FIRST INSTANCE OF NUCLEOPHILIC SUBSTITUTION OF THE HYDROGEN ATOM IN THE 6 POSITION OF THE LUMAZINE SYSTEM. SYNTHESIS OF 6-ALKYLAMINO-1,3-DIMETHYLLUMAZINES

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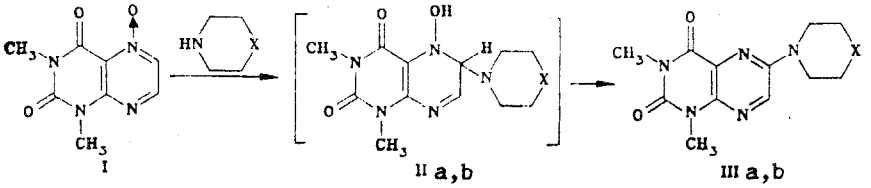
We have previously shown that 1,3-dimethyllumazine is aminated by potassium amide and alkylamines in the presence of an oxidizing agent to give 7-amino-1,3-dimethyllumazines in moderate yields [1]. This reaction pathway is in conformity with the higher degree of electron-deficient character of the 7 position in the lumazine molecule as compared with the 6 position. Since 6-aminolumazines are even less accessible [2], we attempted to change the ratio of the electron deficiencies of the 7 and 6 positions in favor of the latter and thereby change the amination pathway. For this we used 1,3-dimethyllumazine 5-oxide (I). In fact, we found that in its reaction with piperidine and morpholine at room temperature the yellow coloration that is characteristic for 6-aminolumazines develops rapidly at room temperature, and IIa, b are formed in yields greater than 90%. The ease with which the reaction proceeds and, particularly, the fact that the use of an oxidizing agent for stabilization of adduct II is not required are surprising (compare this with other instances of the amination of N-oxides [3].



I II a,b III a,b

II, III a X=CH_2, b X=O

A solution of 0.21 g (1 mmole) of I [4] in 50 ml of piperidine or morpholine was stirred at room temperature for 2 h, after which the mixture was evaporated to dryness. The residue was dissolved in 30 ml of chloroform and passed through a column packed with Brockmann activity II Al_2O_3 (elution with chloroform) with collection of the yellow fraction with R_f 0.8-0.9. The yield was 90-92%.

1,3-Dimethyl-6-piperidinolumazine (IIIa). This compound was obtained in the form of bright-yellow needles with mp 166-168°C (from ethanol). IR spectrum ($CHCl_3$): 1660, 1700 cm^{-1} (CO). PMR spectrum ($CDCl_3$): 1.62 (6H, s, piperidine ring β- and γ-CH_2), 3.45 (3H, s, N—CH_3), 3.57 (7H, broad s, N-CH_3 and piperidine ring α-CH_2), 8.2 ppm (1H, s, 7-H). UV spectrum (methanol), λ_{max}, nm ($\log \varepsilon$): 240 (4.14), 283 (4.38), 418 (3.71).

1,3-Dimethyl-6-morpholinolumazine (IIIb). This compound was obtained in the form of bright-yellow needles with mp 188-191°C (from ethanol). IR spectrum ($CHCl_3$): 1670, 1700 cm^{-1} (CO). PMR spectrum ($CDCl_3$): 3.42 (3H, s, N—CH_3), 3.57 (7H, broad s, N—CH_3 and morpholine ring $2CH_2$), 3.75-3.82 (4H, m, morpholine ring $2CH_2$), 8.2 ppm (1H, s, 7-H). UV spectrum (methanol), λ_{max}, nm ($\log \varepsilon$): 241 (4.25), 280 (4.18), 347 (3.45), 406 (3.51).

Unfortunately, I does not react with diethylamine and tert-butylamine under the same conditions, and only partial deoxidation of I to give 1,3-dimethyllumazine is observed when the mixture is heated.

LITERATURE CITED

1. A. V. Gulevskaya, A. F. Pozharskii, and L. V. Lomachenkova, *Khim. Geterotsikl. Soedin.*, No. 11, 1575 (1990).
2. H. Steppan, J. Hammer, R. Baur, R. Gottlieb, and W. Pfleiderer, *Liebigs Ann.*, No. 12, 2135 (1982).
3. Y. Tagawa, T. Yoshida, N. Honjo, and Y. Goto, *Heterocycles*, **29**, 1781 (1989).
4. W. Pfleiderer and W. Hutzenlaub, *Angew. Chem.*, 77, 1136 (1965).

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