Green Synthesis of 1-Aryl-2,3,4,9-Tetrahydro-1*H*-B-Carbolines using Fe(Iii)-Montmorillonite and Study of their Antimicrobial Activity

ABSTRACT

A series of 1-aryl-2,3,4,9-tetrahydro-1*H*-_-carbolines were synthesized using green ultrasonic synthetic approach in aqueous medium via the Pictet-Spengler reaction. The condensation reaction of tryptamine and various aromatic aldehydes at 80oC in aqueous medium produced the corresponding 1-aryl-2,3,4,9-tetrahydro-1*H*-β-carbolines by means of heterogeneous catalysis with Fe(III)-montmorillonite catalyst. The driving force for reaction feasibility in terms of the condensation of β-arylethylamine with the corresponding aldehyde followed by the ring closure reaction is the acidic nature of the Fe(III)-montmorillonite catalyst. The advantage of this methodology is high product yield and short reaction time compared to the conventional heating and microwave irradiation methods. The structures of synthesized compounds were confirmed by IR, 1H and 13C NMR spectroscopy, mass spectrometry, and elemental analysis. All products were screened for their antimicrobial activity, and some compounds exhibited significant activity against selected bacteria and fungi.