Two feeding trials with broilers (1-31 days of age) were carried out to determine the effect of fortifying grain amaranth based diets with lysine, methionine, casein and ethylene diamine tetra acetate (EDTA) on broiler performance, amino acid availability, plasma amino acid concentrations and nitrogen and mineral retention. In Trial 1, lysine, lysine plus methionine and casein were separately included in six diets containing either 400 g/kg raw or 600 g/kg extruded amaranth. Additionally, one 400 g/kg raw and one 600 g/kg extruded amaranth diets were not fortified. the eight diets were compared to a maize-soyabean meal diet as the control. Chicks on the 600 g/kg extruded amaranth diet with casein gave similar body weights at 31 days of age to those on the control diet. Feed intake and nitrogen retention were similar in the control and the extruded amaranth diets. the availability of amino acids was the highest in the chicks on the control diet. the lack of response to lysine, or lysine and methionine inclusions indicated that these amino acids were not limiting to growth in amaranth diets. In Trial 2, three diets contained 400 g/kg raw amaranth, and another three, 400 g/kg extruded amaranth. Two diets in each group were fortified with either disodium EDTA or casein, while the third was unfortified. Casein inclusion resulted in higher body weights at 31 days of age, but did not affect the plasma concentration of essential amino acids. Dietary EDTA did not enhance mineral retention in the body or the concentration of minerals in plasma. It was evident from both trials that the fortification of amaranth diets with casein improved chick performance and the availability of some amino acids.