The Reactions of ω-Hydroxylactams obtained from the Photocyclisation of Dicarboximide Mannich Bases: a Route to Substituted Imidazoles

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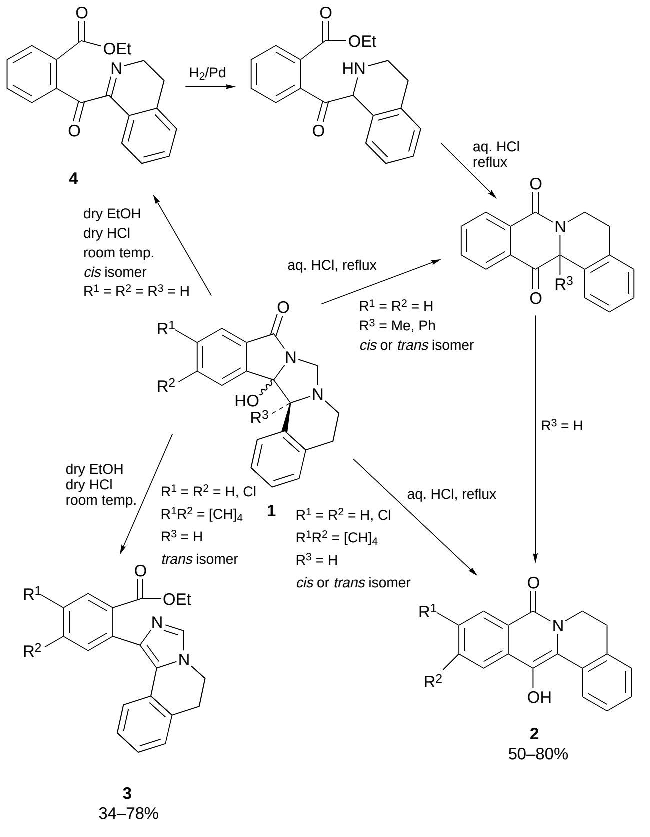
Marjory Close,[a] John D. Coyle,*[b] Edmund J. Haws[a] and Christopher J. Perry[a]

[a]*School of Applied Sciences, The University of Wolverhampton, Wolverhampton, West Midlands WV1 1SB, UK*
[b]*Cookson Group plc, 130 Wood Street, London EC2V 6EQ, UK*

Substituted imidazoles are formed by treatment of ω-hydroxylactams with anhydrous ethanolic HCl.

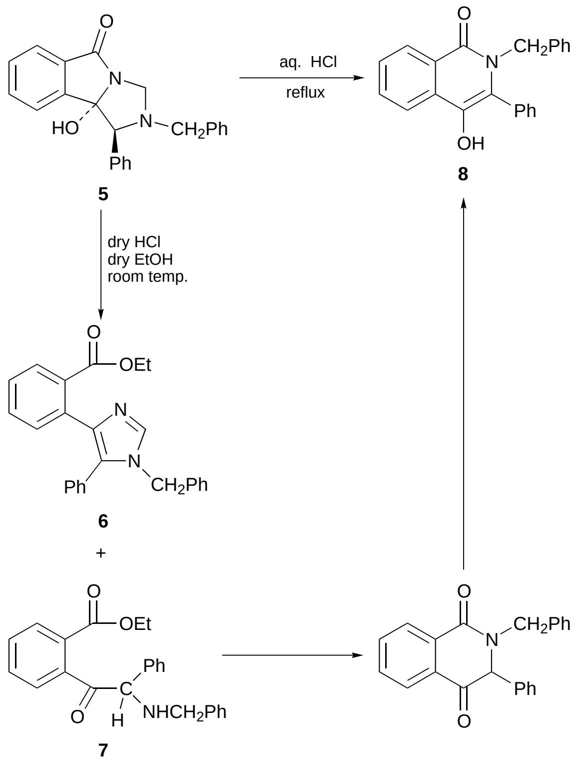
Although there have been many reports on the photocyclisation of *N*-substituted imides to give ω-hydroxylactams,[1] there have been few on the chemistry of these products. We have previously shown that lactams obtained from aromatic dicarboximide Mannich bases are converted by aqueous acid into quinolizinones or isoquinolinones.[4e,5] We have now obtained further evidence for the mechanism of this reaction and also report that under anhydrous conditions a different reaction occurs to give a substituted imidazole. This reaction appears to have widespread application.

We have shown that both *cis* and *trans* isomers of lactam **1** can be converted into quinolizinone **2** on heating with aqueous HCl and that this reaction proceeds *via* a dione which can be isolated when the labile H is replaced by a Me or a Ph group. Under anhydrous conditions the isomers behave differently; the *trans* isomer and its dichloro and naphthyl analogues are converted at room temperature into substituted imidazoles **3**; a similar reaction occurs with the hydroxylactam derived from succinimide. Treatment of the *cis* isomer of **1** under the same conditions or the *trans* isomer with ethanolic HCl containing 10–50% water gave the iminoketoester **4** in addition to the imidazole. Hydrogenation of **4** followed by treatment with aqueous acid gave **2**.



Scheme 1

Lactam **5** with anhydrous acid gave a mixture of imidazole **6** and an aminoketoester **7** the latter spontaneously changing *via* a dione to the isoquinolinone **8**.



Scheme 2

Techniques used: IR, ^{1}H and ^{13}C NMR, MS

References: 21

Schemes: 4

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*To receive any correspondence.