

LG ELECTRONICS CO., LTD.

TEST REPORT

SCOPE OF WORKS

EVALUATION OF STERILIZATION EFFICIENCY OF DISINFECTION ROBOT USING UV-C LIGHT DEVICES

REPORT NUMBER

RT21E-S0023

ISSUE DATE

29-APR-2021

PAGES

30

DOCUMENT CONTROL NUMBER

ISTC-QP-FM-17-03-E1 Rev.1 © 2017 INTERTEK





Report No.: RT21E-S0023 Date: APR 29, 2021

Seongdong-gu, Seoul, Korea Telephone: 82-6-090-9615

Intertek Testing Services Korea Ltd. 1/F, A-JU Digital Tower, 7, Achasan-ro 5 -gil,

Facsimile: 82-3-409-0505

www.intertek.com

OBJECTIVE

The purpose of the testing is:

To define test conditions and evaluate the efficacy of microorganisms inactivation on the surface materials by a disinfection robot using UV-C light devices.

HYPOTHESIS

Staphylococcus aureus & Salmonella on stainless steel exposed to UVC will be decreased 99.999%. Staphylococcus aureus & Salmonella on glass exposed to UVC will be decreased 99.999%. Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC will be decreased 99.999%.

CONCLUSION

Based on the data collected, the Hypothesis is accepted:

Staphylococcus aureus on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 70 seconds.

Salmonella on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 90seconds.

Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 30 seconds.



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PERFORMED BY INTERTEK TESTING SERVICES KOREA LTD.

PERIOD OF TEST 05 APR 2021 ~ 14 APR 2021

DATE OF ISSUE 29 APR 2021

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SECTION 2

OBJECTIVE

The purpose of the testing is:

To define test conditions and evaluate the efficacy of microorganisms inactivation on the surface materials by a disinfection robot using UV-C light devices.

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SECTION 3

PARAMETERS

The following parameters are controlled

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
65 ± 20	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

The following parameters are monitored

VALUE	DESCRIPTION	UNITS	METHOD
23 ± 5	Test room temperature	°C	Data logger
65 ± 20	Test room humidity	% R.H.	Data logger
35-37	Incubated Temperature	°C	Data logger

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SECTION 4

PRODUCT/MODEL DESCRIPTION

PRODUCT INFORMATION: LG DISINFECTING ROBOT

MODEL:

Note:

SECTION 5

SAMPLE ACQUISITION

Sample(s) was supplied by the applicant:

SAMPLE #	DESCRIPTION	MODEL	PURCHASE LOCATION	DATE	CONDITION
1	Disinfection robot	-	Prepared by LG	2021.2	Packaged and undamaged
2	UV Lamp	Philips TUV 36W SLV/6	Prepared by LG	2021.2	Packaged and undamaged

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SECTION 6

HYPOTHESIS

Staphylococcus aureus & Salmonella on stainless steel exposed to UVC will be decreased 99.999%. Staphylococcus aureus & Salmonella on glass exposed to UVC will be decreased 99.999%. Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC will be decreased 99.999%.

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SECTION 7

EQUIPMENT LIST

#	EQUIPMENT DESCRIPTION	MANUFACTURER'S NAME / MODEL # / SERIAL #	INTERTEK ASSET #	CALIBRATION DATE	CALIBRATION DUE	RANGE USED
1	Auto clave	JEIOTECH / ST-105G / 1A035183	ISTK-78-00	2020.04.24	2021.04.23	121 °C
2	Incubator	JEIOTECH / 1L-11 / W070283	ISTK-21-06	2020.08.10	2021.08.10	0 ~ 60 °C
3	Thermometer	NONE/ JB-913 / TEMPNO.11591	ISTC-64-05	2020.04.27	2021.04.27	10 ~ 30 °C
4	hydrometer	NONE/ JB-913 / TEMPNO.11591	ISTC-64-05	2020.04.27	2021.04.27	40 ~ 80 %
5	Pipet (1000)	Biohit / 15582461 /AP-40	ISTC-APM-04	2020.08.20	2021.08.20	100 ~ 1000 uL
6	Pipet (10)	Biohit / 12527456 /AP-22	ISTC-APM-04	2020.11.10	2021.11.10	10 ~ 100 uL
7	Balance	AND/CB-2000/H16-02955	ISTK-01-07	2020.08.10	2021.08.10	(0 ~ 2000) g
8	Clean bench	SEOJIN / - / -	ISTK-23-01	-	-	-
9	Colony counter	Hwashin / 350CL / -	ISTK-48-01	-	-	-

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Note: The equipment measurement uncertainty is stated in the Test Procedure.

SECTION 8

TECHNICAL STAFF

#	Staff Name	Area of Expertise				
1	Ej Kim	Technician / Intertek Testing Korea Ltd.				
2	Kenneth Lee	Sr.Engineer / Intertek Testing Korea Ltd.				
3	Rody Ju	Technical Manager / Intertek Testing Korea Ltd.				
4	Bo Park	Laboratory Director / Intertek Testing Korea Ltd.				
Note: Comple	Note: Complete training records for staff are available upon request					

Testing was conducted at:

Intertek Testing Services Korea Ltd.

4/F, A-JU Digital Tower, 7, Achasan-ro 5 –gil, Seongdong-gu, Seoul, Korea

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SECTION 9

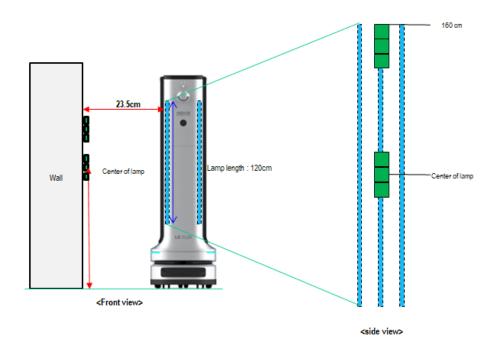
TEST PROCEDURE

1. Test Set up:

Ite	ms	Requirement	Condition
Electrical Supply	Voltage	(220 ± 10)	(220 ± 10)
	Frequency	(60 ± 10) Hz	(60 ± 10) Hz
Ambient Temperature		(25 ± 3) °C	(25 ± 3) °C
Ambient humidity		(40 ± 10) % R.H.	(40 ± 10) % R.H.

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2. Test Condition:



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3. Sample Description

	Photocatalytic specimens				
Туре	UV Lamp (Philips TUV 36W SLV/6)				
Size	Length: 120mm				
Shape	cylinder				
Photo	250/-				

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4. Microorganisms

Bacteria Species	Strain Number
Staphylococcus aureus	ATCC 6538
Klebsiella pneumoniae	ATCC 4352
Salmonella enteritidis	ATCC 12021

5. Reagents

Name	Manufacturer	Product No	LOT No	Expiry date	Contents
1 X PBS buffer	Gibco	70011-044	2193136	22.09.30	
Tryptic Soy Agar	Difco	236950	0244908	25.07.31	
Tryptic Soy Broth	Difco	211825	9065918	24.01.31	

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6. Test method

6.1. Preparation of test

6.1.1 Disconnect 1 ul of the strains cultured on TSA using a loop and inoculate it in 100 ml of TSB.

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- 6.1.2 Incubate in a 37 °C water bath so that the OD value is between 0.8 and 1.0 in the 600 nm wavelength.
- 6.1.3 Using Standard curve data dilute the number of bacteria to 1.0~10.0 x 10⁷ CFU/mL
- 6.1.4 Put the specimen on an empty Petri dish and inoculate it with 10 ul of the 6.1.3 solution.

On 6 stainless steel & glass samples, inoculate Staphylococcus aureus, Salmonella enteritidis.

On 6 fabric samples, inoculate *Staphylococcus aureus*, *Klebsiella pneumoniae*.

In this case, Positive control and Negative control (D.W), respectively, are prepared and placed for the same time as the subsequent procedure.

6.1.5 Cover the petri dish lid diagonally and dry it naturally in the clean bench for 30 minutes. At this time, air is allowed to flow for drying.

6.2 Operating of Disinfection robot

The UV is radiated at the distance-time according to the test conditions.

- 6.2.1 Attach the specimen on the wall so that UV can be easily emitted.
- 6.2.2 Turn on the Lamp. (Cover the Lamp)
- 6.2.3 After the light source stabilizes, Remove the cover and Radiate with a UVC lamp for 30 seconds at a distance of 23.5 cm away.
- 6.2.4 In the same way, repeat the test again for 50s, 70s and 90s.
- 6.2.5 Change every lamp to another batch.
- 6.2.6 Triplicate test complete

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6.3 Extraction of bacteria from sample specimen

6.3.1 Swab three times per specimen recovered and put it in a 50 mL tube containing 10mL of 1 X PBS buffer.

In the case of fabric, it is placed directly into a 50 mL conical tube containing 10mL of 1 X PBS buffer without Swab.

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6.3.2 Voltex more than 5 minutes.

6.4 The method of examination

- 6.4.1 Get 1 mL of Solution and put in an empty Petri dish, and then add 20 mL of TSA medium stored at 45-50 °C.
- 6.4.2 All plates incubate for (48 \pm 4) hours at 37 °C.
- 2.6.3 After incubation, the plates enumerated.

6.5 Calculation of result

- 6.5.1 Percent reduction = $[(a-b)/a] \times 100$
- a: the microorganism number of Positive control
- b: the microorganism number of after UV radiation.

SECTION 10

TEST RESULT

Stainless steel - Staphylococcus aureus

			160 cm		100 cm		
Repeat #1	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	3.3 × 10 ⁶	2.8 × 10 ⁶		3.3 × 10 ⁶	2.0 106	
control	Control 2	2.3 × 10 ⁶	2.8 × 10	-	2.3 × 10 ⁶	2.8 × 10 ⁶	-
	Sample 1	1.6 × 10 ²			0		
30s	Sample 2	1.5 × 10 ¹	6.2 × 10 ¹	99.997	5.0 × 10 ⁰	2.0 × 10 ⁰	99.999
	Sample 3	1.0 × 10 ¹		0			
	Sample 1	1.1 × 10 ²			0		
50s	Sample 2	0	4.2 × 10 ¹	99.998	2.5 × 10 ¹	8.0 × 10 ⁰	99.999
	Sample 3	1.5 × 10 ¹			0		
	Sample 1	0			0		
70s	Sample 2	0	2.0 × 10 ⁰	99.999	0	2.0 × 10 ⁰	99.999
	Sample 3	5.0 × 10 ⁰			5.0 × 10 ⁰		
	Sample 1	1.0 × 10 ¹			0		
90s	Sample 2	0	3.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

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Stainless steel - Staphylococcus aureus

			160 cm			100 cm	
Repeat #2	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	1.0 × 10 ⁷	2.2.125		1.0 × 10 ⁷		
control	Control 2	7.8 × 10 ⁶	9.0 × 10 ⁶	-	7.8 × 10 ⁶	9.0 × 10 ⁶	-
	Sample 1	1.0 × 10 ¹			1.5 × 10 ¹		
30s	Sample 2	1.1 × 10 ²	8.3 × 10 ¹	99.999	3.5 × 10 ¹	1.8 × 10 ¹	99.999
	Sample 3	1.3 × 10 ²			5.0 × 10 ⁰		
	Sample 1	0			0		
50s	Sample 2	0	0	99.999	5.0 × 10 ⁰	3.0 × 10 ⁰	99.999
	Sample 3	0			5.0 × 10 ⁰		
	Sample 1	1.0 × 10 ¹			0		
70s	Sample 2	0	3.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	5.0 × 10 ⁰			0		
90s	Sample 2	0	2.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

Stainless steel - Staphylococcus aureus

			160 cm			100 cm	
Repeat #3	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	1.2 × 10 ⁷			1.2 × 10 ⁷		
control	Control 2	1.1 × 10 ⁷	1.1 × 10 ⁷	-	1.1 × 10 ⁷	1.1 × 10 ⁷	-
	Sample 1	1.8 × 10 ³			0		
30s	Sample 2	9.0 × 10 ¹	6.3 × 10 ²	99.994	1.0 × 10 ¹	1.0 × 10 ¹	99.999
	Sample 3	5.0 × 10 ⁰			2.0 × 10 ¹		
	Sample 1	9.7 × 10 ²			5.0 × 10 ⁰		
50s	Sample 2	1.5 × 10 ¹	3.7×10^{2}	99.996	0	2.0 × 10 ⁰	99.999
	Sample 3	0			0		
	Sample 1	8.0 × 10 ¹			0		
70s	Sample 2	5.0 × 10 ⁰	2.8 × 10 ¹	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	1.5 × 10 ¹			0		
90s	Sample 2	0	5.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

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Stainless steel - Salmonella enteritidis

			160 cm			100 cm	
Repeat #1	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	6.3 × 10 ⁵			6.3 × 10 ⁵	5.4.405	
control	Control 2	6.5 × 10 ⁵	6.4 × 10 ⁵	-	6.5 × 10 ⁵	6.4 × 10 ⁵	-
	Sample 1	2.4 × 10 ²			1.2 × 10 ²		
30s	Sample 2	2.1 × 10 ²	1.8 × 10 ²	99.971	2.0 × 10 ¹	8.7 × 10 ¹	99.986
	Sample 3	9.0 × 10 ¹			1.2 × 10 ²		
	Sample 1	3.0 × 10 ¹			0		
50s	Sample 2	1.0 × 10 ¹	3.3 × 10 ¹	99.994	0	0	99.999
	Sample 3	6.0 × 10 ¹			0		
	Sample 1	0			0		
70s	Sample 2	1.0 × 10 ¹	1.0 × 10 ¹	99.998	0	0	99.999
	Sample 3	2.0 × 10 ¹			0		
	Sample 1	1.0 × 10 ¹			0		
90s	Sample 2	0	3.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

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Stainless steel - Salmonella enteritidis

			160 cm			100 cm	
Repeat #2	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	3.1 × 10 ⁵	0.1.105		3.1 × 10 ⁵	0.4.405	
control	Control 2	3.6 × 10 ⁵	3.4 × 10 ⁵	-	3.6 × 10 ⁵	3.4 × 10 ⁵	-
	Sample 1	4.9 × 10 ²			0		
30s	Sample 2	3.2 × 10 ²	3.1 × 10 ²	99.908	5.0 × 10 ⁰	2.0 × 10 ⁰	99.999
	Sample 3	1.1 × 10 ²			0		
	Sample 1	9.0 × 10 ¹			0		
50s	Sample 2	2.0 × 10 ¹	7.3 × 10 ¹	99.978	0	0	99.999
	Sample 3	1.1 × 10 ²			0		
	Sample 1	0			0		
70s	Sample 2	5.0 × 10°	3.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	5.0 × 10 ⁰			0		
	Sample 1	5.0 × 10 ⁰			0		
90s	Sample 2	0	2.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

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Stainless steel - Salmonella enteritidis

			160 cm			100 cm	
Repeat #3	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	3.1 × 10 ⁵	0.0.105		3.1 × 10 ⁵	0.6.105	
control	Control 2	2.1 × 10 ⁵	2.6 × 10 ⁵	-	2.1 × 10 ⁵	2.6 × 10 ⁵	-
	Sample 1	7.5 × 10 ²			1.0 × 10 ¹		
30s	Sample 2	8.0 × 10 ¹	5.1 × 10 ²	99.803	5.5 × 10 ¹	7.2 × 10 ¹	99.972
	Sample 3	7.1 × 10 ²			1.5 × 10 ²		
	Sample 1	2.2 × 10 ²			0		
50s	Sample 2	1.0 × 10 ¹	8.0 × 10 ¹	99.969	0	0	99.999
	Sample 3	1.0 × 10 ¹			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Staphylococcus aureus

			160 cm			100 cm	
Repeat #1	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	4.5 × 10 ⁶	106		4.5 × 10 ⁶	106	
control	Control 2	3.6 × 10 ⁶	4.1 × 10 ⁶	-	3.6 × 10 ⁶	4.1 × 10 ⁶	-
	Sample 1	5.5 × 10 ¹			0		
30s	Sample 2	1.5 × 10 ¹	2.7 × 10 ¹	99.999	0	0	99.999
	Sample 3	1.0 × 10 ¹			0		
	Sample 1	1.0 × 10 ¹			0		
50s	Sample 2	1.5 × 10 ¹	1.7 × 10 ¹	99.999	0	0	99.999
	Sample 3	2.5 × 10 ¹			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Staphylococcus aureus

			160 cm			100 cm	
Repeat #2	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	9.1 × 10 ⁶	0.7 106		9.1 × 10 ⁶	0.7105	
control	Control 2	8.3 × 10 ⁶	8.7 × 10 ⁶	-	8.3 × 10 ⁶	8.7 × 10 ⁶	-
	Sample 1	0			0		
30s	Sample 2	0	7.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	2.0 × 10 ¹			0		
	Sample 1	0			0		
50s	Sample 2	0	0	99.999	5.0 × 10 ⁰	2.0 × 10 ⁰	99.999
	Sample 3	0			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Staphylococcus aureus

			160 cm			100 cm	
Repeat #3	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	8.9 × 10 ⁶	0.0 106		8.9 × 10 ⁶	0.0 106	
control	Control 2	8.8 × 10 ⁶	8.9 × 10 ⁶	-	8.8 × 10 ⁶	8.9 × 10 ⁶	-
	Sample 1	3.7 × 10 ²			5.0 × 10 ⁰		
30s	Sample 2	2.7 × 10 ²	2.1 × 10 ²	99.997	2.0 × 10 ¹	2.0 × 10 ¹	99.999
	Sample 3	0			3.5 × 10 ¹		
	Sample 1	4.7 × 10 ²			3.0 × 10 ¹		
50s	Sample 2	0	1.6 × 10 ²	99.998	0	1.0 × 10 ¹	99.999
	Sample 3	5.0 × 10 ⁰			1.0 × 10 ¹		
	Sample 1	2.0 × 10 ¹			0		
70s	Sample 2	0	7.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	1.5 × 10 ¹			0		
90s	Sample 2	0	5.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Salmonella enteritidis

			160 cm			100 cm	
Repeat #1	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	6.0 × 10 ⁵	6.7405		6.0 × 10 ⁵	67405	
control	Control 2	7.4 × 10 ⁵	6.7 × 10 ⁵	-	7.4 × 10 ⁵	6.7 × 10 ⁵	-
	Sample 1	5.0 × 10 ¹			0		
30s	Sample 2	7.5 × 10 ¹	6.0 × 10 ¹	99.991	1.0 × 10 ¹	3.0 × 10 ⁰	99.999
	Sample 3	6.0 × 10 ¹			0		
	Sample 1	8.5 × 10 ¹			0		
50s	Sample 2	0	4.8 × 10 ¹	99.992	0	0	99.999
	Sample 3	6.0 × 10 ¹			0		
	Sample 1	1.5 × 10 ¹			0		
70s	Sample 2	0	5.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Salmonella enteritidis

			160 cm			100 cm	
Repeat #2	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	1.6 × 10 ⁵	4.4.405		1.6 × 10 ⁵	1.4 × 10 ⁵	
control	Control 2	1.1 × 10 ⁵	1.4 × 10 ⁵	-	1.1 × 10 ⁵	1.4 × 10°	-
	Sample 1	2.0 × 10 ¹			1.0 × 10 ¹		
30s	Sample 2	7.5 × 10 ¹	3.2 × 10 ¹	99.977	0	5.0 × 10 ⁰	99.996
	Sample 3	0			5.0 × 10°		
	Sample 1	0			0		
50s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Glass - Salmonella enteritidis

			160 cm			100 cm	
Repeat #3	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	3.4 × 10 ⁵	2.4 405		3.4 × 10 ⁵	2.4 405	
control	Control 2	3.3 × 10 ⁵	3.4 × 10 ⁵	-	3.3 × 10 ⁵	3.4 × 10 ⁵	-
	Sample 1	2.1 × 10 ²			1.0 × 10 ¹		
30s	Sample 2	2.0 × 10 ¹	1.1 × 10 ²	99.967	5.0 × 10 ⁰	5.0 × 10 ⁰	99.998
	Sample 3	1.1 × 10 ²			0		
	Sample 1	2.5 × 10 ¹			0		
50s	Sample 2	1.0 × 10 ¹	1.3 × 10 ¹	99.996	0	0	99.999
	Sample 3	5.0 × 10 ⁰			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Fabric - Staphylococcus aureus

			160 cm			100 cm	
Repeat #1	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	9.5 × 10 ⁵	0.4 405		9.5 × 10⁵	0.4 405	
control	Control 2	6.6 × 10 ⁵	8.1 × 10 ⁵	-	6.6 × 10 ⁵	8.1 × 10 ⁵	-
	Sample 1	1.5 × 10 ¹			0		
30s	Sample 2	5.0 × 10 ⁰	7.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
50s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Fabric - Staphylococcus aureus

			160 cm			100 cm	
Repeat #2	Sample	Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	5.4 × 10 ⁵	5.4 × 10 ⁵		5.4 × 10 ⁵	5 4 × 405	
control	Control 2	5.3 × 10 ⁵	3.4 × 10°	-	5.3 × 10 ⁵	5.4 × 10 ⁵	-
	Sample 1	5.0 × 10 ⁰			0		
30s	Sample 2	0	2.0 × 10 ⁰	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
50s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
	Sample 1	0			0		
70s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
_	Sample 1	0			0		
90s	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Fabric - Staphylococcus aureus

	Sample	160 cm			100 cm		
Repeat #3		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	5.1 × 10⁵	6.6 × 10 ⁵	-	5.1 × 10 ⁵	6.6 × 10 ⁵	-
control	Control 2	8.1 × 10 ⁵			8.1 × 10 ⁵		
	Sample 1	0		99.999	5.0 × 10 ⁰	2.0 × 10 ⁰	99.999
30s	Sample 2	5.0 × 10 ⁰	2.0 × 10 ⁰		0		
	Sample 3	0]		0		
	Sample 1	0	0	99.999	0	0	99.999
50s	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
90s	Sample 1	0	0		0	0	99.999
	Sample 2	0		99.999	0		
	Sample 3	0			0		

Fabric - Klebsiella pneumoniae

	Sample	160 cm			100 cm		
Repeat #1		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive	Control 1	6.3 × 10 ⁶	6.5 × 10 ⁶	-	6.3 × 10 ⁶	6.5 × 10 ⁶	-
control	Control 2	6.6 × 10 ⁶			6.6 × 10 ⁶		
	Sample 1	0		99.999	0	0	99.999
30s	Sample 2	0	0		0		
	Sample 3	0			0		
	Sample 1	0	0	99.999	0	0	99.999
50s	Sample 2	0			0		
	Sample 3	0			0		
70s	Sample 1	0	0	99.999	0	0	99.999
	Sample 2	0			0		
	Sample 3	0			0		
90s	Sample 1	0	0		0	0	99.999
	Sample 2	0		99.999	0		
	Sample 3	0			0		

Fabric - Klebsiella pneumoniae

	Sample	160 cm			100 cm		
Repeat #2		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	7.2 × 10 ⁶	7.3 × 10 ⁶	-	7.2 × 10 ⁶	7.3 × 10 ⁶	-
	Control 2	7.3 × 10 ⁶			7.3 × 10 ⁶		
	Sample 1	3.0 × 10 ¹	1.2 × 10 ¹	99.999	5.0 × 10°	2.0 × 10°	99.999
30s	Sample 2	5.0 × 10 ⁰			0		
	Sample 3	0			0		
50s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
70s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
90s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Fabric - Klebsiella pneumoniae

	Sample	160 cm			100 cm		
Repeat #3		Result	Average	Reduction rate (%)	Result	Average	Reduction rate (%)
Positive control	Control 1	5.9 × 10 ⁶	5.9 × 10 ⁶	-	5.9 × 10 ⁶	5.9 × 10 ⁶	-
	Control 2	5.9 × 10 ⁶			5.9 × 10 ⁶		
	Sample 1	5.0 × 10 ⁰	3.0 × 10 ⁰	99.999	0	0	99.999
30s	Sample 2	5.0 × 10 ⁰			0		
	Sample 3	0			0		
50s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
70s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		
90s	Sample 1	0			0		
	Sample 2	0	0	99.999	0	0	99.999
	Sample 3	0			0		

Date: APR. 29, 2021

SECTION 11

Conclusion

Based on the data collected the Hypothesis is accepted:

Staphylococcus aureus on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 70 seconds.

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Salmonella on stainless steel & glass exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 90seconds.

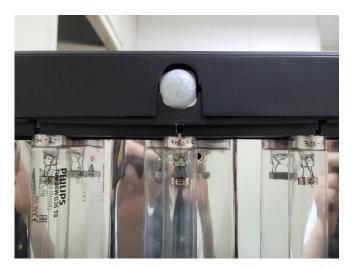
Staphylococcus aureus & Klebsiella pneumoniae on fabric exposed to UVC lamp at a distance of 23.5 cm can decreased 99.999 % at more than 30 seconds.

APPEXDIX I. Photos of sample





<Front view>



<Lamp position view>