Extract

BluTest
GLOBAL MICROBIOLOGY EXPERTISE

Test Report: Biocidal activity of Innov8 Air Disinfection unit against desiccated films of the human norovirus surrogate, feline calicivirus on representative environmental surfaces.

Test Laboratory

BluTest Laboratories Ltd
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Identification of sample

Name of the product	
Supplier	INOV8 SCIENCE LTD, MILL COURT, FEATHERSTONE ROAD, WOLVERTON MILL, MILTON KEYNES, MK12 5EU
Project Code	BS-INO-01
Sample Delivery Date	10 AUGUST 2010
Storage conditions	Room Temperature
Test dates	14 – 16 September 2010

Signed

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6 October 2010

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Introduction

The Innov8 Air Disinfection device is designed to continually remove microbiological contamination from the air through production of low levels of reactive free radicals**.** This investigation by BluTest laboratories Limited was commissioned by the manufacturer to investigate basic efficacy against a naked RNA virus surrogate of human norovirus, feline calicivirus (FCV) and to investigate the efficacy of the device against desiccated films of FCV on representative surfaces. Norovirus-contaminated surfaces represent potential sources of norovirus infection, and therefore reduction of environmental contamination by these stable viruses would be expected to have a beneficial effect on reducing the potential for virus transmission and limiting the duration and severity of norovirus outbreaks. Of particular interest is the capability of the Innov8 AD to remove desiccated virus on soft fabrics, especially those that cannot be laundered, and where liquid disinfectants cannot be effectively used to achieve decontamination. This capability may therefore be additional to the potential efficacy of the device against dissemination of air-borne virus.

A test format was set up by desiccating suspensions of FCV in culture medium containing 0.6g/L protein as foetal bovine serum onto polystyrene, stainless steel, vinyl, poplar wood, polyester/PVC and cotton. These were then expose to still sterile air in a class II cabinet at a set distance from the innov8 AD unit in quadruplicate for 0, 6 and 24 hours. In parallel experiments, the unit was either "on" or "off". The survival of FCV was measured using $\log_{10}$ tissue culture infectious $dose_{50}$ units/ml for each surface and each time point. Non-parametric statistical analysis was performed using the Wilcoxon signed rank test for related samples on SPSS version 19.

Results summary

Polystyrene. At 6 hours the treated sample showed a 1.56 $\log_{10}$ (36-fold) lower viability of FCV and at 24 hours a 2.00 $\log_{10}$ (100-fold, statistically significant at 90% confidence) lower viability compared to the positive control. FCV viability had been reduced almost to undetectable levels at 24 hours.
Stainless steel. At 6 hours the treated sample showed a 1.75 $\log_{10}$ (56-fold, statistically significant at 90% confidence) lower viability of FCV and at 24 hours a 1.99 $\log_{10}$ (100-fold) lower viability compared to the positive control. FCV viability had been reduced almost to undetectable levels at 24 hours.
Vinyl. At 6 hours the treated sample showed a 1.81 $\log_{10}$ (65-fold) lower viability of FCV and at 24 hours a 1.83 $\log_{10}$ (68-fold, statistically significant at 90% confidence) lower viability compared to the positive control. FCV viability had been reduced almost to undetectable levels at 24 hours.
Poplar wood. At 6 hours the treated sample showed a 0.60 $\log_{10}$ (4-fold) lower viability of FCV and at 24 hours a 0.62 $\log_{10}$ (4-fold, statistically significant at 90% confidence) lower viability compared to the positive control. Viability of FCV was supported in a wood matrix, where less than a 1.0 $\log_{10}$ reduction in virus viability occurred after 24 hours, although a decline in viability was observed on treatment with Innov8 AD.
Polyester/PVC. At 6 hours the treated sample showed a 3.00 $\log_{10}$ (1000-fold, statistically significant at 90% confidence) lower viability of FCV and at 24 hours a 2.00 $\log_{10}$ (39-fold) lower viability compared to the positive control. Viability of FCV was supported in a polyester/PVC matrix, where a 0.13 $\log_{10}$ reduction in virus viability occurred after 6 hours and a 2.07 $\log_{10}$ reduction after 24 hours. However, a significant decline in viability was observed on treatment with Innov8 AD.
Cotton. At 6 hours the treated sample showed a 2.58 $\log_{10}$ (380-fold, statistically significant at 90% confidence) lower viability of FCV. FCV levels were reduced to undetectable levels at 6 and 24 hours.

Conclusion.

The innov8 AD was investigated for its ability to reduce the levels of viability of desiccated films of FCV (norovirus surrogate) on six representative environmental surfaces after 6 and 24 hours of treatment.

1. On all surfaces, treatment with the Innov8 AD unit reduced the viability of FCV significantly in comparison to an untreated control.
2. On hard surfaces (polystyrene, stainless steel and vinyl) the reduction in comparison to controls was 68 – 100 fold after t = 24 hours, which is a total 4 – 5 $\log_{10}$ reduction over 24 hours in comparison to viability levels at t = 0.
3. On absorbent polyester/PVC and cotton surfaces that are less amenable to treatment by liquid disinfectants, and which support viability of FCV, the device reduced the levels of FCV effectively in comparison with the control, with a 2.3 – 3.1 $\log_{10}$ reduction observed at t = 6 hours compared to viability a t = 0.
4. On all but two surfaces, polyester/PVC and wood, the device had reduced the levels of FCV almost to undetectable levels after t = 24 hours.
5. The poplar wood, polyester/PVC and cotton surfaces supported enhanced viability of FCV in comparison with hard surfaces. The device was less effective at reducing FCV within wood in comparison with polyester/PVC and cotton. However, a significant reduction was observed in wood comparison with the control.

In addition to its potential to reduce air-born contamination, this study shows evidence to support the ability of the innov8 AD device to be effective against human norovirus, in a desiccated form where it might be expected to be more resistant to the action of free radicals, on representative environmental surfaces. It is especially effective against absorbent surfaces, but less effective against (unsealed) wood surfaces