

بسم الله الرحمن الرحيم



Sudan University of Science and Technology

College of Animal Production Science and Technology



The Effect of adding graded levels of *Coriandrum sativum* and *Cuminum-cyminum* mixture on broiler performance

أثر إضافة مستويات متدرجة من مخلوط الكسبرة والكمون على الأداء الإنتاجي للدجاج اللحم

Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of B.Sc. (Honour) In Animal Production Science and Technology

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الإله _____ داء:

بكل دُب وإمتنان نهدي ثمرة جُهدنا هذا إلى من هُن في الحَيَاة حَيَاةٍ إلى أُمهاتنا إلى:

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إلي آبائنا الذين بذلوا كل شيء حتي نصل إلي هذه المرحلة، الي كل روح طاهره رحلت كانت تؤمن بنا وتدعونا، إلي أجزائنا الأخرى الجميلة التي تشبهنا أخواننا وأخواتنا، و إلي الذين صارو جزءا منا أصدقائنا ولكل من نعرفهم.

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Abstract

Ninety six day old unsexed broiler chicks (Ross 308) were randomly distributed into 4 experimental groups of 24 chicks, each group was further subdivided into 4 replicates with 8 birds each. Cumin and coriander were ground separately into a fine powder and then mixed at a ratio of (1:1) and then added to the basal diets resulting into four experimental diets. Diet (A) with out-cumin and coriander mixture served as control, and 0.75 % of coriander and cumin mixture respectively. The experimental diets were fed for 5 weeks.

The performance data in terms of live body weight (g/bird), feed intake (g/bird), weight gain (g/bird) and feed conversion ratio (g feed/g gain) were recorded. Mortality was recorded when occurred. At the end of the experiment three birds from each replicate were randomly selected, slaughtered and eviscerated, liver, heart and gizzard were weighted individually and recorded. Statistical analysis was made by analysis of variance for completely randomized design. The results revealed a significant improvement, feed intake, feed conversion ratio fed coriander and cumin mixture compared with the control group. (2599.12, 2471.89) and (2491.95 g/bird). Feed conversion ratio on group. The result showed that there were no significant differences diet, the other three diets (B, C, and D) contained graded levels (0.25, 0.5 % in gizzard weight among the treatments but significant differences were observed in heart and liver weight. It could be concluded that feeding coriander and cumin mixture to broiler increase feed intake and feed conversion ratio, but had no effect on weight gain and final live body weight. No significant differences were observed between the bird fed the control diet these fed coriander and cumin mixture in weight gain of final body weight.

ملخص الدراسة

تم استخدام 96 كتوت (سلالة روس 308) غير مجنسة عمر يوم في هذه الدراسة، وتم تقسيمها عشوائيا الي اربعة مجموعات تجريبية تحتوي كل مجموعة على 24 كتوت . وكل مجموعة قسمت الى 3 مجموعات بواقع 8 كتوت لكل مجموعة . تم طحن الكسبرة والكمون كل على حدى وتم خلطهما بنسبة 1:1 . وتمت اضافتهما الى العليقة الاساسية لينتج عن ذلك اربعة انواع من العليقة , العليقة (أ) لا تحتوي على خليط الكسبرة والكمون واستخدمت كعليقة تحكم . العلائق الاخرى (ب,ج,د) تحتوي على خليط الكسبرة والكمون بنسب (0.25, 0.50 , 0.75 %) تواليا . تم استخدام العلائق التجريبية لمد 5 اسبوع .تم تسجيل الاداء الانتاجي للكتاكيت متمثلا الوزن الحى (جرام / طائر) , العلف المستهلك (جرام / طائر) , الوزن المكتسب (جرام / طائر), ومعدل التحويل الغذائي (جرام علف مأكول / جرام وزن مكتسب) . حالات النفوق تم تسجيلها حال وقوعها. فينهاية التجربة تم اختيار طائرين من كل مكرر وتم ذبحهما وإزالة الريش والأحشاء , وتم وزن القانصة والكبد والقلب فرديا وتسجيل أوزانها. ثم تم تحليل البيانات المتحصل عليها بواسطة تحليل التباين (ANOVA) بالتصميم كامل العشوائية . وأظهرت النتائج تحسن كمية العلف المستهلك في الدجاج المغذى علي عليقة تحتوي على خليط الكسبرة والكمون بالمقارنة مع مجموعة التحكم, كالتالي (2599.12)(2471.89) و(2491.95, أعلى من جميع القروبات المغذية علي مخلوط الكسبرة والكمون 'والقروبات المغذية علي مخلوط الكذبرة والكمون و تومن ومعدل التحويل الغذائي لها كما بينت نتائج الدراسة عدم وجود فروق معنوية في وزن القانصة بين مجموعات التجربة , و لكن لوحظ وجود فروق معنوية في وزن الكبد حيث سجلت المجموعة (د) أعلى معدل ثم المجموعة وكذلك في القلب حيث أظهر قروب أعلى قيمة ثم المجموعة و اخيرا المجموعه. لا توجد فروق معنوية بين الدوجن المغذية بالعليقة التحكم والدواجن التي غذية بعليقة مخلوط مسحوق الكسبرة والكمون في الوزن المكتسب والوزن النهائي.

الكلمات المفتاحية :

أثر إضافة الكمون – كسبرة – على الدجاج اللحم .

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Chapter one

Introduction

Poultry industry has played and continue to play a leading role among the agricultural industries in many countries as it the main source of animal protein for human consumption. Poultry production as a business like any other enterprises seeks to generate profit; this is done by keeping production costs as low as possible. Wilson and Bayer (2000) found that feeding cost is 60-70% of the total cost of production. The increasing cost of meat production is one of the most detrimental factors affecting poultry industry in Sudan. Using antibiotics as growth promoters in poultry diets increases their nutritive value and inhibits the effect of intestinal bacteria that may depress dietary fat absorption due to bile acid deconjugation. With increasing concerns about antibiotic resistance, the ban on sub therapeutic antibiotic usage in many countries led to the potential for finding alternatives to antibiotics for poultry production. Herbs and essential oils extracts could be used as natural alternatives to antibiotic growth promoters in poultry nutrition due to their antimicrobial properties. Many herbs and their bioactive constituents possess a broad antimicrobial activity, and appetite and digestion stimulating effects (Lewis et al., 2003 and Demir et al., 2008). Mansoub (2011) suggested that herbal plants have stimulatory effects on pancreatic secretions such as digestive enzymes which help to digest and absorb more amino acids from the digestive tract, Herbal growth promoter (essential oil) had significant improvement of body weight, weight gain, and feed conversion in broilers (Ibrahim et al., 1998). Also improvement in health status (Alkassie, 2009 and Kamel, 2001). Protection against pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Enterococcus faecalis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Salmonella* SP., *Helicobacter pylori* (Taback, et al., 1999 and Chang, et al., 2001). Although action mechanism of phytogenic and herbal feed additives varies,

a positive effect can be expressed through the better appetite, improved feed conversion, stimulation of the immune system and increased vitality, regulation of the intestinal microorganism. A number of studies has focused on the antimicrobial properties as well as growth promoting effects of various plants and plant extracts (Ocak, et al., 2008; Toghyani et al., 2010). *Coriandrum sativum* and *Cuminum cyminum* as natural feed additives in poultry nutrition may be of great benefit and value especially for broilers this due to their antibacterial, inflammatory, antiseptic, anti-parasitic and immunomodulatory properties. However, their influence on growth performance of broiler has not been sufficiently documented specially their cumulative properties, therefore this study aims to determine the Effect of feeding *Coriandrum sativum* *Cuminum cyminum* mixture on performance and internal organs weight of broiler chicks.

CHAPTER TWO

2.0 LITRATURE REVIEW

2.1 poultry production:

poultry is defined as any type of domesticated fowl raised for meat and / or egg (Guerrero *et al*, 2010). Chicken and Turkey are among the most commonly consumed types of poultry currently worldwide in particular the United States, China, the European Union and Brazil. Sudanese Ministry of Livestock, Fisheries and Range lands (2011) estimated the poultry count in 2010 about 43316000 head and chicken meat reach about 30000 tons.

2.2 Growth promoters

2.2.1 Antibiotic Growth promoters

Antibiotic represent a group of chemical compounds produced biologically by certain plants or microorganism usually a fungus which possess bacteriostatic or bactericidal properties. some antibiotic is particularly effective against gram negative bacteria other are most particularly effective against gram positive bacteria, while some termed broad-spectrum antibiotic is effective against a wide range of both grams positive and gram negative bacteria, certain chemotherapeutic agents, such as arsenicals and nitro furans ,have been found to possess bacteriostatic or bactericidal properties and yet, at the effective level, are not toxic to chickens or other host animal Administrating antibiotics to poultry in their feed or drinking water has a major impact on the commercial production of meat for human consumption since the early 1950s(Jukes,1972). The discovery by Jukes and his colleagues at liberal laboratories (Jukes,1985), that aureomycin stimulated significant growth in chickens ,cattle and pigs was the foundation of antibiotic growth promoter in animals for more than 60 years .Many factors have contributed to a low cost for poultry meat to the consumer , but none has contributed Asmuch consumers as have the antibiotic growth promoter

(AGP). Therapeutic use of antibiotic is effective against intestinal and other infections of food animal, and they are effective against colibacillosis, coryza, fowl cholera, mycoplasmosis and salmonella infectious in chickens, therapeutic use results in weight gain as health improves but low doses of antibiotics also stimulate weight gain in healthy animals fed nutritionally complete feed (Jukes 1977).

2.2.2 Mechanisms of growth promoter:

The mechanism by which antibacterial agents improve growth performance is not known, but several theories have been proposed because they think the small intestine epithelium nutrients are or efficiently absorbed (Boyd and Edward., 1976; Fuller, et al., 1984). The different microorganisms responsible for sub-clinical infections are reduced or eliminated (Barnes, 1978).

2.3 Alternatives to antibiotics growth –promoter:

2.3.1 Prebiotics:

Prebiotic has been defined as “a non-digestible feed ingredient that give beneficial effects on host intestinal health by selectively stimulating the growth and/or activity of one or a limited number of beneficial bacterial species already resident in the large intestine” (Gibson and Roberfroid, 1995).

2.3.2 Probiotics:

Nurmi and Rantala (1974) introduced direct-fed microbial (DFM) or probiotics as a means of maintaining gut health, by controlling endemic and zoonotic agents in poultry (La Ragione and Woodward, 2003). In many studies, the live microbial are known as probiotics (Morishita, et al, 1997). Initially, probiotic, which means “for life” in Greek, has been defined as “Organisms and substances which contribute to intestinal microbial balance”. This definition was subsequently refined as “A live microbial feed supplement which beneficially affects the

host animal by improving its intestinal balance of microflora"(Fuller,1989). Probiotics must be of host origin, with stand of processing and storage, resist of gastric acid and bile, persist in the intestinal tract and adhere to epithelium or mucus (Simmering and Blaut,2001). Probiotics aimed to produce a beneficial effect on the host by administration of viable organisms (Gibson and fuller,2000). The direct-fed microbial concept was originally designed to restore microflora population in the gut by stimulating activates of those bacteria that have adverse on the host (Simmering and Blaut2001; Schneitz,2005).

2.3.3 Dietary enzymes:

Poultry diets composed of cereal feedstuffs in large amounts these cereal feedstuffs contain macro –nutrition like starch ,protein and fats many others composed,such as B-glucans,xylans, arabinoxlans,pentosan,pectins,mannanscellulos ,lignin, mucilage and phyticacid, which cannot be digested properly by poultry digested organs (Adams, 2004).Those of which are mentioned as non-digestible feed components possibly increase intestinal viscosity and generate stress in the digestive tract which in turn cause reduction in nutrient utilization in the gut (Adam, 2004) .intestinal viscosity is a major factor limiting performance, especially in cereal based fed bird (Bedford and morgan, 1996) in many studies , it has been show that supplementation of various exogenous enzayemes improve growth performance of animals (Augspurger et al ., 2003 ; Adedokun et al., 2004).it has been suggested by Pluske et al (2002) that dietary enzymes fasten nutrient digestion by breaking open endosperm cell wall . the enzymatic reaction can be almost entirely expected to decrease digested viscosity, and thus achieve better digestion /diffusion (Chot and Annsion,1992). Evidence show that use of supplementary enzymes as alternatives for AGPs in poultry diets modulate the microflora and performance of broiler chickens (Choct ,2009).

2.3.4 Medical plants

Natural feed additives of plant origin are being used to safer, healthier and less regarded than synthetic (antibiotics). It was estimated there are 250,000-500,000 species of plants (Hashemi and Davoodi, 2010). Many scientists have searched for alternatives to antibiotics through utilization of the extracts or levels of some of these plants (Wenk, 2000; Kamel, 2010; Alciçek, 2003). Herbs and their essential oils have been used extensively for many years in food products, perfumery and dental oral products due to their different medicinal properties (Suppakul et al, 2003).

2.4 Herbs and spices growth Promoter:

Besides of important role of medicinal herbs, aromatic plants and spices in daily human nutrition for enhancement of taste, aroma and color of food, these additives have been usefully used in animal nutrition for improvement of health and animal wellbeing. With the ban of antibiotics use in animal nutrition due to the emergence of microbe resistance, alternative growth promoters must be founded. Removal of antibiotics as growth promoters has led to performance problems, feed conversion ratio incensement, and a rise in the incidence of certain animal diseases (Wierup, 2001). The alternatives to antibiotics as growth stimulators are numerous (Simon, 2005; Kostadinović and Lević, 2012; Stanačević et al., 2011; Puvača et al., 2013). Plant derived additives used in animal nutrition to improve performance have been called “phytogenic feed additives” (Windish, et al., 2008). This forms of feed additives have recently gained interest for use in poultry with increasing numbers of scientific publications since the ban of antibiotics growth promoters in 1999. The primary mode of action of these growth promoting feed additives can be attributed mainly to the stabilization of feed hygiene and also from the beneficial effect on the gastrointestinal microbiota through controlling pathogens (Roth and Kirchgessner, 1998). A component in blends of essential oils such as thymol, eugenol, curcumin and p-

per reduces *Clostridium perfringens* concentrations in both the intestinal tract and faces of broilers through the entire growing period (Mitch et al., 2004). In commercial broiler production mainly powder forms essential oils of oregano (*Origanum vulgare*), rosemary (*Rosmarinus officinalis*), sage (*Salvia officinalis*), thyme (*Thymus vulgaris*), garlic (*Allium sativum*), black pepper (*Piper nigrum*) and chilli (*Capsicum annum*) are used singly or in combination as feed additives (Grashorn, 2010; Puvača et al., 2013; Puvača, et al., 2014). Garlic is one of the most traditionally used plants as a spice herb. Garlic has been used for a variety of reasons which most of them has been approved scientifically: ant atherosclerosis, antimicrobial, hypolipidemic, ant thrombosis, antihypertension, antidiabetic. (Mansoub, 2011). There are a lot of active components in garlic like ajoene, s-allylcysteine, diallylsulphide and the most active one allicine (Rahmatnejad and Roshanfekr, 2009). Allicine possibly reduces low density lipoprotein (LDL), triglycerides and cholesterol in serum (Alder and Holub, 1997) and tissues (Stanačev et al., 2012; Puvača et al., 2014), and it has been used in treatments against cardiovascular diseases (Tanamai, et al., 2004). In broilers, it was reported that garlic, as a natural feed additive have improved broiler growth and feed conversion ratio, and decreased mortality rate (Stanačev et al., 2010). Garlic also manifest hypcholesterolemic effects on chickens through inhibition of the most important enzymes that participate in the synthesis of cholesterol and lipids (trihydroxy-tri-methylglutaryl coenzyme A reductase, cholesterol-7 α hydroxylase and the synthesis of fatty acids). In addition, this additive has a relatively low market price, is added in small amounts of 0.2 to 2%, thus not increase production costs, which is of particular importance to manufacturers (Zekić, et al., 2014).

2.4.1 Cuminumcuminum:

Cuminumcuminum (cumin) is an important medical herb in Asia and has antioxidant anticholesterol and antimicrobial properties, other medical properties of the cuminor cumin extract the bacteriostatic, fungistatic, antifertility, antihelminthic and .(Sagdic, et al 2002). Cumin increased activity and excretion content of bile acids (Platel;2000) and also increased pancreas and small intestine digestive enzymes such as amylase, tripsin, chymotrypsin and lipase in rats, (Srinivasan 1996, platel2000 and MuthammaMilan,et al.2008). Cuminumcuminum is a medical plants to feed poultry through their diets as a nutrition and medical sources for different purposes. Cumin plant is considered as one of these sources because of its nutritional and medical properties scientific information from American ministry of agriculture has shown that cumin contains most dietary nutrients such as carbohydrates fat of both saturated and unsaturated fatty acid, proteins moreover minerals, vitamins and water. (Jazani et al. 2008).have indicated the potential use of cumin essential oil for the control of some diseases caused by pseudomonas aeruginosa infections an growth of lactobacillus, (Jonas et al, 2007,Sema and Donas ,2002) .was able to identify the antimicrobial activity against E .coli infections (Ahmed et al,2004).

2.4.2 Coriandrum sativum:

Coriander (Coriandrum sativum L.) is regarded as both an herb and a spice, and reputedly has health advantages. It has been used in medicine for thousands of years (Nadeem,et al., 2013). Certain parts of this plant, such as the leaves, flowers, seeds and fruit, possess antioxidant, diuretic, anti-diabetic, sedative, antimicrobial, anthelmintic and anti-mutagenic qualities (Pathak,et al., 2011; Rajeshwari and Andallu,(2011).

2.5. Effect of feeding *Coriandrum sativum* and *Cuminum cyminum* on broiler performance:

A study was conducted to identify the effect of using cumin (*Cuminum cyminum*) on the performance and some blood traits of broilers. The results showed that groups fed 0.5 and 1.5 performed significantly higher in the average live weight, weekly weight gain, feed consumption, mortality rate and feed conversion ratio. Results showed that chicks fed 1.5 developed a significant decrease in the level of cholesterol in blood serum compared to other treatments. (Galib and Al-Kassi, 2010). (Naeemasa et al 2015) Conducted a study to determine investigate the effects of feeding different levels of coriander (*Coriandrum sativum*) seed powder and extract on the performance and carcass characteristics of broiler chickens, the inclusion of 952 mg/kg of coriander extract in drinking water. These results suggest that coriander diet and coriander extract in water could replace synthetic antibiotics and could be regarded as natural feed additives and growth promoters in poultry diets. (Essa, et al, 2010) conducted a study to determine the potential effect of coriander seed as growth promoting substance in broiler chicks raised under summer condition. results showed that inclusion of 25% coriander seed in broiler diets improve ($p \leq 0.01$) means live weight and weight gain. Furthermore, feed consumption and feed conversion were significantly ($p < 0.05$) higher in the 2% coriander seed as compared with other treatments. Feeding broiler chicks 2% coriander seed as a diet ingredient resulted in a significant improvement in performance parameter. However, reports about the effects of seed on broilers are inconsistent. Some authors found that many herbs and spices had positive effects on animal nutrition (Wenk, 2006, Al-Jaff, 2011). Whereas others did not find clear evidence (Windisch, et al, 2008).

CHAPTER THREE:

3.0 MATERILS AND METHODS

3.1 Experimental site and duration:

This study was carried out at the poultry farm of Faculty of Animal Production Science and Technology, Sudan University of Science and Technology, during the period from 17th January to 27th February 2018 to study the effect of feeding coriandrum sativum and cuminum cyminum mixture on broiler performance.

3.2 Experimental House:

The experiment was conducted in an open sided poultry house (8x3m). The long axis of the house extended east-west facing the wind direction for efficient ventilation, the sides of house were covered by nylon sheet during the brooding period. The house was divided into 12 experimental sections (replicates) of equal size (1 x 1 m). The pen and equipment were cleaned and disinfected by phenol three days before arrival of birds and then fresh wood shaving as litter was spreaded on the floor at a depth of 7cm. Each section was provided with one round metal feeder and round plastic drinker. The house had sufficient light. Lamps were lighted during night to complete the day hours the duration of light needed (24 hours).

3.3 Experimental birds:

A total of ninety six one-day old unsexed broiler chicks (Ross 38) were purchased from Miko company. The chicks were weighed by digital balance, and the mean initial weight was recorded. Chicks were kept for one week during which feed pre started diet contained 23CP and 3200ME. kcal/kg under the same environmental conditions until the experiment started. Chicks were randomly divided into four treatment groups of (24 chick/group) each group was fur-

thered replicated there time with (8) birds per replicate The treatment were distributed in complete randomized design.

3.4 Experimental diets:

Two isocaloricisonitrogenous basal diets (Starter and finisher) were formulated to meet the nutrient requirements for broiler starter and broiler finisher given by National Research Council (NRC,1994). Table (1) showed thecomposition and calculated analysis of the experimentalbasal diets. Dietary treatment included diet 1 (TA) withoutCoriandrumstativum and Cuminumcuminum mixture which served as control diet. There Coriandrumstativum and Cuminumcuminum mixture (1:1) was added in the other three treatments TB,TC and TD at rate of 0.25, 0.5 and 0.75 respectively.

Table(1)Composition(%) and calculated analysis of the experimental starter and finisher diet:

Ingredients	Starter	Finisher
Sorghum	64.8	73.5
Ground nut cake	27	19
Limestone	0.9	0.7
Di calcium phosphate	1.8	0.3
Methionine	0.1	-
Lysine	0.1	-
Super Concentrate	5	5
Salt	0.3	0.5
Oil	-	1
Calculated analysis:		
ME kj/kg	12.8082	14.5092
CP %	22.6684	20.2255
CF %	3.5865	3.3485
Ca %	1.10722	0.894
Ave Phosphate %	0.42444	0.894
Lysine %	1.15582	1.05
Methionine %	0.51716	0.41995

Super concentrate provided:

Me=9.6,Cf=2.07,Cp=38,Ca=5.39, Lysine=10.23 And Methionine=3.44

3.5 Rearing and vaccination program:

Multi-vitamin plus antibiotic were provided in water during the first seven days, in addition to sugar upon arrival of chicks. The birds were vaccinated against infectious bronchitis (I.B) and new castle disease (ND) at day 7 through drinking water. at day 14 they were vaccinated against Gambaro disease. The second dose was repeated. At day 21 and 28 against Gambaro disease and New castle disease respectively also through drinking water. `

3.6 The performance data:

3.6.1 Weekly Live body weight (LBW):

All birds were weighed at the beginning of the experiment and then on weekly-basis by the end of each week at the same time.

3.6.2 Weekly Feed intake(FI):

Feed intake is the amount of feed consumed every week, it was calculated for each replicate on weekly basis, at the end of the week the residual amount of feed was weighed and subtracted from the amount feed provided throughout the week the product was divided by the total number of bird given the average feed intake.

3.6.3 Weekly Weight gain (WG):

Weight gain was calculated by subtracting the live weight at the beginning of the week from live body weight at the end of same week.

3.6.4 Weekly Feed conversion ratio (FCR)

Feed conversion ratio was calculated from the recorded feed intake and body weight gain the using following equation:

(FCR) = feed consumed/weight gain.

3.6.5 Mortality percent (%):

Mortality was recorded when occur for each replicate and mortality (%) was calculated according to the following equation:

$$\text{Dead/Total} \times 100$$

3.6.6 Internal organs weight:

At the end of the 5th week two birds from each replicate were selected randomly and slaughtered eviscerated carcasses were weighted and internal organs (liver, gizzard, heart) weights were recorded.

3.6.7 Statistical Analysis:

The data collected were subjected to analysis of variance (ONE-WAY-ANOVA) and (LSD) test was used to differentiate between means using the statistical package of social science (SPSS VERSION 16) computer program.

CHAPTER FOUR

4.0 RESULTS

4.1 Effect of adding Coriandrumsativum and Cuminumcuminummixture-on weekly feed intake:

Feeding diets contained mixture of Coriandrumsativum and Cuminumcuminum showed no significant ($P \leq 0.05$) differences during the first, 2nd and 5th week, but a significant ($p \leq 0.05$) differences were noted during the 3rd and 4th weeks (Table 2).

4.2 Effect of adding Coriandrumsativum and Cuminumcuminummixture-on weekly weight gain:

Table (3) showed that there is no significant ($P \leq 0.05$) differences in the 1st, 3rd and 5th weeks but a significant ($P \leq 0.05$) differences were reported in the 2nd and 4th week.

4.3 Effect adding Coriandrumsativum and Cuminumcuminum mixture on weekly feed conversion ratio (FCR):

Table (4) showed that there was no significant ($P \leq 0.05$) differences observed in first week. but feed intake significant ($P \leq 0.05$) different during the 2,3,4 and 5 week.

4.4 Effect adding Coriandrumsativum and Cuminumcuminummixtureon weekly body weight:

No significant ($P \leq 0.05$) differences were recorded during week (1,2 ,3 and 5), but a significant ($P \leq 0.05$) differences in week (4) were noticed (Table 5).

4.5 Effect adding Coriandrumsativum and Cuminumcuminummixtureon the performance of 5 weeks old broiler chicks:

Table (6) revealed that feeding diets contain of *Coriandrum sativum* and *Cuminum cyminum* resulted in mixture no significant differences in the total weight gain and final live body weight compared to the control treatment, On the Other hand, feed intake and feed conversion ratio significantly increased in birds fed contain mixture of *Coriandrum sativum* and *Cuminum cyminum*.

4.6 Effect of adding *Coriandrum sativum* and *Cuminum cyminum* mixture on internal organs weights:

Table (7) showed that feeding diets contain mixture of *Coriandrum sativum* and *Cuminum cyminum* resulted in no significant differences in the gizzard weight compared to the control treatment, On the Other hand significant difference were observed in liver and heart weight

Table (2): Effect of feeding *Coriandrum sativum* and *Cuminum cyminum*-mixture on weekly feed intake (g/bird):

Treatment	0.0 M±Std.d	0.25 M±Std.d	0.5 M±Std.d	0.75 M±Std.d	Sig level
Week					
Week 1	196.87±17.01	189.56±30.11	207.46±12.21	206.20±12.95	NS
Week2	244.70±34.84	237.53±8.59	262.08±14.17	241.87±24.37	NS
Week3	230.80±26.54 ^b	270.83±6.77 ^{ab}	304.33±52.18 ^a	228.93±22.45 ^b	*
Week4	338.26±29.45 ^b	380.06±28.41 ^{ab}	365.60±18.87 ^b	427.53±47.28 ^a	*
Week5	323.30±64.60	290.36±69.89	209.4±101.09	206.20±81.68	NS

^a, ^b, ^cMean within the same row followed by different superscripts are significantly (P<0.05) different

** : Highly significant different at (p≤0.01)

* : Significant different at (p≤0.05)

NS: Not Significant

Table (3): Effect of feeding *Coriandrum sativum* and *Cuminum cyminum* mixture on weekly weight gain (g/bird):

Treatment	0.0 M±Std.d	0.25 M±Std.d	0.5 M±Std.d	0.75 M±Std.d	Sig level
Week					
Week1	422.33±64.73	356.33±54.5	396.33±45.44	369.33±25.16	NS
Week2	366.00±45.76 ^b	508.63±50.18 ^a	424.93±93.32 ^{ab}	489.83±79.98 ^{ab}	*
Week3	448.75±86.03	610.42±127.27	602.49±30.86	616.46±90.56	NS
Week4	366.00±45.76 ^b	508.63±50.18 ^a	458.26±30.46 ^{ab}	489.83±79.98 ^a	*
Week5	535.66±4.27	615.10±98.45	589.86±70.96	528.50±9.10	NS

^a, ^b, ^c Mean within the same row followed by different superscripts are significantly different (P<0.05)

***: Highly significant different at (P≤0.01)

*: Significant different at (p≤0.05)

NS: Not Significant

Table (4): Effect of Coriandrum sativum and Cuminum cyminum mixture on weekly Feed Conversion Ratio (FCR):

Treatment	0.0 M±Std.d	0.25 M±Std.d	0.5 M±Std.d	0.75 M±Std.d	Sig level
Week					
Week1	2.17±0.50	1.72±0.29	1.58±0.42	1.79±0.01	NS
Week2	2.09±0.16 ^a	1.88±0.12 ^{ab}	1.84±0.10 ^b	2.02±0.12 ^{ab}	*
Week3	1.93±0.22 ^b	2.24±0.43 ^{ab}	2.00±0.29 ^b	2.55±0.10 ^a	*
Week4	1.07±0.05 ^b	1.34±0.22 ^a	1.24±0.16 ^{ab}	1.13±0.06 ^{ab}	*
Week5	1.69±0.14 ^b	2.14±0.24 ^{ab}	3.27±1.58 ^a	2.86±1.20 ^{ab}	*

^a, ^b, ^c Mean within the same Row followed by different superscripts are significantly (P<0.05) different

**: Highly significant different at (P≤0.01)

*: Significant different at (P≤0.05)

NS: Not Significant

Table No (5): Effect of feeding *Coriandrum sativum* and *Cuminum cyminum* mixture on weekly live body weight (g/bird):

Treatment	0.0	0.25	0.5	0.75	Sig level
Week	M±Std.d	M±Std.d	M±Std.d	M±Std.d	
Week1	350.20±16.18	339.16±23.17	360.41±12.21	359.37±13.44	NS
Week2	582.92±29.10	600.62±22.50	601.24±36.65	622.50±19.84	NS
Week3	813.70±51.86	871.03±28.17	901.41±66.78	892.50±88.87	NS
Week4	1151.66±46.91 ^b	1265.66±52.69 ^{ab}	1266.66±67.68 ^{ab}	1319.66±121.76 ^a	*
Week5	1488.94±15.50	1523.16±91.73	1502.00±48.40	1464.04±185.25	NS

^a, ^b, ^cMean within the same Row followed by different superscripts are significantly (P<0.05) different

** :Highly significant different at (P≤0.01)

* : Significant different at (P≤0.05)

NS: Not Significant

Table (6): Effect of feeding *Coriandrum sativum* and *Cuminum cyminum*-mixture on overall performance of weeks broiler chicks:

Treatment	0.0	0.25	0.5	0.75	
	M±Std.d	M±Std.d	M±Std.d	M±Std.d	
Parameters					Sig level
Initial weight (g)	155.00±1.08	154.79±0.36	153.12±0.62	153.30±1.35	NS
Feed Intake (g)	2138.75±56.38 ^b	2599.12±97.08 ^a	2471.89±142.76 ^a	2491.95±269.23 ^a	*
Weight gain (g/bird)	1333.94±14.45	1368.37±91.40	1348.88±47.85	1310.74±184.32	NS
Feed conversion ratio(g feed /g weight)	1.60±0.05 ^b	1.90±0.08 ^a	1.83±0.17 ^a	1.90±0.07 ^a	*
Final live body weight (g)	1488.94±15.50	1523.16±91.73	1502.00±48.40	1464.04±185.25	NS

^a, ^b, ^cMean within the same Row followed by different superscripts are significantly different (P<0.05)

****** :Highly significant different at (P≤0.01)

***** : Significant different at (P≤0.05)

NS: Not Significant

Table No(7): Effect of feeding Coriandrum sativum and Cuminum cyminum mixture on internal organs weights:

Treatment \ Parameters	0.0	0.25	0.5	0.75	
	M±Std.d	M±Std.d	M±Std.d	M±Std.d	Sig level
Liver weight (g)	30.00±0.00 ^{ab}	28.33±3.81 ^b	30.00±4.33 ^{ab}	35.00±2.50 ^a	*
Heart weight (g)	6.66±1.44 ^{ab}	7.50±0.00 ^a	5.00±0.00 ^b	6.66±1.44 ^{ab}	*
Gizzard weight (g)	21.66±1.44	24.16±5.77	18.33±1.44	23.33±5.77	NS

^a, ^b, ^c Mean within the same Row followed by different superscripts are significantly different (P<0.05)

** : Highly significant different at (P≤0.01)

* : Significant different at (P≤0.05)

NS: Not Significant

CHAPTER FIVE

5.0 DISCUSSION

Feeding diets contain the mixture *Coriandrum sativum* and *Cuminum cyminum* as growth promoter on the performance of five weeks old broiler chicks results showed significant differences in the total feed intake between the treatments were the treated groups recorded high feed intake compared to the control group this finding was agreed with those of (Galib A.M. Al-Kassi (2010) and Essa, et al (2010)) who stated that the addition of *Cuminum cyminum* and *Coriandrum sativum*, increases the broiler feed intake. The results showed significant differences in the feed conversion ratio among the treatment were the control group recorded the best feed conversion ratio compared with treated groups, this finding was conflicting with those of (Galib A.M. Al-Kassi (2010) and Essa. H et al (2010)) who stated that addition of *Cuminum cyminum* and *Coriandrum sativum* decreases the broiler feed conversion ratio. Total weight gain and final body weight were not significantly affected with the inclusion of *Cuminum cyminum* and *Coriandrum sativum*. This results were against those of (Galib A.M. Al-Kassi (2010) and Essa. H et al (2010)) they indicated that birds fed *Cuminum cyminum* and *Coriandrum sativum* were recorded a significant improvement in weight gain and final body weight. The result showed that there are no significant differences in gizzard weight among the treatments but significant differences were observed in heart and liver weight. However, reports about the effects of feeds seed on broilers are inconsistent. Some authors found that many herbs and spices had positive effects on animal nutrition (Wenk, 2006, Al-Jaff, 2011). Whereas others did not find clear evidence (Windisch, et al, 2008).

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS:

6.1 Conclusion:

Based on the results of this study the following conclusions can be withdrawn:

1. addition of *Coriandrum sativum* and *Cuminum cyminum* mixture as growth promoter in broiler diet resulted in effect on broiler performance in terms of increasing feed intake and feed conversion ratio.
2. *Coriandrum sativum* and *Cuminum cyminum* mixture used in broiler feed up to 0.75% without adverse effect.

6.2 Recommendations:

Further research on the effect of feed *Coriandrum sativum* and *Cuminum cyminum* mixture on immune response and carcass characteristic should be done

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