

The Effect of Additional Graded Levels of Guar Germ (*Cyamopsis tetragonoloba*) on Broilers Diet

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ABSTRACT: The present study was designed to investigate the effect of feeding various levels (0%, 5%, 15% and 25%) of guar germ on broiler chick's performance. A total of two hundred one day old chicks of Hubbard breed were used for the experiment with 10 chicks per group (replicate) and 5 replicates per treatment. By 7 weeks of experimentation period, results indicated that chicks that received 5% guar germ had significantly ($P>0.01$) higher body weight gain, higher value of daily feed intake, improved feed efficiency as compared to controls or other dietary treatments, while chicks fed on 25% guar germ diets; significantly showed decreased values of all such parameters.

KEY WORDS: *Guar gum, Broiler chicks, Feed efficiency, Poultry*

INTRODUCTION:

Guar (*Cyamopsis tetragonoloba*) offers relatively inexpensive high protein meal, a produced as a by-product of guar gum manufacture. The protein content of guar meal ranges between 33 to 45% depending on the fraction types (Van-Etten *et al.*, 1961; Cough *et al.*, (1967); Nagpal *et al.*, 1971 and Conner, (2002). Inclusion of guar meal into broiler chicken diets, deleteriously, effect measures of growth performance at the level of 2.5% Aderson and Warnick, 1964 and Conner, (2000). High concentration of guar meal in poultry diets affects feed intake and digestibility (Lee *et al.*, 2003). The anti nutritive effects were attributed to a trypsin inhibitor (Bakshi, 1966 and Couch *et al.*, 1967). Conner (2002) determined that guar meal contained lower level of trypsin inhibitor than processed soybean meal. Therefore the growth inhibition that follows guar meal is attributed to the guar gum content of the meal which causes a depression of growth and sticky

droppings when the total gum in diet exceeds 1.8 percent (Cough, *et al.*, 1967 and Lee, *et al.*, 2003). Guar meal germ constitutes as much as 7.2% of the diet supported growth rate and feed conversion ratio measures similar to those observed with typical concentrate soybean. The objective of this study was to investigate the impact of guar germ at three inclusion levels on growth and feed conversion of broilers.

MATERIALS and METHODS:

Birds:

Two hundred, one day old, broilers chicks (Hubbard breed) were divided into twenty groups in different pens; (five pens for each treatment and each pen consist of ten chicks). All chicks were fed on a commercial pre starter diet for 8 days as an adaptation period.

Housing:

Birds were kept under the deep litter floor system of management in pens; constructed of brick walls of 3.5 meters height on the east–west sides. All pens

were provided with clean disinfected feeders and drinkers.

Diets:

Iso caloric and Iso nitrogenous rations were formulated. Guar germ was autoclaved at 121°C for 20 minutes before adding to rations at 0, 5, 15 and 25%. The other ingredients were sorghum, groundnut cake, limestone, common salt, lysine, Methionine, Premix and super concentrate which formulated to meet the nutrient requirements of broiler chicks according to NRC (1981). Composition of experimental diets (starter and finisher) is shown in table 1.

Vaccination:

Vaccination against Newcastle (Colon

30) was done on days 6 and 23. The chicks were also vaccinated against Gumboro disease on day 14 and day 28 using (Gumporo D78) vaccine.

Measurements:

The initial weight of chicks, weekly weight gain, and feed consumption were measured and feed efficiency (g feed/gain) was calculated.

Statistical analysis:

All data were analyzed as a completely randomized design. Data were subjected to a one way analysis of variance using SPSS software. Differences among treatments means were established using the least significant difference multiple comparison method (Steel and Torric, 1960).

Table 1: Composition of diets used in the experiment for feeding chicks

Groups Ingredients%	A		B		C		D	
	St%	Fin%	St%	Fin%	St%	Fin%	St%	Fin%
Sorghum	58.733	68.9	60.766	76.004	62.327	70.5	64.459	67.501
Groundnut cake	32.736	22.07	25.622	17	14.356	6.362	2.3961	–
Guar germ	–	0	5	5	15	15	25	25
Concentrate	5	5	5	5	5	5	5	3.5
Nacl	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Premix	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Vegetable oil	0.75	0.80	0.73	0.850	0.5	0.85	0.75	1.750
Methionine	0.106	0.145	0.14	0.164	0.188	0.215	0.24	0.293
Lysine	0.018	0.17	0.13	0.23	0.268	0.363	0.428	0.627
Lime stone	0.647	0.76	0.763	0.808	0.811	0.86	0.947	0.769
Wheat bran	1.46	1.605	1.293	0.394	1	0.3	0.23	0.01
ME Kcal/kg	3089.86	3150.006	3086	3157.764	3072.815	3152.026	3060	3150.962
Crude protein	24.6	21.05	23.8	21.1	23.7	21.3	23.27	21.9
Crude fiber	5.063	4.378	4.950	4.443	4.974	4.342	4.87	4.70
Calcium	1	0.96	1	0.97	1	0.96	1	0.97
phosphorus	0.44	0.46	0.48	0.49	0.40	0.54	0.59	0.53

A = Control; B = 5% guar germ diet; C = 15% guar germ diet; D = 25% guar germ diet

St = Starter Fin = Finisher

RESULT and DISCUSSION:

The results (Table 1, 2 and Fig. 1) Showed that the group fed 5% (G.B) guar germ had a higher value in the total feed intake (g) than the other groups receiving 15% and 25% guar germ; This increase in value was highly significant ($P<0.01$) when compared with group that received 25% guar germ (G.D). It is clear from the results that the group fed on 5% guar germ diet exhibited significantly ($P<0.01$) higher total weight gain (g) and better feed conversion ratio than the control group and other groups fed on higher level of guar germ (15% and 25%) which exhibited lower performance for the above parameters. The data obtained during the present work are similar to those reported by Verma and Mecnab, (1983) who noticed that feed intake of birds fed diets containing 10% and 15% guar meal was less than that of birds fed on 5% guar meal. Similar results were also obtained by Cough *et al.*, (1967) who reported that the substitution of soya bean with 10% and 20% guar meal reduced the growth rate significantly ($P<0.01$) in broiler chicks. Vogetanel Penner, (1963) also showed that

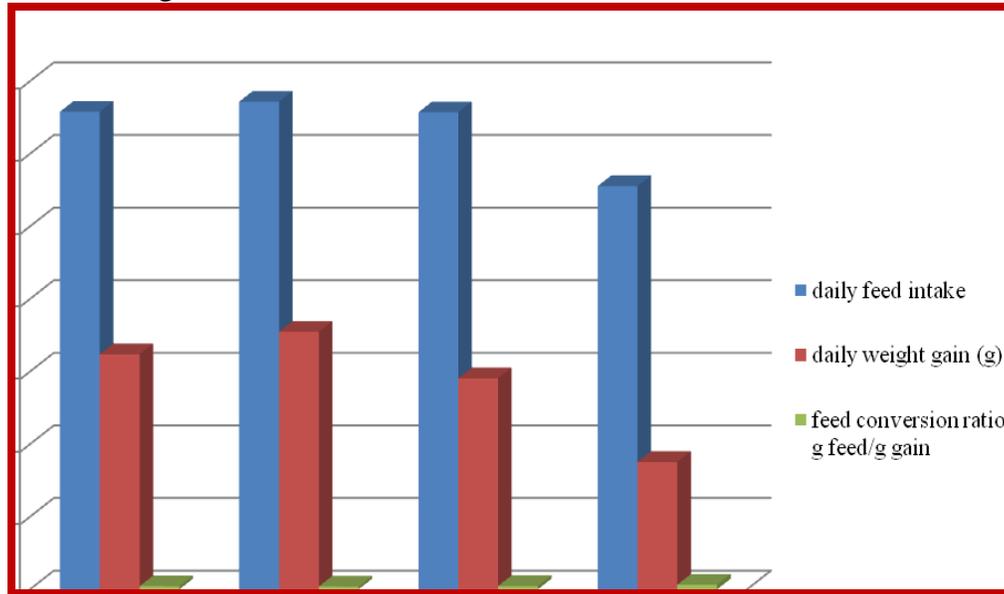
incorporation of guar meal at 10% and 15% in broilers diet caused depression in feed conversion ratio. The possible explanation for the lower performance of broiler chicks following addition of high levels of guar germ at (10%, 15% or 25%); may be due to the presence of residual galactomannas which remains after extraction of gum (Hassan,1999). On the other hand; White *et al.*,(1981) reported that the association of viscosity with limited growth of chicks remains the only reason for growth inhibition, the same authors illustrated that the high viscosity of intestinal content slowed the rate of mixing of the digestive enzymes with substrates and changed the transport properties of nutrient with substrate and altered the transport properties of nutrient of the mucosal surface. In conclusion, despite the variation in the results obtained by different authors, the present results revealed that a higher performance were obtained when chicks were fed 5% guar germ in the diet compared to the control. Treatments above 5% had negative effects on all parameters investigated and decreased performance in all parameters examined.

Table 2: The effect of feeding diet containing different Guar Germ levels on performance of broiler chicks

Parameters	Control	5%	15%	25%
Total feed intake(gram)	3289.0 ^a ± 68.32	3358.5 ^a ± 86.53	3285.2 ^a ± 102.15	2777.0 ^b ± 133.04
Weekly weight gain(gram)	161.9 ^b ± 5.92	177.4 ^a ± 5.84	145.3 ^c ± 7.13	87.7 ^d ± 8.00
Final weight gain(gram)	1133.01 ^b ± 57.91	1241.68 ^a ± 57.49	1071.20 ^c ± 68.19	613.95 ^d ± 74.07
Feed conversion ratio g feed/g gain	2.09 ^a ± 0.14	1.89 ^a ± 0.11	2.26 ^b ± 0.08	3.19 ^c ± 0.31

Values within the same raw with different superscripts are statistically significant($P<0.01$)

L.S. = Level of significance



Figurer, 1 The effect of feeding diet containing different guar germ levels on the performance of broiler Chicks

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