Factors affecting food security in raw-milk pasta-filata cheese manufacture

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Despite research findings on the absence of pathogens in raw-milk cheeses, there is still debate about food security of traditional cheese production systems. This study aimed to evaluate the effect of stretching temperatures

on the growth of the four dairy pathogens bacteria during raw-milk pasta-filata cheesemaking. Cheese production was carried out with raw cow's milk started with commercial Lactic Acid Bacteria (LAB) strains following the traditional transformation process, including curd cooking and stretching phase in hot deprotenized whey. Experimental production were contaminated with 10^3 Colony Forming Unit (CFU)/mL of *Escherichia coli* O157, *Listeria monocytogenes*, *Salmonella* Enteritidis and *Staphylococcus aureus*. The experimental plan included three different stretching temperatures: 74.5 °C for 15 min (A), 83.6 °C for 20 min (B), and 90.2 °C for 20 min (C). Microbiological analyses were performed on raw milk, coagulated milk, curds, acidified curds, stretched curds, cheeses after brining and ripened at 30, 60, and 90 days. All samples were subjected to the decimal serial dilution procedure and the microbial suspensions were used for the plate counts of the pro-technological, spoilage and pathogenic populations. Results showed that during milk coagulation, there was a significant ($P<0.05$) increase on the levels of inoculated pathogens followed by a progressive decrease during curd cooking and acidification. After the stretching phase, the loads of added pathogens drastically reduced (<2 Log CFU/g), in trials B and C, and remaining below the detection limit from brining and during ripening. The levels of mesophilic and thermophilic coccus and rod LAB of curds were superimposable among trials and reached values above 6 Log CFU/g in 90-d ripened cheeses. This study evidenced that stretching cheesemaking technology was impactful in limiting the growth of the four selected dairy harmful bacteria, revealing that the best temperature/time combination to be applied during stretching is 83.6 °C/20 min.