Influence of esterified-glucomannan on performance and organ morphology, serum biochemistry and haematology in broilers exposed to individual and combined mycotoxicosis (aflatoxin, ochratoxin and T-2 toxin)

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Abstract
1. A study was conducted to evaluate the individual and combined effects of aflatoxin B_1 (AF), ochratoxin A (OA) and T-2 toxin (T-2) on performance, organ morphology, serum biochemistry and haematology of broiler chickens and the efficacy of esterified-glucomannan (E-GM), a cell wall derivative of *Saccharomyces cerevisiae*$_{1026}$ in their counteraction.
2. Two dietary inclusion rates of AF (0 and 0·3 mg/kg), OA (0 and 2 mg/kg), T-2 (0 and 3 mg/kg) and E-GM (0 and 1 g/kg) were tested in a 2 × 2 × 2 × 2 factorial manner on a total of 960 broiler chickens from 1 to 35 d of age in an open sided deep litter pen house.
3. Body weight and food intake were depressed by all the mycotoxins, OA being the most toxic during early life.
4. Weights of kidney and adrenals were increased by AF and OA. Liver weight was increased by AF (17·8%), while OA increased gizzard weight (14·6%) and reduced bone ash content (8·1%). T2 toxin showed no effect on these variables.
5. Serum cholesterol content was decreased and activity of serum gamma glutamyl transferase (GGT) was increased by AF and OA while serum protein content was decreased by AF. These effects were more pronounced at 21 d than at 35 d of age. Inconsistent responses were seen in the other variables: blood urea nitrogen (BUN) content, activities of serum alanine amino transferase and aspertate amino transferase. Blood haemoglobin content was depressed by AF and T-2, whereas blood coagulation time was prolonged by OA.
6. Significant interactions were observed between any 2 toxins for their additive effects on body weight, food intake, bone ash content and serum GGT activity at 21 d. Conversely, antagonistic interactions were observed among any 2 of the toxins for their effects on variables such as serum protein and serum cholesterol content. Simultaneous feeding of all 3 mycotoxins did not show increased toxicity above that seen with any 2.
7. Esterified-glucomannan increased body weight (2·26%) and food intake (1·6%), decreased weights of liver (32·5%) and adrenals (18·9%) and activity of serum GGT (8·7%), and increased serum protein (14·7%), cholesterol (21·9%), BUN (20·8%) and blood haemoglobin (3·1%) content, indicating its possible beneficial effect on mycotoxicosis in broiler chickens.