

Adam Nolan

Lab 3 – Microbiology and Identifying Bacteria with DNA sequences

In this lab, we were tasked with examining the agar plates we cultured at the end of the last lab to see what had grown from the hay infusion water. I expected mostly bacteria to be on the plate because the hay-infusion water was swampy and relatively temperate. I would expect archaea to exist on a plate that had been cultured with samples from an inhospitable area, because archaea are typically found in extremely harsh environments.

Before examining our cultures, we examined what was left of our hay infusion culture. About 20% of the water had evaporated, and the moldy-film cover appeared to be thicker. The smell was still putrid and smelled of rot and decay just like before. Any change in smell could have come from a change in the bacteria present though.

Table 1: 100-Fold Serial Dilutions Results

Dilution	Agar Type	Colonies Counted	Conversion Factor	Colonies/mL
10 ⁻³	Nutrient	13,300	x10 ³	13,300,000
10 ⁻⁵	Nutrient	106	x10 ⁵	10,600,000
10 ⁻⁷	Nutrient	7	x10 ⁷	70,000,000
10 ⁻⁹	Nutrient	0	x10 ⁹	0
10 ⁻³	Nutrient + Tet	70	x10 ³	70,000
10 ⁻⁵	Nutrient + Tet	3	x10 ⁵	300,000
10 ⁻⁷	Nutrient + Tet	0	x10 ⁷	0
10 ⁻⁹	Nutrient + Tet	0	x10 ⁹	0

Figure 1.

Half of the agars with the antibiotic failed to develop colonies, while only $\frac{1}{4}$ of the nutrient agars had no colonies on them. The tet plates with colonies on them also developed fungus/mold, and the plates with no colonies also had no mold. The one of the nutrient agars had mold on it, but the rest didn't, leaving some of them with pure colonies. In general, the plates with nutrient only had more colonies, and more colonies/mL. This would lead me to believe that the tetracycline antibiotic was effective against many types of bacteria, and prevented their growth. It did not completely inhibit all growth though.

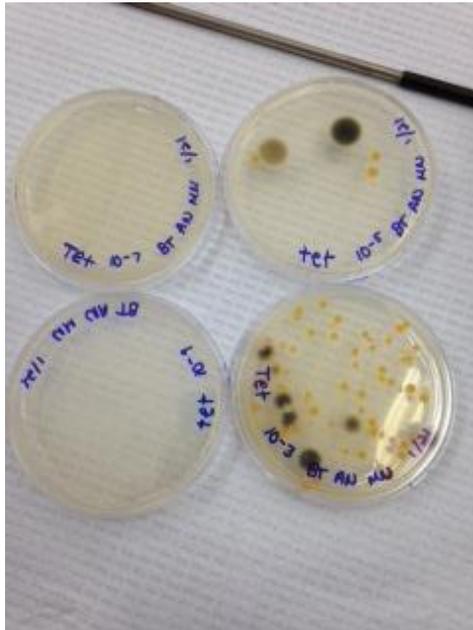


Figure 2: Tet plate colonies

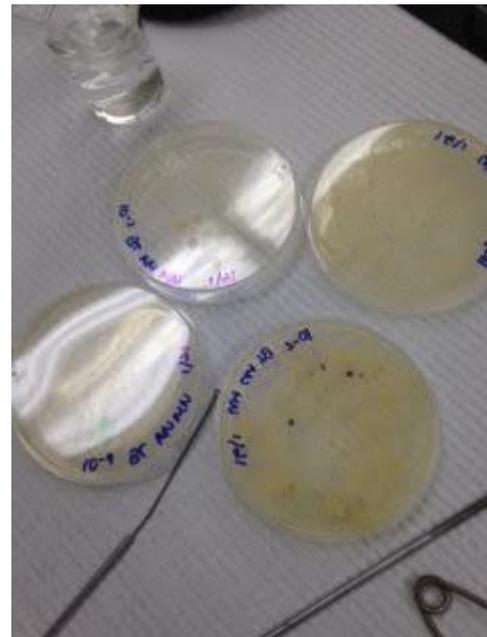


Figure 3: Nutrient plate colonies

Tetracycline is an antibiotic used to treat many types of infections, and is used to stop the growth of bacteria. According to its page on the Mayo Clinic website, tetracycline's effectiveness has decreased in recent years due to the evolutions of resistance to antibiotics in many bacteria

strains. This leads me to believe that the colonies we see on the tet agar plates are those strains that have evolved resistances to this antibiotic.

“Tetracycline (Class) (Oral Route, Parenteral Route)”. *Drugs and Supplements*. Dec 1, 2014.

Mayo Clinic. (Feb 4, 2015)

<http://www.mayoclinic.org/drugs-supplements/tetracycline-class-oral-route-parenteral-route/description/drg-20069585>

Table 2: Bacteria Characterization

Colony Label	Plate Type	Colony Description	Cell Description	Gram + or -
10 ⁻⁵	NA	-Smoother -Some Undulate -Mostly Circular -Some Convex umbonate/raised	-Coccus -Staphylococci -Non-motile	Gram Positive
10 ⁻³	NA	-Punctiform -Yellow/orange color -Raised/convex -smooth -entire (edge)	-Staphylococci -Non-Motile -Multiple pyramids	Gram Negative
10 ⁻³	Tet	-Circular -entire edge -orange -raised -smooth	-Coccus -Diplococci -Non-Motile	Gram Positive
10 ⁻⁵	Tet	-Circular -orange -smooth -raised	-Coccus -More spread out -Floating slowly	Gram Positive