



Abstract

Dry Airborne H₂O₂-Vaporization for Disinfection of Air and Surfaces

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The containment of pathogens in public spaces is an important topic of ever-increasing urgency. The problem of transmission via surfaces and indoor air and the importance of disinfection become particularly clear with regard to multi-resistant germs. In most cases - in industry as well as in health care - the classic manual disinfection is still used, but this method has its limits in many respects: surfaces that are difficult to access, as well as special materials such as fabric covers, etc. restrict its application. The use of aerogenic disinfection methods supplements or replaces the conventional approach by distributing the disinfectant in aerosol particles via the room air. This allows a more uniform, controlled treatment of surfaces of entire rooms.

With the DCX technology, Braincon[®] GmbH & Co KG has positioned itself as an Austrian manufacturer of devices for aerogenous surface disinfection. Disinfection is achieved by cold nebulization of hydrogen peroxide (H₂O₂) and the formation of microaerosols, which minimize condensation on surfaces. In order to ensure progressive development of the established method, scientific tests are indispensable.

In the spirit of translational research and in view of the application in the field of healthcare, a cooperative study was conducted with the Ludwig Boltzmann Institute of Traumatology. The aim was on the one hand to investigate the influence of various parameters on the disinfection performance, but also to test the effectiveness directly in the medical environment. Specifically, an *in vitro* bacterial culture model was used to test the effects of silver content (0.0075 %) in the disinfection solution, as well as ultraviolet (UV) irradiation of the vapor directly. It was found that both UV irradiation of the steam and the addition of silver (0.0075 %) did not improve the efficacy. The effectiveness of the nebulization method was demonstrated by means of chemical indicators. After 20 min of nebulization, 100 % of the indicators showed full color change, despite relatively low H₂O₂ concentration (~100-130 ppm). Moreover, bioindicators were used to confirm the results. The results achieved LOG 6 or even more.

In summary, the obtained data on the one hand demonstrated the high performance of the established aerogenic disinfection with hydrogen peroxide, and also provided a direction for future experiments to maximize its effectiveness.