Microbial Contamination and Die-Off on Plants Irrigated with Treated Wastewater

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Introduction

- Wastewater influent typically has high levels of potentially harmful bacteria
- Wastewater treatment plants significantly reduce the number of bacteria resulting in low bacterial counts in the effluent
- Wastewater plants then typically either discharge to the environment or to a secondary water system
- Secondary water systems are utilized for landscape and crop watering
- Wastewater effluent is generally high in valuable nutrients for plants, but also possibly allows remaining bacteria to regrow
- Using treated wastewater for crops has the potential to contaminate the crops with harmful bacteria

Objectives

- Determine if crops irrigated with treated wastewater are being microbially contaminated
- If crops are contaminated, determine how long contamination persists

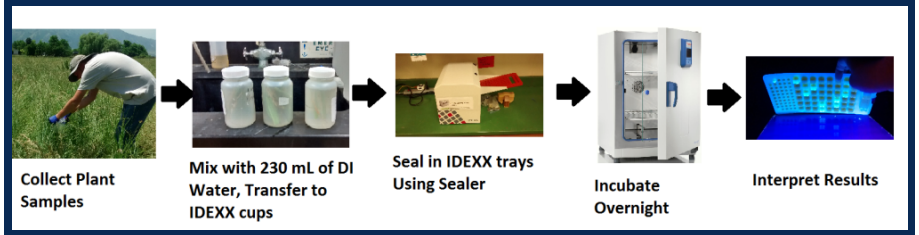

***Figure 1**: The sampling process*

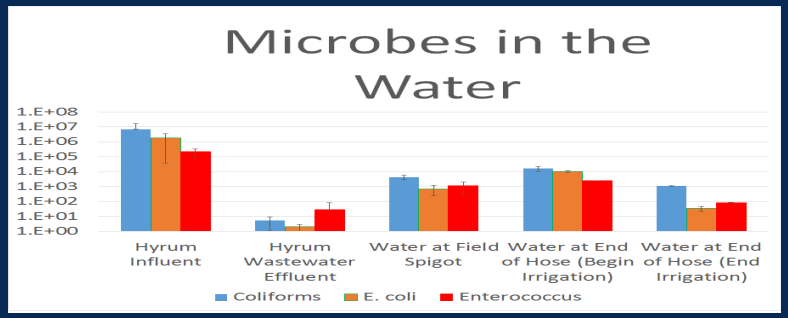

***Figure 2:** The microbial counts throughout the water flow*

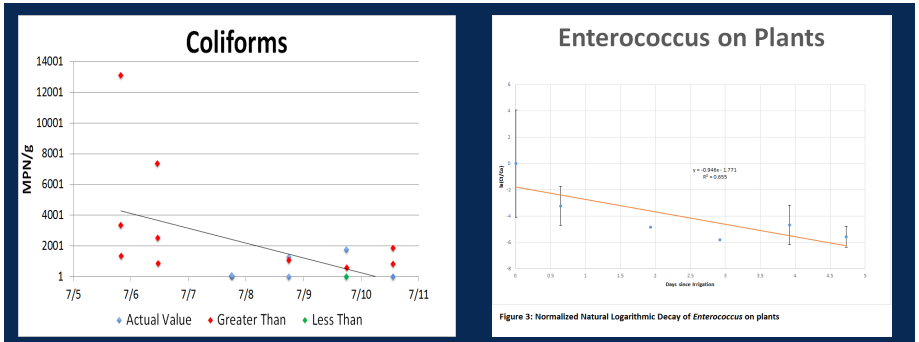

***Figure 3:** Microbial load on crops*

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Methods

- Irrigate field in Hyrum, UT for 12 hours
- Take plant samples immediately after irrigating and then daily for 5 days afterward
- Dilute plant samples in measured amounts of DI water to quantify microbial load
- Process the samples using IDEXX colilert and enterolert

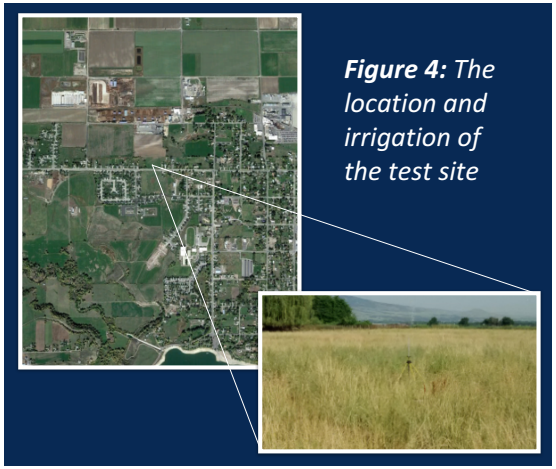

***Figure 4:** The location and irrigation of the test site*

Results and Conclusions

- Water at source has higher microbial load than wastewater plant effluent indicating regrowth in water system
- Plants had high initial coliform and enterococcus levels that decreased over time but only one E. coli detection in initial samples
- Crops are microbially contaminated by treated wastewater
- Contamination primarily persists less than 48 hours