

Growth Performances and Serum Biochemical Response of Broiler Chickens Fed on Diet Supplemented with Cyproheptadine as Substitute Growth Promoters

Afrah A. Habeeb

Technical Institute of Al-Dewaniyah, AL-Furat AL-Awsat Technical University (ATU), Iraq
afrahhabeeb161@gmail.com

Abstract:

The aim of our study is to know the effect of adding cyproheptidine as a feed additive (growth promoter) to the broiler diet. Sixty birds (Ross breed) one day old were been grouped randomly into two groups: a treatment group and a control group, and the chicks were housing and feeding for 49 days (from 1/11 – 19/12/2022). and measure some serum biochemical parameter and growth performance.

The result showed significantly affected ($p < 0.05$) by the treatment group throughout the production period (1-49) days, an increase in body weight, Live body weight gain, Food intake, and weight of abdominal fat, heart, and leg, all other carcass parameters. The serum content of creatinine tends to drop (0.91 mg/dl) while the urea content tends to increase (1.30 mg/dl) in the treatment group. Cyproheptadine was significantly affected ($p < 0.05$) on the serum protein content in the treatment group (2.12 g/dl) than the control group (2.84 g/dl) and there was no significant effect of cyproheptadine in serum contents of (ALAT) and (ASAT), decreased serum content of Cholesterol compared than the control group. From these results, Cyproheptadine is an effective and well-tolerated appetite stimulant in the broiler. So, it can be used to increase the weight of broilers in a shorter period of time than usual.

Keywords: Cyproheptidine, Broiler.

1. Introduction

The poultry industry has recently witnessed great development due to the population increase at the global level during the past decades. The poultry industry now occupies an important position as a source of low-priced protein from meat and eggs of high nutritional value for human consumption.

Poultry feeding constitutes the greatest cost among other costs involved in the production process which may exceed 70% of the cost, published by the Food and Agriculture Organization (FAO).

Cyproheptadine is a first-generation H₁ - antihistamine that also has anti serotonin activity. With additional anticholinergic are used to relieve allergy symptoms [1]. It is well absorbed orally and has a wide margin of safety. Cyproheptadine is metabolized by the liver and excreted in the urine [2]. Cyproheptadine is used as an appetite stimulant for sick cats, including those undergoing chemotherapy. When used for this purpose it should be noted that it may take two to three days for the drug to reach full effect. It also is used to treat feline asthma in cats whose condition is not totally controlled by corticosteroids and bronchodilators [3, 4].

2. Materials and Methods:

2.1 Birds, Dietary Treatments, and Experimental Design.

Sixty (Ross breed) one day old chicks were fed by a special feeding program, grouped randomly into a control group, a treatment group, and housed for 49 days, and measured some serum biochemical parameters and growth performance. Feeding the chicken was free and consumed water.

Table 1: Composition of Broiler Diets

Ingredient.	Starter (1-21). Day	Finisher (22-49). Day
Wheat	20	18.3
Yellow Corn	40.2	43.5
Soybean meal	27	23.4
Sunflower Oil	1.7	3.6
calcium Phosphate	0.4	0.5
Protein Concentrate	10	10
cyproheptadine	0.3	0.3
Nacl	0.4	0.4
Total	100	100

2.2 Growth and Carcass Traits

Data on body weight, body weight gain, and feed intake were collected and carcass characteristics parameters. At the end of the feeding trial, 49 days 12 birds from each treatment group were randomly selected and slaughtered for carcass evaluation. blood from each slaughtered bird was collected for biochemical analysis.

2.3 Serum Biochemical Analysis

From each slaughtered bird blood was collected in a test tube and serum obtained after centrifugation was preserved at -20o C for the evaluation of biochemical parameters. Biochemical parameters consisted of total protein, Cholesterol, alanine aminotransferase (ALAT), aspartate aminotransferase (ASAT), Urea, and creatinine using the colorimetric method.

(1 ml) of blood precoated with heparin, Aliquot of 0.02 ml from the collected blood was mixed with 0.38 ml of leukocyte diluent, in five separated glass test tubes, left

for 5 min at 25°C. To the surface of Neubauer chamber, 10 μ of the mixture was applied under the cover slip. The chamber was left for 3 min to settle the cells. The lymphocytes were counted in the four large squares (each with 16 small squares), and calculate the average number of lymphocytes by applying the following equation [5]:

Lymphocytes count

$$(\text{cell / ml blood}) = \left(\frac{\text{Number of cells counted}}{4} \right) * 20 * 10$$

2.4 Statistical Analysis

The obtained quantitative data were presented as (Mean \pm SE) in tables. SAS was used to analyze the results and ANOVA was used to determine the differences between groups.

3. Results and Discussion

Performances and carcass traits

Table (2) explains the effects of cyproheptadine on feed intake, live body weight, and body weight gain of broiler chickens. All the study parameters were significantly affected ($p < 0.05$) by the treatment. throughout the production period (1-49) days.

Table (2): Effect of cyproheptadine on the growth performance of broiler chickens

Age(days)	Control	treatments
Food intake (g\ bird) (Mean \pm SE)		
1 - 21	572.21b \pm 1.40	658.45a \pm 1.30
22 - 35	981.41b \pm 2.22	1045.21a \pm 2.14

36 - 49	1269.73b±9..27	1385.25a±8.94
1 - 49	4498.83b±20.13	4793.02a±21.46
Live body weight gain(g) (Mean±SE)		
1 - 21	410.81b±4.45	441.01a±11.64
22 - 35	540.89b±2 .85	602.91a±4.51
36 - 49	611.91b±4 .80	627.83a±1.56
1 - 49	2453.021b±9 .55	2587.36a±9.511
Live body weight (g) (Mean±SE)		
1 - 21	665.11b±11 .30	865.41a±11..31
22 - 35	1103.08 b±7.08	1434.32a±6..90
36 - 49	2001.02b ±5.65	2118.33a±8.31
1 - 49	2412.13 b± 6 .66	2635.25a±8.11

The effect of Cyprohptadine on the carcass yield, carcass cuts, and offal weight of the broiler are shown in Table (3). Apart from the relative weight of abdominal fat, heart, and leg, all other carcass parameters studied ($p < 0.05$) were significantly affected by Cyprohptadine in the diet. The high carcass yield was recorded with the treated group. The relative weight of the pancreas, gizzard, and liver increased than the control group.

Table (3): Carcass characteristics of broilers fed with cyproheptadine

Carcass parameters (BW%)	Control	treatments
Carcass yield	73.28b±1.40	89.98a±1.30
Head	2.29b±0.22	3.42a±0.14
Leg	3.24b±1.27	4.45a±0.94
Liver	1.82b±0.63	1.97 _a ±0.46
Heart	0.44±0.27	0.51 _a ±0.16
Pancreas	0.17b±0.07	0.25 _a ±0.06
Gizzard	1.56b±0.47	1.66 _a ±0.46
Abdominal fat	1.67b±0.58	1.82 _a ±0.22

The supplementation of Cyproheptadine induced a significant reduction in the serum content of creatinine as compared to the control group (Table 4). The serum content of creatinine tends to drop while the urea content tends to increase in the treatment group. The Cyproheptadine was significantly affected ($p < 0.05$) on the serum protein content in the treatment group than the control group.

The effect of Cyproheptadine on serum contents of (ALAT) and (ASAT) was not significantly affected ($p < 0.05$) on (ALAT and ASAT) content as compared to the treatment group. Cyproheptadine also significantly decreased the serum content of Cholesterol compared to the control group.

Table (4): The influence of cyproheptadine on serum biochemical (Mean \pm SE) of broiler chicks

Groups	Total protein g/dl	Cholesterol mg/dl	ALAT (UI/I)	ASAT (UI/I)	Urea mg/dl	creatinine mg/dl	Lymphocyte %
Control	2.84b \pm 0.01	69.7 b \pm 0.36	21.25a \pm 0.01	120.47a \pm 0.30	1.10 \pm 0.02b	1.30 \pm 0.02b	1.2 \pm 0.42b
Treatments	2.12a \pm 0.05	39.95a \pm 0.11	21.23a \pm 0.21	120.46a \pm 0.41	1.30 \pm 0.02a	0.91 \pm 0.01a	1.9 \pm 0.33a

The study revealed that used of cyproheptadine in the diet of broiler chickens induced a significant ($p < 0.05$) increase in feed intake as compared to the control group. These results are in close agreement with the findings of Harrison et al [6, 7] which found that cyproheptadine was stimulate the appetite and increased body weight in human, also it had the same effects on cats [8]. The increase of the feed intake recorded in these studies could be due to its affected appetibility. Cyproheptadine is commonly used as an appetizer and treat anorexia in cats due to its anti-serotonin effects [9] and also causes depression or sleep and a decrease of movement [10], all of these may cause an increase in weight gain, therefore increased food intake leads to weight gain and as a result of increased food conversion efficiency. Also, weight gain results from the increase in the weight of Carcass parameters like muscles, head, the heart, limbs, and gizzard, as well as abdominal fat and pancreas, as shown in Table 3. The increase in pancreas weight might suggest that this organ released great quantities of digestive enzymes. Gizzard relative weight increased because of an increase in gizzard activity in the treatment group.

Diet supplemented with cyproheptadine was significant ($p < 0.05$) decrease of blood protein (2.12 g/dl) in the treated group than the control group (2.84 g/dl) the reason may be due to increased protein withdrawal to build muscle, which may lead to increased body weight and these results are agreement with those of Jiang et al. [11] who reported a decrease in protein serum (albumin) in human treated with cyproheptadine, and the decreased of cholesterol (39.95 mg/dl) and creatinine (0.91 mg/dl) in the treated group than control and this reason may be due to increased withdrawal from the blood to the tissues of the body and muscles when the body weight increases. there was no significant effect of cyproheptadine on serum contents of transaminases (ALAT) (21.23 UI/I) and (ASAT) (210.46 UI/I). These results are in agreement with the findings of Valérie et al [12] which found that cyproheptadine had hepatotoxicity is uncommon to rare. The lymphocyte count found that increased in the treated group (1.9 ± 0.33 %) that mean will affect the immunity through its effect on lymphocyte cell number so this result of our study suggests that cyproheptadine is not toxic to the broiler.

4. Conclusions

Cyproheptadine is an effective and well-tolerated¹ appetite stimulant² in broiler. So it can be used to increase the weight of broilers in a shorter period of time than usual.

References:

- [1] Laurence LB, John SL, Keith LP. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. 11th ed. New York: McGraw-Hill; 2002. p. 313-4.
- [2] United States Pharmacopoeia XXII, 1990.

-
- [3] Norris CR, Boothe DM, Esparza T, Gray C, Ragsdale M.: Disposition of cyproheptadine in cats after intravenous or oral administration of a single dose. *Am J Vet Res.* 1998 Jan;59(1):79–81.
- [4] Carol R. Reiner, Kendra C. Decile, Jenni R. Byerly.(2005).Effects of drug treatment on inflammation and hyperreactivity of airways and on immune variables in cats with experimentally induced asthma. *American veterinary medical association journals.* Vol.66. No.7.
- [5] Epifanio M, Marostica PC, Mattiello R, Feix L, Nejedlo R, Fischer GB, et al. A randomized, double-blind, placebo-controlled trial of cyproheptadine for appetite stimulation in cystic fibrosis. *J Pediatr (Rio J)* 2012; 88:155-60.
- [6] Harrison ME et al.: Use of cyproheptadine to stimulate appetite and body weight gain: a systematic review. *Appetite*, (2019).
- [7] Harrison ME, Norris ML, Robinson A, Spettigue W, Morrissey M, Isserlin L (2019). "Use of cyproheptadine to stimulate appetite and body weight gain: A systematic review". *Appetite.* 137: 62–72.
- [8] Norris CR, Boothe DM, Esparza T, Gray C, Ragsdale M. Disposition of cyproheptadine in cats after intravenous or oral administration of a single dose. (1998). *American Journal of Veterinary Research,* 59(1):79-81.
- [9] M. Tiwaskar: Perception, approach and management of loss of appetite: a cross-sectional, questionnaire-based physician survey. *J Assoc Physicians India.* (2020).
- [10] Tokunaga S, Takeda Y, Shinomiya K, Hirase M, Kamei C (2007): Effects of some H1-antagonists on the sleep-wake cycle in sleep-disturbed rats. *J Pharmacol Sci.* Feb;103(2):201-6.
- [11] Jiang H, Chen R, Wang H, Pu H: Interaction of cyproheptadine hydrochloride with human serum albumin using spectroscopy and molecular modeling methods. *Luminescence.* 2013; 28(2): 244-52.
-

-
- [12] Valérie Bertrand, Nathalie Massy, Nancy Vegas , Valérie Gras , Christel Chalouhi, Marie-Pierre Tivolacci, Véronique Abadi. Safety of Cyproheptadine, an Orexigenic Drug. Analysis of the French National Pharmacovigilance Data-Base and Systematic Review. (2021) PMC. Sep 29; 9:712413.