The Effects of inclusion of a Fermented Fish By Product Meal in Guinea Fowl (Numida meleagris) Diets on Performance and Carcass Quality

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Introduction

The guinea fowl (Numida meleagris) has been identified as a poultry species suitable for augmenting meat production (Marletto et al., 1998). The guinea fowl are more tolerant to poor management conditions (Asahima and Dapryan, 1996), resistant to common poultry diseases (Singh and Pandit, 1984), and tolerate aflatoxins better (Joshi et al., 1988) than broilers. Guinea also provide meat with higher protein, more essential amino acids, lower fat, and lower cholesterol contents than broilers (Cappa and Casati, 1978; Singh and Panda, 1984; Singh and Rahaman, 1990). Thus, guinea meat could be an excellent and healthy alternative for consumers.

On the other hand, production of guinea is more expensive than broilers mostly due to the poor conversion efficiency and the high cost of feeds and Med. Furthermore, protein is the most expensive of the major nutrients and protein requirements of guineas are higher than those of broilers. Therefore, feedlots that can provide high quality but less expensive protein will reduce feed costs and benefit production.

A fermented fish by-product meal (FFBPM) using local raw material was developed at the Animal Nutrition Laboratory. It has a nutrient profile similar to conventional protein supplements but at a reduced cost. This FFBPM has been used in number and broiler diets with no detrimental effect on performance (Ziau et al., 2002). Magela et al., 1999. Thus, our FFBPM could be a potential feed resource to partially replace such commonly used ingredients such as corn and soybean.

Objectives

To study the suitability of using FFBPM in guinea diets as a partial substitute for corn and soybean meal to fulfill the protein and energy requirements.

To study the effects of the inclusion of FFBPM in guinea diets on productive performance and carcass quality.

Methods

The FFBPM meal was prepared as follows: Fermentation was carried out in 55-gal plastic containers filled with a mixture of 85% fish by product, 20% corn meal, and inoculated with a starter culture of lactic-acid producing lactobacilli. The culture were seeded with xanthine-fish and allowed to ferment for 14 d. After fermentation, the mixture was dried in an air-sweated dryer at 65°C for 72 h. The dried FFBPM ground to a particle size of approximately 0.3 mm. A complete analysis (AOAC, 1990) of the FFBPM revealed that the final product had crude protein and fat contents of 32.0 and 15.5%, respectively.

A three-phase feeding regimen, consisting of starter (0 to 4 wk), grower (5 to 8 wk), and finisher (9 to 12 wk), was used in the experiment. The control and experimental feed diets were formulated to be isoproteic and isocaloric, with 15% protein and 1,714 kcal/kg. The nutrient levels of FFBPM were established on the basis of the nutrient requirements of guineas (Johari et al., 1988; Oguntona et al., 1988; Oguntona and Zubair, 1988; Mandal et al., 1999). Treatments (experimental diets) consisted of the inclusion of FFBPM at 0, 5, and 10% in each of the starter, grower, and finisher diets. A total of 180-old of guinea keets were raised under standard commercial conditions in a conventional poultry house. They were divided into 18 replicates of 10 birds each (six per treatment) and randomly assigned to 18 floor pens equipped with one hanging tube feeder and nipple type drinkers and bedded with wood shavings at a density of 500 kg/m2. Birds were weighed at 15 d of age to calculate feed conversion (FC), feed index (FI), and body weight gain.

At the end of the experiment, a total of 30 birds per treatment were randomly selected, wing banded, and kept 12 h in slaughter without access to feed and water. After feed withdrawal birds were weighed, exsanguinated, scalded, mechanically plucked, and manually eviscerated. Carcasses were chilled overnight in an ice-slush tank. After chilling, carcasses were drained, reweighed, and cut into the following portions: wings, breast, thigh, drumstick, neck, and rib. Carcass parts and abdominal fat were weighed and the yield expressed as percentage of live bodyweight (LBW).

Results

Table 1. The effect of FFBPM included at different levels in guinea fowl diets

<table>
<thead>
<tr>
<th>Parameter</th>
<th>0% FFBPM</th>
<th>5% FFBPM</th>
<th>10% FFBPM</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodyweight gain (g)</td>
<td>200</td>
<td>220</td>
<td>230</td>
<td>1.20</td>
</tr>
<tr>
<td>Dressed weight  (g)</td>
<td>500</td>
<td>520</td>
<td>550</td>
<td>5.05</td>
</tr>
<tr>
<td>Pectoral fillets (g)</td>
<td>450</td>
<td>470</td>
<td>490</td>
<td>6.86</td>
</tr>
<tr>
<td>Breast (g)</td>
<td>200</td>
<td>220</td>
<td>230</td>
<td>1.20</td>
</tr>
<tr>
<td>Thigh (g)</td>
<td>500</td>
<td>520</td>
<td>550</td>
<td>5.05</td>
</tr>
<tr>
<td>Drumstick (g)</td>
<td>350</td>
<td>370</td>
<td>390</td>
<td>7.17</td>
</tr>
<tr>
<td>Neck (g)</td>
<td>50</td>
<td>55</td>
<td>60</td>
<td>1.17</td>
</tr>
<tr>
<td>Abdominal fats (g)</td>
<td>15</td>
<td>12.5</td>
<td>5</td>
<td>1.20</td>
</tr>
</tbody>
</table>

Data was analyzed according to a Completely Randomized design by ANOVA using the GLM procedures of SAS (SAS Institute, 1985). The Tukey multiple comparison test was used to separate treatment means. All statistical significances were based on a probability of P < 0.05.

Conclusions

Despite the differences observed in the carcasses results, guinea diets performed very well when fed the 10% FFBPM diet. The only difference in FCE was observed at 20 d when control birds had higher FCE than FFBPM diet. This difference was not significant. The FFBPM diet was the lowest in cost but similar to the other two treatments. There were no significant differences on performance and carcass composition. From the present results it can be concluded that a dietary level of 5% FFBPM permits a productive performance and carcass quality comparable to that of the control, whereas the 10% level of FFBPM is less satisfactory. This FFBPM could supply part of the protein provided by imported soybean meal without affecting performance and carcass composition.

References


Oguntona, P., J.S. Ogundae, J. L. Rubia, 1988. Growth performance of roosting chickens (Numida meleagris) to meet or exceed the nutrient requirements for guineas published by earlier workers (Oguntona et al., 1988; Oguntona and Zubair, 1988; Mandal et al., 1999). Treatments (experimental diets) consisted of the inclusion of FFBPM at 0, 5, and 10% in each of the starter, grower, and finisher diets. A total of 180-old of guinea keets were raised under standard commercial conditions in a conventional poultry house. They were divided into 18 replicates of 10 birds each (six per treatment) and randomly assigned to 18 floor pens equipped with one hanging tube feeder and nipple type drinkers and bedded with wood shavings at a density of 500 kg/m2. Birds were weighed at 15 d of age to calculate feed conversion (FC), feed index (FI), and body weight gain.

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Figures

Figure 1. Effects of dietary FFBPM inclusion on live bodyweight gain of guinea fowl broilers.

Figure 2. Effects of dietary FFBPM inclusion on feed conversion efficiency (FCE) on guinea fowl broilers.

Figure 3. Effects of dietary FFBPM inclusion on feed consumed (FC) of guinea fowl broilers.

Figure 4. Effects of dietary FFBPM inclusion on slaughter weight of guinea fowl broilers.

Figures were adapted from the original manuscript by Shipp and Kallio (1990).