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A STUDY OF UROPYGIAL GLAND REMOVAL EFFECTS AT TOW EARLY AGES ON FINAL WEIGHT, DRESSING RATIO, WEIGHT AND RELATIVE WEIGHT FOR SOME CARCASS MAIN CUTS, INTERNAL VISCERA OF ROSS BROILER CHICKENS

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ABSTRACT

This study was conducted to find out some of the effects of surgically removing the uropygial gland at the ages of (7 days and 14 days) on the final weight, dressing ratio and relative weight of the carcass parts and internal viscera of ross broiler, two hundred and fifty two, one-day-old broiler birds were randomly distributed to 3 groups (84 birds per group) and each group had 3 replicates, the first group = control group(C) was left without uropygial gland resection, the second group (T1) surgical resection of the uropygial gland at the 7 days age, the third group (T2) surgical resection of the uropygial gland at the 14 days age, four birds/replicate were randomly collected, i.e 12 birds per group, to reach 36 birds at the end of the study period (marketing age 42 days), and the live weight of the birds (individually final weight) was recorded, and then birds had slaughtered and cleaned, then the carcasses were weighed individually as well as the internal viscera (gizzard / heart / liver) then the carcasses had cut into parts for the purpose of calculating the weight and the relative weight of the carcass parts.

The results showed that the two groups T1 & T2 were superior below the level of $P < 0.05$ in the mean final live weight, mean weight of visceral-free carcass, weight of thighs, chest, wings, neck and back, Also weight of internal viscera edible (heart, liver) compared to control group C, Also, the two groups T1 & T2 were significantly superior under the $P < 0.05$ level in the relative weight of each of the visceral-free carcass, the thighs, chest, and dressing ratio compared to the control group C, with a significant decrease for the two groups T1 & T2 under the $P < 0.05$ level in the relative weight of

each of the wings, neck and back compared to the C control group, and No significant differences under the $P < 0.05$ level for the relative weight of the heart, liver compared to the C control group.

Results conclude that removing the uropygial gland at the age of (7 and 14 days), especially the removing of the uropygial gland at the age of 7 days, led to an improvement in the performance of birds in all the characteristics that were studied, which included (final live weight / dressing ratio / weight and relative weight of the main cuts and edible internal viscera) of the broiler chicken birds ross .

Key words: Uropygial gland, carcass's parts, Edible internal viscera.

INTRODUCTION

Preen gland (Brush, 1993) known as the uropygial gland, It is the only skin gland on the skin of most types of birds. Its secretions are used to protect the feathers against water and prevent their splitting and grooming (Moyer et al., 2003), but the exact functions of the oil gland are still controversial among researchers (Sweeney et al., 2004). It's located within a mass of fatty tissue at the tailbone and above the lavatory muscle of the posterior sacrum (Wexo, 1996; Andreas et al., 2002).

Recent research and studies have indicated that the removal of this gland in whole or in part in the so-called Iraqi method for domestic birds has effects that have led to an improvement in the physiological, productive and immune performance of these birds. Al-Hayani (2005) indicated that the Iraqi method of excision of the uropygial gland led to an increase in the immune response against diseases of Newcastle and Gumboro fever in broilers. Also, its removal led to an improvement in the biochemical characteristics of the blood (Al-Mahdawi et al., 2006_b).

Abdul-Hassan et al. (2006) showed that excision of the uropygial gland of male broiler mothers increased fertility and hatchability with a decrease in the percentage of dead fetuses, and therefore it could be used as a means of fertility support for male broiler mothers suffering from age-related fertility decline, while Razouki et al. (2006) found that the removal of uropygial gland of the Japanese quail led to an increase in egg rates, egg mass weight, feed-to-egg conversion factor, and an increase in fertility and hatchability.

Saleem (2012) confirmed that the implementation of the Iraqi method led to an improvement in the daily and total weight gain, the dressing ratio, the chest Percentage, and the production index of Ross broiler chickens.

Al-Ma'atheedi (2014) explained that the total resection of the uropygial gland of male quail had a better positive effect than the partial resection of this gland, as this led to a significant increase in the relative weight of the testes (right and left), noting the high level of testosterone in the blood serum of male quail. It also led to a significant increase in body weight.

Sharafad (2019) shown that the eradication of the uropygial gland at the age of 14 days improved blood characteristics and helped increase the metabolic rate and protein synthesis, which helped to increase the growth rate better than its removal at the age of 28 days, and the researcher advised to perform the eradication operation at the age of less than 14 days for broiler chickens bred for 42 days.

In view of the lack of scientific studies in Libyan on the importance of the uropygial gland and the effects of its eradication on the qualitative characteristics of the carcasses of broiler birds, and in view of the desire to reveal the appropriate age for the surgical removal process, we have seen conducting this study to find out some of the effects of removing the uropygial gland at two early ages on the final weight, dressing ratio, and the weight and relative weight of the edible internal viscera and carcass cuts (carcass Parts) for ross broiler chicks.

MATERIAL AND METHODS:

This study was conducted in a private poultry farm in Al-Marj region (Libya) and lasted for 42 days. two hundred and fifty two, unsexed broiler birds of one day old were used in this study, with an average weight of 41 grams birds, distributed into 3 groups, the first group (C) the comparison group/Control, where the birds were left without removal of the uropygial gland , and the second group T1 surgically removed of uropygial gland at the age of 7 days and the third group T2 surgically removed uropygial gland at the age of 14 days, using local anesthesia for the tail area and using a surgical scalpel.

The birds were bred according to the ground system, where the barn with cardboard and wooden barriers was divided into 3 groups with 84 birds for each group, and each group was distributed to three replicates, with 28 birds for each replicate, taking into account the sufficient space for each bird with the expansion according to the stages of growth and the increase in the size of the birds to reach the density in The end of the period 7 birds / m², and sawdust was used to brush the floor.

The birds were fed freely on the starting feed for birds from the first day - until the 21st day, then they were fed on the final feed from the 22nd to the 42nd day (marketing age at the end of the study) using feeders and plastic waterers, and the appropriate conditions were provided where the barn was equipped with heaters air to provide the required temperature, and the humidity during the experiment or study period ranged between 48-67%.

- 4 birds/duplicate were randomly collected, i.e 12 birds per group, to reach 36 birds at the end of the study period (marketing age 42 days), the operations were carried out:
- The live weight of the birds (final weight) was recorded.
- The birds were slaughtered to calculate the characteristics of the carcasses, where the feathers, legs and head were removed, and the internal viscera were well cleaned, and then the carcasses were weighed individually as well as the edible internal entrails (gizzard / heart / liver) and the carcasses were cut into the main cuts for the purpose of calculating the weight and relative

weight of the parts of the carcass This is as stated in (Abdel-Mageed, 2012), and the following was calculated:

- The dressing ratio of the carcass was calculated = the weight of the carcass with the edible internal viscera (g) divided by the live weight of the bird (gm) X 100.
- The relative weight of the carcass was calculated = the weight of the carcass free of edible internal viscera (gm) divided by the live weight of the bird (gm) X100.
- The relative weight of the edible internal viscera was calculated = the weight of the edible internal viscera (gm) divided by the live weight of the bird (gm) X100.
- The relative weight of each part of the edible internal viscera was calculated = the weight of the part of the internal viscera (g) divided by the live weight of the bird (gm) X100.
- The relative weight of the cuts was calculated = the weight of the cut (gm) divided by the weight of the carcass free of internal viscera (gm) x 100, according to what was mentioned by (Abdel-Mageed, 2012).

Statistical design: One-way analysis of variance was used to design the experiment. As for the analysis of the experiment data, the ready-made statistical program (SPSS, 1998) was used, and the Duncan, 1955 test was used to separate the averages(mean).

RESULTS AND DISCUSSION:

First: Some of the effects of removing the uropygial gland at two early ages on the final average live weight, weight and relative weight of the carcass free of internal viscera, edible internal viscera and dressing ratio of broiler chickens of Ross (Table 1):

- 1- Final mean live weight (gm/bird): shows the superiority of the T1 group removed uropygial gland at day 7 of life significantly at the level of $P<0.05$ over the group T2 uropygial gland removed at day 14 of age in mean final live weight. and the two groups T1 & T2 significantly outperformed at the level of $P<0.05$ over the control group C that had not removed the pituitary gland.
- 2- Mean visceral-free carcass weight (gm): shows a significant superiority at the level of $P<0.05$ for both groups T1 & T2 compared to the control group C, In addition the significant superiority of the T1 group over the T2 group in the mean weight of the visceral-free carcass.
- 3- The relative weight of the carcass free of internal viscera %: shows that there is a significant superiority at the level of $P<0.05$ for group T1 compared to the control and second groups C & T2, while there are no significant differences between each of the T2 group and the control group C in The relative weight of the carcass free of internal viscera.
- 4- Mean weight of edible internal viscera (heart / liver / gizzard) (gm): shows a significant superiority at $P<0.05$ for both groups T1 & T2 compared to control group C, Moreover,

significant superiority of group T1 compared to the group T2 in the weight of the edible internal organs (heart / liver / gizzard).

- 5- The relative weight of the edible internal viscera (heart / liver / gizzard) %: shows a significant superiority at the level of $P < 0.05$ for group T1 compared to control group C and group T2, while there are no significant differences between each of the T2 and control group C in the relative weight of the edible internal viscera (heart / liver / gizzard).
- 6- Mean carcass weight with edible internal guts (gms) shows a significant superiority at $P < 0.05$ for both T1 & T2 compared to control group C. It also shows the significant superiority of group T1 compared to group T2 in carcass weight with internal viscera edible (heart / liver / gizzard).
- 7- Relative weight of the carcass with the edible internal viscera (dressing ratio): shows a significant superiority at the level of $P < 0.05$ for group T1 compared with the two groups C&T2, while there is an insignificant numerical difference under the level of $P < 0.05$ between group T2 compared with the control group C in the relative weight of the carcass with the edible internal viscera .

Through the results in Table No. (1), it is clear that the process of removing the uropygial gland at my age (7 days and 14 days) led to an increase in the final average live weight, the average weight and the relative weight of each of the carcass free of internal viscera , edible internal viscera , and the

percentage of dressing. In favor of the uropygial gland removal groups, and as it was also shown from the same table that the uropygial gland removal operation at the age of 7 days was the most superior, and these results are consistent with (Al-Mahdawy et al., 2006c), who indicated that the exact mechanics of this improvement in the performance of broilers after excision of the uropygial gland is still unknown. However, according to the opinion of (Al-Mahdawy et al., 2006b; 2006c), it is likely that there is a relationship between this improvement in performance and between essential fatty acids and prostaglandins, As Razuki et al., (2006) believe that excision of the uropygial gland may prevent the attraction and localization of the enzymes necessary for the metabolism of lipids and essential fatty acids, that's important manufacture prostaglandins towards the uropygial gland, but rather to keep them inside the blood circulation for the body to benefit from, and this in turn may lead to an increase in the efficiency in the formation of prostaglandins as a result of the availability of the basic material in their manufacture represented in essential fatty acids, and this will lead to an increase in the efficiency of some hormones that are affected by prostaglandins such as prolactin ,Ovarian follicle-stimulating hormone (FSH) ,the hormone responsible for releasing eggs from the follicles (LH), growth hormone GH, and thyrotropin hormone (TSH) (Al-Mahdawy et.al.,2006a), which in turn leads to an increase in the metabolic rate, meaning that the removal of the uropygial gland it has led to changes in the internal environment of hormones, which was positively reflected in

improving the performance of broilers with an increase in the average ~~The~~ final live weight, the average weight and the relative weight of each carcass free of internal viscera , edible internal viscera , and dressing ratio.

The effects of uropygial gland removal at two early ages on the weight and relative weight of carcass cuts (carcass parts) of Ross broiler chickens are reported in Table 2

- 1- Mean thigh weight (gm): shows the significant superiority of the two groups T1 & T2 at the level of $P<0.05$ compared to the control group C, In addition, significant superiority for T1 $P<0.05$ on the T2 in the mean weight of the thighs (g).
- 2- The relative weight of the thighs: shows that the two treatment groups T1 & T2 were significantly superior at the level of $P<0.05$ compared to the control group C, while there were no significant differences between the two groups T1 & T2 at the level of $P<0.05$ in the relative weight of the thighs.
- 3- Mean chest weight (g): shows the significant superiority of the two groups T1 & T2 at the level of $P<0.05$ compared to the control group C, Also the significant superiority of T1 compared to T2 in the mean chest weight (g).
- 4- The relative weight of the chest: shows that the two treatment groups T1 & T2 were significantly superior at the level of $P<0.05$ compared to the control group C, while there were no significant differences between the two groups T1 & T2 at the level

of $P<0.05$ in the relative weight of the chest.

- 5- Mean weight of the wings (g): shows the significant superiority of the two groups T1 & T2 at the level of $P<0.05$ compared to the control group C . Moreover, the significant superiority of the T1 under the level of $P<0.05$ over the T2 in the mean weight of the wings (g).
- 6- Relative weight of the wings: shows a significant decrease under the level of $P<0.05$ in the relative weight of the wings for the T1 & T2 groups whose the uropygial gland was removed compared to the control group C , It was also shown that the T2 group was significantly superior to the T1 group under the $P<0.05$ level in The relative weight of the wings.
- 7- Mean neck and back weight (gm): shows that the T1 group was significantly superior at $P<0.05$ over all groups, while there were no significant differences between the two groups T2 & C at $P<0.05$ in the mean neck and back weight (gm).
- 8- Relative weight of the neck and back: shows that the control group C was significantly superior to all groups under the $P<0.05$ level in the relative weight of the neck and back , while there were no significant differences between T1 & T2 at the level of $P<0.05$ in the relative weight of the neck and back.

Through the results in Table (2), it is clarifies that the process of removing the uropygial gland at age (7 days and 14

days) led to an increase and improvement in the weight and relative weight of the main cuts (thighs / chest), especially the T1 group who removed the uropygial gland at the age of 7 days, as well as an increase and improvement in the weight of the secondary parts (wings / neck and back) with a decrease in their relative weights, We believe that the nature of these results was greatly affected by the variation in the rates of live body weight of broilers. Where we believe that there is a positive relationship between the mean body weight and dressing ratio , the mean weight of carcass parts . As well (Al-Rawi et al.,2003) reached similar results when they removed the uropygial gland for broilers of different ages.

Effects of uropygial gland removal at two early ages on weight and relative weight of the edible internal viscera(liver/heart/gizzard) of Ross broiler chickens are reported in Table 3.

- 1- Mean liver weight (g): shows the significant superiority of the two groups T1 & T2 at the level of $P<0.05$ compared to the control group C, The significant superiority of the T1 group on T2 group under the level of $P<0.05$ in the mean liver weight.
- 2- The relative weight of the liver % : shows that there are no significant differences at the level of $P<0.05$ between all groups in the relative weight of the liver.
- 3- Mean heart weight (g): Table (3) shows the significant superiority of the two groups T1 & T2 compared to the control group C at the level of $P<0.05$. Also the significant superiority

of the T1 group at the level of $P<0.05$ compared to the T2 group in the mean heart weight.

- 4- The relative weight of the heart % : shows that there are no significant differences at the level of $P<0.05$ between all groups in the relative weight of the heart.
- 5- Mean gizzard weight (g): shows the superiority of the two groups T1 & T2 significantly compared to the control group C at the level of $P<0.05$ in the average weight of the gizzard, Also the data shows the superiority of the group T1 over the group T2 significantly under the level of $P<0.05$ in the mean weight of the gizzard.
- 6- The relative weight of the gizzard %: recorded a significant superiority under the level of $P<0.05$ for the T1 group over all groups, while the C group (control) outperformed the T2 group significantly under the $P<0.05$ level.

Through the results in Table (3) it is shows that the operation to remove the uropygial gland at my age (7 days and 14 days), especially the removal at the age of 7 days, that led to an increase in weight while maintaining the relative weight of the heart and liver constant, As well as an increase in weight with An increase in the relative weight of the gizzard, These results are consistent with (Al-Mahdawi,et.al.,2003) also with the findings of (Al-Rawi et al.,2003) ,and it seems that these results were greatly affected by the variation in weight rates The living body of broilers, Where we believe that there is a positive relationship between live body weight

rates and both of :- dressing ratio /weight of the main cuts of the carcass / weight of the edible internal viscera .

We conclude from this study that the eradication of the uropygial gland at the age of (7 and 14 days), especially the eradication of the uropygial gland at the age of 7 days, led to an improvement in

the performance of birds in all the traits that were studied, which included the final live weight /dressing ratio/ weight and relative weight of carcass cuts(carass parts) / weight and relative weight of internal edible viscera .

Table (1): Effects of uropygial gland removal at two early ages on the mean final live weight, weight and relative weight of visceral-free carcass, edible viscera and dressing ratio (carcass with internal viscera) ± standard error of ross broiler chickens

	C	T ₁	T ₂
Final mean live weight (g/bird)	1980.4±18.9 ^c	2384.6±32.6 ^a	2200.3±89.6 ^b
Mean visceral-free carcass weight (g)	1456.2±24.6 ^c	1789.0±42.5 ^a	1635.0±86.5 ^b
relative weight of the carcass free of internal viscera	73.52±0.59 ^b	74.97±0.83 ^a	74.09±0.72 ^b
Mean weight of edible internal viscera (heart / liver / gizzard) (g)	77.43±1.485 ^c	95.21±2.22 ^a	85.62±4.11 ^b
Relative weight of the edible internal viscera (heart / liver / gizzard)	3.91±0.038 ^b	3.99±0.043 ^a	3.89±0.033 ^b
Mean Carcass weight with edible internal guts (g)	1533.6 ±26.1 ^c	1884.2 ±44.7 ^a	1720.7 ±90.5 ^b
Relative weight of the carcass with the edible internal viscera (dressing ratio)	77.43±0.62 ^b	78.96±0.87 ^a	78.17 ±1.31 ^{ab}

Relative weight = weight : the live weight of the bird.

- C = comparison group without removal of the uropygial gland ,T1 = surgically removed of uropygial gland at the age of 7 days , T2 = surgically removed of uropygial gland at the age of 14 days.
- Means of different letters within the same row include statistically significant differences at the P<0.05 level.
- ns = no significant differences at the P<0.05 level.

Table (2) : Some of the effects of uropygial gland removal at two early ages on the weight and relative weight of carcass cuts(carcass parts) ± standard error of Ross broiler chickens.

	C	T ₁	T ₂
Mean thigh weight (g)	398.12±3.69 ^c	520.87±7.42 ^a	473.10±9.66 ^b
Relative weight of the thighs%	27.33±0.13 ^b	29.10±0.23 ^a	28.91±0.17 ^a
Mean chest weight (g)	495.24±4.58 ^c	645.31±9.19 ^a	578.71±13.08 ^b
Relative weight of the chest%	34.00±0.16 ^b	36.05±0.29 ^a	35.73±0.21 ^a
Mean weight of the wings (g)	153.25±1.41 ^c	176.29±2.51 ^a	165.28±3.38 ^b
Relative weight of the wings%	10.52±0.05 ^a	9.85±0.08 ^c	10.10±0.06 ^b
Mean neck and back weight (g)	409.86±3.79 ^b	447.49±6.38 ^a	413.08±8.38 ^b
Relative weight of the neck and back%	28.14±0.13 ^a	25.00±0.20 ^b	25.24±0.14 ^b

Relative weight = cut weight : the carcass weight

- C = comparison group without removal of the uropygial gland ,T1 = surgically removed of uropygial gland at the age of 7 days , T2 = surgically removed of uropygial gland at the age of 14 days.

- Means of different letters within the same row include statistically significant differences at the P<0.05 level.

- ns = no significant differences at the P<0.05 level.

Table (3): Shows some effects of uropygial gland removal at two early ages on weight and relative weight of the edible internal viscera (liver/heart/gizzard) \pm standard error of Ross broiler chickens.

	C	T ₁	T ₂
Mean liver weight (g)	45.73 \pm 0.83 ^c	55.38 \pm 1.09 ^a	51.26 \pm 2.08 ^b
Relative weight of the liver %	2.31 \pm 0.037 ^{ns}	2.32 \pm 0.034 ^{ns}	2.33 \pm 0.032 ^{ns}
Mean heart weight (g)	9.907 \pm 0.71 ^c	12.644 \pm 0.97 ^a	11.023 \pm 1.11 ^b
Relative weight of the heart %	0.5 \pm 0.03 ^{ns}	0.53 \pm 0.03 ^{ns}	0.5 \pm 0.03 ^{ns}
Mean gizzard weight (g)	21.79 \pm 1.19 ^c	27.19 \pm 1.23 ^a	23.34 \pm 1.39 ^b
Relative weight of the gizzard %	1.10 \pm 0.050 ^b	1.14 \pm 0.037 ^a	1.06 \pm 0.025 ^c

Relative weight = weight : the live weight of the bird.

- C = comparison group without removal of the uropygial gland ,T1 = surgically removed of uropygial gland at the age of 7 days , T2 = surgically removed of uropygial gland at the age of 14 days.

- Means of different letters within the same row include statistically significant differences at the P<0.05 level.

- ns = no significant differences at the P<0.05 level.

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دراسة تأثير إزالة الغدة البولية في سن مبكرة عند عمريين مختلفين على الوزن النهائي ، والوزن النسبي لبعض قطع الذبيحة الرئيسية ، والأحشاء الداخلية لدجاج التسمين الروس

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أجريت هذه الدراسة لمعرفة بعض آثار استئصال الغدة البولية جراحيا في عمر (7 أيام و 14 يوم) على الوزن النهائي والوزن النسبي لأجزاء الذبيحة والأحشاء الداخلية لدجاج التسمين ، عدد مائتان واثنين وخمسون من الطيور عمر يوم واحد وزعت بشكل عشوائي على 3 مجموعات (84 طائر لكل مجموعة) وكان لكل مجموعة 3 مكررات ، المجموعة الأولى = المجموعة الضابطة (C) تركت بدون استئصال الغدة البولية ، المجموعة الثانية (T1) الاستئصال الجراحي من الغدة البولية في عمر 7 أيام ، المجموعة الثالثة (T2) الاستئصال الجراحي للغدة البولية في عمر 14 يوما ، تم جمع 4 طيور / مكرره بشكل عشوائي ، أي 12 طائرا لكل مجموعة ، لتصل إلى 36 طائرا في نهاية فترة الدراسة (عمر التسويق 42 يوم) وتم تسجيل الوزن الحي للطيور (الوزن النهائي) ومن ثم ذبح الطيور وتنظيفها ثم وزن الذبائح منفردة وكذلك الأحشاء الداخلية (قوانص / قلب / كبد) ثم الذبيحة التي تم تقطيعها إلى أجزاء لغرض حساب الوزن والوزن النسبي لأجزاء الذبيحة.

أظهرت النتائج تفوق المجموعتين T1 و T2 عند مستوى $P > 0.05$ في متوسط الوزن الحي النهائي ومتوسط وزن الذبيحة الخالية من الأحشاء ووزن الفخذين والصدر والأجنحة والرقبة والظهر ، وكذلك الوزن الداخلي. الأحشاء الصالحة للأكل (القلب ، الكبد) مقارنة بمجموعة التحكم C ، كما تفوقت المجموعتان T1 و T2 بشكل ملحوظ عند مستوى $P > 0.05$ في الوزن النسبي لكل من الذبيحة الخالية من الأحشاء والفخذين والصدر بالنسبة مقارنة بالكنترول ، مع انخفاض معنوي للمجموعتين T1 و T2 عند مستوى $P > 0.05$ في الوزن النسبي لكل من الأجنحة والرقبة والظهر مقارنة بمجموعة الكنترول ، ولا توجد فروق عند مستوى $P > 0.05$ للوزن النسبي للقلب والكبد مقارنة بالكنترول.

ايضا خلصت النتائج إلى أن استئصال الغدة البولية عند عمر (7 و 14 يوم) وخاصة استئصال الغدة البولية عند عمر 7 أيام أدى إلى تحسن أداء الطيور في جميع الصفات التي تم دراستها.