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ORIGINAL ARTICLE

Effects of Pea Processing On Carcass Characteristics in Broiler Chickens

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ABSTRACT
The aim of this work was to study three effects of raw and processed peas in broiler carcass characteristics. In this study ,210 Ross 308 ,1 day old broiler chicks in a completely randomized design were allocated in 7 treatments and 3 replicates and10 chicks were allocated in each replicate . the experimental Treatments consisted of T1 : control diet , treatment, 2,3 and 4 were included in the control diet by replacing soybean meal with %5 , %10 and15 % of the raw peas ,the treatment s with %5 , %6 and %7 including control diet by replacing soybean meal with soaked peas of %5 ,%10 and 15% , the experimental diets were both of energy and nitrogen . Experimental diets were freely fed to broilers during the starter, growing and finishing periods. But, Feeding on raw peas increases pancreatic weight and the pancreatic weight showed no significant difference between the control treatment when the broilers fed on the soaked peas.
Key words: broiler chick peas, soaked, carcass characteristics

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INTRODUCTION

peas are used primarily as human food in most of the world. But, peas are used to feed livestock and poultry in many countries. Unfortunately, there are different varieties of methionine content in the peas, although high levels of dietary methionine do not always improve the growing period. This shows the differences in digestibility of proteins in different foodstuffs probably due to the presence of anti-nutritional factors (tannins, lectins, non- starch polysaccharides, etc.). It seems that an inverse relationship exists between the amount of tannin and digestible protein, and roughly % 6 of protein digestibility is reduced, if there would be %1 increase in tannin. But peas are similar to beans .so, peas are low in crude protein (26% DM) and crude fiber (less than 6 % DM) .Peas contain Seed oil , slightly above the level of beans .but ,their saturated fatty acids are the same [1, 2]. So, peas contain energy metabolism slightly more than beans. Peas and beans are regarded as a source of protein. Balance of amino acids in Peas looks better and contains more amino acids lysine, methionine and cysteine . However, methionine still remains the main limiting amino acids. Peas have an important contribution to the energy supply of livestock and the rate of metabolic energy in poultry amounts to 2980 kcal kg. Quality of pea protein in the absence of anti- nutritional substances is comparable to the use of methionine and protein soybean meal. Pea anti-nutritional material, to which the most part is the condensed Tannin, can keep the starch and nutrients in the peas away from digestion enzymes .so, this can reduce the metabolic energy and absorbable nutrients of peas [1-3]. Despite having adequate energy and protein quality, peas cannot be regarded as a good meal [2]. So, peas contain anti-nutritional and nutritional substances at the same time that make it difficult to get access to the nutrients found in Peas [2]. For this reason, the use of peas has been challenged .That's why, scientists have focused on these substances for using peas. The most important anti -nutritional substances found in peas include protease and amylase inhibitors, tannins, alpha - Galactocide saponins, non- starch polysaccharides .there are various ways to remove or disable processing of toxins or help changing the structure of pea starch digestive enzymes into improving access to starch granules. Researchers begin to use ways in order to remove toxins found in a pea, including techniques such as: ensile, fermentation, chemical and thermal processes such as steaming, baking, UV irradiation and extrusion of peas. Besides the techniques mentioned above, the economic justification of these methods are also discussed. Actually any broiler

feeding change is done by following goals, to which lower diets prices and better performance of growing broilers considered to be the most important goals. Although the techniques used to remove the toxic found in Peas are too costly .but, it can be selected as one of the effective nutrients for feeding.

MATERIALS AND METHODS

- The formulation of diets

Using purchased broilers breeds catalog and software package UFFDA, the experimental diets were adjusted. Ingredients and chemical composition of diet in early stage (0-10 days) and growth stage (11-28 days) and last phase (29-42 days) are included in the table [4].

- Experimental treatments were as follows:

1. Treatments: dietary control of broilers
2. Treatments: dietary control by replacing soybean with 5% of raw peas
3. Treatments: dietary control by replacing soybean with 10% raw peas
4. Treatments: dietary control by replacing soybean with 15% raw peas
5. Treatments: dietary control by replacing soybean with 5% soaked peas
6. Treatments: dietary control by replacing soybean with 5% soaked peas
7. Treatments: dietary control by replacing soybean with 5% soaked peas

Table 1. Dietary composition used during the growth period with the periods are separated according to the dietary percentage

Final 22-42days				Growth 11-21 days				Starter 0-10 days				
52/85	56/22	59/64	63/02	50/05	53/53	56/95	60/22	45/52	48/91	52/26	55/7	*Corn*
22/04	24/03	26	27/98	25/15	27/05	29	31/08	29/56	31/54	35/56	35/5	*Soybean*
15	10	5	0	15	10	5	0	15	10	5	0	*Pea*
2/91	2/55	2/16	1/8	2/6	2/22	1/85	0/7	2/72	2/35	1/98	1/6	*Fat*
1	1	1	1	1	1	1	1	1	1	1	1	*Calcium Carbonate*
0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	*Vitamin supplement*
0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	0/25	*Mineral supplement*
0/7	0/7	0/7	0/7	0/7	0/7	0/7	0/7	0/7	0/7	0/7	0/7	*Phosphate di calcium*
5	5	5	5	5	5	5	5	5	5	5	5	*5% meat concentration* *
100	100	100	100	100	100	100	100	100	100	100	100	*Sum*

Table 2 an analysis of nutrients in each diet

3051	**3051**	**3051**	**3051**	**3005**	**3005**	**3005**	**3005**	**2969**	**2969**	**2969**	**2969**	***Energy (Kcal/Kg)***
19/39	19/39	19/39	19/39	20/54	20/51	20/5	20/54	22/13	22/13	22/14	22/13	*Crude protein*
3/112	3/016	2/919	2/823	3/311	3/21	3/112	3/021	3/588	3/492	3/397	3/299	*Crude Fiber %*
1/163	1/166	1/168	1/171	1/174	1/176	1/178	1/181	1/188	1/19	1/193	1/195	*Calcium %*
0/492	0/498	0/505	0/511	0/494	0/5	0/506	0/513	0/496	0/502	0/509	0/51	*Accessible phosphate %*
0/142	0/142	0/143	0/143	0/142	0/142	0/142	0/143	0/141	0/141	0/142	0/14	*Sodium*
2/424	2/331	2/225	2/131	2/247	2/146	2/049	1/958	2/237	2/139	2/041	1/94	*Acid linoleum*
1/883	1/866	1/848	1/83	1/967	1/947	1/929	1/914	2/085	2/067	2/05	2/03	*Lysine*
0/497	0/508	0/52	0/531	0/515	0/526	0/537	0/549	0/539	0/551	0/562	0/57	*Methionine*
0/538	0/599	0/579	0/599	0/572	0/591	0/611	0/632	0/617	0/637	0/658	0/68	*Cysteine*

Table 3. % 5 meat concentrate composition

Energy	Protein	Crude Fiber	Calcium	Absorbable Phosphate	Sodium	Linoleum Acid	Lysine	Methionine	cysteine
2200	25	3	11	5.5	2	1.5	3.2	3.3	0.7

- The distribution of chicks at the experimental units:

The experimental units for special treatments are randomly selected and each three pens are regarded as the replicates of each treatment. Number of pens and the treatment are determined randomly .The diets are received in accordance with each pen number and type of treatments. The chicks were randomly distributed within the pens.

- Statistical models and data analysis method:

$Xij=\mu+Ti+Eij$

Xij= the observed rate at any experimental unit

μ =the total average

Ti= the effect of each food treatment

Eij= the effect of experimental error

The data are collected during the experiments and are recorded in Office Excel software .then, using SAS software and analyzing GLM procedure by the experiment-gained data, the multi-domain Duncan Test at the %5 statistical level were applied for comparing the averages.

- Separation of carcasses

Finally, the same two male broilers selected from each experimental unit, were slaughtered. Different organs in a carcass weighed by a digital scale and an accuracy of 0.001 g and, then, recorded. The carcass for cooking is weighed and its thigh, chest, abdominal fat, liver, gizzard, spleen and bursa fabricus are isolated from the carcass and at the end ,the abdominal fat is separated from the ventricles of the poultry and is measured as live weight.

RESULTS

Findings of present study are summarized in table 4.

Table 4. Different words at each row show the significant difference at % 5

	Control	%5 Raw peas	%10 Raw peas	%15Raw peas	%5 Soaked Peas	%10 soaked pea	%15 soaked pea	SEM
Carcass	**57/8a**	**59/45a**	**54/5b**	**54.4a**	**58/4a**	**58.55a**	**57.9a**	**1.067**
Breast	**20/8a**	**20.92a**	**18.13a**	**18.2b**	**20.32a**	**21.05a**	**20.94a**	**0.58**
Thigh	**19.22a**	**19.94a**	**18.22b**	**18.01b**	**19.42a**	**19.5a**	**19.17a**	**0.36**
Liver	**2.11b**	**2.13b**	**2.57a**	**2.62a**	**2.349ab**	**2.259b**	**2.234b**	**0.1**
Abdominal Fat	**2.171a**	**1.86a**	**2.03a**	**2.12a**	**2.352a**	**2.217a**	**2.01a**	**0.22**
Spleen	**0.13a**	**0.135a**	**0.127a**	**0.131a**	**0.128a**	**0.128a**	**0.13a**	**0.01**
Pancreas	**0.172b**	**0.182a**	**0.183a**	**0.183a**	**0.173b**	**0.175b**	**0.174b**	**0.2**
Pursa	**0.255a**	**0.241a**	**0.234a**	**0.23a**	**0.248a**	**0.248a**	**0.25a**	**0.32**

DISCUSSION

The results of Table 4 indicate that the experimental treatment in Pursa and spleen parameters showed no significant difference. However, the percent of carcass organs including thigh, breast, liver, abdominal fat, and small intestine to the live weight were affected by the used treatment. So that the carcass, breast and thigh in treatments which received %10 and %15 of raw peas than other treatments and had significantly reduced compared to the control treatment. But, the other treatments showed no significant differences compared to the control & experiment treatments according to the above mentioned table ($p<0/05$). The liver weight percentage in treatments receiving 10 % and 15 % of raw pea showed significant increase compared to control treatment and other experimental treatment .however, there was no significant difference among the other treatments ($p<0/05$).the result indicates that raw pea contains anti-nutritive substances .so, the broiler chicks receiving the diet containing 10% and 15% of raw peas, had a liver with higher activity to make up for the enzyme against anti-nutritive substances. But a diet containing soaked peas because of decreased anti -nutritive substances .so, the liver activity is reduced[5]. The Abdominal fat in treatments receiving 10 %and 15 % of raw peas decreased compared to control and other treatments. Whereas soaked peas in treatments receiving 10 %and 15% showed significant increase compared to control and other experimental treatments (05/0> p).Raw peas contain anti-nutritive substances as well as tannin, upon which abdominal fat and blood cholesterol can be reduced .this mechanism acts in a this way that tannin may inhibit fat being absorbed in a diet, then broiler chicks would be of lower energy. However, when using processing methods, on which the anti-nutrient are reduced. the interaction between nutrients (energy, protein and other substances) and anti-nutrients (tannins , lectins , oligosaccharides , etc.) is reduced and a better digestion is achieved and the broiler chicks would be of higher energy ,if they were fed with soaked peas .this could be the reason for higher weight of abdominal fat in poultry .the average weight of pancreatic to broiler chickens under treatment fed on raw peas showed statistically significant difference compared to treatments containing soaked peas and control treatment ($p<0/05$). The research conducted was the same as the report of Mehrjardi et al [3] who let the broiler chicks fed on the Different levels of raw, soaked and cooked peas. They reported that pancreatic weight showed significant increase compared to the other two processed methods, when the broiler chicks fed on raw peas [3, 5]. This refers to the presence of trypsin inhibitor found in peas and heating can cause the inhibitor to be removed. This report is the same as Agah et al [1] report as well. According to Farrell [5], Pancreas weight in chicks treated with different levels of Peas showed significantly different compared to the weight of the pancreas in chicks fed on diets containing

peas, broad beans and sweet beans. The research shows that there is no significant effect in weight and pancreas of chicks fed on different levels of PEAs.

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