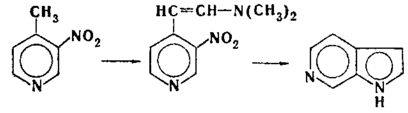
SYNTHESIS OF 6-AZAINDOLE

A. A. Prokopov and L. N. Yakhontov

UDC 547.75'821.07

We have developed a simple method for the preparation of 6-azaindole by condensation of dimethylformamide acetal with 3-nitro-4-methylpyridine (I) (obtained from 4-pyridone by the method in [1]) and subsequent hydrogenation.



I II III

A solution of 6.6 g of pyridine I and 10.6 g of dimethylformamide diethylacetal in 20 ml of anhydrous dimethylformamide (DMF) was heated at 80-90°C (bath temperature) for 30 min; the end of the reaction was monitored by gas–liquid chromatography (GLC) from the disappearance of the peak of starting I [with a Pye-Unicam 104 chromatograph with a 2.1-m by 4-mm column filled with SE-30 silicone elastomer on silanized diatomaceous earth (100-200 mesh); the helium flow rate was 29 ml/min, the column temperature was 150°C, and the retention time was 3.3 min]. The reaction mixture was vacuum evaporated to give 8.9 g (96%) of II as dark-red crystals with mp 106-107°C (from benzene). The product was quite soluble in water and ordinary organic solvents. IR spectrum: 1620 (C=C), 1590 (C=C, C=N, NO_2), and 1335 (NO_2) cm^{-1}. UV spectrum, λ_{max} (log ε): 234 (4.11), 276 (3.89), 349 (4.37), and 440 nm (3.92). PMR spectrum (δ, ppm, 100 MHz, $CDCl_3$): s 2.99 [$N(CH_3)_2$], 8.93 (2-H),* d 5.29 (4β-H), 7.33 (4α-H), 7.22 (5-H), and 8.19 (6-H). A 6.4-g sample of II was hydrogenated in 400 ml of ethanol in the presence of 2.3 g of PdO/C at room temperature at an excess hydrogen pressure of 20-30 cm (water column). The catalyst was then separated, the solution was evaporated, and the residue (3.68 g, mp 124-128°C) was recrystallized from benzene. The yield of 6-azaindole, with mp 133-135°C, was 3.12 g (80%). No melting-point depression was observed for a mixture of the product with a genuine sample [2]. The IR spectra of the two compounds were identical. The authors thank R. G. Glushkov and V. G. Granik for their valuable recommendations in carrying out this research.

LITERATURE CITED

1. O. Bremer, Ann., 529, 290 (1937).
2. M. H. Fisher and A. R. Matzuk, J. Heterocycl. Chem., 6, 775 (1969).

---

* The J constants for 2-H and 6-H are less than unity, and the 2-H signal in the spectrum is therefore represented by a singlet, and the 6-H signal is represented by a doublet.

S. Ordzhonikidze All-Union Scientific-Research Pharmaceutical-Chemistry Institute, Moscow 119021.
Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 8, pp. 1135-1136, August, 1977. Original article submitted January 18, 1977.