STUDIES ON THE METABOLISM OF VOLATILE FATTY ACIDS IN PIGS FED LOW AND HIGH LEVELS OF CARBOHYDRATE

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Eight Large White specific-pathogen-free barrows, initially weighing 23.0±2.1 (SD) kg, were allotted into two groups: one with a low level of carbohydrate intake (LC group); and another with a high level carbohydrate intake (HC group). Using these pigs, the rates of production and absorption of volatile fatty acids (VFA) in the large intestine, endogenous production of acids by the liver, and their uptake by the hind limb and the portal-drained viscera were examined.

During the sixth week of the experiment, digesta and blood samples were taken. The mean body weights at this time were 33.1±0.7 (SD) (n=3) for the LC group, and 42.2±2.2 kg (n=4) for the HC group, respectively. Due to an accident, one pig of the LC group could not satisfy the sampling conditions; the data for this pig at this time were omitted.

The acetate production rates in the large intestine were higher in the LC group than in the HC group. This difference seemed to be due to the difference in crude fiber digestibility between the two groups. There was little difference in the production rates of propionate and butyrate in the large intestine between the two groups.

The VFA absorbed from the large intestine accounted for 11.6 and 9.6% of the metabolizable energy for maintenance for the LC group and the HC group, respectively.

The hepatic endogenous production of not only acetate, but of also propionate and butyrate was found, and it was suggested that the net hepatic endogenous production of VFA in the LC group was higher than that in the HC group.

The arteriovenous differences in acetate concentration across the hind limb and the portal-drained viscera suggested that the acetate uptake in both tissues was higher in the LC group than in the HC group. The arteriovenous concentration differences in propionate and butyrate in both tissues were negligible.