

EFFECT OF CYCLOPIAZONIC ACID ON NUTRIENT UTILISATION AND ENDOGENOUS AMINO ACID  
SECRETION IN BROILER CHICKENS

S. SUKSUPATH, P. SIRIWAN, R.J. COLE\* and W.L. BRYDEN

Cyclopiazonic acid (CPA) is a mycotoxin produced by various *Penicillium* and *Aspergillus* spp. The toxicity of CPA has been studied in rats, dogs, chickens and pigs (Cole, 1986). Chickens exposed to CPA in feed developed ulcerative lesions of the digestive tract as well as necrosis of the liver, kidney and spleen (Dorner et al., 1983). It is likely therefore that part of the growth depressing effect noted in animals ingesting CPA is associated with impaired nutrient absorption and utilisation. The objectives of the present study were to investigate the effect of CPA on protein, energy and calcium utilisation, including endogenous amino acid secretion in growing broiler chickens.

Twenty seven, six week old, broiler chickens were divided into three groups of nine on the basis of body weight and dosed for five days with either 0, 1.5 or 3.0 mg CPA/kg body weight. All chicks were fed a semi-purified diet. Food intake was measured and excreta collected for the last four days of the dosing period to allow for determination of apparent metabolisable energy (AME), calcium retention and protein digestibility. On day six, three hrs after precision feeding with a semi-purified diet containing guanidinated casein, digesta were obtained from the duodenum and upper and lower sections of both the jejunum and ileum. Homoarginine in the guanidinated casein was used as a marker for determining endogenous amino acids (Siriwan et al. 1987).

Chickens receiving CPA appeared clinically normal during the collection period. Dietary AME and the calcium retention was slightly decreased during the dosing period but the digestibility of protein was significantly ( $P < 0.01$ ) decreased by CPA. However the digestibility of individual amino acids was not as severely affected, with the exception of glycine, indicating that the poor protein digestibility probably reflected kidney dysfunction following CPA dosing and a concomitant increase in uric acid excretion. Moreover, chickens dosed with CPA had decreased amino acid digestibility throughout the digestive tract and this reflected a significant ( $P < 0.01$ ) increase in endogenous amino acid secretion into the gut.

The results of the study indicate that impaired protein utilisation is a contributory factor to the poor growth performance observed in chickens ingesting diets contaminated with CPA.

COLE, R.J. (1986). In "Diagnosis of Mycotoxicoses", p 91, ed J.L. Richard and J.R. Thurston (Martinus Nijhoff:Boston).

DORNER, J.W., COLE, R.J., LOMAX, L.G., GOSSER, H.S. and DIENER, U.L. (1983). Appl. Environ. Microbiol. **45**: 698.

SIRIWAN, P., BRYDEN, W.L. and ANNISON, E.F. (1987). Proc. Nutr. Soc. Aust. **12**: 120.

---

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

\* ARS, USDA, National Peanut Research Laboratory, Georgia, U.S.A.