# New Compounds

## Some Diethylaminoethyl Ethers of Coumarins

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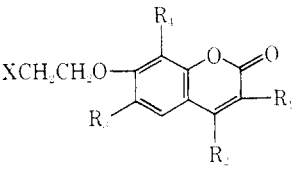
Some N-substituted aminoalkoxy derivatives of chromones[2] and flavones[3] have been reported to possess marked antispasmodic activity. Coumarins are structurally similar to these γ-pyrones and possess interesting biological properties.[4] Therefore, some β-diethylaminoethyl ethers from coumarins have been prepared.

### Experimental Section[5]

**β-Diethylaminoethoxycoumarins.**—To dry AcMe (50 ml) and anhydrous $K_2CO_3$ (0.15 mole), $Et_2N(CH_2)_2Cl \cdot HCl$ (0.15 mole) was added and the contents were thoroughly mixed. Hydroxycoumarin (0.01 mole) was then added with shaking. The reaction mixture was refluxed on a steam bath for 10 hr. Acetone was removed and after cooling $H_2O$ was added to the residue. It was kept overnight and the solid was filtered, washed ($H_2O$), and crystallized from dilute EtOH. See Table I. Compounds **3** and **5** were characterized as picrates and **4** as the oxalate.

TABLE I

DIETHYLAMINOETHYL ETHERS OF SUBSTITUTED 7-HYDROXYCOUMARINS




| No. | X | $R_1$ | $R_2$ | $R_3$ | $R_4$ | Formula[a] | Yield, % | Mp, °C |
|---|---|---|---|---|---|---|---|---|
| 1 | $NEt_2$ | H | Me | Cl | H | $C_{16}H_{20}ClNO_3$ | 70 | 92 |
| 2 | $NEt_2$ | H | Me | Br | H | $C_{16}H_{20}BrNO_3$ | 68 | 86 |
| 3 | $NEt_2 \cdot C_6H_3N_3O_7$ | $CH_2C_6H_5$ | Me | H | H | $C_{29}H_{30}N_4O_{10}$ | 70 | 142 |
| 4 | $NEt_2 \cdot C_2H_2O_4$ | H | Ph | H | H | $C_{23}H_{25}NO_7$ | 75 | 170 |
| 5 | $NEt_2 \cdot C_6H_3N_3O_7$ | H | Ph | Et | H | $C_{29}H_{30}N_4O_{10}$ | 58 | 150 |
| 6 | $NEt_2$ | Me | Me | Cl | H | $C_{17}H_{22}ClNO_3$ | 72 | 120 |
| 7 | $NEt_2$ | Et | Me | H | H | $C_{18}H_{25}NO_3$ | 60 | 85 |
| 8 | $NEt_2$ | *n*-Pr | Me | H | H | $C_{19}H_{27}NO_3$ | 58 | 65 |
| 9 | $NEt_2$ | H | Me | $NO_2$ | H | $C_{16}H_{20}N_2O_5$ | 75 | 136 |
| 10 | $NEt_2$ | H | Me | H | $NO_2$ | $C_{16}H_{20}N_2O_5$ | 62 | 125 |

[a] All compounds were analyzed for C, H, N.

(1) Research Division, Cleveland Clinic, Cleveland, Ohio.

(2) E. Kohlstaedt and K. M. Klinler, German Patent 1,018,874 (1957).

(3) P. K. Jesthi, B. K. Sabat, and M. K. Rout, *J. Indian Chem. Soc.*, **42**, 105 (1965).

(4) P. K. Bose, *ibid.*, **35**, 367 (1958); T. O. Soine, *J. Pharm. Sci.*, **53**, 231 (1964).

(5) Melting points were taken in capillaries and are uncorrected. Where analyses are indicated only by symbols of the elements analytical results obtained for those elements were within ±0.4% of the theoretical values.

## The Reaction of Chloroquinolines with Formamides[1]

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Many medicinally important agents bear amino functions often incorporated by displacement of an "activated" halogen. We should like to report an extension of a previously described[2] technique to several additional formamides and chloroquinolines and to call attention to the unusual behavior observed with monoalkylformamides.

### Experimental Section

**General Procedure for Aminoquinoline Synthesis.**—A solution of 1 g of the chloroquinoline and 10 ml of the formamide (predried by distillation over molecular sieves) was refluxed for 12 hr under a condenser protected by a $CaCl_2$ drying tube. The formamide solution was poured onto chopped ice and $Na_2CO_3$ solution (approximately 1 *M*) and extracted thoroughly ($Et_2O$). The ethereal layer was dried ($MgSO_4$) and evaporated, and the product was recrystallized or distilled *in vacuo* (see Table I).

**General Procedure for Monoalkylformamides.**—When 1 g of 2-chloroquinoline was refluxed for 12 hr with either N-methylformamide or N-*iso*-butylformamide and the reaction mixture then chilled, a 40 and 76% yield, respectively, of carbostyril could be isolated by filtration. No aminoquinoline was detected in the

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(2) N. D. Heindel and P. D. Kennewell, *Chem. Commun.*, 38 (1969).