

## **STUDY THE EFFECT OF ADDING AQUEOUS EXTRACT OF CLOVE (*Eugenia caryophyllus*) TO DRINKING WATER IN PRODUCTIVITY AND PHYSIOLOGICAL EFFICIENCY OF BROILER CHICKEN**

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### **ABSTRACT**

This study was to investigate study the effect of adding the aqueous extract of clove (*Eugenia caryophyllus*) by two different levels to drink water to improve the productive efficiency and some physiological characteristics of the broiler.

The study was carried out on 180 chicks of Hubbard at one day old. They were divided randomly into three groups (60 bird in each group) with three replicates for each group (20 bird for each replicate. In this experment, the bird was given two types of diets, the first diet was a starter that has been feeding on the 1-2<sup>∞</sup> day age-old , whereas the second diet was finisher that has been feeding on 2<sup>∞</sup>-4<sup>^</sup> day age-old.

The experimental treatments divided into three groups. In control group, birds drink free water without any addition. In group T1, birds received 1% of aqueous extract of clove flower in drinking water, whereas group T2 received 5% of aqueous extract of clove flower in drinking water.

The current study showed a significant improvement ( $p < 0.05$ ) in the production efficiency of birds. Its included weight of the body, weight gain, feed conversion ratio, feed and water consumption rate, decrease in mortality rate and improvement in some blood traits including haemoglobin, white blood cell WBC, packed cell volume PCV in treatment groups(T1, T2) compared with control group. As well as the results showed a significant decrease ( $P < 0.05$ ) in the glucose level, cholesterol, urea and creatinine in both

of treatment groups compared with the control group that intake water free from an aqueous extract of clove.

From this study, we concluded that adding of aqueous extract of clove flower at different concentrations led to improved productive and physiological effects of broiler chicken.

## INTRODUCTION

The poultry industry is very important economically in many countries such as Iraq. Most of the poultry farmers are focusing on broiler production due to its less space requirement, smaller marketing age, higher weight gains and quick returns (1).

The use of antibiotic growth promoters (AGP) to improve animal performance has been usual practice for more than half a century (2). Nowadays, the many intended to reduce using the chemical substances in the diet because it's dangerous on the human and animals (3).

The species, herbs, vegetable, some of the plant and growth promoters in broiler diets to the improvement of efficiency of the growth conversion and reducing the cost of feed. Adding herbal plants as growth promoters in broiler diets will improve in their feed conversion ratio, mortality rate, body weight gain (3).

Clove (*Eugenia caryophyllus*) considered as spices and appetiser. It contains 10% volatile oils which most of it eugenol, a substance that have an anaesthetic effect (4). Also, contain vitamins B and C, and the last vitamin involved in stress hormones synthesis thus has a major role in reducing body temperature by enhancing heat dissipation through blood vessels that are surrounding the body to maintain a relatively constant temperature (5). In addition the clove contains phenols compounds that act as anti-bacterial agents.

Clove oils and aqueous extract have been used in food products, perfumery, antiseptic and digestion stimulant, anaesthetics and anti-carcinogenic, antiparasitic and antioxidant (6).

Most research and studies conducted on the clove and clove oil was in the laboratory animals, but in poultry rear. This work aimed to study the effect of adding different two levels of aqueous extract of clove to drink water in broiler performance and some physiological and biochemical parameters.

## MATERIALS AND METHODS

The current study was carried out in the commercial farm of poultry in Diwanayah city.

one hundred eighty unsexed chick type of Hubbard were selected and divided randomly into three groups (C, T1, T2) ( 60 birds in each) . Each treatment subdivided into three replicates ( 20 birds in each replicate). The birds were reared on deep litter system, feed and water were provided ad libitum through the experimental weeks. The birds were given two types of diets; The first diet was a starter that has been feeding on the 1-2<sup>nd</sup> day age-old, whereas the second diet was finisher that has been feeding on 23-4<sup>th</sup> day age-old. The chemical analysis of ration estimated as described previously (7).

The experimental treatments divided as following: Control group: in which birds were drunk free water without any addition. Treatment group T1 received 1% of aqueous extract of clove flower in drinking water.

Treatment group T2 received 5% of aqueous extract of clove flower in drinking water

The aqueous extract of clove was prepared as described by (8).

Body weight, weight gain, feed consumption, feed conversion ratio, mortality rate, water consumption were measured at 24 and 48 days of age. At the end of the experiment, the blood was collected from the wing vein of birds to measured the creatinine cholesterol, sugar, and urea as described previously (9 ,10, 11) .In addition blood parameters ( Hb, WBC , PCV) were measured as described by (13) using specific kits from Randox and Biomerienx company as manufacturer protocols.

### Statistical analysis

The data were analysed by using SPSS (14). Duncans, multiple range test, was used to compare treatment means at (P<0.05) (15).

**Table (1) Chemical composition of clove(*Eugenia caryophyllus*)(16 )**

Nutritional compound	Percentage %
moisture	1±0.006
protein	1.2 ±0.02
lipid	1.12 ± 0.45
Crude fiber	20 ±0.1
carbohydrate	51.5 ± 0.02
ash	5.2 ±0.01

**Table(2) Dietary ingredient and chemical composition of the basal diet to starter and finisher**

ingredient	Starter %	Finisher %
maize	47	50
wheat	10.5	8.5
Soybean meal	27	28
Concentrated protein	10	10
Plants oil	4	2.5
Ground limston	1	0.5
salt	0.5	0.5
	100%	100%
<b>Chemical analysis of nutrition</b>		
Energy ME(Kcal/Kg)	3078	3105
Crude protein	22	19
Lysine%	1.2	1.1
Methoinin+cystein	0.8	0.7
Crude fiber	3.4	3.2
Ca%	1.3	1
Phosphorus%	0.4	0.4

Chemical analysis of nutrition estimated according to NRC 1994(7).

## RESULT

Effect of adding two different levels ( 1% and 5) of aqueous extract of clove (*Eugenia caryophyllus*) to drink water in the productional parameter at 24 days old (body weight, weight gain, feed conversion ratio, water consumption and mortality rate) are shown in table (3) There was a significant increase ( $p < 0.05$ ) in body weight and weight gain in T1 and T2 compared to control group. The current study also revealed a significant decrease ( $p < 0.05$ ) in feed consumption in T1 as compared with C and T2. Furthermore the study revealed a significant improvement in the ratio of the feed conversion and decrease mortality rate in T1 and T2 compared to control group. In addition there was a significant increase in water consumption in C and T1 group in compared to T2 group.

Effect of aqueous clove extract and two levels to drinking water in the productional parameter at 48 days age (body weight, weight gain, feed conversion ratio, water consumption and mortality rate) are shown in table (4) . The result showed a significant

increase ( $p < 0.05$ ) in body weight and weight gain in T1 and T2 compared with control group, while we saw a significant decrease in feed consumption, feed conversion ratio, and mortality rate in T2 compared to T1 and C group.

Effect of clove aqueous extract addition to drink water on haematological trait at 48 days age (Hb, PCV, WBC), are shown in table (5). There was a significant improve in these parameters in T1 and T2 compared to control group which drinking water free from any addition.

Effect of clove aqueous extract addition to drink water on biochemical parameters at 48 days age (urea, sugar, cholesterol and creatinine concentration) are shown in table (6). There was a significant improve and a decrease in all these parameters in treatment groups compared to control group.

**Table (3) Effect of clove aqueous extract addition to drink water on productional parameter at 28 days age.**

parameter group	Weight(g)	Weight gain(g)	Feed consumption(g)	Water consumption(L )	Feed conversion ratio(%)	Mortality rate(%)
C	b 1156.45± 28.269	b 1108.06±29.31 3	b 2110.26±4.883	b 3900.333±0.33	b 1.906±0.047	c 2.666±0.333
T1	a 1218.43±1.61 6	a 1168.43±1.616	a 2031.133±2.057	b 3900.400±0.230	a 1.737±0.004	b 1.66±0.01
T2	a 1250±2.840	a 1201.76±3.301	b 2110.276±1.048	a 3904.900±0.493	a 1.799±0.003	a 0

Results are expressed as Mean ± Standard Error of the mean

Different letter indicates significant differences between treatments at ( $p < 0.05$ )

**Table (4) Effect of clove aqueous extract addition to drink water on productional parameter at 48 days age**

parameter group	Weight(g)	Weight gain(g)	Feed consumption(g)	Water consumption(L)	Feed conversion ratio(%)	Mortality rate(%)
C	c 2500.233± 0.881	c 1201.76±3.301	c 3400.060±0.305	c 8600.1±0. 57	c 1.36±0.333	b 2.666±0.333
T1	b 2550.233±0.120	b 2500.233±0.120	b 2980.126±0.145	b 8540.46±0.37	b 1.16±0.236	b 2.666± 0.33
T2	a 2563.422±0.305	a 2450.233±0.881	a 2975.13± 0.88	a 7700.100±0.577	a 1.12±0.000	a 1±0.00

Results are expressed as Mean ± Standard Error of the mean.

Different letter indicates significant differences between treatments at (p<0.05)

**Table (5) Effect of clove aqueous extract addition to drink water on haematological trait at 48 days age**

parameter group	Hb	WBC	PCV
C	c 7.300± 0.033	c 2300.00±0.577	c 17.966±0.033
T1	b 8.600±0.057	a 3497.00±0.351	b 21.200±0.0.115
T2	a 9.400±0.057	b 2901± 0.577	a 25.033±0.033

Results are expressed as Mean ± Standard Error of the mean

Different letter indicate significant differences between treatments at (p<0.05)

**Table (6) Effect of clove aqueous extract addition to drink water on biochemical trait at 48 days age**

parameter group	urea	sugar	Creatinine	cholesterol
C	b 23.500±0.057	c 55.400±0.577	c 1.806±0.006	c 50.100±0.057
T1	a 15.266±0.033	b 49.666±0.333	b 0.503±0.003	b 45.100±0.057
T2	a 15.10± 0.05	a 40.033±0.033	a 0.40± 0.003	a 36.766±0.057

Results are expressed as Mean ± Standard Error of the mean

Different letter indicates significant differences between treatments at (p<0.05)

## DISCUSSION

It is known that the clove (*Eugenia caryophyllus*) possesses the growth promoting properties such as antimicrobial (5), appetite and digestion stimulating properties (6).

The researcher finds that the supplementation of clove (*Eugenia caryophyllus*) in diet or drinking water of birds leads to impairment of their performance (17).

The result showed the improvement of productive performance of broiler due to the present active material in clove (*Eugenia caryophyllus*) are represented as digestion stimulation factors, and it has an antibiotic effect against organisms in the digestive canal. This material causes greater efficiency in utilization of feed and leads to improvement of growth performance (18).

Many of the plant extracts, spices and herbs have an antimicrobial effect and appetite stimulator (19).

Many of the studies have reported that clove (*Eugenia caryophyllus*) was rich in trace minerals which are essential for protein and carbohydrate metabolism. Reduced the synthesis of fatty acids and cholesterol, that could be improved broiler performance (20).

It has been reported that the clove (*Eugenia caryophyllus*) stimulating bile salt secretion and digestive enzyme activities of intestinal mucosa and pancreas.(21).

The results revealed improvement in Hb, WBC and PCV .This finding is in agreement with previous study (22), in which the medicinal plants have a strong effective on haematological parameters especially HB and PCV. That occurs due to high their nutritional status.

The results released a significant decrease of cholesterol concentration due to the main component of clove (*Eugenia caryophyllus*) and essential oils inhibit hepatic 3-nhydroxy-3 methylglutaryl co enzyme (HMG- COA) reductase activity and lead to hypocholestrolemic (23,24).

Serum glucose was a significant decrease ( $p < 0.05$ ) in T1 and T2 compared to control group This finding is in agreement with previous study (25) in which an aqueous extract of clove (*Eugenia caryophyllus*) exhibits an antihyperglycemic activity in rats without affecting basal plasma glucose concentration.

Blood urea and creatinine reduced significantly These findings are in agreement with the previous study (26) in which the best results in kidney functions, it has been found these treatments decreased the mean values of urea nitrogen and creatinine due to improve in the glomerular function of kidney and maintained positive nitrogen balance in the treatment group compared to control.

### دراسة تأثير إضافة المسحوق المائي للقرنفل لماء الشرب في الكفاءة الإنتاجية والفيولوجية لفروج اللحم

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#### الخلاصة

أجري هذا البحث في أحد حقول الطيور الداجنة الأهلية وذلك بهدف دراسة تأثير إضافة المستخلص المائي للقرنفل وبمستويين مختلفين إلى ماء الشرب في تحسين الكفاءة الإنتاجية وبعض الصفات الفسيولوجية لفروج اللحم

استعمل في التجربة ١٨٠ فرخ نوع هيرد ووزعت عشوائياً الى ثلاث معاملات (٦٠ طير لكل معاملة) بواقع ثلاث مكررات لكل معاملة (٢٠ طير لكل مكرر) ، وغذيت الأفراخ على نوعين من العلائق هما عليقة البادىء من عمر ١-٢٢ يوم وعليقة النهائية من عمر ٢٣-٤٨ يوم .

شملت المعاملات مجموعة السيطرة وهي مجموعة الطيور التي تناولت ماء خالي من اي اضافات ،بينما المعاملة الأولى شملت الطيور التي تناولت ماء مضافا اليه ١% من المستخلص المائي للقرنفل اما المعاملة الثانية شملت الطيور التي تناولت الماء المضاف اليه ٥% من المستخلص المائي للقرنفل . اظهرت النتائج وجود تحسن معنوي ( $p<0.05$ ) في الكفاءة الانتاجية للطيور والتي شملت كل من وزن الجسم والزيادة الوزنية ومعامل التحويل الغذائي ومعدل استهلاك العلف والماء مع انخفاض في نسبة الهلاكات وتحسن في بعض الصفات الدمية التي شملت هيموغلوبين الدم وعدد كريات الدم البيضاء وحجم الخلايا المرصوص في مجموعتي المعاملة مقارنة بمجموعة السيطرة ، في حين انخفض معنوياً ( $p<0.05$ ) تركيز كل من الكلوكوز والكوليستيرول واليوريا والكرياتينين في مجموعتي المعاملة مقارنة بمجموعة السيطرة التي تناولت ماء خالي من المسحوق المائي للقرنفل

يستنتج من هذه الدراسة ان اضافة المسحوق المائي لزهرة القرنفل وبتراكيز مختلفة ادى الى تحسن الكفاءة الانتاجية والفسولوجية لفروج اللحم .

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