Can Tetracycline Resistance be Induced in *Pseudomonas Fluorescens* After Three Weeks?

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There was a comment made during an ICAAC podcast stating that *pseudomonas* “liked” tetracycline. The comment prompted this study on how much *pseudomonas* actually “liked” tetracycline and when is resistance induced. In a three week study we tested *Pseudomonas fluorescens* against a variety of concentrations to see how *P. fluorescens* reacted to this broad spectrum antibiotic.

![The chemical structure of tetracycline.](image)

The experiments consisted of growing *P. fluorescens* in five different concentrations of tetracycline. These ranged from 0.50µl/ml to 20.0µl/ml. Each week a sample was taken from the previous week and added to fresh media and tetracycline. Low concentrations of 0.50µl/ml and 1.00µl/ml tetracycline did not strongly inhibit the growth of *P. fluorescens*. The growth rate, maximum growth (maximal OD), and lag time were affected but not significant enough to show a marked change from a non-tetracycline environment (data not shown). Here *P. fluorescens* didn’t show much “like” for tetracycline as overpower it.

The concentrations where tetracycline showed inhibitory effects were 5.00µl/ml (0.10mM) and 10.0µl/ml (0.20mM). The first week *P. fluorescens* struggled to grow in tetracycline taking over 48 hours in one instance. After letting the bacteria sit for a week then testing it again, it showed strong resistance to the tetracycline. This trend continued through the third week. Lag time was reduced, while maximum growth and growth rate increased.

![The growth of *P. fluorescens* in 10µl/ml (0.20mM) tetracycline each week.](image)

One of the controls was using a concentration that *P. fluorescens* would not grow in. 20.0µl/ml (0.42mM) was enough to prevent any growth of the bacteria each week. However, when we took the bacteria from a lower concentration and added it to a higher concentration of tetracycline, it showed resistance. The growth rate, maximum growth, and lag time were mildly affected.

![The results of increasing the tetracycline concentration on bacteria that is already displaying resistance.](image)

The *Psuedomonas* genus has numerous genes for tetracycline resistance and it appears after one week those genes are activated.

A follow up experiment would be to check how long the resistance genes are produced when tetracycline is absent.

**References**


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