Innovative Disinfection System Using Gas Phase Nucleic Acid Digestion Technology to Support Laboratory Animal Management in Geriatrics Research

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Sterilization of animal testing facilities is performed on articles (breeding equipment, instruments, and laboratory equipment) and on breeding rooms and laboratories to prevent pathogenic microorganisms. Formaldehyde gas, hydrogen peroxide, and chlorine dioxide gas are used for non-heat-resistant sterilization. Although all sterilization methods have their own characteristics, it has been reported that some methods caused corrosion and the accumulation of residues on breeding equipment (rubber products, gloves, etc.) and electronic equipment.

Our facility (NCGG) has kept many naturally aged mice used in gerontology and geriatric research. Since the animals are kept for a long period of time, it is necessary to maintain a clean and appropriate rearing environment. Therefore, we evaluated a new system, Byovector®, of combined gas equipment containing formaldehyde gas components with methanol as raw material, which allows decontamination with no corrosion and no residue.

Materials and Methods

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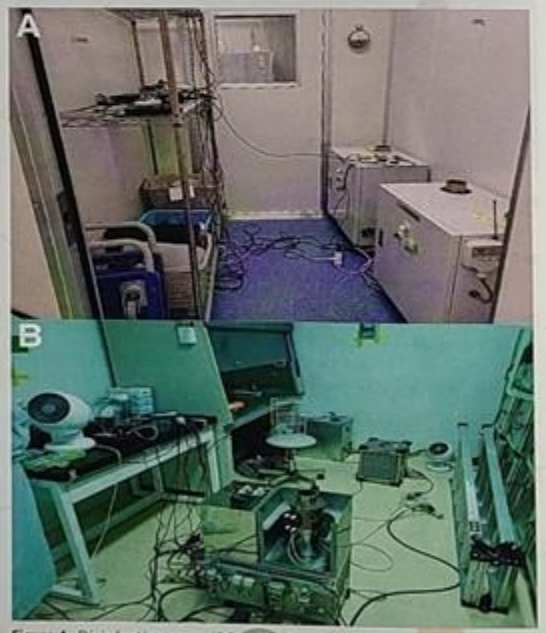

Figure 1. Disinfection room (DR; 10 m³) (A) and the Infectious Diseases Laboratory (IL; 50 m³) (B).

Figure 2. Decontamination device. A) SteriXcure gas generator. B) Gas decomposition device. C) Remote control box. D) Data log monitor.

Figure 3. BI results from IL room.

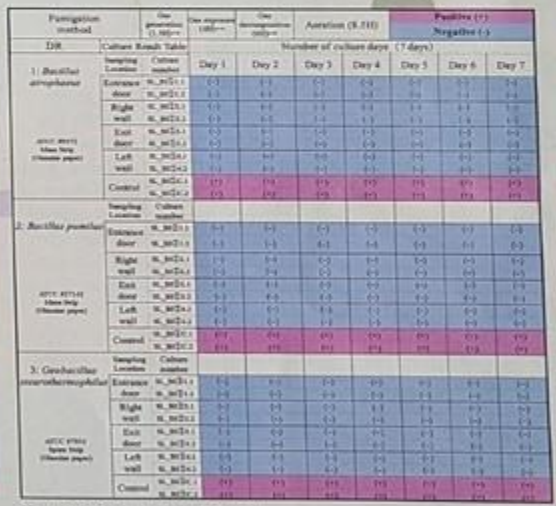

Figure 4. BI results from DR room.

Results and Conclusions

To evaluate the sterilization of each room, CIs were placed in four locations in the DR (Figure 4A) and eight locations in the IL. The tests were distributed in different places far away from each other and at different heights within each room. After each treatment, the CI strips were immediately checked. All the tests in both rooms were negative. In addition, BIs were negative from day 1 to day 7 (spores SAL<10-6) (Figures 3, 4, and 5). Various areas and devices were sampled after treatment. The cultures of the three microorganisms were negative after 7 days of cultivation in both rooms. Electrophoresis and