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SYNTHESIS OF 3-HETARYL-1,2,4,5-TETRAHYDROPYRROLO-[1,2-*a*]QUINAZOLINE-2,5-DIONES

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A convenient method has been developed for the synthesis of 3-hetaryl-1,2,4,5-tetrahydropyrrolo-[1,2-a]quinazoline-2,5-diones by the interaction of 4-chloro-2-hetaryl-3-oxobutyronitriles with substituted anthranilic acids.

Keywords: anthranilic acids, 4-chloro-3-oxobutyronitriles, pyrrolo[1,2-*a*]quinazolines.

Derivatives of pyrrolo[1,2-*a*]quinazoline possess a broad spectrum of biological activity [1-3]. Among them there are found compounds displaying analgesic [1], hypotensive [2], and anticonvulsant properties [3]. This stimulates the synthesis of new compounds of this type, among which pyrrolo[1,2-*a*]quinazoline-2,5-diones are of particular interest since their biological and pharmacological properties have been the least investigated. At the same time they are isomers of quinazoline alkaloids of the peganine series.

Two basic strategies for constructing the pyrrolo[1,2-*a*]quinazoline-2,5-diones skeleton are known. The first consists of the preliminary construction of the quinazoline ring with subsequent annelation of the pyrrole fragment along side *a*. This approach assumes the use as starting materials of anthranilic acid amides substituted at the amino [4,5] and/or the amide [6] nitrogen atom. The second relies on the reverse sequence. The quinazoline cycle is add to a pyrrole ring and the annelation of the latter occurs as a rule *in situ* in the process of forming the pyrrole nucleus. Key intermediates in this approach are γ-arylamino nitriles which are generated either by acylation of methylene-active nitriles with N-(2-carboxyphenyl)glycine or by amination of γ-halo nitriles with an anthranilic acid ester [7-9].

The methods of synthesis described above use functional derivatives of anthranilic acid and do not permit 6-, 7-, 8-, and 9-substituted pyrrolo[1,2-*a*]quinazoline-2,5-diones to be obtained. In view of the high availability of anthranilic acids compared with their functional derivatives it seemed urgent to develop a method of synthesis of pyrrolo[1,2-*a*]quinazoline-2,5-diones based on them. This work is devoted to obtaining 3-hetaryl-substituted pyrrolo[1,2-*a*]quinazoline-2,5-diones from substituted 2-aminobenzoic acids (Scheme 1).

The interaction of 4-chloro-2-hetaryl-3-oxobutyronitriles **1a-g** with anthranilic acid and substituted anthranilic acids **2** in dioxane in the presence of equivalent amount of triethylamine led to 3-hetaryl-1,2,4,5-tetrahydropyrrolo[1,2-*a*]quinazoline-2,5-diones **3a-z** in 55-90% yield.

The first step of the reaction is probably nucleophilic substitution of halogen by the nitrogen of the amino group with the formation of an alkylation product **4a-z**, which is accompanied by an intramolecular addition of the amino group to the nitrile leading to 1-aryl-2-amino-3-hetaryl-4(5H)-oxopyrroles **5a-z**. Subsequent intramolecular acylation at the amino group of compounds **5** leads to the final products **3a-z**. Alkyl,

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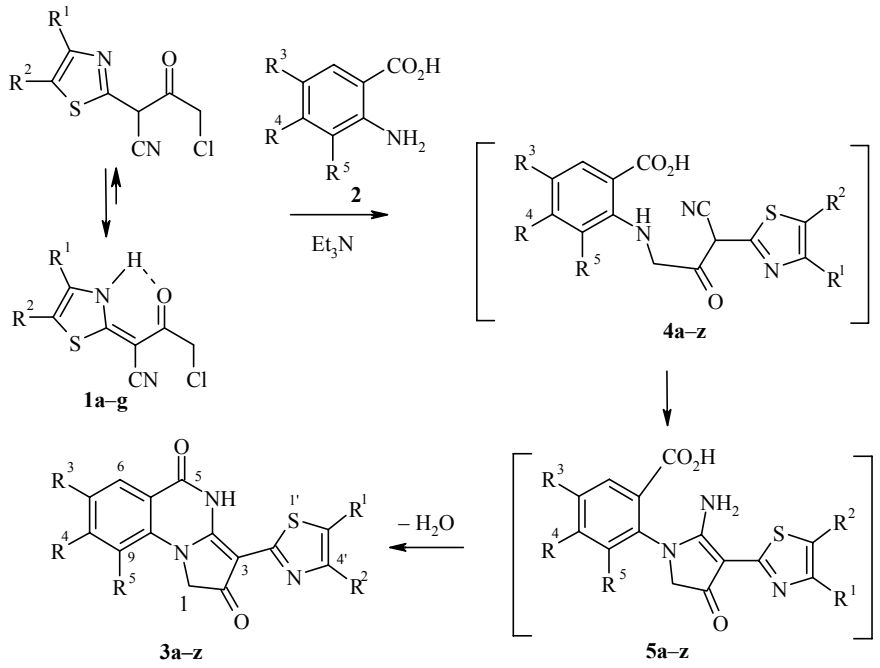
Scheme 1



1a $R^1 + R^2$ = CH=CHCH=CH, **b** R^1 = CH_3, **c** R^1 = Ph, **d** R^1 = 4-ClC_6H_4, e R^1 = 4-BrC_6H_4,
f R^1 = 1-Ad, **g** $R^1 + R^2 = -(CH_2)_4-$; **b-f** R^2 = H; **3-5 a-f** $R^1 + R^2$ = CH=CHCH=CH,
a $R^3 = R^4$ = H, **b** R^3 = CH_3, R^4 = H, **c** R^3 = Et, R^4 =H, **d** R^3 = Br, R^4 =H, **e** R^3 = H, R^4 = Cl,
f R^3 = F, R^4 = H; **g, h** R^1 = CH_3, R^2 = H, **g** $R^3 = R^4$ = H, **h** $R^3 = R^4$ = OCH_3; **i, j** R^1 = Ph, R^2 = H,
i $R^3 = R^4$ = H, **j** $R^3 = R^4$ = OCH_3; **k-p** R^1 = 4-ClC_6H_4, R^2 = H, **k** $R^3 = R^4$ = H, **l** R^3 = CH_3, R^4 = H,
m $R^3 = R^4$ = H, **n** $R^3 = R^4$ = OCH_3, **o** R^3 = I, R^4 = H, **p** R^3 = H, R^4 = CF_3; **q-u** R^1 = 4-BrC_6H_4,
R^2 = H, **q** $R^3 = R^4$ = H, **r** R^3 = CH_3, R^4 = H, **s** $R^3 = R^4$ = OCH_3, **t** R^3 = H, R^4 = Cl,
u R^3 = F, R^4 = H; **v, w** R^1 = 1-Ad, R^2 = H, **v** $R^3 = R^4$ = H, **w** R^3 = CH_3, R^4 = H;
x-z $R^1 + R^2 = -(CH_2)_4-$, **x** $R^3 = R^4$ = H, **y** R^3 = CH_3, R^4 = H, **z** R^3 = I, R^4 = H;
3-5 a-l, **h-z** R^5 = H, **m** R^5 = CH_3

alkoxy, and halogen substituted anthranilic acids **2** participate in the reaction described with the formation of previously unknown 7-, 8-, and 9-substituted 1,2,4,5-tetrahydropyrrolo[1,2-*a*]quinazoline-2,5-diones **3b-f,h,j,l-p,r-u,w,y,z**. The yields of the substituted pyrrolo[1,2-*a*]quinazoline-2,5-diones correlate with the basicity of the anthranilic acid amino group and vary from 70 (for the less basic) to 90% (for the more basic). When using 3-methylanthranilic acid with a sterically hindered amino group the yield of compound **3m** was reduced to 55%. The weakly basic anthranilic acids such as 5-nitro-, 5-chloro-3-methyl-, and 3,5-dichloroanthranilic acids did not participate in this reaction.

The proposed reaction mechanism has been confirmed by model conversions of halo nitriles **1a-e** on their interaction with secondary [10,11] and primary [9,11,12] amines with the formation of products of types **4** and **5** respectively. The structures of products **3a-z** were confirmed by data of IR and ^{1}H NMR spectroscopy, and also by the identity of compounds **3a,g** with the samples obtained by another method [9].

In the ^{1}H NMR spectra of compounds **3a,g,i,k,q,w,x** recorded in DMSO-d_6 a one-proton doublet was observed for the 6-H proton at 8.4-8.5 ppm. The low-field shift of this signal compared with the signal for 6-H in the initial anthranilic acid (at 7.8 ppm) is caused by the deshielding effect of the magnetically anisotropic carbonyl group in position 5. The spectra of these compounds also show a two-proton singlet for the CH_2 group at 4.5-4.8 ppm, the presence of which confirms that under these conditions compounds **3a,g,i,k,q,w,x** exist in

the ketonic tautomeric form. However in CF_3COOD the signal of the methylene group is slowly reduced with time (disappearing completely after 1-2 h). This indicates the deuteration of compounds **3a-z** at position 1, evidently proceeding through the enolic form.

TABLE 1. Characteristics of the Synthesized Compounds **3a-z**

Compound*	Empirical formula	Found, % / Calculated, %		Yield, %
		N	S	
3a	$C_{18}H_{11}N_3O_2S$	12.54 / 12.60	9.43 / 9.62	82
3b	$C_{19}H_{13}N_3O_2S$	12.32 / 12.10	9.46 / 9.23	80
3c	$C_{20}H_{15}N_3O_2S$	11.78 / 11.63	8.74 / 8.87	83
3d	$C_{18}H_{10}BrN_3O_2S$	10.21 / 10.19	7.76 / 7.78	72
3e	$C_{18}H_{10}ClN_3O_2S$	11.30 / 11.42	8.63 / 8.72	77
3f	$C_{18}H_{10}FN_3O_2S$	12.09 / 11.96	8.98 / 9.13	73
3g	$C_{15}H_{11}N_3O_2S$	14.01 / 14.13	10.89 / 10.78	85
3h	$C_{17}H_{15}N_3O_4S$	11.88 / 11.76	9.09 / 8.97	69
3i	$C_{20}H_{13}N_3O_2S$	11.61 / 11.69	9.07 / 8.92	83
3j	$C_{22}H_{17}N_3O_4S$	10.21 / 10.02	7.79 / 7.64	65
3k	$C_{20}H_{12}ClN_3O_2S$	10.53 / 10.67	8.33 / 8.14	90
3l	$C_{21}H_{14}ClN_3O_2S$	10.55 / 10.30	8.08 / 7.86	76
3m	$C_{21}H_{14}ClN_3O_2S$	10.44 / 10.30	8.01 / 7.86	55
3n	$C_{22}H_{16}ClN_3O_4S$	9.76 / 9.91	7.66 / 7.57	81
3o	$C_{20}H_{11}ClIN_3O_2S$	8.24 / 8.08	6.28 / 6.17	80
3p	$C_{21}H_{11}ClF_3N_3O_2S$	8.93 / 9.10	7.06 / 6.94	65
3q	$C_{20}H_{12}BrN_3O_2S$	9.84 / 9.59	7.49 / 7.32	81
3r	$C_{21}H_{14}BrN_3O_2S$	9.24 / 9.29	7.00 / 7.09	66
3s	$C_{22}H_{16}BrN_3O_4S$	8.67 / 8.43	6.68 / 6.43	86
3t	$C_{20}H_{11}BrClN_3O_2S$	9.10 / 8.89	6.62 / 6.78	63
3u	$C_{20}H_{11}BrFN_3O_2S$	9.33 / 9.21	6.85 / 7.03	69
3v	$C_{18}H_{15}N_3O_2S$	12.53 / 12.45	9.39 / 9.50	79
3w	$C_{19}H_{17}N_3O_2S$	11.88 / 11.96	8.99 / 9.12	82
3x	$C_{18}H_{14}IN_3O_2S$	9.12 / 9.07	7.13 / 6.92	77
3y	$C_{24}H_{23}N_3O_2S$	9.91 / 10.02	7.74 / 7.68	81
3z	$C_{25}H_{25}N_3O_2S$	9.83 / 9.74	7.35 / 7.43	75

* Compounds **3a-z** melt above 300°C.

TABLE 2. Data of IR and ^{1}H NMR Spectra of Compounds **3a-z**

Compound	IR spectrum, ν, cm^{-1}		^{1}H NMR spectrum (CF_3COOD), δ, ppm, coupling constant J (Hz)
	CO	others*	
1	2	3	4
3a	1660, 1720	955 (CSC)	5.16 (2H, s, CH_2); 7.60 (1H, d, J = 8.0, 9-H); 7.70-8.00 (3H, m, $2H_{R1+R2}$, 7-H); 8.18 (3H, m, $2H_{R1+R2}$, 8-H); 8.52 (1H, d, J = 8.0, 6-H)
3b	1660, 1710	960 (CSC)	2.62 (3H, s, CH_3); 5.15 (2H, s, CH_2); 7.53 (1H, d, J = 8.0, 9-H); 7.74 (2H, m, H_{R1+R2}); 8.00-8.19 (3H, m, $2H_{R1+R2}$, 8-H); 8.32 (1H, s, 6-H)
3c	1650,1710	960 (CSC)	1.41 (3H, t, J = 10.0, CH_3); 2.94 (2H, q, J = 10.0, $\underline{CH_2}CH_3$); 5.16 (2H, s, CH_2); 7.55 (1H, d, J = 8.0, 9-H); 7.68-8.00 (2H, m, H_{R1+R2}); 8.10 (3H, m, $2H_{R1+R2}$, 8-H); 8.35 (1H, s, 6-H)
3d	1670, 1700	955 (CSC)	5.14 (2H, s, CH_2); 7.53 (1H, d, J = 8.0, 9-H); 7.77-7.95 (2H, m, H_{R1+R2}); 8.13 (2H, m, H_{R1+R2}); 8.24 (1H, dd, ^3J = 8.0, ^4J = 2.0, 8-H); 8.60 (1H, d, J = 2.0, 6-H)
3e	1710, 1670	970 (CSC)	5.13 (2H, s, CH_2); 7.58-8.02 (4H, m, $2H_{R1+R2}$, 7-, 9-H); 8.08-8.25 (2H, m, H_{R1+R2}); 8.45 (1H, d, J = 8.0, 6-H)
3f	1670, 1700	965 (CSC)	5.18 (2H, s, CH_2); 7.60-7.95 (4H, m, $2H_{R1+R2}$, 8-, 9-H); 8.07-8.20 (3H, m, $2H_{R4}$, 6-H)
3g	1650, 1720		2.70 (3H, s, 4'-CH_3); 5.12 (2H, s, CH_2); 7.30 (1H, s, 5'-H); 7.50-7.80 (2H, d and t, J = 8.0, J = 8.0, 9-H, 7-H); 8.10 (1H, t, J = 8.0, 8-H); 8.49 (1H, d, J = 8.0, 6-H)
3h	1660, 1680	1260 (COC)	2.69 (3H, s, 4'-CH_3); 4.17 (3H, s, OCH_3); 4.20 (3H, s, OCH_3); 5.12 (2H, s, CH_2); 7.05 (1H, s, 9-H); 7.26 (1H, s, 5'-H); 7.86 (1H, s, 6-H)
3i	1660, 1700		5.17 (2H, s, CH_2); 7.55-7.85 (8H, m, 4'-Ph, 5'-,7-, 9-H); 8.12 (1H, t, J = 8.0, 8-H); 8.50 (1H, d, J = 8.0, 6-H)
3j	1650, 1690	1260 (COC)	4.17 (3H, s, OCH_3); 4.22 (3H, s, OCH_3); 5.21 (2H, s, CH_2); 7.09 (1H, s, 9-H); 7.60-7.80 (6H, m, 4'-Ph, 5'-H); 7.87 (1H, s, 6-H)
3k	1660, 1700		5.18 (2H, s, CH_2); 7.54-7.83 (7H, m, 4'-Ar, 5'-, 7-, 9-H); 8.12 (1H, t, J = 8.0, 8-H); 8.51 (1H, d, J = 8.0, 6-H)
3l	1650, 1700		2.60 (3H, s, CH_3); 5.21 (2H, s, CH_2); 7.50 (1H, d, J = 8.0, 9-H); 7.58-7.78 (5H, m, 4'-Ar, 5'-H); 7.95 (1H, d, J = 8.0, 8-H); 8.28 (1H, s,6-H)
3m	1640, 1690		2.92 (3H, s, CH_3); 5.20 (2H, s, CH_2); 7.58-7.80 (6H, m, 4'-Ar, 5'-, 9-H); 7.95 (1H, d, J = 8.0, 8-H); 8.40 (1H, d, J = 8.0, 6-H)
3n	1650, 1700	1260 (COC)	4.17 (3H, s, OCH_3); 4.21 (3H, s, OCH_3); 5.20 (2H, s, CH_2); 7.08 (1H, s, 9-H); 7.66 (5H, m, 4'-Ar, 5'-H); 7.87 (1H, s, 6-H)
3o	1660, 1720		5.20 (2H, s, CH_2); 7.35 (1H, d, J = 8.0, 9-H); 7.60-7.80 (5H, m, 4'-Ar, 5'-H); 8.38 (1H, dd, ^3J = 8.0, ^4J = 2.0, 8-H); 8.80 (1H, d, J = 2.0, 6-H)
3p	1660, 1700		5.23 (2H, s, CH_2); 7.66 (7H, m, 4'-Ar, 5'-, 7-, 9-H); 8.56 (1H, d, J = 8.0, 6-H)
3q	1670, 1690		5.17 (2H, s, CH_2); 7.55-7.86 (7H, m, 4'-Ar, 5'-, 7-, 9-H); 8.12 (1H, t, J = 8.0, 8-H); 8.50 (1H, d, J = 8.0, 6-H)
3r	1650, 1710		2.61 (3H, s, CH_3); 5.16 (2H, s, CH_2); 7.52 (1H, d, J = 8.0, 9-H); 7.60-8.00 (6H, m, 4'-Ar, 5'-, 8-H); 8.29 (1H, s, 6-H)
3s	1640, 1680	1265 (COC)	4.17 (3H, s, OCH_3); 4.22 (3H, s, OCH_3); 5.20 (2H, c, CH_2); 7.09 (1H, s, 9-H); 7.61 (2H, d, J = 8.0, 4'-Ar); 7.70 (1H, s, 5'-H); 7.80 (2H, d, J = 8.0, 4'-Ar); 7.90 (1H, s, 6-H)
3t	1660, 1700		5.20 (2H, s, CH_2); 7.56-7.77 (7H, m, 4'-Ar, 5'-, 7-, 9-H); 8.42 (1H, d, J = 8.0, 6-H)

TABLE 2 (continued)

1	2	3	4
3u	1670, 1700		5.16 (2H, s, CH_2); 7.56-7.76 (7H, m, 4'-Ar, 5'-, 8-, 9-H); 8.15 (1H, dd, ^3J = 8.0, ^4J = 4.0, 6-H)
3v	1660, 1700	2820, 2850 (CH)	1.94 (6H, m, $3CH_2$ in Ad); 2.12 (6H, m, $3CH_2$ in Ad); 2.23 (3H, CH_{Ad}); 5.15 (2H, s, CH_2); 7.29 (1H, s, 5'-H); 7.55 (1H, d, J = 8.0, 9-H); 7.76 (1H, t, J = 8.0, 7-H); 8.10 (1H, t, J = 8.0, 8-H); 8.45 (1H, d, J = 8.0, 6-H)
3w	1660,1700	2820, 2850 (CH)	1.94 (6H, m, $3CH_2$ in Ad); 2.12 (6H, m, $3CH_2$ in Ad); 2.23 (3H, CH_{Ad}); 2.59 (3H, s, CH_3); 5.12 (2H, s, CH_2); 7.37 (1H, s, 5'-H); 7.48 (1H, d, J = 8.0, 9-H); 7.92 (1H, d, J = 8.0, 8-H); 8.29 (1H, s, 6-H)
3x	1640, 1700	2850 (CH)	2.09 (4H, s, H_{R1+R2}); 2.95 (4H, s, H_{R1+R2}); 5.07 (2H, s, CH_2); 7.50 (1H, d, J = 8.0, 9-H); 7.71 (1H, t, J = 8.0, 7-H); 8.1 (1H, t, J = 8.0, 8-H); 8.45 (1H, d, J = 8.0, 6-H)
3y	1660, 1720	2850 (CH)	2.09 (4H, s, H_{R1+R2}); 2.59 (3H, s, CH_3); 2.93 (4H, s, H_{R1+R2}); 5.04 (2H, s, CH_2); 7.42 (1H, d, J = 8.0, 9-H); 7.90 (1H, d, J = 8.0, 8-H); 8.27 (1H, s, 6-H)
3z	1650, 1710		2.07 (4H, s, H_{R1+R2}); 2.93 (4H, s, H_{R1+R2}); 5.47 (2H, s, CH_2); 7.28 (1H, d, J = 8.0, 9-H); 8.35 (1H, dd, ^3J = 8.0, ^4J = 2.0, 8-H); 8.75 (1H, d, J = 2.0, 6-H)

*In the IR spectra of the benzothiazolyl derivatives **3a-f** a strong CSC absorption band was observed, probably caused by the asymmetric stretching vibrations of CSC (in the IR spectra of the remaining compounds this band was weak and when among others was not separated). For compounds **3h,j,n,s** the strong COC absorption band is caused by the asymmetric COC stretching vibrations (the band for the symmetric COC vibrations has low intensity and when among others the band is not separated).

The IR spectra of pyrrolo[1,2-*a*]quinazolinediones **3a-z** show two strong bands for the stretching vibrations of the carbonyl groups at 1680-1720 (5-CO) and 1640-1660 cm^{-1} (2-CO)*. The stretching vibrations of the N–H group are observed as weak bands at 3150-3200 cm^{-1}.

We have therefore developed a method for the synthesis of 3-hetaryl-1,2,4,5-tetrahydropyrrolo[1,2-*a*]-quinazoline-2,5-diones, which may be of interest as biologically active compounds.

EXPERIMENTAL

A check on the progress of reactions and the purity of substances obtained was effected by TLC on Silufol UV 254 plates in chloroform–methanol, 9:1, and benzene–ethanol, 9:1. The IR spectra were recorded on a Pye Unicam SP 3-300 in KBr tablets. The ^1H NMR spectra were recorded in DMSO-d_6 or CF_3COOD on a Bruker WP 100 SY (100 MHz) instrument.

* The reverse assignment of the absorption bands of the carbonyl groups was mistakenly made in [7-9]. Analysis of the IR spectra of substituted synthesized compounds **3** showed that the introduction of a substituent into positions 7, 8, and 9 proved to have a significant influence only on the position of the shorter wave absorption band. This enables its assignment as the vibration of the 5-CO group.

The analytical characteristics of the 3-hetaryl-1,2,4,5-tetrahydropyrrolo[1,2-*a*]quinazoline-2,5-diones are given in Table 1, and the spectral characteristics in Table 2.

4-Chloro-2-hetaryl-3-oxobutyronitriles **1a-e** [10,12] and the substituted 2-aminobenzoic acids **2** [13,14] were obtained by known methods.

2-[4-(1-Adamantyl)-2-thiazolyl]-4-chloro-3-oxobutyronitrile (1f). A. 1-(α-Bromoacetyl)adamantane [15] (24 g, 0.093 mol) was added to a solution of thiocyanoacetamide (9.3 g, 0.093 mol) in ethanol (50 ml). The mixture became heated and the bromo ketone dissolved. After 10 min yellow crystals of 4-(1-adamantyl)-2-cyanomethylthiazole hydrobromide precipitated. The mixture was cooled, the solid hydrobromide was filtered off, and washed with ethanol. The crystals obtained were treated with 25% ammonia solution (about 50 ml), which converted them into an oil, and the oil was removed with a separating funnel. The aqueous ammonia layer was extracted with benzene (2 × 30 ml), the extract combined with the obtained oil, washed with water (2 × 50 ml), and dried over $MgSO_4$. The benzene was distilled off in the vacuum of a water-jet pump, the residue was distilled in vacuum, collecting the fraction with bp 176-181°C (0.07 mm Hg), which crystallized in the receiver. 4-(1-Adamantyl)-2-cyanomethylthiazole (17 g, 71%) was obtained; mp 47°C. ^{1}H NMR spectrum (DMSO-d_6), δ, ppm: 7.20 (1H, s, 5-H); 4.50 (2H, s, CH_2); 2.02 (3H, m, 3CH in Ad); 1.92 (6H, m, $3CH_2$ in Ad); 1.73 (6H, m, $3CH_2$ in Ad). Found, %: N 9.92; S 11.01. $C_{15}H_{18}N_2S$. Calculated, %: N 9.71; S 11.12.

B. Chloroacetyl chloride (1.6 ml, 0.021 mol) was added to a solution of 4-(1-adamantyl)-2-cyanomethylthiazole (5.1 g, 0.02 mol) and pyridine (1.7 ml, 0.021 mol) in dry dioxane (8 ml). The mixture became heated and a yellow solid was precipitated. The obtained mixture was heated on a water bath for 1 h. After cooling, the precipitated solid was filtered off, washed with dioxane, and then with water. Compound **1f** (6.1 g, 91%) was obtained; mp 178°C (dioxane). ^{1}H NMR spectrum (DMSO-d_6), δ, ppm: 13.20 (1H, br. s, NH); 7.25 (1H, s, 5-H); 4.40 (2H, s, CH_2); 2.02 (3H, m, 3CH in Ad); 1.92 (6H, m, $3CH_2$ in Ad); 1.76 (6H, m, $3CH_2$ in Ad). Found, %: Cl 10.52; N 7.79; S 8.93. $C_{17}H_{19}ClN_2OS$. Calculated, %: Cl 10.59; N 7.68; S 8.79.

4-Chloro-3-oxo-2-(4,5,6,7-tetrahydro-2-benzothiazolyl)butyronitrile (1g). A. 2-Bromocyclohexanone (70.8 g, 0.4 mol) was added to a hot solution of thiocyanoacetamide (40 g, 0.4 mol) in isopropanol (250 ml) and the mixture was refluxed for 1.5 h. The solvent was evaporated in vacuum, and the oil obtained was treated with 25% ammonia solution (150 ml). The aqueous ammonia layer was extracted with benzene (3 × 50 ml), the combined extract washed with water (2 × 50 ml), and dried over $MgSO_4$. The benzene was distilled off in the vacuum of a water-jet pump, the residue was distilled in vacuum collecting the fraction with bp 123-128°C (0.06 mm Hg). 2-Cyanomethyl-4,5,6,7-tetrahydrobenzothiazole (58 g, 81%) was obtained. ^{1}H NMR spectrum (DMSO-d_6), δ, ppm: 4.50 (2H, s, CH_2); 2.02 (4H, m, 4,4,7,7-H); 1.92 (4H, m, 5,5,6,6-H). Found, %: N 15.82; S 18.11. $C_9H_{10}N_2S$. Calculated, %: N 15.73; S 17.97.

B. Chloroacetyl chloride (1.6 ml, 0.021 mol) was added to a solution of 2-cyanomethyl-4,5,6,7-tetrahydrobenzothiazole (3.2 ml, 0.02 mol) and pyridine (1.7 ml, 0.021 mol) in dry dioxane (10 ml). Heating of the mixture occurred and a yellow solid was precipitated. The mixture obtained was heated on a water bath for 1 h. After cooling, the precipitated solid was filtered off, washed with dioxane, and then with water. Compound **1g** (4.0 g, 80%) was obtained; mp 205°C (dioxane). ^{1}H NMR spectrum (DMSO-d_6), δ, ppm: 13.20 (1H, br. s, NH); 4.40 (2H, s, CH_2); 2.50 (4H, m, H_{R1+R2}); 1.76 (4H, m, H_{R1+R2}). Found, %: Cl 13.96; N 10.02; S 11.13. $C_{11}H_{11}ClN_2OS$. Calculated, %: Cl 13.92; N 11.00; S 11.26.

3-(2-Benzothiazolyl)-1,2,4,5-tetrahydropyrrolo[1,2-*a*]quinazoline-2,5-dione (3a) {General Procedure for Synthesizing 3-(4-R^1-5-R^2-2-thiazolyl)-1,2,4,5-tetrahydropyrrolo[1,2-*a*]quinazoline-2,5-diones 3a-z}. Triethylamine (0.48 ml, 0.0035 mol) was added to a suspension of 2-(2-benzothiazolyl)-4-chloro-3-oxobutyronitrile **1a** (0.75 g, 0.003 mol) and anthranilic acid **2** (0.45 g, 0.0035 mol) in dioxane (5 ml) and the mixture was refluxed for 6 h until disappearance of the initial nitrile **1a** from the reaction mixture (TLC). The mixture was cooled, the precipitated solid filtered off, washed with dioxane, and then with water. The solid was dried, and recrystallized from DMF. Compound **3a** (0.80 g) was obtained.

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