro-1H-1,2,4-triazol-5-ones, **1,** several methods have been developed[1−6]. One of these methods involves the treatment of ester ethoxycarbonylhydrazones, **2,** with hydrazine[2,3]. Using similar routes, 3-alkyl-4-(phenylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones, **3,** and 3-alkyl-4-(methylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones, **4,** have been obtained by replacing hydrazine with phenylhydrazine and methylhydrazine, respectively[2,7]. On the other hand, the treatment of compounds **1** with appropriate aldehydes leading to the synthesis of benzylidenamino compounds of type **5-10** has been reported[1−3,6,8]. In general, the possibility of the reduction of an imine type compound can be taken into consideration[9−11]. Also, the reduction of a 4,5-dihydro-1H-1,2,4-triazol-5-one ring is also possible[12]. For this reason, the attempts to reduce the imines **5-10** may lead to the formation of different products. In the present study, our aim was the reduction of only the imino group of compounds **5-10** without affecting the heteroring. Therefore, a general and convenient method was established by the use of $NaBH_4$ as a selective reducing agent. Thus, 21 new imines **(6-10)** and 23 new 3-alkyl-4-(alkylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones **(11-16)** were synthesized in good yields (Scheme).

Experimental

Melting points were determined on a Büchi oil-heated melting point apparatus and are uncorrected. Experimental data for compounds **6-16** are given in Table 1. The ^{1}H-nmr spectra (δ, ppm) were recorded on a Varian 200A or Varian 60A spectrometer using tetramethylsilane as the internal reference (Table 2).

The ir spectra (ν,cm^{-1}) were run on a Perkin-Elmer 1600 FTIR or Perkin-Elmer 377 spectrophotometer in potassium bromide disks (Table 3). The uv absorption measurements were carried out with 1.10^{-5} - 1.10^{-4}

Scheme



	R		Ar
5,11	Ethyl	a	Phenyl
6,12	Benzyl	b	4-Methylphenyl
7,13	4-Methylbenzyl	c	3-Chlorophenyl
8,14	4-Chlorobenzyl	d	4-Chlorophenyl
9,15	Phenyl	e	3-Bromophenyl
10,16	4-Methylphenyl	f	4-Fluorophenyl

ethanolic solutions and the spectra were measured between 200 and 400 nm with a Shimatzu-1201 spectrophotometer using 10 mm quartz cells (Table 3). The microanalyses were performed on a Carlo Erba 1106 elemental analyzer. The necessary chemicals were obtained from Merck and Fluka. The starting compounds **1** and **2** were synthesized by the methods previously reported[2,13,14]. Compounds **5a** and **5b** were obtained by the method reported earlier[2].

General Method for the Synthesis of Compounds **6-10**:

The corresponding amino compound **1** (0.01 mole) was heated in an oil bath with an appropriate aldehyde (0.01 mole) at a high temperature range, shown in Table 1, for one hour and then allowed to cool. The solid product was recrystallized from an appropriate solvent to give the desired compound.

General Method for the Synthesis of Compounds **11-16**:

The corresponding compounds **5-10** (0.01 mole) were dissolved in 40 ml of dry diglyme (or 15 ml of DMSO) with gentle heating and a solution of $NaBH_4$ (0.03 mole) in 30 ml of dry diglyme (or 0.05 mole of $NaBH_4$ in 25 ml of DMSO) was slowly added to the solution with constant stirring. After the mixture was refluxed for 8 hours, the resulting solution was allowed to cool. In order to precipitate the product, a sufficient amount of water was added to the solution and the mixture was allowed to stand overnight at 0-5°C. The precipitate was filtered and washed with cold water. After drying in vacuo, the solid product was recrystallized from an appropriate solvent to afford the desired compound.

Table 1. Physical Data of Compounds**6-16**

Compound No	Reaction Temp.(°C)	Yield (%)	Mp.(°C) (Recrys.Solvent)	Molecular Formula (Molecular Weight)	Analysis(%) Calcd./Found		
					C	H	N
6c	155-160	83	209-210	$C_{16}H_{13}ClN_4O$	61.45	4.19	17.91
			(ethanol)	(312.76)	61.30	4.00	18.12
6d	155-160	92	213-214	$C_{16}H_{13}ClN_4O$	61.45	4.19	17.91
			(ethanol)	(312.76)	61.57	4.30	18.10
6e	145-150	73	221-222	$C_{16}H_{13}BrN_4O$	53.80	3.67	15.68
			(ethanol)	(357.21)	54.13	3.51	15.76
6f	155-160	96	193-194	$C_{16}H_{13}FN_4O$	64.86	4.42	18.91
			(ethanol)	(296.30)	64.83	4.26	18.35
7a	155-160	92	199-200	$C_{17}H_{16}N_4O$	69.85	5.52	19.16
			(ethanol)	(292.34)	69.74	5.81	19.65
7b	170-175	93	191-192	$C_{18}H_{18}N_4O$	7057	5.92	18.29
			(ethyl acetate)	(306.37)	70.32	6.21	18.73
7c	160-165	84	208-209	$C_{17}H_{15}ClN_4O$	62.48	4.63	17.14
			(ethanol)	(326.79)	61.93	4.36	17.36
7d	160-165	86	197-198	$C_{17}H_{15}ClN_4O$	62.48	4.63	17.14
			(ethyl acetate)	(326.79)	62.67	4.86	17.57
7e	170-175	95	216-217	$C_{17}H_{15}BrN_4O$	55.00	4.07	15.09
			(ethanol)	(371.24)	54.34	3.97	15.01
7f	160-165	80	190-192	$C_{17}H_{15}FN_4O$	65.80	4.87	18.05
			(ethanol)	(310.33)	65.94	5.06	18.25
8a	160-165	79	218-219	$C_{16}H_{13}ClN_4O$	61.45	4.19	17.91
			(ethanol)	(312.76)	61.09	3.81	18.07
8b	170-175	91	212-213	$C_{17}H_{15}ClN_4O$	62.48	4.63	17.14
			(ethanol)	(326.79)	62.00	4.73	16.96
8c	160-165	92	233-235	$C_{16}H_{12}CI_2N_4O$	55.35	3.48	16.14
			(acetic acid/water)	(347.20)	55.49	3.43	16.34
8d	170-175	95	217-218	$C_{16}H_{12}CI_2N_4O$	55.35	3.48	16.14
			(ethanol)	(347.20)	55.47	3.49	16.12
8e	160-165	82	240-241	$C_{16}H_{12}BrClN_4O$	49.07	3.09	14.31
			(dimethyl sulfoxide/water)	(391.65)	48.84	3.06	14.34
8f	170-175	89	214-215	$C_{16}H_{12}ClFN_4O$	58.10	3.66	16.94
			(ethanol)	(330.75)	58.23	3.93	16.80
9c	190-195	91	212-213	$C_{15}H_{11}ClN_4O$	60.31	3.71	18.75
			(ethanol)	(298.73)	60.48	3.71	18.91
9d	195-200	87	215-216	$C_{15}H_{11}ClN_4O$	60.31	3.71	18.75
			(ethanol)	(298.73)	60.49	3.48	19.02
9e	185-190	80	220-221	$C_{15}H_{11}BrN_4O$	52.50	3.23	16.33
			(ethanol)	(343.18)	51.98	3.07	16.22
9f	185-190	88	175-176	$C_{15}H_{11}FN_4O$	63.83	3.93	19.85
			(ethanol/water)	(282.28)	63.56	4.02	19.78
10d	195-200	90	213-214	$C_{16}H_{13}ClN_4O$	61.45	4.19	17.91
			(ethanol)	(312.76)	61.42	3.91	17.66
11a	**[a]**	53	160-161	$C_{11}H_{14}N_4O$	60.53	6.47	25.67
			(water)	(218.26)	60.58	6.66	25.97

Table 1 (Continued)

Compound No	Reaction Temp.(°C)	Yield (%)	Mp.(°C) (Recrys.Solvent)	Molecular Formula (Molecular Weight)	Analysis(%) Calcd./Found		
					C	H	N
11b	[a]	53	129-130	$C_{12}H_{16}N_4O$	62.05	6.94	24.12
			(water)	(232.29)	62.27	7.22	23.90
12c	[a]	50	130-131	$C_{16}H_{15}ClN_4O$	61.05	4.80	17.80
			(water)	(314.77)	60.73	4.90	17.35
12d	[a]	51	157-158	$C_{16}H_{15}ClN_4O$	61.05	4.80	17.80
			(ethanol/water)	(314.77)	60.89	4.40	17.97
12e	[a]	41	126-127	$C_{16}H_{15}BrN_4O$	53.50	4.21	15.60
			(ethanol/water)	(359.23)	53.83	4.25	15.45
12f	[a]	50	171-172	$C_{16}H_{15}FN_4O$	64.42	5.07	18.78
			(ethanol/water)	(298.32)	64.48	4.92	18.70
13a	[b]	61	182-183	$C_{17}H_{18}N_4O$	69.37	6.16	19.03
			(ethyl acetate)	(294.36)	69.54	5.97	18.60
13b	[b]	53	172-173	$C_{18}H_{20}N_4O$	70.11	6.54	18.17
			(ethyl acetate)	(308.38)	70.59	6.82	17.85
13c	[a]	51	120-121	$C_{17}H_{17}ClN_4O$	62.10	5.21	17.04
			(ethanol/water)	(328.80)	62.09	5.19	16.92
13d	[a]	49	174-175	$C_{17}H_{17}ClN_4O$	62.10	5.21	17.04
			(ethyl acetate)	(328.80)	62.00	5.17	16.80
13e	[a]	54	118-119	$C_{17}H_{17}BrN_4O$	54.70	4.59	15.01
			(ethanol/water)	(373.25)	54.97	4.55	14.87
13f	[a]	58	157-158	$C_{17}H_{17}FN_4O$	65.37	5.49	17.94
			(ethanol/water)	(312.35)	65.17	5.52	17.64
14a	[b]	50	206-207	$C_{16}H_{13}ClN_4O$	61.45	4.19	17.91
			(ethanol/water)	(312.76)	61.21	4.25	17.80
14b	[b]	50	198-199	$C_{17}H_{17}ClN_4O$	62.10	5.21	17.04
			(ethyl acetate)	(328.80)	62.19	5.51	16.70
14c	[a]	51	134-135	$C_{16}H_{14}Cl_2N_4O$	55.03	4.04	16.04
			(ethanol/water)	(349.22)	54.86	3.91	15.73
14d	[a]	51	181-182	$C_{16}H_{14}Cl_2N_4O$	55.03	4.04	16.04
			(benzene)	(349.22)	55.04	4.16	16.18
14e	[a]	61	140-142	$C_{16}H_{14}BrClN_4O$	48.82	3.58	14.23
			(ethanol/water)	(393.67)	48.66	3.35	14.15
14f	[a]	50	179-180	$C_{16}H_{14}ClFN_4O$	57.75	4.24	16.84
			(ethanol/water)	(322.76)	57.93	4.50	16.37
15c	[a]	47	173-174	$C_{15}H_{13}ClN_4O$	59.91	4.36	18.63
			(ethanol/water)	(300.75)	59.51	4.15	18.35
15d	[a]	53	190-191	$C_{15}H_{13}ClN_4O$	59.91	4.36	18.63
			(ethyl acetate)	(300.75)	59.55	4.16	18.22
15e	[a]	45	170-171	$C_{15}H_{13}BrN_4O$	52.19	3.80	16.23
			(benzene)	(345.20)	52.46	3.95	15.83
15f	[a]	51	158-159	$C_{15}H_{13}FN_4O$	63.37	4.61	19.71
			(ethanol)	(284.29)	63.31	5.00	19.64
16d	[a]	48	200-201	$C_{16}H_{15}ClN_4O$	61.05	4.80	17.80
			(ethyl acetate)	(314.77)	61.24	5.07	18.20

[**a**] Refluxing temperature of the reaction mixture in diglyme, [**b**] Refluxing temperature of the reaction mixture in dimethyl sulfoxide.

Table 2. ^{1}H NMR Data for Compounds **6-16[a]** (in ppm)

Compound No	CH_3	CH_2	CH_2	CH	NNH	NH	Ar-H
6c	-	4.10(s,2H)	-	9.78(s,1H)	-	9.63(s,1H)	7.20-7.50(m,7H) 7.59(d,1H) 7.78(s,1H)
6d	-	4.18(s,2H)	-	9.78(s,1H)	-	9.50(s,1H)	7.22-7.45(m,5H) 7.40(d,4H) 7.70(d,2H)
6e	-	4.18(s,2H)	-	9.78(s,1H)	-	9.30(s,1H)	7.20-7.96(m,9H)
6f	-	4.18(s,2H)	-	9.78(s,1H)	-	10.10(s,1H)	7.04-7.40(m,7H) 7.70(d,2H)
7a	2.34(s,3H)	4.08(s,2H)	-	9.78(s,1H)	-	10.06(s,1H)	7.10(d,2H) 7.25(d,2H) 7.45(m,3H) 7.75(m,2H)
7b	2.38(s,3H) **[b]**	4.06(s,2H)	-	9.78(s,1H)	-	10.10(s,1H)	7.15(d,2H) 7.26(d,4H) 7.70(d,2H)
7c	2.38(s,3H)	4.10(s,2H)	-	9.78(s,1H)	-	9.10(s,1H)	7.18(d,2H) 7.22(d,2H) 7.35-7.50(m,2H) 7.60(d,1H) 7.78(s,1H)
7d	2.38(s,3H)	4.08(s,2H)	-	9.78(s,1H)	-	9.10(s,1H)	7.18(d,2H) 7.22(d,2H) 7.40(d,2H) 7.70(d,2H)
7e	2.38(s,3H)	4.06(s,2H)	-	9.78(s,1H)	-	9.10(s,1H)	7.10-7.38(m,5H) 7.60(m,2H) 7.96(s,1H)
7f	2.38(s,3H)	4.06(s,2H)	-	9.78(s,1H)	-	9.96(s,1H)	7.08-7.32(m,6H) 7.78(d,2H)
8a	-	4.08(s,2H)	-	9.79(s,1H)	-	9.82(s,1H)	7.25-7.32(m,4H) 7.42-7.52(m,3H) 7.70-7.78(m,2H)
8b	2.38(s,3H)	4.06(s,2H)	-	9.77(s,1H)	-	10.00(s,1H)	7.20-7.40(m,6H) 7.64(d,2H)
8c	-	4.10(s,2H)	-	9.78(s,1H)	-	9.70(s,1H)	7.25(d,4H) 7.30-7.50(m,2H) 7.60(d,1H) 7.75(s,1H)
8d	-	4.10(s,2H)	-	9.78(s,1H)	-	9.20(s,1H)	7.30(d,4H) 7.40(d,2H) 7.64(d,2H)
8e	-	4.12(s,2H)	-	9.78(s,1H)	-	9.15(s,1H)	7.20-7.40(m,5H) 7.60(m,2H) 7.90(s,1H)
8f	-	4.06(s,2H)	-	9.78(s,1H)	-	9.60(s,1H)	7.10-7.38(m,6H) 7.74(m,2H)

Table 2 (Continued)

Compound No	CH_3	CH_2	CH_2	CH	NNH	NH	Ar-H
9c	-	-	-	9.82(s,1H)	-	10.18(s,1H)	7.20-7.52(m,5H) 7.60(d,1H) 7.78(s,1H) 7.90-8.05(m,2H)
9d	-	-	-	9.82(s,1H)	-	9.54(s,1H)	7.22-7.60(m,5H) 7.76(d,2H) 7.98(d,2H)
9e	-	-	-	9.82(s,1H)	-	9.14(s,1H)	7.30-7.76(m,7H) 7.88(s,2H)
9f	-	-	-	9.80(s,1H)	-	10.20(s,1H)	7.10-7.60(m,5H) 7.78-7.85(m,2H) 7.90-8.05(m,2H)
10d	2.42(s,3H)	-	-	9.82(s,1H)	-	10.30(s,1H)	7.26(d,2H) 7.40(d,2H) 7.76(d,2H) 7.84(d,2H)
11a	1.10(t,3H)	2.22(q,2H)	4.20(d,2H)	-	4.98(t,1H)	9.88(s,1H)	7.20-7.40(m,5H)
11b	2.36(s,3H) [**c**]	2.28(q,2H)	4.18(d,2H)	-	4.95(t,1H)	9.95(s,1H)	7.04-7.34(m,4H)
12c	-	3.72(s,2H)	3.96(d,2H)	-	4.80(t,1H)	9.84(s,1H)	7.10-7.40(m,9H)
12d	-	3.60(s,2H)	3.94(d,2H)	-	4.86(t,1H)	10.16(s,1H)	6.60-7.58(m,9H)
12e	-	3.56(s,2H)	3.96(d,2H)	-	6.36(t,1H)	11.26(s,1H)	6.80-7.40(m,9H)
12f	-	3.60(s,2H)	3.94(d,2H)	-	4.90(t,1H)	10.06(s,1H)	6.60-7.40(m,9H)
13a	2.32(s,3H)	3.44(s,2H)	3.96(d,2H)	-	6.20(t,1H)	11.20(s,1H)	6.80-7.28(m,9H)
13b	[**d**]	3.32(s,2H)	3.92(d,2H)	-	6.20(t,1H)	11.20(s,1H)	6.60-7.20(m,8H)
13c	2.28(s,3H)	3.50(s,2H)	3.88(d,2H)	-	6.34(t,1H)	11.20(s,1H)	6.64-7.34(m,8H)
13d	2.36(s,3H)	3.60(s,2H)	3.98(d,2H)	-	4.86(t,1H)	10.16(s,1H)	7.00-7.40(m,8H)
13e	2.38(s,3H)	3.62(s,2H)	3.98(d,2H)	-	4.76(t,1H)	9.86(s,1H)	7.04-7.54(m,8H)
13f	2.34(s,3H)	3.56(s,2H)	3.96(d,2H)	-	6.26(t,1H)	11.26(s,1H)	6.64-7.24(m,8H)
14a	-	3.50(s,2H)	4.04(d,2H)	-	4.80(t,1H)	9.88(s,1H)	7.10-7.40(m,9H)
14b	2.32(s,3H)	3.50(s,2H)	3.96(d,2H)	-	6.36(t,1H)	11.32(s,1H)	6.74-7.36(m,8H)
14c	-	3.56(s,2H)	3.96(d,2H)	-	6.36(t,1H)	11.28(s,1H)	6.80-7.32(m,8H)
14d	-	3.58(s,2H)	4.00(d,2H)	-	4.90(t,1H)	10.00(s,1H)	7.00-7.40(m,8H)
14e	-	3.60(s,2H)	4.00(d,2H)	-	6.36(t,1H)	11.32(s,1H)	6.80-7.60(m,8H)
14f	-	3.58(s,2H)	4.02(d,2H)	-	4.80(t,1H)	9.90(s,1H)	7.00-7.40(m,8H)
15c	-	-	4.18(d,2H)	-	5.20(t,1H)	10.56(s,1H)	7.00-7.85(m,9H)
15d	-	-	4.10(d,2H)	-	6.48(t,1H)	11.40(s,1H)	6.75-7.65(m,9H)
15e	-		4.18(d,2H)	-	5.20(t,1H)	10.55(s,1H)	7.00-7.50(m,9H)
15f	-	-	4.18(d,2H)	-	5.22(t,1H)	10.60(s,1H)	6.80-7.85(m,9H)
16d	2.40(s,3H)	-	4.18(d,2H)	-	5.20(t,1H)	10.60(s,1H)	7.10-7.80(m,8H)

[**a**] The spectra for 12e, 13a-c, 13f, 14b, 14c, 14e and 15d were recorded in dimethyl sulfoxide-d_6 and for the others in deuteriochloroform. [**b**] 2,44(s,3H,CH_3). [**c**] 1.16(t,3H,CH_3). [**d**] 2.28(s,6H,2CH_3).

Table 3. IR and UV Data for Compounds **6-16**

Compound	IR, v(cm^{-1}[a]				UV,λ_{max}(nm)/εx10^{-3},L.mol^{-1}.cm^{-1}
No	NH	C=0	C=N	[b]	(in ethanol)
6c	3190	1715	1610,1590	780,685,805 700	295(11,53),257(13,55), 219(18.10)
6d	3200	1705	1600,1590	760,695,870	295(11.99),264(12.79), 211(16.61)
6e	3200	1720	1610,1590	790,690,810, 710	295(8.06),257(9.50), 216(15.71)
6f	3250	1720	1620,1600	700,680,840	291(11.44),257(12.51), 211(18.41)
7a	3190	1710	1610,1590	755,695,870	290(11.41),257(12.05), 215(21.28)
7b	3190	1700	1610,1590	870,810	294(24.30),264(26.35), 219(23.12)
7c	3185	1715	1585,1570	780,710,835	292(12.33),255(16.03), 216(32.15)
7d	3190	1705	1615,1595	870,820	293(16.12),264(19.00), 214(32.15)
7e	3190	1715	1585,1560	775,715,820	282(8.84),255(11.45), 212(30.10)
7f	3190	1700	1610,1600	880,825	290(10.20),256(11,73), 214(20.27)
8a	3190	1715	1615,1595	760,710,845	266(20.33),216(22.51)
8b	3200	1720	1620,1600	860,800	293(15.59),268(13,44), 220(21.07)
8c	3190	1715	1590,1565	780,710,850	294(10.76),256(12.66), 224(18.80)
8d	3200	1710	1600,1580	850,820	295(14.09),264(14.81), 219(20.45)
8e	3180	1720	1595,1570	790,730,855	295(10.61),257(12.26), 225(19.17)
8f	3195	1705	1610,1590	880,820	290(10.63),257(11.46), 216(20.05)
9c	3220	1705	1610,1550	700,670,750,660	258(10.86),213(13.24)
9d	3190	1705	1610,1570	755,675,870	264(19.04),213(17.18)
9e	3160	1705	1605,1585	755,665,775,705	258(18.17),227(18.23)
9f	3220	1710	1610,1585	730,690,840	257(24.08),215(21.97)
10d	3200	1700	1600,1580	870,810	265(24.51),218(16.76)
11a	3280,3090	1690	1590	740,690	271(8.60),207(10.10),
11b	3285,3100	1700	1580	820	211(7.07)
12c	3220,3070	1710	1580	690,670,790,700	210(16.25)
12d	3230,3080	1715	1560	830	211(8.26)
12e	3250,3090	1710	1590	780,700,830,740	210(15.16)
12f	3225,3070	1700	1575	710,695,830	208(14.64)
13a	3260,3090	1700	1590	730,700,810	210(15.12)
13b	3250,3090	1720	1590	830	214(15.22)
13c	3250,3100	1695	1565	790,710,830	214(11.60)
13d	3280,3100	1700	1570	820	207(27.67)
13e	3280,3090	1700	1570	780,700,820	215(14.07)
13f	3250,3075	1695	1565	850,835	208(12.84)

Table 3 (Continued)

Compound	IR, v(cm^{-1}[a]				UV,λ_{max}(nm)/εx10^{-3},L.mol^{-1}.cm^{-1}
No	NH	C=0	C=N	[b]	(in ethanol)
14a	3260,1090	1700	1570	720,690,840	210(16.83)
14b	3250,3080	1710	1580	860,820	218(18.27)
14c	3250,3100	1710	1570	780,725,850	217(7.93)
14d	3230,3090	1710	1580	830	221(16.91)
14e	3230,3080	1710	1580	790,730,850	219(11.65)
14f	3250,3090	1700	1590	810,790	207(28.72)
15c	3255,3060	1700	1530	765,690,790,735	258(7.67),211(12.86)
15d	3280,3090	1710	1515	740,690,830	264(15.29),217(16.19)
15e	3280,3080	1705	1540	735,660,785,765	257(6.74),208(15.91)
15f	3290,3090	1710	1515	740,670,830	254(10.78),207(28.72)
16d	3290,3090	1710	1510	910,830	254(12.74),208(29.60)

[a] Potassium bromide pellets. [b] Substituted aromatic ring.

Results and Discussion

A general method for the synthesis of 4-(alkylamino)-4,5-dihydro-1H-1,2,4-triazol-5-ones **(11-16)** was established according to the reactions shown in the Scheme. Forty-four new 1H-1,2,4-triazol-5-one derivatives synthesized in the study are expected to exhibit some biologically active properties[8,15–20].

References

1. C.F. Kröger, L. Hummel, M. Mutcher and H. Beyer, **Chem. Ber. 98**, 3025 (1965).
2. A. A. İkizler and R. Ün, **Chem. Acta Turc.** 7, 269(1979); **Chem. Abstr., 94,** 15645d (1981).
3. R. Milcent and C. Redeuilh, **J. Heterocycl. Chem. 16**, 403 (1979).
4. A. A. İkizler, A. İkizler, H. Yüksek, Ş. Bahçeci and K. Sancak, **Tr. J. Chem. 18**, 51 (1994); **Chem. Abstr. 121**, 28059t (1994).
5. A. İkizler, N. Demirbaş, A. Demirbaş and A. A. İkizler, **Polish J. Chem. 70**, 1114 (1996).
6. A. A. İkizler, A. İkizler, M. Serdar and N. Yıldırım, **Acta Polon. Pharm.-Drug Research 54**, 363 (1997).
7. E. Ayça, A. A. İkizler and M. Serdar, **Chem. Acta Turc. 9**, 381(1981); **Chem. Abstr. 97**, 6227d (1982).
8. A. A. İkizler, A. İkizler and N. Yıldırım, **Monatsh. Chem. 122**, 557 (1991).
9. Z. Hovii, T. Sakai and T. Inoi, **J. Pharm. Soc. Japan, 75**, 1161 (1995).
10. J. H. Billman and A. C. Diesing, **J. Org. Chem. 22**, 1068 (1957).
11. A. R. Katritzky and K. S. Laurenzo, **J. Org. Chem. 53**, 3978 (1988).
12. J. Daunis, Y. Guindo, R. Jacquier and P. Viallefont, **Bull. Soc. Chim. France**, 3296 (1971).
13. A. A. İkizler and H. Yüksek, **Org. Prep. Proced. Int. 25**, 99 (1993).
14. R. Ün and A. İkizler, **Chem. Acta Turc., 3**, 113 (1975); **Chem. Abstr. 84**, 150568 g (1976).

15. A. Demirbaş, C. B. Johanson, N. Duman and A. A. İkizler, **Acta Polon. Pharm-Drug Research, 53**, 117 (1996).

16. N. Doğan, A. İkizler, C. B. Johanson and A. A. İkizler,**Acta Polon. Pharm-Drug Research, 53**, 227 (1996).

17. H. Yüksek, A. Demirbaş, A. İkizler, C. B. Johanson, C. Celik and A. A. İkizler, **Arzneim.-Forsh-Drug Res, 47**, 405 (1997).

18. A. A. İkizler, A. İkizler, M. Serdar and N. Yıldırım, **Acta Polon. Pharm-Drug Research, 54**, 363 (1996).

19. A. A. İkizler, F. Ucar, H. Yüksek, A. Aytin, I. Yasa and T. Genzer, **Acta Polon. Pharm-Drug Research, 54**, 135 (1997).

20. A. A. İkizler, F. Ucar, N. Demirbaş, I. Yasa, A. Demirbaş and T. Genzer, **Indian J. Pharm. Sci. 5**, 61 (1999).