

1,3-Dimethylbenzimidazolinium iodide and 1,3-dimethylbenzimidazoline in reduction processes of C=N group of imines

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Keywords: 1,3-dimethylbenzimidazolinium iodide, Schiff bases (imines).

Abstract

Interaction between 1,3-dimethylbenzimidazolinium iodide (as an analogue of 1,3-benzodithiolium and 1,3-benzothiolium and tropylium salts), aromatic Schiff bases, and sodium tetrahydroborate in tetrahydrofuran medium (in the presence of imidazole as a cation carrier, or without) at the ratio of starting reagents imine : 1,3-dimethylbenzimidazolinium iodide : sodium tetrahydroborate = 1:1:1 was studied. It was found out that, as basically distinct from the reaction of imines with analogues (1,3-benzodithiolium and 1,3-benzothiolium and tropylium salts) which, while reacting under similar conditions with Schiff bases, form accordingly the products of reductive heterylation – *N*-arylmethyl-4-(1,3-benzodithiol-2-yl)aniline, or tropylation – *N*-arylmethyl-4-(7-cyclohepta-1,3,5-trienyl)aniline, whereas the reaction of imines with 1,3-dimethylbenzimidazolinium iodide under similar conditions afforded *N*-arylmethylanilines in a high yield. This fact enables characterizing the 1,3-dimethylbenzimidazolinium iodide cation as more stable and less electrophilic due to an appreciable delocalization of a positive charge in the cation and, as a consequence, placing it as last (less reactive) in a series of known heteroanalogues (1,3-benzodithiolium > xanthilium > thioxanthilium > tropylium > *N*-methylacridinium > 1,3-dimethylbenzimidazolinium).

The use of 1,3-dimethylbenzimidazoline as a donor of hydride-ion H⁻ (instead of sodium tetrahydroborate) also results in corresponding secondary aromatic amines as the reduction products of Schiff bases.

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