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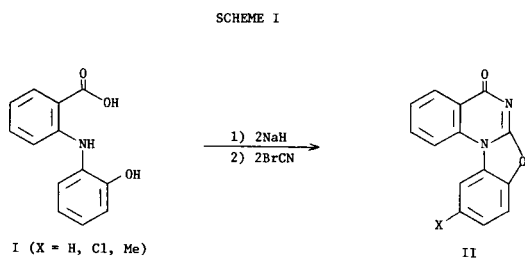
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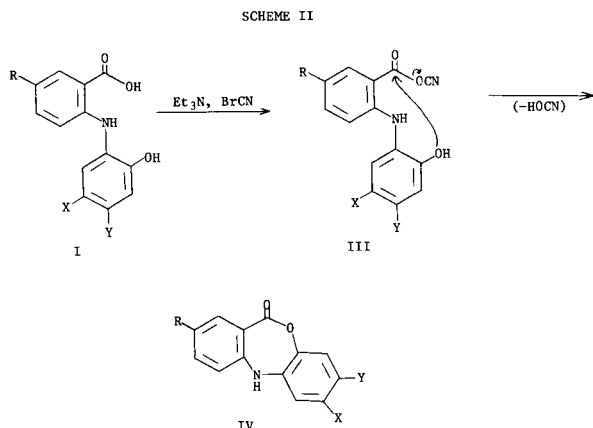
The treatment of *N*-(2-hydroxyphenyl)anthranilic acids with cyanogen bromide in the presence of triethylamine gave dibenz[*b,e*][1,4]oxazepin-11-(5*H*)ones in good yields.

J. Heterocyclic Chem., **18**, 855 (1981).

Previously we reported (1) that the disodium salts of *N*-(2-hydroxyphenyl)anthranilic acids (I) afford 5*H*-benzoxazolo[3,2-*a*]quinazolin-5-ones (II) in excellent yields upon the treatment with more than two equivalent amounts of cyanogen bromide in tetrahydrofuran (Scheme I).



This paper reports that in the presence of an organic base such as triethylamine the reaction of I with cyanogen bromide takes a different cyclization course from the one previously reported to form the lactones, dibenz[*b,e*][1,4]oxazepin-11-(5*H*)ones (IV). Apparently, under the reaction conditions cyanogen bromide reacts only with the carboxylic acid group in I to give the labile intermediates III which cyclize with internal displacement of the cyanate by the phenolic hydroxy group (Scheme II).



- a: R = X = Y = H
 b: R = H, X = Cl, Y = H
 c: R = NO₂, X = CH₃, Y = H
 d: R = NO₂, X = H, Y = CH₃

In a typical example, two equivalent amounts of cyanogen bromide and triethylamine were added to an ice-chilled solution of Ib in tetrahydrofuran, and the resulting mixture was allowed to stir for 0.5 hour at 0°, 2 hours at room temperature, and was heated to reflux briefly, giving IVb in a 53% yield. The melting point (236-238°) and the infrared spectrum of IVb thus prepared were in agreement with those reported by Raines, *et al* (2), and the elemental analysis was satisfactory for the structure. Table I lists dibenz[*b,e*][1,4]oxazepin-11-(5*H*)ones prepared in the similar fashion.

The parent member (IVa) of the ring system has been reported first by Gurien, *et al* (3), who effected the cyclization of Ia to IVa by using thionyl chloride in 15.7% yield. However, the lactone thus prepared was unstable when exposed to air. Soon after, Raines, *et al* (2), reported that the use of dicyclohexylcarbodiimide for such cyclization gives stable product in better yield (21-77%). The products prepared by the cyanogen bromide method are also stable, and the yields (53-81%) are even higher than those obtained by the dicyclohexylcarbodiimide method.

The successful synthesis of lactone by the use of the cyanogen bromide indicates potential usefulness of the reagent in the preparation of esters and amides including peptides.

EXPERIMENTAL

Melting points were determined in capillary tubes (Thomas-Hoover melting point apparatus) and are uncorrected. Ir spectra were obtained in potassium bromide pellets using a Perkin-Elmer 21 spectrophotometer. Combustion elemental analyses were performed by the Analytical Section of these Laboratories.

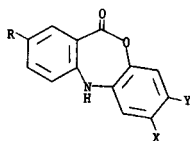
The syntheses of *N*-(2-hydroxyphenyl)anthranilic acids Ia-c were described in the literature (1,4) and *N*-(2-hydroxy-4-methylphenyl)-5-nitroanthranilic acid (Id) was prepared by the procedure described by Kim (1), mp 232-234° dec.

Anal. Calcd. for C₁₄H₁₂N₂O₅: C, 58.33; H, 4.20; N, 9.72. Found: C, 58.16; H, 4.10; N, 9.71.

7-Chlorodibenz[*b,e*][1,4]oxazepin-11-(5*H*)one (IVb).

The syntheses of IVa-d were exemplified by the preparation of IVb. To an ice-chilled solution of Ib (2.6 g, 0.01 mole) in 70 ml of tetrahydrofuran was added cyanogen bromide (2.2 g, 0.02 mole) and triethylamine (2.1 g, 0.02 mole). The resulting mixture was stirred for 0.5 hour at 0° for 2 hours at room temperature, then was heated under gentle reflux for 15

Table I
Dibenz[*b,e*][1,4]oxazepin-11-(5*H*)ones



| Compound No. | R | X | Y | Mp, °C | Recrystallization | | Formula | Analysis |
|--------------|-----------------|----|----|-------------|-------------------|----------|---|---|
| | | | | | Solvent | Yield, % | | |
| IVa | H | H | H | 158-160 (a) | EtOH | 52.5 | C ₁₃ H ₉ NO ₂ | Calcd. C, 73.92; H, 4.30; N, 6.60 Found C, 73.53; H, 3.94; N, 6.51 |
| IVb | H | Cl | H | 236-238 (b) | EtOH | 53 | C ₁₃ H ₈ ClNO ₂ | Calcd. C, 63.55; H, 3.28; N, 5.70 Found C, 63.28; H, 3.32; N, 6.04 |
| IVc | NO ₂ | Me | H | 288-290 | THF | 83 | C ₁₄ H ₁₀ N ₂ O ₄ | Calcd. C, 62.22; H, 3.73; N, 10.37 Found C, 62.23; H, 3.63; N, 10.50 |
| IVd | NO ₂ | H | Me | 275-277 | THF | 57 | C ₁₄ H ₁₀ N ₂ O ₄ | Calcd. C, 62.22; H, 3.73; N, 10.37 Found C, 62.39; H, 3.90; N, 10.40 |

(a) Literature mp 159-161° (2) and 161-162° (3). (b) Literature mp 236-238° (2).

minutes. After the reaction mixture was cooled to room temperature, it was filtered to remove salts and the filter residue was washed with tetrahydrofuran. The combined filtrate and washings were evaporated on a rotary evaporator under reduced pressure to give a solid residue. The residue was triturated with ether several times, then with water, giving 3.3 g of product, mp 220-225°. Recrystallization from ethanol improved the mp to 236-238°, and gave 1.3 g (53% yield) of analytically pure IVb (see Table I).

REFERENCES AND NOTES

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- (2) S. Raines, C. A. Kovacs, S. Goldstein and F. P. Palopoli, *J. Med. Chem.*, **11**, 895 (1968).
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