Synthesis and Antimicrobial Activity of New 5-(3,4-Dichlorophenyl)-2-alkylthio-1,3,4-oxadiazoles and Their Triazolo[3,4-b][1,3,4]thiadiazine Derivatives

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The treatment of infectious diseases still remains an important and challenging problem because of combination of the factors including emerging infectious diseases and the increasing number of multi-drug resistant pathogens. Significant increases in resistant bacterial and fungal infections prompt researchers to find novel compounds having new and/or effective mechanisms. Among them, 1,3,4-oxadiazole-2-thiones and their fused ring derivatives exhibit broad antimicrobial activity [1-3].

With the aim to obtain new antibacterial agents, we synthesized a series of 5-(3,4-dichlorophenyl)-2-alkylthio-1,3,4-oxadiazole and their triazole[3,4-b][1,3,4]thiadiazine derivatives. The synthesis of 5-(3,4-dichlorophenyl)-2-alkylthio-1,3,4-oxadiazoles was carried out by the reaction of 5(3,4-dichlorophenyl)-1,3,4-oxadiazole-2-thione with substituted phenacyl bromides, as a second step, reactions of these compounds with hydrazine hydrate in glacial acetic acid led to corresponding triazole[3,4-b][1,3,4]thiadiazines.

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\text{Scheme- Synthetic pathway of the compounds}
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Purity and identity of the synthesized compounds were checked and the proposed structures were confirmed by the results of IR and \textsuperscript{1}H-NMR spectroscopic measurements.

All the new structures were tested for their antimicrobial performance against a series of bacteria and fungus by microdilution method. Minimal inhibitory concentration (MIC) were shown that some of the compounds exhibited potent antimicrobial activity.