EVALUATION OF HOMOARGININE AS A DIGESTIBILITY MARKER IN POULTRY

K. ANGKANAPORN , Y. MOLLAH and W.L. BRYDEN

Recent studies demonstrate that the use of guanidinated proteins in which lysine has been converted to homoarginine is a suitable technique for the measurement of endogenous amino acid secretions into the small intestine (Siriwan et al. 1994). There is considerable interest in the use of this amino acid marker technique for calculation of the true digestibility of dietary amino acids. Apparent and true digestibility of amino acids in poultry is either determined at the terminal ileum or in the excreta of birds that have been caecectomised. Caecectomy removes that area of the gut in which most microbial activity occurs, thus overcoming a major objection to the use of excreta in digestibility studies with birds. In previous studies (Siriwan et al. 1994), homoarginine was used as a marker of ileal endogenous amino acid secretions and in the present study it was evaluated as a marker of endogenous amino acids in excreta of intact and caecectomised cockerels.

Twenty four cockerels, twelve of which had been caecectomised were fed semi-purified diets containing casein or guanidinated casein (200 g/kg) as the only protein source. The birds were fed the diets for six days and excreta samples were collected for analysis. At the end of the collection period the birds were killed and samples of digesta from the lower ileum were collected. All samples were freeze-dried and subsequently analysed for amino acids. Apparent digestibility of amino acids was determined in the ileum and in the excreta and these samples were corrected for endogenous amino acids using homoarginine as the marker for the determination of true amino acid digestibilities.

The true digestibility of amino acids in the ileum was very high (0.98) indicating that almost all of the amino acids in the terminal ileum were of endogenous origin. In contrast, endogenous secretions in excreta where calculated to be low due to a 20-fold increase in the level of homoarginine in the excreta (38 ± 2.9 g/kg DM) compared to that in ileal digesta (2.1±1.2 g/kg DM). This observation indicated the unsuitability of homoarginine as a marker to assay endogenous amino acids in excreta. The result was unexpected as previous reports (Stevens and Bush 1950; Ryan et al. 1968) have suggested that a significant proportion of homoarginine is rapidly converted to lysine after absorption. The source of homoarginine in excreta is likely to be mainly of urinary origin rather than dietary origin, since the concentration of homoarginine in ileal digesta was low. This has been demonstrated in a subsequent study (Angkanaporn et al. 1994) where homoarginine was found to be excreted from birds via urine. Homoarginine is not a suitable marker to determine endogenous amino acid secretions in poultry excreta but is applicable to studies where measurements are made in the small intestine.

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Department of Animal Science, The University of Sydney, Camden, NSW 2570