A Supplementary Evaluation of the Medi-Shower™ Hose

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Introduction

Ulster University carried out an assessment of the antibacterial properties of the Medi-Shower™ hose for C-TRIC (Maranna Sweeney) on behalf of Medi-Shower™. In their report (no reference given), a Medi-Shower™ hose (containing Biomaster™ antimicrobial technology) was compared with a commercially available dometic shower hose, for their "anti-bacterial properties against a bacterial solution that has been lying in the system for 7 days (to mimic non-sterile stagnant water). A clinical isolate strain *Pseudomonas aeruginosa* (PA0049) was used to artificially contaminate the two hoses, with an aqueous suspension (1/4 strength Ringer's) containing approximately 10^4 colony forming units (CFU) per mL. The level of *P.aeruginosa* in both hoses was tested after 2 hours and 4 days at room temperature. The report concluded that the Medi-Shower™ hose has anti-bacterial properties against non-sterile stagnant water in comparison to the commercially available shower hose. Whilst there was an increase in *P.aeruginosa* levels in the Medi-Shower™ hose, the Medi-Shower™ hose showed significantly reduced numbers of *P.aeruginosa* growing over a 4 day period at room temperature when compared to the standard hose product. Testing was not extended to 7 days as initially proposed as the significant differences seen between the hoses over the 4 days were seen as sufficient to make conclusions.

Terry Easy requested that 20/30 Labs carry out an independent evaluation, using a similar testing to supplement and corroborate the results found by the above Ulster report. Testing was only conducted using a Medi-Shower™ hose. The Medi-Shower™ hose was contaminated with a reference stock culture of *Pseudomonas aeruginosa* at approximate 10^5 CFU per mL. This level of contamination was used in order to provide a worst-case scenario that the hose may be exposed to in use with an Automated Washer-Disinfector (AWD) e.g. contents of header tank flushed through the AWD after a weekend of water left stationary to stagnate. The levels of contamination present in the Medi-Shower™ hose were tested at time = 0 hrs (Positive Control Count) and then after 48 hours and 5 days at room temperature. These time points were chosen with respect to the use of an AWD in a small Endoscopy Department. The 48 hour time point reflects the time over the weekend which the AWD machine may not be in use and therefore water may be allowed to stagnate within the hose. The 5 day time point reflects a worst-case scenario over a bank holiday weekend where the AWD machine may not be used and water may therefore be allowed to stagnate within the hose.

Method

Preparation of Aqueous Contaminating Solution:

A fresh culture of reference stock *Pseudomonas aeruginosa* (ATCC 28475) was prepared in Tryptone Soya Broth (TSB) for 24 hours at 35°C. An inoculating suspension was prepared using the culture and ¼ Strength Ringer's solution, with a contamination level of approximately 10^5 CFU per mL.

A positive control count was carried out at time = 0 hrs, to give the initial contamination level within the hose.

Artificial Contamination of Hoses:

The Medi-Shower™ hose was initially rinsed with sterile ¼ Strength Ringer's solution to remove any potential debris/material and was then left to dry at room temperature. The hose was then filled with the aqueous contaminating solution (as prepared above). The Medi-Shower™ hose was able to hold 100 mL of

the solution. The hose was sealed at both ends with parafilm and left flat on a work bench at room temperature for the duration of the test.

Analysis of Bacterial Contamination Levels:

To quantify the bacterial levels in the Medi-Shower™ hose, serial dilutions were made of a sample taken from the hose. These were spread-plated onto Tryptone Soya Agar (TSA) and incubated for 48 hrs at 35°C before being counted. Samples were tested in duplicate.

Results

Table 1: *Bacterial counts at t= 0hrs, 48hrs and 5 days for the Medi-Shower™ hose*

Time	Control Count (CFU/mL)			
	D1	D2	Mean	Log^{10} (Mean)
0 hrs (Positive Control)	7.8×10^5	6.1×10^5	6.95×10^5	5.84
48 hrs	4.6×10^5	3.7×10^5	4.15×10^5	5.62
5 days	9.5×10^4	1.01×10^5	9.8×10^4	4.99

Conclusion

The starting level of contamination within the Medi-Shower™ hose was 6.95×10^5 CFU / mL. After 48 hours, this decreased slightly to 4.15×10^5 CFU / mL. After 5 days the level of contamination present within the hose was 9.8×10^4 CFU / mL, again showing a slight decrease from 48hrs to 5 days.

The results show that the levels of contamination within the Medi-Shower™ hose remained the same or reduced slightly over 5 days, and therefore suggest that the hose does not promote growth, as shown in the report produced by Ulster University.

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