EFFECT OF PROCESSING ON THE FEEDING VALUE OF GRAIN AMARANTH FOR BROILERS

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The renewed interest in grain amaranth *(Amaranthus* spp.) in recent years is due to its high protein content and its potential value as a health food. Another attractive feature of grain amaranth is its high drought tolerance and adaptability to varying climatic and agronomic needs. The protein content of grain amaranth is higher (120-180 g/kg) and better balanced in essential amino acids than those of almost all cereals (NRC 1984). The protein is rich in lysine, sulphur amino acids and tryptophan and complements the amino acid profiles of cereals and plant protein supplements used in human and animal nutrition. Raw amaranth grains however, are known to contain anti-nutritional factors. Preliminary studies in our laboratory have shown that inclusion of raw amaranth *(Amaranthus hypochondriacus)* in broiler diets affected feed intake and relative organ weights, and depressed growth (Ravindran et al. 1995). The objective of the present study was to determine whether autoclaving (at 130°C for 1 hr) improves the feeding value of amaranth for broilers.

In experiment one, a diet based on maize, soyabean meal and meat meal served as the control and the experimental diets were formulated by including 200, 400 and 600 g/kg of autoclaved amaranth. All four diets were formulated to contain similar contents of metabolizable energy, crude protein, lysine and sulphur amino acids. Each diet was fed to four pens of six male broiler chicks each. The diets in mash form and water were provided ad libitum from seven to 16 days of age. Weight gains, feed intake and feed/gain of chicks fed on diets containing 200 and 400 g/kg amaranth did not differ significantly ($P > 0.05$) from those fed the control diet. Diets containing 600 g/kg amaranth supported chick performance that was lower ($P < 0.05$) than those attained on the control and 200 g/kg amaranth diets. The performance of chicks fed on 400 g/kg amaranth diets was numerically, but non-significantly ($P > 0.05$), better than those on 600 g/kg amaranth diets. In experiment two, apparent metabolizable energy (AME) of raw and autoclaved amaranth were determined using 24 individually-caged six-week-old male broiler chickens by the method of Mollah et al. (1983). The assay diets contained 820 g/kg of raw or autoclaved amaranth. The average AME ± SE (on a dry matter basis) of raw and autoclaved samples were 11.85 ± 0.29 and 13.10 ± 0.26 MJ/kg, respectively. These results demonstrate that the growth-depressing effects of grain amaranth can be largely overcome by autoclaving and that processed grain can be successfully incorporated up to 400 g/kg levels in broiler diets.

MOLLAH, Y., BRYDEN, W.L., WALLIS, I.R., BALNAVE, D. and ANNISON, E.F. (1983). Brit. Poult. Sci. 24: 81.

NATIONAL RESEARCH COUNCIL. (1984). 'Amaranth: Modern Prospects for an Ancient Crop', (National Academy Press: Washington, DC).

RAVINDRAN, V., HOOD, R.L., GILL, J., KNEALE, C.R. and BRYDEN, W.L. (1995). Proc.Aust. Poult. Sci. Symp. 7: 207.

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