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# The Effect of Ozone Treatment on Selected Pathogenic Bacteria


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## INTRODUCTION

Each year worldwide, foodborne illness caused by consuming food contaminated by bacteria and/or their toxins cause 600 million cases and 420000 deaths (WHO). This study investigated the effect of ozone against foodborne pathogen bacteria:

- *Staphylococcus aureus* ATCC 25923
- *Escherichia coli* ATCC 25922
- *Listeria monocytogenes* ATCC 7644
- *Salmonella enteritidis* ATCC 13076

## MATERIALS AND METHODS

- The bacterial inoculum, with an initial concentration of 7-8 log CFU/mL, was serially diluted (from -1 to -8) and inoculated onto separate Petri dishes
- The bacteria were exposed to gaseous ozone
- Ozonation was conducted within a fume hood under controlled environmental conditions, maintaining an air temperature of 24 °C and a relative humidity of 55%
- The concentration of ozone was kept at 10 mg/L, over 10 and 20 minutes
- Following the ozone treatment, the plates were incubated at 37 °C for 24h

| Pathogenic bacteria | Control | Treatment with ozone at 10 mg/L | |
|---|---|---|---|
| | | 10 min | 20 min |
| | log CFU/mL | | |
| ***Staphylococcus aureus*** | 7.55 | 7.90 | 6.86 |
| ***Listeria monocytogenes*** | 7.48 | 5.38 | 5.93 |
| ***Escherichia coli*** | 7.10 | 6.04 | 6.64 |
| ***Salmonella enteritidis*** | 7.28 | 6.76 | 6.66 |

**Table 1.** The effect of ozone treatment on bacteria at $10^{-5}$ dilution

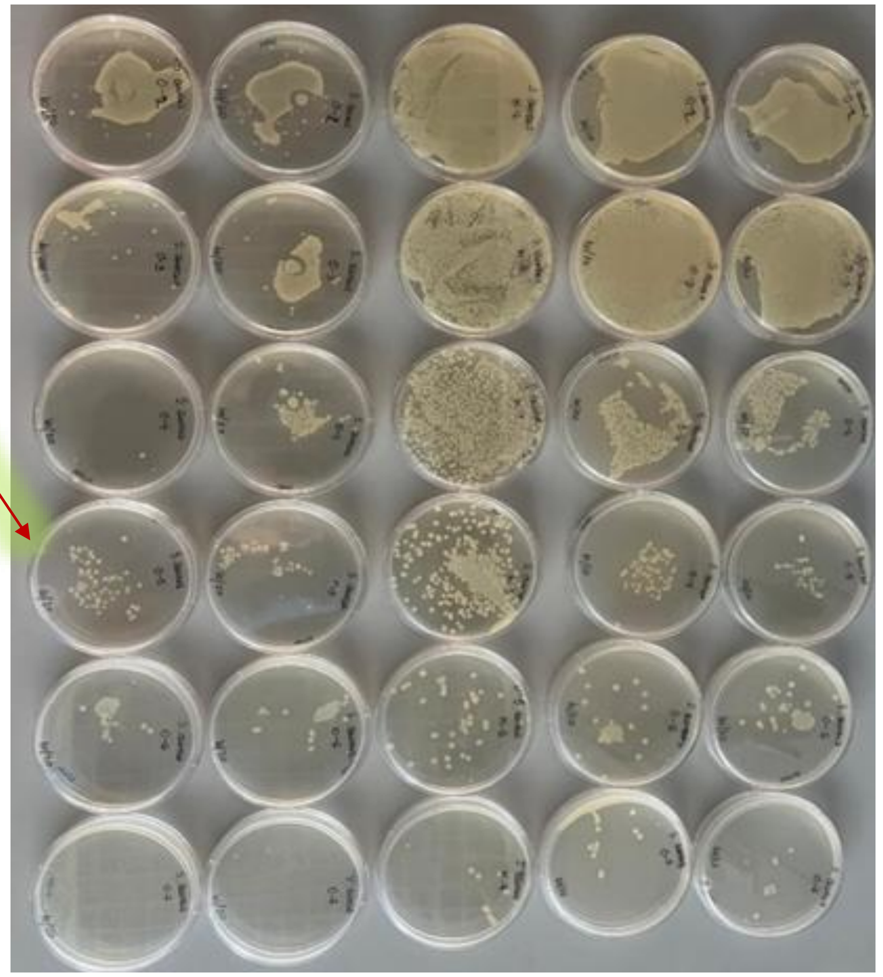


**Figure 1.** The effect of ozone treatments on *S. aureus* for -2 to -7 dilutions

## RESULTS

- The gaseous ozone treatments (10 mg/L, 10 and 20 min) had a suppressive effect on pathogenic bacteria on all tested dilutions. The results for $10^{-5}$ dilution are shown in Table 1. This dilution was chosen for the countability of CFUs (Figure 1.)
- Exposure to ozone for 20 minutes reduced the count of bacteria from 7 to 20% compared to control sample
- The results show that 20 minutes of treatment with the ozone in concentration of 10 mg/L is efficient method to suppress the growth of *S. aureus*, *E. coli*, *L. monocytogenes*, *S. enteritidis*

## CONCLUSION

These results suggest the potential application of ozonation as an effective disinfection method against these selected pathogenic microorganisms.


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