Studies on feeding value of azolla in quails in relationship to its carcass traits

A Varadharajan, R Gnanasekar and S Kothandaraman

Abstract

An experiment was conducted to evaluate the effect of dietary incorporation of different levels of Azolla meal (AZM) on the production performance of Japanese quails. One week old 150 quails (Coturnix coturnix japonica) were randomly divided into 3 groups viz. T1, T2 and T3 with 5 replicates of 10 birds each. T1 served as control (0% AZM) and T2 and T3 groups were fed with a diet containing 3% and 6% AZM, respectively for a period of 6 weeks. Feed consumption was calculated during the entire trial period. At the end of the trial period, randomly 5 birds from 5 replicates of T1, T2 and T3 were slaughtered to study the carcass characteristics. There was significant difference in 3 groups’ carcass characteristics with respect to giblet, back and wings percentage though other parameters were insignificant. It was concluded that AZM could be incorporated in quails’ diet up to 6% without affecting the feed consumption and carcass traits. More importantly, it doesn’t exhibit any untoward incidence and was considered safe and economical.

Keywords: Azolla meal, Japanese quails, carcass traits, dressing percentage

Introduction

Feeds of plant origin, as the green plants are recognized as excellent sources of protein, fat and pharmacologically active secondary metabolites. Aquatic plants are gaining much interest in food and biomedical research, resulting from its broad range of uses such as human food, animal feed and bio-fertilizers. Among aquatic plants floating fern Azolla (Azolla pinnata) can be used as unconventional high potential feed resource. Azolla is a free floating fresh water fern belonging to the family Azollaceae and order Pteridophyta. It contains almost all essential amino acids, minerals such as iron, calcium, magnesium, potassium, phosphorus, manganese etc. apart from appreciable quantities of vitamin A precursor beta carotene. Azolla have a symbiotic relationship with the nitrogen-fixing blue-green algae. It is this unique symbiotic relationship that makes Azolla, a wonderful “super plant” with high protein content, as it can readily colonize areas of fresh water and grow at great speed doubling its biomass every two to three days. It is also found to contain probiotics and biopolymers (Pillai et al., 2005) [14]. Thus, Azolla appears to be a potential source of nutrients. The bio-composition of Azolla makes it one of the most economic, efficient and sustainable feed substitute for poultry thus incorporation of Azolla as an alternative protein ingredient in quail ration could make quail production economical. The present study was, therefore, conducted to see the effect of inclusion of Azolla meal at different levels on the growth and performance of quails in relationship with its carcass traits. In poultry production, feed cost accounts for nearly 60% of the total cost of production (Shaikh and Zala, 2011) [16]. The shrinking feed resources of the world and their escalating cost has triggered search for cheap unconventional feeds for poultry production. There is a conscientious effort to switch on to non-conventional feed items to slash feed cost in poultry production.

Azolla has been established as a potential feed ingredient for livestock and poultry by many researchers (Pillai et al., 2005) [14]. Azolla (Azolla pinnata), an aquatic fern, abundantly available in stagnant water in tropical and subtropical regions of the world, has been recommended for feeding broiler and layer chicken (Basak et al., 2002) [41]. It is very rich in proteins, essential amino acids, vitamins, growth promoter intermediaries and minerals (Pillai et al., 2005; Henry et al., 2017) [14, 9]. Inclusion of azolla in the poultry diet economizes production (Dhumal et al., 2009) [7] but very limited studies have been conducted on evaluating its effects on the carcass traits of Japanese quails. Further, in the recent past, small and marginal poultry farmers of India are more interested in rearing Japanese quails rather than other species due to increasing consumer demand especially in urban areas.

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Hence, an attempt was made to investigate the effect of feeding azolla (Azolla pinnata) meal (AZM) on carcass traits of Japanese quails (Coturnix coturnix japonica).

Materials and Methods
Azolla was collected from the ponds maintained at the farm, dried under shade, ground and stored in plastic bags. One hundred and fifty quails of 1 week belonging to single hatch were weighed individually and allotted randomly to 3 groups T1, T2 and T3 with 5 replicates of 10 quails each. Three experimental diets were prepared by incorporating 0%, 3% and 6% of azolla meal (AZM) in quail ration of groups T1, T2 and T3, respectively. Birds were kept in quail cages and feed and water were provided ad lib.

Ingredient composition and calculated nutrient content of three diets have been presented in Table 1. Weekly feed consumption was recorded for 6 weeks. At the end of feeding trial, 5 birds from each treatment (total 15 birds) were randomly selected and slaughtered to study the carcass characteristics like dressed weight, weight of legs, wings, breast, back, neck thigh, glibet and dressing percentage.

<table>
<thead>
<tr>
<th>Feed ingredient</th>
<th>Level of Azolla meal (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Maize grits</td>
<td>40</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>24</td>
</tr>
<tr>
<td>Groundnut oil cake</td>
<td>12</td>
</tr>
<tr>
<td>Azolla meal (AZM)</td>
<td>0</td>
</tr>
<tr>
<td>Rice bran</td>
<td>15</td>
</tr>
<tr>
<td>Shell grit</td>
<td>7</td>
</tr>
<tr>
<td>DCP</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Data were statistically analyzed by one way ANOVA using SPSS windows (SPSS, Inc., 2002) [19]. Significant differences (P<0.05) between means were determined by Duncans multiple comparison test (Duncan, 1955) [8].

Results and Discussion

Table 2: Effect of different levels of AZM in quail ration on carcass traits

<table>
<thead>
<tr>
<th>Group</th>
<th>Feed intake (g per bird/d)</th>
<th>Live wt (g)</th>
<th>Head, leg, wing (g)</th>
<th>Giblet (%)</th>
<th>Back (g)</th>
<th>Breast (g)</th>
<th>Wings (g)</th>
<th>Thigh (g)</th>
<th>Dressed weight (g)</th>
<th>Dressing (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 1(0% AZM)</td>
<td>23.02</td>
<td>168.20</td>
<td>16.32</td>
<td>08.12</td>
<td>33.08</td>
<td>39.12</td>
<td>10.02</td>
<td>24.02</td>
<td>110.32</td>
<td>65.588</td>
</tr>
<tr>
<td>T2 (3% AZM)</td>
<td>21.78</td>
<td>175.92</td>
<td>16.34</td>
<td>13.64</td>
<td>35.02</td>
<td>43.96</td>
<td>10.98</td>
<td>22.06</td>
<td>112.24</td>
<td>63.801</td>
</tr>
<tr>
<td>T3 (6% AZM)</td>
<td>23.12</td>
<td>175.14</td>
<td>16.46</td>
<td>10.02</td>
<td>28.12</td>
<td>37.92</td>
<td>9.02</td>
<td>23.16</td>
<td>105.64</td>
<td>60.317</td>
</tr>
<tr>
<td>SEM</td>
<td>0.45</td>
<td>4.222</td>
<td>0.415</td>
<td>0.675</td>
<td>1.218</td>
<td>1.358</td>
<td>0.425</td>
<td>1.576</td>
<td>1.982</td>
<td>1.240</td>
</tr>
<tr>
<td>P value</td>
<td>0.378</td>
<td>0.779</td>
<td>0.822</td>
<td>0.013</td>
<td>0.031</td>
<td>0.103</td>
<td>0.002</td>
<td>0.898</td>
<td>0.412</td>
<td>0.372</td>
</tr>
</tbody>
</table>

Means bearing different superscripts in a column differ significantly (P<0.05)

Incorporation of AZM in diets of quails up to 6% level did not affect feed intake for the experimental period of 6 weeks. However, Shamma et al. (2013) [17] reported that performance of broiler quails depressed beyond 5% by substitution of AZM in the diet. Inconsistent results on AZM inclusion have been reported which could be due to differences in species, physiological status, percent levels of AZM and type of concentrate replaced. Several workers (Basak et al., 2002; Bholka, 2011; Naghshi et al., 2014) [4, 5, 11] reported that feeding of AZM up to 5% level in diets of commercial broiler chicken had positive effect on production performance. Including AZM up to 7.5% of body weight increased body weight gain by 2.6% with higher Ramikhet virus titers in commercial broilers (Prabina and Kumar, 2010) [15]. However, Alalade et al. (2007) [9] observed non-significant variations in growth performance of Nera brown pullets when AZM was fed up to 10% level. Shaukat et al. (2015) [18] noticed a linear reduction in feed consumption of broiler chicken with increased AZM levels in the diets. Similar findings on production performance of ducks were reported elsewhere (Lawas et al., 1998; Sujatha et al., 2013) [10, 20]. Recently, Henry et al. (2017) [9] found that fresh azolla supplementation @ 30 g/bird/d reduced feed consumption without affecting the growth performance in turkeys at 7 weeks age which might be due to high protein and mineral content of azolla.

There was no significant influence of level of AZM on carcass traits except for giblet, back and wings percentage which were higher (P<0.05) in 3% AZM fed group (Table 2). Shaukat et al. (2015) [18] also reported no effect on carcass traits on feeding azolla up to 20% level. Basak et al. (2002) [4] reported higher dressing percentage of broiler chicken in treatment group fed 5% AZM due to the higher body weight gains. Naghshi et al. (2014) [11] also reported better carcass efficiency with 5% azolla feeding in commercial broilers except for abdominal fat, liver, gizzard and breast relative percentage.

Conclusion
It could be concluded that azolla meal might be fed to quails up to 6% as a replacement without affecting feed consumption and carcass traits. None of the birds in the 3 groups showed any untoward and adverse effect on feeding azolla meal and may be considered safe and economical.

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