

7 SUMMARY

Influence of a biological exhaust air washer on the emission of microorganisms and endotoxins from a duck-fattening unit

In this work the effect of a biological exhaust air washer on the emission of microorganisms and endotoxins was investigated. The exhaust air washer was originally developed to reduce ammonia- and odour emissions. It was a combination of a bioscrubber and a chemofilter. The washing water circulated within facility.

In order to determine the effect of the exhaust air washer on the bioaerosol emission from the duck-fattening unit, the concentrations of dust, airborne aerobic bacteria, airborne aerobic gram-negative bacteria, inspirable endotoxin and moulds were measured before and after the washing process.

Furthermore, the concentrations of bacteria, endotoxins and moulds in the washing water and the composition of gram-negative bacterial and mould flora in the air and the washing water were determined.

In all 22 cases the investigated exhaust air washer decreased the emission of dust, airborne aerobic bacteria and endotoxins. In some cases the concentrations of airborne aerobic gram-negative bacteria (7 out of 22) and moulds (6 out of 22) were increased. In addition to this, the quality of the washing water had an influence on the air composition by forming a secondary aerosol.

The predominant bacterial family in the air in front of the exhaust air washer were *Enterobacteriaceae*, whereas the air after the washer contained mainly *Pseudomonadaceae*.

In order to express the quantitative effect of the exhaust air washer a reduction factor was applied. In average the dust concentration was reduced by a factor of 3.0, the aerobic bacteria by a factor of 6.1 and the endotoxin concentration by a factor of 12.5.

The airborne aerobic gram-negative bacteria were reduced in average by a factor of 1.9, however, in 7 out of 22 cases it was increased by a factor of 14.8 maximum. The concentrations of airborne moulds were decreased in average by a factor of 2.3. In 6 out of 22 cases it increased by a factor of 3.8 maximum.

Future investigation should show whether another filter stage or a treatment of the washing water to minimize the germs (disinfection) can increase the purification efficiency of the exhaust air washer.