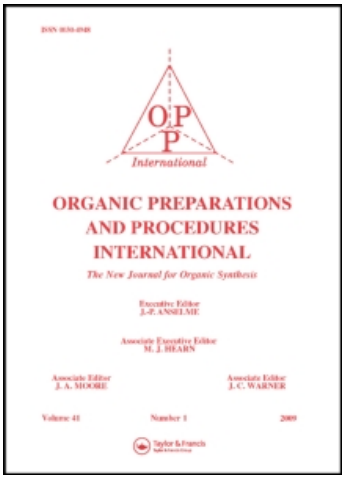

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ESTERIFICATION OF 1-METHYLINDOLE-2-CARBOXYLIC ACID WITH TRIMETHYL PHOSPHITE

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ESTERIFICATION OF 1-METHYLINDOLE-2-CARBOXYLIC ACID WITH TRIMETHYL PHOSPHITE

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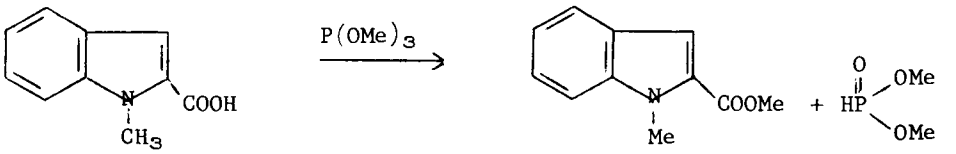
We would like to report a facile esterification of 1-methylindole-2-carboxylic acid (I) with trimethyl phosphite. The general advantages of this method are two fold. First, it does not require external strong acid catalysis and, second, the yield is high.



I

Literature survey showed that Kamai et al [1] used trimethyl phosphite for the esterification of acetic acid, butyric acid and benzoic acid, and also isobutyl phosphite for the esterification of acetic acid. In each case the corresponding ester and dialkyl hydrogen phosphite were isolated.

Later, Dieter[2] studied the reaction of acetic acid with mixed trialkyl phosphites.

The reaction of trialkyl phosphites with α,β-unsaturated acids has also been reported[3].

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EXPERIMENTAL[4]

1-Methylindole-2-carboxylic acid (I) was prepared by the cyclization of N-methyl-N-phenylhydrazone of pyruvic acid.[5]

Reaction of I with trimethyl phosphite. A mixture of I (17.5 g; 0.1 mole) and trimethyl phosphite (124 g; 1 mole) was refluxed for 22 hours. The resulting pale yellow solution was evaporated in vacuo on the steam bath to give a pale yellow oil which crystallized readily. It was recrystallized from methanol to give 17.7 g (94% yield) of colorless plates of methyl 1-methylindole-2-carboxylate, m.p. 97-98.5°. UV: λmax 227 (ε22,800); 293 (19,500). IR: C=O: 1715 sh, 1700, 1675 sh, 1660 sh; C=C: 1610, 1515; C-O: 1252, 1227; C-N: 1190 sh, 1165, 1142, 1127, 1085; aromatic 760, 745.

These spectra were identical to those of the authentic sample (m.p. 97-98°) prepared by esterification of I with diazomethane. This ester was previously prepared[6] by esterification of I with hydrogen chloride in methanol at room temperature and melted at 97.5-98.5°.

REFERENCES

1. Gil'm Kamai, V. A. Kukhtin and O. A. Strogova, Trudy Kazan. Khim, Tekhnol. Inst. im. S. M. Kirova, No. 21, 155 (1956); Chem. Abstr., 51, 11994 (1957).
2. J. A. Dieter, Ph. D. Dissertation, University of Kansas (1967); Dissertation Abstracts 28, 3217 (1967-68).

3. Gil'm Kamai and V. A. Kuhtin, Z. Obshch. Khim., 27, 2372 (1957); J. Gen. Chem. USSR, Engl. transl. 27, 2431 (1957); H. W. Coover, M. McCall and B. Dickey, J. Am. Chem. Soc., 79, 1963 (1957); K. M. Kirillova, V. A. Kukhtin and T. M. Sudakova, Dokl. Akad. Nauk SSSR, 149, 316 (1963); Engl. transl. in Proc. Acad. Sci, USSR, Chem. Sect., 149, 209 (1963).

4. Melting points were taken in a capillary tube and are corrected. Infrared spectra were determined in nujol using a Perkin-Elmer Model 421 recording spectrophotometer. Ultraviolet spectra were determined in 95% ethanol using a Cary Model 14 spectrophotometer.

5. E. Fischer and F. Jourdan, Chem. Ber., 16, 2241 (1883); H. R. Snyder and P. L. Cook, J. Am. Chem. Soc., 78, 969 (1956); D. A. Shirley and P. A. Roussel, ibid., 75, 375 (1953).

6. J. R. Johnson, R. B. Hasbrouck, J. D. Dutcher and W. F. Bruce, J. Am. Chem. Soc., 67, 423 (1945).

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