# Photocyclization of *NN*-Disubstituted β-Ketoamides

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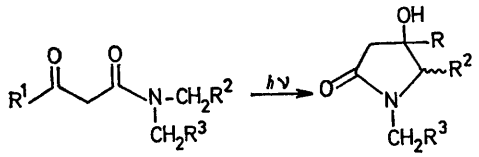
*Summary* *NN*-Disubstituted β-ketoamides (Ia—f) undergo photocyclization to give *N*-substituted-4-hydroxy-2-pyrrolidinones (IIa—f).

REPORTS have been published on the photochemical reactions of β-diketones[1] and β-ketoesters.[2] However, there are few reports concerning those of β-ketoamides.[3]



(I) (II)

| | Yield/% |
|---|---|
| a; $R^1=R^2=R^3=Ph$ | 80 |
| b; $R^1=Ph$, $R^2=R^3=H$ | 88 |
| c; $R^1=Ph$, $R^2=R^3=Me$ | 60 |
| d; $R^1=Me$, $R^2=R^3=H$ | 73 |
| e; $R^1=R^2=R=^3=Me$ | 76 |
| f; $R^1=Ph$, $R^2,R^3=CH_2OCH_2$- | 80 |

We report here that the irradiation of *NN*-disubstituted β-ketoamides (Ia—f) gives *N*-substituted-4-hydroxy-2-pyrrolidinones (IIa—f).

When a benzene solution of *NN*-dibenzylbenzoyl acetamide (Ia) was irradiated in a Pyrex vessel under nitrogen with a high-pressure mercury lamp, 1-benzyl-4,5-diphenyl-4-hydroxy-2-pyrrolidinone (IIa) was obtained (80%). The irradiation of β-ketoamides (Ib—f) under the same conditions gave the corresponding 4-hydroxy-2-pyrrolidinones (IIb—f), in good yields. The structures of (IIa—f) were elucidated by i.r., n.m.r., and mass spectra and elemental analyses. The formation of (IIa—f) can be explained in terms of photocyclization *via* δ-hydrogen abstraction by the ketone carbonyl group.

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[1] P. De Mayo, H. Takeshita, and A. B. M. A. Sattar, *Proc. Chem. Soc.*, 1962, 119; G. Kornis and P. De Mayo, *Canad. J. Chem.*, 1964, **42**, 2822; R. B. LaCount and C. E. Griffin, *Tetrahedron Letters*, 1965, 1549.

[2] P. Markov, L. Shiskova, and Z. Zdravkova, *Tetrahedron Letters*, 1972, 4017; D. Veierov, T. Bercovici, E. Fischer, Y. Mazur, and A. Yogev, *J. Amer. Chem. Soc.*, 1973, **95**, 8173.

[3] J. Reisch and D. H. Niemeyer, *Tetrahedron*, 1971, **27**, 4637; W. R. Oliver and L. R. Hamilton, *Tetrahedron Letters*, 1971, 1837, reported type II cleavage of *N*-substituted β-ketoamides.