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Note

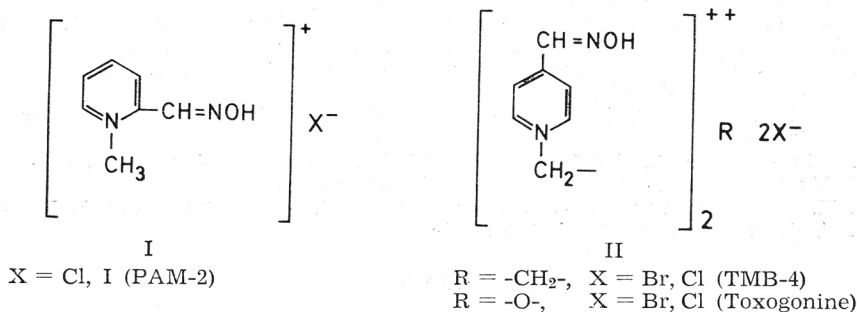
Synthesis of 1,5-Dioxopentane-bis-(4-hydroxyiminoformylpyridinium) Dichloride

Z. Binenfeld, M. Orlov, D. Rakin, and M. Milojević

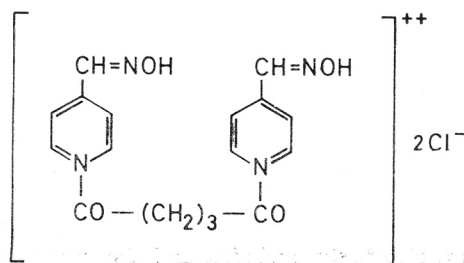
High Military Technical School, Zagreb, Croatia, Yugoslavia

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Fifteen years ago Wilson demonstrated¹ that hydroxylamine is capable of reactivating to a certain degree acetylcholine esterase inhibited by organophosphorus compounds. The same kind of activity was found in a number of hydroxamic acids which were not suitable for therapeutic use and also in several pyridinium mono- and dioximes. Among the latter class of compounds the best results were obtained with different 2- or 4-hydroxyiminoformylpyridinium salts of structure I and II^{2,3}.



1,3-Acetone bis-(4-hydroxyiminoformylpyridinium) dibromide (MBM-3, II, R = CO, X = Br) synthesized by Hauschild *et al.*⁴, was shown to be less toxic than TMB-4 and had a very good protective effect in experimental Sarin and Paraoxon poisoning^{5,6}. It was, therefore, of interest to synthesize compounds with more than one carbonyl group in the aliphatic chain between the two pyridine rings. In this communication the synthesis of the title compound III, the first dioxodioxime in this series, is described.



III

EXPERIMENTAL

1,5-Dioxopentane bis-(4-hydroxyiminoformylpyridinium) Dichloride

In a three necked flask fitted with a mechanical stirrer, dropping funnel and condenser with a CaCl_2 tube was placed a solution of 6.1 g. (0.05 mole) of 4-hydroxyiminoformyl pyridine in 50 ml. of absolute chloroform. The flask was cooled in a mixture of ice and sodium chloride (about -15°C)*, and dry nitrogen was bubbled through the solution.

From the dropping funnel 4.25 g. (0.025 mole) of glutaric acid dichloride was added during 15 minutes under continual stirring. After 3 hr. the reaction was stopped, the precipitate separated and washed with chloroform and ether. The white crystals were dissolved in ethanol and precipitated with ether. This was repeated 2–3 times and 5.80 g. of stable white crystals (yield 56%) m. p. $148-150^\circ$ were obtained.

Anal. $\text{C}_{17}\text{H}_{18}\text{Cl}_2\text{N}_4\text{O}_4$ (413.18) calc'd.: N 13.5; Cl 17.2%
found: N 14.0; Cl 17.1%

Neutralization equivalent calc'd.: 413; found; 429.

The IR spectrum showed a very intense carbonyl band at 1775 cm^{-1} . The shift towards higher wave numbers is caused by the proximity of a quaternized N-atom⁷. The characteristic band at 1100 cm^{-1} corresponds to the N-O frequency and is also shifted towards higher wave numbers (the N-O group in oximes is placed at around 1000 cm^{-1}).

REFERENCES

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IZVOD

Sinteza 1,5-dioksopentan-bis-(piridinijum 4-aldoksim) diklorida

Z. Binenfeld, M. Orlov, D. Rakin i M. Milojević

Iz diklorida glutarne kiseline i piridin-4-aldoksima u apsolutnom kloroformu kao otapalu na -15° u struji dušika sintetiziran je 1,5-dioksopentan-bis-(piridinijum 4-aldoksim) diklorid tt. $148-150^\circ$.

VISOKA TEHNIČKA ŠKOLA JNA
ZAGREB

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* If moisture is not rigorously excluded and the reaction performed at temperatures above -15° only 4-hydroxyimino-formylpyridinium hydrochloride was obtained.