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Search for new anti-TB leads: Green synthesis and evaluation of antitubercular activity

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Tuberculosis (TB) remained as the major global health problem. Multi-drug resistant (MDR) strains and HIV co-infection are the greatest challenges to treat this disease. The severity of the problem has further accentuated due to the observation of extremely drug resistance (XDR) TB. The MDR and XDR TB, strains are not only resistant to the front-line drugs isoniazid and rifampicin, but also to the number of second-line drugs. These resulted in resurgence in research activities to address the urgent need for new anti-tuberculosis drugs. 1,2-Diamine moiety is present in various biologically active molecules, are important building blocks for the synthesis of various drug intermediates, and serve as ligand in asymmetric catalysis. Ethambutol is one of the diamine-based first line anti-TB drug. Recently, SQ109 (N-geranyl-N-(2-adamantyl) ethane-1,2-diamine) has been reported to be highly potent against the H37Rv and MDR strains of M. Tb. and is in phase-II clinical development. In view of the prevalence of TB amongst the economically underprivileged section of the population worldwide the development new therapeutics with affordable price becomes highly imperative. Thus search of small molecular entity with lesser structural complexity and ease of preparation following greener synthetic routes becomes a mandate for anti-TB new drug development programme. In the context of greener synthetic routes the water-assisted/mediated synthesis is one of the top priority agenda. The use of water as a reaction medium address adequately the aspect of maintaining greenness and the unique physical and chemical properties of water increase the reactivity/selectivity often unattainable in organic solvents. Efforts have been directed towards this direction from this laboratory through development of new and green synthetic protocols. The present study highlights the synthesis of 1,2-diamines, representing the pharmacophoric feature of the 1,2-diamine-based anti-TB drugs, in aqueous medium and evaluation of their anti-tubercular activity that resulted new leads.

Biography

Babita Tanwar has completed MTech Pharma in Pharmaceutical Technology Bulk Drug from National Institute of Pharmaceutical Education and Research (NIPER), Mohali, Punjab and currently pursuing PhD programme (SRF) since 2011 under the guidance of Dr. Asit K Chakraborti in the Department of Medicinal Chemistry, NIPER, Mohali, Punjab, India. She has filed an Indian Patent (Application No.3741/DEL/2013) on "An improved green protocol for the synthesis of 1,2-diamines via ring opening of aziridines with amines."

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