Aroylmethylamine Synthesis by Stephen Reduction of Aroyl Cyanides

C. G. STUCKWISCH

Department of Chemistry, University of Miami, Coral Gables, Florida 33124

Received June 15, 1971

The Stephen reduction of nitriles normally gives rise to an aldimine complex that affords the aldehyde on hydrolysis.[1] Wibaut and Overhoff isolated 2,6-dichloro-4-aminomethylpyridine as the end product of the Stephen reduction of 2,6-dichloro-4-cyanopyridine.[2]

In the course of the synthesis of sympathomimetic amines, we observed that the reduction of aroyl cyanides by the Stephen method leads to the corresponding aroylmethylamine hydrochlorides in good yields. Table I summarizes the results.

TABLE I

STEPHEN REDUCTION OF AROYL CYANIDES

ArCOCN	$ArCOCH_2NH_3^+ Cl^-$	
Ar⁻	Yield, %	Mp, °C
Phenyl[a]	67	184–186 dec[b]
2-Methylphenyl[c]	78	160–161 dec[b]
3-Methylphenyl[c]	50	174–175 dec[d]
4-Methylphenyl[c]	62	208–210 dec[d]
4-Methoxyphenyl[e]	60	197–199 dec[f]
3,4,5-Trimethoxyphenyl[g]	56	254–255 dec[h]
2-Furyl[i]	50	249–250 dec[j]

[a] T. S. Oakwood and C. A. Weisgerber, "Organic Syntheses," Collect. Vol. III, Wiley, New York, N. Y., 1958, p 112. [b] S. Cheng, S. Jonsson, and F. T. Semeniuk, *J. Pharm. Sci.*, **51**, 108 (1962). [c] F. Asinger, A. Saus, H. Offermanns, and H. D. Hahn, *Justus Liebigs Ann. Chem.*, **691**, 92 (1966). [d] G. Jones, *J. Chem. Soc.*, 1918 (1960). [e] J. F. Eastman and S. Selman, *J. Org. Chem.*, **26**, 293 (1961). [f] H. E. Baumgarten and J. M. Petersen, *J. Amer. Chem. Soc.*, **82**, 459 (1960). [g] G. P. Schiemenz and H. Engelhard, *Chem. Ber.*, **92**, 1336 (1959). [h] A. Sonn, *ibid.*, **58**, 1103 (1925). [i] E. Fischer and F. Brauns, *ibid.*, **46**, 892 (1913). [j] O. Dann, H. Ulrich, and E. E. Moeller, *Z. Naturforsch.*, **7b**, 344 (1952).

The amino ketones can be reduced to amino alcohols with hydrogen in the presence of a palladium-on-carbon catalyst;[3] however, direct reduction of acyl cyanides to amino alcohols is perferred.[4]

Experimental Section

Reduction Procedure.—Anhydrous stannous chloride (28.0 g, 0.15 mol) in 100 ml of anhydrous ether was saturated with hydrogen chloride at room temperature. While the mixture was stirred in an ice–water bath, 0.1 mol of the aroyl cyanide was added dropwise. After 3 hr the mixture was filtered and the residue was washed with anhydrous ether. The residue was suspended in 500 ml of water containing 5 ml of hydrochloric acid, and was then saturated with H_2S. The tin sulfides were removed by filtration and the filtrate was evaporated in a rotary still. The residual aroymethylamine hydrochloride was purified by crystallization from acetone–ether.

---

[1] E. Mossetig, *Org. React.*, **8**, 246 (1954).

[2] J. P. Wibaut and J. Overhoff, *Recl. Trav. Chim. Pays-Bas*, **52**, 55 (1933).

[3] G. N. Walker and M. A. Moore, *J. Org. Chem.*, **26**, 432 (1961).

[4] A. Burger and E. D. Hombaker, *J. Amer. Chem. Soc.*, **74**, 5514 (1952).

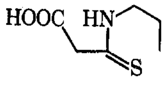
The Action of Hydrazine and Its Derivatives on the Addition Products of Allyl Isothiocyanate and Dimethyl Malonate. A Correction

GEORGE JUST* AND PHILLIP ROSSY

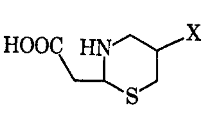
Department of Chemistry, McGill University, Montreal, 110, Quebec, Canada

Received July 15, 1971

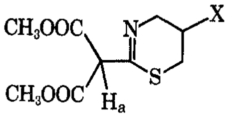
In connection with some other work, we needed samples of I and II, the preparation of which has been described by Worrell.[1]



I



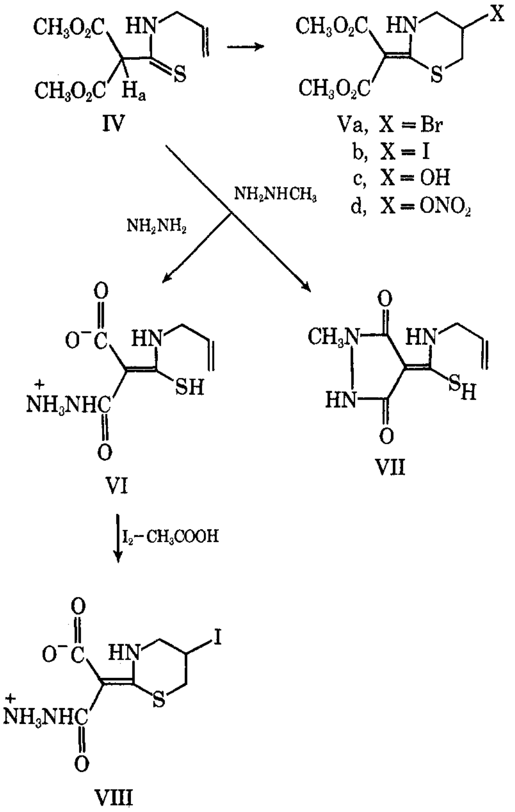
IIa, X = Cl
b, X = Br
c, X = I



III

Condensation of dimethyl malonate and allyl isothiocyanate gave IV. Hydrazinolysis of IV, followed by reaction with hydrochloric acid, did not, however, yield I, mp 120–121°, as described, but the hydrazide VI, mp 120–121° (Scheme I). No attempt was made to differentiate between the two possible geometric isomers.

SCHEME I



The structure of I had been based on its sufur analysis (Calcd for $C_6H_9O_2NS \cdot 2H_2O$: S, 16.4. Found:

---

[1] D. E. Worrell, *J. Amer. Chem. Soc.*, **54**, 2061 (1932).