

7. SUMMARY

Effects of *Enterococcus faecium* on physiological transport parameters in the pig jejunum.

In this work, the influence of feeding a probiotic bacterium (*Enterococcus faecium* NCIMB10415) on physiological parameters regarding transport functions (absorption and secretion) and barrier effects in the piglet jejunum was investigated. The conventional Ussing-chamber technique was used to study the effects on the absorptive and secretory properties of the epithelia. The sows were fed with the probiotic bacterium starting day 91. *ante partum*. Possible differences between the probiotic-fed and the control group were assayed by examining changes in transport rates after the different substances were added to the buffer solution.

To study the absorptive attributes, a carbohydrate (glucose) and an amino acid (glutamine) were added in different concentrations. The changes in short circuit current (I_{SC}) were observed and compared. Mannitol fluxes were used to assay differences in paracellular permeability. By adding different concentrations of PGE₂, a substance which induces chloride secretion, the secretory attributes were tested.

For further analyses, the changes in short circuit current ($= \Delta I_{SC}$) were statistically examined and compared.

1. The probiotic-fed groups show a tendency toward a higher response of I_{SC} after adding glutamine. These figures are statistically not significant.
2. The differences after adding PGE₂ showed a tendency of the probiotic-fed groups to lower values (except the age group 28 days). However, this was statistically not significant. A dose-dependant protection of the probiotic against chloride secretion could not be seen.
3. The group of probiotic-fed piglets aged 14 days showed significantly higher values after adding glucose in different concentrations. All other probiotic-fed

groups also revealed higher absorbtive capacity than the control groups, although these differences were not significant.

4. No tendency could be found in the investigation of paracellular permeability using mannitol. Only the group of probiotic-fed animals aged 28 days showed significantly lower values than animals of the same age in the control group. Consistent with the hypothesis that mannitol fluxes are correlated to tissue permeability, the appendant resistance was also higher in that group.
5. The results of this investigation show a large variation.
6. The present work leads to the conclusion that the probiotic bacterium *Enterococcus faecium* can have a positive effect on the intestinal mechanisms, particularly in the critical phase of weaning. The severity of diarrhoeas commonly associated with these age groups could be reduced.
7. The tendency of the probiotic-fed groups to show higher absorption rates could have a positive effect on zoo technical parameters such as gain of weight and facilitate the feed changeover in the critical phase of weaning.