

Lind Equipment - Lab Test Report

Project Summary

Lind Equipment has contracted the ImPaKT Centre to conduct anti-viral testing with SARS-CoV-2 via viral titer reduction assays after exposure to UV-C light emitted from Lind Equipment's constructed device. Lind Equipment provided a UV-C emitting device on an adapted stand for testing within ImPaKT's CL3 laboratory. After consultation with Lind Equipment, ImPaKT moved forward with testing doses of 10, 15 and 30 mJ/cm² of UV-C. At all three doses of UV-C treatment, the SARS-CoV-2 viral titer was reduced by 4 Logs, equating to a 99.99% reduction of infectious virus. SARS-CoV-2 reported inactivation by the UV-C treatment, and the log reduction were limited by the starting viral titer.

Experimental Method

UV-C Equipment Setup

The UV-C light source was mounted on a bracket to allow the light source to sit within the CL3 biosafety cabinet (BSC). Viral supernatants (150ul) were placed into the center of a 60mm polystyrene plate placed approximately 18 inches below the lights source (Figure 1).



Figure 1. Lind Equipment UV-C Device in CL3 BSC.

SARS-CoV-2 preparation and UV-C Treatment

The SARS-CoV-2 (WA1/2020) virus stock at a titer of 10^{5.8} TCID₅₀/ml was thawed and diluted, 150ul of the virus was added to the center of 60mm polystyrene dish approximately 18 inches below the UV-C device. A UV-C light dose detector was placed next to the 60mm dish and turned on. As instructed by Lind Equipment, the UV-C device was turned on and the UV-C detector was monitored. At the desired UV-C dose levels, the light source was turned off. This process was repeated three times to achieve the doses of 10, 15, and 30 mJ/cm². UV-C treated viral supernatants were titered onto 20,000 Vero E6 cells in 96 well flat bottom plates to quantitate viral titer reduction as a result of exposure.

Results

In Table 1, at all three doses of UV-C treatment, 10, 15, 30 mJ/cm², the SARS-CoV-2 viral titer was reduced by 4 Logs, a 99.99% reduction of infectious virus. It should be noted that the virus inactivation could have been higher at all doses but the viral titer reduction was limited by the starting viral titer.

Table 1. Lind UV-C Viral Titer Reduction

Dose(mJ/cm ²)	Viral Titer	Reduction Factor (Log10) v. Control	% Viral Reduction
10	10 ⁰	4	99.99%
15	10 ⁰	4	99.99%
30	10 ⁰	4	99.99%

*Control virus titer 10^{3.75} TCID₅₀/ml

Supplementary material

List of study materials:

- Lind Equipment UV-C device
- SARS-CoV-2 (WA1/2020) (TCID₅₀/ml 10^{5.8})
- VERO E6 cell line (*Cercopithecus aethiops*, kidney)
- Dulbecco's Modified Eagle media supplemented with 10% or 2% fetal bovine serum
- Polypropylene 1.5ml tubes
- 60mm polystyrene dishes
- 96-well flat bottom plates
- EVOS M7000 Microscope