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*A review paper on synthesis, characterization, and antimicrobial evaluation of novel benzimidazole-isoxazole derivatives with potential pharmacological significance*

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## Abstract:

This research paper describes the synthesis and antimicrobial evaluation of novel benzimidazole-isoxazole derivatives. The study begins with the synthesis of a novel imidazole derivative, 2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetohydrazide (1). Through its reaction with various benzaldehyde derivatives (2a-e), the compound (1) generates Schiff bases (3a-e). Further transformations involve the synthesis of 1-(2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetamido)-5-oxo-2-arylpyrrolidine-3-carboxylic acid derivatives (4a-e), N-(3-(1H-benzo[d]imidazol-2-yl)-5-oxo-2-arylpyrrolidin-1-yl)-2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetamide (5a-e), and N-(4-(1H-benzo[d]imidazol-2-yl)-3-phenyl-5-aryl-4H-pyrrolo[2,3-c]isoxazol-6(5H)-yl)-2-(1-methyl-1H-benzo[d]imidazol-2-ylthio)acetamide (7a-e). The synthesized compounds are characterized and subjected to antimicrobial screening. The results indicate potential applications of these compounds in the pharmaceutical and agricultural industries.

## Keywords:

benzimidazole, pyrrolidine, isoxazole, characterization, antibacterial activity, antifungal activities