Xavier J Salom-Roig et al., Organic Chem Curr Res 2017, 6:1(Suppl)
http://dx.doi.org/10.4172/2161-0401.C1.016

Nazarov cyclization mediated by a chiral sulfoxide: Lewis acid induced switch of torquoselectivity

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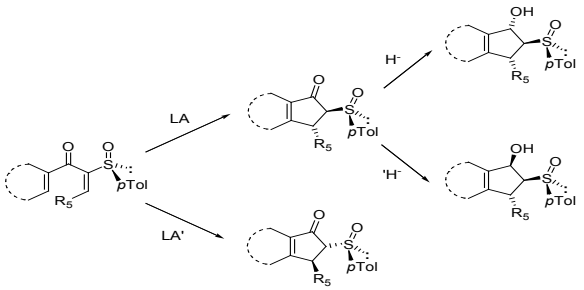
A Nazarov cyclization of activated dienones bearing a dihydropyran as an electron-donating group (EDG) and a chiral sulfoxide group as an electron-withdrawing group (EWG) and as a chiral inductor is described. The direction of the torquoselectivity highly depends on the nature of the Lewis acid promoter. This diastereodivergent strategy furnishes each *trans* stereoisomers from a common precursor. The scope of the reaction was extended to substrates bearing a phenyl and an activated aromatic or heteroaromatic moieties as an EDG. The corresponding Nazarov products are precursors of 3-aryl substituted cyclopenta[*b*]pyranone, indanone, pyrrole-fused and furan-fused cyclopentanone scaffolds, which are frequently encountered in many natural products such as sterhirsutins A and C, (+)-pauciflorol and the strigolactone analogue (±)-ST362. Thus, we report the first enantioselective synthesis of two 3-aryl substituted indanones known by their anticancer activity. The synthetic utility of this methodology was also highlighted by the transformation of the Nazarov cyclized products into highly functionalized cyclopenta-fused oxacycle-based scaffolds. As an example, the cyclopentene carbonyl group could be reduced stereoselectively in the corresponding cyclopentenols.



Biography

Xavier J Salom-Roig has done his undergraduation from the University of València and at the Ecole de Chimie, Polymères et Matériaux (ECPM) in Strasbourg (France). He continued his education and completed his PhD in 1999 under the supervision of Professor G Solladié at ECPM. In 2000, he was a Post-doctoral Associate of Professor Jean-Pierre Sauvage at the University of Strasbourg. In 2004, he joined Professor J Martínez's group, at the University of Montpellier (France) as an Associated Professor. Currently, he works on the synthesis of 1,2-aminoalcohols and substituted cyclopentenones using sulfoxides as chiral inductors.

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