

# Trapping Viruses with Treated HVAC Material

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## Background

- Airborne viruses are a major health concern, specifically in recent years due to the Covid-19 pandemic
- HVAC materials and ventilation systems serve as an excellent way to control for these airborne viruses and to prevent the spread of infection

## Objectives

- Cystic Acid Metal Oxide (CAMO) treated MERV 8, 10, and 13 tested to determine their virus capturing capabilities
- Different filter coating techniques used to determine the ideal infection preventing procedures

## Methods

- Phi-x174 aerosolized from the right side of a plexiglass chamber using a sprint nebulizer and suctioned through a CAMO filter using an aqueous impinger series
- Air, surface, and filter samples taken to determine the virus reduction capabilities of each filter
- All three of these samples processed using the EPA double agar technique using *E. coli* CN-13 as a bacterial host
- Currently the experiment is scaling up and full size HVAC filters are being tested using the same method in an HVAC system

## Results

- All CAMO treated materials had greater virus trapping capabilities than their non treated counterpart
- The greatest log reduction attributed solely to CAMO was 1.60

## Discussion

- CAMO serves as a valid option to prevent the spread of Covid-19 and other airborne viruses
- CAMO traps airborne microbes and prevents their spread to the air and to surfaces
- Future work includes continuing large scale HVAC experiments to better understand how these filters operate

## Citations

Environmental Protection Agency. (2015). Method 1601: Male-specific (f+) and somatic coliphage in water ... - US EPA. Environmental Protection Agency. (n.d.). Retrieved December 7, 2022, from [https://www.epa.gov/sites/default/files/2015-12/documents/method\\_1601\\_2001.pdf](https://www.epa.gov/sites/default/files/2015-12/documents/method_1601_2001.pdf)

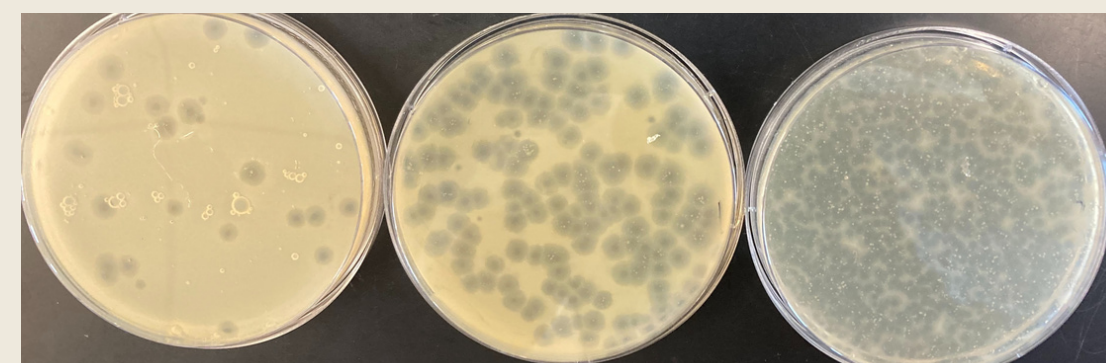


Figure 1: Plates from a treated, untreated, and blank run of the system

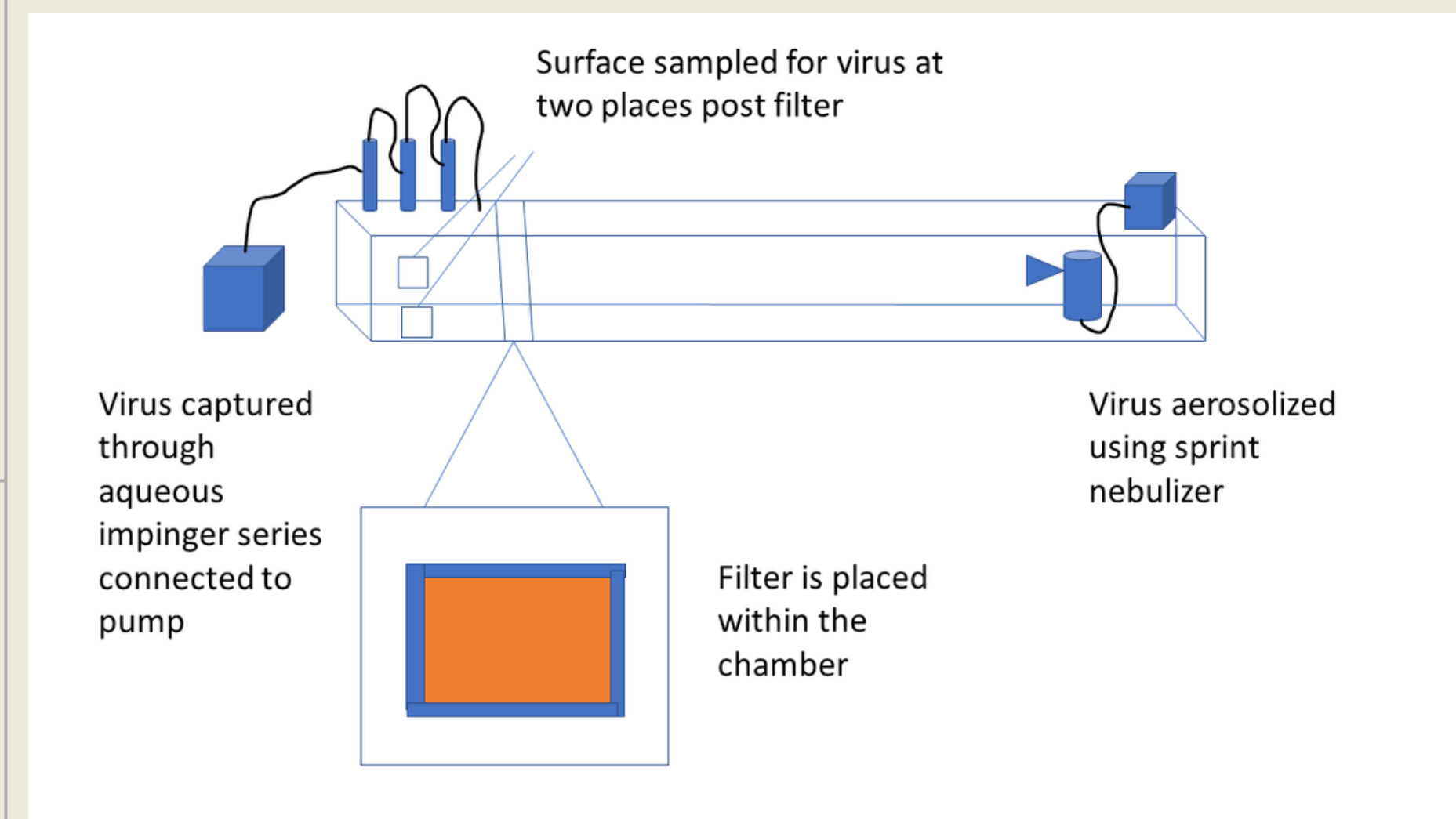


Figure 2: Small Chamber Diagram

Material Treatment	Material Type					
	MERV 8		MERV 10		MERV13	
	Virus Reduction	Log Reduction Compared to Baseline	Virus Reduction	Log Reduction Compared to Baseline	Virus Reduction	Log Reduction Compared to Baseline
Untreated	5.09	+0.00	5.30	+0.00	5.08	+0.00
50mM Alumoxane 1 Side Spray	6.15	+1.06	6.26	+0.96	5.32	+0.24
50mM Alumoxane 2 Side Spray	5.32	+0.23	6.90	+1.60	5.66	+0.58
75mM Alumoxane 1 Side Spray	5.47	+0.38	6.49	+1.19	5.22	+0.14

Figure 3: Small Chamber Results