CONTAMINATION FROM CONDENSATION DROPLETS IN SLAUGHTERHOUSES ENVIRONMENT

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I. INTRODUCTION

Despite the importance given to condensation in food processing industries, there are neither microbiological criteria established, nor hazards scientifically proved. Previous scientific work on this subject is also rare. This project was developed with the objective of verifying the profile and bacteriological load of condensation in cold rooms facilities of a cattle slaughterhouse located in Goiânia/Goiás/Brazil.

II. MATERIALS AND METHODS

The contamination profile, in the condensation drops located at the chilling chambers (at the entrance, center and at the exit), the quartering and deboning room of a beef slaughterhouse were investigated. Samples were obtained on nine different days over three weeks. Samples were collected with a swab, absorbing the droplet without touching the surface. At least two swabs were obtained from each sampled point, and placed into a tube containing 5 mL of 0.1% peptone water. Drops from the same location constituted a “pool” representing a single sample. Thus, in total, 35 samples in the form of a “pool” and 750 drops of condensation were collected. The squeegees used to wipe away the condensation droplets were also sampled by swabbing a 20 cm^2 area.
Mesophilic counts were performed according to BRASIL (1) and psychrotrophic counts according to BRASIL (2) and APHA (3). Presence of *Listeria monocytogenes* was performed following AOAC, 2004.02 - MiniVidas (4); *Salmonella* spp., according AOAC 996.08 - MiniVidas (5), *Escherichia coli*, according to BRASIL, (1) with modifications. Decision 2073/2005/EC of the European Commission was taken as a reference standard (6).

III. RESULTS AND DISCUSSION

The mesophilic count revealed contamination in 24/35 samples (69%). The average contamination was 0.65 log CFU per drop of condensation. When only positive samples were analyzed, the average was 1.86 log CFU/mL, with only one sample – obtained from the ceiling of the quartering room – with values above 3.5 log CFU/mL, (3.64 log). The psychrotrophic count revealed contamination in only 4/35 samples (11.43%). The average count of positive samples was 2.9 log CFU/mL. Within the 750 condensation drops analyzed, neither *Listeria monocytogenes* nor *Salmonella* spp. were detected. *Escherichia coli* was identified in only two samples (5.71%), one of them from drops located on the counterweight of the saw in the quartering room and another at the exit of the maturation chambers, on the plastic curtains located around the rail window. In both locations, flaws were found in the hygiene and sanitation processes at the time of sample collection.

Condensation represents a risk to food safety, since drops, when reaching surfaces or food products, may carry pathogenic or spoilage bacteria. However, our results showed low contamination, both by pathogenic and spoilage microorganisms. The absence of *Listeria monocytogenes*, a microorganism frequently implicated as a possible contaminant of condensation droplets, would be considered one of the most relevant results obtained in this research. *Salmonella* spp. was also not found in any sample. Our results, indicating lower contamination than previously reported by other authors (7), may be related to the effectiveness of self-control programs adopted by food exporting industries.

IV. CONCLUSION

The results regarding contamination in condensation droplets in the studied areas showed the absence of pathogens, such as *Listeria monocytogenes* and *Salmonella*, as well as low counts of mesophiles and psychrotrophics. The results obtained suggested that cleaning and sanitizing methods applied regularly in areas where condensation forms, kept contamination under control. However, it is essential to review these programs, doubling care and attention, specifically targeting surfaces where condensation usually occurs. Despite the limited period of time, and having been carried out in just one plant, the results obtained would suggest the need to deepen knowledge about contamination associated with condensation. New research will provide scientifically based information to address cases of condensation with modern risk assessment criteria.

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Field Code Changed