Effects of Tetracycline and Kanamycin on Growth of *Pseudomonas fluorescens*

Naomi Drake, Alicia Powell, Allie County  
Department of Microbiology, NCSU, Raleigh, NC

Unlike Superman and kryptonite, super bugs possess the “power” to become resistant to specific antibiotics (1). Reports suggest *Pseudomonas fluorescens* to be a super bug towards tetracycline (2) yet vulnerable to kanamycin (3). We decided to test these reports and determine which antibiotic, tetracycline or kanamycin, would have a greater effect on the growth of *P. fluorescens*. We proposed that the organism’s lag phase would extend more significantly when exposed to kanamycin than tetracycline. (The Bioscreen C instrument was used to measure optical density to create growth curves.)

Tetracycline was initially tested. We performed a serial dilution and tested a range from 1:10 to 1:10,000,000. As seen in Fig. 1, the 1:10 and 1:100 dilutions fully inhibited growth. The 1:1000 dilution delayed growth but the others (1:10^4, 1:10^5, 1:10^6, and 1:10^7) did not.

![Fig. 1: Growth of *P. fluorescens* when treated with a range of dilutions of tetracycline](image1)

Furthermore, we tested the effects of kanamycin by repeating a serial dilution, and testing a range from 1:10 to 1:12800. As seen in Fig. 2, the 1:10, 1:100, 1:200, and 1:400 dilutions fully inhibited growth. The 1:800 dilution significantly delayed growth. The 1:1600 dilution also delayed growth. The others (1:3200, 1:6400, and 1:12800) did not.

![Fig. 2: Growth of *P. fluorescens* when treated with several concentrations of kanamycin](image2)

Following our experiments, we found that *P. fluorescens* reached an optical density (OD) of approximately 0.4 after 20:00:05 hours when treated with tetracycline (1:1000 dilution). *P. fluorescens* reached an OD of approximately 0.4 after 28:30:05 hours when treated with kanamycin (dilution 1:1600). We were able to conclude that kanamycin played a significant role in extending our organism’s lag phase in comparison to tetracycline. While the lag phase was lengthened in the presence of both antibiotics, it was more extreme with kanamycin.

![Fig. 3: Comparing growth of *P. fluorescens* when treated with tetracycline vs kanamycin](image3)

References

1. Reiss PJ, Battling the Superbugs, 1996, 59(3):36-41