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Report on:

Testing of the antiviral activity of Touch antimicrobial coating following a method based on BS ISO 21702:2019

Work performed by Campden BRI (Chipping Campden) Limited
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Campden BRI (Chipping Campden) Limited – part of the Campden BRI group
Station Road ◆ Chipping Campden ◆ Gloucestershire ◆ GL55 6LD ◆ UK
Providing services under an ISO 9001 registered quality management system

1 SUMMARY

An antimicrobial coating, Touch Antimicrobial (EPC) coating was tested to determine its virucidal activity towards enveloped viruses (e.g. coronaviruses, influenza) using the surrogate virus phi6 *Pseudomonas syringae* phage.

The test methodology used to determine antiviral activity was based on BS ISO 21702:2019.

Results showed that under the test conditions, a 4.2-log mean reduction in infectious viral titre of Phi6 was achieved on Touch antimicrobial (EPC) coated surfaces after 2 hours' contact time when compared with uncoated stainless-steel control surfaces. After 4 hours' contact time, a mean log reduction of 5.32 logs in Phi6 was observed on coated surfaces.

2 BACKGROUND

Bromoco International Ltd requested that Campden BRI carry out a quantitative surface test to evaluate for antiviral activity of their surface coating, Touch Antimicrobial (EPC), towards enveloped viruses when applied to stainless steel surfaces.

The method used in this trial is based on BS ISO 21702:2019 – Measurement of antiviral activity on plastics and other non-porous surfaces and varies from the standard method with regard to the test microorganisms assessed and the contact time applied (ISO 21072 is based on a 24h contact time). The virus used in the trial is Phi6 bacteriophage, an enveloped RNA virus which is used as a surrogate for coronavirus and influenza.

This trial is designed to assess efficacy of the product against the Phi 6 after 2- and 4-hours exposure to coated surfaces. No log reduction target is identified in BS ISO 21702, but a 4-log reduction is commonly targeted by surface disinfectant treatments (e.g. BS EN 16777:2019) and may be considered a suitable target reduction.

3 SAMPLES/MATERIALS

6 stainless steel surfaces measuring 5x5cm were coated with Touch Antimicrobial (EPC) film and provided by Bromoco International for use in the study.

9 uncoated stainless steel surfaces were provided by Campden BRI and used as control surfaces.

4 METHODS

4.1 Product

The details of the product tested are shown below along with the sample code.

Table 1 PRODUCT DETAILS

Campden BRI Sample Code		DT221	
Name of the Product	Touch Antimicrobial (EPC) coating	Product Batch Code	Not provided
Product Manufacturer		Bromoco International Ltd.	
Date of product arrival at Campden BRI		16 July 2020	
Surface material and dimensions		Stainless steel, 5x5cm	
Storage conditions of product		Dark, ambient temperature.	
Test temperature (°C)		25	
Contact time		2 hours, 4 hours	

4.2 Organisms

Table 2 Viruses tested and their host bacteria details

Virus Host	Culture code	Passage number
Phi6 *P.syringae* bacteriophage *Pseudomonas syringae*	DSM 21518 DSM 21482	2

Stock solutions of the Phi6 phage were produced and kept at 5°C

4.3 Microbiological Analysis

Inoculated test samples of product were enumerated for levels of the bacteriophage using the methods detailed in Table 3. Dilutions of the samples were carried out within 15 minutes of the test.

Table 3: Microbiological tests

Organism	**Test method**	**Method Summary***
MS2 enumeration	Plaque assay (Dawson *et al.* 2005) amended*	Plaque assay with NZCYM 37°C for 18 - 24h
Phi6 enumeration	Plaque assay (Dawson *et al.* 2005) amended**	Plaque assay with NZCYM 25°C for 18 – 24h

*. the plaque assay followed the method quoted, with the following amendment, a 0.2% Maltose supplement was added to the NZCYM top agar.

** the plaque assay followed the method quoted, with the following amendment, incubation at 25 ± 1°C

5 RESULTS

5.1 Verification of test

- All controls and validations were within the basic limits of the test.
- The variability of the log PFU/cm^2 counts of the control surfaces was within limits (max count – min count/mean count ≤0.2)
- The log PFU/cm^2 counts recovered from untreated test surfaces after 2 and 4 hours' incubation were greater than the stated minimum level of 6.2x10^2 PFU/ cm^2.

Table 4. Antiviral activity results for phi 6 bacteriophage

Exposure time (hours)	Replicate	Log PFU/cm^2 count		Reduction*
		Control	Test	
0	1	6.35	-	-
	2	6.30	-	-
	3	6.35	-	-
	mean	**6.34**	-	-
2	1	6.03	2.46	**4.20**
	2	5.62	0.80	
	3	5.79	1.57	
	mean	**5.81**	**1.61**	
4	1	5.79	-0.20	**5.32**
	2	5.55	0.18	
	3	4.88	0.27	
	mean	**5.40**	**0.08**	

*Reduction is calculated as the difference between the mean log PFU/cm^2 counts from the control and surfaces at each contact time.

6 DISCUSSION/CONCLUSION

All controls and acceptance criteria were verified.

The product, Touch Antimicrobial (EPC), showed antiviral activity towards enveloped viruses (e.g. coronavirus, influenza) when tested with a method based on BS ISO 21702:2019 using phi6 bacteriophage as a surrogate virus under the selected test conditions (25°C, 2 hours and 4 hours contact time). The following mean log reductions were observed after each contact time:

2 hours: 4.20 logs
4 hours: 5.32 logs

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