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Green synthesis of Isoxazole-5(4 H)-one derivatives using Theophylline Hydrogen Sulfate as a catalyst

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Abstract

A green and eco-friendly synthetic protocol has been established for the preparation of a series of isoxazole derivatives using Theophylline Hydrogen Sulfate (THS) as a highly efficient and reusable solid acid catalyst. In this method, aldehydes react smoothly with ethyl acetoacetate and hydroxylamine hydrochloride in aqueous medium under ambient conditions with continuous stirring. The use of water as a solvent, along with THS, not only promotes the reaction efficiently but also eliminates the need for hazardous organic solvents or harsh conditions. The protocol provides multiple advantages such as short reaction times, high to excellent product yields, operational simplicity, and easy catalyst recovery and reuse. Owing to its environmentally benign nature, low cost, and sustainability, this method represents a practical approach for the green synthesis of isoxazole derivatives and can be a promising alternative for large-scale and industrial applications.

Keywords Isoxazole-5(4H)-one derivatives, THS, Green catalysis, Aqueous medium, Heterocyclic synthesis

Graphical abstract

