

Session: Emerging technologies

Water hose biofilms in the meat processing environment harbor complex microbial communities

Eva Maria Voglauer¹, Benjamin Zwirzitz², Sarah Thalgueter¹, Evelyne Selberherr³, Martin Wagner^{1,3}, Kathrin Rychli³

¹*FFoQSI GmbH - Austrian Competence Centre for Feed and Food Quality, Safety and Innovation, Austria*

²*Institute of Food Science, University of Natural Resources and Life Sciences, Vienna, Austria*

³*Unit of Food Microbiology, Institute of Food Safety, Food Technology and Veterinary Public Health, University of Veterinary Medicine Vienna, Austria*

Biofilms pose manifold problems in diverse environments. Research on biofilms in the food processing environment is limited, yet biofilms are often mentioned as contamination source for food production in scientific literature. We showed that biofilms exist in the meat processing environment during production and even after regular cleaning and disinfection. Biofilms were present on food contact surfaces and non-food contact surfaces. Among these non-food contact surfaces, predominately water hoses were identified to harbour biofilms.

The evaluation of biofilm presence in water hoses has been performed in critical settings (e.g. household, hospitals), yet in the food environment the confirmation of water hoses as biofilm reservoirs is still lacking. It has been previously described that biofilms alter the appearance and microbial quality of water along the distribution chain. Especially in the food processing environment safe and hygienic water distribution is essential, as it is required for maintaining product quality and safety.

In this study, the microbial communities of water hoses, the source water, and environmental sites in contact with water at a meat processing plant were investigated. Biofilms were present in all water hoses, as determined by the presence of bacterial DNA and biofilm matrix components (carbohydrates, extracellular DNA, and proteins). The microbial community of biofilms was less diverse than the water microbial community. The source water harboured the richest microbial community and different rooms showed different microbial community patterns, especially with respect to certain abundant genera. Overall, the microbial communities of biofilms, water, and the environment were distinct from each other. Within biofilms, genera that are associated with an intracellular lifestyle (e.g. *Neochlamydia* and *Legionella*) were present. On surfaces in the meat processing plant, genera associated with food spoilage were identified (e.g. *Pseudomonas*, *Acinetobacter*, *Psychrobacter*). This study provides first insights into the complex microbial communities of water hose biofilms in the food processing environment.