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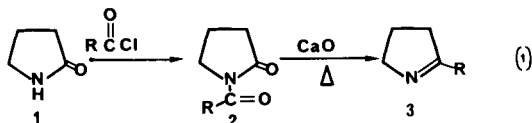
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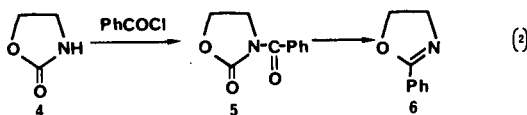
Thermal rearrangement of *N*-acyl-2-oxazolidones in the presence of calcium oxide has been shown to provide a new entry into 2-substituted oxazolines.

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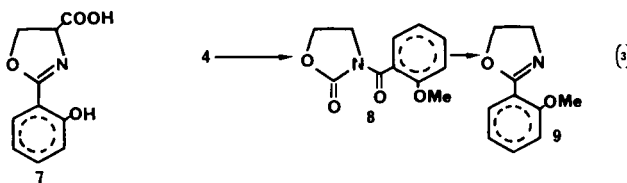
By analogy to the *N*-acyllactam rearrangement used in our laboratory for the synthesis of 2-substituted pyrrolines and piperidineines (Equation 1) (1), we envisioned a new procedure for preparing 2-substituted oxazolines.



The model scheme chosen for our initial attempts had as its target, 2-phenyloxazoline (6) (Eq 2). Benzoyl chloride was mixed with 2-oxazolidone, (4), to yield the *N*-benzoyl-2-oxazolidone (5). Heating an equal weight of 5 and calcium oxide with an open flame gave a distillate (65% yield), which by glc was shown to be 97% of one component. GLC collection of an analytically pure sample *via* glc followed by spectral examination, assured us that we had prepared 6.



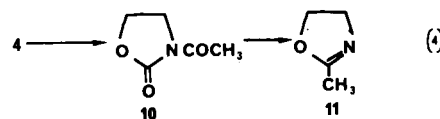
This initial success, coupled with the possibility that an approach like this might find eventual application in a synthesis of the natural product, mycobactic acid, (7) (2) prompted us to examine a functionalized 2-phenyl substituent (Eq 3).



In a manner similar to that used for the preparation of 5, *o*-anisoyl chloride (3) reacted with 4 to yield the *N*-(*o*-anisyl)-2-oxazolidone derivative, 8. Thermal rearrangement of 8 with calcium oxide gave a viscous liquid which by glc was 81% pure. Examination of a glc collected sample by mass spectral, nmr and ir methods supported the assignment of the structure for 9.

Although this method seems compatible with aryl rearrangement, our one attempt at a simple methyl rearrange-

ment proved quite unsatisfactory. In a manner similar to that previously described, acetyl chloride and 4 were converted to 10. Calcium oxide-mediated rearrangement of 10 resulted in a considerable amount of fragmentation, as evidenced by glc. Analysis by glc-ms allowed us to identify the component of interest, 11, and a collected sample had a proton nmr spectrum which matched that previously reported in the literature (4).



At this juncture has been demonstrated a new approach to 2-substituted oxazolines, and find that it seems most suitable for synthesis of the aryl derivatives.

EXPERIMENTAL

N-Benzoyl-2-oxazolidone (5).

To a stirred solution of benzoyl chloride (4.84 g, 34.5 mmoles) and pyridine (0.91 g, 11.5 mmoles) at 0° C was added 2-oxazolidone (1.0 g, 11.5 mmoles). After addition was complete, the reaction mixture was gently refluxed for 10 hours. After cooling, 100 ml of dichloromethane were added to the semi-solid reaction product, and the resulting solution was sequentially washed with 10 ml of 5% hydrochloric acid, 20 ml saturated sodium bicarbonate, water and saturated sodium chloride. The dichloromethane layer was dried over magnesium sulfate and after filtration the solvent was evaporated to leave a solid product. This was washed with ether to yield 1.1 g of white crystals, mp 167-167.5°; ¹H nmr (deuteriochloroform, TMS): ppm 4.13-4.19 (t, 2H, J = 7.9 Hz); 4.45-4.51 (t, 2H, J = 7.9 Hz); 7.42-7.43 (d, 2H, J = 2.0 Hz); 7.51-7.58 (t, 1H); 7.67-7.64 (dd, 2H); ms: (70 ev) m/e 191.

Anal. Calcd. for C₁₀H₉NO₃: C, 62.82; H, 5.26. Found: C, 62.87; H, 4.91.

2-Phenyl-2-oxazoline (6).

To 0.78 g of 5 was added an equal weight of calcium oxide. The solids were thoroughly mixed and placed in a flask with a side arm. The mixture was gently heated with a micro Bunsen burner until the solid had melted, at which time it was vigorously heated to distill 0.39 g of a liquid product. Analysis by glc (10% Apiezon on Chromosorb W, 60/80) indicated the material to be 97% pure; ¹H nmr (deuteriochloroform, TMS): ppm 4.03-4.11 (t, 2H, J = 9.2 Hz); 4.40-4.48 (t, 2H, J = 9.2 Hz); 7.41-7.48 (m, 3H); 7.93-7.91 (d, 2H); ms: m/e = 147.

Anal. Calcd. for C₉H₉NO: C, 73.45; H, 6.16. Found: C, 73.45; H, 6.16.

N-(*o*-Anisoyl)-2-oxazolidone (8).

To a stirred solution of *o*-anisoyl chloride (2.35 g, 13.8 mmoles) and pyridine (0.91 g, 11.5 mmoles) at 0° was slowly added 4 (1 g, 11.5 mmoles). The reaction mixture was maintained under nitrogen atmosphere; and the addition had been completed the reaction mixture was

heated at reflux for about three hours. The product was worked up the same as **5**, yielding 1.9 g of crystalline product (75%), mp 87-88° ¹H nmr (deuteriochloroform): 3.82 (s, 3H); 4.15-4.20 (t, 2H, J = 7.3 Hz); 4.42-4.48 (t, 2H, J = 7.3 Hz); 6.91-6.94 (d, 1H, J = 8.6 Hz); 6.98-7.04 (t, 1H); 7.26-7.32 (dd, 1H); 7.35-7.44 (td, 1H); ms: m/e 221.

Anal. Calcd. for C₁₁H₁₁NO₄: C, 59.73, H, 5.01. Found: C, 59.56; H, 5.11.

2-*o*-Methoxyphenyl-2-oxazoline (**9**).

To 1 g of **8** was added an equal weight of calcium oxide. The mixture was heated as previously described to give 0.55 g of a liquid which by glc (10% SE-30 on Anochrom) was shown to be 81% pure. The nmr spectrum of a glc collected sample gave the following results: 3.93 (s, 3H); 4.08-4.15 (t, 2H, J = 9.2 Hz); 4.34-4.41 (d, t, 2H); 7.40-7.43 (t, d, 1H); 7.78-7.82 (dd, 1H, J = 2.0 Hz); ms: m/e 177.

Anal. Calcd. for C₁₀H₁₁NO₂: C, 67.78; H, 6.26. Found: C, 67.61; H, 6.42.

N-Acetyl-2-oxazolidone (**10**).

In a procedure the same as used for **5**, acetyl chloride (2.71 g, 34.5 mmoles), pyridine (0.91 g, 11.5 mmoles) and 2-oxazolidone (1 g, 11.5 mmoles) yielded 1.1 g of crystalline product, mp 63-64°; nmr: 2.50 (s, 3H); 4.00-4.17 (m, 2H); 4.25-4.50 (m, 2H); ms: M⁺ = 129.

Anal. Calcd. for C₅H₇NO₃: C, 46.51; H, 5.46. Found: C, 46.54; H, 5.56.

2-Methyl-2-oxazoline (**11**).

In a procedure as described for **6**, 1 g of **10** and 1 g of calcium oxide were heated to give 0.43 g of liquid product. Analysis by (10% SE-30 on Anakram) showed about 25% rearrangement product and the remainder as fragmentation products. The nmr spectrum of a sample collected by glc matched the literature spectrum (4b).

Acknowledgment.

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