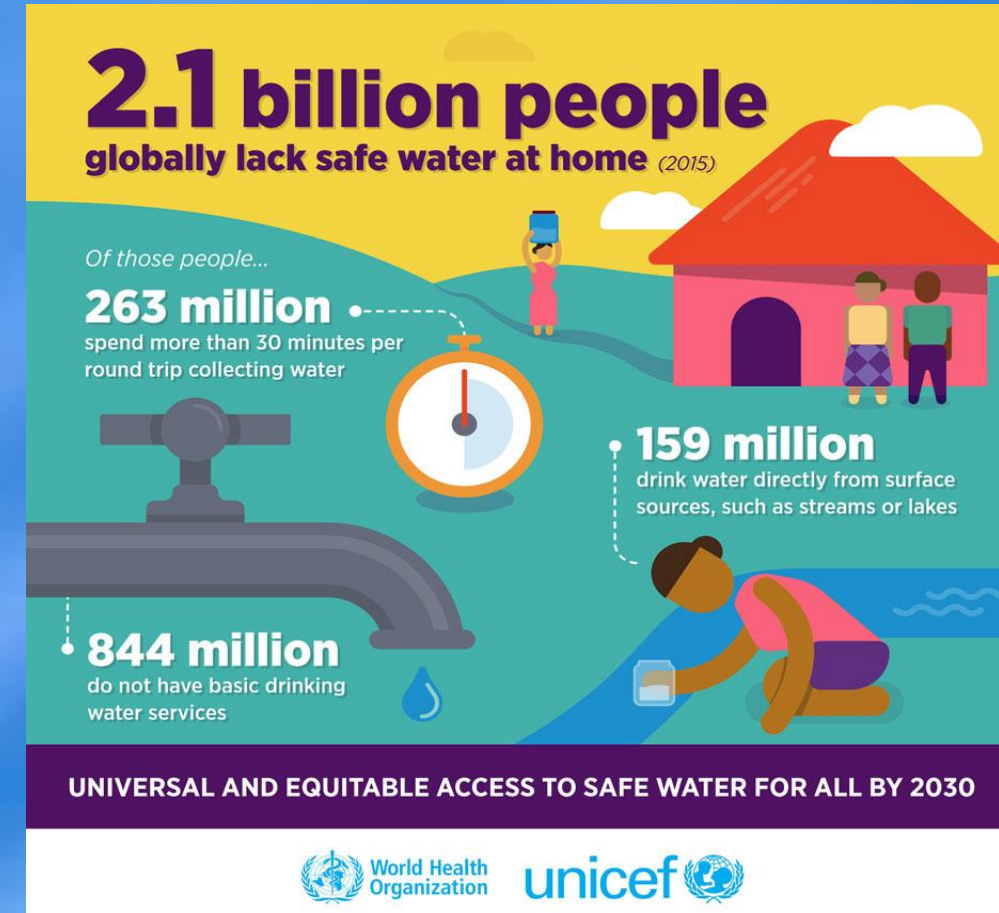


Efficiency Study Of Manz Engineering LTD. Pilot Filter At Removing Bacterial Coliforms From Water

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SITUATION



According to the World Health Organization, 2.1 billion people worldwide do not have access to safe water for drinking, food preparation, hygiene and sanitation. This mostly effects places of poverty and people in extremely rural areas where the water is contaminated by animal waste or sewage. These contaminants can contain harmful coliforms such as *E. coli* O157:H7.

COMPANY

Manz Engineering Ltd is a Calgary, Alberta based BioSand filter company, founded by Dr. David Manz. He was a professor of environmental engineering at the University of Calgary when he began working on the BioSand filter. His goal is to improve the quality of accessible water around the world.



<http://www.manzwaterinfo.ca>

REQUEST

The request was to test different parameters (time, Flow rates, biofilm formation, bacterial inoculum...) to optimize the efficiency of the BioSand filter at eliminating bacteria from water.

This project was brought to Lethbridge college in 2015.

Below: Karli Tremel (left), David Manz (right)



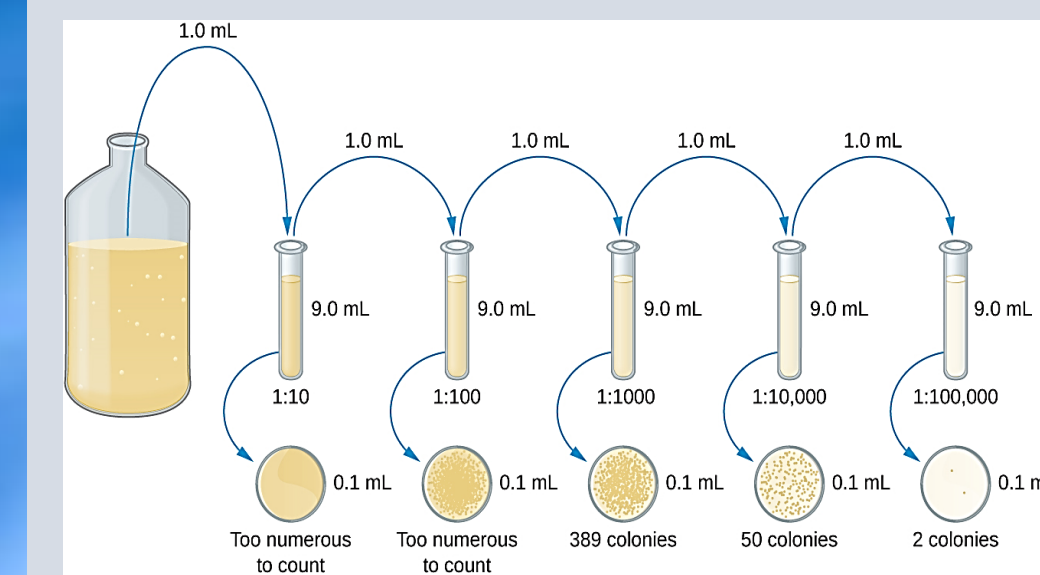
<http://www.manzwaterinfo.ca>

THE PROJECT

Procedure

- We used fish water from our aquaponics center to mimic river water.
- Fish water (18 liters) were collected daily and passed through the Slow Sand filter.
- Different flow rates are considered to test their impact on BioSand Filter efficiency.
- Bacterial analysis are performed on Filtered and Fish waters (Serial dilutions were performed, analysis were done in triplicate).
- Chromogenic media is used to select coliforms bacteria.
- Colony forming units (CFU) are counted to calculate the Percentage of coliforms removed by the BioSand filter.

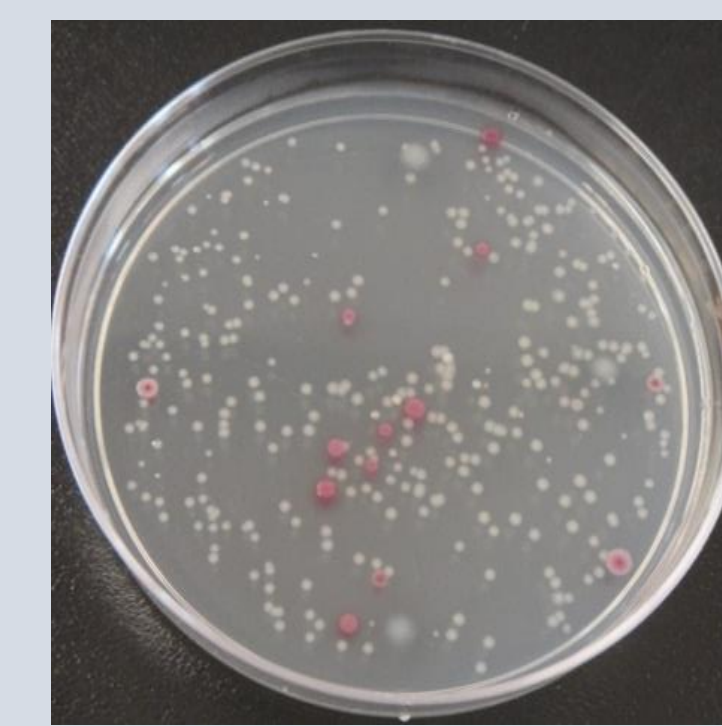
Example of serial Dilution, this allows for a countable number of colonies.



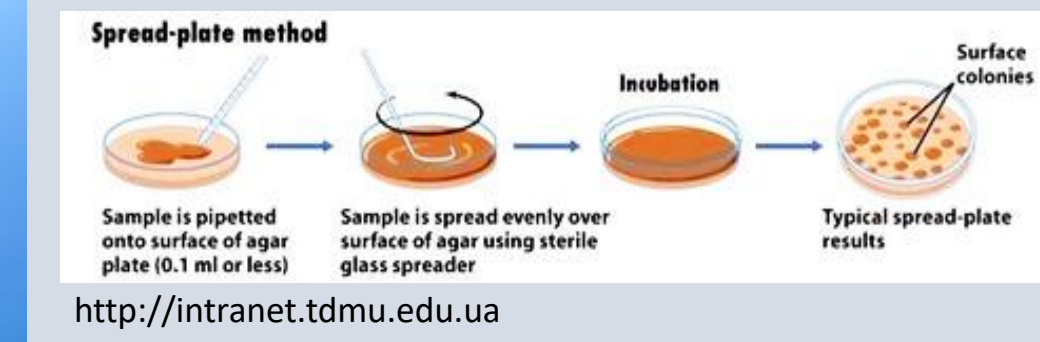
Filter water bacterial analysis Chromogenic medium



Fish water bacterial analysis Chromogenic medium

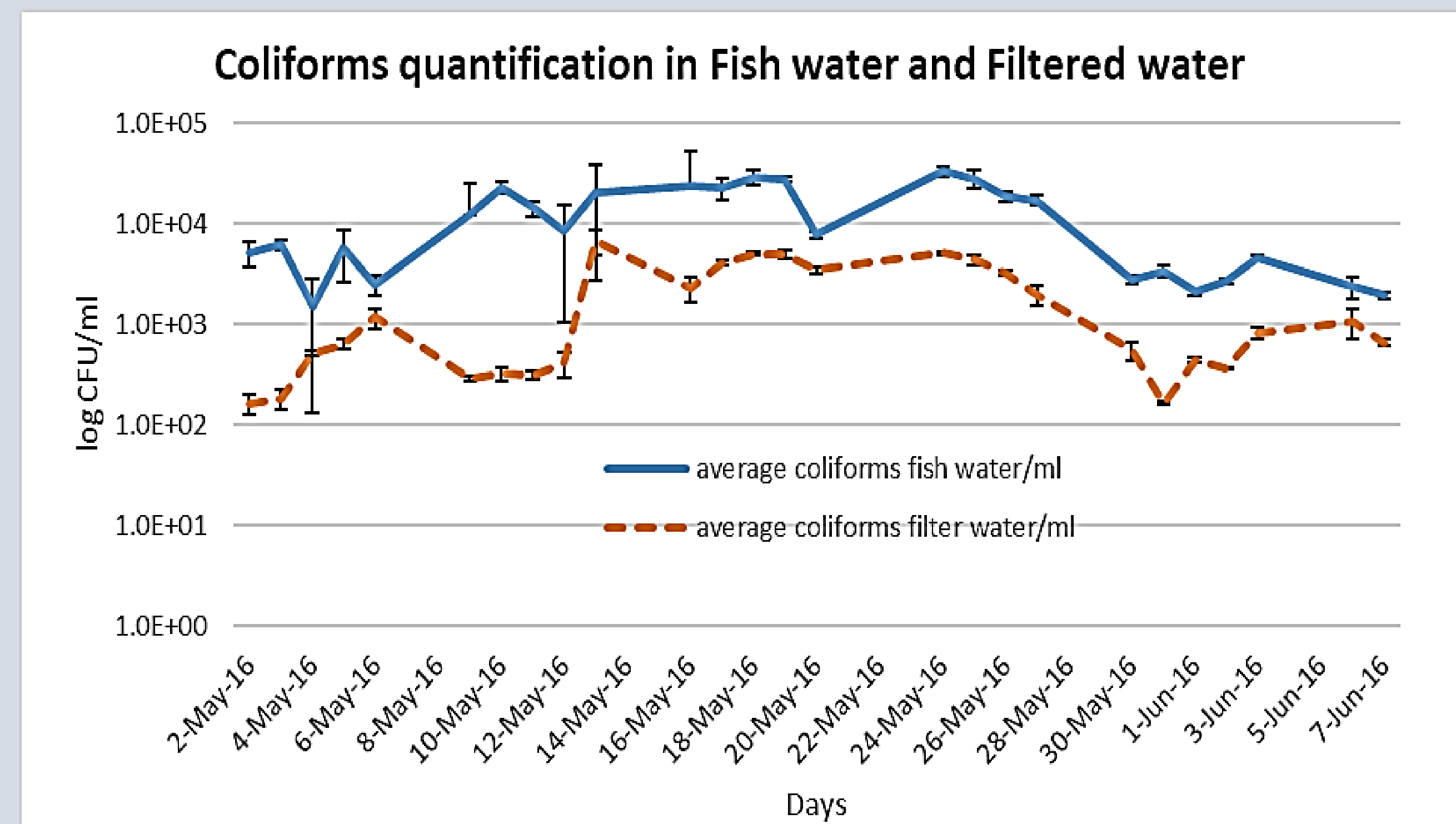


After dilution, the spread plate technique is used to incubate and grow colonies.



RESULTS

We can see a clear efficiency of the Sand Filter at removing the coliforms bacteria, the maximum log reduction being 1.9.



THE EXPERIENCE

I was trained and guided by the Microbiology Research group to:

- Conduct the research using the Scientific method
- Utilize the microbiology laboratory
- Access fish water that would mimic a natural water source at The Aquaponic Centre of Excellence
- Analyzing my results using Excel and Word.

THE GAIN

Dr. Manz was provided with monthly reports and a final report that described the effect of the flow rates and biofilm formation on the efficiency of his system. This information was used to teach people how to utilize effectively the Manz Engineering Ltd. Pilot Filter to have safe drinking water in places that do not have the access of having clean water.

As a student focused on healthcare, this opened doors to a network of resources that I would not have otherwise. Being involved in this research and innovation, I have a passion for an area of study and career opportunities that I did not know previously. My goal is to enhance our Canadian healthcare and the healthcare professionals' ability to care for people both in urban centers and remotely through research and innovation.

APPLIED REASERCH AT LETHBRIDGE COLLEGE

Applied research offers an opportunity for students to become involved in areas of study that interests them while gain practical experience and new resources for the future.

Lethbridge college has been and is currently involved in several different applied research projects including but not limited to:

- A prairie plant project, this is working on identifying antibiotic properties in plants native to Alberta
- A method of eliminating *E. coli* using dissolved ozone in water to treat cattle trucks(see Ashtin Halmrast)
- Also different projects involving agriculture and irrigation

ACKNOWLEDGMENTS

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