Correlation between airborne bacteria, carcass dirtiness and hygiene indicators of bovine carcasses in the slaughterhouse environment

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Introduction

Escherichia coli is one of the hygiene indicators evaluated in the slaughterhouse environment. Cattle are the main reservoirs, being asymptomatic shedder since *E. coli* is a commensal of their digestive tract. From this, it can be deduced that faeces are the main way by which skin and meat can be contaminated. Furthermore, the amount of soiling and visible dirt on the skin of the animal, at slaughterhouse level, are possibly related to *E. coli* contamination. Therefore, clean animals at the slaughterhouse along with good hygiene practices during slaughter are essential requirements to avoid or reduce carcasses contamination and guarantee food safety. Our study aims to demonstrate the correlation between visible contamination of the carcasses and slaughterhouse aerosol with the hygiene level, evaluated by laboratory techniques.

Materials and methods

During our study, total mesophilic aerobic bacteria and E. coli were enumerated. An innovative method was applied to determine the visible contamination of carcasses, such as hairs and faecal specks, by using a 100 cm^2 sheet of transparent adhesive plastic material applied on the side of the carcass to collect all particles, then counted first against a black and then against a white background. Airborne bacteria in slaughterhouse aerosol were determined by EasySPT air sampler. The device typically used for the airborne microbiota monitoring, has a suction flow of 10 L / min. Three Petri dishes with selective medium were placed in the machine suction chamber to evaluate three different bacterial populations: total mesophilic aerobic bacteria, *Enterobacteriaceae* and enterococci. A linear regression was performed to determine the correlation of visible contamination of the carcass and bacterial load of the aerosol with results of the microbiological analysis.

Results and conclusions

A total of 249 carcasses were sampled. The mean values of total aerobic bacteria and *E. coli* were always under the upper limit provided by the regulation. Sixty carcasses, out of 249 (24%), were positive for *E. coli*. A statistically significant correlation of visual dirtiness score and aerosol was observed with bacterial counts. These results are of the utmost importance to streamline the control practices for hygiene criteria of production processes in slaughterhouses by lessening the expensive and time consuming routine procedures of laboratory analytical methods.