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**Influence of intramammary infection by Streptococci and Escherichia coli on the  
coagulation properties of milk**

In this work we investigated the influence of infection caused by Streptococci and Escherichia coli on the quality of milk. It is of high importance to understand the processes that occur during mastitis. The quality of the milk and its ability to coagulate may be significantly impaired during inflammation and there is a need to understand whether these processes can be detected and if they proceed after milking in the milking tanks.

In our research, we examined and compared the properties of milk from healthy udder, infected udder, and inoculated milk. We examined different strains of Escherichia coli, Streptococci dysgalactiae, and Streptococci ubires. The milk samples were analyzed for their ability to coagulate, and we characterized a number of properties including morphology, size and charge, by spectroscopy, scattering and advanced microscopy methods.

Our research identified a number of strains that had negative effect on the milk ability to coagulate. Fat globules morphology was not different in the infected or inoculated milk, except of two E. coli strains, where large aggregation of fat globules formed. These aggregated resulted from bacteria degradation of the casein proteins which normally wrap the fat globules. Milk micelles analysis showed prominent changes in the micelles structure and caseins composition in the presence of bacteria. When fat globules were removed, it was already visible that the turbidity of E. coli inoculated milk was much lower than other examined milk samples. Furthermore, we show for the first time, using electron microscopy, that the presence of bacteria in the milk cause the disassembly of milk micelles, and the separation of kappa casein in this process, followed by the rearrangement and self-assembly of kappa casein into long amyloid fibers. Amyloids fibers may cause damage to the udder tissue and even to the digestive system of milk consumers. These results were observed in infected udder milk as well as in inoculated milk and they support previous works where it was demonstrated that Strep. Dysgalactiae can secrete enzymes that cleave the beta casein protein in a specific site, and thus decrease the milk coagulation ability. It was also shown that these enzymes are still active in the milk tanks, further increasing the damage caused to the milk out of the infected udder.