Case Study: Bio-decontamination of East Shore Hospital ICU, Singapore using hydrogen peroxide

The Challenge

As the Severe Acute Respiratory Syndrome (SARS) epidemic worsened in Singapore, it became clear that hospitals were forming focal points for the spread of the virus. At the height of the crisis Government sources estimated that 87% of new infections were hospital acquired. Although little was known about the method of transmission, research indicated that SARS could survive outside its host for up to 6 days, thereby representing a serious risk to staff and patients who came into contact with potentially contaminated surfaces.

Clarus™ R gas generators and R2 aeration units

In response to this problem our client, Parkway Healthcare Group, the largest private healthcare provider in Asia, sought to limit the risk to its most susceptible patients by bio-decontaminating its entire intensive care ward, comprising 11 rooms of total volume 860m^3.

The Solution

BIOQUELL's rapid, residue free Room Bio-decontamination Service (RBDS) utilises the microbicidal power of free radicals released by hydrogen peroxide vapour to bio-decontaminate rooms. The RBDS equipment first distributes hydrogen peroxide throughout the target area, ensuring all surfaces are bio-decontaminated, before converting the gas to oxygen and water vapour, as described below.

Independent verification of the technology against extremely resilient organisms such as anthrax, 'superbugs' such as MRSA and a number of viruses allows BIOQUELL to be absolutely confident of its efficacy against the SARS virus.

Background: *Bio-decontamination within a room or chamber is achieved by depositing an even layer of approximately 1 micron* 'micro-condensation' *of* H_2O_2 *over all surfaces. The term* 'micro-condensation' *may be defined as a microscopic film of* H_2O_2*, which being at a sub-micron level is invisible to the naked eye. Scientific research has proven that it is this low temperature, residue-free deposit that actually deactivates micro-organisms during the gassing process.*

GAS $2H_2O_2 \xrightarrow{\text{CATALYST}} 2H_2O + O_2$ (water) + (oxygen) Residue Free

Methodology

Given that the ward was clear of patients BIOQUELL was able to shut down the dedicated air conditioning system. As an extra precaution, air-conditioning vents were sealed, as were all openings to areas outside the gassing zone, effectively eliminating the possibility of unwanted gas dispersion.

Four strategically placed the Clarus™R gas generators and ten oscillating fans ensured even gas distribution throughout the target zone, before twelve Clarus R2 aeration units catalytically converted the gas to oxygen and water, leaving the ward free of any residues. Eight hours later the ward and all hospital equipment was returned for patient use.

Gassing Cycle Verification

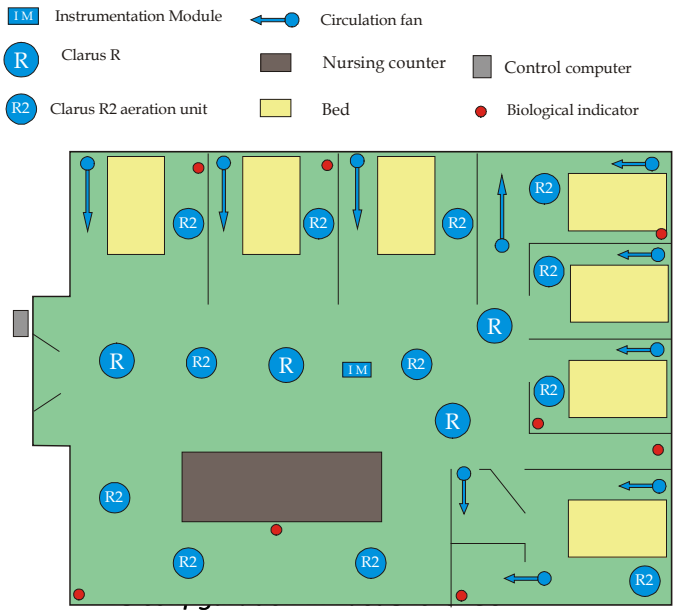
The efficacy (effectiveness) of the gas was verified using 'biological indicators.' These highly resilient *Bacillus stearothermophilus* spores were placed in challenging locations during gassing and then subjected to ideal growth conditions in an incubator afterwards. None of these biological indicators grew, indicating that full biological bio-decontamination had been achieved in the target area.

Conclusions and Feedback

BIOQUELL is confident that any SARS virus in the gassing zones was bio-deactivated – therefore negating the risk of SARS spreading from those areas; and ultimately realising the main requirement of the client. Indeed, there have been no incidents of SARS at East Shore hospital.

As an added benefit of the process, other environmentally associated hospital acquired pathogens (such as MRSA and VRE) were bio-deactivated, with the likely result of reducing hospital acquired-infection and all its associated costs. The implementation of a regular bio-decontamination programme would sustain this reduced re-infection level.

The public, many of whom had been too scared of infection to go to East Shore, returned in increasing numbers as BIOQUELL continued the bio-decontamination programme. Although this was partly due to the reduced SARS risk in general, it is likely that the widespread publicity generated by the RBDS programme significantly contributed to restoring public confidence.



Parkway have volunteered to act as a reference for RBDS. For details please contact BIOQUELL.

BIOQUELL Bio-decontamination solutions

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