A NEW SYNTHESIS OF PYRIMIDO[4,5-b]QUINOLINE-2,4(1H,3H)-DIONE (5-DEAZAALLOXAZINE) DERIVATIVES

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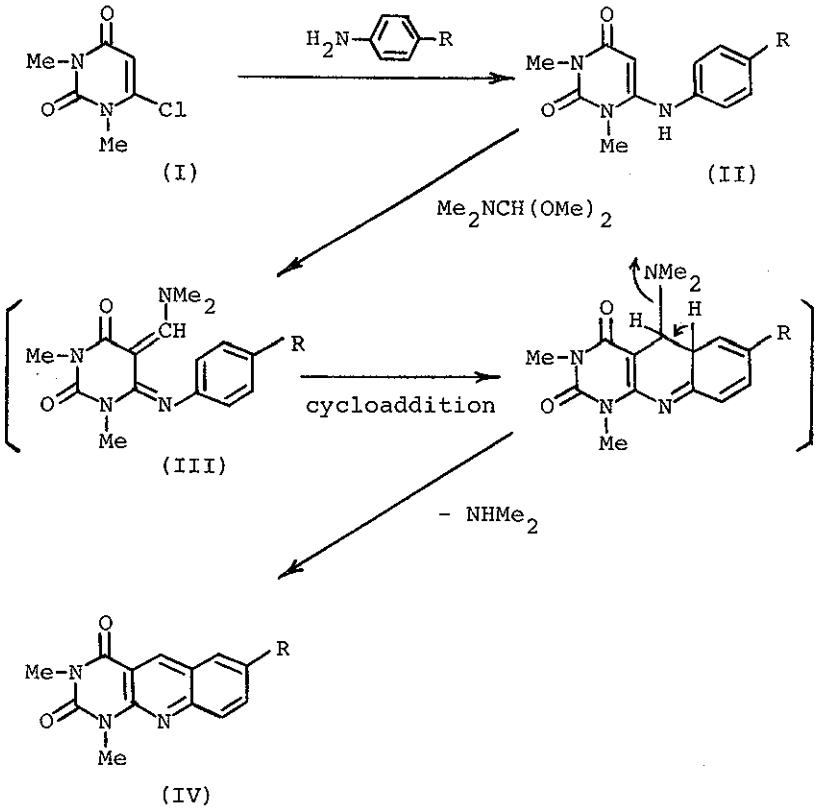
Treatment of 6-anilino-1,3-dimethyluracils with dimethylformamide dimethylacetal afforded the corresponding 1,3-dimethylpyrimido[4,5-b]quinoline-2,4(1H,3H)-diones (1,3-dimethyl-5-deazaalloxazines).

We wish to report a new synthesis of 1,3-dimethylpyrimido-[4,5-b]quinoline-2,4(1H,3H)-dione (1,3-dimethyl-5-deazaalloxazine) derivatives (IVa-e) by a treatment of 6-anilino-1,3-dimethyluracils (IIa-e) with dimethylformamide dimethylacetal.

The starting materials, (IIa-e), were prepared by the nucleophilic displacement of 6-chloro-1,3-dimethyluracil (I)[1] with the respective anilines according to the reported procedure[2] (Table I).

Heating of (IIa) with excess dimethylformamide dimethylacetal at 95° for 1.5 hr afforded 1,3-dimethylpyrimido[4,5-b]quinoline-

2,4(1H,3H)-dione (IVa), which was isolated by concentration of the reaction mixture and addition of ethanol. In complete analogy with the above result, the reaction of other 6-anilino-1,3-dimethyluracils (IIb-e) with dimethylformamide dimethylacetal provided the corresponding pyrimido[4,5-b]quinoline derivatives (IVb-e)(Table II). The structures of (IVa-e) were confirmed by the satisfactory spectral data and elemental analyses.[3]



Scheme

Table I 6-Anilino-1,3-dimethyluracils

Compd.	R	Mp (°C)	Yield (%)
IIa	H	190-192[a,b]	87
IIb	OMe	188-190[a,c]	91
IIc	Br	217-219[a]	97
IId	Cl	210-212[a,d]	81
IIe	NO_2	270-272[e]	48

a) Recrystallized from EtOH.

b) Lit.[2] mp 186.5-187°.

c) Lit.[4] mp 243°.

d) Lit.[2] mp 212-214°.

e) Recrystallized from DMF.

Table II 1,3-Dimethylpyrimido[4,5-b]quinoline-2,4(1H,3H)-diones[a]

Compd.	R	Mp (°C)	Yield (%)
IVa	H	211-212	60
IVb	OMe	273-274	63
IVc	Br	275	56
IVd	Cl	270	62
IVe	NO_2	>300	35

a) All compounds were recrystallized from DMF.

As depicted in the Scheme, the new pyrimido[4,5-b]quinoline synthesis is presumably initiated by the formation of 5-N,N-dimethylaminomethylene intermediate (III), which possesses an azahexatriene-type structure. This could undergo intramolecular cyclization through valence isomerization and subsequent aromatization by elimination of dimethylamine. Recently, this type of intramolecular cycloaddition of azahexatrienes has been demonstrated in the preparation of purines,[5,6] pteridines,[6,7] and pyrazolo[3,4-d]pyrimidines.[5,8]

REFERENCES AND NOTES

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2 H. Goldner, G. Dietz, and E. Carstens, Annalen, 1966, 694, 142: As one exception, the compound (IIe) was prepared by the fusion of (I) with p-nitroaniline at 180° for 3 hr.

3 For example, the spectral data for compound (IVa) are as follows. MS (m/e): 241 (M^+), IR ν_{max}^{Nujol} cm^{-1}: 1650 (C=O), 1705 (C=O), NMR(DMSO-d_6) δ: 3.33 (3H, s, N-Me), 3.63 (3H, s, N-Me), 7.33-8.33 (4H, m, C_6H_4), 9.40 (1H, s, C^5-H).

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