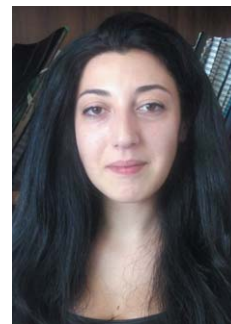


SYNLETT Spotlight 369

N-Methylimidazole: Attractive and Valuable Chameleonic Species

Compiled by Graziella Greco



This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

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Dedicated to Dr. Raquel P. Herrera for her encouragement and humanity.

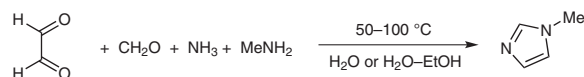
Introduction

In the last decades *N*-methylimidazole (*N*-Mim) has attracted the attention of a great number of research groups due to its broad chameleonic behavior, being widely used in organic chemistry as a solvent, as co-catalyst, ligand in metal complexes, Brønsted or Lewis base catalyst. *N*-Mim participates in the active center of several enzymes, as an ionic liquid precursor, as electron acceptor or as key intermediate in synthesis.^{1–7} On the other hand, the chemistry of imidazole compounds in general has been also a center of interest due to the presence of its essential functional unit in a large variety of biological important molecules, being the *N*-methylimidazole used to mimic aspects of several of these biomolecules.⁸ These derivatives can be helpful in studies to elucidate biological mechanisms, and its importance has led to several international patents. The different roles played by *N*-methylimidazole have

been extensively applied for the synthesis of important targets.⁸

Preparation

The Radziszewski process is used at industrial scale for the preparation of *N*-methylimidazole. This reaction is performed by using glyoxal, which is condensed with formaldehyde, ammonia and methylamine or in a smaller scale by direct methylation of imidazole.⁹ Nevertheless, *N*-methylimidazole is also commercially available as a liquid.

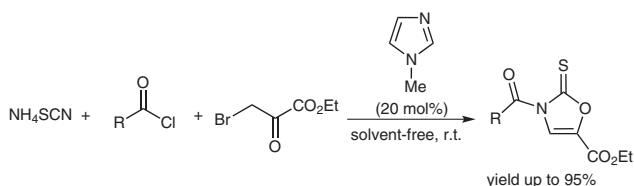


Scheme 1 Industrial synthesis of *N*-methylimidazole

Abstracts

(A) Lewis Base Catalyst:

Yavari and co-workers reported an efficient synthesis of functionalized 1,3-oxazoline-2-thiones promoted by a catalytic amount of *N*-methylimidazole. In the invoked mechanism, the role of the *N*-methylimidazole is assumed to be added to the in situ formed isothiocyanate, and released in the last step to generate the final cyclic adduct.¹



(B) Brønsted Base Catalyst:

Lin and co-workers have developed a novel strategy for the aza-Michael addition of *N*-heterocycles to α,β -unsaturated carbonyl compounds under the catalytic action of *N*-methylimidazole as Brønsted base. The final 1,4-adducts were achieved with very good yields and in short reaction times.²

