

DEVELOPMENT OF GUT FUNCTION IN PIGLETS DURING THE TRANSITION FROM LIQUID TO SOLID FEEDING

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Summary. After weaning, piglets often experience a growth check, associated with a high incidence of diarrhea. The objective of the study was to determine functional changes in the small intestine of piglets during the transition from liquid to solid diet by measuring brush-border enzyme activities. A total of 7 female piglets (6.23 ± 0.24 kg BW; German Landrace x Piétrain), weaned at 18 d of age, were fitted with a simple T - cannula at the distal ileum and housed individually in metabolism cages. The animals were fed twice daily (0800 h and 1500 h) ad libitum, and had free access to water. After surgery they received for 1wk a commercial milk-replacer with 21.9 % CP, 15.7 % CF and 18.3 MJ ME/kg (as fed). During wk 2 and 3, the animals were fed a pelleted diet based on grain and soybean meal with 21.2 % CP, 5.6 % CF and 14.5 MJ ME/kg (as fed). The activities of maltase (α -glucosidase, EC 3.2.1.20), lactase, (β -galactosidase, EC 3.2.1.23), leucine aminopeptidase (LAP, EC 3.4.11), sucrase (sucrase α -D glucohydrolase, EC 3.2.1.48) and alkaline phosphatase (AP, EC 3.1.3.1) were determined in ileal digesta samples collected 6 d before and 14 d after transition from liquid milk diet to a solid pelleted diet. Sampling was performed three times per d from 0800 to 0900 h, 1200 to 1300 h and 1500 to 1600 h.

Following transition from liquid to solid feeding, there was a constant increase in the activities of maltase ($p < 0.01$), LAP ($p < 0.001$) and AP ($p < 0.01$), whereas the level of lactase decreased, however, not significantly ($p > 0.05$). The activity of sucrase in wk 2 and 3 increased ($p < .01$) compared to wk 1, while no difference was observed ($p > 0.05$) between wk 2 and 3. The level of lactase is negatively correlated with age ($r = -0.25$) and body weight ($r = -0.20$). In contrast to the level of lactase, the level of maltase, sucrase, LAP and AP is positively correlated with age ($r = 0.30 / 0.14 / 0.30 / 0.14$; $p < 0.01$) and body weight ($r = 0.24 / 0.13 / 0.31 / 0.10$; $p < 0.01$). Enzyme activities were affected by the time of sampling. In conclusion, there is both a diet and age / body weight effect on the activities of brush-border enzymes in the small intestine of early - weaned pigs.

Keywords: Piglets, Small intestine, Enzymes, Granulation.