

عنوان مقاله:

Antimicrobial and Antibiofilm Activity of ۴-Benzylidene-۲-methyl-oxazoline-۵-one against Pathogen Bacteria

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خلاصه مقاله:

One of the major challenges in healthcare is the rise of antibiotic resistance, where bacteria have developed resistance to a wide range of commonly available antibiotics. These resilient bacteria pose a significant threat to public health, leading to severe illnesses and creating a substantial challenge for treatment. Therefore, the discovery of new antimicrobial agents is crucial in controlling the spread of infections caused by drug-resistant bacteria. This study focuses on the synthesis of oxazoline and investigates the antimicrobial and anti-biofilm properties of this compound named ۴-benzylidene-۲-methyl-oxazoline-۵-one. The structure of the oxazoline compound was precisely characterized by ^1H NMR, ^{13}C NMR, and FT-IR. The antibacterial activity was assessed on *S. aureus* using the agar-well diffusion while the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values were determined to identify the concentration ranges with significant inhibitory effects. *S. aureus* is one of the most noticeable microorganisms in medical and clinical sciences, especially nosocomial infections. Additionally, the study evaluated the compound's impact on biofilm formation and the expression of the *icaA* gene. The results from the MIC and MBC testing demonstrated that the compound exhibits both bacteriostatic and bactericidal effects on both Gram-positive and Gram-negative bacteria, as well as yeast. Furthermore, the presence of this antibacterial compound led to a reduction in *icaA* gene expression. ۴-Benzylidene-۲-methyl-oxazoline-۵-one displayed significant antimicrobial activity and hindered biofilm formation. Moreover, it was observed that ۴-benzylidene-۲-methyl-oxazoline-۵-one induced cell death through its toxic effects on MCF-۷ cells. When it was tested at concentrations of ۰.۰۱, ۰.۱, and ۱ mg/ml this compound exhibited cytotoxic effects and significantly decreased cell viability.

کلمات کلیدی:

Benzylidene-۲-methyl-oxazoline-۵-one, Antimicrobial, Biofilm, IcaA gene expression-۴

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