Chapter 11
Imidazo-Pyridines:
A Hybrid N-Heterocycles for Their Sustainable Synthetic Approaches and Significant Clinical Diversity

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ABSTRACT

The structural resemblance between the fused imidazopyridine heterocyclic ring system (a purine system) has prompted biological investigations to assess their potential therapeutic significance. They are known to play a crucial role in numerous disease conditions. In recent years, new preparative methods for the synthesis of imidazopyridines using various catalysts or non-catalytic systems have been described. In the present chapter, we summarise the recent approaches adopted for the synthesis of functionalized imidazo-pyridines over the last two decades along with their clinical advancement and applications. The key points adopted here including, traditional cyclo-condensation, reaction with nitro olefins, reaction with alkynes, 3-CCR (3-Component Condensation Reaction) based MCRs and miscellaneous aspects of imidazo-pyridine along with its biological importance have been

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presented and discussed. This chapter will provide new initiatives to the chemists towards the synthesis of imidazo-pyridines and possible medicinal applications with the reported methods.

1.0 INTRODUCTION

Imidazopyridine the imidazole moiety fused with the pyridine ring' is an important class of biologically active nitrogen-containing heterocycle (Sanapalli *et al.,* 2022). Among the various imidazopyridine derivatives, imidazo[1,2-*a*] pyridine moiety is the most important in the field of natural products and pharmaceuticals (Pawar *et al.,* 2023). These derivatives show a wide range of biological activities such as antifungal, anti-inflammatory, antitumor, antiviral, antibacterial, antiprotozoal, antipyretic, analgesic, antiapoptotic, hypnoselective, and anxioselective activities (Geedkar *et al.,* 2022). There are several drugs such as zolpidem (used in the treatment of insomnia), alpidem (as an anxiolytic agent), olprinone (for the treatment of acute heart failure), zolimidine (used for the treatment of peptic ulcer), necopidem and saripidem (both work as an anxiolytic agent) are available in the market which contain imidazo[1,2-*a*] pyridine moiety (Panda *et al.,* 2022; Vanya *et al.,* 2021). The optically active **GSK812397** is a drug for the treatment of HIV infection (Jenkinson *et al.,* 2010). The antibiotic drug Rifaximin also contains this fused heterocyclic moiety **(Figure 1)** (Giorgio *et al.,* 2024). In addition, some abnormal N-heterocyclic carbenes are also prepared based on imidazo[1,2-*a*] pyridines (Hendriks *et al.,* 2015).

Applications of Quartz Crystal Microbalances Modified With Metal Organic Frameworks: A Review

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