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5*H*-Benzothiazolo[3,2-*a*]quinazolin-5-ones (Va-d) were synthesized by thermal cyclization of *N*-(2-benzothiazolyl)-2-fluorobenzamides (IVa-d) which were obtained by allowing 2-fluorobenzoyl chloride to react with 2-aminobenzothiazoles.

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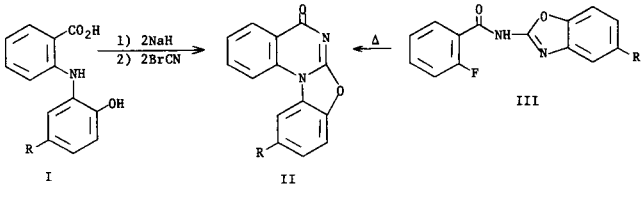
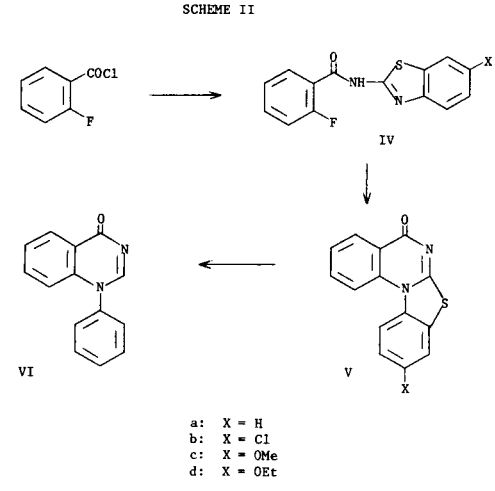
In a previous communication (1) I have described a facile synthesis of 5*H*-benzoxazolo[3,2-*a*]quinazolin-5-ones (II) by the treatment of disodium salt of *N*-(2-hydroxyphenyl)anthranilic acids (I) with cyanogen bromide. The thermal cyclization of *N*-(2-benzoxazolyl)-2-fluorobenzamides (III) which were prepared from 2-fluorobenzoyl chloride and 2-aminobenzoxazoles was an alternative route for the compounds (Scheme I). Our efforts in the search for a novel antiinflammatory lead compound led me to extend the work with the synthesis of benzothiazolo[3,2-*a*]quinazolin-5-ones by the latter method. Only a few reports on the angular benzothiazoloquinazoline are found in the literature: Modi, *et al* (2), described the synthesis of 8,9,10,11-tetrahydro-5*H*-benzothiazolo[3,2-*a*]quinazolin-5-ones, and Shulga reported on 1,2,3,4-tetrahydrobenzothiazolo[3,2-*a*]quinazolin-12-ium salts (3,4).

SCHEME I



Treatment of 2-aminobenzothiazole with 2-fluorobenzoyl chloride in the presence of triethylamine afforded *N*-(2-benzothiazolyl)-2-fluorobenzamide (IVa) in a 76% yield (Scheme II). Other intermediates prepared similarly are listed in Table I.

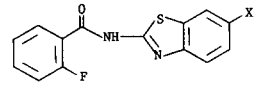
SCHEME II



The cyclization of IVa was effected by fusion neat for a few minutes giving Va in a 45% yield. The product showed an infrared absorption band at 6.00μ which is attributable to the carbonyl group at the 5-position, and the combustion analysis agreed with the formula $C_{14}H_8N_2OS$. Furthermore, in support of the structure V, the

Table I

N-(2-Benzothiazolyl)-2-fluorobenzamides



Compound No.	X	Mp (°C)	Yield, %	Formula	Analysis C, % Calcd.	C, % Found	H, % Calcd.	H, % Found	N, % Calcd.	N, % Found
IVa	H	158-161	76	$C_{14}H_9FN_2OS$	61.75	61.76	3.33	3.13	10.29	10.33
IVb	Cl	225-228	60	$C_{14}H_8ClFN_2OS$	54.82	54.89	2.63	2.57	9.13	8.99
IVc	OMe	177-180	89	$C_{15}H_{11}FN_2O_2S$	59.59	59.74	3.67	3.52	9.27	9.33
IVd	OEt	169-171	81	$C_{16}H_{13}FN_2O_2S$	60.74	60.94	4.14	4.12	8.86	8.80

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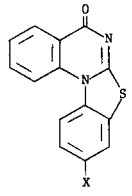
Table II

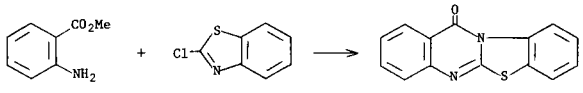
5*H*-Benzothiazolo[3,2-*a*]quinazolin-5-ones



Compound No.	X	Mp (°C)	Yield, %	Formula	Analysis C, % Calcd.	C, % Found	H, % Calcd.	H, % Found	N, % Calcd.	N, % Found
Va	H	233-235	45	$C_{14}H_8N_2OS$	66.66	66.54	3.20	3.15	11.11	11.09
Vb	Cl	349-350	60	$C_{14}H_7ClN_2OS$	58.64	58.59	2.46	2.56	9.77	9.92
Vc	OMe	277-279	54	$C_{15}H_{10}N_2O_2S$	63.83	63.73	3.57	3.55	9.93	10.04
Vd	OEt	218-221	79	$C_{16}H_{12}N_2O_2S$	64.84	64.85	4.08	4.15	9.46	9.45

desulfurization of the product with Raney nickel in refluxing ethanol afforded 1-phenyl-1,4-quinazolin-4-one. An unlikely but possible alternative structure VII was ruled out by direct comparison of the product with the linear isomer (VII) prepared by the method described by McCarty (5) (Scheme III); the melting point of the binary mixture of the two was depressed. Table II lists 5*H*-benzothiazolo-[3,2-*a*]quinazolin-5-ones prepared in this study.

SCHEME III



VII

EXPERIMENTAL

Melting points were determined in capillary tubes using a Thomas-Hoover melting point apparatus and are uncorrected. Ir spectra were obtained in potassium bromide pellets using a Perkin-Elmer 21 spectrophotometer, and Nmr spectra were taken on a Varian XL-100 spectrometer using tetramethylsilane as the internal reference. Combustion elemental analyses were performed by the Analytical Section of these laboratories.

N-(2-Benzothiazolyl)-2-fluorobenzamide (IVa).

To a stirring mixture of 2-aminobenzothiazole (14 g), triethylamine (9.4 g) and benzene (300 ml) was added slowly 2-fluorobenzoyl chloride (15 g). The resulting mixture was stirred at room temperature for 1 hour, then heated under reflux for 0.5 hour. After being cooled to room temperature, the mixture was filtered. The filtrate was concentrated on a rotary evaporator under reduced pressure to about 50 ml. The precipitate that separated was collected on a filter, washed with ether and recrystallized from ethyl acetate giving 19.2 g of the product (see Table I); ir: μ 5.98 (C=O); nmr (deuteriochloroform): a complex aromatic multiplet centered at δ 7.50 (8H) and an exchangeable singlet at δ 10.50 ppm (NH). Compounds IVb-d (see Table I) were similarly prepared (see Table I).

5*H*-Benzothiazolo[3,2-*a*]quinazolin-5-one (Va).

Three g of IVa were fused neat for about 5 minutes using a gas burner in a well ventilated hood. The solid mass thus obtained was crushed to powder and triturated with ethanol, then recrystallized from dimethylformamide, giving 1.25 g (45%) of the product. Compounds Vb-d were similarly prepared (see Table II).

1,4-Dihydro-phenylquinazolin-4-one (VI).

A mixture of Va (2.65 g), Raney nickel (9 g) and ethanol (250 ml) was heated under reflux for 6 hours and filtered hot. When the filtrate was allowed to set at room temperature overnight, a precipitate was separated. The precipitate was collected on a filter and washed with ethanol giving 1.5 g of the unreacted starting material. The filtrate was concentrated to about 20 ml on a rotary evaporator, and the concentrated solution was set at room temperature overnight. The precipitate that separated was collected on a filter and recrystallized from ethyl acetate twice, giving VI. The mp (181-182°) and spectral data of the product agreed with those reported by Irwin (6).

REFERENCES AND NOTES

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(5) J. E. McCarty, *J. Org. Chem.*, **27**, 2672 (1962).

(6) W. J. Irwin, *J. Chem. Soc., Perkin Trans. I*, 353 (1972).