



ARE Labs Full Report

Article Info

Radic8: VK 103
Project Number: 10906.70

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- MS2 Bacteriophage

Testing Lab:

Aerosol Research and Engineering Laboratories, Inc.
Project #: 10906.70

Conflict of Interest:

Aerosol Research and Engineering Laboratories, Inc. have no affiliations with, or involvement in any capacity, with Radic8's financial interests such as; membership, employment, stock ownership, or other equity interest.

ABSTRACT

Background:

Due to the high rate of infectious disease transmission through aerosol exposure to pathogenic microorganisms, systems designed to reduce the levels of airborne pathogens and other contaminants from indoor air have been attracting significant attention. This in-vitro study characterizes the efficacy of Radic8's VK 103, air purification system to reduce respirable bioaerosol levels from the air in a 16m³ stainless steel bioaerosol test chamber. The species selected for this study, the MS2 bacteriophage, is a recognized surrogate for a more dangerous pathogenic organisms. MS2 is a non-enveloped ssRNA virus that is a common surrogate for influenza viruses and is a tentative surrogate for SARS-CoV-2. This study will include three (3) bioaerosol challenge trials and one (1) control trial, without the device in operation, to quantify the net log reduction of the VK 103 device.

Methods:

The MS2 bacteriophage was aerosolized into a sealed 16m³ environmental bioaerosol chamber, containing the Radic8 VK 103, using a Collison 24-Jet Nebulizer. All the bioaerosols had a mass median aerodynamic diameter (MMAD) of 0.7µm. Bioaerosol samples were taken at multiple time points throughout each trial, in order to quantify the reduction rate capability of the air purification device. Impinger samples were serially diluted, plated, incubated, and enumerated in triplicate to yield viable bioaerosol concentrations for each sampling point. Chamber control trial data, or natural decay, was subtracted from the device trial data to yield the net LOG reduction of the device.

Results:

The Radic8 VK 103, set on its highest fan speed, was effective at reducing the tested bioaerosol by a minimum net log of 4.0 or greater (equivalent to 99.99% reduction) within 35 minutes or less. The device was observed to reduce viable bioaerosol by a total 6.17 net log in 60 minutes. This report will present test results for the tested organism, MS2 bacteriophage.

Conclusions:

The VK 103 is extremely adept at removing bioaerosols from indoor air. Within 35 min of operating, the VK 103 had removed >4.0 Net Log (99.99%) of MS2 from the test chamber. Given the level of reduction of this organism, conclusions can be drawn about how the device would work against more dangerous pathogens that have similar characteristics to our surrogate test organism.



Item	Standard	Certification
Electrical safety	IEC 60335-2-65; UL 507; CSA C22.2#113-15 Ed.10; IEC 60335-1;	CE/CB; CSA; SABER; InMetro;
Ozone Emission	Cl. 32.102 of IEC 60335-2-65; UL 867; CSA C22.2#187:20 Ed.5;	CE/CB; CSA;
Photobiological safety(UVC)	Cl. 32.102 of IEC 60335-2-65; IEC 62471;	CE/CB; CSA; SABER; InMetro;
Electromagnetic compatibility (EMC)	EN 55014-1, EN 55014-2, EN 61000-3-2, EN 61000-3-3, CISPR 14-1, CISPR 14-2, IEC 61000-3-2, IEC 61000-3-3;	CE/ CB;
EMC and Conducted Emission & Radiated Emission	FCC Part 15 SDoC (CE-EMC & FCC Part 15)	FCC
Ozone emission and UV Leakage	GB 28235; GB/T 18202	China Disinfection

