

Examination of the Composition of the Luminal Fluid in the Small Intestine of Broilers and Absorption of Amino Acids under Various Ambient Temperatures Measured In vivo

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Abstract :

Composition and normal concentrations of nutrients (glucose, methionine, sodium and potassium) as well as the pH and osmolarity were determined in digesta collected from different segments of the small intestine of broilers both under thermoneutral and heat stress conditions in order to formulate a perfusate closely simulating physiologically normal conditions of the small intestine. Whilst glucose and methionine levels of the luminal fluid decreased with passage ($p < 0.05$) sodium and potassium increased ($p < 0.05$). Heat stress (30°C) partly decreased concentrations of glucose and methionine in digesta ($p < 0.05$). Based on these analyses, a luminal perfusate was composed and used to study the absorption of DL-methionine (DL-Met) and the liquid hydroxy analogue of methionine (DL-HMB) as well as of the DL-HMB diand oligomers under different ambient temperature conditions in vivo. Adaptive responses on length and weight of small intestine (jejunum) as well as on absorption of both methionine sources were observed which were dependent on the magnitude of imposed heat load. At higher temperature (35°C) length and weight of the small intestine decreased while absorption rate of both Met sources increased compared to the thermoneutral condition (22°C). Data suggested higher absorption velocity for DL-Met compared to that for DL-HMB ($p > 0.05$). There was no interaction between DL-Met and DL-HMB absorption and ambient temperature. It was demonstrated that only a marginal portion of the di-and oligomer fraction of DL-HMB was absorbed. Results suggest that the perfusate formulated on basis of luminal fluid analyses was suitable for investigating absorption of amino acids.

Key Word :

Broiler, luminal fluid, in vivo absorption, methionine sources

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