A passive sampling approach to trace Covid-19 infection in wastewater networks from student campus residences

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Accumulation of biomarker material over time using manmade device or biological organisms



SPMD Semi Permeable Membrane Device POCIS Polar Organic Chemical Integrative Sampler Oysters

Between active (grab) and autonomous (composite)

Passive sampling of viruses for wastewater-based epidemiology: a case-study of SARS-CoV-2



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Practical benefits of passive sampling

WATER IN STITUTE

- I. Cost of production
 - Reusable & replaceable (R80 per device vs. R36000 per composite sampler)
- 2. Size of device
 - Reduce ragging and blockages
 - Easy to transport and prepare
- 3. Longer contact time to sample matrix
- 4. Less contact time with inhibitors & diluents
- 5. Direct access to biomarker target
 - Fecal matter (molecular)
 - C18 packing (chemistry)





Common gauze





Shade cloth







6-7 hrs & 20-22 hrs Rope tied to grappling hooks or manhole cover











I. POC: Grab vs. composite vs. passive

2. Implementation of routine surveillance

Case study at student campus settings







Upscaling



- Low cost of printing samplers
- Easy to add new sites No need for expensive equipment
- Easier to move upstream
- More sites = more info about area



Challenges

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- Costing
- Identifying manholes
- Safety of personnel (samplers)
- Sampling is labor intensive
- Ethics?
- How do you use the data?