



T.C. SAĞLIK BAKANLIĞI
HALK SAĞLIĞI GENEL MÜDÜRLÜĞÜ
Çevre Sağlık Daire Başkanlığı
Yetkili Laboratuvar



ISO 21702:2019

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
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No: 37/1 Çankaya/Ankara

for
SMART PAINT MANUFACTURING SDN. BHD.

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Customer : SMART PAINT MANUFACTURING SDN. BHD.
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Report Date: 15.12.2021
Report No : R-21-0327

Prof. Dr. Murat ERTÜRK
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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) | : <i>SARS-CoV-2 (COVID-19) Clinical Isolate (GenBank: MT955161.1)</i> |
| 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 $24^{\circ}\text{C} \pm 1^{\circ}\text{C}$. 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 $37^{\circ}\text{C} \pm 1^{\circ}\text{C}$, 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.

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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 Results |
|--|------------------|---------------------------|------|--|
| | | Result | Mean | |
| 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=-0,54 R=4.75 (>99.99%) |
| | Control 2 | 5.38 | | |
| | Control 3 | 5.50 | | |
| | Test 1 | 0.50 | 0.50 | R= Tt6-Ct0 R=-5.29 |
| | Test 2 | 0.50 | | |
| | Test 3 | 0.50 | | |

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| TEST | Test Material | (Log TCID ₅₀) | | Verification Results |
|--|------------------|---------------------------|------|---|
| | | Result | Mean | |
| 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 | | |

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| TEST | Test Material | (Log TCID ₅₀) | | Verification Results |
|--|------------------|---------------------------|------|-------------------------------------|
| | | Result | Mean | |
| 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 (t24 Hours) | Control 1 | 4,88 | 4,83 | R= Ct24-Ct0 R=-0.96 R=4.33 |
| | Control 2 | 4,75 | | |
| | Control 3 | 4,88 | | |
| | Test 1 | 0.50 | 0.50 | R= Tt24-Ct0 R=-5.29 (>99.99%) |
| | Test 2 | 0.50 | | |
| | Test 3 | 0.50 | | |

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**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 | 43344244 | 04004000 |
| t0 infectivity dose | Control 1 | 4444 4444 | 4444 4444 | 4444 4444 | 4444 4444 | 0030 2000 | 0000 0000 | |
| | Control 2 | 4444 4444 | 4444 4444 | 4444 4444 | 4442 4444 | 0404 0300 | 0000 0000 | |
| | Control 3 | 4444 4444 | 4444 4444 | 4444 4444 | 4444 4444 | 0030 4000 | 0000 0000 | |
| | Control 1 | 0000 0000 | 0000 0000 | | - | - | - | - |
| | Control 2 | 0000 0000 | 0000 0000 | | - | - | - | - |
| | Control 3 | 0000 0000 | 0000 0000 | | - | - | - | - |
| Cytotoxicity | Test 1 | 0000 0000 | 0000 0000 | | - | - | - | - |
| | Test 2 | 0000 0000 | 0000 0000 | | - | - | - | - |
| | Test 3 | 0000 0000 | 0000 0000 | | - | - | - | - |
| | Control 1 | 4444 4444 | 4444 4444 | 4300 3444 | 0000 0000 | 0000 0000 | | - |
| | Control 2 | 4444 4444 | 4444 4444 | 0043 4023 | 0000 0000 | 0000 0000 | | - |
| | Control 3 | 4444 4444 | 4444 4444 | 4043 4400 | 0000 0000 | 0000 0000 | | - |
| Neutralization (interference) | Test 1 | 4444 4444 | 4444 4444 | 0034 0330 | 0000 0000 | 0000 0000 | | - |
| | Test 2 | 4444 4444 | 4444 4444 | 4044 3000 | 0000 0000 | 0000 0000 | | - |
| | Test 3 | 4444 4444 | 4444 4444 | 0034 0040 | 0000 0000 | 0000 0000 | | - |
| | Negative Interference | 4444 4444 | 4444 4444 | 0344 4444 | 0000 0000 | 0000 0000 | | - |
| | Negative Interference | 4444 4444 | 4444 4444 | 0444 4444 | 0030 0000 | 0000 0000 | | - |
| | Negative Interference | 4444 4444 | 4444 4444 | 4404 4444 | 0002 0400 | 0000 0000 | | - |
| T6 Hours | Control 1 | 4444 4444 | 4444 4444 | 0000 4401 | 0000 0000 | 0000 0000 | | - |
| | Control 2 | 4444 4444 | 4444 4444 | 0440 4302 | 0023 0000 | 0000 0000 | | - |
| | Control 3 | 4444 4444 | 4444 4444 | 4444 4444 | 0000 0000 | 0000 0000 | | - |
| | Test 1 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 2 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 3 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| T12 Hours | Control 1 | 4444 4444 | 4444 4444 | 0444 4444 | 0000 0000 | 0000 0000 | | - |
| | Control 2 | 4444 4444 | 4444 4444 | 0400 4000 | 0000 0000 | 0000 0000 | | - |
| | Control 3 | 4444 4444 | 4444 4444 | 0000 3424 | 0000 0000 | 0000 0000 | | - |
| | Test 1 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 2 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 3 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| T24 Hours | Control 1 | 4444 4444 | 4444 4444 | 0034 0400 | 0000 0000 | 0000 0000 | | - |
| | Control 2 | 4444 4444 | 4444 4444 | 0000 3020 | 0000 0000 | 0000 0000 | | - |
| | Control 3 | 4444 4444 | 4444 4444 | 0440 3000 | 0000 0000 | 0000 0000 | | - |
| | Test 1 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 2 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |
| | Test 3 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 | | - |

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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.

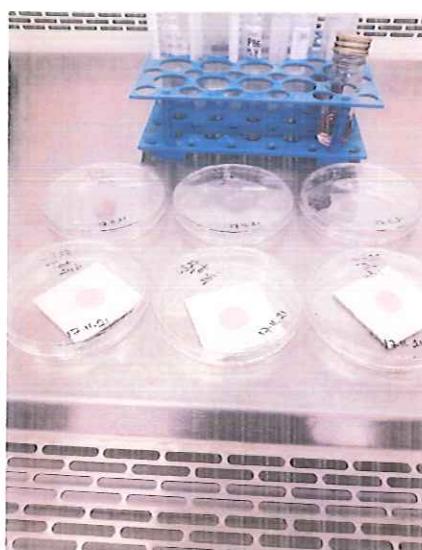
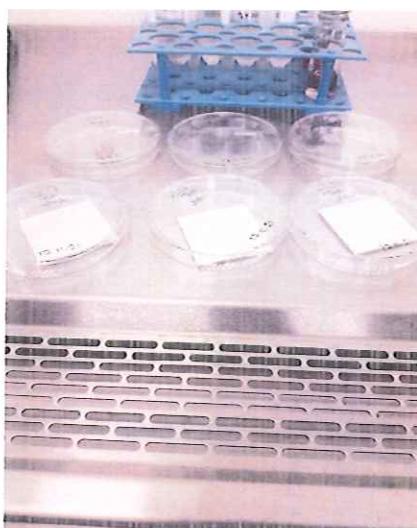


Fig. 2. Sars-CoV-2 virus inoculated surfaces covered with 40x40 mm film



THIS REPORT CONSISTS OF 7 PAGES, INCLUDING THE FRONT PAGE

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