



Effect of Different Loading Methods on Adsorption of Hydrogen Peroxide Concentration and Injection Pressure during Packaging Materials

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Introduction

Hydrogen peroxide plasma sterilization technology is a technology for low temperature sterilization of medical instruments and consumables using hydrogen peroxide as a medium. Recently, it has been found that the dominant bactericidal effect of hydrogen peroxide plasma sterilization is the concentration of vaporized hydrogen peroxide and its diffusion state. Any factors in the sterilization process that can affect the concentration of hydrogen peroxide gas in the active part of the sterilization chamber will affect the factors. The final sterilization effect leads to sterilization failure^[1]. The selection of the items to be sterilized, the quality of the cleaning and drying of the items to be sterilized, the selection of the packaging materials, the loading amount and the loading method all affect the hydrogen peroxide concentration, thereby affecting the sterilization effect, improper selection can even lead to sterilization failure^[2]. Cai Bilan et al.^[3] found that the cycle cancellation rate due to "poor hydrogen peroxide concentration" caused by "adsorbed articles" was 61.1%. Therefore, a reasonable choice of packaging materials, standard loading is essential. Regarding the selection of packaging materials and the amount of packaging, the literature^[4-6] has been clearly reported, but at present, there is no search for different packaging materials. Relevant literature on impact. This paper summarizes the adsorption and packaging pressure of the STERRAD 100S hydrogen peroxide low-temperature plasma sterilizer when it is packaged with Tyvek paper-based bags and non-woven fabrics. influences.

Results

The adsorption concentrations of the sterile bag of hydrogen peroxide in the control group were 13.745 ± 3.754 and 8.065 ± 4.599 , respectively. The hydrogen peroxide adsorption concentrations of the two materials in the experimental group were 11.120 ± 4.187 and 8.205 ± 4.181 , respectively. The differences between the groups were statistically significant ($P < 0.05$). The adsorption of non-woven fabrics in the control group and the experimental group was found to be 13.745 ± 3.754 , and the adsorption of non-woven fabrics in the experimental group was observed. The concentration was 11.120 ± 4.187 , and the difference was statistically significant. The pressure (torr) of the control group was 9.121 ± 0.243 , and the pressure of the experimental group was 9.410 ± 0.188 . The difference was statistically significant ($P < 0.05$).

Methods

Sixty-five 45cm*10cm*5cm empty silicone instrument boxes recommended by Johnson & Johnson were selected. Three were made of 100cm*100cm non-woven double-layer packaging; three were made of Tyvek 60cm*20cm paper-plastic bag single-layer packaging. The three packages to be sterilized in the non-woven package were placed on the upper shelf of the sterilizer, and the special Guard was placed on the lower shelf, which was set as the control group; the experimental group was reversed. The load is 70%, and each is 20 pots. Immediately after the sterilization, the aseptic bag was used to adsorb the concentration of hydrogen peroxide, and the pressure of each pan was recorded according to the physical printing paper.

Conclusion

Tyvek material packaging has less adsorption to hydrogen peroxide and is more suitable for low-temperature plasma sterilization of hydrogen peroxide. In the mixed loading, the sterile package of Tyvek packaging is placed on the upper layer, and the sterile package of non-woven packaging. Placed on the lower layer, the sterilization is smoother and the sterilization quality is more guaranteed.

Tables

Table 1 Comparison of Adsorption of Hydrogen Peroxide by Two Packaging Materials in Control and Experimental Groups (*t, P*)

Category	H ₂ O ₂ adsorption concentration (PPm)	
	Control group	Test group
Non-woven fabric	13.745 ± 3.754	11.120 ± 4.187
Tyvek	8.065 ± 4.599	8.205 ± 4.181
<i>t</i>	4.279	2.203
<i>P</i>	0.000	0.034

Table 2 Comparison of Adsorption Properties of Controlled Nonwovens and Adsorption of Nonwovens in Experimental Groups (*t, P*)

Group	H ₂ O ₂ adsorption concentration (PPm)		
		<i>t</i>	<i>P</i>
Control group non-woven fabric	13.745 ± 3.754	2.088	0.044
Experimental group non-woven fabric	11.120 ± 4.187		

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