CHLORINE DIOXIDE GAS FOR THE PREVENTION OF INFECTIOUS DISEASES

https://www.pureairmena.com/wp-content/uploads/2019/09/CHLORINE-DIOXIDE-GAS-FOR-THE-PREVENTION-OF-INFECTIOUS-DISEASES.pdf

MAK/TWA/PEL of chlorine dioxide: 0.1 ppm = 0.28 mg/m^3 // Effective for air disinfection: ≥ 0.03 ppm = 0.084 mg/m^3

ANTIMICROBIAL ACTIVITY OF CLO2 GAS AT EXTREMELY LOW CONCENTRAIONS

Ogata and Shibata first reported the effect of extremely low-concentration ClO2 gas at a level of 0.03 ppm (0.084 μg/L) against influenza virus in an animal experiment[6] using a sophisticated machine to generate and deliver ClO2 gas at finely controlled concentrations.[7] The gas concentration was precisely controlled and accurately monitored during the study as demonstrated by recently published paper.[81] They found that the lethal activity of influenza A virus aerosol exposed to mice was dramatically reduced when 0.03 ppm ClO2 gas was present simultaneously with the virus aerosol. All the virus-challenged mice were alive and appeared quite healthy during and after the exposure of the virus when ClO2 gas was concomitantly present.[6] This result suggests the potential usefulness of the gas to protect human diseases caused by floating microbes in a room. A crucial point of this result is that evacuation of people from the room would not be required during the exposure to the gas because the concentration of the ClO2 gas employed is extremely low, i.e., below the permissible exposure concentration to human as mentioned above.[79,80,82] Thus, the exposure is not fumigation. Currently there is no useful and reliable measure to protect humans from infection by floating microbes without requiring evacuation in closed or semi-closed spaces, such as an airplane cabin or a spacecraft. The prevention of airborne microbe infection by the extremely low-concentration of ClO2 gas will open new avenues in the field of public health, e.g., prevention of highly pathogenic and transmissible H5N1 influenza virus.[83] The use of 0.03 ppm ClO2 gas is also useful in prevention of mosquito-related infective diseases, such as malaria and dengue fever, given that this concentration of ClO2 gas has a repellent effect against mosquitoes.[84]

CONCLUSION

Exposure to extremely low concentrations of ClO2 gas, effect on animals, whereas 0.03 to 0.1 ppm still has inactivation activities against bacteria and virus. Such concentrations of ClO2 gas could be used without requiring evacuation of people to prevent infections by microbes floating in air in closed or semi-closed spaces, such as in the cabins of aircrafts, living rooms and spacecraft. This effect of ClO2 gas can be used to prevent the spread of infectious diseases, such as highly pathogenic H5N1 influenza virus, by increasing the quality of indoor air. Currently, such a disinfectant is not commercially available. To the best of our knowledge, the extremely low concentrations of ClO2 are the only measure to prevent the infection by airborne microbes in the presence of humans.

Morino, H., T. Fukuda, T. Miura, und T. Shibata. „**Effect of Low-Concentration Chlorine Dioxide Gas against Bacteria and Viruses on a Glass Surface in Wet Environments".** Letters in Applied Microbiology 53, Nr. 6 (2011): 628−34. https://doi.org/10.1111/j.1472-765X.2011.03156.x.> Abstract: ... The low-concentration ClO2 gas (mean 0·05 ppmv, 0·14 mg m−3) inactivated Flu-A and E. coli (>5 log10 reductions) and FCV and S. aureus (>2 log10 reductions) in the wet state on glass dishes within 5 h.

Ogata, Norio, Miyusse Sakasegawa, Takanori Miura, Takashi Shibata, Yasuhiro Takigawa, Kouichi Taura, Kazuhiko Taguchi, u. a. „**Inactivation of Airborne Bacteria and Viruses Using Extremely Low Concentrations of Chlorine Dioxide Gas".** Pharmacology 97, Nr. 5−6 (2016): 301−6. https://doi.org/10.1159/000444503. > Abstract: ... The numbers of viable airborne bacteria in the operating room of a hospital collected over a 24-hour period in the presence or absence of 0.03 ppm ClO2 gas were found to be 10.9 ± 6.7 and 66.8 ± 31.2 colony-forming units/m3 (n = 9, p < 0.001), respectively. ...