

## Suspect Biogenic Amine Toxicity in an Experimental Broiler Flock

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Unexpected illness and deaths occurred in an experiment to determine the efficacy of four antibiotic feed additives in a necrotic enteritis challenge model. The experimental basal diet was based on a commercial wheat-soy formulation and contained xylanase and phytase at the recommended rates of inclusion. The starter diet in week 1 (days 0-7) was fed as a mash. Adhering to the challenge model, all birds were fed a high protein diet (50 % commercial starter, 50 % fishmeal) in the second week post-hatch (days 7-14). The fishmeal diet was fed as a short cut 5 mm pellet. All diets were mixed at the University of New England, and pelleted using a small scale 'cold' pelleter, with pellet temperatures ranging from 54°C to 81°C. The experimental antibiotics were incorporated into the diets. Challenged and unchallenged negative controls (no antibiotic) were included in the experimental design.

Twelve hundred and ninety-six broiler chicks were split into 54 pens of 24 birds (1:1 sex ratio per pen). All birds were fed *ad libitum* and had free access to water via drinker nipples. On day 9, all birds from challenged treatments were given an oral suspension containing sporulated oocysts of *Eimeria spp.* whilst unchallenged birds received sterile PBS. As part of the model, challenged treatments were to be inoculated with *Clostridium perfringens* (scheduled to begin on day 14).

Mortality rates of birds were within the normal tolerances for commercial practice up to day 12 (12 days of age), when an elevated level of dead birds was observed (approximately 3.1 % of flock). The remaining birds did not appear to be ill but were to be drinking more often than normal. The following day (day 13), a further 4.1 % of the flock had died. When, a further 6.9 % of the flock had died by the following morning, the experiment was terminated and all remaining birds were euthanized. All birds that died up to and including Day 11, and representative samples of birds from days 12 to 14 underwent post-mortem examination. The predominant lesions were ulceration and fissures with haemorrhaging of the gizzard, particularly at the isthmus and ulceration of the pylorus with resultant dark sanguineous fluid in the oral cavity ("Black vomit"), crop, proventriculus, gizzard and small intestine. Some ulcers showed complete penetration into the peritoneal cavity. The pH of crop fluid from freshly dead birds was acidic and went as low as 2.3. The first signs of gizzard erosion were observed in birds post-mortemed on day 9, i.e after 2 days on the fishmeal diet. These erosive lesions were observed in both test and control groups.

The lesions were consistent with biogenic amine toxicity causing excess gastric acid secretion. It was suspected that gizzerosine, a highly potent derivative of histamine, associated with overheated fishmeal was the causative agent (Okazaki et al 1983). Gizzerosine stimulates proventricular gland secretory cells to release excessive hydrochloric acid, with resultant lesion in the gastrointestinal tract from acid damage. Test results for the biogenic amines: Beta-phenylamine, putrescine, cadavarine and histamine, in both the raw fishmeal and the pelleted fishmeal diets, were at low levels not associated with toxicity, but unfortunately as yet we have not been able to get an analysis done for gizzerosine. Copper analysis of feed was 12.5mg/kg, ruling out copper toxicity.

Okazaki T., Noguchi T., Igarashi K., Sakagami Y., Set H., Mori K., Naito H., Masumura T. and Sugahara M. (1983) *Agric. Biol. Chem.* **47**, 2949.

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