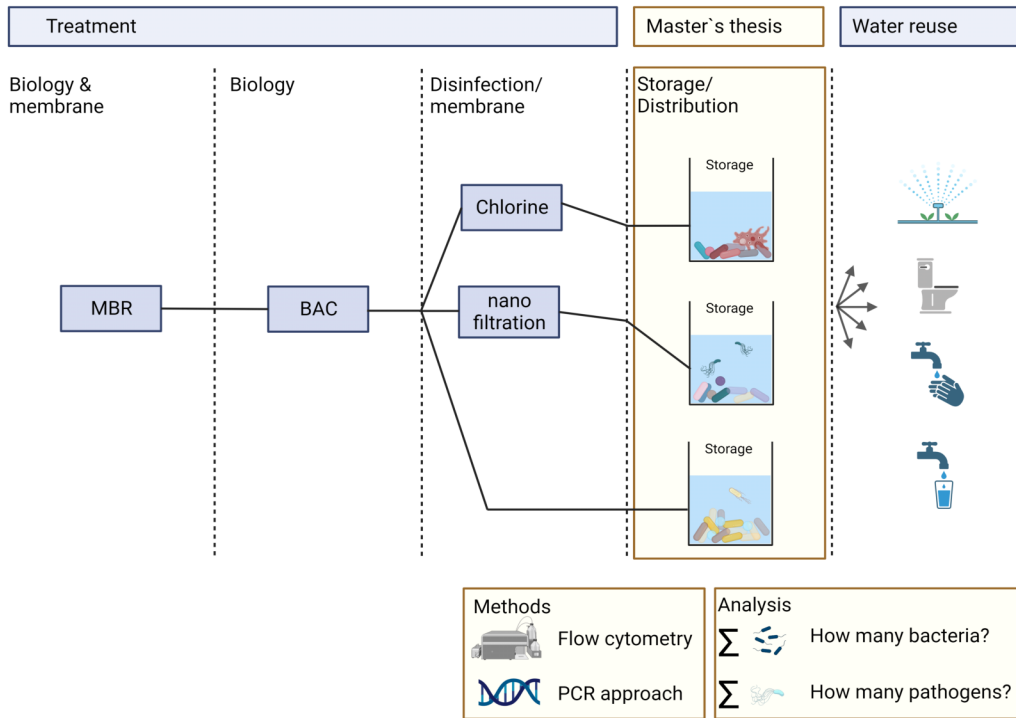


Investigating bacteria growth in treated greywater

Keywords: Water treatment, Microbiology, Opportunistic Pathogens, Greywater

Proposed: December 2023

Valid until: March 2024



Background

In the context of climate crises and increasing water demands, water scarcity is an increasing burden¹. Water reuse can help to lower domestic water consumption. Greywater, washing water such as shower-, handwashing-, or laundry water, is generally considered less polluted compared to wastewater. Therefore, water reuse projects often focus on the treatment of greywater. At the Eawag campus, we are treating greywater with different technologies. For on-site water reuse systems, often water needs to be stored before reuse. Growth of microbial pathogens in drinking water systems has been studied intensively². However, there is a very limited amount of studies investigating the potential of opportunistic pathogen growth in treated and stored greywater. Therefore, the risk of (opportunistic) pathogen growth remains uncertain.

Objectives of the suggested topic

Objective: This project aims to compare different treatments of greywater and their impact to the treated and stored water over time. More detailed we want to investigate

- the total bacteria growth capability
- the potential growth of opportunistic pathogens
- investigate differences of bacterial and pathogen growth between biofilm and water phase for different treatments

Work in a microbiology laboratory, and learn techniques such as culturing, flow cytometry, and digital PCR.

Specific information / Requirements

The student should be motivated to learn microbiology laboratory techniques.
Depending on the starting date, research question and experimental setup can be adjusted.

Advisors and Supervisors

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References

1. Caretta, M.A SS, A. Mukherji, M. Arfanuzzaman, R.A. Betts, A. Gelfan, Y. Hirabayashi, T.K. Lissner, J. Liu, E. Lopez Gunn,, R. Morgan, S. Mwanga,. Water. In: Climate Change 2022: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Lössche, V. Möller, A. Okem, B. Rama (eds.). In: Cambridge University Press, Cambridge, UK and New York, NY, USA; 2022:551-712. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter04.pdf
2. Falkinham J. Common Features of Opportunistic Premise Plumbing Pathogens. *IJERPH*. 2015;12(5):4533-4545. doi:10.3390/ijerph120504533