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ASSESSING THE INHIBITORY EFFECT OF RETAPAMULIN ON ESCHERICHIA COLI (ATCC 13706)

Antimicrobial resistance is one of the top 10 global threats to human health and a major global health threat to animals and the environment. The increasing and widespread use of antibiotics has led to their global-scale misuse and abuse, resulting in the emergence of antibiotic-resistant bacterial strains at alarming rates. The lack of speed in the development of new therapeutics for resistant bacteria is also a contributing factor to this global issue. Pleuromutilin, a diterpene natural product isolated from the fungus *Clitopilus passeckerianus*, has shown to be a potent inhibitor of Gram-positive (*Staphylococcus aureus*) and some Gram-negative bacteria (*Haemophilus influenzae*) by selectively inhibiting bacterial translation. Retapamulin, the first drug in the new class of pleuromutilin antibiotics to be approved for human use as a topical antibiotic, was shown to be effective against Gram-positive bacteria, including methicillin-resistant *Staphylococcus aureus* (MRSA) in clinical trials. Although most strains of the Gram-negative bacteria *Escherichia coli* (*E. coli*) are harmless,

several strains have acquired antibiotic resistance. *E. coli* (strain ATCC 13706) is commonly found in wastewater; therefore, it is susceptible to becoming antibiotic-resistant. Given the observed inhibitory effects of retapamulin and pleuromutilin against Gram-positive bacteria and some Gram-negative bacteria, respectively, we hypothesize that retapamulin hinders the growth of *E. coli* (ATCC 13706). After performing the disk diffusion assay, we found that retapamulin inhibits *E. coli* at 500 ug/ml and it plateaus at 4000 ug/ml (ANOVA, $df(1,9)$, $F=26460$, $p=4.73 \times 10^{-58}$). Furthermore, the observed minimum inhibitory concentration (MIC) of retapamulin on the growth of *E. coli* was 15.63 ug/ml, while the minimum bactericidal concentration (MBC) of retapamulin that killed the bacterium was 500 ug/ml. Overall, our study strongly suggests that *E. coli* (ATCC 13706) is susceptible to retapamulin.

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