HETEROCYCLES, Vol. 6, No. 7, 1977

SYNTHESIS OF s-TRIAZOLO[1,5-b]ISOQUINOLINES. NEW STABLE o-QUINONOID HETEROCYCLES

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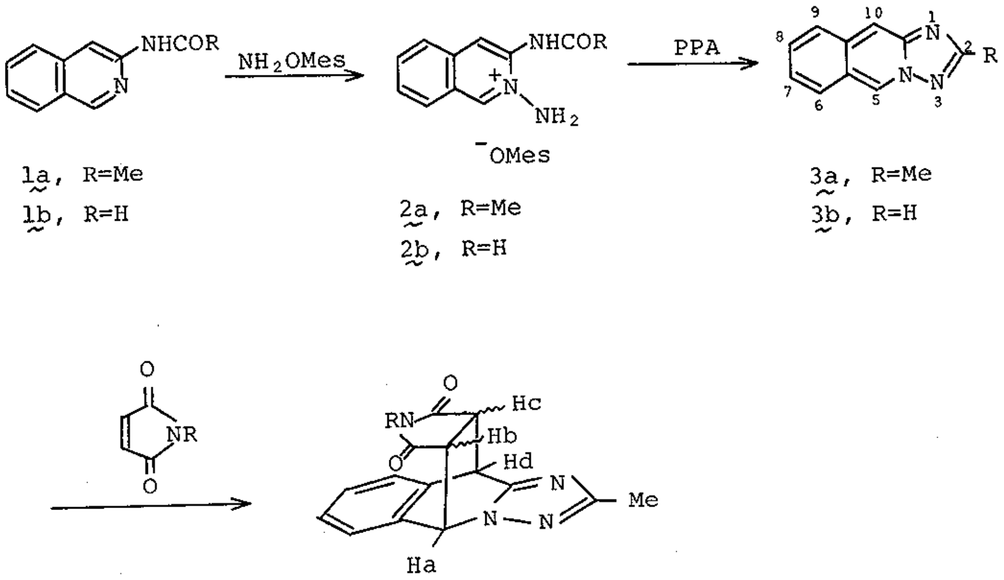
The synthesis and some properties of new stable o-quinonoid heterocycles, s-triazolo[1,5-b]isoquinolines, are described.

During the last ten years, interest in the syntheses and chemistry of o-quinonoid heterocycles has been noticeable.[1] This class of compounds, particularly ones lacking ring substituents, are usually unstable and sometimes isolated only as their stable N-phenylmaleimide adducts. We now wish to report the synthesis of new stable o-quinonoid heterocycles, s-triazolo[1,5-b]isoquinolines (3).[2]

Treatment of 3-acetamidoisoquinoline (1a) with an equimolar quantity of O-mesitylenesulfonylhydroxylamine (MSH)[3] in methylene chloride at room temperature for 10 min gave 74% yield of 2a, m.p. 134°.[4] Heating 2a in polyphosphoric acid (PPA) at 80° for

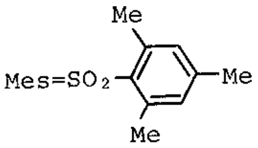


1a, R=Me
1b, R=H

2a, R=Me
2b, R=H

3a, R=Me
3b, R=H

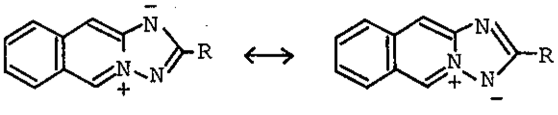
4, R=Ph
5, R=Me



1 hr gave 3a, m.p. 182-183°, in 76% yield, which was stable even in refluxing xylene for 10 hr. The structure of 3a was determined from its spectral data [nmr δ ($CDCl_3$) 2.70 (s, 3H, CH_3), 7.3-8.0 (m, 4H, arom. H), 8.10 (bs, 1H, H-10), and 9.30 (bs, 1H, H-5); uv $\lambda_{max.}$ (EtOH) 238 (log ε 4.61), 250 sh (4.38), 346 sh (3.41), 361 (3.52), and 378 nm (3.38)] and chemical evidence. Refluxing 3a with N-phenylmaleimide or N-methylmaleimide in benzene gave the corresponding cycloadducts 4, m.p. 298° [ir $\nu_{max.}$ (KCl) 1780, 1705 cm^{-1}; nmr δ ($CDCl_3$) 2.39 (s, 3H, CH_3), 3.58 (dd, 1H, J_{bc}=9 Hz, J_{cd}=3 Hz, Hc), 3.82 (dd, 1H, J_{bc}=9 Hz, J_{ab}=4 Hz, Hb), 5.15 (d, 1H, J_{cd}=3 Hz, Hd), 6.17 (d, 1H, J_{ab}=4 Hz, H_a), 6.4-6.6 (m, 2H, arom. H), 7.2-7.5 (m, 7H, arom. H)] and 5, m.p. 261.5-263° [ir $\nu_{max.}$ (KCl) 1780, 1700 cm^{-1}; nmr δ ($CDCl_3$) 2.30 (s, 3H, CH_3), 2.57 (s, 3H, CH_3), 3.39 (dd, 1H, J_{bc}=9 Hz, J_{cd}=3 Hz, H_c), 3.62 (dd, 1H, J_{bc}=9 Hz, J_{ab}= 4 Hz, H_b), 5.01 (d, 1H, J_{cd}=3 Hz, H_d), 6.03 (d, 1H, J_{ab}=4 Hz, H_a), 7.0-7.3 (m, 4H, arom. H)], in quantitative yields.

Similarly, reaction of 3-formamidoisoquinoline (1b), m.p. 138°, with MSH gave 2b, m.p. 130-131°, in 82% yield, which was cyclized with PPA to 3b, m.p. 160-161°, in 57% yield [nmr δ ($CDCl_3$) 7.3-8.0 (m, 4H, arom. H), 8.22 (bs, 1H, H-10), 8.58 (s, 1H, H-2), 9.38 (bs, 1H, H-5); uv $\lambda_{max.}$ (EtOH) 235 (log ε 4.67), 249 sh (4.34), 345 sh (3.45), 360 (3.59), 378 nm (3.47)]. This compound was rather unstable and gradually decomposed in refluxing benzene.

The thermal stability of compounds 3 may be attributed, at least in part, to the contribution of the mesoionic structures, e.g., 6.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REFERENCES

1. D.W.H. MacDowell, A.T. Jeffries, M.B. Meyers, J. Org. Chem., 1971, 36, 1416, and references cited therein; M.P. Cava, N.M. Pollack, O.A. Mamer, and M.J. Mitchell, ibid., 1971, 36, 3932; M.J. Haddadin and N.C. Chelhot, Tetrahedron Letters, 1973, 5185.
2. Although a U.S. patent has claimed the synthesis of a pyrrolo[1,2-b]isoquinoline, we were unable to repeat this observation. [R.H. Sprague, U.S.P., 2622082 (Dec. 16, 1952)].
3. Y. Tamura, J. Minamikawa, and M. Ikeda, Synthesis, 1977, 1.
4. All new compounds gave satisfactory elemental analyses.

Received, 20th April, 1977