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[Infect Genet Evol.](#) 2019 Jan;67:78-87. doi: 10.1016/j.meegid.2018.11.002. Epub 2018 Nov 3.

Chlorine dioxide inhibits the replication of porcine reproductive and respiratory syndrome virus by blocking viral attachment

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PMID: 30395996 DOI: [10.1016/j.meegid.2018.11.002](https://doi.org/10.1016/j.meegid.2018.11.002)

Abstract

Porcine reproductive and respiratory syndrome virus (PRRSV) causes a great economic loss to the swine industry globally. Current prevention and treatment measures are not effective to control the outbreak and spread of porcine reproductive and respiratory syndrome (PRRS). In other words, new antiviral strategies are urgently needed. Chlorine dioxide (ClO₂) is regarded as a broad-spectrum disinfectant with strong inhibitory effects on microbes and parasites. The purpose of this study was to evaluate the inhibitory effects and underlying molecular mechanisms of ClO₂ against PRRSV infection in vitro. Here, we identified ClO₂ (the purity is 99%) could inhibit the infection and replication of PRRSV in both Marc-145 cells and porcine alveolar macrophages (PAMs). ClO₂ could block PRRSV binding to cells rather than internalization and release, suggesting that ClO₂ blocks the first stage of the virus life cycle. We also demonstrated that the inhibition exerted by ClO₂ was attributed to the degradation of PRRSV genome and proteins. Moreover, we confirmed that ClO₂ could decrease the expression of inflammatory cytokines induced by PRRSV. In summary, ClO₂ is an efficient agent and potentially suppressed PRRSV infection in vitro.

Keywords: Antiviral activity; Chlorine dioxide; PRRSV.

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