

Antiviral effect of chlorine dioxide against influenza virus and its application for infection control

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インフルエンザウイルスに対する二酸化塩素の抗ウイルス効果と感染対策への応用

[Abstract]

Influenza is a respiratory tract infection, causing pandemic outbreaks. Spanish flu (A/H1N1), a pandemic occurred between 1918 and 1919, tolled patients and fatalities of 500 million and 50 million, respectively. Recently, human infection with highly pathogenic avian influenza A/H5N1 and swine influenza [Pandemic (H1N1) 2009] was reported. Because of the population explosion and busy global aircraft traffics, Pandemic (H1N1) 2009 is rapidly spreading worldwide. In addition, it is seriously concerned that H5N1 influenza pandemic would emerge in the very near future. The pandemic will cause the freeze of social activity and the crisis of business continuity, having a serious impact on the global economy consequently. It is fervently desired that efficient methods of infection control against influenza pandemic be developed.

Chlorine dioxide (ClO₂) has a strong antiviral effect, and can disinfect the surface of object and the air in space. In recent study on interaction between ClO₂ and protein, ClO₂ oxidatively modified tyrosine and tryptophan residues, and the protein was structurally denatured. Since hemagglutinin and neuraminidase of influenza virus A/H1N1 were inactivated by the reaction with ClO₂, it is likely that denaturation of the proteins caused inactivation of the virus. A low concentration (0.03 ppm) of ClO₂ gas, where people can stay for a long period of time without any harmful effect, prevented the death of mice caused by infection of influenza virus delivered as aerosol. We review current information based on the efficiency of ClO₂ solution and gas, and also discuss the application of ClO₂ against influenza pandemics outbreak.

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