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FIRST EXAMPLE OF AN ANRORC REARRANGEMENT OF A PYRAZOLO[5,1-*c*][1,2,4]TRIAZINE INVOLVING A SIDE CHAIN

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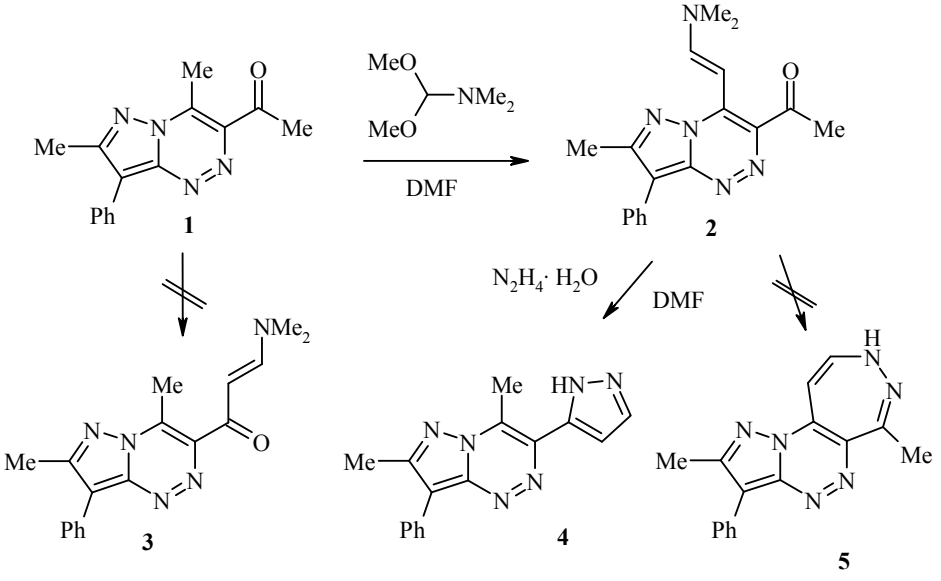
The nucleophilic rearrangement of annelated azines involving the atoms of a side chain has been little studied [1-3]. In the literature there are no examples of a 1,3-exo ring CC exchange [2] occurring *via* an ANRORC mechanism to an *as*-triazine ring. In continuing our study of the chemistry of azoloazines [4-6] we report for the first time a similar rearrangement in the pyrazolo[5,1-*c*][1,2,4]triazine system.

We have found that the condensation of DMF dimethylacetal with the pyrazolotriazine **1** containing two active Me groups gives exclusively the enamine **2**. A second possible regioisomer **3** is not observed. The structure of compound **2** was proved using X-ray analysis and this will be published in a full article.

The reaction of the product of aminomethylation **2** with hydrazine hydrate unexpectedly gave the pyrazolyl derivative **4** rather than the tricyclic diazepine **5**.



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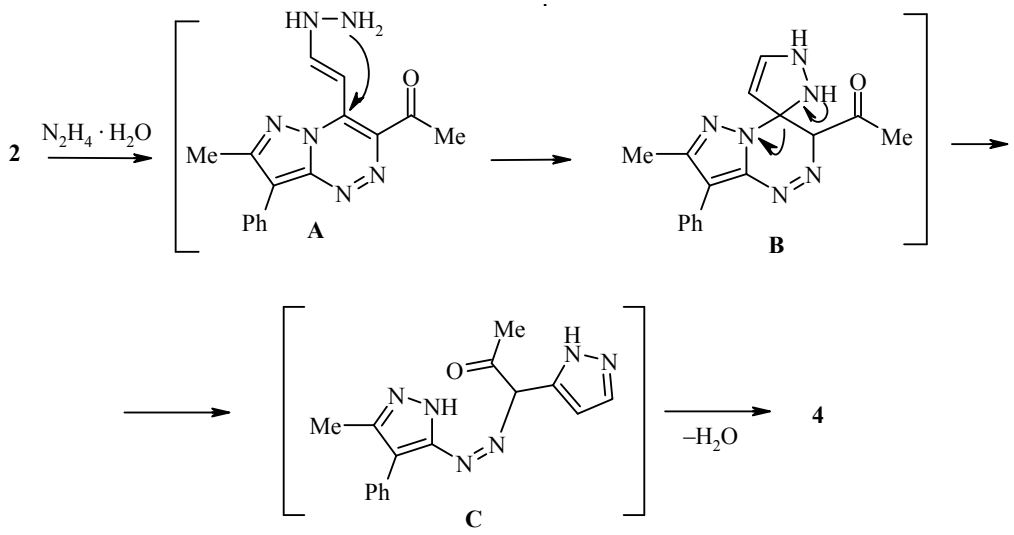
Although we were unable to identify the intermediate in this reaction it evidently occurs *via* an ANRORC mechanism. The enhydrazine **A** formed in the transamination process closes to the spiro pyrazoline **B** as a result of nucleophilic attack at the electron-deficient triazine position. Subsequent recyclization of the six-membered fragment *via* intermediate **C** gives the rearrangement product.



The spectroscopic parameters for the pyrazolo[5,1-*c*][1,2,4]triazine **4** agree well with the structure proposed and are very close to those of the 2-desaza analog, the structure of which was proved by an X-ray investigation [7].

^{1}H NMR spectra were recorded on a Bruker AC-300 spectrometer (300 MHz) using DMSO-d_6 and with TMS as internal standard. Elemental analysis was carried out on a Carlo Erba NA 1500 instrument.

1-{4-[(*E*)-2-(Dimethylaminovinyl)]-7-methyl-8-phenylpyrazolo[5,1-*c*][1,2,4]triazin-3-yl}ethanone (2). A mixture of the pyrazolotriazine **1** [6] (2.7 g, 1.0 mmol), DMF (15 ml), and DMF dimethylacetal (1.4 g, 1.2 mmol) was heated for 10 min at 120ºC. The reaction product was cooled and the precipitate filtered off was washed with 2-propanol. Yield 2.7 g (85%); mp 211-213ºC (dimethylacetamide) as orange needles. ^{1}H NMR spectrum, δ, ppm (*J*, Hz): 2.64 (3H, s, 7-CH_3); 2.75 and 3.09 (both 3H, both s, $N(CH_3)_2$); 2.35 (3H, s, $COCH_3$); 7.13 (1H, d, ^3J = 18.0, H ethylene); 7.35 (1H, t, *J* = 7.4, C_6H_5); 7.50 (2H, t, *J* = 7.4, C_6H_5); 7.87 (2H, d, *J* = 7.7, C_6H_5); 9.79 (1H, d, ^3J = 18.0, H ethylene). Found, %: C 67.47; H 5.85; N 21.70. $C_{18}H_{19}N_5O$. Calculated, %: C 67.27; H 5.96; N 21.79.

4,7-Dimethyl-8-phenyl-3-(1H-pyrazol-5-yl)pyrazolo[5,1-*c*][1,2,4]triazine (4). A mixture of compound **2** (1.6 g, 0.5 mmol), hydrazine hydrate (0.5 ml, 1.0 mmol) and DMF (15 ml) was refluxed for 30 min. The product which precipitated on cooling was washed with 2-propanol. Yield 1.1 g (76%); mp 237-239ºC (2-propanol) as yellow plates. ^{1}H NMR spectrum, δ, ppm (*J*, Hz): 2.70 (3H, s, 7-CH_3); 3.15 (3H, s, 4-CH_3); 7.03 (1H, d, ^3J = 2.2, H pyrazole); 7.40 (1H, t, *J* = 7.4, C_6H_5); 7.55 (2H, t, *J* = 7.4, C_6H_5); 7.89 (2H, d, *J* = 7.6, C_6H_5); 7.94 (1H, d, ^3J = 2.2, H pyrazole); 13.24 (1H, s, NH). Found, %: C 66.30; H 4.76; N 28.92. $C_{16}H_{14}N_6$. Calculated, %: C 66.19; H 4.86; N 28.95.

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