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Pharmacology. 2017;99(3-4):114-120. doi: 10.1159/000452339. Epub 2016 Nov 2.

Generation and Measurement of Chlorine Dioxide Gas at Extremely Low Concentrations in a Living Room: Implications for Preventing Airborne Microbial Infectious Diseases

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Abstract

Background/aims: Preventing respiratory diseases caused by airborne microbes in enclosed spaces is still not satisfactorily controlled. At extremely low concentrations (about 30 parts per billion), chlorine dioxide (ClO₂) gas can inactivate airborne microbes and prevent respiratory disease. It has no toxic effect on animals at this level. However, controversies still remain regarding how to measure concentrations of ClO₂ gas at such low levels. It is therefore necessary to prove that measured gas concentrations are accurate and reproducible.

Methods: ClO₂ gas was released from a gas generator and its concentration was measured by a novel highly sensitive gas analyzer. We compared its data with those from ion chromatography.

Results: We demonstrate that the gas concentrations measured in a room using the gas analyzer are accurate and reproducible after comparing the results with those from ion chromatography. However, the temperature dependence of the gas analyzer was found. Therefore, data correction is required for each temperature at which gas concentration is measured. A theoretical analysis of the gas concentrations predicted by the rate of ClO₂ gas released from the ClO₂ generator was also performed.

Conclusion: Our results advance progress toward using low concentration ClO₂ gas to prevent airborne infectious diseases such as influenza.

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