Microwave-assisted and base-dependent synthesis of γ-lactones or esters using N-heterocyclic carbenes as organocatalysts

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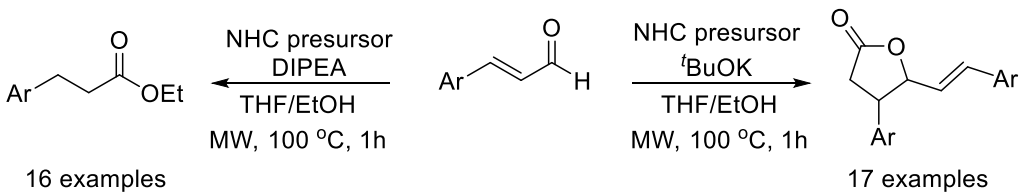
γ-Lactones are natural products found in plants, marine fungi and microorganisms and are used as intermediates for the synthesis of other added-value chemicals, but also in the flavoring and fragrance industry thanks to their aromas. γ-Decalactone has a peach-like scent, while whiskey and cognac γ-lactones give their distinctive scent to the corresponding drinks. The reactivity of γ-lactones is due to the lactone ring that undergoes ring-opening reactions to yield valuable compounds for further chemical transformations. N-heterocyclic carbenes (NHCs) are reactive species that are used as ligands in organometallic catalysts such as Grubbs' second-generation catalyst or more recently as stand-alone organocatalysts.

Our group has worked on the NHC-catalyzed, MW-assisted synthesis of hydroxymethylketones starting from aliphatic or aromatic aldehydes and paraformaldehyde, while the NHC precursors were either salts that yielded the NHC by using a suitable base or protected NHCs that were deprotected *in situ* due to the reaction conditions [1-3]. Inspired by the work of Bode *et al.* [4-5] we decided to use NHCs and MW irradiation for the synthesis of γ-lactones. In this work we will present a series of novel NHCs that were used together with commercially available NHCs in the microwave-assisted and base-dependent synthesis of γ-lactones starting from cinnamaldehyde analogues. Depending on the base used to generate the NHC either the γ-lactone or the corresponding saturated ester of cinnamic acid analogue was formed. The scope of these reactions will be discussed in detail.



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