

Title: USE OF GASEOUS OZONE FOR THE CONTROL OF *Salmonella* AND *Listeria* ON PIG CARCASSES

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Abstract:

Post-harvest antimicrobial technologies have been associated with the hygienic slaughter process in order to eliminate foodborne pathogens on pig carcasses. In this sense, the gaseous ozone application has aroused great interest in the food industry, because it is effective against pathogenic microorganisms, and it undergoes rapid dissociation without leaving toxic residues in treated foods. The aim of this study was to assess the effect of gaseous ozone treatment applied on pig carcasses during the cooling step, in terms of reduction of Total Aerobic Mesophilic (TAM) populations and control of *Salmonella*, *Listeria* and *Escherichia coli*. The experiment was conducted at a swine slaughter facility, in five consecutive blocks that comprised each one the following treatments: T1- eight pig carcasses subjected to cooling (16 hours at 3°C); T2- eight pig carcasses subjected to two periods of four hours of ozone application (up to 5 ppm) during the cooling period (16 hours at 3°C). The ozone treatment was carried out using an ozone generating equipment (Alvap®) with coupled timer and concentration monitor. The targeted microorganisms were determined before and after the treatments. *Salmonella* and *Listeria monocytogenes* isolates were submitted to Pulsed Field Gel Electrophoresis (PFGE) and the pulsotypes were compared. In the T1, no significant difference ($p>0.05$) was observed in TAM counts before and after cooling. In contrast, the application of ozone (T2) resulted in a significant ($p<0.05$) decrease of TAM on the carcasses. Regarding the number of positive carcasses for *Salmonella* and *E. coli*, a significant increase ($p<0.05$) was observed in T1, while the same pattern was not observed in T2. However, no reduction in the number of *E.coli* positive carcasses and only a tendency ($p=0.08$) of less *Salmonella* positive ones was observed in T2. No effect was observed on the *Listeria* population after treatments. *Salmonella* Agona (n=10), Derby (n=7), Typhimurium (n=2), and O:4.5 (n=1), as well as *Listeria innocua* (n=5) and *L. monocytogenes* (n=10) were isolated from the carcasses. Similar PFGE pulsotypes of *Salmonella* and *L. monocytogenes* were detected before and after cooling in T1, demonstrating that the low temperature was not able to eliminate these isolates. The results demonstrate that the tested protocol of ozone application is able to reduce the number of TAM on pig carcasses, whereas it is not effective in eliminating *Salmonella*, *E. coli* and *Listeria* sp.

Key-words: antimicrobial treatment, carcass cooling, total aerobic mesophilic, *Escherichia coli*, *Salmonella*.

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