

Hygienic Status of Hospital Surfaces Following Cleaning Using ATP Bioluminescence Detection

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Objectives: This study investigated the efficacy of ATP detection method on hospital surfaces. The influence of surface physicochemistry, surface chemistry and conditioning film on microbial load retained following antibacterial wipe cleaning of Stainless steel (SS) and Ceramic tiles surfaces (CT) were evaluated.

Background: Due to their ease of use and fast turnaround of results, ATP Bioluminescence Monitoring devices are regularly used in hospitals including operating rooms¹. The ATP devices are also routinely used in the food and beverage industry as it give a real time estimation of surface cleanliness and a rapid indication of the overall contamination of the surface.

Methods: Surface physicochemistry was determined from contact angles using water, 1-bromonaphthalene and formamide. Stainless steel (304 2B) and gloss finished ceramic tiles (40 mm x 40 mm) were soiled with 100 μ L standardized cultures (1.0×10^7 CFU mL⁻¹) of *Escherichia coli*, *Staphylococcus aureus* and *Candida* sp. suspended in either saline (non-complex) or nutrient broth (complex) media. Upon soiling, the surfaces were cleaned with two different commercially available antibacterial wipes containing different solvent concentrations. Following cleaning, the remaining organic load on the surfaces was determined using the ATP Sanitation Bioluminescence Monitoring System (Hygiena Ultra Snap, UK).

Results: The SS surfaces were hydrophobic (ΔG_{iwi} - 66.6) while the CT surfaces were hydrophilic (ΔG_{iwi} 1.94). The 6.4 % difference in solvent content of the antibacterial wipes had no significant effect on organic load retained on the surfaces ($p > 0.05$) in saline. However, the surfaces soiled with complex nutrient broth media required further cleaning (> 30 RLU).

Conclusion: The results indicated that surface physicochemistry, chemistry and soiling agent influenced the amount of organic load removal from surfaces, rather than the solvent content of the wipes as determined by ATP Bioluminescence Monitoring devices.

References: ¹Ramirez *et al.*, (2019). Surface contamination in the operating room: use of adenosine triphosphate monitoring. *Journal of Anesthesia* 33 85 – 89.