Effect of Dietary Inclusion of Sorghum on the Performance of Broiler Chickens

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ABSTRACT

Following rice and corn, sorghum is the third grain planted in Asia. Regarding sorghum price and the climate (dry and semi-dry), it can replace corn in industry. However, its nutritive value changes due to genetic and environmental factors. This study investigate, the effect of different levels (control: corn, ration of 15% of sorghum, ration of 30 percent of sorghum, ration of 15% of sorghum along with 0.1 percent of methionine, and ration of 30% of sorghum along with 0.1 percent of methionine) on broiler chickens performance. Two hundreds (200) broiler chickens of 308 race were allocated to 5 treatments with 4 repeats (10 chickens per repeat). The rations were prepared for beginning, growth, and find periods. The chickens were fed freely at the experimental stage. Having been or derged with SAS 9.1 software in GLM version, the data were analyzed. Dancon method was also employed to compare the means. The results showed that adding sorghum at investigable levels has a significant effect on the performance of broiler chickens (p < 0.05). The results also showed high coefficient of FCR in 15 percent-replaced sorghum without methionine. The ratio of 15 percent of sorghum with methionine during the growth period (third and fourth week) had the Maximum weight increase.

INTRODUCTION

Having hatched out, the broiler chickens changed the energy supply from yolk full of lipid to carbohydrates in food stuff.

On modern raising farms 2 or 3 kinds of food stuff includes up to 75 Percent of ration. Ration foodstuff should provide the necessary materials as well as being economical so that the maximum production and output be acquired.

Adding corn, wheat, barley, and sorghum as dominant grains to birds Food to provide energy as protein sources is of paramount importance. Planted sorghum, a member of grain family, is also called cluster corn in Iran. Regarding the similarity of the name of this plant with corn that has led to wrong statistics on plant level, we use the international name sorghum to differentiate between these grains.

Sorghum is among the five most important grain in the world and following rice and corn is the third one in Asia (Ravin Dran and Blier, 1991).

Due to draught and high price of corn throughout the world in recent years, farmers and raisers have focused on other grains especially sorghum (Gualtri and RaoAsini; 1990).

A study by Ebadi et al. (1997) on sorghum in Iran showed that the amount of protein, ADF, fat, and tannins differ among different numbers. Following cysteine, tryptophan is the first bounding amino acid in Sorghum; however, it exists more in sorghum than in corn (Haulan and Prod foot; 1982). Researchers announced that using tannic acid reduces nitrogen survival. It is stated that the activity of protolthic in mice intestine with the ration including 5% tannic acid was three times more than the control group (Glick and Jesblin; 1970).

In another study, the researchers found that adding one or two Bounding amino acid to the rations including sorghum with high tannin improves the negative effect of these statistics in birds and achieve results with little tannin (Alkin et al., 1990).

As the results above show there is a difference between the amounts of amino acid and digestive capacity. Regarding the improving tasks performed on sorghum in some countries as Australia, this grain can be a good replacement for cornin broiler chickens food. The study by Shakouri et al., (2009) showed no significant difference on the Performance of the chickens fed with sorghum and corn. The results of the experiment
performed by Cherin et al (2002) demonstrated that the carcass yield of chickens fed with sorghum increases and can be better maintained in refrigerating room. Tannin is the most important anti-nutritional factor for sorghum. Besides the undesirable effects of this combination, its anti-oxidative function would have useful effects on the meat produced. Tannin in sorghum can reduce the amount of thiobarbitoric acid as an oxidation index. This leads to immunization of most lipids from oxidation (Cherin et al 2002).

Regarding the similarity between corn and sorghum in terms of nutritious substances and energy, sorghum has replaced corn in birds rations in some countries. The high price of corn and the difficulties in importing corn have made much attention to this grain especially in areas where its planting is possible. Researchers prove that replacing corn with sorghum to 70 percent brings about similar results on food intake and body weight increase of a chickens, and sorghum can be used up to 80 % in broiler chickens rations without reducing the growth performance (AshaRajini et al 1986).

In another study, it was revealed that using sorghum instead of corn doesn’t change the growth performance; and that using different kinds of sorghum with different amount of tannin in broiler chicken rations has no effect on their growth performance (Robio et al., 1990).

In the following sections the nutritious as well as anti-nutrioual impact of sorghum have been investigated. The applications of sorghum are parallel to those of corn and barley. It used not only as feed, but in starch and alcohol industries as well. Sugar exists in the majority of sorghum stems and its amount in sweet sorghum is more than others. Although this matter has been proved during the years but cry stilizing its sugar has got many problems. Its juice is used as syrup in compote, coke, drug and other industries. The advantage of this syrup is that it doesn’t sugar because it is not easily crystalized. Compared with sugar cane and beetroot planting sweet sorghum is simple and economical; however, acquiring sugar from sorghum is more expensive (Houlan and proud foot; 1982). Researchers state that the digestion system of the broiler chickens fed with sorghum including high amount of tannin expands in order to overcome the anti–nutrious effects of tannin (NiaCouti et al., 1996). Also, adding enzyme complement to rations improves weight, FCR and Protein digestive capacity (Harby and Pierson ;2002)

Topchian et al (2008) showed that replacing sorghum with enzyme had no undesirable effect on food consumption. The weight intake of chickens fed by rations including sorghum and a mix of Avivzyme and phytase enzymes (2620 gr) had no difference with control ration but had an important difference with control ration and phytase enzyme. The 49 day weight in control rations based on corn (2720 gr) was more than the sorghum rations (2510 gr). The average weight of cares of a 30 percent of sorghum and a blend of avizyme and phytase enzymes had no difference with control rations, but had an important difference to 50% with a blend of avizyme and phytase enzymes had no effect on FCR. In this study different levels accompanied with metionin have been Used. With rations including corn and phytaseenzyme. Replacing sorghum up

MATERIALS AND METHOD

This experiment has been randomly conducted over 200 broiler chickens on poultry farm at agriculture college of Astara Azad University. Preparing food rations during the experimental period was performed by a computer program for regulating rations of domestic animals (UFFDA). The food stuff used in this research is measured and organized based on NRC (1994) suggested tables. Water was permanently available for chickens. All managerial programs and raising conditions were equally implemented among cares. Vaccination was done according to the vet’s suggested schedule. The Experimental cares of this research include:
1. The control ration including corn.
2. The ration of 15% of sorghum.
3. The ration including 30 percent of sorghum;
4. The ration of 15% of sorghum with 0.1 percent of metionin.
5. The ration of 30 percent of sorghum with 0.1 percent of metionin.

Each care had four repetitions and for each repeat ten one – day chickens have been considered. The food ration are calculated and Prepared for two stages of (8 -21 days) and the growth stage (21-42 days). The chickens were being fed with usual rations during are: The Day – chicken method was employed to measure the average weight increase of chickens and the consumed food at the end of the Related period. The data was statistically analyzed using SAS 9.1 software. To compare the mean of those variables which had meaningful Fisher test, Dancon’s multi-dimensional test was applied.

RESULTS AND DISCUSSION

Food consumption:

The result of average weekly food consumption of each care are Shown in table 1. The results show that had significant effects on Weekly food consumption (p < 0.05). Based on the acquired results, there was significant difference among the most ration levels on the second and the third raising weeks (p<
The results of the present research do not confirm these results. Researchers have also concluded that in chickens fed with sorghum rations full of tannin the digestive system is developed and enlarged in order to overcome the anti-nutritious effects of tannin (NiaGten; 1996). Also, adding enzyme complementary in rations can improve weight increase, FCR, and digestive capacity of protein (Harby and Pearson, 2002).

Table 1: Effect of experimental diets on weekly feed intake (g) of broiler chickens.

<table>
<thead>
<tr>
<th>Age (day)</th>
<th>21-28</th>
<th>14-21</th>
<th>7-14</th>
<th>methionine (%)</th>
<th>sorghum (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-42</td>
<td>921.40</td>
<td>830.50</td>
<td>638.60</td>
<td>419.80</td>
<td>256.70</td>
</tr>
<tr>
<td>28-35</td>
<td>814.27</td>
<td>627.43</td>
<td>383.27</td>
<td>842.33</td>
<td></td>
</tr>
<tr>
<td>32-39</td>
<td>966.10</td>
<td>860.10</td>
<td>656.93</td>
<td>450.27</td>
<td>270.77</td>
</tr>
<tr>
<td>25-32</td>
<td>82.357</td>
<td>367.03</td>
<td>478.43</td>
<td>247.57</td>
<td></td>
</tr>
<tr>
<td>19-26</td>
<td>47.47</td>
<td>14.97</td>
<td>10.60</td>
<td>6.48</td>
<td></td>
</tr>
<tr>
<td>14-21</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0001</td>
<td>0.0001</td>
<td></td>
</tr>
</tbody>
</table>

0.05). Comparing the rations of 15 percent of sorghum and metionin with zero levels and 15 percent of sorghum without metionin ethrough out the experiment had the most food consumption. Also, Adding 30 % of sorghum improves weekly food consumption on the 3rd and 4th weeks. Comparing metionine levels during the experiment weeks showed that rations with 0.1 % metionine in contrast to rations lacking it increased food consumption.

Mendal et al. (2007) found out that adding 0.2 percent of metionin had no effect on broiler chicken food consumption to the age of 21 days. However, adding 0.05 percent of metionin had a significant increase on food consumption which accords with this study. Ahmad et al. (1991) reported that using 64% - 83 % levels of tannin in broiler chicken Rations causes significant weight loss and increase in food consumption with high levels of tannin. These results are in accord with our study.

**Weight gain:**

The results of average weekly weight increase of each care are shown. Realized significant effect of different experimental rations (p<0.05) on weight increase. Regarding the results, there was different significant difference between different levels (p<0.05) so that during whole the experiment weeks rations containing 30 percent of sorghum had the least weight increase compared with zero level and 15 percent of sorghum. Although adding 0.1 percent of methionine to rations had numerical improvement on weekly weight increase of chickens, there was no significant difference in 15% sorghum level. However, in 30 in table 2. The results of statistics analysis of weekly weight increase percent there was a significant effect on weekly weight increase level (p<0.01).

Although there was a significant differences among main levels of phytase enzyme during the growth period (p<0.5), it didn’t have any significant effect on weight increase of chickens in the final period. Adding 15 percent of sorghum compared with complementary Rations with metionin led to weight increase of chickens; however, this wasn’t very significant. Also, compared with control rations the chang wasn’t significant.

**FCR:**

The results related to the consumption of weekly food stuff is shown in average form. The statistical results of FCR by mixed procedural model after the correction of time effect on FCR showed that the effect of various cares on FCR was not significantly different (p<0.05) during the third, fourth, and fifth week of raising. However, on the second and last week the change was significant (p<0.05). On the second week (7 -14 day old) the most coefficient was related to 15 percent of sorghum without metholine while other cares didn’t show significant change. The most coefficient of FCR on the 6th week was also related to 15 percent sorghum with or without metionine and rations with 30% Sorghum without metionine had the least FCR.

Researchers have proved that replacing corn with sorghum with 70% has similar results on food output and weight increase and in ration of broiler chickens we can use sorghum seed about 80% without any decrease in growth development (Asharn Gini et al., 1986). In another study, it was revealed that using 100% sorghum instead of corn can be possible without any decline in growth development. Also, different sorghum seeds with different level of tannin can be used in broiler rations without any decreasing effect on growth development (Robio et al; 1990).

Ebadi et al. (2003) concluded that increasing the density level of tannin can have a significant effect on lowering the weight and food output in broiler chickens of 22 days age. The result of the present research does not confirm these results. Researchers have also concluded that in chickens fed with sorghum rations full of tannin the digestive system is developed and enlarged in order to overcome the anti-nutritious effects of tannin (NiaGten; 1996). Also, adding enzyme complementary in rations can improve weight increase, FCR, and digestive capacity of protein (Harby and Pearson, 2002).
REFERENCES


