15th World Sterilization Congress

Title: Performance of the sterilization device using a low-temperature atmospheric pressure plasma

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Abstract

Objective

Medical instruments should be properly sterilized for reuse. Although high pressure steam and EOG are used for sterilization, there are disadvantages, such as high temperature, long-time operation and harmful effect. Therefore, sterilization method with low-temperature, short-time operation and safety is demanded. Plasma sterilization can satisfy these demands because plasma produces chemical species which are effective for sterilization in atmospheric air at low temperature. In this study, we developed a plasma sterilization device.

Methods

A sterilization device developed by using the atmospheric pressure air plasma was used.
The Biological Indicators, which use *Geobacillus stearothermophilus* spores (ATCC 7953) and *Bacillus atrophaeus* spores (ATCC 9372), were used and concentrations of chemical species were measured with gas detector tubes (GASTEC).

Results

Our device realized sterilization for 25-35 minutes at room temperature. The sterilization-test was performed in a syringe according to the regulation, Japanese Society of Medical Instrumentation. A sterilization factor was investigated and, it was suggested that NO_x, which was generated by plasma, contributed to kill bacteria comparing with the results of NO_2 mixed Argon gas. Decomposition of NO_x whose concentration must be below an upper limitation of a regulation for safety has also been tried to develop with dielectric barrier discharge.

Conclusions

In this study, we developed the sterilization device using the atmospheric pressure air plasma and realized short-time operation at room temperature. NO_x would be sterilization factor and we tried to decompose NO_x for safety.

Key message

Plasma has a potential as an innovative sterilization.