

Faculty of Engineering

Summer Research Program 2021-2022

Studying filter membranes to increase sensitivity for passive sampling of SARS-CoV-2

David McCarthy, Yussi Palacios Delgado. Civil Engineering Department.

david.mccarthy@monash.edu

<https://research.monash.edu/en/persons/david-mccarthy>

Objective

Optimisation of COVID-19 wastewater monitoring devices for improved detection

Project Details

Public health monitoring for SARS-CoV-2 in sewage systems is extensively performed in the State of Victoria for early detection and prevention of COVID-19 outbreaks. Through wastewater surveillance, it has been possible to detect people infected with SARS-CoV-2 for implementation of early intervention strategies. However, continued improvement of these systems is needed if Victoria is to continue to rapidly respond to this pandemic.

Charged membranes are an integral part of current passive capture technologies (Fig. 1). However, only a limited number of available membrane types have been tested for virus recovery in sewage. Therefore, in order to develop the next generation of wastewater surveillance tools, further testing of filter membranes with sewage wastewater, previously sparked with gamma-irradiated SARS-CoV-2 fragments, will need to be undertaken (Fig. 2). The accumulation and desorption rate of the virus will also need to be tested through standard molecular techniques.

By undertaking this research program, you will gain hands on laboratory experience in the evaluation of wastewater passive sampling device designed in the EPHM laboratory. The outcome of this research will be important to select membranes for further testing in passive samplers.

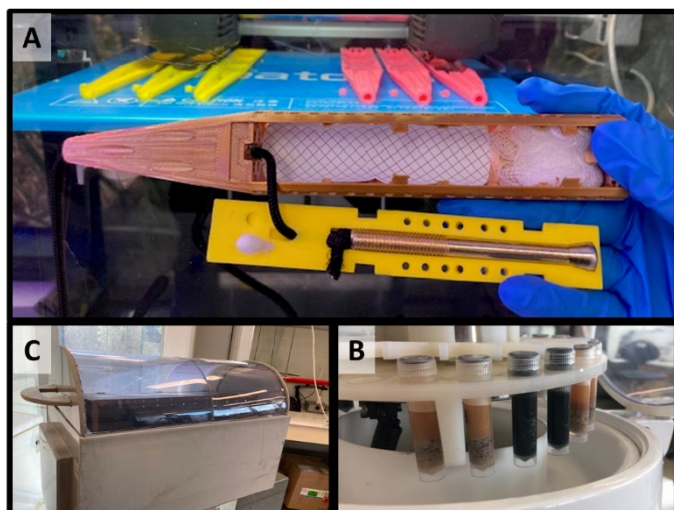


Fig. 1. Experimental setting for wastewater related research in EPHM lab. A: Membranes in passive samplers. B: mechanical tumbler, C: Samples in a bid beater for total RNA extraction.

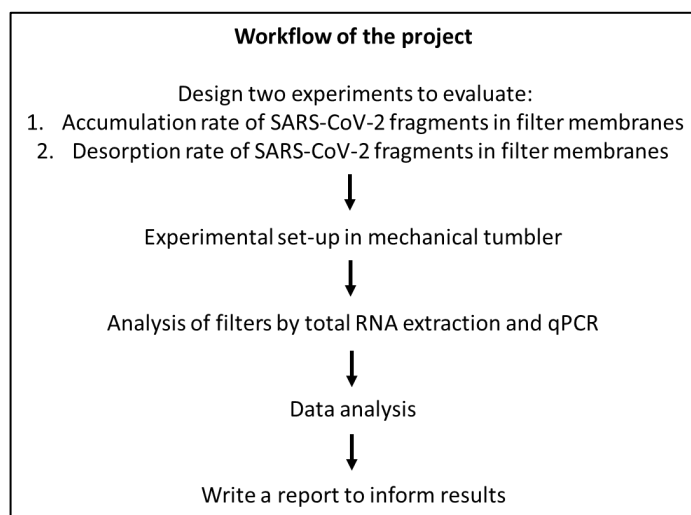


Fig 2. Diagram describing the main steps of the project

Prerequisites: No prerequisites are required.