

PRE-HARVEST FOOD SAFETY CONCEPTS

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Water pipe deposits in swine nursery units as a possible reservoir of *Salmonella*?

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Introduction

The quality of drinking water is crucial for the health, welfare and performance of swine. As a consequence of poor water quality, undesirable substances as well as microorganisms can be introduced into the food chain. The farmer himself is responsible for ensuring that water is suitable for animal nutrition in accordance with legislation and that technical installations are sufficient, so that the risk of water contamination is minimized. So far, there is neither a guidance for risk assessment according to inorganic and organic deposits nor biofilms in drinking water installations on farms. It is known, that components in water originating from deposits/biofilms can cause a bad taste of drinking water. Hence, this might lead to a decreased uptake of water by the pigs. It is also discussed that biofilms might be a reservoir for pathogens.

Materials and Methods

Deposits in drinking water installations in 15 piglet rearing farms were sampled and analyzed for their physical, chemical and microbiological characteristics. Based onto results from analysis of deposits from the first five farms, a practical approach for a risk assessment on farms was elaborated and tested on ten farms. Deposits were classified with respect to their inorganic proportion and by microbiological culture methods. Different cleaning concepts were tested under laboratory conditions on the respective pipes containing farm-specific deposits.

Results

In four farms *Escherichia coli* and *Salmonella enterica* (predominantly *S. Typhimurium* var. Copenhagen) were isolated in a number of biofilms from water pipes. The antibiotic resistance patterns of respective isolates were compared with those from isolates originating from routine samples or from those reported in literature. Cleaning concepts based onto alternating applications of basic and acid cleaning substances combined with mechanical flow impulses were successful to remove most of the deposits.

Discussion and Conclusion

Inorganic deposits and biofilms are farm-specific with a high variation between farms depending on water origin, pipe installation, dosage of substances by water, technical devices and operation. The results of the study suggest, that water pipes might be a reservoir for zoonotic *Salmonella* strains and that pigs consuming faecally contaminated drinking water are at risk to be infected. Furthermore *Salmonella* detection may be of importance for the prevalence of seroreagents in the context of salmonella monitoring. The fact, that pathogens were most frequently detected in the periphery of the pipeline system near to the drinkers, suggested that predominantly a retrograde bacterial contamination from drinkers takes place on farm. In addition the resistance patterns and the minimal inhibitory concentrations of antimicrobial substances of the potentially pathogenic microorganisms did not differ from those reported in other studies or routinely tested. If a high load of *E. coli* or *Salmonella* is detectable in water pipes of nursery systems, water origin, pipe installation and drinker technique should be checked and a pipe cleaning procedure might be recommendable.

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