



## **Effect of Different Levels of Local Concentrated Protein Manufactured from Slaughterhouse Wastes on some Carcasses Traits of Broiler**

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**Abstract:** This study was conducted to determine the effect of different levels of local concentrated protein extracted from slaughterhouse wastes on some carcasses traits of broiler. A total of 225 female broiler Ross 308 chicks, one day, were used, randomized distributed into five treatments, with three replicates per treatment (15 chicks each replicate). The treatments were as follows: T1; basal diet contains 4% imported protein. T2; basal diet contains 2% imported protein+2% local manufactured protein. T3; basal diet contains 4% local manufactured protein. T4; basal diet contains 6% local manufactured protein. T5; basal diet contains 8% local manufactured protein. The results showed that there were no significant differences between the treatments on the carcass weight, dressing percentage, relative weights of the thigh and breast, as well as the relative weight of the abdominal fat. There were no significant differences among all treatments for the sensory traits of the thigh and breast. In conclusion, the locally manufactured animal protein extraction had no negative significant effect on the characteristics of carcasses and could be used as an efficient alternative to imported protein concentration used in broiler diets.

**Keywords:** Local protein, Slaughterhouse wastes, Carcasses traits, Broiler.

## **Introduction**

Nutrition constitutes 70% or more of the total cost of poultry production and has a direct impact on the production process. Therefore, special attention must be paid to nutrition (Abdelmageed, 2012). The feed components significantly affect the growth of meat and the productivity of laying hens, so the diet should contain all nutrients in a balanced way according to the needs of the bird

(Puvadolpirod & Thaxton, 2000). The poultry industry is dependent on imported protein concentrates in Iraq, it is the main source of animal protein, vitamins, minerals and some feed additives in poultry diets, however, the high prices increase the production cost (Al-Athary, 2002). Thousands of tons of poultry waste are dumped annually,

like heads, legs, feathers and intestines, disposed of as waste or used as animal fertilizers, due to the availability of the waste in large quantities, it has become an environmental problem (Al-Tai, 2005). Therefore, some studies have tended to be used in the production of protein concentrates, involves the composition of animal diets, especially poultry and fish, modern technologies were used to convert these animal wastes into beneficial materials for animal feeding, and preserving the environment from the accumulation of these substances, and impact on public health (Ibrahim, 2000).

The researchers resorted to the use of chemical methods using acid, alkaline and salt, these methods were characterized by the short time of decomposition, cheapness and easy, in addition to enzymatic methods. There are a lot of studies that try to make a protein that competes with the imported protein, good progress has been made in this field, but there was no perpetuation of these actions (Ahmed *et al.*, 2018; Frempong *et al.*, 2019).

The aim of this study to manufacture a protein concentrate from the carcass waste (heads and legs), and add it into diets as an alternative to the imported protein concentrate, study the effect on some carcasses traits of broiler.

## Materials & Methods

The study was conducted at poultry farm, Agriculture College, University of Basrah, from 11\11\2019 to 16\12\2019. A total of 225 female broiler Ross 308 chicks, one day old, 40 g weight were randomly distributed into five treatments, with three replicates per treatment (15 chicks each replicate). Chickens are bred in

three-story cages with an area of 1 m<sup>2</sup> per cage. Provides appropriate conditions for rearing such as heat and ventilation, within the necessary limits, the chicks were fed on two types of diets, the first Starter diet (1-21 days) and the second the grower diet (22-35 days), as shown in table (1).

### Protein concentrate preparing

Broiler heads and legs were collected from the poultry field slaughter house, Agriculture College, University of Basrah, and washed with water, chopped with an electric mincer, then was exposed to steam at 140°C for 50 minutes (Wiradimadja *et al.*, 2014), the product was dried at 45°C and the resulting material was ground. After analyzing a sample of a protein content, to ensure chemical composition and amino acid content by using a device Amino acid Analyzer, according to the results of the laboratory examination reached, the protein composition was modified by mixing with the amino acid, vitamins and minerals (Wafi), according to the ratio 3 protein products + 1 Wafi mixture.

### Study traits

Six birds per treatment were slaughtered randomly at 35 days of age to calculate the carcass weight and dressing percentage, and relative weight of carcass cuts were calculated according to the method mentioned by Zangana & Al-Mashhadani (2018). The relative weight of abdominal fat to body weight was estimate according to Al-Hummod (2016). Sensory tests for thigh and breast cuts were conducted according to the method described by Yang *et al.* (2007). The degree of the sensory evaluation were determined according to table (2).

**Table (1): The composition of the diets used and chemical analysis during the starter and grower periods.**

Items	Treatments	Starter diet (1-21 days)				
		T1	T2	T3	T4	T5
Maize		42.5	42.7	42.7	42.7	42.2
Wheat		18	18	18	18	18
Soybean meal		32	32	32	30	28.5
Imported protein conc.*		4	2	0	0	0
Local protein conc. Manufactured**		0	2	4	6	8
PREMIXES***		1	1	1	1	1
Limestone		2	2	2	2	2
Plant oil		0.5	0.5	0.5	0.5	0.5
Total		100	100	100	100	100
<b>Chemical Analysis</b>						
Crude protein (%)		23.1	23.1	23.1	22.9	22.9
Metabolizable energy (kcal.kg-1)		2954	2950	2957	2959	2955
Items	Treatments	grower diet (22-35 days)				
		T1	T2	T3	T4	T5
Maize		46.5	46.5	46.5	46.5	46
Wheat		18	18	18	18	18
Soybean meal		27.5	27.5	27.5	25.5	24
Imported protein conc.*		4	2	0	0	0
Local protein conc. manufactured		0	2	4	6	8
PREMIXES		1	1	1	1	1
Limestone		1.5	1.5	1.5	1.5	1.5
Plant oil		1.5	1.5	1.5	1.5	1.5
Total		100	100	100	100	100
<b>Chemical Analysis</b>						
Crude protein (%)		21.3	21.3	21.4	21.1	21.1
Metabolizable energy (kcal.kg-1)		3072	3070	3072	3066	3047

\* The protein concentrate for broiler feeding (Brocorn-5 special W) produced by the company (Wafi B.V. Alblaserdam-Holland), chemical composition: 40% crude protein, 5% crude fat, 2.20% crude fiber, 7.10% Moisture, 28.30% crude ash, 4.20% Calcium, 4.65% Phosphorus, 2107 Met. energy (kcal/g).

\*\* Local protein conc. manufactured, chemical composition: 42.79% crude protein, 8.69% crude fat, 2.7% crude fiber, 7.32% Moisture, 21.72% crude ash, 4.2% Calcium and 3% Phosphorus.

\*\*\* Premixes, chemical composition: 10% crude protein, 2.1% crude fat, 0.34% crude fiber, 2.66% Moisture, 51.02% crude ash, 20.08% Calcium, 10.83% Phosphorus, 753.82 kcal kg Met. energy (kcal.g<sup>-1</sup>).

### Statistical analysis

A Complete Randomized Design (CRD) were used, the significant differences between the means were compared with Least Significant Difference (LSD) test with a significant level (P

<0.05), the SPSS program (SPSS, 2017) was used in statistical analysis and use the following mathematical model ( $y_{ij} = \mu + \tau_i + e_{ij}$ ).

**Table (2): Sensory evaluation of cooked breast and thigh meat traits (Hajem, 2018).**

Sensory evaluation menu							
Degree		Evaluation		Degree		Evaluation	
9		Excellent		5-6		Moderate	
8		Very good		3-4		Acceptable	
7		Good		2-1		Unacceptable	
N. Sample	Colour	Flavor	Tenderness	Juiciness	General acceptance		
1							
2							
3							
4							
5							

## Results & Discussions

Table (3) shows that no significant differences of the use of local manufactured protein concentrate on the carcasses traits (carcass weight, dressing percentage, relative weight of main cuts and abdominal fat).

The results agreed with Sahraei *et al.* (2012), indicated that there were no significant differences on the carcasses weights and the relative weight of the main cuts (breast and thigh) when used the poultry slaughterhouse waste powder as a source of protein into broiler diets in ratios (30, 60 and 90 g.kg<sup>-1</sup> feed<sup>-1</sup>). While the results were not agreed with those of Ahmed *et al.* (2018), indicated improve in the

carcass weight, dressing percentage and main cuts weight, when they use slaughterhouse wastes as a protein concentrate in broiler diets, T4 (15% slaughterhouse wastes) was a significant increase ( $P < 0.05$ ) in carcass weight, while the dressing percentage and weights for breast and thigh were better at T3 (10% slaughterhouse wastes).

The result agreed with that of Abiola *et al.* (2012), they concluded that there were no significant differences in the relative weight of abdominal fat, when they replaced fish meal with poultry hatching powder in broiler diets. However, Sahraei *et al.* (2012), observed a significant differences ( $P < 0.05$ ) in the relative weight of abdominal fat between a control and

**Table (3): The effect of different level of the local protein concentrate manufactured on some carcasses traits of broiler (Mean± SE).**

Traits Treatments	Body weight (g)	Carcass weight (g)	Dressing percentage (%)	Relative weight of thigh (%)	Relative weight of breast (%)	Relative weight of abdominal fat (%)
<b>T1</b>	1782.30±1.85 a	1261.00±2.1 a	70.74±0.04 a	20.90±0.87 a	37.74±1.30 a	0.51±0.04 a
<b>T2</b>	1780±1.73 a	1255.00±1.51 a	70.50±0.20 a	20.57±1.42 a	37.68±1.41 a	0.50±0.05 a
<b>T3</b>	1778±2.08 a	1264.00±2.08 a	71.08±0.19 a	21.22±1.10 a	39.32±0.76 a	0.49±0.02 a
<b>T4</b>	1779±2.06 a	1256.70±3.33 a	70.69±0.19 a	21.34±1.29 a	39.91±0.48 a	0.50±0.03 a
<b>T5</b>	1790±0.57 a	1261.00±5.68 a	70.88±0.30 a	22.41±0.92 a	38.91±0.85 a	0.51±0.02 a

**T1**; basal diet contains 4% imported protein. **T2**; basal diet contains 2% imported protein+2% local manufactured protein. **T3**; basal diet contains 4% local manufactured protein. **T4**; basal diet contains 6% local manufactured protein. **T5**; basal diet contains 8% local manufactured protein.

treatment of the slaughterhouse wastes broiler diets. Tables (4 and 5) were showed that the effect of using different level of the local protein concentrated manufactured on the sensory traits of the breast and thigh cuts of broilers. There is no significant differences between the local protein concentrated manufactured and imported protein concentrate on colour, flavor, tenderness, juiciness and general acceptance of the cuts of breast and thigh. We can conclude it has no significant differences of the use of local

protein. The present results are similar to those of Eyng *et al.* (2013), when they used tilapia powder (fish meal) as a source of protein of different levels in broiler diets as their results showed that adding tilapia powder to diets in ratios 2, 4, 6 and 8% had no effect on the sensory characteristics (aroma, flavor, colour, texture and whole quality) of the thigh and breast meat, while the results were not agreed with results of Al-Hummod & Mohsen (2019),

**Table (4): The effect of different level of the local protein concentrate manufactured on sensory traits of breast cut (Mean± SE).**

Traits Treatments	Colour	Flavor	Tenderness	Juiciness	General acceptance
<b>T1</b>	7.33±0.33a	7.50±0.29a	6.86±0.67a	7.13±0.13a	6.90±0.29a
<b>T2</b>	7.33±0.37a	7.50±0.29a	6.83±0.33a	6.95±0.58a	7.00±0.58a
<b>T3</b>	7.67±0.33a	7.33±0.88a	6.77±0.33a	7.67±0.67a	7.17±0.17a
<b>T4</b>	7.66±0.67a	8.00±0.29a	6.73±0.67a	6.98±0.52a	6.92±0.00a
<b>T5</b>	8.00±0.57a	7.67±0.67a	7.00±0.25a	7.33±0.33a	7.07±0.23a

**T1**; basal diet contains 4% imported protein. **T2**; basal diet contains 2% imported protein+2% local manufactured protein. **T3**; basal diet contains 4% local manufactured protein. **T4**; basal diet contains 6% local manufactured protein. **T5**; basal diet contains 8% local manufactured protein.

**Table (5): The effect of different level of the local protein concentrate manufactured on sensory traits of thigh cut (Mean± SE).**

Traits Treatments	Colour	Flavor	Tenderness	Juiciness	General acceptance
T1	7.33±0.33a	8.00±0.00a	7.67±0.33a	7.67±0.33a	8.00±0.30a
T2	8.00±0.58a	8.33±0.33a	6.94±0.29a	8.00±0.58a	8.00±0.38a
T3	8.16±0.60a	7.83±0.44a	6.96±0.33a	7.67±0.16a	8.17±0.44a
T4	7.33±0.33a	7.67±0.33a	7.50±0.29a	7.67±0.33a	7.67±0.17a
T5	7.33±0.33a	8.33±0.14a	7.67±0.33a	7.50±0.28a	7.50±0.28a

**T1**; basal diet contains 4% imported protein. **T2**; basal diet contains 2% imported protein+2% local manufactured protein. **T3**; basal diet contains 4% local manufactured protein. **T4**; basal diet contains 6% local manufactured protein. **T5**; basal diet contains 8% local manufactured protein.

which showed a significant differences ( $P \leq 0.05$ ) in the flavor of quail meat fed on a diet containing protein concentrate made from feathers compared to quail meat fed on a diet containing commercial protein concentration.

The local manufactured protein were similar to the results of the imported protein. Also, the absence of significant differences between control and other experimental treatments for the mentioned characteristics, indicates that the processed protein is not less efficient than the imported, to complete the birds' requirements from essential amino acids, in proportion to the different supplies of the body, whether in growth, production, or formation of hormones and enzymes that have important vital functions in the body.

## Conclusions

In conclusion, the locally manufactured animal protein extraction had no negative significant

effect on the characteristics of carcasses and could be used as an efficient alternative to imported protein concentration used in broiler diets.

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## تأثير استخدام نسب مختلفة من المركز البروتيني المصنع محليا من مخلفات المجازر في بعض صفات ذبائح فروج اللحم

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**المستخلص:** اجريت هذه الدراسة بهدف معرفة تأثير استخدام المركز البروتيني المصنع محليا في بعض صفات ذبائح فروج اللحم. استخدم في التجربة 225 فرخ فروج لحم (اناث) بعمر يوم (سلالة Ross-308) وزعت الافراخ عشوائيا على خمس معاملات و بواقع ثلاث مكررات (15 فرخ/ مكرر). وكانت معاملات التجربة كالاتي: المعاملة الاولى (السيطرة T1) قدم للأفراخ فيها عليقة تحتوي 4% بروتين مستورد، المعاملة الثانية (T2) قدم للأفراخ فيها عليقة تحتوي 2% بروتين مستورد + 2% بروتين مصنع، المعاملة الثالثة (T3) قدم للأفراخ فيها عليقة تحتوي 4% بروتين مصنع، المعاملة الرابعة (T4) قدم للأفراخ فيها عليقة تحتوي 6% بروتين مصنع والمعاملة الخامسة (T5) استخدام عليقة تحتوي 8% بروتين مصنع. أظهرت النتائج انعدام الفروق المعنوية بين معاملات التجربة في وزن الذبيحة، نسبة التصافي، الاوزان النسبية لقطعيات الفخذ والصدر فضلا عن الوزن النسبي لدهن البطن. اما فيما يخص الصفات الحسية لقطعيات الفخذ والصدر فلم تكن هنالك اي فروق معنوية بين جميع المعاملات. نستنتج من هذه الدراسة ان المركز البروتيني الحيواني المصنع محليا لم يكن له تأثير معنوي على صفات الذبائح وبالإمكان استخدامه كبديل كفوء للمركبات البروتينية المستوردة والمستخدمه في علائق الفروج.

**الكلمات المفتاحية:** البروتين المحلي، مخلفات المجازر، صفات الذبائح، فروج اللحم.