

Study Title

Spectral Irradiance Measurement of UVC Room Sterilizer

Purpose: To measure the irradiance of the test device and calculate the UV dose and exposure time

Sample received on: 25 October 2020

Condition of product: Received in excellent condition- Visual Inspection

Date of experiments: 25 October 2020

Sample type: UVC system (room sterilizer)- Model-SES-UVCCOO-55

Sender: SARIN Energy

Wavelength of interest (nm): 253.7 ± 10 nm (germicidal)

Measurements recorded at room temperature

Method: Internal SOP for quantifying irradiance and power measurements

Summary

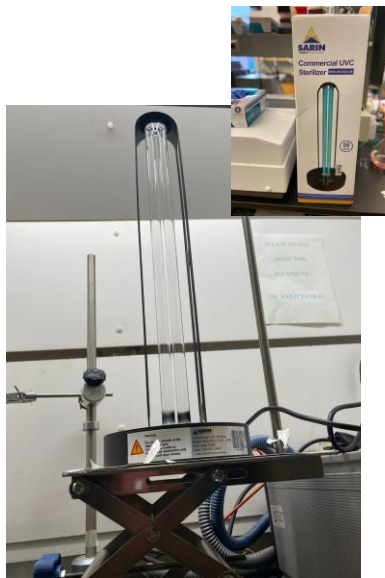


Figure 1. UV Sterilizer

Using the Ocean Optics Spectrometer, irradiance measurements were conducted on the Commercial UVC Sterilizer [Figure 1]. Spectrometer is equipped with an irradiance probe — a solarization-resistant optical fiber with Spectralon cosine corrector of 180 degrees field of view, coupled to its end. Spectralon is a Lambertian diffuse material with a higher than 95% reflectance in the 220 to 400 nm range. Spectral irradiance of the lamp was measured using an optical fiber, set about 5.5 cm and 9 cm from the device. This system is calibrated with NIST-traceable Deuterium (D2) and Quartz-Tungsten-Halogen (QTH) calibration sources with approximately 5% and 3% uncertainties. A warmup time of 20 minutes is a prerequisite for any optical measurement. All measurements were done in triplicate and data was averaged [Figure 2]. At a distance of 1 meter, an irradiance value of 0.25 mW/cm^2 was observed. In contrast, irradiance of 0.035 mW/cm^2 was observed at a distance of 2.67 meters. Irradiance was relatively stable. Based on the irradiance of 0.25 mW/cm^2 (1.02 m) and 0.035 mW/cm^2 (2.67 m), exposure time, the calculated doses are illustrated in [Table 1]. Figure 2 shows spectral irradiance.

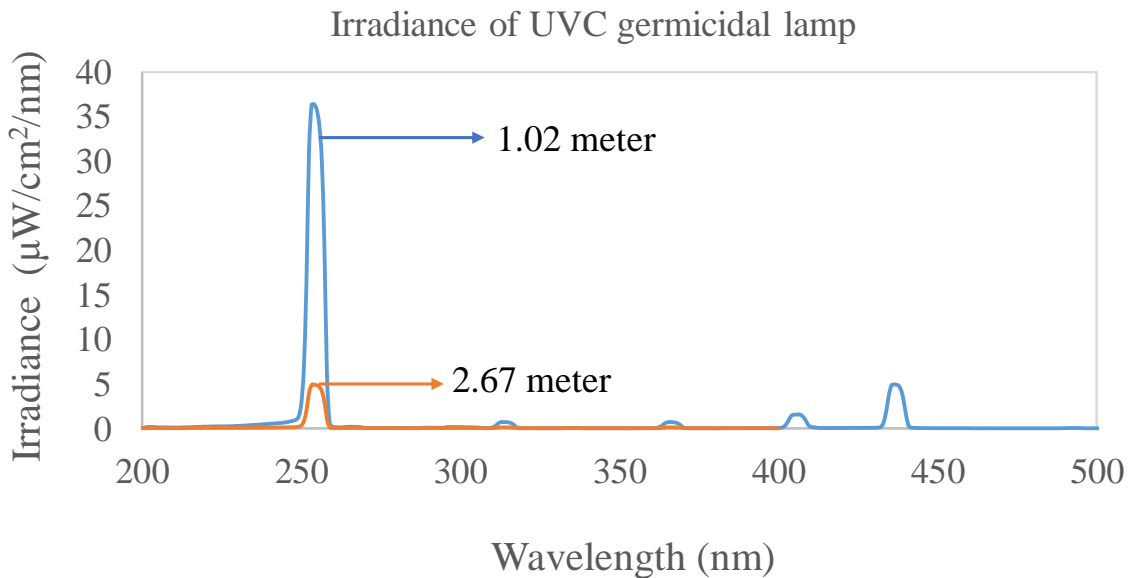


Figure 2. Spectral Irradiance of the lamp

Table 1. Predicted Log inactivation of Sars-Cov-2^a

Dose (mJ.cm ⁻²)	Exposure time, sec	Distance, m	Log reduction
0	0.00		0.00
2.50	10.00	1	1.19
5.00	20.00	1	2.38
7.50	30.00	1	3.57
12.50	50.00	1	5.95
0	0		0.00
2.50	71.43	2.67	1.19
5.00	142.86	2.67	2.38
7.50	214.29	2.67	3.57
12.50	357.14	2.67	5.95

^a <https://www.frontiersin.org/articles/10.3389/fmicb.2020.572331/full>

Conclusions:

The optical device emits germicidal photons at 254 nm. Model predicted exposure doses to inactivate Sars-Cov-2 are shown above. The data needs to be validated experimentally using Sars-Cov-2 surrogate (Murine coronavirus MHV-1 NCBI accession: FJ647223.1).



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Rev	Date	Details of Changes	Created By	Checked By	Report¹ Approved By
1	25, October, 2020	Initial release under new format and numbering.	Ankit Patras	Brahmaiah Pendyala	
2	30, October, 2020			Ankit Patras	Ankit Patras

¹This report is only for research purposes.