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LEVELS OF INTESTINAL β -GALACTOSIDASE ACTIVITY, LACTIC ACID AND BLOOD GLUCOSE IN PIGLETS AFFECTED BY "PIG-SCOUR"

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Colibacillosis in preweaning piglets, "Pig-Scour", is a serious disease causing retardation of growth of affected piglets. This study was carried out to confirm an assumption that fall of β -galactosidase in the small intestine is a probable mechanism of malnutrition, and that microbial fermentation of undigested lactose is accelerated in the large intestine. Twelve piglets (9-11 days old) from 3 litters, i.e., 6 naturally affected piglets with pig-scour and 6 apparently healthy littermates, were employed to determine levels of mucosal β -galactosidase activity in the small intestine, lactic acid in the large intestine and blood glucose in the carotid, anterior vena cava and portal vein. The levels in the affected piglets were compared with those in their littermates (control).

The results were summarized as follows:

1. The mucosal activity of β -galactosidase in the affected animals markedly decreased in the small intestine within 48 hours after onset of the scour.
2. Blood glucose levels in the affected animals remained within normal range but tended to be lower compared with the control.
3. The levels of lactic acid in the cecum and colon were significantly higher in the affected animals.
4. Weight loss was observed in the scraped and collected mucosa of the small intestine of the affected animals and compared with that of the control littermates.

From the results, it was confirmed that mucosal β -galactosidase activity of the small intestine decreased in the early stage of the pig-scour. Relatively lowered levels of blood sugar were considered to partially reflect maldigestion of lactose due to depression of this enzyme. The maldigestion of lactose was indirectly suggested from the increased concentration of lactic acid in the contents of the large intestine.

In this study, it was suggested that reduction of β -galactosidase activity in the upper digestive tract in pig-scour leads to malnutrition and to serious dehydration in affected animals because of maldigestion of lactose and development of osmotic diarrhea caused by increased lactic acid in the large intestine.