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Microbiology Study Report No.: 5148.20

Antimicrobial Efficiency of Portable pulsed ultraviolet unit Yanex-5

Customer	Indexinnovation Ltd. registration number: 515557163 Bazel 8, Tel-Aviv, 6238507, Israel Attn: Mr. Isaac YANOFSKY
Email	issy@indexinnovation.co.il
Date sample tested	February 6, 2020
Aminolab No.	011017.20-M
Sample Description	Portable pulsed ultraviolet unit for air and surfaces disinfection Yanex-5

Test Method:

The study was performed according to the sponsor's protocol.

Purpose

Studying the antimicrobial efficiency of pulsed ultraviolet radiation generated by the Yanex-5 unit against several multidrug-resistant microorganisms.

Test microorganisms:

1. *Klebsiella pneumoniae* (ATCC 10031)
2. *Methicillin-resistant Staphylococcus aureus* (MRSA) (ATCC 700699)
3. *Carbapenem-resistant Enterobacteriaceae* (CRE) (a hospital strain)
4. *Acinetobacter baumannii* (ATCC BAA-747)
5. *Vancomycin-resistant enterococci* (VRE) (a hospital strain)
6. *Pseudomonas aeruginosa* (ATCC9027)
7. *Clostridium difficile* (a hospital strain)

Test media and solutions:

Tryptic Soy Agar (TSA)
CNA Columbia Agar
Buffered Sodium Chloride-Peptone solution pH 7.0

Test procedure:

For bacteria 1-6: Six (6) Petri plates were inoculated each with 0.01mL bacterial suspension containing about 10^8 - 10^9 CFU/ml (each test microorganism was tested separately). The plates were put into the incubator at 37°C for 50 minutes to dry. After drying 3 plates were treated by the sponsor for 10 minutes with Portable pulsed ultraviolet unit for air and surfaces disinfection Yanex-5. The rest 3 plates were served as Positive Control (PC). Microorganisms were removed from each plate by rinsing with 10mL Buffered Sodium Chloride-Peptone solution pH 7.0 and enumerated using pour plate method on TSA.

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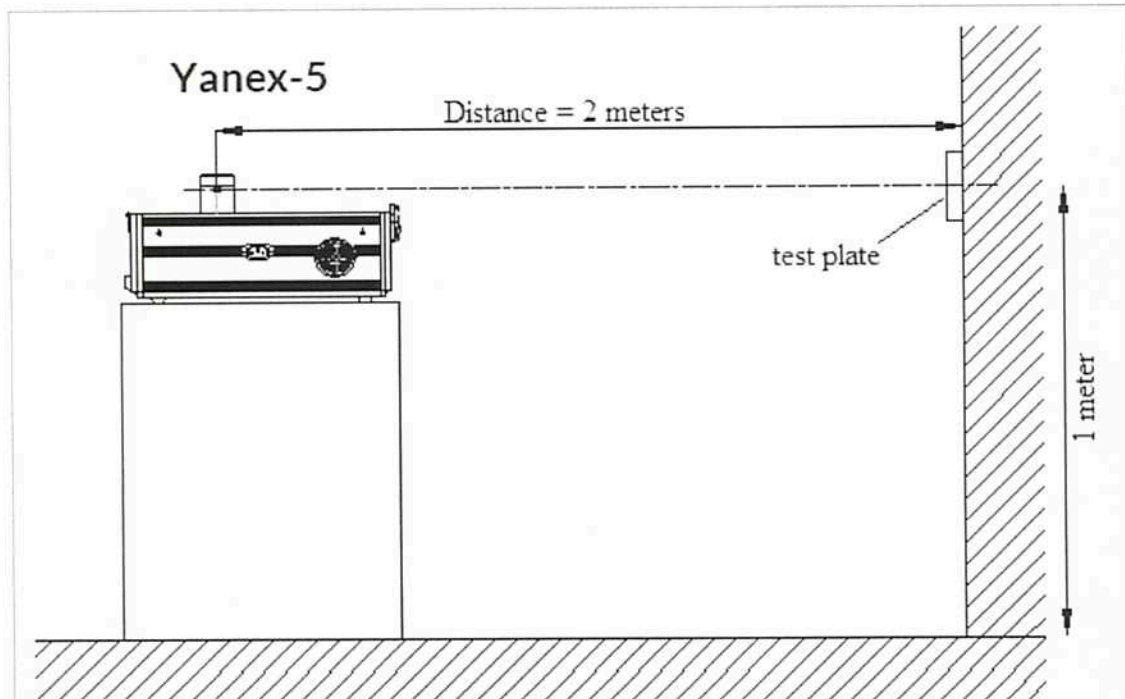
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For bacterium 7: Six (6) Petri plates were inoculated, dried and treated as above. Microorganisms were removed from each plate by rinsing and enumerated using membrane filtration method. Membranes were placed onto CNA Columbia Agar plates and incubated in anaerobic conditions.

All plates were incubated at 35±2°C for 5 days.

The treatment of test plates is carried out from a distance of 2 meters according to the scheme below:



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Results

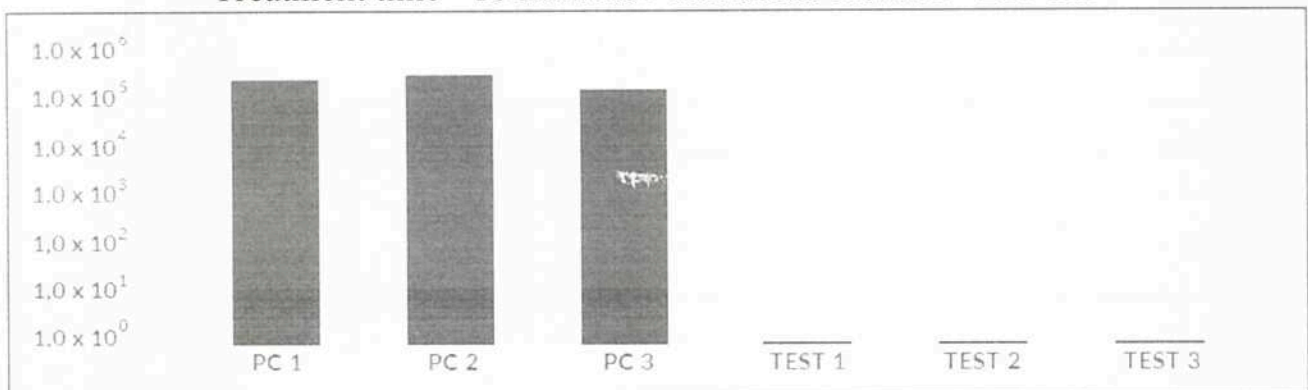
***Klebsiella pneumoniae* (ATCC 10031)**

Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	<1	<1	0	5.48
Test 2	<1			
Test 3	<1			
PC-1	3.07 x 10 ⁵	3.01 x 10 ⁵	5.48	
PC-2	4.00 x 10 ⁵			
PC-3	1.93 x 10 ⁵			
Inoculum size	7.30 x 10 ⁸ CFU/ml			

***Klebsiella pneumoniae* (ATCC 10031)**

Treatment time - 10 minutes / Treatment distance - 200 cm



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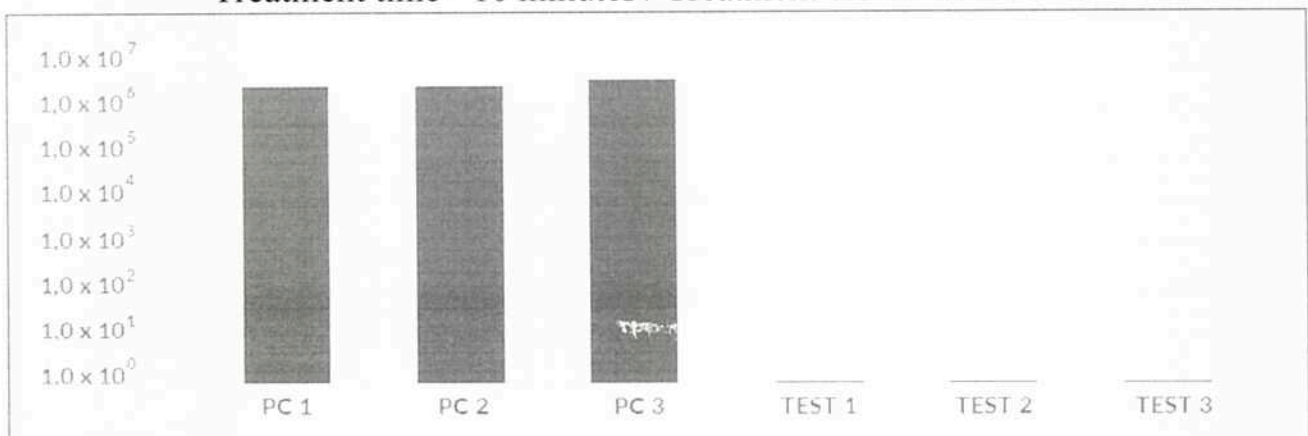
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Results

Methicillin-resistant Staphylococcus aureus (MRSA) (ATCC 700699)
Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	<1	<1	0	6.59
Test 2	<1			
Test 3	<1			
PC-1	3.50 x 10 ⁶	3.90 x 10 ⁶	6.59	
PC-2	3.50 x 10 ⁶			
PC-3	4.70 x 10 ⁶			
Inoculum size	8.70 x 10 ⁸ CFU/ml			

Methicillin-resistant Staphylococcus aureus (MRSA) (ATCC 700699)
Treatment time - 10 minutes / Treatment distance - 200 cm



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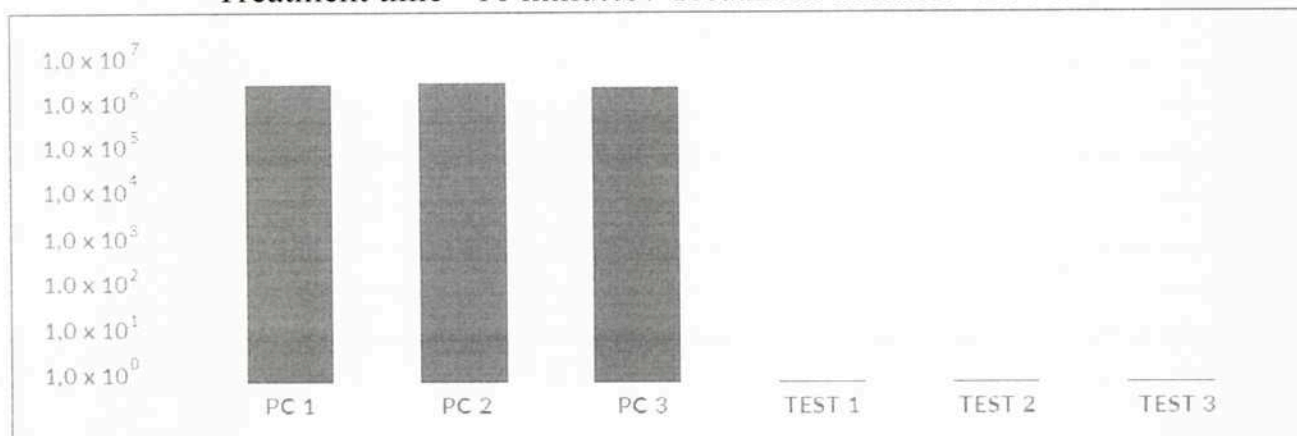
Carbapenem-resistant Enterobacteriaceae (CRE) (a hospital strain)

Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	<1	<1	0	6.62
Test 2	<1			
Test 3	<1			
PC-1	4.30 x 10 ⁶	4.20 x 10 ⁶	6.62	
PC-2	4.60 x 10 ⁶			
PC-3	3.60 x 10 ⁶			
Inoculum size	1.09 x 10 ⁹ CFU/ml			

Carbapenem-resistant Enterobacteriaceae (CRE) (a hospital strain)

Treatment time - 10 minutes / Treatment distance - 200 cm



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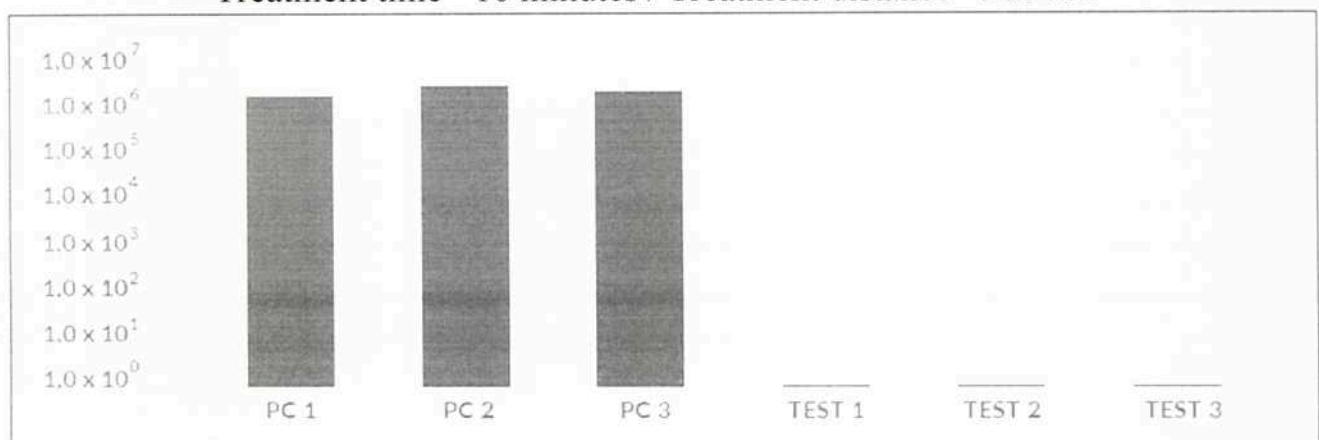
***Acinetobacter baumannii* (ATCC BAA-747)**

Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	<1	<1	0	6.52
Test 2	<1			
Test 3	<1			
PC-1	2.50 x 10 ⁶	3.30 x 10 ⁶	6.52	
PC-2	4.20 x 10 ⁶			
PC-3	3.20 x 10 ⁶			
Inoculum size	8.50 x 10 ⁸ CFU/ml			

***Acinetobacter baumannii* (ATCC BAA-747)**

Treatment time - 10 minutes / Treatment distance - 200 cm



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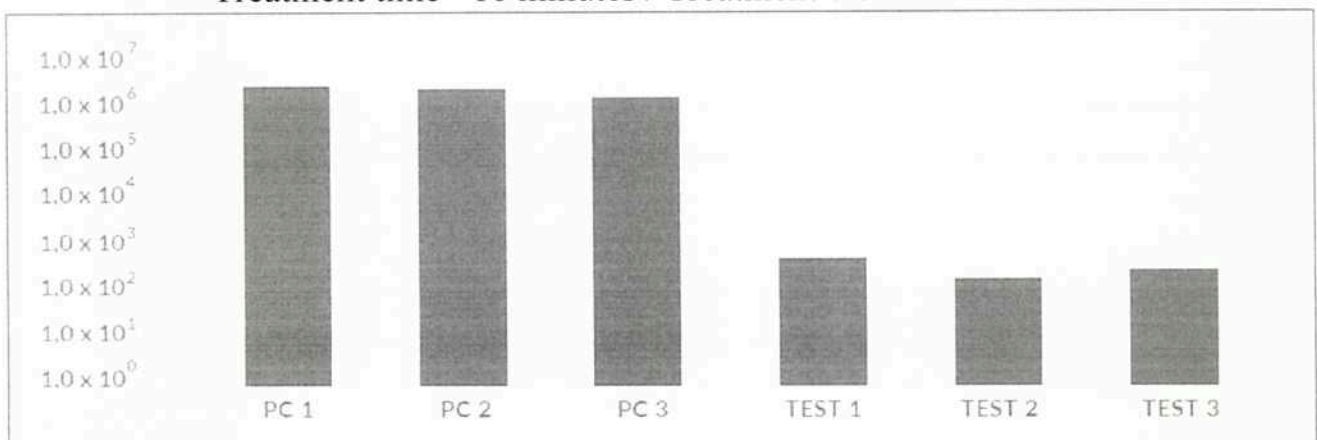
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Results

Vancomycin-resistant enterococci VRE (a hospital strain)
Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	647	408	2.61	3.89
Test 2	220			
Test 3	357			
PC-1	3.90×10^6	3.17×10^6	6.50	
PC-2	3.40×10^6			
PC-3	2.19×10^6			
Inoculum size	4.40×10^8 CFU/ml			

Vancomycin-resistant enterococci VRE (a hospital strain)
Treatment time - 10 minutes / Treatment distance - 200 cm



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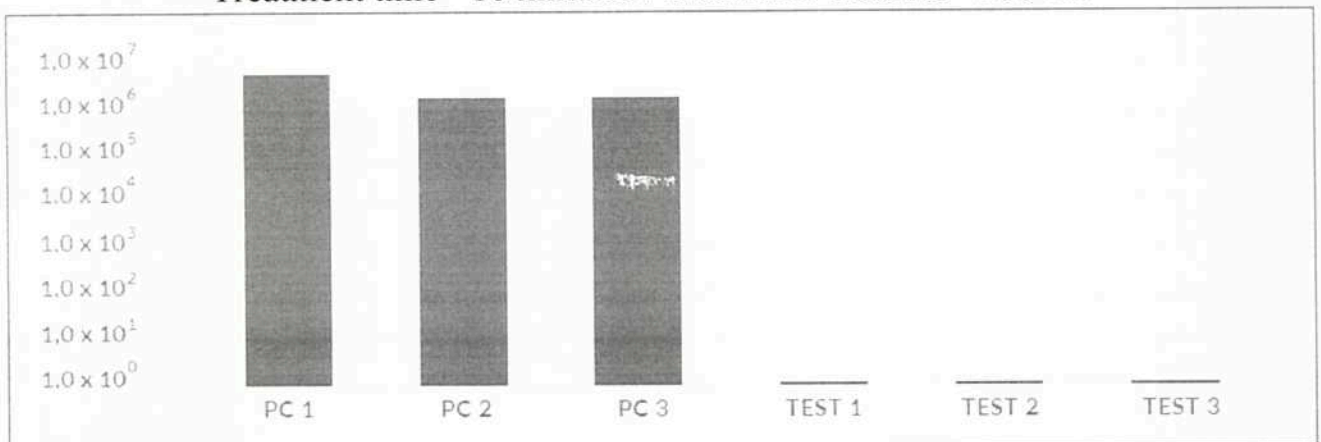
***Pseudomonas aeruginosa* (ATCC9027)**

Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	<1	<1	0	6.58
Test 2	<1			
Test 3	<1			
PC-1	7.20 x 10 ⁶	3.79 x 10 ⁶	6.58	
PC-2	2.06 x 10 ⁶			
PC-3	2.10 x 10 ⁶			
Inoculum size	1.43 x 10 ⁹ CFU/ml			

***Pseudomonas aeruginosa* (ATCC9027)**

Treatment time - 10 minutes / Treatment distance - 200 cm



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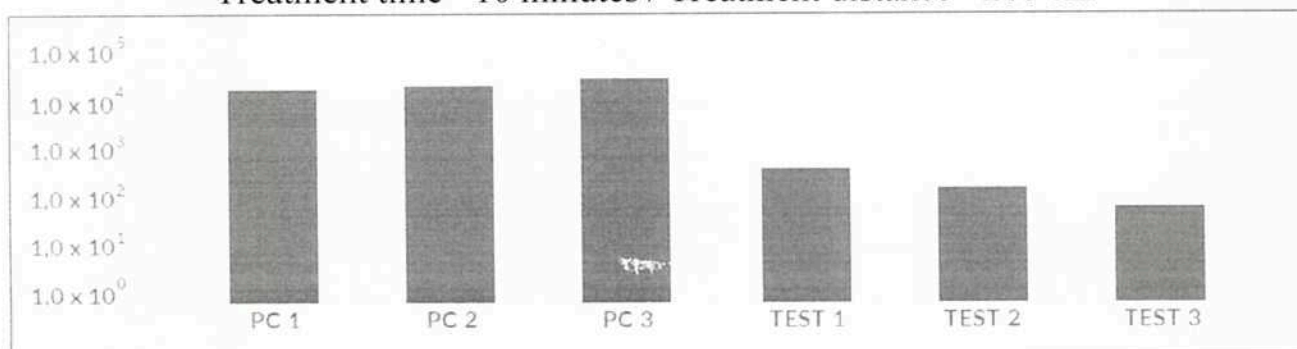
***Clostridium difficile* (a hospital strain)**

Treatment time - 10 minutes / Treatment distance - 200 cm

Plate ID	CFU/sample	Average CFU/sample	Log	Log reduction
Test 1	550	285	2.45	2.04
Test 2	220			
Test 3	86			
PC-1	2.50 x 10 ⁴	3.10 x 10 ⁴	4.82	
PC-2	2.80 x 10 ⁴			
PC-3	4.00 x 10 ⁴			
Inoculum size	3.20 x 10 ⁶ CFU/ml			

***Clostridium difficile* (a hospital strain)**

Treatment time - 10 minutes / Treatment distance - 200 cm



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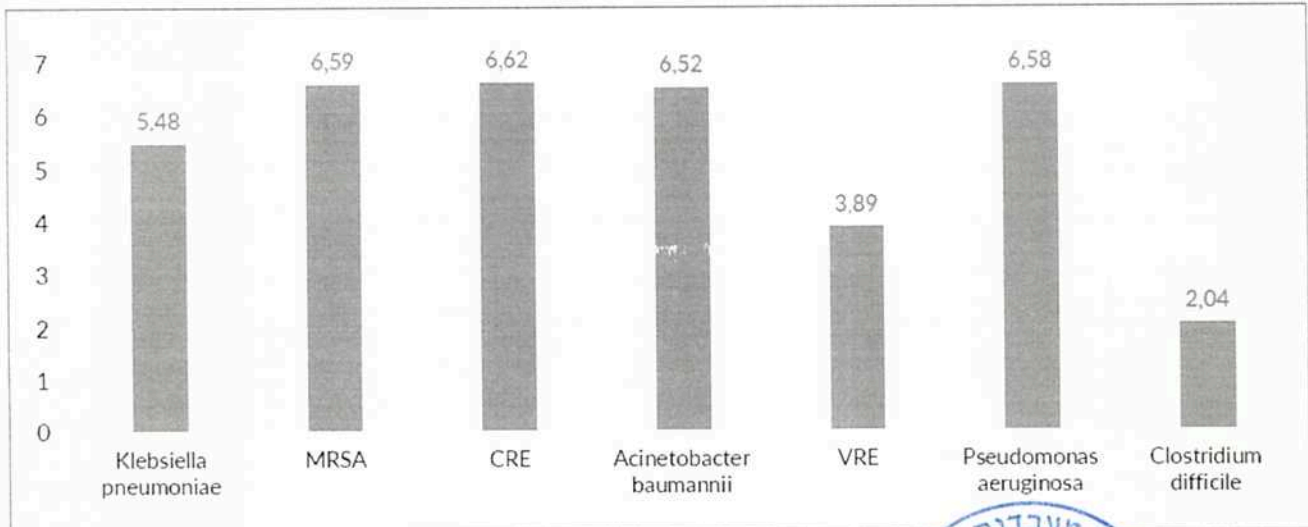
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Summary results

Total Log reduction for each microorganism

Treatment time - 10 minutes / Treatment distance - 200 cm



Examined by Naira Gortsunian. Ph.D. 

Confirmed by Helena Ashkenazi .Ph.D. Lab.Manager: 



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***End of certificate of analysis ***