Potential of Salmonella Heidelberg and S. Infantis at the production of biofilms in polystyrene and stainless-steel surfaces

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We know that chicken meat can be a source of foodborne pathogens, especially Salmonella spp, even with good hygienic practices allowing it to survive and multiply both in the processing environmental and in the food. Once present, Salmonella can adhere to equipment and utensils by forming microbial biofilms on the most diverse surfaces of the slaughter line. Considering that the pre-chiller is the last step in the chicken slaughter, any contamination of the carcasses is carried through the next steps, for example, to the cutting rooms. Since these isolates be able to form biofilms, the cutting production environment can become contaminated and compromise the safety of the process especially due to cross-contamination caused by the detachment of mature biofilms on the surfaces. Thus, the main of our study was to evaluate the ability of Salmonella spp. Isolated from chicken carcass samples after the pre-chiller stage in the formation of biofilms in stainless steel and polypropylene. We used 16 isolates of Salmonella spp. 15 of S. Heidelberg and one of S. Infantis, originating from of chicken carcass obtained by superficial rinsing immediately after the pre-chiller tank exit. The isolates of Salmonella spp. kept at -18ºC were recovered in BHI broth, with incubation at 36°C/24h following standardization at 0.5 on the MacFarland scale. We conducted adhesion assay on 96-well stainless steel and polypropylene plates with two replications, at least. As a negative control we used uncultured BHI broth. We inoculated 200µl of each of the 16 isolated in triplicate into the plaques with incubation at 30ºC/25h for adhesion. We washed the wells with 250µl of PBS and fixed the adhered cells with 200µl of 99% methanol and stained with 200µl of 1% crystal violet. We used 33% glacial acetic acid for the detachment of the adhered cells and then we made the reading in a Diatek® microplate reader, model DR-200B at 450 nm wavelength. We classified the isolates as: not adherent, with poor adherence to, with medium adherence to or strong adherence to. Of 15 isolates of S. Heidelberg, 2 (20%) shown poor adherence to, two of which adhered to both surfaces studied and only one adhered in polypropylene. The other 12 isolates were considered not-adherent. The only isolate of S. Infantis was considered non-adherent. Our results showed that the Salmonella isolates found on chicken carcasses have a potential to form biofilms with the possibility of adhering to and colonizing abiotic surfaces in following stages of technological processing to obtain chicken cuts which could contribute to cross contamination of the final product.

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