Efficacy of Dietary Fenugreek and Kalonji Seed Powder on Carcass Traits of Guinea Fowls

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ABSTRACT
A study was conducted on 100, day old guinea fowls (Pearl variety) for 12 weeks to study the efficacy of fenugreek (Trigonella foenum-graecum) and kalonji (Nigella sativa) seed powder supplementation on carcass traits and meat composition of thigh and breast. The experimental guinea fowls were randomly divided into five treatment groups viz. T1 control, T2 (2.0% fenugreek seed powder), T3 (1.0% kalonji seed powder), T4 (2.0% fenugreek + 1.0% kalonji seed powder) and T5 (1.0% fenugreek + 0.5% kalonji seed powder), with two replications of ten guinea fowls each. The supplementation was done for 84 days. On 84th day, three guinea fowls from each replicate (6 guinea fowls/treatment) were sacrificed for study of carcass yield, cut up parts, organ weights and processing losses. The results indicated that dietary fenugreek and kalonji seed powder supplementation in guinea fowls improved dressed yield in T4 group of guinea fowls. Cut up parts in terms of thigh weights were improved in fenugreek and kalonji seed powder supplemented groups with maximum weight observed in T5 group of guinea fowls whereas breast weight was significantly increased in T4 group of guinea fowls. From the results of present study, it can be concluded that combination of fenugreek (2%) and kalonji (1%) seed powder through feed may be advised to improve carcass yield in guinea fowls.

Key words: Carcass traits, fenugreek seeds, guinea fowls, kalonji seeds

Guinea fowls are gallinaceous birds which are farmed to meet requirement of diversified poultry production. Guinea fowl production for meat is potentially advantageous enterprise in many parts of world¹⁵. Guinea fowl meat is one of the preferred meat due to its leanness and game bird’s meat texture. Guinea fowl is a promising genetic resource for evolving a low input-grain saving poultry alternative for production in the developing world. Guinea fowl have also gained popularity due to better resistance to common diseases and parasites, short reproduction cycle and limited cultural barriers on consumption¹⁵,¹⁶.

Supplementation of herbs and herbal products in various poultry feeds is predicted to serve safer alternatives of growth promoters due to their suitability, low cost of production, reduced risk of toxicity, minimum health hazards and environment friendliness. The production of designer meat using herbs and herbal products is relatively a new concept. Among the various phytogenics available, Fenugreek (Trigonella foenum-graecum), is an annual legume, cultivated all over the world. Its seeds possess properties of lowering blood sugar level, anthelmentic, antibacterial, anti-inflammatory and antipyretic⁷. They are rich in minerals, vitamins of B complex group, vitamins (A, D), lecithin and choline that help to dissolve cholesterol and fatty substances. They also contain neurin and trimethylamine which tends to stimulate the appetite by their action on the nervous system⁵. Fenugreek is a good source of dietary protein and fatty acids i.e. linoleic,
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linolenic, oleic and palmatic. Fenugreek seed powder in broiler diets improved the carcass characteristics of broiler chicks.

Kalonji (Nigella sativa), often called black cumin, is an annual flowering plant of the family Ranunculaceae, native to south and southwest Asia. It grows to 20–30 cm, with finely divided, linear (but not thread-like) leaves. Its seeds have been used as natural medication for lots of diseases for over 2000 years. Kalonji seeds are natural feed additive which stimulate the digestive system, enhance appetite and thereby increase the amount of feed intake. Addition of kalonji seeds at 1% level in broiler diet caused a significant (P ≤ 0.05) increase in liver weight.

These two herbal products have been used in human beings since ancient times. However, there is limited information on the effects of Fenugreek and Kalonji seed powder supplementation in chicken however such information is lacking in guinea fowls. Therefore, the objective of the present study was to evaluate the effect of supplementation of fenugreek and kalonji seed powder at different levels on the carcass traits of guinea fowls.

MATERIALS AND METHODS

Experimental design and management: This study was conducted according to the University Animal Welfare norms of “Institutional Animal Ethics Committee” GBPUAT, Pantnagar. The experiment was carried out at Instructional Poultry Farm, College of Veterinary and Animal Sciences, GBPUAT, Pantnagar (Uttarakhand) for a period of 84 days. Fenugreek and kalonji seed powder supplementation was done to the feed of guinea fowls as follows: The treatments groups were T1 (control), T2 (2.0% fenugreek seed powder), T3 (1.0% kalonji seed powder), T4 (2.0% fenugreek + 1.0% kalonji seed powder) and T5 (1.0% fenugreek + 0.5% kalonji seed powder). The diets were formulated to meet the nutrients requirements of guinea fowls. Each group was reared on deep litter using rice hull up to 12 weeks under standard managemental conditions.

Carcass traits and meat composition studies: At the end of the experiment on 84th day, 3 birds were randomly chosen per replicate i.e. 6 birds/treatment, starved of feed overnight and slaughtered. Slaughtering was performed by severing the jugular vein (kosher method) manually with sharp knife without anaesthetizing. Weight was taken after bleeding to calculate blood loss (% live weight). The slaughtered birds were defeathered using hot water (58ºc) and weighed again. Weights of head, shank and wing tips were also recorded. Dressing weights with and without giblet were noted and related to the live weight. Liver, heart, spleen and gizzard were removed, weighed and related to the live weight, cut-up-parts i.e. drumstick, thigh, breast, wings, neck and back weight were taken and related to the live weight, after weighing.

Statistical Analysis: All the data obtained in the experiment were analysed using Analysis of Variance (ANOVA) and the Critical Difference (CD) was calculated to determine any significant difference among the treatment means.

RESULTS AND DISCUSSION

Dressed yield: In present experiment dressed yield with and without giblet were maximum in T4 group of guinea fowls (Fig 1). Dressed yield with giblet was statistically similar in T1, T3 and T5 group of guinea fowls whereas dressed yield without giblet of each group differ significantly to each other except T3 and T5 group of guinea fowls. The dressed yield with giblet and without giblet revealed a significant (P < 0.05) impact of fenugreek and kalonji seed powder supplementation in guinea fowls. Similar findings were reported by who noted a significant difference (P ≤ 0.05) in carcass yield, edible carcass yield, breast meat weight, giblet percentage and back weight in fenugreek and black cumin supplemented groups.
In contrast, 4,8 reported no significant effect of fenugreek on dressing percentage. Similar to the findings of present experiment were observed by 6. Authors 9 also reported that addition of 4% black seeds to the diet of broilers significantly (P<0.05) increased dressing percentage. On the contrary 1 observed that birds fed on diet supplemented with 1% whole crushed Nigella sativa seeds showed a significant (P< 0.05) reduction in dressing per cent when compared to those fed on control diet while 2 observed no significant effect of black cumin seeds on dressing percentage. The improved dressed yield due to the fenugreek and kalonji seed powder supplementation could be attributed to the improved weight gain in guinea fowls. The improved dressed yield may also be attributed to high nutritional value of fenugreek and kalonji.

Cut-up parts: In the present study thigh weight was significantly higher in treatment groups as compared to control group (Table 1). Breast weight was maximum and significantly (P<0.05) higher in T4 group of guinea fowl compared to control group. Drumstick, back, neck and wing weights in all supplemented groups were comparable to control group. Similar to finding of present experiment, 13 also observed that extract of Trigonella foenum-graecum (Fenugreek) seeds significantly affected the breast and thigh weight of broiler chicken. Findings of the present experiment regarding kalonji supplementation corroborate with those of earlier researchers 11 who noted significantly increased thigh and breast weights of broilers due to supplementation black cumin seeds. The increase in thigh and breast weight in the present experiment may be due to antioxidant property of fenugreek seeds which stimulate secretion of digestive enzymes. Similarly essential oils in kalonji seeds stimulate enzymes thereby better availability of nutrients resulting in higher thigh and breast weights.

Organ weights: The results for organ weights viz. heart, liver, gizzard and spleen of different groups are presented in Table 2. Organ weights showed no significant difference in control and all supplemented groups. These findings are in close agreement with those of 11,3,1,18,12. In contrast, 9 noted significantly higher liver weight in broilers fed black cumin seed at 40g/kg. The difference in results of organ weights may be due to difference in level or species.
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Processing losses: The processing losses i.e. blood loss, feather loss, head, shank and wing tips in guinea fowls provided fenugreek and kalonji seed powder supplemented diet were comparable to control (Table 3). The results regarding the processing losses revealed a numerical variation among all the groups. Therefore, it may be concluded that the fenugreek and kalonji seed powder supplementation did not materially affect the processing losses of guinea fowls.

Table 1: Effect of fenugreek and kalonji seed powder supplementation on cut up parts (% live weight) of guinea fowls (mean±SE)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Thigh*</th>
<th>Breast*</th>
<th>Drumstick</th>
<th>Back</th>
<th>Neck</th>
<th>Wing</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>11.61±0.14</td>
<td>23.33±0.01</td>
<td>9.07±0.23</td>
<td>13.37±0.19</td>
<td>4.70±0.07</td>
<td>9.77±0.02</td>
</tr>
<tr>
<td>T2</td>
<td>13.19±0.05</td>
<td>23.75±0.36</td>
<td>9.30±0.10</td>
<td>13.76±0.04</td>
<td>4.88±0.17</td>
<td>9.69±0.05</td>
</tr>
<tr>
<td>T3</td>
<td>12.94±0.76</td>
<td>23.28±0.07</td>
<td>9.49±0.09</td>
<td>13.8±0.10</td>
<td>4.73±0.22</td>
<td>9.75±0.01</td>
</tr>
<tr>
<td>T4</td>
<td>13.28±0.09</td>
<td>24.36±0.18</td>
<td>9.98±0.01</td>
<td>14.01±0.08</td>
<td>4.62±0.10</td>
<td>9.79±0.05</td>
</tr>
<tr>
<td>T5</td>
<td>13.44±0.07</td>
<td>23.53±0.01</td>
<td>9.69±0.11</td>
<td>13.59±0.18</td>
<td>4.84±0.16</td>
<td>9.71±0.01</td>
</tr>
</tbody>
</table>

Values with different superscripts within a column differ significantly* (P<0.05)

Table 2: Effect of fenugreek and kalonji seed powder supplementation on organ weights (% live weight) of guinea fowls (mean±SE)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Heart</th>
<th>Liver</th>
<th>Gizzard</th>
<th>Spleen</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>0.50±0.01</td>
<td>1.86±0.01</td>
<td>2.31±0.02</td>
<td>0.166±0.01</td>
</tr>
<tr>
<td>T2</td>
<td>0.49±0.03</td>
<td>1.82±0.03</td>
<td>2.33±0.01</td>
<td>0.173±0.02</td>
</tr>
<tr>
<td>T3</td>
<td>0.48±0.02</td>
<td>1.80±0.01</td>
<td>2.32±0.01</td>
<td>0.175±0.02</td>
</tr>
<tr>
<td>T4</td>
<td>0.53±0.03</td>
<td>1.86±0.02</td>
<td>2.40±0.01</td>
<td>0.174±0.04</td>
</tr>
<tr>
<td>T5</td>
<td>0.48±0.02</td>
<td>1.76±0.03</td>
<td>2.35±0.01</td>
<td>0.173±0.03</td>
</tr>
</tbody>
</table>

Table 3: Effect of fenugreek and kalonji seed powder supplementation on processing loss (% live weight) of guinea fowls (mean±SE)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Blood loss</th>
<th>Feather loss</th>
<th>Head</th>
<th>Shank</th>
<th>Wing tips</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>3.16±0.01</td>
<td>8.58±0.04</td>
<td>3.14±0.01</td>
<td>3.99±0.01</td>
<td>1.72±0.01</td>
</tr>
<tr>
<td>T2</td>
<td>3.18±0.01</td>
<td>8.60±0.02</td>
<td>3.28±0.12</td>
<td>3.82±0.35</td>
<td>1.76±0.13</td>
</tr>
<tr>
<td>T3</td>
<td>3.17±0.01</td>
<td>8.53±0.01</td>
<td>3.18±0.02</td>
<td>3.88±0.01</td>
<td>1.73±0.03</td>
</tr>
<tr>
<td>T4</td>
<td>3.18±0.01</td>
<td>8.56±0.01</td>
<td>3.27±0.01</td>
<td>3.86±0.03</td>
<td>1.71±0.11</td>
</tr>
<tr>
<td>T5</td>
<td>3.18±0.02</td>
<td>8.48±0.01</td>
<td>3.24±0.08</td>
<td>3.85±0.04</td>
<td>1.78±0.05</td>
</tr>
</tbody>
</table>

*Processing losses: The processing losses i.e. blood loss, feather loss, head, shank and wing tips in guinea fowls provided fenugreek and kalonji seed powder supplemented diet were comparable to control (Table 3). The results regarding the processing losses revealed a numerical variation among all the groups. Therefore, it may be concluded that the fenugreek and kalonji seed powder supplementation did not materially affect the processing losses of guinea fowls.
CONCLUSION

It can be concluded from the results of present study that supplementation of mixture of 2.0% fenugreek seed powder and 1.0% kalonji seed powder through diet may be advised to improve carcass yield in guinea fowls.

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