Assessment of the virucidal efficacy of Dycem® with and without Biomaster

Introduction

The dissemination of potentially pathogenic viruses increases infection risk in both healthy and immunocompromised individuals. Viral infections can result in a range of clinical outcomes ranging from relatively mild common colds to deadly global pandemics. Interventions, both preventative and curative, are essential to slowing and/or stopping the spread of infectious viruses.

Biomaster is added to Dycem® during the manufacturing process, aiming to provide lasting effectiveness against microbial growth. Biomaster contains silver ions, which have proven natural antimicrobial properties. Dycem® with and without Biomaster was assessed for its virucidal efficacy against Influenza Type A (H1N1), Adenovirus type-5 (AdV) Murine norovirus (MNV) and human coronavirus 229E (CoV 229E).

Methodology

- The evaluation of virucidal efficacy was performed using ISO 21702:2019.
- Test samples were inoculated with viral suspensions and suspensions were covered with a 20 mm x 20 mm sterile film.
- Samples were incubated at 20 ± 2˚C for 4 hours.
- Following incubation, samples were rinsed thoroughly in assay medium to resuspend any remaining virus.
- Viral infectivity was quantified using TCID50 and viral titre determined using the Spearman-Kärber method.
- Dycem® with and without Biomaster was tested in triplicate. Negative controls were Dycem® without Biomaster at 0 hours.

Results

Following a 4 hour incubation, Dycem® with Biomaster resulted in Log reductions of 0.44 $Log_{10}TCID_{50}mL^{-1}$, 2.44 $Log_{10}TCID_{50}mL^{-1}$, 1.33 $Log_{10}TCID_{50}mL^{-1}$ and 1.33 $Log_{10}TCID_{50}mL^{-1}$ H1N1, AdV, MNV and CoV 229E respectively, in comparison to negative controls (Table 1).
Following a 4 hour incubation, Dycem® without Biomaster resulted in Log reductions of 0.83 $Log_{10}TCID_{50}mL^{-1}$, 2.44 $Log_{10}TCID_{50}mL^{-1}$, 1.38 $Log_{10}TCID_{50}mL^{-1}$ and 1.78 $Log_{10}TCID_{50}mL^{-1}$ H1N1, AdV, MNV and CoV 229E respectively, in comparison to negative controls (Table 2).

	Dycem® with Biomaster		
Test virus	**Average recovery ($Log_{10}TCID_{50}mL^{-1}$)**	**Average Log reduction ($Log_{10}TCID_{50}mL^{-1}$)**	**Percentage reduction (%)**
Influenza A	7.11	0.44	64.06
Adenovirus type-5	3.50	2.44	99.50
Murine norovirus	5.17	1.33	95.36
Human coronavirus 229E	2.83	1.33	95.36

Table 1. Average recovery, reduction and percentage reduction values for Dycem® with Biomaster following incubation with Influenza A, Adenovirus type-5, Murine norovirus and human coronavirus 229E.

	Dycem® without Biomaster		
Test virus	**Average recovery ($Log_{10}TCID_{50}mL^{-1}$)**	**Average Log reduction ($Log_{10}TCID_{50}mL^{-1}$)**	**Percentage reduction (%)**
Influenza A	6.72	0.83	85.32
Adenovirus type-5	3.50	2.44	99.50
Murine norovirus	5.13	1.38	95.78
Human coronavirus 229E	2.39	1.33	98.33

Table 2. Average recovery, reduction and percentage reduction values for Dycem® without Biomaster following incubation with Influenza A, Adenovirus type-5, Murine norovirus and human coronavirus 229E.

Discussion and Conclusions

Reductions in all viruses were observed when compared to the 0 hour negative controls, in Dycem® both with and without Biomaster. Results could suggest that polymer coatings without the addition of Biomaster are demonstrating virucidal properties, or viability of virus on surfaces decreased due to the length of incubation.

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