

Summary of the doctoral thesis. Dorota Bederska-Łojewska

“Gastroprotective effect of feed additives containing kaolin clay in piglets”

Promotor: dr hab. Marka Pieszki prof. IZ. Instytut Zootechniki - PIB

Reduced rate of growth of piglets, as well as the deterioration of nutrient utilization, are recognized as the effects of diarrhea, which have the greatest influence on the profitability of pig production. The doctoral dissertation takes under consideration reducing costs of pig production through the addition to a diet of suckling and weaned piglets natural feed additives with multidirectional function, improving digestive tract and preventing diarrhea. Usage in nutrition kaolin clay, dried pomaces of aronia and fructooligosaccharides aims to help maintain good health of the young animals and improve weight gain. The aim of work was to improve digestion, assimilation of nutrients, lower the pH of the intestinal contents and the absorption of toxins, reduce the number of pathogenic bacteria and to stimulate the proliferation of beneficial intestinal microflora. An additional advantage of the materials used in the experiment is the possibility of their use in the feeding of organically reared pigs.

The data available in the literature on the occurrence and prevention of diarrhea in piglets, there was presented the hypothesis assuming that the use of kaolin clay, enriched with dried pomaces of chokeberry and fructooligosaccharides in pig nutrition may have a positive impact on their health and production traits.

In order to verify the above hypothesis the appropriate studies were performed. The project range the composition of the paste administered to the piglets during the first period of rearing and in powder form which was added to the feed mixture after weaning. Feed additives contain in their composition kaolin clay, dried pomaces of chokeberry pomaces and fructooligosaccharides derived from chicory root. Chemical analysis of kaolin clay composition showed a high content of kaolin > 64%, 20% carbon and 1% iron. Furthermore, the clay has a high absorption capacity and sorption and affinity for the medium chain polypeptides which include bacterial toxins. The second of the tested ingredients dried chokeberry pomaces are rich source of anthocyanins, phenolic acids and tocopherol, which have strong antioxidant activity of beneficial effects on the intestinal epithelium. The third component, derived from chicory root, contained in its composition fructans 95.4% and 4.5% of disaccharides which have prebiotic effect stimulating the growth of lactic acid bacteria. On the basis of preliminary studies the specified doses were prepared in the form of a paste and

powder for piglets. Experimental tests were divided into two stages. The stage one was performed on piglets suckling which obtained in the form of a paste the feed additive in 5, 12, 19 and 26 days of age (6 ml). In a second step, which included the period from weaning of the sows at 28 days of age up to 70 days of age, the animals received feed mixture containing (6 g/1 kg feed mixture) a feed additive A (kaolin clay) and B (kaolin, fructooligosaccharides and dried pomaces of aronia) and a control group without the additive.

The obtained results confirmed the beneficial effect of feed additive A and B on the growth and health parameters of piglets. Significantly higher feed utilization improvement rearing period between 7 and 28 days of age in group A ($P < 0.0178$), and tended to improve weight gain ($P < 0.1596$) and higher weaning weight: gr. A 8.39 kg (12.3%); gr. B 8.73 kg (16.9%) compared to 7.47 kg in control group (0%) although no statistically significant difference was observed. A similar trend was observed later. The additives had a large impact on reducing the incidence of diarrhea and improve the condition of the intestinal mucosa.

The results of morphological and biochemical blood parameters confirmed the beneficial effects of the additives in the comparison to the control group. Additive A and B administered in the form of a paste 5 times to the suckling piglets had a beneficial influence on the growth of intestinal commensal microflora in the colon. After weaning, in the jejunum, a significant increase in lactic acid bacteria and *Bacteroides* was observed in group A. Furthermore, in both experimental groups restricted populations of *E. coli* were confirmed. In the large intestine, the lactic acid bacteria population was the highest in group A and B while *Bacteroides* only in group A. There was a tendency to reduce the level of pathogenic bacteria *E. coli* (group B) and fecal *Streptococcus* in both experimental groups. The feces of animals that received additives contained significantly less water ($P < 0.0010$) and were characterized by a higher concentration of nitrogen compounds, although not statistically significant differences was noted.