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# Uganda Water Filter

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## Rural Uganda

- Lack of access to municipal water
- Locals obtain water from boreholes, springs, open wells, and taps
- Contaminated water leads to diseases and infections
- Diarrheal diseases are the 6th leading cause of death





# Key Requirements



1

Filters 4 liters  
of water per  
person per day



2

Conforms to  
WHO standards



3

Uses regionally  
available  
materials



4

Does not rely  
on electric  
power



5

Sustainable at  
the local level

# Device Description



## Filtration

Using plant xylem to filter out E. Coli from contaminated water

## Design

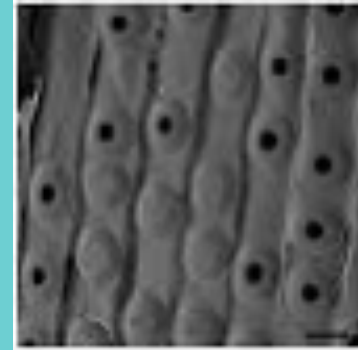
4 liters of clean water need to be produced daily so we included a pressurization factor and multiple xylem housing to meet this requirement

# Xylem Filtration

- Lignified Stems Transports Water More Easily due to Cell Structure
- Section of the Tree needs to be kept moist throughout in order to transport water
- Bacteria Removal from Water Using Plant Xylem
  - Bacteria gets caught in the Margo Pits
  - The margo pit traps bacteria of certain sizes



Lignified Stem



Margo Pits



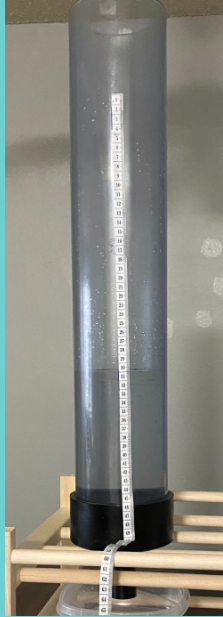
Single Margo Pit

# Xylem Alternative Testing



# Design Description

First prototype

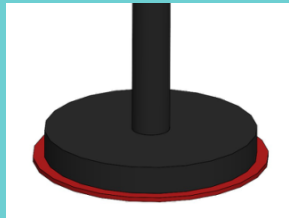


Second prototype

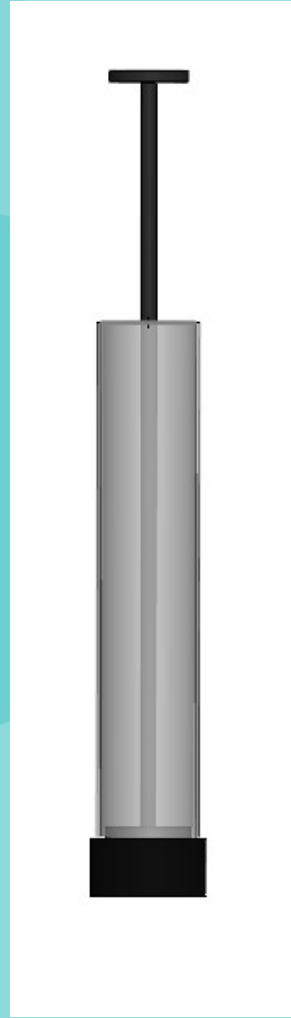
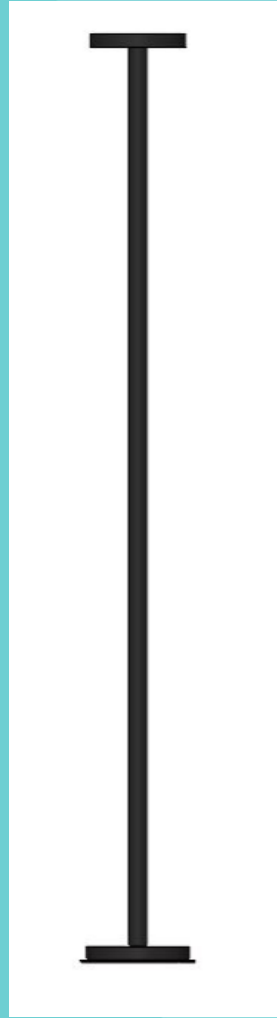
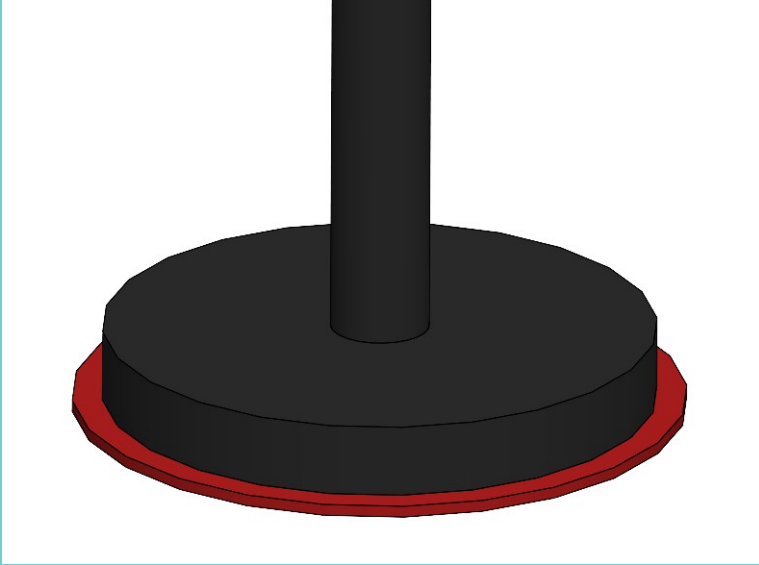
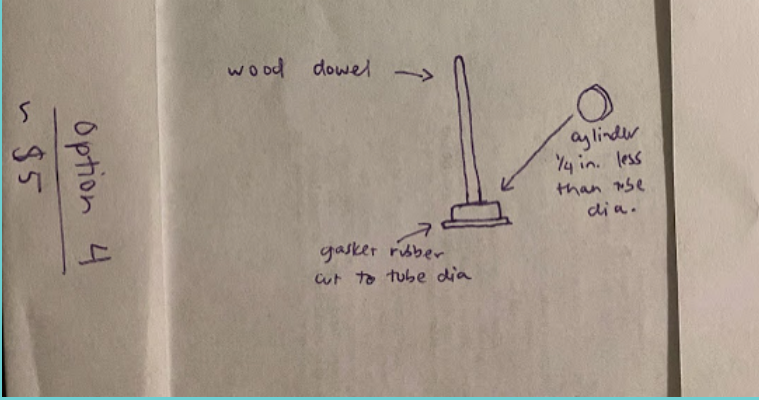


- Water column: acrylic tube & 4in diameter hub cap
- Housing: plastic or metal pipe fitting with latex tubing around the xylem (fits up to 10)
- Plunger (optional): plastic disc used as a handle, threaded rod, second plastic disc with a 1/16" gasket and 2 o-rings

Plunger



# Plunger



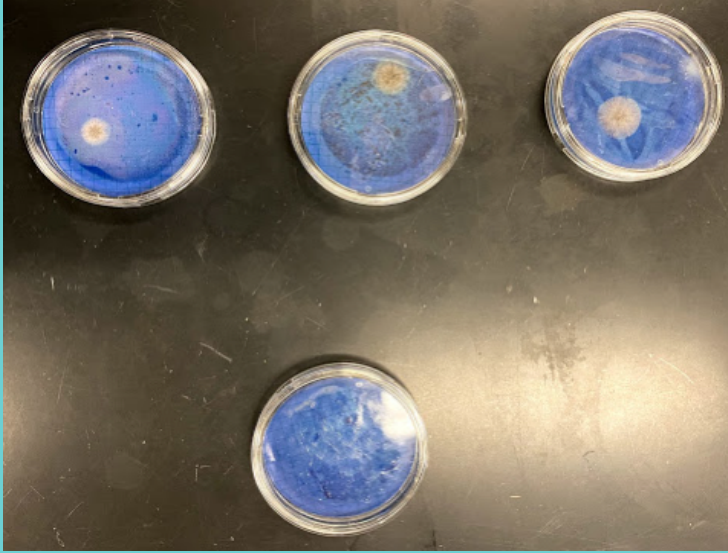
# Xylem housing



- Plastic or metal pipe fitting with latex tubing around the xylem
  - Smooth interior: best for bird of paradise
- Thread xylem sample into metal pipe fitting
  - Threaded: best for pine and eucalyptus

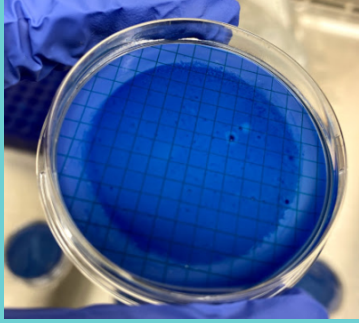
# Results from testing

## Funghi growth

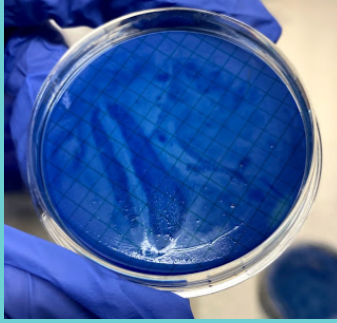


## Bird of Paradise

Plastic

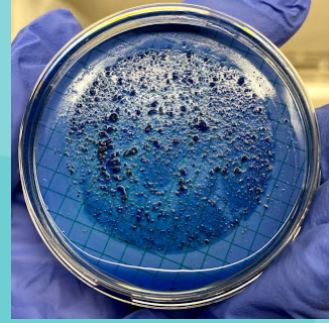


Brass

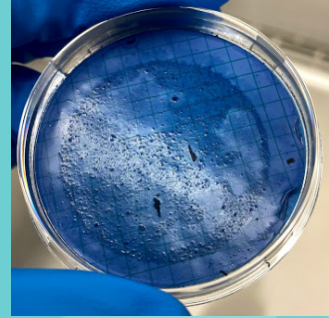


Pine

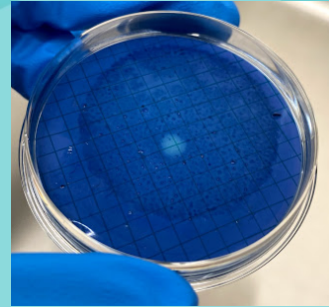
Untouched



Washed

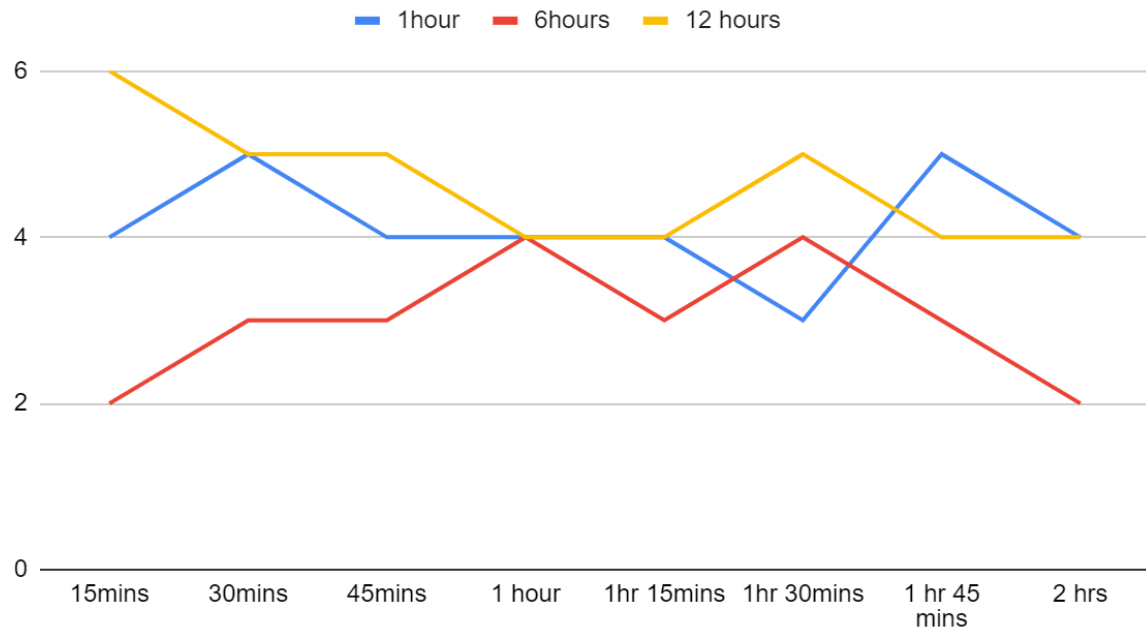


Washed and sanded



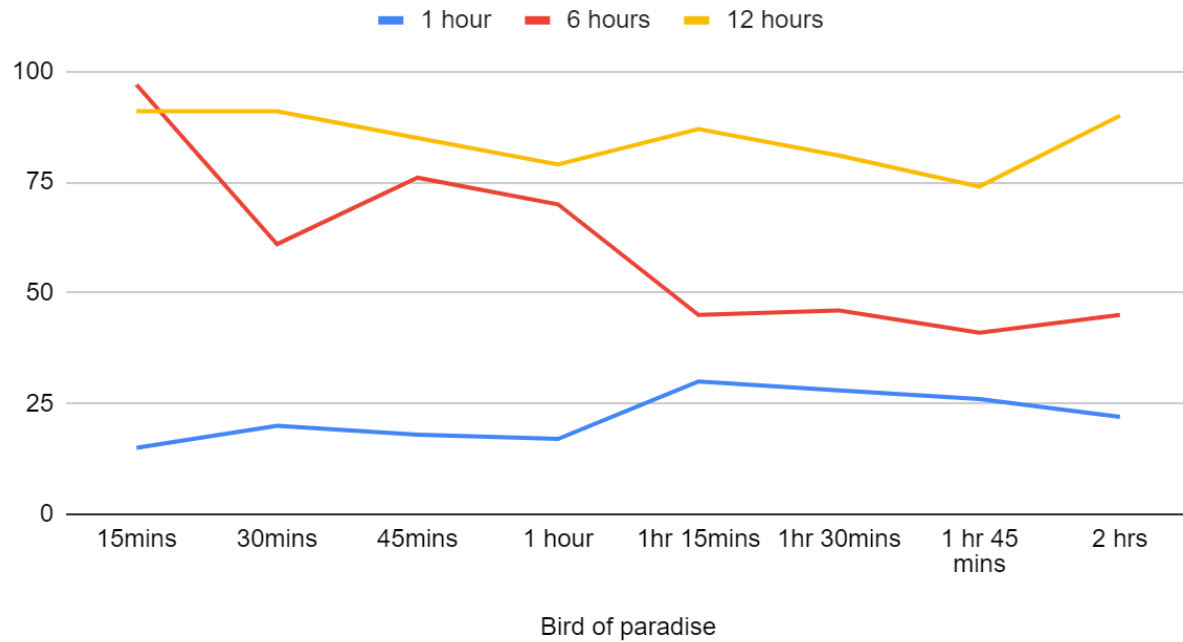
# Results from soaking

## Eucalyptus



# Results from soaking

## Bird Of Paradise



# Project Status

**Goal:** Construct a user-centered device to filter toxins out of water.



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# Future work

## Future testing:

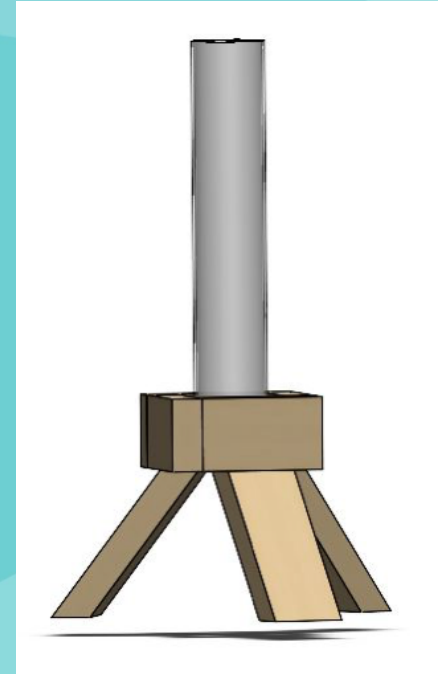
Lifetime of sample

Testing flow rates with pressurization

## Additional work:

Creating an instruction manual for users

Creating the stand to hold the column upright



Thank you!