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The chemistry of nitrosoalkenes and azoalkenes in the synthesis of heterocyclic compounds

The chemistry of conjugated nitrosoalkenes and azoalkenes, used as electron-deficient heterodienes in hetero-Diels–Alder reactions or as Michael-type acceptors in conjugated 1, 4-addition reactions, has been successfully explored for the synthesis of a plethora of heterocyclic systems (Figure 1). Hetero-Diels–Alder reactions of 3-tetrazolyl- nitrosoalkenes and azoalkenes proved to be an efficient approach to 5-(substituted)-1H-tetrazoles, including tryptophan analogues and β-carbolines bearing the 1H-tetrazol-5-yl substituent. The alkylation of five-membered heterocyclic compounds via reaction with conjugated nitrosoalkenes and azoalkenes was also applied to the functionalization of dipyrromethane and bis(furan-2-yl)methanes. Combining hetero-Diels–Alder reactions of nitroso- and azoalkenes with furans with their ring-opening reactions, the synthesis of novel heterocycles was achieved, namely 6-(2-oxobutyl)-1,6-dihydropyridazines, 6-(2-oxopropyl)-1,6-dihydropyridazines, 5-(3-oxobutyl)-isoxazoles and 5-(3-oxobutyl)-pyrazoles. Base-mediated dehydrohalogenation of α,α-dihalo-oximes and α,α-dihalo-hydrazones in the presence of pyrrole, indole and pyrazoles allowed the development of new routes to dipyrromethanes, bis(indolyl)methanes and bis(pyrazolyl)methanes, respectively. Calix [4]pyrroles and bilanes were also obtained from the reaction of azoalkenes with dipyrromethanes. The study included the biological evaluation of some of the new heterocyles. Further details of this chemistry will be presented and discussed.

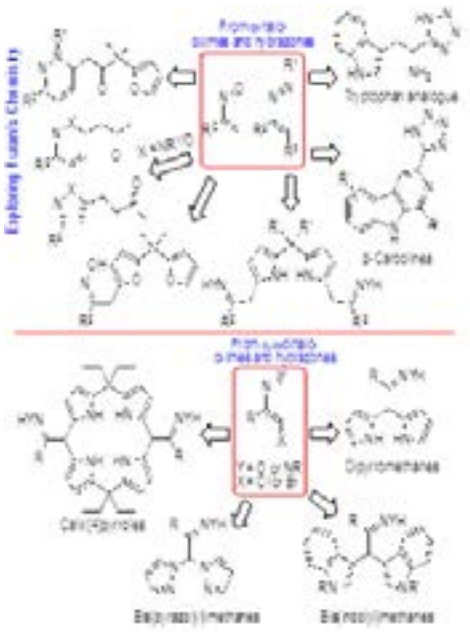

Figure 1: Chemistry of nitrosoalkenes and azoalkenes.

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Biography

Teresa M V D Pinho e Melo studied Chemistry at the University of Coimbra, where she obtained her PhD in Organic Chemistry in 1995 and received her Habilitation in Organic Chemistry in 2003. She was a Research Fellow at the University of Liverpool (1992-1993). She is currently Director of the Department of Chemistry, Associate Professor with Habilitation and Head of the Organic Chemistry Research Group at the University of Coimbra. She is also President of the Division of Organic Chemistry of the Portuguese Chemical Society. She has published more than 125 peer-reviewed scientific papers in international journals. Her research interests are in the area of synthetic and mechanistic heterocyclic organic chemistry. She is particularly concerned with the development of synthetic routes to new bioactive molecules.

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