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EFFECTS OF DIFFERENT LEVELS OF REPLACING SORGHUM GRAINS INSTEAD OF CORN ON JAPANESE QUAIL PERFORMANCE

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ABSTRACT

The purpose of this study was to evaluate the Effects of different levels of replacing sorghum grains instead of corn on Japanese quail performance. 320 heads 1 day-age Japanese quail chicks under four treatments, four repetition and 20 heads in each one designed for this experiment based on completely randomized plan and then fed during 8 weeks and freely. The first treatment as control (based on corn and soybean meal), and second, third, fourth treatment respectively basal diet by replacing 20, 40 and 60% sorghum were instead of corn. The results showed that replacing sorghum with corn up to 40% had no significant difference on performance and traits of carcass,60% of food intake decreased body weight and also increased food conversion ratio ($P \leq 0.05$)

Keywords: Sorghum, Corn, Quail, Performance

INTRODUCTION

Sorghum had high amount of protein in comparison with corn but its fat and vitamins are lower than corn **[1].** One of limitation of using sorghum is because the absence of amino acids such as lysine and their interactions with tannins **[4].** Sorghum cultivation is more compatible with warm and dry regions and the most areas in Iran are in this region but also in terms of energy generation has 90 to 95 percent energy, which is why it is one of the world 5 first grains **[1].** During researches it has found that high tannin sorghum has flavonoid oligomers that these called condensed tannins. These compounds inhibit the oxidation flow density lipoprotein. Moreover, stabilization of the increase in toxic substance significantly is due to, weight reduction and food yield rates in 21days age broilers. Sorghum contains toxic material and this belief exist that this toxin decrease growth rate and increase mortality in broiler chicks fed with diets based on sorghum **[6].** There are several reports that imply on role of negative effects in high-tannin sorghum diets on growth performance, feed intake and feed conversion ratio **[4;7].** researchers have noted that fed chicks with diets containing high-tannin sorghum to overcome anti-nutritional effects of tannins, digestive system can be great and extend **[2].**

MATERIALS AND METHODS

Diets were based on the needs of quails and because of the nutrients in food items for 3 stages formulated by software (UFFDA). Rations prepared for the first 3 stages (1 to 2 weeks), growth (2 to 4 weeks) and the last (4 to 8 weeks of age).Totally in each breeding period, 4 experimental diets were used as flour. Metabolizable energy content of the experimental diets was set in the same period of investigation. It is noteworthy that in preparation of diets except control diet, the other 3 diets containing different amounts of sorghum (20, 40 and 60%) was used to replace corn.

Experienced treatments consist: Treatment 1: control diet (based on corn and soy bean), treatment 2: control by replacing 20 percent of sorghum instead of corn, Treatment 3: control by replacing 40 percent of sorghum corn and treatment 4: control by replacing 60 percent of sorghum instead of corn.

Studied traits

- Feed intake 2. Weight gain, 3.feed conversion ratio

  Statistical design and analysis

  So in this experiment 4 treatments and for each one 4 repetitions experimented that totally they collected 16 experimental units. In each experimental unit 20 of 1 day age broilers were used. The designs′ statistical model is $X_{ij} = \mu + T_i + E_{ij}$ is X_{ij}= amount of each observation ,μ= population mean, T_i= I th effect of diet, E_{ij}= effect of experimental error

SAS software for compare the means Dunkens multi range test was used in 5% aptness level in order to analyze the data of evaluated traits.

Table 1: Comparing food intake (gram) means in beginning, growth, last and all experimental period

60%	40%	20%	Control treatment	Experimental treatments
^{b}**45.7**	^{b}**47.3**	^{a}53	^{a}53	**Initial(0-2weeks)**
^{b}**118.2**	^{a} **128.8**	^{a}2**127.2**	^{a} **125.8**	**Growth(2-4weeks)**
^{b} 230	^{a}**256.6**	^{a}**256.4**	^{a}257	**Last(4-8weeks)**
^{b} **393.9**	^{a} **432.7**	^{a}**436.6**	^{a}8 **435.8**	**All of period(0-8weeks)**

Means that have the same letters are not significantly different (P ≤0.01).

Table 2: Comparison of body weight gain means (g) in the initial, growing, end and whole of experiment period

60%	40%	20%	Control treatment	Experimental treatments
b30.06	b 31.3	a636.6	a236.2	Initial (0-2weeks)
b47.66	a 59.9	a60.2	a 60.5	Growth (2-4weeks)
b5 59.58	a80.2	a80	a79.4	Last (4-8weeks)
b 137.3	a 172.4	a175.8	a174.1	All of period (0-8weeks)

Means that have the same letters are not significantly different (P≤ 0.01)

Table 3: Comparison of feed conversion ratio in the initial, growing, end and whole of experiment period

60%	40%	20%	Control treatment	Experimental treatments
a1.52	a1.51	b1.45	b1.46	Initial(0-2weeks)
a2.48	b 2.16	b2.11	b 2.08	Growth(2-4weeks)
a 3.86	b3.19	b3.2	b3.23	Last(4-8weeks)
a 2.87	b 2.5	b2.48	b 2.5	All of period(0-8weeks)

Means that have the same letters are not significantly different (P≤ 0.05).

DISCUSSION

- **Food consumption**

As listed in Table 1, there is significant difference in all training courses means of food intake between experimental treatments (P≤0.05). Based on table, the treatment received 40 and 60 percent sorghum had lower food consumption in the initial stages than other treatments. In other periods of experience (growth & last) the treatment received 60% sorghum, had lowest level of food consumption to other experimental treatments, however between other treatments of this experience, there is no significant difference. This problem is especially important during the breeding period, which is evident in the field of culture In the study, the levels of 10, 20, 30 and 40%, replacement instead of corn indicates that the daily average feed intake of quails when the chicks fed to 20, 30 and 40 percent of sorghum increased, whereas no significant difference to the levels of the study corresponded with the results of present study **[5].** Also similar study have done by some researchers on broilers, they reported that sorghum in broilers diets reduced feed intake in whole three periods, initial, growth and last that results are corresponded to obtained findings in the present study **[6].**

- **Daily weight gain**

Table 2 shows the comparison of daily weight gain means between treatments provided during the experimental diets. As can be seen in table of comparison of daily weight gain mean as a parameter, treatments' feed intake, 40and 60 percent sorghum had lower daily weight gain in initial step to other treatments. In other periods of experience (growth & last) the treatment received 60% sorghum had lower daily weight gain to others however between other treatments of experience no significant difference exist. This is especially important during the breeding period, which is evident in field of breeding. In a study that respectively sorghum and filbert bean have high amount of tannin , replaced them instead of corn and reported that with increasing replacing level, daily weight gain had significant increase, therefore, it is line with result of this study **[3].** However, daily average weight gain of quails, are closely related with availability of nutrients in diet of birds. Therefore, if food intake reduced in exist treatments, weight gain will decrease too. However, sorghum contains a variety of nutrients and anti-nutrients that can reach out quail and reduce the digestibility and the reduction in weight.

- **FCR**

The table of FCR shows that in all training courses, FCR between experimental treatments have significant differences ($p \leq 0.05$). Based on result of this study receiver treatment of 40 and 60 percent sorghum in the initial stage had lower food conversion ratio than other treatments. In other experience courses (growth &last) receiver treatment of 60% sorghum had lower FCR than other experimental treatments. However between other treatments of experience there is no significant difference. This is especially important during the breeding period, which is evident in the field of breeding. Researchers during an experience reported that replacing 70 to 100% sorghum instead of corn had no significant difference in food conversion and performance **[8].** Also, in a report stated that diets with high tannins decreases protein and amino acid digestibility. In addition, it also reduces nitrogen digestibility of sorghum **[9,10].** Therefore, we can say that sorghum in diet because of tannin and bind the protein content decreased feed conversion ratio at 60% level.

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