北醫學報 第二十三卷 第一期 1994年六月
P. 21-23

Heteroquinones with Biological Activity III: Synthesis of Indoloquinolinequinones

Hsien-Shou Kuo and Chung-Lung Wang

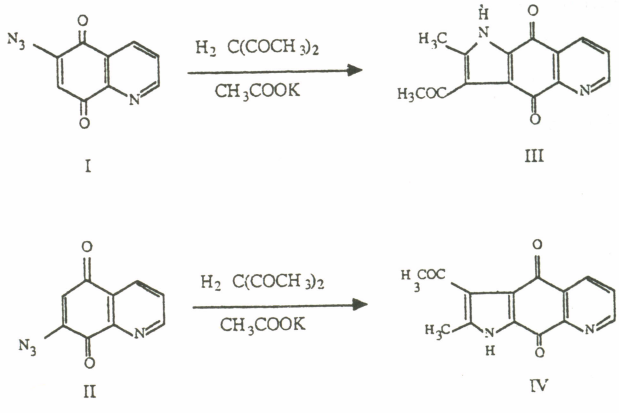
ABSTRACT

The Michael addition reactions of 6- and 7-azido-5,8- quinolinequinone with acetylacetone gave 2-methyl-3-acetylpyrrolo[2,3-g] quinoline-4,9-dione and 2-methyl-3-acetylpyrrolo[3,2-g] quinoline-4,9-dione, respectively.

Azidoquinones undergo a Michael addition reactions to give high yields of indoloquinones has been reported[1]. In continuation of our studies on the synthesis of heteroquinolinequinones[2], now we report the reaction of azidoquinolinequinones with active methylene, acetylacetone.

The azidoquinolinequinones (I, II, III) were prepared from the respective chloro-subsituted quinolinequinone by direct nucleophlilic displacement of the halogen by azide ion in ethanolic solution[3]. The 6-azido-5,8-quinolinequinone (I) reacts immediately with acetylacetone in present of potassium acetate to give 2-methyl-3-acetylpyrrolo [2,3-g] quinoline-4,9-dione (III). Similarly, acetylaetone reacts with 7-azido-5, 8-quinolinequinones (II) in the potassium acetate to give 2-methyl-3-aetylpyrrolo [3,2-g]-quinoline-4,9-dione (IV).

The structure of these new indoloquinolinequinones based upon their spectra (ir, nmr, mass) and analytical data.



I III

II IV

Department of Organic Chemistry and Biochemistry, Taipei Medical College.
Received for Publication: May 5, 1994.

EXPERIMENTAL

The ir spectra were measured with a JRA-1 spectrometer using the pressed potassium bromide discs and the nmr spectra were recorded on a Varian A-60-A spectrometer with tetramethylsilan as internal standard. The mass spectra were obtained with a Hitachi RMU-6 mass spectrometer.

2-Methyl-3-acetylpyrrolo [2,3-g] quinoline-4,9-dione(III): A solution of 6-azido-5,8-quinolinquinone (1g, 5 mmol), acetylacetone (0.5 g, 5 mmol), and potassium acetate (0.55 g, 6 mmol) in absoluted methanol (25 ml) was refluxed for 3 hours. The mixture was poured into crushed ice, and the precipitate filtered and recrystallized from dioxane to give a yellow crystalline solid, III, 0.22g (18%), m.p. $<300°C$; ms: m/e 254 (M^+); nmr (CF_3COOD): 2.79, 3.01 (each 3H, each S, 2x CH_3; ir (KBr): 3000(NH), 1660 (CO), 1665 (CO).

Anal. Calcd. for $C_{14}H_{10}O_3N_2$: C, 66.12; H, 3.96; N, 11.02.

Found: C, 66.31; H, 3.70; N, 10.89.

2-Methyl-3-acetylpyrrolo [3,2-g] quinoline-4, 9-dione (IV): A solution of 7-azido-5, 8-quinolinequinone (1 g, 5 mmol), acetylacetone (0.5 g, 5 mmol), and potassium acetate (0.55 g, 6 mmol) in absoluted methanol (25 ml) was refluxed for 2 hours. The mixture was poured into crushed ice, and extacted with chloroform, and evaporated to dryness. The resulting residue was chromatographyed on alumina. Elution with chloroform afforded a solid which was recrystallized from dixane to give a yellow crystalline solid, IV, 0.04 g (3%), m.p. 283°C; ms: m/e 254 (M^+); nmr (CF_3COOD): 2.72, 2.98 (each 3H, each S, 2x CH_3); ir (KBr): 3180 (NH), 1665 (CO).

Anal. Calcd. for $C_{14}H_{10}O_3N_2$: C, 66.12; H, 3.96; N, 11.02.

Found: C, 66.41: H, 3.59; N, 11.30

REFERENCES

1. Cajipe G; Rutolo D. Moore H. W.: Reactions of Azidoquinones with Nucleophiles. Tetrahedron Letters 47, 4695-4698, 1973.
2. Lin S. F., Kuo H. S., Tung Y. C.: Heteroquinones with Biological Activitiy II: Synthesis and Antimicrobial Activities of 6-Amino-7-chloro-5,8-quinolinequinones Derivatives. Bulletin of Taipei Medical College 17: p67-72, 1988.
3. Yoshina S, Kuo H.S.: Studies on Hetercyclic Compounds XLI. Synthesis of 5,8-Quinolinequinone Derivatives (2). Synthesis of 6-and 7-Amino-5,8-quinolinequinone Derivatives. J. Pharm. Bull. Japn 97; 827-834, 1977.

雜環醌類之生理活性 III: 吲哚喹啉酮之合成

郭憲壽　王宗隆

6-及 7-疊氮基-5,8-喹啉酮與乙醯丙酮以 Michael 加成反應可分別得到 2-甲基-3-乙醯吡咯[2,3-g]喹啉-4,9-二酮及 2-甲基-3-乙醯吡咯[3,2-g]喹啉-4,9-二酮。

台北醫學院　有機化學與生化學科
民國八十三年五月五日受理