



ISO 21702:2019

T.C. SAĞLIK BAKANLIĞI
HALK SAĞLIĞI GENEL MÜDÜRLÜĞÜ
Çevre Sağlığı Dairesi Başkanlığı
Yetkili Laboratuvar

Measurement of antiviral activity on plastics and other non-porous surfaces

Test Results Report



This report was prepared by
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for

SMART PAINT MANUFACTURING SDN. BHD.

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1. TEST INFORMATION

Manufacturer	: SMART PAINT MANUFACTURING SDN. BHD.
Product(s)	: Smart Eco – Medi Safeguard
Storage Conditions	: Room temperature
Sample Code	: COV-21-0327
Sample Acceptance Date	: 22.10.2021
Study Period	: 29.11.2021-03.12.2021
Test Name	: Antiviral efficacy test for the product of Smart Eco – Medi Safeguard
Test Method	: ISO 21702:2019- Measurement of antiviral activity on plastics and other non-porous surfaces
Control Test Sample	: Control surfaces without antimicrobial coating
Virus (es)	: SARS-CoV-2 (COVID-19) Clinical Isolate (GenBank: MT955161.1)
Contact Time	: 6, 12 and 24 Hour
Test Temperature	: 24 °C ± 1 °C
Virus-Cell Incubation °C	: 37 °C ± 1 °C, 5 % CO ₂

2. TEST METHOD

Stock cultures of SARS-CoV-2 (COVID-19) Clinical Isolate (GenBank: MT955161.1) were prepared using Vero E6 cell line cultured in DMEM-10 (Dulbecco's Minimum Essential Medium containing 10% FBS (fetal bovine serum), penicillin / streptomycin / Amp.B).

In each experiment, 9 of Smart Eco – Medi Safeguard Test samples (treated) of 50 mm x 50 mm dimensions were used, while 12 of the Reference control samples (untreated) of the same size were used. Three samples of each the treated and untreated control samples were used for cytotoxicity and neutralization tests, and 3 of untreated control surfaces with the virus inoculum were processes at t0 time. The others were inoculated with 0.4 ml of stock virus and left for the exposure time of 6-12-24 hours at 24°C ± 1°C. At the end of the exposure time, a harvest was obtained by washing each samples with 10 ml of DMEM-10. Next, log dilutions of harvest obtained from the samples were transferred to 96-well tissue culture plates containing cells and incubated at 37 °C ± 1 °C, 5% CO₂ incubator. After 4 days of incubation, cytopathic effect was evaluated under inverted microscope and the virus TCID₅₀ titer recovered was calculated according to the Spearman-Karber formula. Virucidal (virus killing) activity was calculated in terms of Log and % activity by comparing the average TCID₅₀ value of control samples with the mean TCID₅₀ value of test samples.

3. SUMMARY TEST RESULT:

Compared to the untreated control surfaces, Smart Eco – Medi Safeguard treated surfaces killed SARS-CoV-2 virus at rate of > 99.99 % within 6 hours.

Compared to the untreated control surfaces, Smart Eco – Medi Safeguard treated surfaces killed SARS-CoV-2 virus at rate of > 99.99 % within 12 hours.

Compared to the untreated control surfaces, Smart Eco – Medi Safeguard treated surfaces killed SARS-CoV-2 virus at rate of > 99.99 % within 24 hours.

4. RESULTS

4.1. Summary of the test results obtained with Smart Eco – Medi Safeguard treated and untreated control surfaces subjected to SARS-CoV-2 (COVID-19) virus

TEST	Test Material	(Log TCID ₅₀)		Verification	
		Result	Mean	Results	
Virus titration	Stock virus	7.75	-	OK	
Cytotoxicity	Control 1	0.5	0.5	OK	
	Control 2	0.5		OK	
	Control 3	0.5		OK	
	Test	0.5	0.5	OK	
	Test	0.5		OK	
	Test	0.5		OK	
Neutralization Efficacy Control (interference)	Control 1	5,25	5,17	OK	
	Control 2	5.13		OK	
	Control 3	5.13		OK	
	Negative Control	5,38	5,50	OK	
	Negative Control	5,50		OK	
	Negative Control	5,63		OK	
	Test 1	5.00	4.96	Difference <0,5 OK	
	Test 2	5.00			
	Test 3	4,88			
t0 hour virus infectivity test	Control 1	5,75	5,79	OK	
	Control 2	5.88			
	Control 3	5,75			
Virucidal Test (t6 Hours)	Control 1	4,88	5.25	R= Ct6-Ct0	R=4.75 (>99.99%)
	Control 2	5.38		R=-0,54	
	Control 3	5.50			
	Test 1	0.50	0.50	R= Tt6-Ct0	
	Test 2	0.50		R=-5.29	
	Test 3	0.50			

TEST	Test Material	(Log TCID ₅₀)		Verification	
		Result	Mean	Results	
Virus titration	Stock virus	7.75	-	OK	
Cytotoxicity	Control 1	0.5	0.5	OK	
	Control 2	0.5		OK	
	Control 3	0.5		OK	
	Test	0.5	0.5	OK	
	Test	0.5		OK	
	Test	0.5		OK	
Neutralization Efficacy Control (interference)	Control 1	5,25	5,17	OK	
	Control 2	5.13		OK	
	Control 3	5.13		OK	
	Negative Control	5,38	5,50	OK	
	Negative Control	5,50		OK	
	Negative Control	5,63		OK	
	Test 1	5.00	4.96	Difference <0,5 OK	
	Test 2	5.00			
	Test 3	4,88			
t0 hour virus infectivity test	Control 1	5,75	5,79	OK	
	Control 2	5.88			
	Control 3	5,75			
Virucidal Test (t12 Hours)	Control 1	5,38	5.04	R= Ct12-Ct0 R=-0.75 R=4.54 (>99.99%)	
	Control 2	4,75			
	Control 3	5.00			
	Test 1	0.50	0.50	R= Tt12-Ct0 R=-5.29	
	Test 2	0.50			
	Test 3	0.50			

4.2.1. Smart Eco – Medi Safeguard - SARS-CoV-2 (COVID-19) Clinical Isolate (GenBank: MT955161.1)

Raw Data

TEST	Material	Log dilution- cpe evaluation						
		-1	-2	-3	-4	-5	-6	-7
Virus Titration	Stock Virus	44444444	44444444	44444444	44444444	44444444	4334244	0400000
t0 infectivity dose	Control 1	4444	4444	4444	4444	0030	0000	
		4444	4444	4444	4444	2000	0000	
	Control 2	4444	4444	4444	4442	0404	0000	
		4444	4444	4444	4444	0300	0000	
	Control 3	4444	4444	4444	4444	0030	0000	
		4444	4444	4444	4444	4000	0000	
Cytotoxicity	Control 1	0000	0000	0000	-	-	-	-
		0000	0000	0000	-	-	-	-
	Control 2	0000	0000	0000	-	-	-	-
		0000	0000	0000	-	-	-	-
	Control 3	0000	0000	0000	-	-	-	-
		0000	0000	0000	-	-	-	-
	Test 1	0000	0000	0000	-	-	-	-
		0000	0000	0000	-	-	-	-
		0000	0000	0000	-	-	-	-
Test 2	0000	0000	0000	-	-	-	-	
	0000	0000	0000	-	-	-	-	
	0000	0000	0000	-	-	-	-	
Test 3	0000	0000	0000	-	-	-	-	
	0000	0000	0000	-	-	-	-	
	0000	0000	0000	-	-	-	-	
Neutralization (interference)	Control 1	4444	4444	4444	4300	0000	0000	-
		4444	4444	4444	3444	0000	0000	-
	Control 2	4444	4444	4444	0343	0000	0000	-
		4444	4444	4444	4023	0000	0000	-
	Control 3	4444	4444	4444	4043	0000	0000	-
		4444	4444	4444	4400	0000	0000	-
	Test 1	4444	4444	4444	0034	0000	0000	-
		4444	4444	4444	0330	0000	0000	-
		4444	4444	4444	4044	0000	0000	-
	Test 2	4444	4444	4444	3000	0000	0000	-
		4444	4444	4444	0034	0000	0000	-
		4444	4444	4444	0040	0000	0000	-
	Negative Interference	4444	4444	4444	0344	0000	0000	-
4444		4444	4444	4444	0000	0000	-	
4444		4444	4444	0444	0030	0000	-	
4444		4444	4444	4444	0000	0000	-	
Negative Interference	4444	4444	4444	4404	0002	0000	-	
	4444	4444	4444	4444	0400	0000	-	
	4444	4444	4444	4444	4401	0000	-	
	4444	4444	4444	4444	4401	0000	-	
T6 Hours	Control 1	4444	4444	4444	0000	0000	0000	-
		4444	4444	4444	4401	0000	0000	-
	Control 2	4444	4444	4444	0440	0023	0000	-
		4444	4444	4444	4302	0000	0000	-
	Control 3	4444	4444	4444	4444	0000	0000	-
		4444	4444	4444	4444	0000	0000	-
	Test 1	0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
Test 2	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
Test 3	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
T12 Hours	Control 1	4444	4444	4444	0444	0000	0000	-
		4444	4444	4444	4444	0000	0000	-
	Control 2	4444	4444	4444	0400	0000	0000	-
		4444	4444	4444	4000	0000	0000	-
	Control 3	4444	4444	4444	0000	0000	0000	-
		4444	4444	4444	3424	0000	0000	-
	Test 1	0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
Test 2	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
Test 3	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
T24 Hours	Control 1	4444	4444	4444	0034	0000	0000	-
		4444	4444	4444	0400	0000	0000	-
	Control 2	4444	4444	4444	0000	0000	0000	-
		4444	4444	4444	3020	0000	0000	-
	Control 3	4444	4444	4444	0440	0000	0000	-
		4444	4444	4444	3000	0000	0000	-
	Test 1	0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
		0000	0000	0000	0000	0000	0000	-
Test 2	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
Test 3	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	
	0000	0000	0000	0000	0000	0000	-	

