Leena Abdulaziz Muhamed Elhassan et al., J Pharma Care Health Sys 2017, 4:4 (Suppl)
DOI: 10.4172/2376-0419-C1-024

Antibacterial activity evaluation of certain novel synthetic chalcone derivatives

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Introduction & Aim: Seeking new antimicrobial agents to overcome the emergence of antibiotic resistance, some novel synthetic chalcone derivatives were evaluated for their antibacterial activity. The study targeted chalcone derivatives due to the great antimicrobial activity shown by compounds from this family in other previous studies.

Methodology: Four synthetic chalcone derivatives TChD-(01-04) were synthesized according to Claisen-Schmidt condensation and their structures were deduced using various spectral techniques (IR, MS, ^{1}H-NMR and ^{13}C-NMR). These compounds were evaluated for their antibacterial activity against *Staphylococcus aureus* (ATCC 25923) and *Escherichia coli* (ATCC 25922) using microdilution assay in comparison with DMSO (as vehicle control) and Ciprofloxacin and Gentamicin in term of MIC, Emax and EC50 values. Also the pharmacodynamic interactions between the synthesized chalcone derivatives were determined by using checkerboard assay and the antibacterial activity of each combination was compared with those of each drug alone and with Ciprofloxacin and Gentamicin.

Results: MIC values of the synthesized TChDs ranged between 256 to >512 µg/mL against S. *aureus* with Emax between 60.94±5.58% to 99.39±0.61% and MIC ≥512 µg/mL against *E. coli* Emax range 84.58±5.19% to approximately 100%. Among the tested compounds TChD-03 was the best with high efficacy against both strains and the best MIC value against *S. aureus.* On the other hand the FIC index of TChD-02 with TChD-03 combination showed additive effect against both *S. aureus* and *E. coli.*

Conclusion: The synthesized chalcone derivatives showed promising antibacterial activity, which may be enhanced by improving their physicochemical properties.

Biography

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