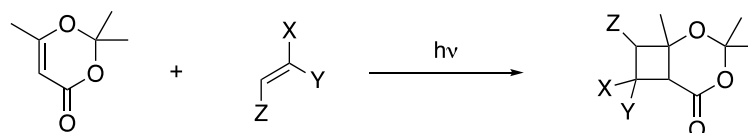


Photochemical [2+2] Cycloaddition of an Unsaturated Lactone/Aminal to Alkenes

Alessia Sahli

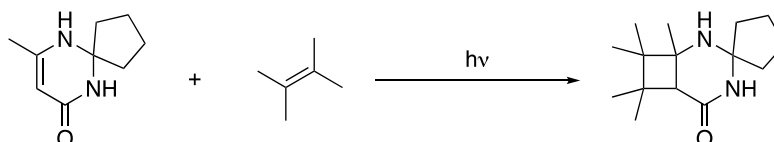
The photochemical [2+2] cycloaddition is a versatile tool in the synthesis of natural products. This reaction enables the synthesis of cyclobutane systems which can be kept as such, opened or extended to larger ring systems, thus creating new possibilities to form complex molecules.

In 1980, Baldwin *et al* published the photocycloaddition between an unsaturated lactone and different alkenes but only little experimental details were provided.¹ The aim of this project was therefore to better define the reaction conditions. After optimization of the reaction conditions, the photoreaction was carried out with various alkenes to synthesize a small library of compounds containing a cyclobutane moiety. The synthesized compounds could be possible precursors in the synthesis of natural products (*Scheme 1*).



Scheme 1: [2+2] photocycloaddition between an unsaturated lactone and alkenes

In a second part, an aminal with structural analogy to the above unsaturated lactone was synthesized to study the photochemical [2+2] cycloaddition and to compare it to the



Scheme 2: Photochemical [2+2] cycloaddition between an aminal and a simple alkene

previously studied lactone (*Scheme 2*).

Prof. Christian G. Bochet

¹ Baldwin, S. W.; Wilkinson, J. M. Photochemical Annulations. 6. Four-Carbon Photochemical Annulation of Alkenes with 2,2,6-Trimethyl-1,3-Dioxolenone. *J. Am. Chem. Soc.* **1980**, *102* (10), 3634–3635. <https://doi.org/10.1021/ja00530a059>.