VII. Summary

"Investigations about effects of the probiotical feed-additives *Enterococcus faecium* NCIMB 10415 and *Bacillus cereus* var. Toyoi NCIMB 40112 on the immunestatus of sows and piglets"

The prohibition of antibiotics as feed additives (since January 2006) led to a strengthened demand for alternatives like probiotics. Until today immune modulating effects of probiotics were only partially examined.

Aim of the present study was to investigate effects of the probiotical feed-additives *E. faecium* NCIMB 10415 (Cylactin®) and *B. cereus* var. Toyoi NCIMB 40112 (Toyocerin®) on the immune-status of pregnant and lactiferous sows and their litters. In two attempt-passageways the animals were randomised and separated into a test-group (with probiotical supplementation) and a control-group (without supplementation). The probiotic sows' feed was supplemented from early in pregnancy and was maintained until weaning of the piglets (day 28). Piglets had free access to a supplemented prestart feed from day 14 in life. After weaning they were fed with supplemented feed till the end of the study. IgG as the most important parameter of the systemic immune-reaction (in blood), and secretory IgA as most important parameter of the local immune-system (in feces and in whey) were measured using sandwich-ELISA.

Until weaning time point the feed supplementation with the probiotic culture *B. cereus* var. Toyoi had a positive effect on the intestinal immune-system of the piglets.
After weaning both *E. faecium* and *B. cereus* var. Toyoi caused an immune-modulation in the sense of a reduced systemic IgG concentration. At the 35th and 56th day in life significantly reduced total-IgG-amounts were measured in the piglets' blood samples ($p \leq 0.05$). After weaning the measured values of the most probiotic piglets were lower compared to those of the control group at any time point sampled. As a possible reason for this observation, an improved health status of the probiotic piglets must be taken into account. Hence in a parallel attempt (examinations of the Institute of Animal Nutrition) a significantly reduced incidence of diarrhoea was observed in the same animals during the study. Possibly the probiotic animals had a lower pathogenic load and less antigenic challenge than the control group. No influence of *E. faecium* could be observed in the blood or feces samples

from the sows. But *E. faecium* significantly increased the IgA concentration in the *colostrums* ($p \leq 0.05$).

The application of *B. cereus* var. Toyoi induced an enhanced intestinal IgA-production in the sows.

Furthermore antibodies against the shiga-toxin-variant 2e by *E .coli* (serogroups O138:K81 and O141:K85ac) were examined in a specific ELISA. Only samples of those animals which were tested positive for virulence-factors of edema disease before were taken for the shiga-toxin-ELISA. Possibly the influence of *E. faecium* in the sense of a reduced frequency of positive samples was based. The only positive tested piglet after weaning belonged to the control group.

The results illustrate explicit effects for probiotics. They can improve intestinal health and reduce and / or avert diseases. However, the reduced amounts of IgG in the piglets after weaning show, that probiotics doesn`t means healthyness strictly. Rather, it is the surrounding, the animal husbandry and the feeding that affects the health-status of the single individual.