NEW SYNTHESES OF BETAINE ALDEHYDES BY CATION EXCHANGE

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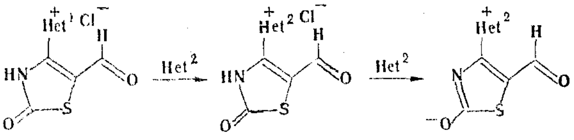
The ability of betaine salts Ia, b in reactions with heterocycles to exchange one cation for another, which resembles the replacement of nitrogen bases in nucleotides in the case of point mutations, has been observed for the first time. The reaction proceeds readily in alcohol media at a salt:base molar ratio of 1:3 at 20-25°C. Cross exchanges of quinoline and acridine in salts Ia, b and their replacement of cations of the bases to give IIIa-h, where Het^2 = pyridine (a), 4-ethylpyridine (b), 4-isopropylpyridine (c), 4-benzylpyridine (d), 4,4-dipyridyl (e), quinoline (f), isoquinoline (g), and acridine (h), were carried out.



Ia,b IIIh IIIa-g

New betaines and, only in the case of acridine, a salt (in 65% yield with mp 147-149°C) are formed in the reaction. The structure of the salt was confirmed by the PMR spectrum (DMSO) [9.43 (1H, s, CHO), 9.18 (1H, 9-H, s), and 7.1-8.1 ppm (8H, m)] and the UV spectrum (alcohol) [λ_{max} (log ε): 250 (5.10) and 366 nm (4.30)]. A shift of the signal of the formyl proton to stronger field [9.21 (IIIa), 9.03 (IIIb), 9.36 (IIIc), 9.33 (IIId), 9.02 (IIIe), 9.20 (IIIf), and 9.13 ppm (IIIg) (DMSO)] due to shielding by the negative charge and typical multiplets of the corresponding cations are observed in the PMR spectra of betaines IIIa-g.

The yields of the betaines range from 10 to 70%, depending on the base used.

The structures of IIIa-g were confirmed by alternative synthesis from 4-chloro-5-formyl-Δ^4-thiazolin-2-one [1].

LITERATURE CITED

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