SUSCEPTIBILITY OF COMMERCIAL BROILER STRAINS TO FUSAROCHROMANONE-INDUCED TIBIAL DYSCONDROPLASIA

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Tibial dyschondroplasia (TD), a condition characterised by the presence of an abnormal cartilage mass in the proximal head of the tibia, is a widespread problem of fast-growing broiler chickens. It has been shown to be induced by various factors including nutrition, genetics and management (Orth and Cook, 1994). Fusarochromanone (FC), produced by some isolates of Fusarium equiseti, is the only mycotoxin associated with the aetiology of TD (Walser et al., 1982). In the present study, the influence of FC on the incidence of TD in three commercial broiler strains, designated as Strain A, B and C, was examined.

Three separate trials, using day-old broilers, were conducted. In Trial 1, the effects of supplementing a maize-soyabean meal basal diet with either 30 g/kg of FC-contaminated rice, 10 g/kg cysteine, 4.8 g/kg DL-methionine, dietary electrolytes or dietary electrolytes plus 10 g/kg cysteine on the incidence of TD in Strain A was investigated. The FC-contaminated rice had a toxin concentration of 30 mg/kg. Each diet was fed to four pens of eight birds each. In Trial 2, broiler Strain B which has been previously observed in this laboratory to be susceptible to TD (Van Wel, 1992) was utilised. The treatments consisted of a wheat-sorghum-soybean meal basal diets and three experimental diets containing 30, 60 or 90 g/kg of FC-contaminated rice. Each diet was fed to two pens of eight birds each. In Trial 3, the influence of feeding diets containing 0, 30 or 60 g/kg of FC-contaminated rice on the incidence of TD in three commercial broiler strains (A, B and C) was compared. In all trials, performance data was recorded at days 7, 14, 21 and 28. On day 28, the birds were killed and examined for TD. In TD positive birds, lesions were scored according to the size of the cartilage plug.

In Trial 1, although the weight gain and the feed:gain ratio of Strain A broilers were influenced (P < 0.05) by dietary treatments, none of the birds showed any indication of TD. In Trial 2, dietary inclusion of more than 30 g/kg of FC-contaminated rice lowered (P < 0.05) weight gains of Strain B broilers but had no effect on feed intake and feed:gain. However, TD was observed and the incidence and severity of TD lesions increased with increasing levels of dietary FC levels. In Trial 3, significant differences (P < 0.05) were observed among strains in both incidence and severity of TD. Strains B and C exhibited high susceptibility to TD while Strain A appeared to be resistant to the condition. In Strains B and C, the incidence and severity of TD increased with increasing levels of dietary FC. The present results confirm the ability of FC in induce TD and demonstrate that genetic predisposition to TD is a primary factor in the development of the disease.


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