Introducing *virus*PHIX™

Virus Inactivation and RNA Stabilising Transport Medium

Long term RNA stabilisation at room temperature

Inactivates all tested viruses & most bacteria

Non-toxic, guanidine free formulation

Compatible with most front-end RNA purification kits

Developed and manufactured in the UK

Introduction

*virus*PHIX™ is a novel RNA stabiliser and virus inactivation medium based on technology developed by RNAssist Limited (Cambridge, UK). It has shown to stabilise RNA for up to 1 year at 20°C, and has successfully inactivated all tested viruses and some bacteria to date. Unlike other virus transport mediums, *virus*PHIX™ does not contain guanidine, a highly toxic substance than can produce hydrogen cyanide when mixed with household cleaning products such as bleach. *virus*PHIX™ is a completely non-toxic, non-volatile reagent that can be used safely in a home testing environment and shipped for PCR analysis. The *virus*PHIX™ range of products are manufactured and sold worldwide by Rapid Labs Limited (Colchester, UK). With over 200 evaluators around the world, *virus*PHIX™ is a popular choice for RNA stabilisation thanks to its compatibility with most front-end RNA purification kits.

Viruses/bacteria inactivated with *virus*PHIX™		
SARS-CoV-2	**Mtb***	**BVDV**
Zika	**Vaccinia**	***Staph. a***
Dengue	**FIV**	***P. aeruginosa***
Influenza A	**Hep B (duck)**	**Listeria**

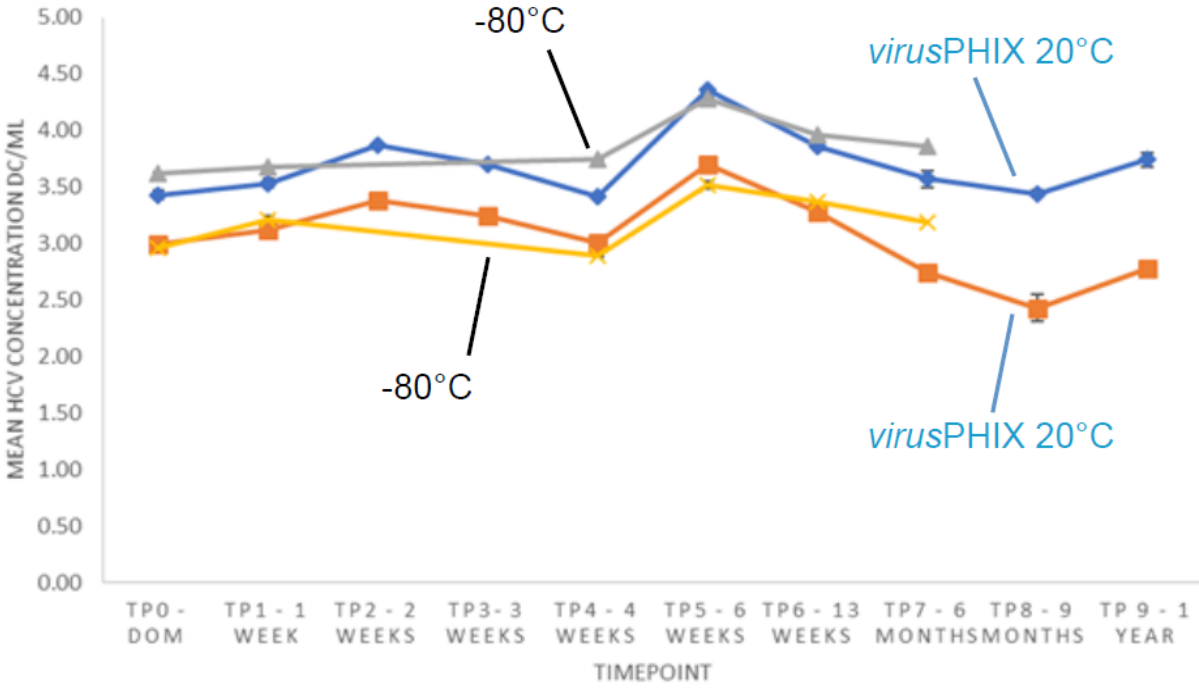
*Clinical *Mycobacterium tuberculosis*

Please contact us to view the full list of inactivated viruses and bacteria

> We have been able to move our dengue research from a CL3 to CL2 facility thanks to *virus*PHIX™, improving the safety of our research and saving a lot of time and resources in the process.
> - Dr SM, Pasteur Institute, Paris

> We were able to fix our samples on collection in West Africa and safely transport them to Cambridge. Despite delays in the shipping where samples where delayed at Dubai for at least a day at 45˚C, nevertheless the samples retained an excellent level of quality.
> - Dr VL, Sanger Institute, Cambridge

1 Year stability of 2 HCV strains in *virus*PHIX™ at 20˚C, compared with -80˚C storage



Thanks to Shubana Kazi and Alastair Ricketts

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*virus*PHIX+™

The original formulation, recommended for Swab and saliva testing

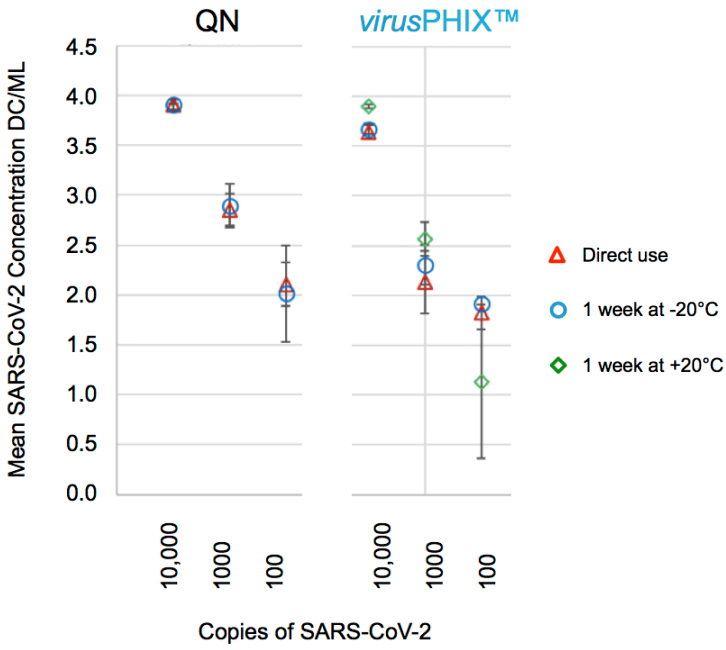
Inactivation in 10 minutes, RNA stabilisation for at least one month

A recent study from the Roslin Institute in Edinburgh, UK concluded that *virus*PHIX+™ inactivates SARS-CoV-2 in as little as 10 minutes when treated at a 1:1 sample to reagent ratio at room temperature. Under these conditions, a 10log6 reduction in SARS-CoV-2 virus titre was recorded. An additional independent study by Qnostics UK demonstrated that stabilises SARS-CoV-2 virus RNA for at least 33 days at 20˚C. Sputum samples spiked with SARS-CoV-2 RNA were analysed over 33 days, and the Ct value was compared with *virus*PHIX+™ treated samples and control (no stabiliser added).

Independent SARS-CoV-2 Inactivation Studies

Treatment	Test 1: Reduction in SARS-CoV-2 virus titre	Test 2: Cell Passage
***virus*PHIX+™, 10 minutes**	**≥6.4 log10**	**Virus not detected**
***virus*PHIX+™, 30 minutes**	**≥7.1 log10**	**Virus not detected**
PBS Control, 10 minutes	**-**	**Virus detected**
PBS Control, 30 minutes	**-**	**Virus detected**

An independent UK organisation evaluated the reduction in virus titre SARS-CoV-2 spiked samples (tissue culture fluid) and presence of SARS-CoV-2 over a series of cell passages. Triplicate samples of tissue culture fluid containing 5% (v/v) foetal calf serum, spiked with SARS-CoV-2 were treated with *virus*PHIX+™ for indicated contact time/s or mock-treated in triplicate with an equivalent volume of PBS. Purified samples were immediately titrated on Vero E6 cells to establish virus titre. Reduction in virus titre following treatment is given as the difference between the mean log10 TCID50/ml for treated conditions and the PBS control (*Test 1*). In parallel, purified samples were seeded onto Vero E6 monolayers to amplify any remaining virus over the course of up to four serial passages. This test is qualitative and reports either the presence or absence of virus amplification (*Test 2*). Please contact us if you wish to view the full study reports.



RT-qPCR Limit of Detection study of SARS-CoV-2 in non-inactivating buffer QN compared with *virus*PHIX™ inactivation buffer

Limit of Detection (LOD) study demonstrating the successful detection of Low (100), Medium (1000) and High (10,000) SARS-CoV-2 copies/ml. In each case SARS-CoV-2 was detected (S-gene) following bioMerieux EasyMag Nuclisens™ RNA purification and RT-qPCR. A comparison of detection sensitivity was made between the inactivating reagent *virus*PHIX™ and the non-inactivating aqueous buffer (QN™). Also shown is the effect of storing SARS-CoV-2 in *virus*PHIX™ for 1-week at either 20˚C (blue circle) or -20˚C (green diamond) compared with no storage direct use (red triangle).

Data kindly provided by Qnostics, Glasgow UK.

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*virus*PHIX-LV™

Suitable for nasopharyngeal swab samples

A lower viscosity formulation, optimised for automated liquid handling platforms (Hamilton, Ortho, Tecan).

Independent SARS-CoV-2 inactivation results

Treatment	Reduction in SARS-CoV-2 virus titre
***virus*PHIX-LV™, 10 minutes**	**≥5.1 log10**
***virus*PHIX-LV™, 30 minutes**	**≥6.0 log10**
PBS Control	**-**

An independent UK organisation evaluated the reduction in virus titre SARS-CoV-2 spiked samples (tissue culture fluid). Samples were treated with *virus*PHIX-LV™ at a 1:10 ratio at room temperature. 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 diluted two-fold to reduce product viscosity and subjected to a purification step to remove cytotoxic buffer components. PBS-treated samples were subjected to the same dilution and purification procedure in parallel. Purified samples were titrated on Vero E6 cells to establish virus titre. This test is quantitative and reports the titre of virus in each treatment condition in TCID50 per ml. Reduction in virus titre following treatment is given as the difference between the mean log10 TCID50/ml for treated conditions and the PBS control. Please contact us if you wish to view the full study reports.

*virus*PHIX-P9™

Suitable for saliva and swab samples

Recommended as an inactivation and RNA stabilisation media for saliva and swabs, especially when it is necessary to add sample directly into an RT-LAMP, LamPORE or RT-PCR assay without RNA purification*. Extensive testing at QCMD has shown that virusPHIX-P9™ is compatible with a variety of SARS-CoV-2 antigenic tests including a wide range of Lateral Flow tests.

**virus*PHIX-P9™ has been demonstrated to be directly compatible with LAMP assays, please contact us for further information.

Independent SARS-CoV-2 inactivation results

Treatment	Reduction in SARS-CoV-2 virus titre
***virus*PHIX-P9, 10 minutes**	**≥4.4 log10**
virusPHIX-P9, 30 minutes	**≥4.8 log10**
PBS Control	**-**

The same independent tests were performed using *virus*PHIX-P9™ to determine SARS-CoV-2 virus titre following 10 minutes and 30 minutes treatment. Samples were diluted in *virus*PHIX-P9™ at a 1:3 ratio, all other conditions remained the same. Please contact us if you wish to view the full study reports.

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