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(57) Abstract :
The present invention relates to the synthesis and antimicrobial evaluation of a novel chalcone compound, 3-(4-(dimethylamino)phenyl)-1-(4-((3-(m-tolyloxy)propyl)amino)phenyl)prop-2-en-1-one (compound 7C). The compound was synthesized via a three-step process involving Williamson ether synthesis, nucleophilic substitution, and Claisen–Schmidt condensation. Structural characterization was confirmed by FT-IR and ^{1}H NMR spectroscopy. Molecular docking studies showed strong binding interactions with E. coli DNA gyrase and C. albicans lanosterol alpha-demethylase, indicating potential antimicrobial mechanisms. In-silico ADMET analysis suggested favorable drug-like properties. In-vitro studies demonstrated significant activity against S. aureus, E. coli, C. albicans, and C. mycoderma, with MIC values ranging from 8 to 32 micrograms per mL. The compound shows promise as a broad-spectrum antimicrobial agent.

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