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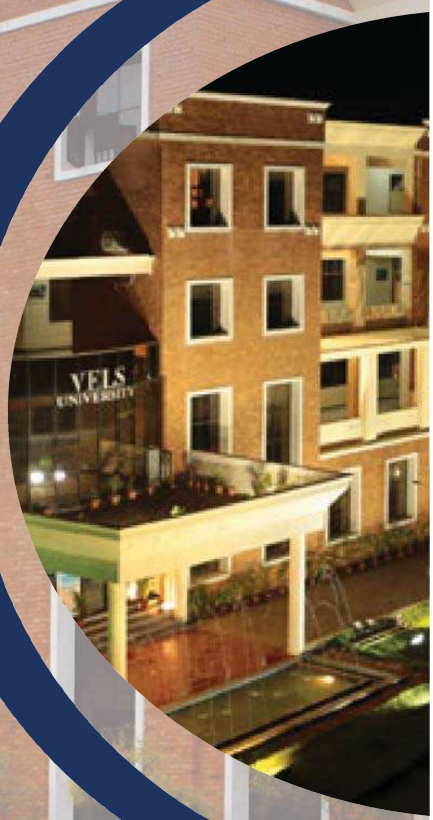

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DESIGN AND NOVEL SYNTHESIS OF SCHIFF BASE DERIVATIVE FOR ANTIMICROBIAL ACTIVITY

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Abstract

Schiff base derivatives have emerged as significant compounds in medicinal chemistry due to their diverse pharmacological properties, particularly their antimicrobial potential. In this study, a novel series of Schiff base derivatives was rationally designed and synthesized through condensation reactions between various substituted aromatic aldehydes and primary amines. The synthesis was carried out under mild conditions, yielding stable imine-linked compounds with good efficiency. Structural characterization of the synthesized molecules was accomplished using spectroscopic techniques such as FTIR, ^{1}H NMR, and mass spectrometry, confirming the formation of the azomethine (–C=N–) functional group. The antimicrobial activity of these compounds was evaluated against a panel of Gram-positive and Gram-negative bacteria, along with selected fungal strains, using standard in vitro assays. Results indicated that several derivatives exhibited significant antimicrobial activity, in some cases comparable to standard drugs. Structure–activity relationship analysis suggested that the presence of electron-donating and electron-withdrawing substituents on the aromatic ring played a crucial role in enhancing biological efficacy. Overall, this study demonstrates that Schiff base derivatives represent promising scaffolds for the development of new and effective antimicrobial agents.

Keywords:: Schiff base derivatives, Antimicrobial activity, Novel synthesis, Aromatic aldehydes, Primary amines, Azomethine group, Structure–activity relationship (SAR), Spectroscopic characterization, Bioactive compounds, Drug development.