

# Viruses

## (MS2 Bacteriophage)

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Viruses are extremely tiny pathogens that are only capable of reproduction by infecting the cells of a living organism. Viruses take over their host's biological machinery and force them to create a multitude of genetically identical copies. Their reproduction cycles are commonly detrimental to the host and are responsible for a wide host of diseases. Viral infections are the scourge of plants, animals, bacteria, and all known forms of life.

In humans, specific viruses are known to cause diseases such as influenza, HIV, Ebola, hepatitis, chicken pox, the common cold, and many others.

Viruses spread by entering a cell when the host comes into contact with an individual virus particle. This can occur via contact with a surface where the particle has settled or by exposure to air contaminated with virus particles.



# Molekule Air Pro RX PECO Filters Destroy MS2 Bacteriophage RNA Virus

## PURPOSE

This research tested the efficiency of the catalytic Photo Electrochemical Oxidation (PECO) filters used in the Molekule Air Pro RX to capture and destroy virus particles.

## SET-UP

The PECO filters used in the Molekule Air Pro RX were compared against filters that lacked any mechanism to physically destroy virus particles. Both types of filters were placed in a custom-built air flow system that is designed to aerosolize viruses into the airstream. The virus species chosen was the MS2 bacteriophage, a proxy for human pathogens such as influenza and SARS-CoV-2. After collecting the viruses, any viable particles were extracted from the filters and counted to measure killing efficiency. The PECO filters were examined for the presence of viruses after one hour and after twenty-four hours of catalytic activation and compared to the standard filters.

## RESULT

A large degree of viable viruses were present on the standard filters, but few viruses were present after one hour of activation. Practically no viruses could be recovered from the photocatalytic filters after twenty-four hours of activation.

| FILTER TYPE             | AVERAGE NUMBER OF VIRUS PARTICLES PRESENT | DESTRUCTION EFFICIENCY |
|-------------------------|---|------------------------|
| Standard filter         | 6,500,000                                 | NA                     |
| PECO Filter<br>1 hour   | 3,400                                     | 99.9477%               |
| PECO Filter<br>24 hours | Less than 40*                             | 99.9994%*              |

\*Below the limit of detection.



**READ REPORT**  
**MOLEKULE AIR PRO RX**

Aerosol Research and Engineering  
Laboratories Report on Molekule Air  
Pro RX Filter Efficacy Against Viruses

