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EFFECT OF DIET DILUTION BY DRIED GREEN PEAS HUSKS POWDER ON SOME PRODUCTIVE AND CARCASS TRAITS OF BROILER CHICKENS

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Summary

This study was conducted in the poultry field of the Animal Production Department in Agriculture College, Al-Muthanna University to investigated the effect of dried green peas husks powder on feed in some productive and carcass traits of broiler chickens. For this purpose, 300 chicks, one day old, were assigned to 4 treatments. Each treatment had 3 replicates (contained 25 birds) under a completely randomized design (CRD). Four treatments were included, the first treatment was control (T1), second treatment 15% dried green peas husks powder (T2), third treatment 30% dried green peas husks powder (T3), and forth treatment 45% dried green peas husks powder (T4) to 7-14 days for all treatment. The results of these study revealed that T2 not differ significantly with control group (T1) in all treat, while the results showed that T3 and T4 significantly decreased at ($P \leq 0.05$) in all traits when compared with T1 and T2 groups.

Key words : Diet dilution, green peas husk, production, carcass, broiler.

Introduction

The genetic improvement has led to quickly growth in strains emergence of broiler chickens characterized by high growth and high coefficient converting diet led to an improvement in the final body weight as well as improvement in the dressing and deboning percentage (Dawkins and Layton, 2012), but the high speed of growth has affected negatively on broiler immunity (Yang *et al.*, 2011). As well as high rate of metabolic diseases such as Ascitis, Sudden Death Syndrome and skeletal deformities during the first three weeks of bird age (Baghbanzadeh and Decuypere, 2008), based on that research tended modern scientific studies to search for ways to treat the negative relationship between the high speed of growth and immune response following the early food rationing systems and feed programs (Singh *et al.*, 2011). The dilution diet program considered one of the important method in the food rationing by easing materials feed in low energy and protein content, as these substances diluted to a bush be non-digestible or digestion so few bush becomes low in energy content and protein to insure the maintenance requirements during the rationing period, which is usually short and early age in the life of broiler (Clarita *et al*., 2010). The material include oat husks, rice husks, bird feathers residue and sawdust which characterized by a high proportion of fiber (Al-Hayali, 2004). Rezael *et al.* (2006) showed that easing feed by different levels of coal wood in feed an early age led to non-appearance of metabolic diseases of broiler chickens. Sahraei and Shariatmadari (2007) showed that not significantly affect in body weight of broiler chickens when nourished on diluted feed (wheat bran and sand) in late age. The husks peas green of the bi-products of the process of peeling green peas as it contains a high proportion of fibers more than 50%. The husks peas green is poor in important nutrients protein and carbohydrates, therefore the using of these materials were limited in animals with Simple stomach like birds (Wadhwa and Bakshi, 2013).

The aim of this study to showing the non-use dried green peas husks in early ages in diet on productive and carcass characteristics of broiler chickens.

Materials and Methods

Preparation of feed

A commercial starter and finisher diet described in (table 1) were purchased from local market. Chicks were fed on starter diet during the first three weeks and then fed on finisher diet until five weeks the end of experimental period.

Green peas husks were collected from Al-Samawa shops, dried by sun at 6 days and crushed by small crusher.

Table 1 : Composition of basal diet.

Basal Diet		Items
23 to 35 d	**1 to 22 d**	
65.0	57.0	Corn
21.0	29.0	Soybean meal (45%)
10.0	10.0	Animal protein concentrate
2.3	2.0	Plant oil
0.3	0.3	Salt
1.0	1.0	Mineral and vitamin premix
0.4	0.4	Limestone
	0.1	Methionine
	0.2	Lysine
100 %	100 %	Total
Calculated analysis		
20.40	22.89	Crude protein (%)
3216	3069	Metabolism energy (kilo calorie per kg. Diet)
0.41	0.54	Methionine (%)
1.03	1.21	Lysine (%)
2.6	2.5	Crude fat (%)
3.13	3.63	Crude fiber (%)
1.07	1.09	Calcium (%)
0.54	0.58	Phosphorus (%)

*calculated analysis according to NRC (1994).

Table 2 : Chemical analysis of dried green peas husks.

(%)	Contents*
8.97	Crude protein
55.12	Crude fiber
10.0	Humidity
0.64	Fat
20.27	Carbohydrates
5.0	Ashe

*Chemical analysis in labs of Agriculture college, Al-Muthanna University.

Chemical analyzed in Agriculture college labs (table 2).

Broiler husbandry and experimental design

The experiment was carried out at poultry research farm, faculty of agriculture, university of Al-Muthanna, Iraq, during the period from 28-2-2015 till 1-4-2015 and aimed to effect of dried green peas husks powder on feed in some productive and carcass traits of broiler chickens. A total of 300 one day old Ross308 broiler chicks were randomly assigned (CRD) chicks in the four experimental groups were formulated without dried green peas husks powder (control, T1), 15% dried green peas husks powder from 7 to 14 day (T2), 30% dried green peas husks powder from 7 to 14 day (T3), 45% dried green peas husks powder from 7 to 14 day (T4) of the basal diet (table 3).

Each treatment group was replicated three times with 25 chicks per replicate. Chicks were reared in battery cages (1.5 × 1.0 m) with four tears. Chicks were raised in a temperature and humidity controlled room with a 24-

Table 3 : Ingredients and experimental diets on the feed restriction (7-14 day) of broiler chickens.

T4	T3	T2	T1	Items
34.0	41.0	49.0	57.0	Corn
10.0	15.0	22.0	29.0	Soybean meal (44%)
7.0	10.0	10.0	10.0	Animal protein concentrate
45.0	30.0	15.0	-	dried green peas husks
2.0	2.0	2.0	2.0	Plant oil
0.3	0.3	0.3	0.3	Salt
1.0	1.0	1.0	1.0	Mineral and vitamin premix
0.4	0.4	0.4	0.4	Limestone
0.1	0.1	0.1	0.1	Methionine
0.2	0.2	0.2	0.2	Lysine
100	100	100	100	Total
Calculated analysis*				
17.08	18.70	20.43	22.89	Crude protein (%)
2390.5	2610	2837	3069	Metabolism energy (kilo calorie per kg. Diet)
0.350	0.380	0.410	0.540	Methionine (%)
0.650	0.837	1.024	1.211	Lysine (%)
2.6	2.5	2.6	2.5	Crude fat (%)
26.52	18.84	11.22	3.63	Crude fiber (%)
1.021	1.043	1.065	1.087	Calcium (%)
0.500	0.539	0.541	0.580	Phosphorus (%)

*calculated analysis according to NRC (1994).

h. constant light schedule and *ad. libitum* access to water and feed throughout the experiment.

Sampling and measurements

Broilers were weighed by pen and feed intake was recorded weekly. This information was then used to calculate body weight gain and feed conversion ratio after correcting mortality and calculated the mortality and production index. Chicks in all treatments were slaughtered at the end of the experiment by cervical dislocation, and liver, gizzard and heart were collected, weighed, and calculated as a percentage of life body weight, the carcasses in all treatments were cut to main cuts (Breast, Thigh and drumsticks) and secondary cuts (back, wings and neck) and calculated as a percentage of life body weight (Al-Fayadh and Naji, 2012).

Statistical analysis

Data generated from the present experiment was subjected to statistical analysis using the GLM procedure of SAS (2001) statistical software package. When significant differences were noted, mean were compared using Duncan's multiple range test (1955).

Results and Discussion

Body weight and body weight gain

Tables 4 and 5 showed non-significant effect of green peas husks powder on body weight and body weight gain in all treatments at first week of broiler age, in the second week control treatment had higher significantly means (P≤0.05) compared with dried green peas husks powder treatments, low body weight in dilution diets treatments may be due to lower energy and protein levels (Hassanabadi *et al*., 2008). At the third till five weeks of bird age, control treatment had the significant increased (P≤0.05) compared with T3 (30% dried green peas husks powder from 7 to 14 day) and T4 (45% dried green peas husks powder from 7 to 14 day), while non-significant differ between control treatment and T2 (15% dried green peas husks powder from 7 to 14 day). The main reason of decrease growth rate in T3 and T4 compare with T1 and T2 due to highly percentage of fiber and low percentage of proteins and energy in the diets, Leeson and Summers (2005) found the low food intake led to negative effect on body weight and body weight gain. For delayed of growth rate in broiler chickens can be used of diets with low energy and protein concentrations. This method has an advantage in that it does not need any additional labor of weighing the feed and is accomplished by lowering the level of either protein or energy (Sahraei, 2012).

Feed consumption

A significant differences in feed intake (table 6) were found at the first week of the life of birds, a significant decrease (P≤0.05) in dilution treatment compared with control treatment at the second weeks of bird age, the low feed consumption in dilution treatment due to an increase in the proportion of fiber material cellulosic, which leads to increased volumetric in the amount of intake of feed (the case of satiety physicist), which makes the relatively small amounts eat, causing a lack of basic essential nutrients adequately (Atapattu and Silva, 2016). This result is consistent with what he found both Khudair and Ibrahim (2010); they were pointed to the existence of a significant decrease in feed consumption in dilution treatments at the age of 4-14 days and significant increase decline with increasing dilution of sawdust ratio in comparison with control. This reduction in feed intake may have been due to of a protein and amino acid deficiency, since other nutrients were at normal levels. But, Rosebrough and McMurtry (1993) showed that the effect of diet energy restriction in broiler chickens, the restriction period was from 6 to 12 days and was designed to only support the maintenance requirements for body weight. Body weight at 54 days was achieved for birds given feed ad libitum from day 13 to 54 and for those fed ad libitum from 21 days onward.

Table 4 : The effect of diet dilution by dried green peas husks powder on weekly body weight (gm) of broiler ± standard error.

Bird age (days)					Treatments
35	28	21	14	7	
2051.16 ± 181.1 a	1340.20 ± 127.4 a	877.28 ± 78.4 a	440.28 ± 37.6 a	171.22 ± 15.4	**T1**
2045.29 ± 183.4 a	1328.71 ± 126.1 a	861.71 ± 82.1 a	417.55 ± 35.1 b	170.55 ± 14.7	**T2**
1912.15 ± 185.2 b	1204.29 ± 119.8 b	763.47 ± 75.0 b	374.23 ± 39.7 c	170.94 ± 14.8	**T3**
1807.44 ± 186.0 c	1193.56 ± 120.5 c	719.64 ± 68.0 c	355.19 ± 32.2 d	170.13 ± 15.3	**T4**
*	*	*	*	N.S	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). N.S. non-significant.

Table 5 : The effect of diet dilution by dried green peas husks powder on weekly body weight gain (gm) of broiler ± standard error.

Cumulative average body weight gain (35 Days)	Bird age (days)					Treatments
	35	28	21	14	7	
2011.16 ± 169.4 a	710.96 ± 58.3 a	462.92 ± 43.8 a	437.00 ± 41.2 a	269.06 ± 21.1 a	131.22 ± 11.7	**T1**
2005.29 ± 172.8 a	717.02 ± 59.2 a	466.56 ± 45.2 a	444.16 ± 42.0 a	247.00 ± 23.3 b	130.55 ± 12.2	**T2**
1872.15 ± 177.2 b	707.86 ± 60.2a	440.82 ± 43.6 b	389.24 ± 41.2 b	203.29 ± 17.4 c	130.94 ± 12.1	**T3**
1767.44 ± 160.7 c	667.88 ± 56.3 b	419.82 ± 41.6 c	364.45 ± 40.7 c	185.06 ± 15.6 d	130.13 ± 13.6	**T4**
*	*	*	*	**	N.S	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. **Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.01) *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). **N.S:** non-significant.

Table 6 : The effect of diet dilution by dried green peas husks powder on weekly feed consumption (gm) of broiler ± standard error.

Cumulative average feed consumption (35 Days)	Bird age (days)					Treatments
	35	28	21	14	7	
2011.16 ± 169.4 a	1116.22±101.7b	722.17 ± 67.8 b	677.35 ± 67.6 b	411.57 ± 31.5 a	154.84 ± 14.1	**T1**
2005.29 ± 172.8 a	1117.10±109.0b	732.49 ± 69.2 b	678.99 ± 65.8 b	395.20 ± 33.4 a	156.42 ± 15.7	**T2**
1872.15 ± 177.2 b	1199.96±105.3a	750.58 ± 70.1 ab	692.85 ± 68.7 a	345.59 ± 29.8 b	155.38 ± 14.0	**T3**
1767.44 ± 160.7 c	1215.69±110.0a	765.69 ± 70.8 a	710.68 ± 57.6 a	333.09 ± 26.7 b	156.15 ± 14.4	**T4**
*	*	*	*	*	N.S	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). **N.S:** non-significant.

Feed conversion

Results in table 7 refers to the absence of significant differences in feed conversion ratio during the first week of the life of birds, but during the second and third week of the birds age was a significantly improvement ($P \leq 0.05$) in the control treatment compared to all dilution feed treatments.

Leeson *et al*. (1996) reported that diluting commercial broiler chicken diets from 35 to 49 days of age with oat hulls and sand, which led to the diets deficient in energy content, caused a significant reduction in body weight at 42 days of age, although the growth was compensated thereafter. Birds seemed to maintain energy intake, therefore there was increased feed intake with energy deficient diet. Coon *et al*. (1981) comparing the performance of male and female broiler chickens fed low or high energy rations for 56 days, found a significant improvement in the feed conversion ratio using a diet with high energy level.

Mortality and production index

The mortality in table 8 is observed and there is a significant decrease ($P \leq 0.05$) in all feed dilution treatments compared with control group during the period of research, amounting to five weeks and conclude, however, that the high proportion of mortality in the treatment of control because of the high speed of growth and increased feed consumption as a result of the free nutrition (Julian, 2005) as well as increased metabolism that cause increased need for oxygen and increased heart rate and increased arterial blood and relaxes and enlargement of the right ventricle and then failing to oxygen and high processing pressure mortality result ascites disease and sudden death (Leeson *et al*., 1995). Agreed this result with the findings of the each of the Halley (2006), he pointed to a significant decrease in the proportion of mortality food rationing early ages transactions and interpreted so that the easing of feed will lead to a decline in energy and protein level than limit the growth of the bird because negative correlation between growth and immunity of the birds, which reduces the injured bird diseases and acclaim mortality arising from it (Naji, 2006). And indicates the same table to a

Table 7 : The effect of diet dilution by dried green peas husks powder on weekly feed consumption (gm diet/ gm weight gain) of broiler ± standard error.

Cumulative average feed conversion (35 Days)	Bird age (days)					Treatments
	35	28	21	14	7	
1.50 ± 0.02 a	1.57 ± 0.01 a	1.56 ± 0.01 a	1.55 ± 0.01 a	1.53 ± 0.02 a	1.18 ± 0.02	**T1**
1.51 ± 0.02 a	1.58 ± 0.02 a	1.57 ± 0.02 a	1.68 ± 0.01 b	1.60 ± 0.02 b	1.20 ± 0.01	**T2**
1.64 ± 0.01 b	1.70 ± 0.03 b	1.70 ± 0.02 b	1.78 ± 0.01 c	1.70 ± 0.01 c	1.19 ± 0.01	**T3**
1.76 ± 0.01 c	1.82 ± 0.02 c	1.83 ± 0.02 c	1.95 ± 0.01 d	1.80 ± 0.02 d	1.20 ± 0.02	**T4**
*	*	*	*	*	N.S	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). **N.S:** non-significant.

Table 8 : The effect of diet dilution by dried green peas husks powder on mortality (%) and production index of broiler ± standard error.

Production index	Mortality(%)	Treatments
354.25 ± 1.95 b	9.33 ± 0.71 a	**T1**
371.52 ± 2.12 a	4.00 ± 0.36 c	**T2**
319.80 ± 2.04 ab	4.00 ± 0.39 c	**T3**
277.76 ± 2.11 c	5.33 ± 0.47 b	**T4**
*	*	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05).

Carcass traits

The table shows 9 the effect of feed relieve powder peel green peas dried in dressing percentage with and without viscera edible to the sacrifices of broiler chickens at the age of 35 days, as the table indicates the emergence outweigh the moral (P≤0.05) in ratios dressing either with or without the entrails Interior edible (heart, liver and gizzard) in favor of the two treatments T1 and T2 compared T3 and T4 treatments due as a result of the deterioration of bird growth by using high levels of powdered husks, dried peas since there is a direct correlation between the rate of body weight and dressing percentage (Al-Fayadh and Naji. 2012). As for the relative weight of abdominal fat (the same table) was observed

Table 9 : The effect of diet dilution by dried green peas husks powder on dressing percentage with or without viscera edible (%) of broiler ± standard error.

Dressing percentage with viscera edible (%)	Viscera edible (%)			Dressing percentage without viscera edible (%)	Treatments
	Liver	Gizzard	Heart		
74.55 ± 0.69 a	3.17 ± 0.028 a	2.41 ± 0.023 a	0.446 ± 0.003 a	68.52 ± 0.62 a	**T1**
74.47 ± 0.71 a	3.14 ± 0.022 a	2.39 ± 0.021 a	0.444 ± 0.003 a	68.50 ± 0.67 a	**T2**
73.79 ± 0.70 b	2.87 ± 0.023 b	2.20 ± 0.023 b	0.431 ± 0.002 b	68.29 ± 0.64 b	**T3**
73.11 ± 0.71 c	2.60 ± 0.024 c	2.03 ± 0.020 c	0.410 ± 0.003 c	68.07 ± 0.63 c	**T4**
*	*	*	*	*	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05).

significant increase (P≤0.05) for the treatment of T2 in the production index at the age of 35 days compared to the transactions and other events due to the reflection of moral improvement happening in both the rate of body weight as well as lower mortality and improvement in feed conversion ratio (Naji and Gabro, 1999).

and no significant rise (P≤0.05) in the percentage of abdominal fat in the control treatment compared to transactions relieve hay and agreed this result with the findings of the each of Leeson and Zubair (1997). They noted that the decline in both energy and protein in diets ease the feed will reduce the deposition of fat in the sacrifices of broiler chickens. The table 10 shows the

Table 10 : The effect of diet dilution by dried green peas husks powder on main and secondary cuts (%) of broiler ± standard error.

Secondary cuts (%)			Main cuts (%)			Treatments
Neck	Wings	Back	Drumstick	Thigh	Chest	
5.40 ± 0.04 c	11.48 ± 0.08 c	25.95 ± 0.24 c	13.32 ± 0.09 a	16.44 ± 0.14 a	28.41 ± 0.26 a	**T1**
5.42 ± 0.05 c	11.50 ± 0.10 c	25.97 ± 0.21 c	12.31 ± 0.08 a	16.42 ± 0.14 a	28.38 ± 0.27 a	**T2**
5.53 ± 0.05 b	11.68 ± 0.11 b	26.19 ± 0.25 b	12.12 ± 0.11 b	16.29 ± 0.15 b	28.19 ± 0.25 b	**T3**
5.67 ± 0.04 a	11.86 ± 0.09 a	26.57 ± 0.24 a	11.93 ± 0.10 c	16.06 ± 0.13 c	27.91 ± 0.20 c	**T4**
*	*	*	*	*	*	**Significant**

T1: Control. **T2:** 15% dried green peas husks powder from 7 to 14 day. **T3:** 30% dried green peas husks powder from 7 to 14 day. **T4:** 45% dried green peas husks powder from 7 to 14 day. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05).

effect of feed relieve powder peel green peas dried in the relative weight of main and secondary cuts offerings broiler chickens, Noting get outweigh the moral ($P \leq 0.05$) in the relative weight of main cuts (chest, thigh and drumstick) in T1 and T2 compared with T3 and superior turn significantly ($P \leq 0.05$) compared with T4, and indicates the same table to the existence of a significant decrease ($P \leq 0.05$) in the relative weight of secondary cuts (back, wings and neck) in T1 and T2, as compared to T3, which showed the results to fall significantly ($P \leq 0.05$) compared with T4, as the use of high levels of green husks peas powder dried has led to a decline in the relative weights of main cuts and high relative weights values for secondary cuts values and agreed this result with the findings of the each of Leeson and Zubair (1997) they find a significant decrease in the relative weight of the main cuts with the significant increase in the relative weight of secondary cuts when forage relieve dry, scaly patches rice compared to control treatment.

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