A Novel Synthesis of 7-Acetyl-4,5,5a,6,6a,7,8,9-octahydroindeno[7,1-*fg*]quinolin-9-one

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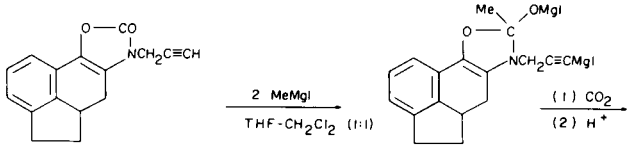
Treatment of the acetylenic acid **3** with magnesium carbonate in water at 60° yielded the tetracyclic ketone 5.

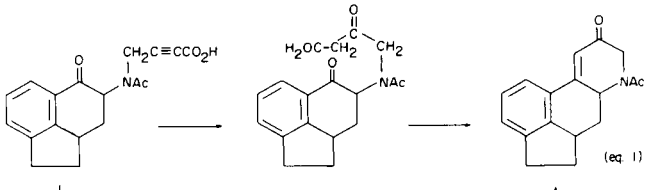
J. Heterocyclic Chem., **19**, 703 (1982).

N-Prop-2-ynyl-oxazolinones such as **1** offer a potential route to lysergic acid and related isosteres (equation 1).

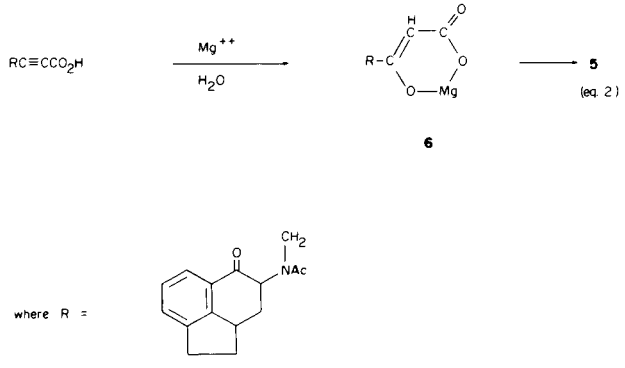
On the first occasion, work-up of **3** was complicated by emulsion problems and the crude product (*ca.* 150% yield) containing inorganic contaminants, was treated with 0.5*M* sodium hydrogencarbonate to isolate the required acid.



1 **2**



3 **4** **5**



6

To our surprise, the clear extract on warming to 60° became hazy and over 0.25 hour deposited the crystalline ketone **5**, (2) in 12% overall yield. Despite many attempts this totally unexpected 'one-pot' reaction could never be repeated. Improved conditions for the isolation of the acetylenic acid **3** furnished it as a yellow glass (3) which, unlike the first crude product, could not be converted into the ketone **5** with aqueous sodium hydrogencarbonate. Subsequently it was found that a similar treatment of **3** with magnesium carbonate (1 equivalent) did furnish **5** and that this treatment could be repeated at least twice on the recovered acetylenic acid to give the tetracyclic ketone **5** in overall yield from **1** of 29%, a not unsatisfactory result considering that seven steps could well have been involved in the overall process.

The small conversion, limited data and curious reaction conditions make difficult a rational explanation of these results. It would appear that magnesium ion was essential since many other metallic hydroxides were examined without success, and that possibly, under its influence a small conversion to the magnesium salt of the β-ketoacid **4** in its enolic form **6** took place with subsequent cyclisation and decarboxylation to give **5** (equation 2).

Acknowledgement.

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REFERENCES AND NOTES

(1) R. E. Bowman, *J. Chem. Soc., Perkin Trans. I*, 2126 (1980).

(2) Colourless plates from ethanol, mp 184-185°; ir: ν max 1662 (C=C-CO), 1640 (amide I), 1610 (C=C), 1587 cm^{-1}; nmr (deuteriochloroform): 90 MHz, δ 1.4-3.5 (7H, m, 5a-H and 4,5,6-H_2), 2.2 (3H, s, COMe), 3.9-4.5 (2H, m, 8-H_2), 5.1-5.3 (1H, m, 6a-H), 6.5 (1H, s, 10-H), 7.17-7.3 (2H, m, 2,3-H) and 7.37-7.4 (1H, m, 1-H).

Anal. Calcd. for $C_{17}H_{17}N_2$: C, 76.4; H, 6.4; N, 5.25; M^+ 267.1259. Found: C, 76.4; H, 6.3; N, 5.4; M^+ 267.1260.

(3) Isolated as a light-stable glass [ir: ν max 2240 s (C=C-CO_2), 1690 (C=O) and 1650 (amide I) cm^{-1}] by extraction with 0.5*M* sodium acetate [α,β-acetylenic acids are considerably stronger acids than acetic acid (R. A. Raphael, "Acetylenic Compounds in Organic Synthesis", Butterworths, London, 1955, p 81)].