Between 2004 and 2008, intentional contamination of feed ingredients with melamine and cyanuric acid resulted in severe renal failure in companion animals and humans. Nitrogen rich compounds were used to artificially increase the protein content of ingredients, so as to increase profit for an international food company. Six experiments were conducted at the University of Missouri-Columbia to determine the individual and combined toxicity of melamine and cyanuric acid. Concentrations of melamine at 1.0% or higher caused toxic effects in broilers and turkeys that included depressed growth, increased kidney weights, mortality, and renal casts in the kidneys that contained nonpolarizable melamine crystals. Melamine residue levels were highest in the kidney, followed by the liver, bile, and breast muscle. Cyanuric acid up to 3.0% of the diet did not cause toxic effects in broilers or turkeys. Combinations of melamine and cyanuric acid depressed growth in broilers but had no effect on mortality at concentrations up to 3.0%. In turkeys, the addition of cyanuric acid to melamine in concentrations up to 3.0% reduced the toxic effects of melamine. Both broilers and turkeys fed combinations of melamine and cyanuric acid had renal crystals viewable under normal and polarized light. These data confirm that melamine alone is toxic to poultry albeit at higher concentrations than caused toxicity in companion animals. By contrast, cyanuric acid was not toxic to poultry at similar concentrations. However, when fed in combination with melamine, cyanuric acid alleviated the toxic effects of melamine.