A SIMPLE SYNTHESIS OF 3-ARYL-1,5,7-TRIMETHYLPYRAZOLO-[3,4-d]PYRIMIDINE-4,6(5H,7H)-DIONES

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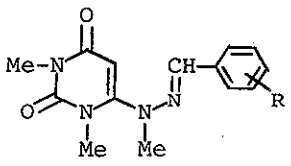
Treatment of 6-(benzylidene-1'-methylhydrazino)-1,3-dimethyluracils with thionyl chloride afforded the corresponding 3-arylpyrazolo[3,4-d]pyrimidines.

Thionyl chloride has recently been shown to be an effective reagent for the cyclization of 6-amino-5-benzylideneamino-1,3-dimethyluracils and 5-benzylideneamino-1,3-dimethylbarbituric acids to the corresponding purine[1] and oxazolo[5,4-d]pyrimidine derivatives[2], respectively. In connection with these findings, we wish to report that thionyl chloride is also an effective reagent for the cyclization of 6-(benzylidene-1'-methylhydrazino)-1,3-dimethyluracils (Ia-e) to 3-aryl-1,5,7-trimethylpyrazolo[3,4-d]pyrimidine-4,6(5H,7H)-diones (IIa-e).

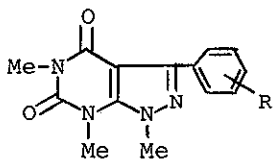
The key intermediates, (Ia-e), were prepared by the method given in the literature.[3]

Treatment of (Ia)(0.001 mol) with thionyl chloride (1 ml) at

90° for 5 min afforded 1,5,7-trimethyl-3-phenylpyrazolo[3,4-d]-pyrimidine-4,6(5H,7H)-dione (IIa)[3], which was isolated by evaporation of the reaction mixture and addition of 5% aqueous ammonia. This reaction was equally applicable to other 6-(benzylidene-1'-methylhydrazino)-1,3-dimethyluracils (Ib-e) to give the corresponding 3-arylpyrazolo[3,4-d]pyrimidines (IIb-e)(Table). The structures of (IIa-e) were established by elemental analyses and by their spectral data.[4]

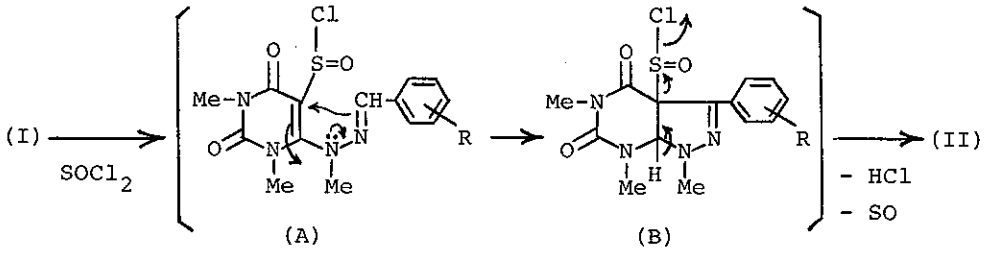


(I)



(II)

This new, simple pyrazolo[3,4-d]pyrimidine synthesis presumably proceeds through the initial formation of the 5-sulfinyl chloride intermediate (A)[5] by the electrophilic attack of thionyl chloride at the electron-rich 5 position of (I), followed by cyclization to give the second sulfinyl chloride intermediate (B) and subsequent elimination of hydrogen chloride and sulfur monoxide (Scheme).



Scheme

Table 3-Aryl-1,5,7-trimethylpyrazolo[3,4-d]pyrimidine-4,6(5H,7H)-diones (II)

Compd.	R	Recrystn. solvent	Mp(°C)	Yield(%)
IIa	H	EtOH	195-197	45
IIb	4-Me	MeOH	240	60
IIc	4-OMe	EtOH	214	83
IId	4-NMe_2	EtOH	194-196	32
IIe	$3,4\text{-di-Cl}_2$	EtOH	245-246	35

REFERENCES AND NOTES

1 K. Senga, K. Shimizu, and S. Nishigaki, Chem. Pharm. Bull., in press (B-11534).

2 K. Senga, J. Sato, and S. Nishigaki, Heterocycles, in press (COM-77-31).

3 F. Yoneda and T. Nagamatsu, Bull. Chem. Soc. Japan, 1975, 48, 1484.

4 The compounds (IIa,c,d, and e) were identical in their IR spectra with the authentic samples prepared by the reported procedure.[3]

5 An analogous intermediate has also been postulated in the reaction of 6-amino-1,3-dimethyluracils with thionyl chloride to give thiazolo[4,5-d]pyrimidines : I.M. Goldman, J. Org. Chem., 1969, 34, 3285.

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