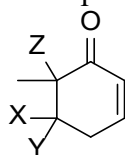


Photochemical [2+2] Cycloaddition of an unsaturated Aminal/Lactone to Alkenes

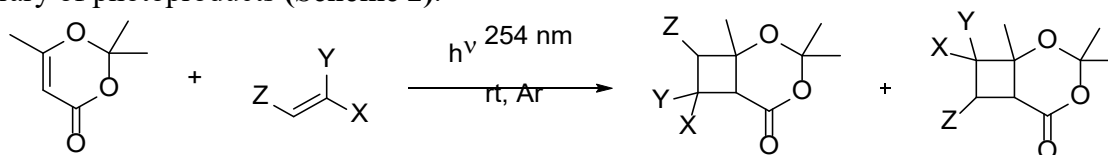
Nicolas Francisco Rosa De Sousa

The group of Baldwin *et al.* published the [2+2] photocycloaddition between an unsaturated lactone and various alkenes as part of a multistep leading ultimately to enones (**Scheme 1**).¹



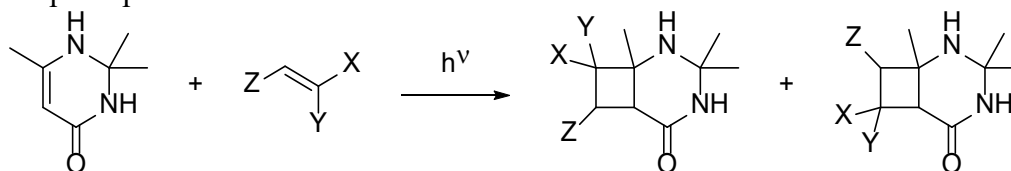
Scheme 1 Baldwin's enones derivatives obtained.

This work was taken up by Sahli in order to provide many details to the lack of information of the experimental part, work up and purification steps to reproduce the results published by Baldwin *et al.*^{1,2} Sahli was able to determine the reaction conditions to form the desired photoproducts and produced a small library. The conditions to open the 6-membered ring were also established.³ Further investigations were done with the unsaturated lactone to optimize the reaction. Sensitizers, photocatalysts and transition metal catalysts were successively employed in order to improve the yields. Various functionalized alkenes were used to see if some functional groups have a strong impact on the reaction behavior and to increase the library of photoproducts (**Scheme 2**).



Scheme 2 [2+2] Photocycloaddition between an unsaturated lactone and alkenes.

The aim of the present work is to perform [2+2] photocycloadditions between a structural analog of Baldwin's unsaturated lactone, the aminal shown on **Scheme 3**, and various alkenes. Thus, the aminal was first synthesized and then the reaction conditions were determined to afford the photoproducts.



Scheme 3 [2+2] Photocycloaddition between an aminal and alkenes.

Finally, an unsaturated lactam with structural analogy to Baldwin's lactone was synthesized to then perform [2+2] photocycloadditions. These photoproducts could be precursors of non-natural amino acids.

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