H1N1 Virus Case Study

Proven reduction of the H1N1 influenza virus on BioCote treated materials

Background

Outbreaks of influenza caused by the H1N1 virus are a repeated threat. The contagious H1N1 virus spreads effectively between people and, due to the widespread international travel, between countries.

July 2009 saw the beginning of the most recent global H1N1 influenza pandemic with around 30,000 confirmed cases reported in 74 countries although unconfirmed cases make this outbreak undoubtedly more significant. The economic impact of influenza can be huge; the World Health Organisation estimated an H1N1 pandemic could cost the UK economy over £70 billion so a measure with the potential to limit the spread of viral infection is worthy of including in an infection control strategy. The evidence described here suggests the application of BioCote® antiviral technology has the potential to complement strategies aimed at inhibiting the spread of viruses responsible for influenza illness.

Viruses cause human disease by infecting cells of the body. Viral disease can be averted if the virus is rendered noninfectious before it enters the body's cells and establishes an infection. Antiviral vaccines typically operate by converting the virus from an infectious to noninfectious form. This study quantified the conversion of influenza A H1N1 virus from an infectious to non-infectious form because of its exposure to BioCote® containing materials.

Aim

To understand how effective BioCote® approved silver ion antimicrobial technology is against influenza A H1N1 virus when incorporated into various manufacturing materials.

Method

Known amounts of infectious H1N1 virus (Fig.1) were added to the surface of a variety of materials commonly used for manufacturing that contained BioCote® approved antimicrobial silver ions; specifically, acrylonitrile butadiene styrene (ABS), polycarbonate (PC), thermoplastic polyurethane (TPU), polyvinyl chloride (PVC) and polybutylene terephthalate (PBT) polymers, laminated wood board and wet and powder paints. Exposures were left overnight after which the virus was recovered from the test materials. Viruses still able infect cells after exposure to BioCote® technology were counted using an immunological microplate plaque assay (Fig.2). Because controls were included in these experiments, the amount of virus inactivation directly attributable to the BioCote® silver technology was determined.

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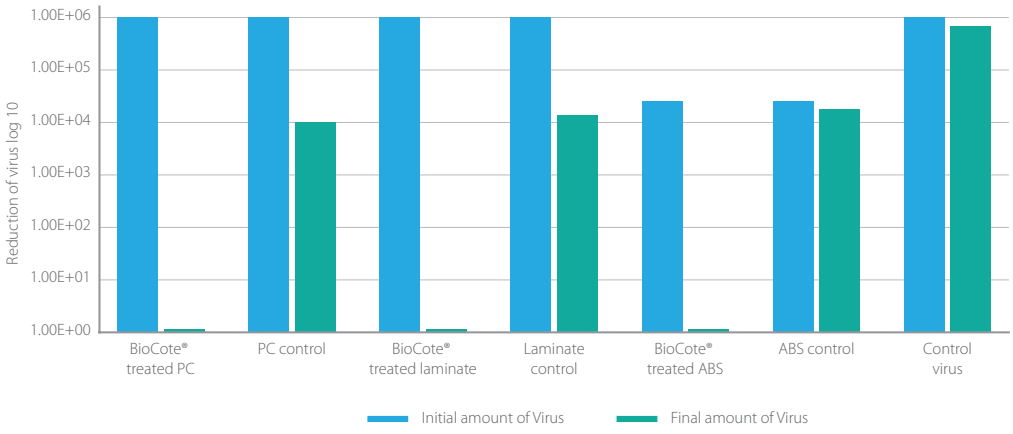
Results

All BioCote® containing materials demonstrated significant antiviral activity compared to untreated and/or virus controls.

A selection of reductions in numbers of infectious H1N1 virus because of exposure to treated materials is presented in Fig.3 alongside corresponding reductions by untreated controls. The survival of the H1N1 virus under test conditions not exposed to any material was also determined.



Results for Laminate

>99.99%

reduction in viable H1N1 virus particles on BioCote treated laminate

Results for PC

>99.99%

reduction in viable H1N1 virus particles on BioCote treated PC

Conclusions

BioCote® approved silver ion technology is effective at significantly reducing numbers of infectious influenza A H1N1 virus. Antiviral activity was demonstrated by BioCote® containing ABS, PC, TPU, PVC and PBT polymers, laminated board and wet and powder paints.