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An efficient one pot multicomponent synthesis of some novel substituted imidazoles using nano zirconia catalyst under solvent free conditions: a greener "nose" approach

Sundaram Singh
Indian Institute of Technology(BHU), India

An increase in regulatory limitations on the use, manufacture and disposal of perilous organic solvents has focused attention on the development of non-hazardous alternatives such as solvent-less synthesis, multicomponent reactions and reusable heterogeneous catalysts for the sustainable development of chemical enterprise. These organic reactions possess many advantages over traditional reactions in organic solvents. For example, solvent-less, multicomponent reactions with reusable heterogeneous catalysts reduce the consumption of environmentally hazardous solvents and minimize the formation of other waste. The reactions occur under mild conditions and usually require easier workup procedures and simpler equipment. Nano zirconia (ZrO_2) has been widely investigated in the past decades due to their multiple potential applications. The crystal phase of ZrO_2 (monoclinic and tetragonal) strongly influences the catalyst activities and selectivities. A highly efficient method for the synthesis of substituted imidazoles from a multicomponent reaction of isatin derivatives with ammonium acetate and aromatic aldehydes under solvent free conditions has been established. The reaction is supposed to proceed via nano ZrO_2-catalyzed C=O bond activation followed by the formation of diamine intermediate and its condensation with ZrO_2 activated isatin derivatives. Because of the simple and readily available starting materials, easy operation and high bioactivity of imidazoles, this strategy can be broadly applied to medical chemistry. The recyclability of the nano ZrO_2 catalyst is another emphasis of proposed methodology.

Biography

Sundaram Singh has completed her PhD BHU, Varanasi. She is the Associate Professor of Chemistry Department, IIT (BHU), Varanasi. She has published more than 20 papers in reputed journals. Her research area is green synthesis, organic synthesis and evaluation of biological activity.

sundaram.apc@itbhu.ac.in

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