TITLE: TEMPERATURE AND BIOCIDAL AGENTS EFFECTS ON BIOFILMS OF *Salmonella* Minnesota

AUTHORS: MELO, R.T.; BRAZ, R.F.; PERES, P.A.B.M.; CARDOSO, T.R.; MENDONÇA, E.P.; MONTEIRO, G.P.; SANTOS, L.S.; SANTOS, F.A.L.; DUMONT, C.F.; ROSSI, D.A.

INSTITUTION: UNIVERSIDADE FEDERAL DE UBERLÂNDIA – FACULDADE DE MEDICINA VETERINÁRIA, UBERLÂNDIA, MG (AVENIDA PARÁ, 1720, CEP 38400-902, UBERLÂNDIA – MG, BRAZIL)

ABSTRACT:

Salmonella is a microorganism often involved in episodes of foodborne diseases, being the poultry products the largest transmission vehicle. The increasing isolation of *S.* Minnesota in the poultry industry is worrying, since the mere presence of the genus generates sanitary embargoes and international alerts. Biofilms contributes to a difficult control of *Salmonella* in the industries, becoming a source of constant contamination, therefore, it is important to know the behavior of *S.* Minnesota in the existing temperatures in the industry and facing the biocides commonly used in the processes of hygiene. The aim of this study was to evaluate the capacity of biofilm formation and the biofilm formation index (BFI) in *S.* Minnesota isolates at different temperatures, as well as the potential of biocides in the combat of formed sessile structures. Twenty strains of *S.* Minnesota isolated in the years 2009, 2010 and 2014 in broiler slaughterhouses of two Brazilian companies were used, they were both qualified for national and international market. The BFI was obtained by the traditional method, in TSB broth with 5% of chicken juice, at temperatures of 4ºC, 25ºC and 37ºC. For the inhibition test, the biofilms were formed on cellulose membranes for three days and treated with 1% chlorhexidine, 1% sodium hypochlorite and 0.8% peracetic acid for 15 minutes in order to simulate the industrial hygiene process. The ability of *S.* Minnesota to generate biofilm at different temperatures is strain-dependent and quite alterable. At 4 °C the biomass intensity was significantly lower than those found at temperatures of 25 °C and 37 °C. The BFI demonstrated that there is inhibition of biofilm production at 4 °C, but there is still the production of biomass with contaminant potential. For all the tested biocides the presence of tolerant strains was observed, being 60% (12/20) resistant to all the agents. The use of peracetic acid and chlorhexidine demonstrated the same efficiency, with a reduction of about 3 log cycles in the counts, higher than that found for sodium hypochlorite. These data indicates a possible exposure to sublethal doses of the agent promoting the selection of resistant strains or acquisition of genetic material that favored the development of resistance to the disinfectant agents. The use of low temperatures in the industry favors the control of the sessile form. Together, stringent control and monitoring measures in the sanitization processes should be a priority in the industry to prevent or remove *S.* Minnesota biofilms, ensuring the safety of the final product.

Keywords: biomass, contamination, disinfectants, resistance

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