



## SARS-CoV-2 inactivation testing: interim report

<b>Report identifier</b>	HCM/CoV2/032/v1
<b>Report date</b>	16 July 2020
Undertaken by High Containment Microbiology, NIS Laboratories, National Infection Service, Public Health England N.B. This is an interim report and may be updated as further results are obtained	

<b>Product/treatment details</b>	
Product/treatment	VPSS
Manufacturer	E&O Laboratories
Product code	BM1675
Available information on product composition, as supplied	No information available
Manufacturer's recommended ratio of sample to product	No information available

<b>Sample details</b>	
Sample type tested	Tissue culture fluid containing 5% (v/v) foetal calf serum
Virus strain tested	SARS-CoV-2 England 2
Ratio of spiked virus stock to sample matrix	Not applicable; tissue culture fluid used undiluted

<b>Experimental conditions</b>	
Ratio of sample to product tested	1 volume sample to 10 volumes product 1 volume sample to 1 volume product
Contact time/s	30 minutes (1:10) 10 minutes (1:1)
Temperature of incubation	Room temperature

<p>Brief description of tests performed</p>	<p>Triplicate samples were treated with test buffer for indicated contact time/s or mock-treated in triplicate with an equivalent volume of PBS. All samples were then subjected to a purification step to remove cytotoxic buffer components. PBS-treated samples were subjected to the same purification procedure in parallel, as a control for virus recovery.</p> <p><b>Test 1:</b> Purified samples were immediately titrated on Vero E6 cells to establish virus titre. This test is quantitative and reports the titre of virus in each treatment condition in TCID<sub>50</sub> per ml. Reduction in virus titre following treatment is given as the difference between the mean log<sub>10</sub> TCID<sub>50</sub>/ml for treated conditions and the PBS control.</p> <p><b>Test 2:</b> In parallel, purified samples were seeded onto Vero E6 monolayers to amplify any remaining virus over the course of up to four serial passages. Virus amplification over each passage was detected by visual (microscopic) examination of monolayers for cytopathic effect, and confirmed by SARS-CoV-2-specific real-time PCR. This test is qualitative and reports either the presence or absence of virus amplification. This test may detect levels of virus that are below the detection limit of the titration assay (test 1) due to a greater sample plating volume and the opportunity for any virus present to amplify over serial passages.</p>
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<b>Table of results (1 volume sample to 10 volumes product)</b>			
Maximum detectable virus reduction in test 1 (log <sub>10</sub> TCID <sub>50</sub> /ml)			5.2
	<b>Test 1: Virus titration post-treatment</b>		<b>Test 2: Passage of samples in cell culture</b>
	Mean virus titre (log <sub>10</sub> TCID <sub>50</sub> /ml)	Titre reduction (log <sub>10</sub> TCID <sub>50</sub> /ml)	Virus detected/ Virus not detected
PBS-treated	6.9	-	Virus detected (all replicates)
Test buffer-treated (30 minutes)	≤1.7 <sup>†</sup>	≥5.2	Virus detected (2 replicates)

<sup>†</sup>Virus titre in undiluted sample could not be determined due to buffer toxicity

<b>Table of results (1 volume sample to 1 volume product)</b>			
Maximum detectable virus reduction in test 1 (log <sub>10</sub> TCID <sub>50</sub> /ml)			5.1
	<b>Test 1: Virus titration post-treatment</b>		<b>Test 2: Passage of samples in cell culture</b>
	Mean virus titre (log <sub>10</sub> TCID <sub>50</sub> /ml)	Titre reduction (log <sub>10</sub> TCID <sub>50</sub> /ml)	Virus detected/ Virus not detected
PBS-treated	6.8	-	Virus detected (all replicates)
Test buffer-treated (10 minutes)	≤1.7 <sup>†</sup>	≥5.1	Virus detected (1 replicate)

<sup>†</sup>Virus titre in undiluted sample could not be determined due to buffer toxicity

## Interpretation

Test 1: Both conditions tested reduced virus titre to below the limit of detection for test 1. The maximum detectable titre reduction in this test was  $\geq 5.2 \log_{10}$  for 1:10 and  $\geq 5.1 \log_{10}$  for 1:1.

Test 2: Infectious virus was recoverable following serial passage in cell culture from at least one treated sample replicate for each condition, indicating that inactivation by this treatment was incomplete.

Demonstrating complete inactivation is dependent on the starting titre of virus used for testing, and it is likely that complete inactivation could be achieved if samples contained lower levels of infectious virus than those tested here. Conversely, sample treatments that inactivate virus effectively in our testing may fail to inactivate samples containing higher levels of virus than those evaluated in this study.

This test has been performed on tissue culture fluid containing 5% (v/v) foetal calf serum. The effectiveness of this treatment against SARS-CoV-2 may vary when used to inactivate clinical samples or other types of sample matrix. Any results of inactivation testing using other sample matrices will be released as they become available.

**Inactivation reagents should not be assumed to be 100% effective against SARS-CoV-2.**

**Suitability of products and treatments for inactivation of other pathogens has not been evaluated in this study.**

**All COVID-19 laboratory testing workflows must be subjected to suitable and sufficient risk assessment, with consideration given to any inactivation step. Risk assessments should be reviewed regularly as new information on the inactivation of SARS-CoV-2 becomes available.**

**The impact of chosen inactivation method on the sensitivity of subsequent SARS-CoV-2 detection should also be assessed locally.**

## Disclaimer

PHE's evaluations of commercial products and treatments for inactivating SARS-CoV-2 have been carried out primarily for PHE's own internal use and the reports of such evaluations are shared solely for readers information; PHE does not in any way recommend any particular product for virus inactivation; and PHE shall not be responsible for the choice of product or treatment for virus inactivation, and it is the responsibility of the testing laboratory to ensure that any such product or treatment implemented has undergone the necessary verification and validation; and PHE shall not be liable, to the greatest extent possible under any applicable law, for any claim, loss or damage arising out of or connected with use of this and related reports and choice of virus inactivation products or treatments.

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## Summary of revisions

Version 1: New document

Queries regarding this report or HCM inactivation testing should be directed to [HCMgroup@phe.gov.uk](mailto:HCMgroup@phe.gov.uk)

PHE publications gateway number: GW-1464