



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
ANTİMİKROP AR-GE ve BİYOSİDAL ANALİZ MERKEZİ
Nasuh Akar Mah. Süleyman Hacıabdulloğlu Cad.
No: 37/1 Çankaya/Ankara

for

SMART PAINT MANUFACTURING SDN. BHD.

*This report cannot be partially copied and reproduced without the written permission of the laboratory, and cannot be used outside the relevant institutions.
Unsigned reports are invalid.*

*This report is only valid for the sample whose information is above (delivered to our laboratory).
Our laboratory does not perform the sampling process, and our laboratory is not responsible for errors caused by sampling or problems that may occur due to the sample not representing the whole.
This report cannot be used for advertising purposes.
(*This experiment is not within the scope of accreditation.*

Customer : SMART PAINT MANUFACTURING SDN. BHD.

Contact : SIEW KOR SHIN s.siew@smart-paints.com

Address : 9&11, JALAN INDAH GEMILANG 5, TAMAN PERINDUSTRIAN
GEMILANG, 81800 ULU TIRAM, JOHOR. MALAYSIA

Report Date: 15.12.2021

Report No : R-21-0328

Prof. Dr. Murat ERTÜRK
Responsible Manager

Bio. Ceren ÖZKAN
Quality Assurance

ANTİMİKROP ANTİMİKROBİYAL MÜD. LAB.
AR-GE MÜH. VE DANIŞMANLIK SAN. TİC. LTD. ŞTİ
Nasuh Akar Mah. Süleyman Hacıabdulloğlu Cad. No:37/1
Çankaya / ANKARA

Tic. Sic. No: 070 031 8715 Mersis No:007003187150001

0
1521327

1. TEST INFORMATION

Manufacturer : SMART PAINT MANUFACTURING SDN. BHD.
Product(s) : Smart Eco – Mediglo
Storage Conditions : Room temperature
Sample Code : COV-21-0328
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 – Mediglo
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 % CO₂

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 – Mediglo 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 – Mediglo treated surfaces killed SARS-CoV-2 virus at rate of 99.76 % within 6 hours.

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

Compared to the untreated control surfaces, Smart Eco – Mediglo 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 – Mediglo 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	4,88	4,88	Difference <0,5	
	Test 2	4,88		OK	
	Test 3	4,88		OK	
t0 hour virus infectivity test	Control 1	5,75	5,79	OK	
	Control 2	5.88		OK	
	Control 3	5,75		OK	
Virucidal Test (t6 Hours)	Control 1	4,88	5.25	R= Ct6-Ct0	R=2,63 (99.76%)
	Control 2	5.38		R=-0,54	
	Control 3	5.50			
	Test 1	3,25	2,62	R= Tt6-Ct0	
	Test 2	2,88		R=-3,17	
	Test 3	1,75			

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	4,88	4.88	Difference <0,5	
	Test 2	4,88		OK	
	Test 3	4,88		OK	
t0 hour virus infectivity test	Control 1	5,75	5,79	OK	
	Control 2	5.88		OK	
	Control 3	5,75		OK	
Virucidal Test (t12 Hours)	Control 1	5,38	5.04	R= Ct12-Ct0	R=4.50 (>99.99%)
	Control 2	4,75		R=-0.75	
	Control 3	5.00			
	Test 1	0.50	0.54	R= Tt12-Ct0	
	Test 2	0.63		R=-5.25	
	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	4,88	4.88	Difference <0,5	
	Test 2	4,88		OK	
	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 (t24 Hours)	Control 1	4,88	4,83	R= Ct24-Ct0	R=4.33 (>99.99%)
	Control 2	4,75		R=-0.96	
	Control 3	4,88			
	Test 1	0.50	0.50	R= Tt24-Ct0	
	Test 2	0.50		R=-5.29	
	Test 3	0.50			

4.2.1. Smart Eco – Mediglo - 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	43344244	04004000
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	-	-	-	-	
Test 2	0000	0000	0000	-	-	-	-	
	0000	0000	0000	-	-	-	-	
Test 3	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	0043	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	0440	0000	0000	
		4444	4444	4444	0004	0000	0000	
	Test 2	4444	4444	4444	4004	0000	0000	
		4444	4444	4444	4000	0000	0000	
	Test 3	4444	4444	4444	0444	0000	0000	
		4444	4444	4444	0000	0000	0000	
Negative Interference	4444	4444	4444	0344	0000	0000		
	4444	4444	4444	4444	0000	0000		
Negative Interference	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		
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	4444	4044	0000	0000	0000	0000		
	4444	1400	0004	0000	0000	0000		
Test 2	4444	4000	0000	0000	0000	0000		
	4444	0440	0000	0000	0000	0000		
Test 3	4444	0320	0000	0000	0000	0000		
	4044	0300	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		
Test 2	0000	0000	0000	0000	0000	0000		
	4000	0000	0000	0000	0000	0000		
Test 3	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		
Test 2	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		

ANTİMİKROB ANTİMİKROBİYAL MAD. LAB.
 BİYOLOJİK MÜH. VE DİYALİZ KİMYASAL İNTELEKTÜEL
 Çankaya / ANKARA
 Mersis No: 070 031 8715 Mersis No: 070031871500015

№ 2.1327

5. Archive:

All original raw data obtained specifically for this study will be archived. This original data includes, but is not limited to, the following information: Notebooks, data sheets and calculations, all handwritten raw data and controlled copy of the final work report.

6. Keeping Test Material:-

Remaining test and control surfaces will be stored at room temperature for 3 months as the witness samples used during the period of this study.

Appendix-1

Following photographs showing the samples of laboratory work are included on the request made by the customer:

Fig. 1. Treated and Untreated surfaces each inoculated with SARS-CoV-2 virus in sterile petri dishes. (Note that unlike the treated surfaces the inoculum on the untreated surfaces did not spread.)



Fig. 2. Sars-CoV-2 virus inoculated surfaces covered with 40x40 mm film



THIS REPORT CONSISTS OF 7 PAGES, INCLUDING THE FRONT PAGE.

ANTİMİKROBİYAL MAD. FAB.
KİMYA MÜH. VE DAN. HİZ. KİMYA SAN. TİC. LTD. ŞTİ
Sıhhiye Akad. Mah. Süleyman Hacıabulloğlu Cad. No 377
Çankaya / ANKARA
Tic. Sic. No: 070 031 8715 Mersis No: 0070031871500014

№ 2 1 3 2 7