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Novel Piperazine Coupled Benzimidazoles: Antimicrobial Evaluation

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Over the past few decades, gradually increasing drug resistance in the treatment of infectious disease indicate a crucial problem in antimicrobial therapy and necessitates continuing research into novel classes of antimicrobials. A number of researchers have reported antimicrobial properties in benzimidazoles. Keeping the these facts in view, we considered it of interest to synthesize some novel benzimidazole analogues for their antimicrobial activity. The structures of the compounds were elucidated using elemental analysis, IR, ^{1}H-NMR and mass spectral data. The synthesized compounds were tested for their *in-vitro* antimicrobial activity against the Gram-positive bacteria *Staphylococcus aureus* and *Bacillus subtilis*, the Gram negative bacteria *Proteus mirabilis* and *Pseudomonas aeruginosa*, the fungal strain *Aspergillus niger* and the yeast like pathogenic fungus *Candida albicans*, by disk diffusion method. Most of compounds displayed significant activities against all the pathogenic microorganisms tested including *Pseudomonas aeruginosa* and *Candida albicans* responsible for nosocomial infection. Out of all the twenty compounds evaluated for antimicrobial studies, most active compound showed appreciable antibacterial activity against all six microbial strains used (zone of inhibition in disk diffusion method- 17 mm against *Staphylococcus aureus*, 14 mm against *Bacillus subtilis*, 16 mm against *Proteus mirabilis*, 17 mm against *Pseudomonas aeroginosa*, 15 mm against *Aspergillus niger* and 17 mm against *Candida albican*). The considerable antimicrobial activity of active compounds may be attributed to the presence of phenyl and benzyl substitutions which might be responsible for penetration of the compound inside the microbial strains used due to their increased lipophilic character. Structure activity relationship among the synthesized compounds was also studied.

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