

TESTING & EFFICACY

CORONAVIRUS (COVID-19) SURROGATE TESTING (AIRBORNE)

PERFORMED BY CAMPDEN BRI (CHIPPING CAMPDEN) LIMITED

Trials were conducted within the Campden BRI aerobiology laboratory to determine the efficacy of HyGenikx towards airborne Phi6 - a recognised SARS-CoV-2 surrogate (the coronavirus that causes COVID-19). Results show the air and surface sanitisation system **removes up to 99.99% of the airborne COVID-19 surrogate in under 3 hours.**

Method Phi6 Pseudomonas syringae phage is an enveloped RNA virus* used as a surrogate for coronavirus and influenza.

Phi6 was nebulised into an aerobiology test chamber to represent heavily contaminated air.

Air samples were then taken every 20 minutes for a period of 3 hours, to determine levels of Phi6 in the air.

This was performed in paired trials – with the HyGenikx unit turned off as a control, and with the HyGenikx unit turned on.

The efficacy of the systems was determined by calculating both log reductions† of the test run compared to the control run and Decimal reduction (D) values, which is the time it takes to achieve a 1-log reduction.

6 sets of trials were completed, and the average was reported as a result.

Results The level of Phi6 in the air decreased in all trials. The D value achieved ranged from between 19 minutes and 60 minutes and the test samples showed log reductions of up to >4.1 (where the levels of virus are no longer detectable) when compared to equivalent control samples. An average of 4 log reduction was reported – **with HyGenikx removing up to 99.99% of the airborne COVID-19 surrogate in under 3 hours.**

Conclusion HyGenikx is effective at reducing airborne RNA viruses, including the SARS-CoV-2 surrogate (the coronavirus that causes COVID-19).



These results, we believe, are an industry first, making HyGenikx Air and Surface Sanitisation System the most effective product of this type on the market.

Test carried out under control conditions to BS EN 17272:2020

*Notable human diseases caused by RNA viruses include the common cold, influenza, SARS, MERS, COVID-19, Dengue Virus, hepatitis C, hepatitis E, West Nile fever, Ebola virus disease, rabies, polio, mumps, and measles.

†Log reduction is used to express the relative number of microorganisms eliminated.

CORONAVIRUS - AIRBORNE TRANSMISSION - THE LATEST

NEWS + RESEARCH

Aerosol particles are now acknowledged as a primary vehicle for COVID-19 transmission. With new data emerging all the time, below are some of the latest findings:

- Evidence suggests COVID-19 is mainly spread through fine aerosols that stay suspended in the air, rather than large droplets that contaminate surfaces. [Source: www.sciencenews.org](http://www.sciencenews.org)
- SARS-CoV-2 (the virus that causes COVID-19) can stay suspended in the air for 16 hours. [Source: https://pubmed.ncbi.nlm.nih.gov/32568661/](https://pubmed.ncbi.nlm.nih.gov/32568661/)
- The transmission of COVID-19 through surfaces is considered low – with studies suggesting the risk is less than 1 in 10,000. Instead, the main route is thought to be through respiratory droplets. [Source: www.cdc.gov](http://www.cdc.gov)
- More than 1 in 10 COVID-19 patients in the UK caught the virus in hospital. Dr Chris Green suggests this may be, in part, due to an under-appreciation of the role of airborne transmission. [Source: www.birmingham.ac.uk](http://www.birmingham.ac.uk)
- The Government has now recognised the importance of using air disinfection technologies to reduce the risk of virus transmission – with a trial of air purifiers and UV light systems in progress in schools. [Source: www.bbc.co.uk](http://www.bbc.co.uk)

LISTERIA MONOCYTOGENES + LISTERIA INNOCUA TESTING

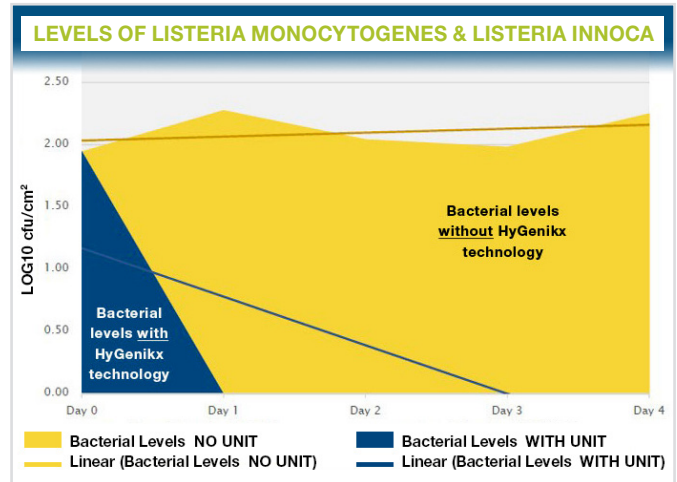
PERFORMED BY ALS LABORATORIES

An independent validation study was conducted by ALS Laboratories into the effect of HyGenikx technology on harmful *Listeria* species, one of which—*Listeria monocytogenes*—is a bacterial pathogen and widely associated with foodborne outbreaks.

Method Sterile surfaces were inoculated with *Listeria monocytogenes* and *Listeria innocua*, left to dry, and stored in a cold room at $1\pm 1^\circ\text{C}$ for four days, where bacteria were measured daily. This was performed in the presence and absence of HyGenikx technology.

Results Without HyGenikx technology, bacteria levels remained around 2 log cfu/cm². With HyGenikx technology, bacteria levels decreased to 0 log cfu/cm² within 24 hours, and all samples were below detectable levels by day 3.

Conclusion The findings showed that in the absence of HyGenikx technology, there was steady surface contamination with moderate bacterial growth, but in the presence of HyGenikx technology there was a depletion of the bacterial contamination beyond detectable levels. This study validates the ability of HyGenikx to eliminate harmful *Listeria* from the environment, protecting both staff and customers.



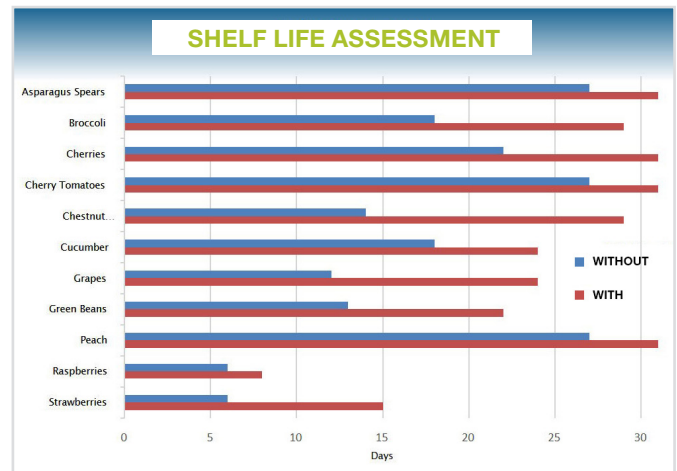
FOOD SHELF-LIFE TESTING

PERFORMED BY ALS LABORATORIES

An independent validation study was conducted by ALS Laboratories into the ability of HyGenikx to prolong the shelf-life of produce stored in a cold room, as well as its ability to improve environmental conditions.

Method The project was structured in two phases, identical in all aspects except for the introduction of the HyGenikx unit at the beginning of the second phase. 11 food samples were stored in a cold store at $5\pm 1^\circ\text{C}$ for 31 days and assessed on when they were deemed to have passed their saleable shelf-life. Swabs and air plates were also used to monitor the environment of the cold store.

Results (Shelf-life) The results showed a consistent increase in the shelf-life of the produce during the second phase of the trial with HyGenikx (compared to the first phase, without), with an average increase of the shelf-life of 58.1% (approximately 7.5 days). There was an increase in the shelf-life of all 11 products trialled, ranging from 14% to 150%. The highest three increases recorded were Strawberries, with +150% (+9 days), Chestnut Mushrooms, with +107.1% (+15 days) and Grapes with a twofold increase (+12 days).



Results (Air and Surface Contamination) With HyGenikx, the surface contamination decreased by approximately 45% and the air contamination by approximately 76% overall.

Conclusion HyGenikx was proven effective at achieving a longer shelf-life for the chosen fruit and vegetables and improving environmental conditions in a cold store during the trial. Crucially, these results were achieved in a simulated working environment cold store - which provide as close to “real world results” as possible. Principally, fruit and vegetable life and quality can be significantly extended, and environments improved, with the installation of HyGenikx.