Cyproheptadine as Growth Promoter In Broiler Chickens

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Summary

Cyproheptadine hydrochloride is a very high potent histamine and serotonine antagonist. This study was conducted to investigate the role of cyproheptadine on feed intake, body weight gain, feed conversion ratio, serum total protein, cholesterol and glucose. Red blood cells (RBC), Hemoglobin (Hb), Packed Cell Volume (PCV) and differential leukocytic count in blood of chickens were also estimated. A total of 60 one-day-old Fabro chicks were randomly divided into 2 groups. One group was received cyproheptadine at a rate of 10 µg / 100g body weight daily for eight weeks and the second group was used as a control.

The results revealed that cyproheptadine could stimulate feed intake and improve body weight gain in chickens. Erythrocyte count, hemoglobin content and PCV where increased significantly in these chickens accompanied by an increase in percentage of lymphocytes with a significant decrease in percentage of heterophiles and H / L ratio. This drug also reduces the total protein, cholesterol and glucose in serum.

(السيبروهيبتيدين كمحفز للنمو في فروج اللحم)

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الخلاصة

السيبروهيبتيدين هيدروكلورايد يستخدم في الطب البشري كمضاد للهستامين والسيروتونين. استهدفت الدراسة تأثير السيبروهيبتيدين على نمو فروج اللحم وبعض المؤشرات الفسلجية. تم استخدام 60 فرخ لحم غير مجنس بعمر يوم واحد نوع فابرو. قسمت إلى مجموعتين متساويتين، الأولى جرعت بمادة السيبروهيبتيدين (10 مايكروغرام / 100 غم من وزن الجسم) والثانية جرعت بالماء الاعتيادي يومياً ولمدة ثمانية أسابيع.

ربيت الأفراخ في غرفة 3 × 4 م^2 واستمرت الإضاءة لمدة 23 ساعة يومياً وساعة واحدة ظلام طيلة فترة التجربة. لقحت الأفراخ حسب نظام التلقيحات المتبعة في التربية.

غذيت الأفراخ على عليقة أساسية تحتوي على 20% و 18.5 % بروتين و3060 و3110 كيلو سعرة للبادئ والنهائي على التوالي. كان الماء والعلف يقدمان بصورة حرة طيلة فترة التجربة.

تم حساب استهلاك العلف اليومي ووزنت الأفراخ فردياً في اليوم الأول وفي نهاية كل أسبوع ولمدة 8 أسابيع كما حسبت كفاءة التحويل الغذائي. جمع نموذجين من الدم أسبوعياً من الأفراخ عن طريق الوريد الوداجي أو وريد الجناح. استخدم 1سم^3 من الدم لغرض فحوصات الصورة الدموية (كريات الدم الحمر وكمية خضاب الدم وحجم الخلايا المرصوصة والعد التفريقي لكريات الدم البيض) واستخدم 3سم^3 لغرض عزل مصل الدم الذي استخدم لقياس البروتين الكلي والسكر والكولسترول.

بينت النتائج أن السيبروهيبتيدين تسبب في زيادة استهلاك العلف والزيادة الوزنية مع زيادة كبيرة في عدد كريات الدم الحمر وكمية خضاب الدم وحجم الخلايا المرصوصة. كما تسبب في خفض معدل البروتين الكلي والسكر والكولسترول في مصل الدم. أما بالنسبة لكريات الدم البيض فقد حصلت زيادة ملحوظة في عدد الخلايا اللمفية ونقصان في عدد الخلايا المتغايرة مع نقصان في نسبة الخلايا المتغايرة / اللمفية مع عدم تأثر بقية الأنواع.

نستدل من هذه النتائج أن السيبروهيبتيدين تسبب في تحفيز النمو للأفراخ وزيادة الأوزان وتحسين الصورة الدموية وهذا قد يعود إلى تأثيراته في بعض الأنسجة وتحفيز تصنيع البروتينات في

عضلات الجسم وتطويره الجانب المناعي للحيوان من خلال نقصان نسبة الخلايا المتغايرة / اللمفية.

Introduction

Cyproheptadine - hydrochloride is a very high potent histamine and serotonin antagonist. It is used in laboratory animals to releaf bronchoconstriction induced by histamine and serotonin (1, 2, 3). It is available as tabletes (4 mg) and as syrup (2mg / 5 ml) for human beings per day. Cyproheptadine usually stimulates feed intake and increases body weight in children (4). On comparing cyproheptadine with multi - B vitamins in children Penfold suggested that cyproheptadine is an appetite stimulant more than multi - B vitamins because it induced a high growth rate and body weight. A significant increase of feed intake and growth rate of chicken had been reported by administration of cyproheptadine (6).

This drug has also been used as effective prophylactic therapy for cyclic vomiting syndrom (7). Moreover, erythromelagia which is arare disorder characterized by burning pain of the extrimities associated with red discoloration and increased temperature of the skin had been relieved by cyproheptadine where as a spirin has no effect (8).

This study was conducted to investigate the role of cyproheptadine on feed intake, body weight, feed conversion ratio, some blood parameters, total protein, cholesterol and glucose in serum.

Materials and Methods

A total of sixty one day old Fabro broiler chicks were used, they were divided equally into 2 groups. The mean weight was approximately equal in each of the two groups. the first group was received cyproheptadine orally at 10 µg / 100 g body weight daily for eight weeks and the other group was used as a control. During the whole experiment the following parameters were estimated :

1 - Feed intake, body weight, feed conversion ratio.
2 - Blood samples (4 ml) were collected from the jugular and wing veins weekly. One ml was used for total red blood cells, hemoglobin,packed cell volume and differential leukocytic count as mentioned by (9).
3 - Serum was isolated for protein, cholesterol, glucose estimation according to

(10,11,12) respectively.

All data were subjected to two way analysis of variance and least significant difference test (13).

Results

Feed intake, body weight gain and feed conversion ratio -Table (1) shows that cyproheptadine produced a significant increase in feed intake, body weight gain ($p < 0.05$). Feed conversion ratio shows no significant difference between the two groups.

RBCs, Hb and **PCV** - Cyproheptadine significantly increased the total red blood cells, haemoglobin content and packed cell volume (table 2).

Lymphocyte, heterophils and **H/L ratio** - Table (3) indicate that cyproheptadine causes a significant increase in differential lymphocyte number with a significant decrease in differential heterophils number and H/L ratio.

Serum total protein, cholesterol and **glucose levels** - Total serum protein, cholesterol and glucose shows a significant decrease in the treated group compared with control (table 4).

Table (1) - Feed intake, body weight gain and feed conversion ratio for control and cyproheptadine groups

Weeks	Control			Cyproheptadine		
	Feed intake gm/ bird / Week	Weight gain gm / bird / week	Feed conversion Ratio	Feed intake gm/ bird / Week	Weight gain gm / bird / Week	Feed conversion Ratio
1	84.0^{a} ± 1.1	57.0^{a} ± 1.2	1.47^{a} ± 0.04	90.5^{a} ± 1.7	70.2^{b} ± 1.1	1.35^{b} ± 0.05
2	238.0^{a} ± 3.2	124.9^{a} ± 2.3	1.91^{a} ± 0.07	270.2^{a} ± 4.1	154.0^{b} ± 2.6	1.75^{a} ± 0.06
3	369.6^{a} ± 6.0	234.1^{a} ± 3.0	1.57^{a} ± 0.04	395.5^{a} ± 5.9	234.4^{a} ± 3.5	1.68^{a} ± 0.07
4	496.8^{a} ± 6.6	171.0^{a} ± 2.2	2.90^{a} ± 0.32	535.0^{a} ± 7.9	168.2^{a} ± 2.8	3.18^{b} ± 0.45
5	603.2^{a} ± 9.3	219.3^{a} ± 2.9	2.75^{a} ± 0.08	667.8^{b} ± 13.3	232.2^{b} ± 3.3	2.86^{b} ± 0.54
6	656.0^{a} ± 10.2	298.7^{a} ± 3.2	2.19^{a} ± 0.36	700.0^{b} ± 10.5	253.0^{b} ± 3.7	2.76^{b} ± 0.22
7	788.7^{a} ± 10.1	230.0^{a} ± 2.6	3.42^{a} ± 0.38	833.0^{b} ± 10.3	248.0^{b} ± 2.3	2.35^{b} ± 0.52
8	810.2^{a} ± 12.2	250.0^{a} ± 2.7	3.24^{a} ± 0.50	845.0^{b} ± 11.3	276.0^{b} ± 2.2	3.06^{b} ± 0.35

Figures are the mean of 30 chicks ± SEM. Those bearing variable subscripts are significantly different ($P<0.05$).

Table (2) - Red blood cells, Hemoglobin and packed cell Volume for control and cyproheptadine groups

Weeks	Control			Cyproheptadine		
	RBC (cell $\times 10^{12}$/L)	Hb (gm/dl)	PCV (ratio)	RBC (cell $\times 10^{12}$/L)	Hb (gm/dl)	PCV (ratio)
1	$1.058^{a} \pm 0.04$	$7.0^{a} \pm 0.6$	$22.0^{a} \pm 0.8$	$1.200^{b} \pm 0.07$	$8.0^{b} \pm 0.5$	$25.0^{b} \pm 1.7$
2	$1.210^{a} \pm 0.09$	$7.3^{a} \pm 0.2$	$23.2^{a} \pm 0.6$	$1.980^{b} \pm 0.10$	$8.9^{b} \pm 0.4$	$25.8^{b} \pm 1.5$
3	$2.436^{a} \pm 0.04$	$7.4^{a} \pm 0.2$	$23.3^{a} \pm 0.9$	$2.816^{b} \pm 0.05$	$8.9^{b} \pm 0.7$	$26.3^{b} \pm 0.07$
4	$2.567^{a} \pm 0.05$	$7.5^{a} \pm 0.9$	$24.4^{a} \pm 0.7$	$3.450^{b} \pm 0.10$	$9.0^{b} \pm 0.2$	$27.0^{b} \pm 1.0$
5	$2.973^{a} \pm 0.10$	$7.8^{a} \pm 0.4$	$25.0^{a} \pm 0.7$	$3.853^{b} \pm 0.10$	$9.2^{b} \pm 0.7$	$27.6^{b} \pm 0.5$
6	$3.526^{a} \pm 0.10$	$8.0^{a} \pm 0.2$	$25.3^{a} \pm 0.6$	$3.710^{b} \pm 0.07$	$8.6^{b} \pm 0.2$	$27.3^{b} \pm 0.8$
7	$3.522^{a} \pm 0.06$	$8.0^{a} \pm 0.1$	$25.6^{a} \pm 0.3$	$3.750^{b} \pm 0.10$	$8.9^{b} \pm 0.1$	$27.8^{b} \pm 0.3$
8	$3.485^{a} \pm 0.10$	$8.4^{a} \pm 0.1$	$27.0^{a} \pm 0.3$	$3.782^{b} \pm 0.10$	$9.1^{b} \pm 0.6$	$27.8^{b} \pm 0.2$

Figures are the mean of 30 chicks ± SEM. Those bearing variable subscripts are significantly different ($P<0.05$).

Table (3) - Lymphocyte, heterophils percentage and H/L ratio for control and cyproheptadine groups.

Weeks	Control			Cyproheptadine		
	Lymphocyte (%)	Heterophils (%)	H/L ratio	Lymphocyte (%)	Heterophils (%)	H/L ratio
1	$49.0^{a} \pm 1.8$	$41.3^{a} \pm 0.2$	$0.84^{a} \pm 0.03$	$55.0^{b} \pm 2.3$	$34.8^{b} \pm 0.3$	$0.62^{b} \pm 0.04$
2	$50.9^{a} \pm 1.5$	$40.7^{a} \pm 2.4$	$0.79^{a} \pm 0.04$	$60.1^{b} \pm 2.9$	$30.6^{b} \pm 0.9$	$0.50^{b} \pm 0.03$
3	$54.0^{a} \pm 0.3$	$41.9^{a} \pm 2.2$	$0.77^{a} \pm 0.03$	$63.3^{b} \pm 1.1$	$27.5^{b} \pm 1.3$	$0.43^{b} \pm 0.03$
4	$63.3^{a} \pm 4.2$	$29.1^{a} \pm 1.6$	$0.45^{a} \pm 0.02$	$70.5^{b} \pm 3.1$	$20.7^{b} \pm 1.6$	$0.29^{b} \pm 0.02$
5	$69.2^{a} \pm 2.9$	$23.2^{a} \pm 1.5$	$0.33^{a} \pm 0.02$	$75.0^{b} \pm 0.9$	$20.5^{b} \pm 2.5$	$0.27^{b} \pm 0.02$
6	$69.1^{a} \pm 2.3$	$25.8^{a} \pm 0.5$	$0.37^{a} \pm 0.03$	$74.9^{b} \pm 0.6$	$22.0^{b} \pm 1.0$	$0.29^{b} \pm 0.03$
7	$68.0^{a} \pm 1.8$	$24.6^{a} \pm 1.8$	$0.36^{a} \pm 0.03$	$76.1^{b} \pm 1.1$	$19.6^{b} \pm 1.8$	$0.25^{b} \pm 0.03$
8	$72.0^{a} \pm 1.4$	$23.6^{a} \pm 1.0$	$0.32^{a} \pm 0.02$	$77.2^{b} \pm 1.7$	$19.8^{b} \pm 0.7$	$0.25^{b} \pm 0.02$

Figures are the mean of 30 chicks ± SEM. Those bearing variable subscripts are significantly different ($P<0.05$).

Table (4) - Total protein, glucose and cholesterol for in serum for control and cyproheptadine groups.

Weeks	Control			Cyproheptadine		
	Serum protein (gm/dl)	Serum glucose (mg/dl)	S.cholestrol (mg/dl)	Serum protein (gm/dl)	Serum glucose (mg/dl)	S.cholestrol (mg/dl)
1	3.60^{a} ± 0.10	306.6^{a} ± 11.3	69.6^{a} ± 1.3	3.30^{b} ± 0.10	301.6^{b} ± 10.2	64.8^{b} ± 1.9
2	2.99^{a} ± 0.10	203.3^{a} ± 12.8	96.5^{a} ± 2.9	2.75^{b} ± 0.02	165.0^{b} ± 8.2	83.5^{b} ± 8.3
3	2.38^{a} ± 0.06	211.9^{a} ± 10.6	97.8^{a} ± 5.2	2.06^{b} ± 0.05	145.0^{b} ± 9.0	81.7^{b} ± 6.5
4	2.44^{a} ± 0.05	224.3^{a} ± 12.1	143.1^{a} ± 3.1	2.23^{b} ± 0.07	130.0^{b} ± 7.2	119.9^{b} ± 3.7
5	2.88^{a} ± 0.09	276.0^{a} ± 10.5	153.9^{a} ± 2.7	2.23^{b} ± 0.08	130.2^{b} ± 8.6	125.0^{b} ± 2.4
6	2.78^{a} ± 0.09	251.0^{a} ± 11.0	185.8^{a} ± 3.7	2.00^{b} ± 0.04	138.0^{b} ± 5.7	132.0^{b} ± 5.2
7	2.14^{a} ± 0.06	176.6^{a} ± 9.8	88.9^{a} ± 1.9	1.98^{b} ± 0.09	130.3^{b} ± 9.2	61.5^{b} ± 3.7
8	2.24^{a} ± 0.09	189.0^{a} ± 10.4	97.9^{a} ± 3.1	1.24^{b} ± 0.01	135.0^{b} ± 10.2	66.8^{b} ± 4.6

Figures are the mean of 30 chicks ± SEM. Those bearing variable subscripts are significantly different ($P<0.05$).

Discussion

Cyproheptadine has been reported to improve appetite and promote weight gain in human beings [4, 5, 7], in cats [14, 3], in chickens [6]. This drug has antiserotonergic activity thus it reducing melatonin synthesis [6, 3]. Melatonin hormone synthesized and stored in the pineal gland during dark period. Most animals do not eat during the hours of darkness but some do eat during night[15]. Cyproheptadine had been used as appetite stimulant against the refusal feed effect of deoxynivalenol [16].

The increase of red blood cells, haemoglobin, packed cell volume by giving Cyproheptadine might be due to it's effect in stimulating intestinal absorption of nutrients. Cyproheptadine increases the percentage of lymphocyte and this is very important for immunity. This drug has been found to affect the plasma adrenocorticotropin secretion in Nelson's syndrome [17].

Adrenocorticotrophic hormones had been found to reduce the number and activity of lymphocytes [18]. The low H / L ratio in birds received Cyproheptadine suggests that this drug may act as antistress factor and thus produce a high immune response in the body.

The significant depression in total serum protein, cholesterol and glucose by Cyproheptadine suggeste that this drug promotes the utilization of these nutrients by cells for protein synthesis in muscles and accelerating of certain enzyme reactions. This effect may produced as a response to growth hormone stimulation by Cyproheptadine - suppression ofserotonine [19].

Drash etal found a mean of 10 % lowering of fasting blood sugar following Cyproheptadine ingestion compared with normal control.

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