A NOVEL SYNTHESIS OF SOME ANNELATED PYRIMIDINES: REACTION OF
6-HYDROXYLAMINO-1,3-DIMETHYLPYRIMIDINE-2,4-DIONE WITH IMINES
AND α-CHLOROIMINES
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Abstract - Reaction of imines and α-chloroimines with
6-hydroxylamino-1,3-dimethylpyrimidine-2,4-dione gives
isoxazolo[3,4-d] and pyrazolo[3,4-d]pyrimidines
respectively in good yields.

The purine and pyrimidine nuclei are present in nucleic acids, nucleotides and
several other naturally occurring biologically active substances. Because of
this purine and pyrimidine derivatives occupy a unique position of significance
and there has been tremendous effort to synthesize novel heterocycles having an
annelated pyrimidine nucleus. Several approaches have been reported to
construct heterocycles on C-5, C-6 double bond of substituted uracils. In this
communication we describe a novel and facile method of synthesizing isoxazolo-
[3,4-d] and pyrazolo[3,4-d]pyrimidines.

6-Hydroxylamino-1,3-dimethylpyrimidine-2,4-dione \textsuperscript{1} (1.71 g, 0.01 mol) and
imine \textsuperscript{2a} (1.09 g, 0.01 mol) on stirring at room temperature for 3 h in absolute
alcohol (15-20 ml), on concentration of the reaction mixture gave a solid \textsuperscript{3a}
crystallizable from alcohol, mp 205°C in 63% yield. \textsuperscript{1}H-NMR (CDCl\textsubscript{3}) \( \delta : 3.10 
(3H, s), 3.25 (3H, s), 6.45 (1H, q, furan H\textsubscript{4}), 7.50 (1H, d, furan H\textsubscript{3}), 7.95 (2H, d, furan H\textsubscript{5}) \). The mass spectrum of \textsuperscript{3a} showed molecular ion at m/e 247. When \textsuperscript{2b}
was used the same compound \textsuperscript{2a} was obtained which clearly proved the elimination
of amine part and was further confirmed by isolating the amine from the mother
liquors (tlc). Use of \textsuperscript{2a-d} gave \textsuperscript{3a} in 70% yield\textsuperscript{6}.

In contrast when α-chloroimines were used the imine nitrogen was involved in
the pyrazolo ring formation. When equimolar quantities of \textsuperscript{1} and α-chloroimine
\textsuperscript{4a} in the presence of dry triethylamine were refluxed in dry benzene for 2 h,
a crystalline solid was obtained. This material on purification and crystalli-
zation gave 2a, mp 208°C, in 70% yield. 1H-NMR (TFA) δ: 2.75 (3H, s), 2.98 (3H, s), 6.8-7.2 (10H, m). The mass spectrum of 2a showed molecular ion at m/e 332. Similarly were obtained 2b-d in good yields.

Regarding the reaction mechanism involved in these transformations, the reaction appears to be triggered by the attack of electron rich C-5 position onto the imine carbon followed by cyclisation. However, further work is in progress to understand the mechanism as well as the scope of the reaction.

REFERENCES AND NOTES

6. (a) We do not believe 2a-ɛ can undergo simple hydrolytic cleavage because on stirring 2 alone in alcohol under identical conditions no such cleavage could be detected. (b) All the new compounds reported gave satisfactory spectral as well as analytical data.

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