709

IN VITRO ANTIBACTERIAL ACTIVITY OF OZONE: TOPICAL OZONATED FORMULATIONS (OIL, GAS, WATER) AGAINST MULTIDRUG-RESISTANT BACTERIA

Lessandra Michelin [a,*],
Kaliane Cristina da Silva Lopes [a],
Rodrigo Araújo Leite [a],
Isabela da Silva Voltolini [a], Claudia Wollheim [a],
Rodrigo Schrage Lins [b]

[a] *Universidade de Caxias do Sul (UCS), Caxias do Sul, RS, Brazil*
[b] *Instituto de Educação Médica (IDOMED), Brazil*

Introduction: Ozone has microbicidal activity, promoting the inactivation of microorganisms by oxidation in topical ozone therapy formulations, using gas, water, and ozonized oil as vehicles. Ozonized topical formulations have been described as adjunct therapies for the treatment of skin lesions (1–3). The objective of the study was to evaluate the in vitro microbicidal effect of these formulations applied to seven standard bacterial strains.

Methodology: The antibacterial activity of ozone in vegetable oil, gas, and water formulations was evaluated against seven ATCC® and NCTC® standard bacterial strains, two multidrug-resistant Gram-negative strains: *Klebsiella pneumoniae* TEM, SHV®, TM KPC-2–producing, imipenem-resistant – ATCCBAA, and *Escherichia coli* IMP ATCC® 13476, and one Gram-positive coccus with the mecA gene (*Staphylococcus aureus* MRSA NCTC® 12493), and four bacterial strains non-resistant to antimicrobials (*Klebsiella pneumoniae* NCTC® 13368, *Escherichia coli* ATCC® 25922, *Pseudomonas aeruginosa* ATCC® 27853, and *Staphylococcus aureus* ATCC® 25923). Visual comparison and colony-forming unit counts on the plates were performed after exposure to ozonized formulations at different concentrations and times. Sunflower oil with a peroxide index of 600 mmol-Eq/kg was used. Gas was obtained through a medical ozone generator at concentrations of 30 and 60 mg/L. The water used was laboratory type II reagent water, with a temperature variation of 2 to 4°C, and ozonized using a medical generator. Exposure time to the different formulations ranged from 1 to 15 minutes.

Results: After analysis, the gas and oil formulations demonstrated antimicrobial activity, inhibiting the growth of bacteria, whether multidrug-resistant or not. Ozonized water showed faster activity in inhibiting bacterial growth, followed by gas and oil formulations. In the evaluation of exposure time, 100% inhibition of strain growth was observed with all three formulations after 10 minutes.

Conclusion: The three topical formulations demonstrated similar in vitro antimicrobial activity, even in multidrug-resistant strains, showing potential as an adjunct topical solution for the control of these microorganisms.

Keywords: Multidrug-Resistant Bacteria, Ozone, Ozonated Gas, Ozonated Water, Ozonated Oil.

https://doi.org/10.1016/j.bjid.2026.105339

710

AUDIT OF ADHERENCE TO PREVENTION MEASURES FOR NON–VENTILATOR-ASSOCIATED PNEUMONIA IN A TERTIARY HOSPITAL

Mauricio Sério de Paula [a,*],
Samuel Rodrigues dos Santos [a],
Renata Aparecida Belei [a],
Ana Paula Candido Martins [b],
Maria Eduarda Rodolfo Cordeiro [b],
Danielle Ruiz M. Ferreira [a],
Cláudia M.D.M. Carrilho [a],
Maria Cristina da Silva Paduan [a],
Herlieni de Oliveira Mota e Silva [a],
Adriana Cristina Galbiatti Parminondi Elias [a],
Maria de Fátima Oliveira Hirth Ruiz [a],
Marcos Toshiyuki Tanita [a],
Flávia Mendonça da Silva Oussaki [a]

[a] *Universidade Estadual de Londrina (UEL), Londrina, PR, Brazil*
[b] *Centro Universitário Filadélfia (UniFil), Londrina, PR, Brazil*

Introduction: Non–ventilator-associated pneumonia (NVAP) is highly relevant because it affects patients whose airway immune barriers are not compromised by devices. Despite this, incidence remains high.

Objective: To analyze adherence to NVAP prevention measures across hospital sectors.

Methods: Descriptive, cross-sectional, quantitative observational study in a public tertiary university hospital in Northern Paraná, including inpatient units, emergency departments, and post-anesthesia recovery room. Data were collected by infection control committee interns from March 2024 to June 2025 (morning/afternoon/night) using an institutional Google Forms® audit tool.

Results: A total of 2,211 observations were collected: 52.7% in the morning, 37.8% afternoon, 9.5% night. Head-of-bed elevation 30–45° was present in 81.6%. Oral hygiene three times daily was not performed in 56.2%. Respiratory physiotherapy was not performed in 31.3%, though 40.9% were "not applicable." Early ambulation occurred in only 38.5%. Postoperative analgesia was not provided in 69.8%, despite 800–1,000 surgeries per month. In 47.4%, nebulizer mask or bag-valve-mask was protected.

Conclusion: NVAP prevention measures were not satisfactorily performed, increasing infection risk. Head-of-bed elevation showed highest adherence as it requires less work. Measures requiring more team effort—oral hygiene, early ambulation, and postoperative analgesia—had lower adherence. Prevention measures must be reinforced in wards to improve patient safety and care quality.

Keywords: Public Health, Health Surveillance, Pneumonia, Public Hospital.

https://doi.org/10.1016/j.bjid.2026.105340