

Investigation of Safety of Inhaled Chlorine Dioxide Gas on Pregnant Rats

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Abstract

Background: Chlorine dioxide gas has a potent antimicrobial activity at extremely low concentration that have no adverse effect to animals and play important role in infection control. Due to the observed wide use of chlorine dioxide gas badges recently during the COVID-19 pandemic and due to the limitation of studies on the effect of this gas on pregnancy; this study aimed to exam the effect of long-term use of low concentration of chlorine dioxide gas inhalation exposure in pregnant rats during gestation period followed by a two-week recovery period for the rat's fetuses.

Methods: This piece of research is a non-clinical, randomized controlled *in vivo* study that was conducted on female rats. Two groups of pregnant rats were used to investigate the safety of exposure to chlorine dioxide gas during gestation; test and control groups. The test group; 11 pregnant rats were exposed to chlorine dioxide gas which was released at 0.03 ppm for 24 hours/day throughout the period of gestation by using the AirDoctor® badge (a commonly used device claiming protection from infection with COVID-19 pandemic). Other 11 control pregnant rats were exposed to room air only. During the study period, the body weight was recorded at baseline and at 18-day of gestation as well as serum creatinine and serum ALT levels. Oral cavity swabs for 3 rats were taken to test for bacterial microbiota before and after 18 days of exposure to the gas. Fetal viability, weight, and teratogenic features were monitored for two weeks after delivery.

Results: No hepatotoxicity signs according to serum ALT level results and no nephrotoxicity signs according to serum creatinine level results were observed during the whole study period. No significant difference were observed in body weights or in microbial sequencing results. The Fetus's general health was ensured.

Conclusions: The safety of inhaled chlorine dioxide gas up to 0.03 ppm cannot be doubted, but up to date there are no clinical studies on pregnant confirming safety, the duration of use, and route of administration of this gas.

Keywords: Chlorine dioxide gas, Inhalation, Pregnant rats, AirDoctor®.