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**Hygienisation of process water in the poultry slaughtering process**

**by means of organic acids and oxygen releasers**

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**Abstract:**

**Background/Objective:** Measures to protect consumers from food-borne diseases are implemented throughout the entire production chain for broiler chickens. There is a risk of cross-contamination with zoonotic pathogens through process water or on surfaces, particularly during the slaughter process. As part of the joint research project "KontRed", the existing processes for hygienisation in poultry slaughter are to be optimised and supplemented by further approaches. The focus is on the possible use of chemical and physical disinfection measures to decontaminate process water, in particular scalding water, as well as the poultry carcasses themselves.

**Methods:** The effectiveness of organic acids (formic acid, lactic acid), oxygen releasers (peracetic acid, hydrogen peroxide, ozone) and the effectiveness of UV-C treatment for the hygienisation of scalding water was tested using suspension tests with food-relevant pathogens. Water with various degrees of organic contamination was used as model water.

In addition, the effectiveness of organic acids and oxygen releasers on the surfaces of the carcasses was tested by means of carrier tests based on EN 13697 using chicken skin as the test matrix. The test parameters were adapted to the usual scalding and cooling processes in poultry slaughterhouses.

**Results:** The organic acids tested showed effective disinfection in the suspension tests, even with high organic loads. A reduction of 5 log10 levels was achieved at a concentration of 2% and 4.5% for formic acid and lactic acid respectively. The oxygen-releasing substances peracetic acid and hydrogen peroxide also effectively disinfected the model water, in some cases at very low concentrations of 0.03% and 2%. When ozone was used, however, it was not possible to achieve effective disinfection even at very high ozone doses (10 - 20 mg/L). The inactivation of scalding water by UV irradiation was successful. The fluence required for 5 log10 inactivation was 220 J/m².

A reduction of 1 log10 level was achieved on chicken skin using 0.1% peracetic acid. In contrast, the organic acids tested (formic acid, lactic acid) only achieved a reduction of 1 log10 level at high concentrations (10-20%). The sensory alterations on the poultry carcasses were minimal and hardly detectable.

**Conclusion:** The results of the suspension tests show that, with the exception of ozone, hygienisation of process water is possible with the chemical disinfectants tested. A reduction of 5 log10 levels was also achieved with organic additives, which reflect the conditions in the scalding water in practice. The use of UV-C is another option for hygienisation. The UV systems certified for drinking water must have a minimum irradiance of 400 J/m² and could therefore also be used to decontaminate process water. Peracetic acid achieved the best results for the hygienisation of chicken skin. A relevant reduction in germs was demonstrated here at a very low concentration of the active ingredient.

**Keywords:** disinfection, decontamination, slaughter, process water, food safety