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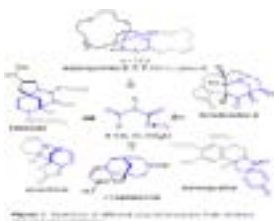
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Chloroacetamides: Versatile intermediates for the synthesis of nitrogen heterocycles using radical and non-radical processes**Faiza Diaba**

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Nitrogen heterocycles are found in a wide range of natural products and biologically active structures. Development of new robust and simple synthetic routes that allow rapid access to these functionalized scaffolds is of great importance in medicinal chemistry. During the last few years we have demonstrated that chloroacetamides are valuable intermediates for the synthesis of 5, 6 and 7-membered aza-heterocycles using radical and non-radical processes. Thus, using radical chemistry under either atom transfer radical cyclizations (ATRC) mediated by Cu(I) or the hydride reductive method, we get access to the 2-azabicyclo[3.3.1]nonane derivatives used later in the preparation of the tetracyclic core of madangamines D, E and F, the methylated tricyclic structure of himalensine A alkaloid and the tricyclic framework of immunosuppressant FR901483. We also described the first dearomatizing spirocyclization from N-benzyltrichloroacetamides using CuCl catalyst and under microwave activation for the synthesis of 2-azaspiro[4.5]decadienes. Moreover a direct synthesis of the 6-azabicyclo[3.2.1]octane ring, prevalent in a range of biologically active compounds, from an α -carbamylation of ketones was also achieved. The process involves an unprecedented intramolecular haloform-type reaction of trichloroacetamides promoted by enamines (generated *in situ* from ketones) as counter-reagents. The syntheses are achieved using extremely short reaction times and solvent free protocols providing 6-azabicyclo[3.2.1]octane derivatives with good yields. Efforts are pursued to explore more the synthetic potential of chloroacetamides.

**Recent publications**

1. Diaba F, Pujol Grau C, Martinez Laporta A, Fernandez I and Bonjoch J (2015) Synthesis of the tetracyclic ABCD ring systems of madangamines D-F. *Organic Letters* 17:568-571.
2. Diaba F, Martinez Laporta A, Coussanes G, Fernandez I and Bonjoch J (2015) Synthesis of the ABC fragment of calyciphylline A-type Daphniphyllum alkaloids. *Tetrahedron* 71:3642-3651.
3. Diaba F, Montiel J A and Bonjoch J (2016) Intramolecular radical non-reductive alkylation of ketones via transient enamines. *Chemical Communications* 52:14031-14034.
4. Diaba F, Martinez Laporta A and Bonjoch J (2014) Atom transfer radical cyclization of trichloroacetamides to electron-rich acceptors using Grubbs' catalysts: synthesis of the tricyclic framework of FR901483. *Journal of Organic Chemistry* 79:9365-9372.
5. Diaba F, Montiel J A, Serban G and Bonjoch J (2015) Synthesis of Normorphans through an efficient intramolecular carbamylation of ketones. *Organic Letters* 17:3860-3863.

Biography

Faiza Diaba studied Chemistry at the University of Constantine, Algeria. She then obtained her PhD in Organic Chemistry with Dr. Micheline Grignon Dubois at Bordeaux I University, France. After a two years Postdoctoral position with Prof. Josep Bonjoch at Barcelona University, she pursued her scientific career as a Lecturer and since 2009, she has been an Associate Professor at the same university. Her research interests are focused on developing new synthetic methodologies for the synthesis of nitrogen-containing heterocycles directed to the total synthesis of natural compounds based on radical chemistry, organocatalysis and electrophilic cyclizations promoted by iodine.

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