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Inactivation modeling of *Staphylococcus* positive coagulase and fecal coliforms during ripening of serrano artisanal cheese

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Serrano artisanal cheese is a traditional raw milk dairy product in southern Brazil, whose safety remains a huge discussion in food science area. For safe consumption of unpasteurized milk products, ripening is a critical period for pathogen and spoilage microorganism populations reduction and, thus, the knowledge on inactivation kinetics of microorganisms is necessary to warrant food safety and quality. In the present work, inactivation kinetics of foodborne pathogens required by Brazilian regulations in serrano artisanal cheeses were statistically evaluated during ripening. *Salmonella* spp., *Listeria monocytogenes*, positive coagulase *Staphylococcus aureus* and fecal coliforms were analyzed for up to 60 days. Experimental data were fitted to first order, Weibull and Log-linear+shoulder models. Results showed the chesses to be safe for the presence of *Salmonella* spp. and *L. monocytogenes* through the studied period. First order and Weibull models presented good performance to represent positive coagulase *S. aureus* and fecal coliforms during ripening, although Weibull distribution showed up better fit to experimental data. Log-linear+shoulder equation was discarded to describe the microorganism count reduction for physical criteria. Kinetics showed an initial resistance of fecal coliforms to be inactivated, unlike positive coagulase *S. aureus* population. The results found in this study show that the maturation process of the 60 days old serrano artisanal cheese was effective in the reduction of coliforms at 45ºC and staphylococci coagulase positive modeling analysis allowed to estimate serrano cheese ripening period to be longer than 33 days for achieving a safe product according to the Brazilian policy standards.
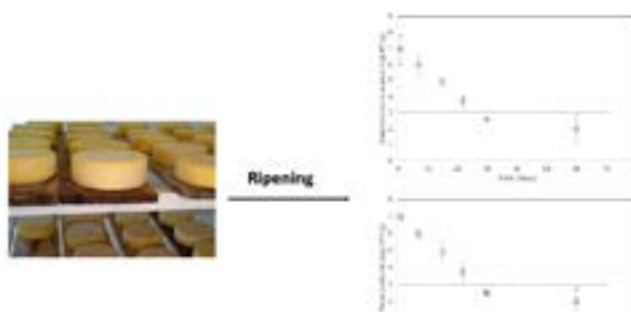
Figure 1. Graphical abstract: kinetic modeling of foodborne pathogens in serrano artisanal cheese during ripening.

Recent Publications:

1. Pretto A N and Sant Anna V (2017) Serrano cheese: a cultural, quality and legal vision. Sanitary Vigilance in Debate: Society, Science and Technology. 5(4): 81-86.

2. Sant Anna V et al. (2013) Antimicrobial activity of peptide P34 during thermal processing. Food and Bioprocess Technology. 6(1):73-79.

3. Malheiros O S et al. (2015) Kinetic modeling of thermal inactivation of antimicrobial peptides produced by *Lactobacillus* sakei subsp. sakei 2a. Thermochimica Acta. 605:95-99.

4. Silveira S T (2013) Stability modeling of red pigments produced by Monascus purpureus in submerged cultivations with sugarcane bagasse. Food and Bioprocess Technology. 6(4):1007-1014.

5. Sant Anna V, Corrêa A P F and Daroit D J, Brandelli (2013) Kinetic modeling of thermal inactivation of the Bacillus sp. protease P7. Bioprocess and Biosystems Engineering. 36(7):993-998.

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Biography

Voltaire Sant Anna pursued his Food Engineering; PhD in Chemical Engineering Federal University of Rio Grande do Sul (Brazil) respectively. He has published more than 40 papers dealing with food science and technology in reputed journals. Currently, he has been working with mathematical modeling and optimization of relevant subjects for food industries.

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