

Acidic Ionic Liquid Catalyzed Efficient Tandem Cycloannulation Approach Towards Synthesis of Tetracyclic[6,5,5,5]Indole Ring

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ABSTRACTS

Indole based ring systems constitute a part of significant biologically active natural compounds, which also have been used as synthons of complex molecules. Amidst the indole variants, the tetrahydropyrrolo[2,3-b]indole core and the tetrahydroimidazo[1,2-a]indole core are key structural motifs which are present in a growing class of bioactive alkaloids, such as the potent vasodilator amauromine; the insecticidal okaramine C; Bacillus subtilis pheromone ComX and cholecystokinin antagonist asperlicin; the substance P antagonists fiscalins respectively. There has been much focus these days on the synthesis of tetracyclic[6,5,5,5]indole based skeletons which are considered as combinations of tetrahydropyrrolo[2,3-b]indole and tetrahydroimidazo[1,2-a]indole rings. A novel single step protocol catalyzed by an acidic ionic liquid has been devised for the synthesis of such tetracyclic[6,5,5,5]indole based cores. There have been reports on the synthesis of these polycyclic indole based rings but most of the reported methods make use of toxic organic solvents, cumbersome experimental procedures and multiple steps. The reaction devised by us involves a one-pot tandem cycloannulation of phenacyl bromide with tryptamine catalyzed by acidic ionic liquid. Acidic ionic liquids have emerged as revolutionary candidates in the replacement of conventional homogeneous and heterogeneous acid catalysts on account of their negligible vapor pressure, outstanding flexibility, heat resistance, non-volatility, non-corrosiveness and tunable polarity with common organic solvents. Furthermore, the ionic liquid used here could be recycled and reused for further reaction cycles without considerably affecting the yield of the target compound. The reaction occurs at room temperature and provides the merits of easy work-up, high yields and short reaction times.