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INVESTIGATIONS OF 2,3'-BIQUINOLINES

23*. SYNTHESIS OF 1'-R-1',4'-DIHYDRO-2,3'-BIQUINOLIN-4'-ONES BY CLAISEN CONDENSATION

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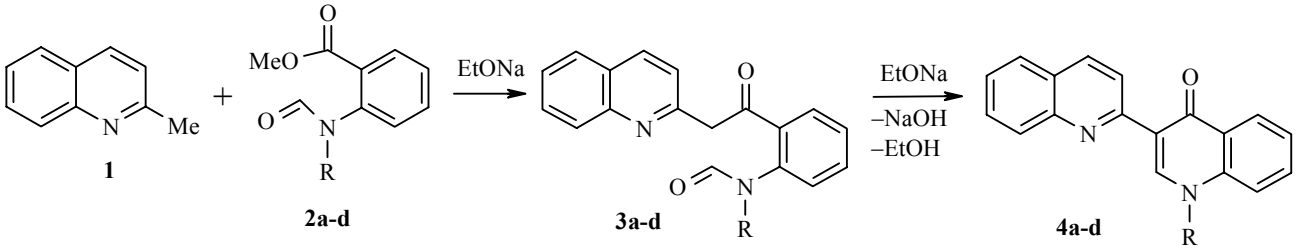
A method has been developed for the synthesis of 1'-R-1',4'-dihydro-2,3'-biquinolin-4'-ones based on the interaction of quinaldine with N-alkyl-N-formylanthranilic acid methyl esters under the conditions of the Claisen condensation.

Keywords: 2,3'-biquinolines, 1'-R-1',4'-dihydro-2,3'-biquinolin-4'-ones, N-alkyl-N-formylanthranilic acid methyl esters, Claisen condensation, cyclization.

Several methods have been developed previously for the synthesis of 1-'R-1',4'dihydro-2,3'-biquinolin-4'-ones **4**, based on hydroxylation of biquinolinium salts [2] or oxidation of polycyclic compounds [3,4]. One-stage methods of synthesis of these compounds starting from simple quinoline derivatives have not been studied, consequently we have developed such a method of synthesis, based on the Claisen condensation.

A similar conversion was described recently for the synthesis of 3-hetarylchromones [5]. We showed that quinolones **4** may be obtained by boiling quinaldine (**1**) and the methyl esters of N-alkyl-N-formyl-anthranilic acids **2** in ethanol in the presence of sodium ethylate.

The reaction probably comprises acylation of quinaldine and subsequent intramolecular condensation of the intermediate ketone **3**.



1 **2a-d** **3a-d** **4a-d**

2–4 a R = Me, **b** R = Et, **c** R = Bu, **d** R = CH_2Ph

Attempts to carry out this reaction using methyl esters of N-acetyl- and N-benzoylanthranilic acids were unsuccessful.

* For Communication 22 see [1].

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EXPERIMENTAL

The NMR spectra were recorded on a Bruker WP-200 (200 MHz) instrument, internal standard was TMS. The mass spectra were recorded on a MAT 311A instrument. A check on the progress of reactions and the homogeneity of synthesized compounds was effected on Silufol UV-254 plates, solvent system was ethyl acetate–petroleum ether, 1:1.

Synthesis of 1'-R-1',4'-Dihydro-2,3'-biquinolin-4'-ones (General Method). Quinaldine (0.14 g, 1 mmol) was added carefully to a solution of sodium ethylate, obtained by dissolving sodium (0.046 g, 2 mmol) in absolute ethanol (10 ml), and the mixture was stirred for 15 min. The methyl ester of the substituted anthranilic acid (1 mmol) was added. The mixture was stirred for 15 min, then boiled for 5 h, and poured into water (50 ml). The solid was filtered off, and dried.

1'-Methyl-1',4'-dihydro-2,3'-biquinolin-4'-one (4a, $C_{19}H_{14}N_2O$). Yield 0.146 g (51%); mp 193-194°C [2]. A mixing test with an authentic sample gave no depression of melting point. The ^{1}H NMR spectrum was identical to that given in [2].

1'-Ethyl-1',4'-dihydro-2,3'-biquinolin-4'-one (4b, $C_{20}H_{16}N_2O$). Yield 0.15 g (50%); mp 139-140°C (benzene) (lit. mp 139-140°C [2]). A mixing test with an authentic sample gave no depression of melting point. The ^{1}H NMR spectrum was identical to that given in [2].

1'-Butyl-1',4'-dihydro-2,3'-biquinolin-4'-one (4c, $C_{22}H_{20}N_2O$). Yield 0.157 g (48%); mp 125-126°C (benzene), (lit. mp 125-126°C [2]). A mixing test with an authentic known sample gave no depression of melting point. The ^{1}H NMR spectrum was identical to that given in [2].

1'-Benzyl-1',4'-dihydro-2,3'-biquinolin-4'-one (4d, $C_{25}H_{18}N_2O$). Yield 0.065 g (18%); mp 171-172°C (benzene) (lit. mp 171-172°C [2]). A mixing test with an authentic sample gave no depression of melting point. The ^{1}H NMR spectrum was identical to that given in [2].

REFERENCES

1. D. V. Moiseev, V. I. Goncharov, and A. V. Aksenov, *Khim. Geterotsikl. Soedin.*, 848 (2007). [*Chem. Heterocycl. Comp.*, **43**, 715 (2007)].
2. O.N. Nadein and A. V. Aksenov, *Khim. Geterotsikl. Soedin.*, 942 (2001). [*Chem. Heterocycl. Comp.*, **37**, 867 (2001)].
3. F. Kröhnke, H. Dickhäuser, and I. Vogt, *Liebigs Ann. Chem.*, **644**, 93 (1961).
4. S. Niementowski, *Ber.*, **39**, 385 (1906).
5. V. G. Pivovarenko and V. P. Khilya, *Khim. Geterotsikl. Soedin.*, 625 (1991). [*Chem. Heterocycl. Comp.*, **27**, 496 (1991)].