EXAMINATIONS OF THE PENETRATION ABILITY OF GERMS THROUGH THE EGGSHELL OF SPF-INCUBATED EGGS DEPENDING ON PRE-TREATMENT OF THE INCUBATED EGGS

P. Trenner, G. Seemann and M. Mitsching

LWU Hygiene GmbH, Eberswalde[1], Lohmann Tierzucht GmbH, Cuxhaven[2], Kesla Forschung & Service GmbH + Co.KG, Hygienelabor Weimar[3]

Washing of eggs is generally regarded to as very critically because it is supposed to injure the cuticle as a barrier against germs.

In order to investigate the influence of the quality of the cuticle on the penetration behaviour of germs, washed and unwashed SPF-incubated eggs were artificially contaminated with *Enterococcus faecium.*

At first the eggs were warmed to 40 °C (oviposition temperature) to simulate the so-called "suction effect" during the cooling phase. Following contamination the eggs were cooled for 2-3 h at room temperature (20°C). Afterwards they were stored for two days at 15°C.

The next step was to stain all eggs in the *MST- CUTICLE BLUE- Test.* Staining with *MST- CUTICLE BLUE* aims on indicating the quality of the cuticle.

Unwashed eggs appeared to show worse staining results than washed eggs. Nevertheless in both groups 2/3 of the eggs were colonised by *Enterococcus faecium* on the interior of the lime shell. Also within each group the colonisation by test germs did not depend on whether the cuticle was well or badly stained.

In a further experiment untreated eggs were stored uncooled (23-25°C) for three days after artificial contamination with *Enterococcus faecium.* In even 100% of these eggs *Enterococcus faecium* was isolated from the inner leaf of the shell membrane.

Assuming that the *MST- CUTICLE BLUE- Test* really allows an estimation of the quality of the cuticle, the condition of the cuticle appears irrelevant if the germ pressure is high. The germs nearly always find a way into the eggs. This occurs particularly fast if the eggs are not stored cooled.

Because the "suction effect" was not simulated in the second experiment one can assume that the germs also actively penetrate through the lime shell at high strain pressure and without cooling.

In a third experiment it was examined if the germ penetration can be prevented by disinfection of the incubated eggs. For that purpose incubated eggs (without simulation of the "suction effect") were contaminated with *Enterococcus faecium.* An experimental group passed through a two-stepped disinfection procedure where as the second group remained untreated.

The disinfection occurred in the first step as aerosol disinfection with a 1% *Wofasteril spezial – Lösung* (active ingredient: peracetic acid). After 2 h standing time an additional immersion disinfection occurred in a 0.5% *Interdes F– Lösung* (active ingredient: quaternary ammonium compounds) with addition of approx. 1% hydrogen peroxide.

In 30% of the non-disinfected eggs *Enterococcus faecium* was isolated from the inner leaf of the shell membrane. In the disinfected eggs no enterococci were isolated from the inner shell membrane.

These investigations very clearly emphasize the benefit of an as possible fast and effective disinfection of incubated eggs after laying as well as the necessity of cooling until the begin of incubation.