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The Susceptibility of 2,3-Difluoroquinoxaline Towards Nucleophilic Aromatic Substitution

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Sir:

Because of a recent communication (1) on the considerable reactivity of fluoropyrazine towards nucleophilic reagents in aromatic substitution we would like to report the following observations concerning 2,3-difluoroquinoxaline.

The halogen exchange reaction has been employed successfully in our laboratory to prepare 2-fluoropyridine (2), 2,6-difluoropyridine (3) and 2-fluoroquinoline (3), in yields ranging from 52-60%. In these reactions, the corresponding chloro-derivative was treated with anhydrous potassium fluoride at about 200°, employing anhydrous dimethyl sulfone as the reaction solvent. After 70-120 hours reaction time the formed fluoro compounds were isolated from the reaction mixture by steam distillation which was then followed by further purification.

In order to prepare 2,3-difluoroquinoxaline the commercially available 2,3-dichloroquinoxaline was subjected to the halogen exchange reaction. Steam distillation of the product however yielded 2,3-dihydroxyquinoxaline (4) in approximately quantitative yield.

2,3-Dichloroquinoxaline when steam distilled was recovered unchanged. Also, when this compound was subjected to the conditions of the halogen exchange reaction but omitting anhydrous potassium fluoride the 2,3-dichloroquinoxaline could again be recovered unchanged upon subsequent steam distillation.

The observed formation of 2,3-dihydroxyquinoxaline is then clearly due to the nucleophilic attack of water upon the 2,3-difluoroquinoxaline formed in the halogen exchange reaction. The susceptibility of 2,3-difluoroquinoxaline towards nucleophilic attack thus appears to be far greater than of 2-fluoro, or 2,6-difluoropyridine or 2-fluoroquinoline, as is also the case for the monocyclic fluoropyrazine.

REFERENCES

(1) H. Rutner and P. E. Spoerri, *J. Heterocyclic Chem.*, 2, 492 (1965).
(2) G. C. Finger, L. D. Starr, D. R. Dickerson, H. S. Gutowski and J. Hamer, *J. Org. Chem.*, 28, 1666 (1963).
(3) J. Hamer, W. J. Link, A. Jurjevich and T. L. Vigo, *Rec. Trav. Chim.*, 81, 1058 (1962).
(4) R. D. Haworth and S. Robinson, *J. Chem. Soc.*, 777 (1948).

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