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

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Scope

The standard describes the method for measuring antiviral activity on plastics and other non-porous surfaces of antiviral-treated products against specified viruses.

Outline of Test Method (Obligatory Test Conditions)

A test suspension of is inoculated onto a test plastic surface and covered with a cover film. The surface is maintained at a specified temperature for a defined period. At the end of the contact time media is added to the surface of the plastic, and the surface is washed over to recover any remaining organism. The number of surviving organisms which can be recovered from the surface is determined quantitatively taking in to account the test surface size.

Feline coronavirus comparison

	Feline coronavirus	**COVID-19 (SARS-CoV2)**
Realm	Riboviria	Riboviria
Order	Nidovirales	Nidovirales
Family	Coronaviridae	Coronaviridae
Genus	Alphacoronavirus	Betacoronavirus
Species	Alphacoronavirus 1	COVID-19

The members of the family Coronaviridae are enveloped and have a positive sense RNA genome. Coronaviruses have a distinct morphology with an outer 'corona' of embedded envelope spikes. These viruses cause a broad spectrum of animal and human disease.

Andrew M.Q. King, Michael J. Adams, Eric B. Carstens, and Elliot J. Lefkowitz 'Virus Taxonomy, Classification and Nomenclature of Viruses, Ninth Report of the International Committee on Taxonomy of Viruses' 2012 ISBN 9780123846846

Test information		Deviation
Name of Product	Hale Defence +	
Batch Number & Expiry Date	N/S	
Date of Delivery	05/05/2020	
Period of Analysis	22/05/2020-28/05/2020	
Storage Conditions	Ambient	
Appearance of the Product	White paint	
Test Concentrations	As supplied	
Test Temperature	20°C ± 1°C	
Temperature of Incubation	37°C ±1°C	
Identification of the Viral Strains:	Feline coronavirus, Strain Munich	*1*
Contact Times	2 hours	
Stability and Appearance During Test	No Change Observed	

Deviations from Standard Method

1 - The test surface was challenged against Feline coronavirus.
2 – No control material was supplied so samples were compared to glass slides.

The test sample and mixed thoroughly before painting the product onto glass slides and allowing to dry before testing.

Calculation notes
All recovery and log reduction calculations were performed for TCID50 rather than plaque assays. Cytotoxicity of the test product was performed through adding 10ml of culture media and washing the surface, this solution was then added to cells in serial dilution and cytotoxicity calculated by TCID50. Log recovery per surface is calculated and an average reduction given.

Test Result Summary

The test product has shown a log reduction of 1.23 (94.11%) against Feline coronavirus.

See page 2 for acceptance criteria and raw data tables below for complete test results.

Summary

Log recovery						
	1	**2**	**3**	**Average**	**Log recovered per surface**	
Test	3.38	3.29	3.04	3.24	*At*	5.24
Control *(t)*	4.29	4.46	4.66	4.47	*Ut*	6.47
Control *(0)*	5.17	4.92	5.17	5.08	*Uo*	7.08

Antiviral activity per surface *(R)*
1.23
R=(Ut-Uo)-(At-Uo)

Controls

Cytotoxicity (Test)	Negative
Cytotoxicty (Control)	Negative

Inactivation control				
	Log recovered		**Difference**	**Valid**
Test	*St*	4	0.08	Valid
Control (Untreated)	*Su*	4.04	0.04	Valid
Negative control	*Sn*	4.08	N/A	Valid

KEY

CPE	Cytopathic effect
Counts	0-4 indicating degree of cytopathic effect 0 = No effect, 1 = 25% CPE, 2 = 50% CPE, 3 = 75% CPE, 4 = 100% CPE
d	Dilution factor (log)
Sum px	Sum of % CPE from the highest dilution showing 100% CPE to the lowest dilution assessed.
n	Number of dilutions
SD50	Dilution showing 50% of the end point according to Spearman-Kärber method
SE	Standard error
xp	Lowest dilution showing 100% CPE
TCID50	Titre causing 50% of the end point according to Spearman-Kärber

Sn Log of negative control
Su log of untreated control
St Log of test control

At Log of treated test
Ut Log of untreated control at time
Uo Log of untreated control at time 0
R Log reduction