

Abstract Submitted
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A Study of Xylem Filtration for Fecal Coliform Removal MIRA M. WILEY, FRANK G. JACOBITZ, University of San Diego — In Uganda, there is a need for a practical, inexpensive, and effective water filtration device to prevent the contraction of water-borne diseases. A previous study found pine xylem to be capable of filtering fecal coliform bacteria through pressure-driven filtration (Boutilier, et. al. 2014). The current work shows that eucalyptus xylem has the same capability. A prototype for a filtration device using xylem has been developed and tested. Testing revealed the device to be effective using only the force of gravity. Through an application of Darcys Law to the data collected from long-term flow rate experiments using pine xylem, its permeability factor was determined. The permeability factor average is $0.45 \text{ kg}/(\text{s}^*\text{m}^*\text{MPa})$ with a standard deviation of 0.06. Previous literature determined the range to be 0.5-0.6 $\text{kg}/(\text{s}^*\text{m}^*\text{MPa})$. The discrepancy in these values may be due to a variation in the xylem area, as a portion of the cross-section conducts water, while the remainder is impermeable. The disparity may also be due to slight differences in the properties of the pine. The close alignment of these values and initial results show promise for the filtration device in rural Ugandan communities.

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