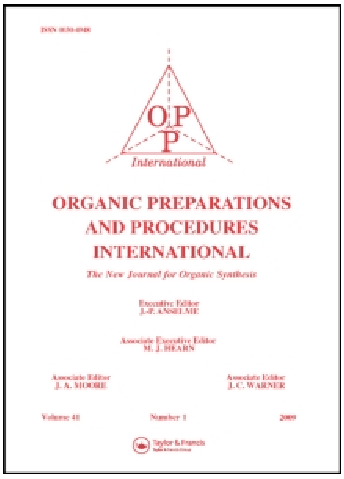

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A CONVENIENT SYNTHESIS OF THE PYRROLO[1,2-a]OUINOLINE RING SYSTEM

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A CONVENIENT SYNTHESIS OF THE PYRROLO[1,2-a]QUINOLINE RING SYSTEM

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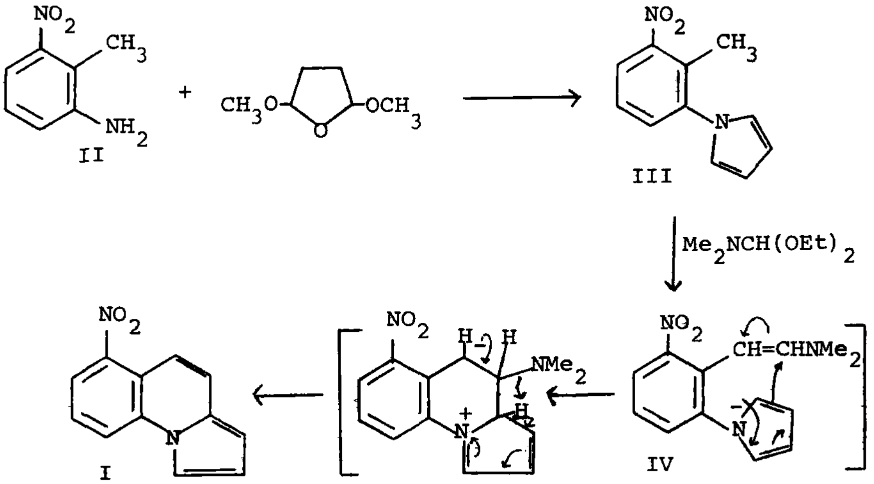
In connection with a synthetic program directed towards the synthesis of alkaloid-like compounds, 6-nitropyrrolo[1,2-a]quinoline (I) was required as a starting material. Since the four-step procedure of Boekelheide et al.[1] for the synthesis of this ring system was not suitable to our needs, an alternate pathway to I was examined. We now report here a simple, two-step process for the synthesis of I starting with commercially available 2-methyl-3-nitroaniline (III).

Compound II was converted in a straightforward fashion to the pyrrolyl derivative III with dimethoxytetrahydrofuran[2]



and this in turn was condensed with dimethylformamide diethylacetal.[3] The enamine IV formed in this latter reaction, underwent a facile intramolecular cyclization reaction under the influence of adsorbents such as silica gel or alumina to give the desired tricyclic compound I in good yield.

EXPERIMENTAL[4]

1-(2-Methyl-3-nitrophenyl)pyrrole (III). - A solution of 18.4 g (0.12 mole) of 2-methyl-3-nitroaniline[5] in 100 ml of glacial acetic acid was treated with 16 g (0.12 mole) of 2,5-dimethoxytetrahydrofuran[5] and heated on the steam bath for 1.5 hr. The resultant dark solution was poured into 600 ml of water and the mixture was extracted with 500 ml of ether. The organic layer was separated, washed, dried and concentrated. The residue was dissolved in carbon tetrachloride and purified by passing the solution through florisil. Evaporation of the eluant gave 18.9 g (78%) of III as an off-white solid. Recrystallization from hexane gave white plates, mp. 77-79°. Nmr spectrum (DMSO-d_6) δ 6.33 (2H, t, pyrrole), 7.00 (2H, t, pyrrole).

Anal. Calcd for $C_{11}H_{10}N_2O_2$: C, 65.34; H, 4.98; N, 13.85.
Found: C, 65.41; H, 4.88 N, 14.13.

6-Nitropyrrolo[1,2-a]quinoline (I). - A solution of 15.2 g (0.075 mole) of III in a mixture of 46.8 g (0.3 mole) of 94% dimethylformamide diethylacetal[3] and 30 ml of DMF was heated under reflux for 23 hr. Excess solvent was removed at reduced pressure and the residue was dissolved in benzene and purified by passing the solution through ca. 300 g of neutral grade alumina.[6] Continued elution with benzene and evaporation of the solvent gave a red solid which was recrystallized from 2-propanol-dichloromethane to yield 9.5 g (60%) of I as red needles, mp 137-139°. The mass spectrum showed the molecular ion at m/e = 212. The nmr spectrum (DMSO-d_6) was compatible: δ 6.64 (1H, m, pyrrole H), 6.83 (1H, t, pyrrole H), 7.33-8.57 (6H, m, aromatic); uv spectrum: $\lambda_{max}^{2\text{-propanol}}$ 228 nm (ε 28,000), 243 (24,300), 283 (5480), 316 (3320), 355 (2920) and 420 nm (3550).

<u>Anal</u>. Calcd for $C_{12}H_8N_2O_2$: C, 67.92; H, 3.80; N, 13.20. Found: C, 67.76; H, 3.49; N, 13.20.

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3. H. Meerwein, W. Florian, N. Schön and G. Stopp, Ann., <u>641</u>, 1 (1961).
4. All melting points are corrected. Nmr spectra were determined with a Varian A-60 spectrometer, mass spectra with a CEC 21-100 spectrometer and uv spectra with a Cary Model 14 spectrophotometer.
5. Commercially available from Aldrich Chem. Co.
6. The use of silica gel, instead of alumina, gave the same results.

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