Effect of varying boiling time (1-3 h) on nutritive value of false yam (*Icacina oliviformis*) seed meal in broiler chicken diet

H.K. DEI*, N. IS-HAQ and A. MOHAMMED

Department of Animal Science, Faculty of Agriculture, University for Development Studies, P.O. Box TL1882, Tamale, Ghana.*Corresponding author: hkdei@yahoo.com

A study was conducted using finishing broilers to determine the effect of varying boiling times of false yam seed meal on their performance. One hundred and twenty chicks (Cobb strain) were selected and randomly divided into 12 groups of 10 birds each. False yam seeds were boiled for 1 h, 2 h and 3 h, sun-dried and ground. Four dietary treatments comprising a control (no seed meal) and diets containing false yam seed meal boiled at 1, 2 and 3 h were tested in a grower diet at 100 g/kg using a completely randomized design and each treatment replicated thrice. Birds were fed from 4 to 8 weeks of age. Feed and water were provided *ad libitum*. Data were analysed by ANOVA using “GENSTAT”. Birds fed the seed meals were similar (P>0.05) in terms of feed intake, live weight gain, feed efficiency and carcass yield. All birds fed the seed meals recorded lower (P<0.001) values of growth variables measured, but similar (P>0.05) carcass yields compared to those of the control birds. It was concluded that false yam seeds could be boiled for 1 h for feeding broilers.

Keywords: false yam seed, boiling duration, growth performance, broiler chickens

INTRODUCTION

False yam (*Icacina oliviformis*) is a perennial shrub that produces appreciable yields of both tuber and seeds (FAY, 1993). Both products are high in starch (FAY, 1991), therefore have a potential as non-conventional feed ingredients in poultry diets. Anti-nutritional factors, particularly gum resins ((NATIONAL RESEARCH INSTITUTE, 1987) are a major limiting factor which must be dealt with through appropriate processing methods. Boiling the tuber in water has been identified as a promising method in ameliorating the adverse effects of the tuber on broiler performance (DEI et al., 2011a). It is not known how varying boiling periods of the seeds would influence the nutritive value, since a previous study involving boiling the seeds for half an hour showed no improvement in the nutritive value (DEI et al., 2011b). Therefore, this study was conducted during the finishing phase of broiler chickens to determine the effect of varying boiling times (1-3 h) of false yam seeds on their growth performance.

MATERIALS AND METHODS

False yam fruits were obtained from the wild by hand picking. The fruits were cracked with a stone to remove the seeds which were crushed with the stone and boiled in water for 1, 2 and 3 h, respectively. The ratio of seeds to water for processing was 1 part of seeds to 2 parts of water. The boiled seed samples were sun-dried for 3 days and each sample ground into a gritty meal and labeled BFYSM-1h, BFYSM-2h and BFYSM-3h to represent boiling durations of 1, 2 and 3 h, respectively. The processed seed samples were not analysed for their chemical compositions at the time of the study due to logistics constraints.
The study was conducted between August and October at Nyankpala in the Northern Region of Ghana, which is located in the Guinea Savanna Zone. The Zone is characterized by a wide diurnal temperature variation (28-45°C) with low day-time humidity (17-42%) during the dry season from November to April (KASEI, 1988).

At 4 weeks of age, 120 chicks (Cobb strain) were selected and randomly divided into 12 groups. Ten birds (6 males, 4 females) were in each group with mean initial live weight of 900 g per bird. They were housed in a raised wire-mesh floor pens with a floor space of 0.16 m² per bird per pen. Four treatments comprising a Control (no seed meal) and diets containing each of the BFYSM as substitute for maize at 100 g/kg on weight by weight basis were tested. A completely randomized design was used and each treatment was replicated three times. The Control diet contained 200 g/kg CP and 12.4 MJ/kg ME. The experimental diets were fed in mash form from 4 to 8 weeks of age. Feed and water were provided for ad libitum consumption. Light was provided 24 h daily. Both the feed and birds were weighed weekly to determine feed intake and live weight gain, respectively. Feed conversion ratio was defined as live weight gain per unit feed consumed. Mortality was recorded. At 8 weeks of age, 2 birds (male, female) per replicate were randomly selected, starved for 8 h, weighed, slaughtered, defeathered, eviscerated, and carcasses weighed. Carcass yield was calculated as a percentage of the carcass dress weight over live weight. Growth and carcass data were analysed by ANOVA using “GENSTAT (version 8)” (LAWES AGRICULTURAL TRUST, 2005).

RESULTS AND DISCUSSION

The results are shown in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control</th>
<th>1 h</th>
<th>2 h</th>
<th>3h</th>
<th>±SED</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed intake (g/bird/day)</td>
<td>161.5a</td>
<td>133.3b</td>
<td>123.6b</td>
<td>123.4b</td>
<td>5.72</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Weight gain (g/bird/day)</td>
<td>64.9a</td>
<td>43.5b</td>
<td>37.1b</td>
<td>38.7b</td>
<td>2.76</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gain : Feed Ratio</td>
<td>0.40a</td>
<td>0.33b</td>
<td>0.30b</td>
<td>0.31b</td>
<td>0.016</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Final live-weight (kg/bird)</td>
<td>2.72a</td>
<td>2.12b</td>
<td>1.94b</td>
<td>1.98b</td>
<td>0.077</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Carcass dress weight (kg/bird)</td>
<td>2.14</td>
<td>1.71</td>
<td>1.68</td>
<td>1.75</td>
<td>0.163</td>
<td>0.068</td>
</tr>
<tr>
<td>Per cent carcass yield</td>
<td>78.0</td>
<td>77.8</td>
<td>78.2</td>
<td>78.1</td>
<td>1.58</td>
<td>0.997</td>
</tr>
<tr>
<td>Mortality (dead/total)</td>
<td>3/30</td>
<td>2/30</td>
<td>0/30</td>
<td>1/30</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

SED-standard error difference, P-probability, Means with different superscripts are significantly different (P<0.05)

Birds fed the seed meals showed no significant (P>0.05) differences in terms of feed intake, live weight gain, feed conversion ratio and carcass yield (Table 1). However, all the birds fed the seed meals recorded lower (P<0.001) values of growth variables measured. Contrary to the growth performance, there was no significant difference between the Control group and the BFYSM groups (Table 1).

The reduction in feed consumption of birds fed the BFYSM based diets was an indication of the presence of residual concentrations of anti-nutritional factors. DEI et al. (2011) attributed reduction in feed consumption of birds fed false yam tuber meal to the gum resins which could depress feed acceptability. Also, the observed relatively high feed utilisation by the Control group compared to their BFYSM counterparts (Table 1) could be due to the adverse effects of the residual concentrations of the anti-nutritional factors.
Nevertheless, feed intake of all the experimental birds was high enough to ensure good growth performance (Table 1). The similarity in performance of all the birds fed the BFYSM based diets suggests that boiling the seeds beyond an hour offered no nutritional advantage. However, boiling the seeds for an hour and above improved the nutritional value. In a previous study, boiling the seeds for 30 minutes did not improve its feed value for broilers (DEI et al., 2011b). In this study, the growth performance of the Control group was better than those of BFYSM groups, but not so when their carcases were evaluated (Table 1). This could be due to differences in the sizes of internal organs, the head and feathers which were discarded during processing.

CONCLUSION
Based on the results of this study, it is concluded that false yam seeds can be boiled for 1 h for feeding broiler chickens.

REFERENCES


LAWES AGRICULTURAL TRUST, 2005: GenStat 8th ed. Rothamsted Experimental Station, Harpenden, UK.