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EFFECT OF MICROBIAL PHYTASE ON PERFORMANCE AND MORPHOMETRIC OF BROILER CHICKS' INTESTINE IN THE DIETS CONTAINING SORGHUM

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ABSTRACT

240 of Ross 308 Broiler Chicks were used to examine the effect of microbial phytase on performance and morphometric of broiler chicks' intestine. This experiment was conducted in a completely randomized design with 3 treatments, 4 replications and 20 chicks in per replication for 42 days.The experimental diets include: (1) Control treatment (Without any additive) (2) Treatment containing sorghum without additive (3) Treatment containing supplemented sorghum with microbial phytase. Production traits were measuredduring the course weekly and 2 chickens were selected from each cage in order to examine the qualitative traits and they were evaluated for separating the carcass at the end of the course. There was no significant differenceamong experimental treatments regarding feed consumption in the entire course, but in terms of numerical, the highest feed consumption was related to the treatment containing supplemented sorghum with microbial phytaseand the lowest one was related to the control diet. Supplemented sorghum with microbial phytaseimproved weight gainthat the weight gain was significant compared to the control treatment in the courses 10-24 and 0-42. Feed conversion ratio in the course 10-24 became significant in comparison with other treatments and in the course 0-42 also it was outstanding as compared to the control treatment, however, there wasn't significant difference in the other courses. Supplemented sorghum with microbial phytase increased crypt depth as compared to non-additive sorghum. The width of Willi was increased by using microbial phytase in the diets containing sorghum. Willie level and the comparison of Willie height to crypt depth increased in the effect of supplemented sorghum with microbial phytase as compared to the other treatments (05/0 <p).The use of sorghum in the diet reduced the relative weight of abdominal fat. The obtained results showed that rate of speed feed sorghum can be replaced by maize without negative effects on growth performance entirely and complementing with microbial phytase is increased growth performance.

KEY WORDS: Broiler Chicks, Sorghum, Microbial phytase, Growth performance, Intestine morphology

INTRODUCTION

The problem of feed and its related costs in meat production, especially in broiler chicks that it is allocated approximately 60 to 70 percent costs of poultry farming are the most important issues in this field (Holsheimer and Veerkamp, 1992). Considering the increase in international price of maize and the portion of this cereal in the diet of poultry, it seems that using alternative sources of corn in order to reduce production costs in the poultry industry is very helpful. Sorghum can be a

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good substitute for maize due to the same nutritional value (Leeson and Summers, 1996).Sorghum is used as food substance for human, animal nutrition and industrial needs. (Leeson and Summers, 1996; Ebadi et al. 2003) The nutritional value of maize is less than 3 to 5%and is used as an energy source in poultry diets. According to dry and arid climate of Iran and for reducing maize import, it seems that sorghum can be used as a replacement in order to use in poultry nutrition, consequently, it is necessary to use appropriate methods to improve the nutritional value of this cereal for poultry.

MATERIALS AND METHODS

180 Ross 308 broiler chicks were used in this experiment. 1 day Average weight of chicken's was2 ± 40.

- **The experimental diets**

The used experimental diets were prepared on the basis of sorghum and recommended management guide of Ross 308broiler chickens for the beginning courses (1 to 10 days), growth (11 to 24 days) and the finishing (25 to 42) and by using the software UFFDA. The chemical composition of foodstuffs using in diets adjustment was considered in accordance with the tables of National Research Council (NRC, 1994).

- **Measured traits**

Feed Intake, Body Weight Gain, Feed Convertion Ratio and Carcass quality parameters.

- **The statistical model**

The statistical model of design is in this form Xij=μ+Ti+Eij.
Amount of each observation: Xij, The population mean: μ, The effect of i on diet:Ti, The effect of experimental error: Eij
SAS software was used to analyze the data regarding the measured traits and Duncan's multiple range test was used to compare the means at 5% probability level.

RESULTS AND DISCUSSION

- **Quantitative Traits**

Quantitative or the performance including feed consumption mean, body weight gain mean, feed conversion ratio mean is discussed in each breeding period separately.

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Table 1. The effect of the experimental diets on feed consumption, weight gain and feed conversion ratio in 0-42 day

Treatment	Feed consumption	Weight gain	Feed conversion ratio
Maize control	4615.61	2522.77[b]	1.830[ab]
Non-additive sorghum	4642.34	2496.26[b]	1.862[a]
Sorghum with phytase	4647.54	2672.69[a]	1.740[b]
SEM	72.92	34.84	0.03
P value	0.947	0.012	0.050

Dissimilar letters in each column indicate the difference between the means (0/05> p).

- **Qualitative Traits**

Efficiency percent of the carcass, thigh, chest, abdominal fat, liver, pancreas, and wings were considered in this section.

Table 2.The effect of the experimental diets on the relative weight of different organs of Broiler Chicks (at the age of 24 days)

Treatment	Abdominal fat	Proventriculitis	Splee n	Liver	Gizzard	Pancrea s	Bursa of fabricius
Maize control	1.60[a]	0.489	0.087	3.51	1.872	0.328[b]	0.220[b]
Non-additive sorghum	1.04[c]	0.504	0.099	3.48	1.960	0.314[b]	0.267[a]
Sorghum with phytase	1.23[b]	0.493	0.113	3.37	2.015	0.386[a]	0.247[ab]
Standard error	0.051	0.020	0.008	0.084	0.083	0.014	0.010
Probability level of significance	0.0001	0.659	0.164	0.164	0.112	0.009	0.0001

Dissimilar letters in each column indicate the difference between the means (0/05> p).

According to the results of this study feed consumption was not affected by experimental treatments in all breeding periods. However, consumption of diets containing Sorghum by chickens, with and without additives, as compared with the control diet containing corn increased numerically. This observation agrees with results of some researchers (Nyachoti et al. 1996), and doesn't match with others results (Hassan et al. 2003; Macleod, 1991) that have been reported the reduction in food consumption in broiler chicks diets with Sorghum. This is likely due to the high nutritional value of Sorghum and low level of its anti-nutritional substances that have been used in this study. Generally, HTS (high tannin Sorghum) reduce feed consumption due to have anti-nutritional tannin and creating astringent and bitter taste, consequently; the lack of observing the effect of Sorghum on feed consumption may be the reason for its low tannin content. Energy is required for maintaining, growth of body tissues, vital metabolic activities and maintaining normal body temperature in the broiler. Primarily, Broiler chickens eat cereal in order to provide energy (Adamu et al. 2012). Therefore, the diets containing high-energy reduce feed consumption and low-energy diets increase it (Yolsin, 1990; Salissou, 2009). Considering the low energy and digestibility of Sorghum as compared to maize, it seems chicks compensate their needed energy by consuming

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more feed. According to the tables of feed conversion ratio of broilers chicks that fed with diets containing sorghum without additives was high numerically in all breeding courses and It had difference significantly with the groups who receiving diets containing supplemented sorghum with additives in 0 to 42 days, because of the low digestibility of nutrients and low energy of diets containing sorghum without additives which lead to digest and absorb nutrients with less efficient and achieved less weight growth. Considering both tannin and phytate compound have capable of bonding with nutrients, especially protein and reduces their digestibility from this way, consequently; supplementing the diets with microbial Phytase and Polyethylene glycol through Phytate and tannin tight connection reduce the forming of complex of these compounds with nutrients and increase their digestibility. In addition, according to the results of this study digested nutrients are absorbed with higher efficiency due to an increase in plant height and Willi level in supplemented diets with phytase that it increases growth of tissues. In this study the weight of the organs of the proventriculitis, spleen, liver and gizzard were not affected by the experimental treatments, but diets with and without sorghum additive-containing significantly decreased levels of abdominal fat which agreed with the findings of other researchers (Kwari et al. 2012). They stated that the weight of abdominal fat significantly decreased in the diet with increasing levels of sorghum that this decline was more evident in more than 25% cases. Abdominal fat decreased by increasing replacing levels of sorghum may be due to lower levels of sorghum fat as compared with corn fat. This observation is confirmed by other investigators (Scott chicken feeding) is also reported an increase in abdominal fat of broilers is associated with the amount of fat in the diet. According to the results of some studies (Karimi, 2008) the amount of abdominal fat and liver weight were not affected by replacing of Sorghum grain in diets for broiler chickens. Other researchers (Golian et al. 2009; Moran, 1986) reported that high energy significantly increases body weight and produce abdominal fat, but the body' weight is not affected by the level of energy. The relative weight of abdominal fat linearly increases with increasing dietary energy as well.

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