# Chiral imidazolium salts derived from amino acids as additives for *S*-proline catalyzed asymmetric aldol reaction

B. Altava, M. I. Burguete, N. Carbò, S.V. Luis

*Inorganic and Organic Department, University Jaume I, Avda. V. Sos Baynat, Castellón, Spain - altava@uji.es*

**Keywords:** organocatalysis, chiral imidazolium salts, *S*-proline.

Catalytic applications represent a central subject in Green Chemistry. For the next future, research efforts need to be driven towards the development of practical catalytic processes for the preparation of Fine Chemicals and Pharmaceutical products, which are areas with the highest waste factors. One of the more straightforward approaches to implement the potential for practical use and to implement the "Green character" of catalytic processes is the use of organocatalytic reagents.[1,2] From the toolbox of small organocatalysts, proline is by far one of the most popular ones, as it is cheap, readily available in both enantiomeric forms and can be used for a wide range of synthetic transformations.[3,4] Among them the direct catalytic aldol reaction is a well-studied and broadly applicable C-C bond-forming reaction, which provides enantiomerically enriched β-hydroxy carbonyl compounds.[5]

By other side, since CILs used as catalyst in aldol reaction by Luo et al.[6] in 2007, many CILs were developed as catalysts for asymmetric reactions. However, in asymmetric reactions where CILs cannot be applied as catalysts, using CILs as the solvent to investigate the chiral inducing capabilities has rarely been reported. L-proline combined with ILs were also proved to be an efficient catalytic system for asymmetric aldol reactions.[7,8] ILs may interact with the organocatalyst through H-bonding interactions to form the supramolecular active catalyst.

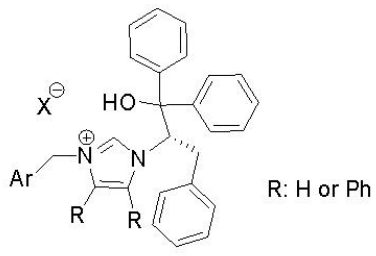


Fig. 1 – General structure of the chiral midazolium salts.

Taking this into account and in connection with our ongoing interest in expanding the use of chiral imidazolium receptors derived from natural amino acids previously prepared by our research group[9] herein, we present our results on the use of new CILs derived from amino acids with the gerneral structure shown in Fig. 1 as additives for the *S*-proline catalyzed direct aldol reaction between ketones and aromatic aldehydes.

## Acknowledgements

Ministerio de Ciencia e Innovación (CTQ2011-28903-C02-01) and Generalitat Valenciana PROMETEO 2012/020, accompGV-/2013/207.

## References

1 P. Melchiorre, M. Marigo, A. Carlone, G. Bartoli, Angew. Chem., Int. Ed., 2008, 47, 6138.
2 R. C. Wende, P. R. Schreiner, Green Chem., 2012, 14, 1821.
3 S. K. Panday, Tetrahedron: Asymmetry, 2011, 22, 1817.
4 S. Mukherjee, J. W. Yang, S. Hoffmann, B. List, Chem. Rev., 2007, 107, 5471.
5 V. Bisau, A. Bisau, V. K. Singh Tetrahedron, 68, 4541, (2012)
6 Luo, S.; Mi, X.; Zhang, L.; Liu, X. H.; Cheng, J. P.; Tetrahedron, 2007, 63, 1923.
7 J. Shah, H. Blumenthal, Z. Yacob, J. Liebscher, Adv. Synth. Catal., 2008, 350, 1267.
8 K. R. Reddy, L. Chakrapani, T. Ramani, C.V. Rajasekhar, Synth. Commun., 2007, 37, 4301.
9 B. Altava, M.I. Burguete, D. S. Barbosa, J. Escorihuela, S.V.Luis, Tetrahedron: Asymmetry, 2009, 20, 999.