

Individual and Combined Effects of Melamine and Cyanuric Acid in Young Pekin Ducks

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Abstract :

An experiment was conducted with Pekin ducks to determine the toxicity of melamine (MEL) and cyanuric acid (CYA) in ducks fed treatments from day 3 to day 21 of age. Two hundred and twenty three three-day-old male ducks were assigned to one of 10 treatment groups. Treatments included: (1) a basal diet (BD) containing no MEL or CYA; (2) BD+0.5% MEL; (3) BD+1.0% MEL; (4) BD+1.5% MEL; (5) BD+0.5% CYA; (6) BD+1.0% CYA; (7) BD+1.5% CYA; (8) BD+0.5% MEL+0.5% CYA; (9) BD+1.0% MEL+1.0% CYA and (10) BD+1.5% MEL+1.5% CYA. Control and treatments fed MEL alone or MEL+CYA were fed to 5 pens of 5 ducks each. Treatments fed CYA alone were fed to 4 pens of 4 ducks each. Compared to controls, birds fed $\geq 1.0\%$ MEL had lower ($P<0.05$) feed intake (FI) and body weight gain (BWG), heavier ($P<0.05$) relative kidney weights and higher ($P<0.05$) mortality. No mortality was observed in birds fed CYA alone or MEL+CYA combinations. No differences in FI, BWG, relative kidney weights or mortality were noted among controls and ducks fed CYA alone or MEL+CYA combinations. Melamine crystals were only observed in the bile of ducks fed $\geq 1.0\%$ MEL alone. Renal histopathology included mild dilation of the embryonal nephrons and collecting tubules. Eosinophilic to basophilic casts, some containing spherical eosinophilic crystals were also present in the embryonal nephrons and collecting tubules. Histopathology results suggested that $\geq 1.00\%$ MEL in the diet of ducks could cause severe renal pathology and mortality due to renal failure. The renal pathology observed in ducks was similar to that seen in other poultry species fed toxic concentrations of MEL. CYA alone up to 1.5% of the diet was not toxic to ducks and CYA reduced the toxicity of MEL when the two compounds were fed in combination.

Key Word :

Melamine, cyanuric acid, kidney, crystal, pekin duck

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