Listeria monocytogenes in milk biofilms

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Biofilms develop successively on devices of milk production without sufficient cleaning and originate from the microbial community of raw milk. The established biofilm matrices enable incorporation of pathogens like *Listeria monocytogenes* which can cause a continuous contamination of food processing plants. *L. monocytogenes* is frequently found in raw milk and non-pasteurized raw milk products and as part of a biofilm community in milk meters and bulk milk tanks. *Listeria*-contaminated products are known to cause listeriosis, a severe infection with high mortality for persons at risk, such as pregnant women, elderly or children. The aim of this project was to identify at which stage during biofilm formation members of *L. monocytogenes* settle best and if *L. monocytogenes* strains interact with the microbial community of raw milk in the same manner. Quantification of settled *L. monocytogenes* in raw-milk biofilm was carried out by fluorescence in situ hybridization (FISH). Microbial interaction on population level was analysed by terminal restriction fragment length polymorphism analysis (T-RFLP) and the chemical composition by Fourier transform infrared spectroscopy (FTIR).

Addition of *L. monocytogenes* to raw milk caused an enriched biofilm formation mainly by attachment of milk compounds. Formation of biofilm and attachment of *Listeria* cells was not *Listeria* serotype but strain specific. However, the added *L. monocytogenes* strains were not abundant since mainly members of the genera *Citrobacter* and *Lactococcus* dominated the bacterial biofilm community. Overall, added *L. monocytogenes* strains led to a highly competitive interaction with the raw-milk community and triggered enriched biofilm formation.