

PROCEEDINGS OF THE WORLD CONFERENCE ON OZONE THERAPY IN MEDICINE, DENTISTRY AND VETERINARY. ANCONA (ITALY). SEPTEMBER 22nd – 23rd - 24th, 2017

Water and air ozone treatment as an alternative sanitizing technology [abstract]

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ABSTRACT

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Citation

Martinelli M, Giovannangeli F, Rotunno S, Trombetta CM, Montomoli E. Water and air ozone treatment as an alternative sanitizing technology [abstract]. Proceedings of The World Conference on Ozone Therapy in Medicine, Dentistry and Veterinary. Ancona (Italy). September 22nd – 23rd - 24th, 2017. J Ozone Ther. 2019;3(4):23. doi: 10.7203/jo3t.3.4.2019.15426

Academic Editor

Jose Baeza-Noci,
School of Medicine, Valencia
University, SPAIN

Editor

World Federation of Ozone Therapy,
Bologna, ITALY

Received

June 17, 2019

Accepted

December 08, 2019

Published

December 30, 2019

Intellectual Property

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Purpose: Investigate the effectiveness of ozone treatment as an alternative sanitizing technology to conventional disinfectants in reducing the microbial contamination of both water and air.

Patients and methods: Ozone was added for 20 minutes to a well-defined volume of water and air by the system named “Ozonomatic®”. The effectiveness of ozonation was determined by counting CFU/m³ or ml of bacteria present in samples of air or water collected before (T0) and after (T1) the addition of ozone and comparing the microbial load of different bacteria present in ozonized and non-ozonized samples.

Results: When the ozonation equipment was located at 30 cm from the surface of the water in the bath tub in which the bacteria were inoculated, the treatment was able to reduce the microbial load present in the aerosol by 70.4% at a temperature of 36°C for 48 hours. Conversely, at 22°C for 5 days, only a modest decrease (9.1%) was observed. *Escherichia coli* and *Pseudomonas aeruginosa* were completely eliminated. A 93.9% reduction was observed for *Staphylococcus aureus*, followed by *Streptococcus faecalis* (25.9%). The addition of ozone to water was able to almost eliminate *Staphylococcus aureus* (98.9% reduction) and also to exert a strong impact on *Legionella pneumophila* (87.5% reduction). *Streptococcus faecalis* and *Pseudomonas aeruginosa* showed a decrease of 64.2% and 57.4%, respectively. Conversely, only a 26.4% reduction was observed for the bacterium *Escherichia coli*. This study showed that the addition of ozone in the air exerted a modest reduction on microbial load at 36°C, whereas no effect was observed at 22°C.

Conclusion: Aqueous and gaseous ozone treatments were effective against microbial contaminants, reducing the CFU of the microorganisms and confirming its efficacy in water and air disinfection.