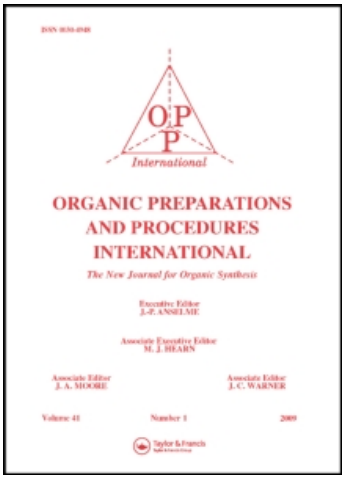

Organic Preparations and Procedures International
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t902189982

AN IMPROVED PROCEDURE FOR THE OXIDATION OF 2,5- AND 5,6-DIHALO-3-METHYLPYRIDINES

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To cite this Article Setliff, F. L. , Huie, W. R. and Adams, R. L.(1983) 'AN IMPROVED PROCEDURE FOR THE OXIDATION OF 2,5- AND 5,6-DIHALO-3-METHYLPYRIDINES', Organic Preparations and Procedures International, 15: 1, 67 — 68
To link to this Article: DOI: 10.1080/00304948309355433
URL: http://dx.doi.org/10.1080/00304948309355433

9. a) U. Krueerke, E. Wittouck, Chem. Ber., 95, 174 (1962).
b) P. Ch. Wälchli, C. H. Eugster, Helv. Chim. Acta, 61, 885 (1978).
10. N. Campbell, A. H. Sommers, Org. Synth. Coll. Vol., 3, 446 (1955).
11. F. Degering, L. G. Boatright, J. Am. Chem. Soc., 72, 5137 (1950).
12. O. L. Chapman, K. C. Mattes, R. S. Cheridan, J. A. Klun, ibid., 100, 4878 (1978).
13. F. L. M. Pattison, J. B. Stothers, R. G. Woolford, ibid., 78, 2255 (1956).

AN IMPROVED PROCEDURE FOR THE OXIDATION OF 2,5- AND 5,6-DIHALO-3-METHYLPYRIDINES

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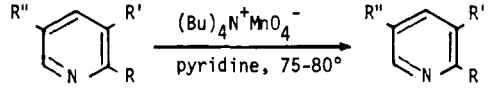
Oxidations of 2,5- and 5,6- dihalo-3-methylpyridines to the respective 2,5- and 5,6- dihalonicotinic acids with aqueous potassium permanganate proceed in low yields (10-50%)[1-5]. The use of tetrabutylammonium permanganate (TBAP) in pyridine[6] significantly improves the yields of the aforementioned oxidations (Table 1).



I II

a)	R = Cl; R' = Br; R" = CH_3	a) R = Cl; R' = Br; R" = COOH
b)	R = Br; R' = Br; R" = CH_3	b) R = Br; R' = Br; R" = COOH
c)	R = Br; R' = CH_3; R" = I	c) R = Br; R' = COOH; R" = I
d)	R = Cl; R' = CH_3; R" = Br	d) R = Cl; R' = COOH; R" = Br
e)	R = Br; R' = CH_3; R" = Br	e) R = Br; R' = COOH; R" = Br
f)	R = F; R' = CH_3; R" = Br	f) R = F; R' = COOH; R" = Br
g)	R = Cl; R' = CH_3; R" = I	g) R = Cl; R' = COOH; R" = I
h)	R = Br; R' = CH_3; R" = Cl	h) R = Br; R' = COOH; R" = Cl

Table 1. Comparative Yields (%) of Nicotinic Acids (II) from Oxidations

Method	IIa	IIb	IIc	IId	IIe	IIf	IIg	IIh
$KMnO_4$	50[1]	45[1]	16[5]	25[1]	30[1]	28[1]	30[4]	43[5]
TBAP	62	72	66	61	64	73	72	60

EXPERIMENTAL

5,6-Dibromonicotinic acid (IIb).Typical Procedure.-A solution of 8.63g (24 mmol) of freshly prepared[6] TBAP (dried in vacuo) in dry pyridine (110 ml) was added dropwise over a period of 1.5 hr. under nitrogen to a magnetically stirred solution of 5,6-dibromo-3-methylpyridine (Ib, 2.0g, 8 mmol) in dry pyridine (30 ml) maintained at 75-80° (oil bath). The resulting mixture was stirred under nitrogen for an additional hour at 75-80°. After cooling to 15°, sodium bisulfite (13g) was added and this was followed by the slow addition of 6 M HCl (400 ml) with stirring. The resulting clear solution was refrigerated overnight whereupon the crude product IIb crystallized[7] as small needles, which were collected by filtration. Extraction of the filtrate with ether (400 ml) followed by evaporation of the solvent afforded an additional amount of product. Recrystallization of the combined crude material from aqueous ethanol yielded 1.62g (72%) of pure 5,6-dibromonicotinic acid, mp. 171-172°, lit.[1] mp. 173-174°. The IR spectrum was identical to that of an authentic sample. (IR verification of identity was done with all products.)

Acknowledgement.-Support of this work by a University of Arkansas at Little Rock Faculty Research Grant is gratefully acknowledged.

REFERENCES

1. F. L. Setliff, J. Chem. Eng. Data, 15, 590 (1970).
2. F. L. Setliff and G. O. Rankin, ibid., 17, 515 (1972).
3. F. L. Setliff and D. W. Price, ibid., 18, 449 (1973).
4. F. L. Setliff and J. E. Lane, ibid., 21, 246 (1976).
5. F. L. Setliff and J. S. Greene, ibid., 23, 96 (1978).
6. T. Sala and M. V. Sargent, Chem. Comm., 253 (1978).
7. In some cases there was no crystallization on overnight refrigeration; therefore, the product was isolated by ether extraction as described.