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ARTICLE

Ionic liquid catalyzed one-pot multi-component synthesis of fused pyridine derivatives: A strategy for green and sustainable chemistry

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This work is dedicated to my beloved parents.

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Abstract

The synthesis of a combinatorial library of heterocycle-fused pyridine derivatives has been achieved successfully via a one-pot four-component reaction of aromatic/aliphatic aldehyde, malononitrile, thiazolidine-2,4-dione and ammonium acetate in the presence of piperidinium acetate as the catalyst. It involved the Knoevenagel condensation of the aldehyde and malononitrile to produce arylidene malononitrile as an intermediate, which was further intramolecular cyclization through Michael type addition ketone to the electrophilic double bond of the arylidene to produce fused pyridines in high yields. Environmental friendliness, low cost, Operational simplicity, extensive reusability and applicability, and easy recovery of the catalyst using simple evaporation are the critical features of this methodology. Also, a series of pyridine based dihydrothiazolo[4,5-b] pyridine-6-carbonitrile analogs were synthesized and selected for their in vitro antifungal and antibacterial activities.

CONFLICT OF INTEREST

The authors declare no competing financial interest.

Supporting Information

Filename	Description
jhet4135-sup-0001-supinfo.docx Word 2007 document , 1.2 MB	**Figure S1.** ^{1}H NMR spectra of fresh Piperidinium acetate-IL. **Figure S2.** ^{13}C NMR spectra of fresh Piperidinium

Filename	Description
	acetate-IL. **Figure S3.** ^{1}H NMR spectra of after 4th cycle Piperidinium acetate-IL. **Figure S4.** IR spectra of Compound (**5a**). **Figure S5.** ^{1}H-NMR spectra of Compound (**5a**). **Figure S6.** ^{15}N NMR (ghsqc) spectra of compound **5b.** **Figure S7.** ^{13}C-NMR spectra of Compound (**5a**). **Figure S8.** IR spectra of Compound (**5b**). **Figure S9.** ^{1}H-NMR spectra of Compound (**5b**). **Figure S9.** ^{1}H-NMR spectra of Compound (**5b**). **Figure S10.** ^{13}C-NMR spectra of Compound (**5b**). **Figure S11.** IR spectra of Compound (**5c**). **Figure S12.** ^{1}H-NMR spectra of Compound (**5c**). **Figure S13.** ^{13}C-NMR spectra of Compound (**5c**). **Figure S14.** IR spectra of Compound (**5m**). **Figure S15.** ^{1}H-NMR spectra of Compound (**5m**). **Figure S16.** ^{13}C-NMR spectra of Compound (**5m**). **Figure S17.** IR spectra of Compound (**5h**).

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