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Effect of different levels of oxytetracycline antibiotics on some intestine and immune traits of Chinese ducks

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Abstract

This study was conducted in the field of poultry, Agricultural Research and Experiments Station, College of Agriculture, Al-Muthanna University, from 14/12/2021 to 14/2/2022. A total of Sixty one-day-old Peking ducks were reared, with an average weight of 42 g, to study the effect of adding different levels of oxytetracycline antibiotics at levels: 0, 0.125, 0.250 and T4 0.375% on some intestinal and immune traits of Chinese ducks. The results indicated a significant superiority remove on the relative weight and length of the small intestine with all its parts (duodenum, jejunum and ileum) for Chinese ducks when using the antibiotic oxytetracycline antibiotics, it was described as a growth stimulator compared to the control treatment. The addition of the antibiotic oxytetracycline antibiotics at high levels (0.375 mg/kg feed) led to a significant improvement remove of the immunological characteristics represented by the relative weight of bursa gland compared to the control treatment.

Key words: oxytetracycline antibiotics, ducklings, intestines, immunity.

Introduction

The specialists in the field of poultry breeding were interested in non-traditional breeding, by raising species other than chickens, including ducks, which ranks second after chicken in terms of economic importance referrence

Through its contribution to the provision of meat and eggs as well as by-products such as feathers and liver, its production has increased to more than one million three hundred thousand tons annually, and most of it is produced in Asian countries (FAO, 2014).

Duck breeds are characterized by their resistance to most diseases, with low mortality, ease of breeding, weak sentence, as well as another very important characteristic is (the strength of duck veins to endure bad weather conditions), this trait led to the expansion of duck breeding in various regions of the world, also, the cheapest costs for raising and caring for duck veins

Their feeding encouraged that breadth.

Today, ducks are considered one of the most efficient types of domestic birds in the production of meat and their high ability to convert fodder into meat. The

average weight of two-month-old Peking ducks was (2.75) kg (Dillak *et al*., 2018).

In intensive poultry farming, antibiotics such as tetracycline, bacitracin, tylosin, salinomycin, verginamicin and pampermycin are often used (Diarra and Malouin, 2019). Tetracyclines account for more than two-thirds of antimicrobials administered to animals (Gonzalez and Angeles, 2017).

The use of antibiotics, especially oxytetracycline, with concentrations higher than the permissible ones, leads to the deterioration of the characteristics of poultry, it was noted that the characteristics of the intestine such as the length and weight of the small intestine, as well as the height of the villi and the depth of the crypts, significantly decreased when the antibiotic Doxycycline was given at a dose of 10 mg/L of drinking water for broilers at 15 days of age compared to the control treatment (Pavlova, 2015).

The current study aims to determine the effect of oxytetracycline antibiotic on some gut and immune traits of Chinese ducks.

Material and methods

This study was conducted in a private field for duck breeding in Al-Muthanna Governorate, from 14/12/2021 to 14/2/2022. The field experiment was included to study the effect of adding oxytetracycline on some productive traits of Chinese ducks.

A total 60 unsexed, one day Chinese duck chicks were used, prepared from one of the hatcheries in Al-Qadisiyah Governorate, were randomly distributed to 4 treatments, and each treatment included three replicates, (5 chicks each replicate), the treatments were as follows:

and has been fed on diets which oxytetracycline has been added it with the levels 0.125 , 0.250 , 0.375 mg/kg as a feed for the treatment T1,T2,T3 and T4 respectively.

The chicks were reared on the floor in a special room for raising ducks, it provided all the conditions for breeding ducks. The hall has been divided into 12 pens with dimensions 200 cm x 125 cm per pen.

oxytetracycline was obtained from local markets, which was added to diet 0.125, 0.250 and 0.375 mg per 1 kg of diet.

Studied traits

Relative length of the parts of the small intestine

Small intestine length measurements were taken for six birds from each treatment at the end of the experiment after slaughtering and bad word inner viscera removal. The intestines were separated at the area of contact with the gizzard. Parts of the small intestine (duodenum, jejunum, ileum) were measured by metric scale. Live Weight Based on Al-Hayali (2004).

The relative weight of the parts of the small intestine

The small intestine was separated from the internal viscera and its parts were separated from the small intestine (duodenum, jejunum, ileum) separately and cleaned of material and residual waste. The percentage of each of them to the weight of the living body was calculated according to Al-Hayali (2004).

Relative Weight and Bursa index

Bursa gland was separated from carcasses of (6) birds for each of the experimental treatments after cutting the connective tissue around the gland and weighed by a sensitive scale. The relative weight of the

gland was calculated based on the weight of the living body.

The Bursa Index was also calculated by dividing the relative weight of the gland in the experimental treatment by its relative weight in the control treatment, as indicated by researchers Lucio and Hitchner, (1979).

Results and Discussion

Effect of different levels of oxytetracycline anttibiotics for feed on the relative weight of the intestines of Chinese duck carcasses:

Table (1) indicates the effect of adding different levels of oxytetracycline antibiotics to the feed on the relative weight of the intestines (%) of Chinese duck carcasses, it was noted that oxytetracycline antibiotics has a significant effect (P≤0.05) on the relative weight of the intestine, increased significantly (P≤0.05) in treatment T4 compared to treatment T3, which increased significantly (P≤ 0.05) compared with the T2 . treatment, which showed a significant increase (P≤0.05) compared to the control treatment in the relative weight of each of the duodenum, jejunum, ileum and the relative weight of the small intestine, the relative weight of the duodenum was 0.617, 0.639, 0.656 and 0.677%, the relative weight of the jejunum is 1.842, 1.872, 1.903 and 1.934%, the relative weight of lleum was 1.866, 1.833, 1.918 and 1.939%, as the relative weight of the small intestine was 4.325, 4.395, 4.478 and 4.551 for the T1, T2, T3 and T4 treatments, respectively.

Table (1) Effect of adding different levels of oxytetracycline to feed on the relative weight of intestines (%) of Chinese duck carcasses (mean ± standard error).

Treatments	Relative weight			
	duodenum	jejunum	ileum	Intestine
T1	d0.002±0.617	d0.005± 1.842	d0.003±1.866	d0.009±4.325
T2	c0.003±0.639	c0.006 ± 1.872	c0.004 ± 1.883	c0.014±4.395
T3	b0.002±0.656	b0.004 ± 1.903	b0.004± 1.918	b0.010±4.478
T4	a0.002±0.677	a0.003±1.934	a0.002±1.939	a0.005±4.551
Sig.	*	*	*	*

Treatmentmean T1:control without adding, T2,T3, and T4 : (0.125 , 0.250 , 0.375 oxytetracycline / kg diet) .

Effect of different levels of oxytetracycline for feed on the relative length of intestines of Chinese duck carcasses

Table (2) shows the effect of adding different levels of oxytetracycline to the feed on the relative length of duck intestines, it was noticed that there was a significant difference (P≤0.05) in the relative length of the duodenum, jejunum, ileum, and intestines, in favor of treatment T4, which was significantly superior (P≤0.05) compared with treatment T3 that was significantly superior (P≤0.05) at the expense of treatment T2, which significantly outperformed the control treatment. The average relative length of the duodenum was 1.440, 1.467, 1.480 and 1.495, the relative length of the jejunum was 5.552, 5.578, 5.596 and 5.615, relative ileum length 4.231, 4.250, 4.261 and

4.282, as the relative length of the total small intestine was 11.224, 11.296, 11.338 and 11.393 for T1, T2, T3 and T4 parameters, respectively.

Table (2) Effect of adding different levels of oxytetracycline antibiotics to feed on the relative length of intestines (%) of Chinese duck carcasses (mean ± standard error).

Treatments	Relative weight			
	duodenum	jejunum	ileum	Intestine
T1	d0.003±1.440	d0.002± 5.552	d0.001±4.231	d0.003±11.224
T2	c0.005±1.467	c0.001 ±5.578	c0.002 ±4.250	c0.005±11.296
T3	b0.002±1.480	b0.002 ±5.596	b0.002± 4.261	b0.002±11.338
T4	a0.003±1.495	a0.002±5.615	a0.002±4.282	a0.008±11.393
Sig.	*	*	*	*

Treatmentmean T1:control without adding, T2,T3, and T4 : (0.125 , 0.250 , 0.375 oxytetracycline / kg diet) .

The addition of the antibiotic oxytetracycline antibiotics had an effect in increasing both the weight and the relative length of the small intestine compared to the control treatment, this may be attributed to the fact that the presence of pathogenic bacteria increases mucus secretion in the mucosal layer of the gastrointestinal tract and decreases the height and width of the small intestinal villi as defense mechanisms (Castanon, 2017). Therefore, the use of antibiotics leads to an increase in wall diameter and height of the gastrointestinal tract, which increases the length of the villi in all three parts of the intestine (Latha write italic, 2016). The use of antibiotics can lead to the production of volatile fatty acids, reducing the pH and creating an unsuitable environment to prevent the growth of pathogenic bacteria, as a result, it reduces intestinal wall regenerations and creates villi of greater length and width (Quintana-Hayashi write italic , 2018). Pathogenic microorganisms reduce the rate of nutrient absorption in the small intestine in four ways, include: decreased intestinal wall thickness, reduced rate of passage of substances in the GI tract, nutrient degradation, and increased need for nutrients due to increased motility of intestinal mucus (Dkhil write italic, 2011). The increase in the turnover of mucus and intestinal cells is due to the increased production of polyamines and volatile fatty acids, the activity of the antibiotic can increase the length and width of the small intestine (Rehman and Munir, 2015).

Effect of different levels of oxytetracycline antibiotics for feed on the relative weight of the Bursa and Bursa index of Chinese duck carcasses.

Table (3) shows the effect of adding different levels of oxytetracycline antibiotics on the relative weight of the bursa gland and the bursa index for ducks, it was noted that there was a significant ($P \leq 0.05$) superiority in the relative weight of the Bursa gland, compare with treatment T4, which was significantly superior ($P \leq 0.05$) compared to treatment T2 and T3 significantly superior ($P \leq 0.05$) at the expense of the control treatment. No significant differences were observed between T3 and T2 treatments.

The relative weight of Bursa gland was 0.0685, 0.0723, 0.0738 and 0.0757 for T1, T2, T3 and T4 treatments, respectively. As for the results that we obtained for the Bursa gland guide, it was noted that treatment T4 was significantly (0.05 P≤) at the expense of treatment T2, which was significantly superior (P≤0.05) at the expense of the control treatment. No significant differences were observed between treatments T2 and T3 on the one hand, and treatments T3 and T4 on the other hand. Bursa gland index was 1.000, 1.055, 1.077 and 1.105 for T1, T2, T3 and T4 parameters, respectively.

Table (3) Effect of different levels of oxytetracycline for feed on the relative weight of bursa gland and the index of Bursa gland of Chinese duck (mean ± standard error).

Treatments	Bursa weight	Bursa index
T1	0.0008±0.0685	c0.000± 1.000
T2	b0.0003±0.0723	b0.010 ±1.055
T3	b0.0001±0.0738	ab0.011 ±1.077
T4	a0.0002±0.0757	a0.010±1.105
Sig.	*	*

Treatmentmean T1:control without adding, T2,T3, and T4 : (0.125 , 0.250 , 0.375 oxytetracycline / kg diet) .

The addition of the antibiotic oxytetracycline antibiotics leads to a significant increase in the relative weight and index of the Fabricia gland compared to the control treatment, the high levels of the antibiotic oxytetracycline antibiotics (0.375 mg/kg feed), it gave the best results and significantly compared to the rest of the levels (0.125 and 0.250 mg/kg feed). There is no accurate scientific explanation for these results. it may be due to the increased stimulation of secretion of apocrine cells of the glandular tissue, which increases their activity and increase their relative weight (Chrzastek write italic , 2011).

Conclusion

It is concluded that the use of the antibiotic oxytetracycline antibiotics has a role in improving the intestine trait as well as improvement of immunity traits of Chinese duck.

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