بسم الله الرحمن الرحيم

Sudan University of Science and Technology

College of Graduate Studies

Response of Broiler Chicks to Ration Containing Different Levels of Anise Seeds Powder as Natural Feed Additive

إستجابة كتاكيت اللاحم للعليقه المضاف إليها مستويات مختلفة من مسحوق بذرة الينسون كإضافات علفيه طبيعية

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الآية

قال تعالى:

(اللَّهُ نُورُ السَّمَوَاتِ وَالْأَرْضِ مَثَلُ نُورِهِ كَمِشْكَاةٍ فِيهَا مِصْبَاحٌ الْمِصْبَاحُ فِي زُجَاجَةٍ الزُّجَاجَةُ كَأَنَّهَا كَوْكَبٌ دُرِّيٌّ يُوقَدُ مِنْ شَجَرَةٍ مُبَارَكَةٍ زَيْتُونَةٍ لَا شَرْقِيَّةٍ وَلَا غَرْبِيَّةٍ يَكَادُ زَيْتُهَا يُضِيءُ وَلَوْ لَمْ تَمْسَسْهُ نَارٌ نُورٌ عَلَى نُورٍ يَهْدِي اللَّهُ لِنُورِهِ مَنْ يَشَاءُ وَيَضْرِبُ اللَّهُ الْأَمْثَالَ لِلنَّاسِ وَاللَّهُ بِكُلِّ شَيْءٍ عَلِيمٌ).

صدق الله العظيم

سورة النور الآية (35)

Dedication

TO

My father uniforms illuminates my way and the cause of my life and has achieved my dream

TO

My mother is the reason for my happiness and my success

TO

My sisters and brothers are support me secret of my success and provide

TO

All my friends help me to realizing my dream inside and outside Sudan University of Science and Technology

Acknowledgment

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Last, but no least; my ultimate thanks to my family for the support they provided me through my entire life and for their sincere encouragement to pursue my academic interests and fulfill my dreams.

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Abstract

The experiment was conducted to investigate effect of *Pimpinellaanisum* powder addition to broilers chick diets on the performance, serum chemistry and commercial cuts. Four experimental diets were designed A, B, C and D. A served as a control B, C, D was supplemented with Anise seed. At rate 0.2%, 0.4% and 0.6% respectively. Eighty four broiler chicks 7 days old were randomly distributed in to four treatments, each treatment with three replicates and each replicates with 7 chicks. Design (CRD) Complete randomize design, Average weight gain, FCR, dressing percentage, non carcass compound (liver, gizzard) and chemical analysis of blood serum parameters were use as criteria of response. Economics for each group was calculated at the end of the experimental period. Results showed significant between treatment groups in dressing percentage, non carcass components and chemical analysis of blood serum. The supplementation of group diet with 0.2% *Pimpinellaanisum* was recorded significant ($P \leq 0.05$) different between 0.4% and 0.6% in body weight and FCR. Diets contain *Pimpinellaanisum* 0.2% consumed the lowest value of feed compared to other tested groups, also obtained the highest total profit compared to other tested groups.

ملخص البحث

أجريت هذه التجربة لمعرفة أثر إضافة مسحوق الينسون علي عليقة كتاكيت اللاحم وتأثيره علي الأداء العام , ومصل الدم في أربعة معاملات وهي أ ,ب ,ج,د. أ هي المجموعة القياسية، المضاف لها مسحوق الينسون بنسبة 0.2% ,ب مضاف لها مسحوق الينسون بنسبة 0.4%ج مضاف لها مسحوق الينسون بنسبة 0.6%.استخدمت في هذه التجربة 84 كتكوت لاحم عمر7أيام حيث وزعت عشوائيا علي أربعة معاملات كل معاملة بها ثلاثة مكررات، كل مكرر 7كتاكيت حيث تم إستخدام النظام العشوائي الكامل وذلك لجمع البيانات عن العليقة المستهلكة، معامل التحويل الغذائي والوزن المكتسب، نسبة التصافي والأجزاء الداخلية (الكبد، القانصة) وتحليل الدم. وتم حساب القيم الاقتصادية لكل المجموعات في نهاية الفترة التجريبية. حيث أوضحت النتائج أن هناك فرق معنوي علي مختلف المعاملات في نسبة التصافي والأجزاء الداخلية وأيضا التحليل الكيميائي للدم. أظهرت النتائج أن هناك فرق معنوي($P\leq0.05$) بين المجموعة المضاف لها 0.2% مسحوق الينسون والمجموعتين 0.4% و0.6% في وزن الجسم ومعامل التحويل الغذائي. المجموعة المضاف لها مسحوق الينسون بنسبة 0.2% تستهلك اقل كمية عليقة مقارنة بالمجموعات المختبرة الأخرى،وأيضا حققت اعلي ربح مقارنة بمجموعات الينسون الأخرى.

CHAPTER ONE

INTRODUCTION

In Sudan, poultry industry has evolved gradually since it was introduced in the fifties of the twentieth century. The importance of poultry production has increased recently due to the increase in population incomes and in standard of living, therefore the poultry industry is under increasing pressure to produce high quality product for the consumers. Birds today grow much faster, and reach higher market weights than ever before, not only because of the exceptional genetic improvement but also through the feed formulation and management practices. Poultry feed costs about 65-70% of the total variable costs of the poultry industry.

Poultry industry is one of the most dynamic branches of world agribusiness trade. Antibiotics are frequently used for the treatment and control of diseases and even as growth promoters to improve poultry performance. Addition of certain antibiotics fed at low levels for anextended period of time is a common practice in the poultry industry and provides economic benefits by increasing weight gain and improving feed efficiency from 1 to 5% (Thromke *et al*., 1998). Recently, published data indicated that indiscriminate use of in-feed antibiotics increases several strains resistance to antibiotics used for human health and enhances transferring the resistance to other bacteria (Botsoglou *et al*., 2001). In fact, it has been reported to phase out these antibiotics from the European Union market since January 2006. Nowadays, the possibility of using new natural alternative additives instead of antibiotics in poultry diets being researched. Phytogenic feed additives used in poultry feeding to improve performance of poultry. Anise seed (PA) is an annual herb, indigenous to Iran, India, Turkey and Pakistan. PA seed contains eugenol, methylchavicol, anisaldehyde and estragole .PA seed has been used

as an anthelmintic, antifungal, antipyretic and anelgesic(Afifi *et al*., 1994). Moreover, the plant and especially its fruit oil, has been used for treatment of some of the diseases like rhinitis, cough and other symptoms of the common cold (Schilcher *et al*., 2000). Based on these ideas a study was planned to elucidate the potential of PA seed as growth promoter and immune stimulator in broiler chicks.

The objective of this research was to study the response of broiler chicks to rations supplemented with different levels of Anise seed as natural feed additive on their performance, carcass yield and serum chemistry.

CHAPTER TWO

LITERATURE REVIEW

2-1 Feed additives

Feed for broiler and laying hens is formulated to contain an optimum nutrient obtainable cost for desirable growth, production and efficiency of feed utilization. To insure that dietary nutrients are ingested, protected from destruction, absorbed and transported to the cells of body, certain non-nutritive feed additives are sometimes used in addition to this optimum concentration and balance nutrients. Other feed additive has been used to alter the metabolism of the chicken in an effort to produce better growth or more desirable finished products (Leeson and Summers, 2001). Additives are usually included in feed mixture in very careful weighing, handing and mixing. The feed additive are falling in to two groups: the first group comprises those additive that have a specific nutrition role, and includes fifteen or more promoting substance unite, the second groups covers those compounds with the prevention and control of disease, and here the number used has so far to top sixty. Antibiotics may be included in both groups (Ray and Fox 1979).

2-2 Antibiotics

Antibiotics represent a group of chemical compounds produced biologically by certain plants or microorganism, usually a fungus, which process bacteriostatic bactericidal properties, other antibiotics are particularly effective against negative bacteria. Other antibiotics are most effective against positive bacteria, wide range of both gram negative and gram positive bacteria.

Certain chemotherapeutic agents such as arsenicals and nitro furans have been found to posses bacteriostatic or bactericidal properties and at the effective levels are not toxic to chickens or other host animals (Parks *et al*., 2000)

The growth promoter effect of antibiotics was discovered in the 1940s, when it was observed that animals fed dried mycelia of streptomycin aureofaciens contain chlortetracycline residues improved their growth.

The mechanism of action of antibiotics as growth promoters is related to interaction with intestinal microbial population (Dibner and Richards, 2005).The United States food and drug administration approved the use of antibiotics as animal additive without veterinary prescription in 1951 (Jones and Ricke, 2003). Also in 1950s and 1960s, each European state approved its own national regulations about the use of antibiotics in animal feed (Castanon, 2007). The antibiotics as growth promoter may produce one or more of the following effect: (Besharati *et al*., 2005) they may favor the growth nutrients synthesizing microbes or in habit that of nutrient destroying microorganism. (Gulcin *et al*,. 2003) antibiotics may inhibit the growth of organisms that produced excessive amount of ammonia and other toxic nitrogenous waste products in the intestine. (N.A. Afifi *et al*,. 1994) they may improve availability or absorption of certain nutrient, (Schilcher, 2000) they may improve feed or water consumption or both. antibiotics systemically may instances prevent or cure actual pathological disease which occur either in the intestinal or systemically. they may reduce the maintenance cost associated with turnover of the intestinal epithelium (Kahn *et al*.,2005) .Many scientific findings suggested that antibacterial used for animal feeding as growth promoters become risky for human and animal health (Manninig *et al*.,1994). However, the swan committee report (1969) was the first to suggest that the use sub therapeutic levels of antibiotics for growth promotion and disease prevention could increase the risk of bacteria acquiring resistance to specific

antibiotics (Nasir and Grashorn., 2006). The United States banned the use of enrofloxacin in 2005, (Colligon, 1999). Since 1th January the use of antibiotic growth promoters is prohibited in the European Union (Buchanan *et al*., 2008).

2-3 Nutrition strategies and feed additives

The use of the most antibiotics growth promoters as feed additives has been banned by the EU. Due to cross resistance against pathogens and residues in tissues, scientists has searched for alternatives to antibiotics, in this view; varieties of substances are used in poultry diets. Herbs and spices, essential oils extracted from aromatic plants e.g.; enzymes, organic acid, probiotics, amino acids all shown promising results for use in organic poultry production (Griggs and Jacob 2005).

2-4 Taxonomy

Anise is belonging to the family of *Apiaceae*(*Umbelliferae*) which consists 300-455 genera and 3000-3750 species distributed in the northern hemisphere (Rechinger1972, Heywood 1999).The genus *Pimpinella* L. consist 150 species, The family *Apiaceae*can be familiar by certain characters that are generally found in the group including the herbaceous nature of the family; the frequent occurrence of compound leaves; small flowers, with a small number of floral parts arranged in whorls and grouped in shaped inflorescences. Only few species are economically significance, these are including, *Pimpinellaanisum* L (Kubeczka *et al*.,1989).

2-5 Morphological characteristics

Anise plant reaches a maximum height of 30-70 cm with ternately pinnate leaves. Very small and white flowers are born in compound umbels which distributed into 7 to 15 rays. The leaves of anise plant at the basal part are

simple, 1.3-5.1 cm long and shallowly lobed, while leaves top on the stems are feathery pinnate divided into numerous leaves (Chevallier, 1996). The fruit of anise is pyriform or ovoid laterally compressed which 3-5 mm in length and 2-3 mm wide. The color of anise fruits is greyish-green to greyish-brown with a sweet smell. Every fruit contains two carpals both containing an anise seed. The seed is small and curved, about 0.5 long and grayish-brown. The percarp is broadly ovoid, five ridged with short hairs and various vittae (Ross 2001). The essential oil is located in the schizogenic oil ducts of anise fruits, and shoots (Figueiredo *et al*., 2008).

2-6 Chemical assay

Aniseed contains 1.5–6.0 mass % of a volatile oil consisting primarily of trans-anethole and also as much as 8–11 mass % of lipids rich in fatty acids, such as palmitic and oleic acids, as well as approximately 4 mass % of carbohydrates, and 18 mass % of protein (Besharati *et al*,. 2005) Other studies have demonstrated the presence of eugenol trans-anethole, methylchavicol, anisaldehyde, estragole, coumarins, scopoletin, umbelliferone, estrols, terpene hydrocarbons, polyenes, and polyacetylenes as the major compounds of the essential oil of anise seed (Gulcin *et al*., 2003) In another study for determination of the composition of essential oil of Pimpinellaanisum L. fruits obtained from different geographical areas of Europe, in addition to the major components (trans-anethole (76.9–93.7%) and γ-himachalene (0.4–8.2%), some other compounds such as trans-pseudoisoeugenyl 2-methylbutyrate, panisaldehyde, and methylchavicol were also identified in essential oil (A. Orav and Arak., 2008). Study of components of the whole plants and the seeds of *Pimpinellaanisum* from Alberta showed that the major oil constituent (*trans*-anethole) was 57.4% of whole plant and 75.2% of seed oil. The other constituents of plant oil, present in amounts of 1–5% were *cis*-anethole, carvone, *β*-caryophyllene, dihydrocarvyl acetate, estragole and

limonene(M. B. Embong *et al*,. 1997). The chemical constituents of aniseed extract obtained by Supercritical extraction using CO2 were determined by GCMS. The major compounds were anethole (90%), *γ*-himachalene (2−4%), *p*-anisaldehyde (<1%), methylchavicol (0.9−1.5%), *cis*-pseudoisoeugenyl 2-methylbutyrate (3%), and *trans* pseudoisoeugenyl 2-methylbutyrate (1.3%) (V. M. Rodrigues *et al*., 2003). A new terpene hydrocarbon called neophytadiene was isolated from aniseed in 1978 (G. Burkhardt *et al*., 1986). 4-(*β*-d-glucopyranosyloxy) benzoic acid which is one of the phenolic glycosides of the Umbelliferae family was also isolated from aniseed (U. Dirks and Herrmann, 1984). In a study by Fujimato *et al*., four aromatic compound glucosides, an alkyl glucoside, and a glucide were isolated as new compounds from the polar portion of methanolic extract of anise fruits. The structures of the new compounds were clarified as (E)-3-hydroxy-anethole *β*-d-glucopyranoside, (E)-10-(2-hydroxy-5-methoxyphenyl) propane *β*-d-glucopyranoside, 3-hydroxyestragole *β*-d-glucopyranoside, methyl syringate 4-*O*-*β*-d-glucopyranoside, hexane-1,5-diol 1- *O*-*β*-d-glucopyranoside, and 1-deoxy-l-erythritol 3-*O*-*β*-dglucopyranoside (Fujimatu *et al*., 2003). Isolation and structure elucidation of flavonoid constituents from anise, caraway, coriander, and fennel by means of chromatography on cellulose columns lead to isolation of quercetin 3-glucuronide, rutin, luteolin 7-glucoside, isoorientin, and isovitexin as crystalline compounds and apigenin 7-glucoside and a luteolin glycoside as noncrystalline compounds from anise (Kunzemann and Herrmann, 1977). In another study, a silver ion HPLC procedure was used to determine the fatty acids composition of aniseed oil. The results showed the positionally isomeric 18:1 fatty acids Oleic acid (*cis*9–18:1), petroselinic acid (*cis*6–18:1), and *cis*vaccenic acid (*cis*11–18:1), in aniseed oil by a single gradient run on a single cation exchange column laboratory converted to the silver ion form (R. V. Denev *et al*.,2011). Also three lignin-carbohydrate protein complexes were isolated from a hot water extract of the seeds of

Pimpinellaanisum by combination of anionexchange, gel filtration, and hydrophobic interaction column chromatographies (J. B. Lee *et al*.,2011).

2-7 Pharmacological Properties

2-7-1 Antibacterial and Antifungal Effects.

The antibacterial activities of the aqueous, 50% (v/v) methanol, acetone and petroleum ether extracts of *Pimpinellaanisum* L. fruits were tested against 4 pathogenic bacteria (*Staphylococcusaureus, Streptococcuspyogenes, Escherchia coli,* and *Klebsiellapneumoniae*) by disc diffusion method. The results showed that only aqueous and methanol extracts exhibited fair antibacterial activity against all of the test bacteria and the aqueous extract was found to be more effective than methanolic extract, whereas acetone and petroleum ether extracts cannot inhibit the growth of the pathogenic test bacteria (Akhtar *et al*., 2008).

2-7-2 Antimicrobial effects

Antimicrobial effects of water and ethanolic extracts of aniseed were studied by Gulcin *et al* (2003). against 10 bacterial species and *also Candida albicans* with disc diffusion method. In this study, ethanolic extract showed significant inhibitory activity against all tested bacteria but not effective on *Candida albicans*. However, the antimicrobial effect of water extract was not detected against Gram-negative bacteria, *Pseudomonas aeruginosa*, and *Escherichia coli*, but it was effective against *Candida albicans* (Gulcin *et al*., 2003). The alcoholic extracts of *Pimpinellaanisum*seeds also showed antibacterial activity against *Micrococcus luteus* and *Mycobacterium smegmatis* (D. A. Ates *et al*.,2003).

2-7-3 Effect on Gastrointestinal System

Effect on Gastric Ulcer. For studying the effect of aqueous suspension of anise against gastric ulcers in rat, acute gastric ulceration was produced by

various noxious chemicals and indomethacin. The results showed that anise significantly inhibited gastric mucosal damage induced by
necrotizing agents and indomethacin. The antiulcer effect was further confirmed histologically (A. Al Mofleh *et al*., 2007).

2-7-4 Effect on Constipation

The laxative efficacy of a phytotherapic compound containing *Pimpinellaanisum* L., *Foeniculumvulgare* Miller, *Sambucusnigra* L., and *Cassiaaugustifolia* was studied in a randomized clinical trial included 20 patients presenting with chronic constipation according to the criteria of the American Association of Gastroenterology. The primary endpoint was colonic transit time (CTT), measured radiologically. Secondary endpoints included number of evacuations per day, perception of bowelfunction, adverse effects, and quality of life. The results of the study revealed significant laxative effects of phytotherapic compound when compared with placebo. This effect was demonstrated by a decrease in colonic transit time as well as an increase in the number of daily evacuations. Although quality of life did not show significant differences among the study periods and no significant differences were observed interms of adverse effects throughout the study period, so this compound can be a safe alternative option for the treatment of constipation (Picon *et al*., 2010).

2-7-5 Analgesic and Anti-Inflammatory Effect

Screening of some Iraqi medicinal plants for analgesic activity showed that the extracts of *Tribulusterrestris* and *Pimpinellaanisum* exhibited significant analgesic activity versus benzoquinone induced writing and in thermal tests (H. A. A. Twaij *et al*., 1988). In a study by Tas, essential oil of *Pimpinellaanisum* showed significant analgesic effect similar to morphine and aspirin. Alsofixed oil of anise was investigated for anti-inflammatory and analgesic activity in mice. The finding showed that the fixed oil of anise has

anti-inflammatory effect as strong asindomethacin and it showed analgesic effect comparable to that of 100 mg/kg aspirin and 10mg/kg morphine at 30th min (A. Tas *et al*., 2006).

2-7-6 Antioxidant Activity

In a study by Gulcin *et al (2003)*., the antioxidant properties of water and ethanolic extracts of aniseeds were evaluated using different antioxidant tests, and antioxidant activities were compared with synthetic antioxidants such as butylatedhydroxyanisole (BHA), butylated hydroxyl toluene (BHT), and *α*-tocopherol. Both extracts of aniseeds showed strong antioxidant activity, reducing power, DPPH radical and superoxide anion scavenging, hydrogen peroxide scavenging, and metal chelating activities compared to BHA, BHT, and *α*-tocopherol, and water extract exhibited greater antioxidant capacity than ethanolic extract (Gulcin *et al.*,2003).

2-8 Poultry feeding

(Al-Kassie, 2008), the supplementation of 1% anise seed in broiler diets significantly improved the performance of birds on the basis of weight gain and FCR during a growing period of 6 week. Authors concluded that aniseed growth promoting effect might be due to digestive stimulating effect and antimicrobial effect. El-Deek *et al.* (2001) who investigated that the higher body weight was found in birds fed with aniseed. The increase in body weight may be due to the presence of active material such as anethole, which has stimulating effects on the digestive system.

CHAPTER THREE

MATERIALS AND METHODS

3-1 Site of Experiment

The experiment was conducted in poultry farm, College of Agricultural Studies, Sudan University of Science and Technology, Department of Animal Production, during the period 35 days which the ambient temperature ranged between 16C^{o} to 28C^{o}.

3-2 Housing

The house is open system, East-West long axis, the house dimensions were length, width and height.12 separate replicates of equal size 1m^{2} each were used wire net partitions, each replicates was provided with wood shaving litter and one feeder and as drinker to allow optimum consumption of feed and water ad labium.

Heat lamps were used for the control of heating and lighting and had put in away to ensure adequate and uniform distribution of heat and light, light was open during the period of whole night, to protect the chicks from cold. Strict sanitation program was maintained in the house before and during the period of experiment.

3-3 Experimental Chicks

A total number of chicks 84 one day old winter broiler chicks of Arberacar strain obtained from a local commercial hatchery. At the end of adaptation period, all chicks were weighed with an average initial weight of 164g. The chicks were then assigned randomly into four dietary treatment groups (D, C, B and A) in a complete randomized design (CRD), each group was divided into 3 replicates, each of 7 chicks. Ground brooding rearing system was adopted for 5 weeks experimental period.

3-3-1 Vaccination Program

The chicks were vaccinated against Infectious Bronchitis (IB) and Newcastle disease (ND) at 7 days of age and given multi-vitamin to chicks before and after vaccination to guard against stress. At 14 days age they were vaccinated against Newcastle disease and Infectious Bursal Disease (IBD) Gambaro through drinking water. The dosage was then repeated at 21 and 28 days of age for Newcastle disease and Gambaro respectively.

3-4Experimental Ratios

The chicks were fed a commercial broiler pre-starter for a week. In this experiment a bush has been installed in the Sudan University, College of Agricultural Studies. The chicks were fed on dietary treatment. The first group D fed on Anise seed powder 0.2%. The second group C fed on PA powder 0.4%. The third group B fed on PA powder 0.6%. The last group A fed on basal diet (control). The basal diet was formulated to meet the nutrients requirements of broiler chicks according to the (NRC, 1994). The ingredients percent compositions of the experimental diets were presented in Table (1).

3-5 Data Collected

3-5-1 Performance Data

Performance value of experiment Average Body Weight Gain the equation final body weight gain-initial weight and feed intake (gm) for cash group were determined weekly through the experimental period, feed conversion ratio (FCR),feed intake and body weight gain. Health of the experimental stock and mortalities were closely observed and recorded daily.

Mortality Rate= Number of Mortality/Total Number*100.

3-5-2 Panel Test

The stored right side of carcasses was slightly seasoned wrapped individually in aluminum foil and roasted at $190c^0$ for 70 minutes with average internal temperature of $88c^0$ and served warm. Well trained panel test were used to score color, flavor, tenderness and juiciness of meat (Cross *et al*., 1978) (Appendix 1).

The roasted samples were served randomly to each judge at room temperature. Water was provided to the panelist to rinse their mouth after tasting each sample.

3-6 Calculation

The hot carcasses were weighed for calculation the dressing percentage expressed as a percentage of live weight. Non carcasses components (heart, liver, head, abdominal fat, intestine, feet, neck and gizzard) also were weighed and commercial cuts percentages were determined.

Table 1: The ingredients percent composition of Basal diet:

Ingredients%	**A**
Dura	64.14
Ground nut cake	14.00
Sesame cake	15.00
Concentrate	5.00
Lime stone	0.487
Dicalcium	0.618
Salt	0.25
Methionine	0.159
Lysine	0.344
Total	100

Table 2: Calculated composition of control diet:

Ingredients	**%**
Crude protein	23
Crude fiber	4.15
Ash	4.91
Ether Extract	3.54
Lysine	1.49
Methionine	0.63
Calcium	1.49
Phosphorus	0.76
ME kcal/k	3072

Calculated according to Ellis (1981)

3-7 Experimental Design and Statistical Data Analysis:

The data obtained were statistically analyzed with the standard procedures of analyses of variance (ANOVA) using completely randomized design. Significant differences between treatment means were separated using the Duncan's multiple range tests with 5% probability (Duncan, 1995).

CHAPTER FOUR

RESULTS

4-1 Performance

The effect of feeding different levels of Pimpinella Anisum compared with control on the performance of broiler chicks was summarized in(Table3). Result obtained showed no significant (P≥0.05) difference in the performance parameters (Body weight gain, feed intake and final body weight) of broiler chicks fed on diets supplemented with graded levels Data obtained for body weight gain showed that the chicks fed on diet containing 0.2% Anise seed showed numerically heavy body weight followed by group A 0%, 0.4%, and 0.6% Anise seed respectively. Feed intake also was similar between groups. However, there is no significant (P≥0.05) difference for feed conversion ratio (FCR) between experimental groups.

4-2 Value of non carcasses components, commercial cuts and dressing percentages

Value of non carcass components of (Liver, gizzard, heart, intestine, neck and head) of experimental chicks showed no significant (P≥0.05) different (Table 4). But the abdominal fat, feet and dressing percentages results showed significant different (P≤0.05) between groups.

Values of commercial cuts were illustrated in (Table5) the results recorded significant different (P≤0.05) between groups.

4-3 Panel Test

The subjective panel test meat attributes of tested groups (Table8) showed significant different (P≤0.05) between groups. But the tenderness and flavor was highly significant in (D,C and B) compared with control groups.

The results showed that the addition of Aniseed 0.2%, 0.4% improved the flavor, color, juiciness and tenderness compared between other groups.

4-4 Chemical Analysis of Serum

The result of chemical analysis of blood sample collected from experimental chicks (table 7) revealed significant ($P \leq 0.05$) different in (cholesterol, uric acid, phosphorous, total glycerol, urea, protein and calcium), tested groups. But the albumin result showed no significant ($P \geq 0.05$) between other groups.

4-5 Mortality

The result recorded that no significant difference ($P \geq 0.05$) mortality rate in all groups of experimental chicks.

4-6 Economical Appraisal

The economic calculation for broiler chicks fed on experimental diets was shown in (Table9). Chicks fed on diets containing 0.2% Aniseed recoded high profit compared with other tested groups.

Table 3: The Performance of Broiler Chicks fed on different levels of anise seed powder.

Item	D	C	B	A	SE
Initial weight(g)	171.67	172.33	172.67	174	N.S
Final body weight(g)	2047	1900	1866	1933.3	N.S
Body weight gain(g)	1868.3	1727.7	1700	1750	N.S
Feed intake(g)	3266.4	3242.6	3550.8	3130.5	N.S
FCR	1.75	1.87	2.09	1.79	N.S
Mortality%	0.00%	0.0 0	4%	0.0 0	N.S

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

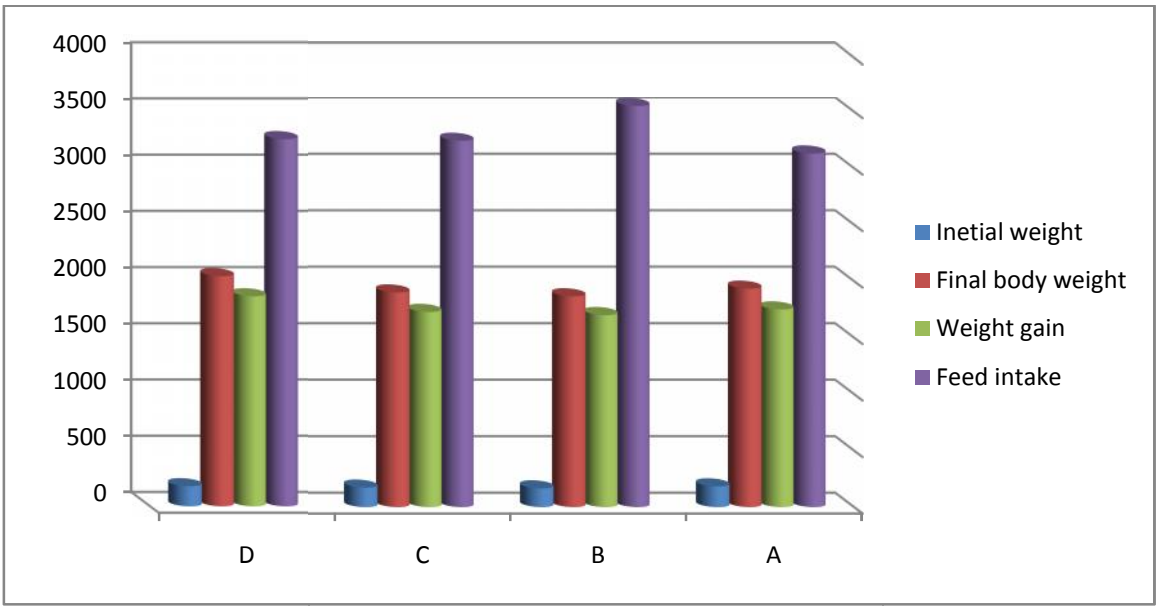
B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure1: Chicks fed on Diets Containing Different levels of Anise seed during period (5) weeks



Key:

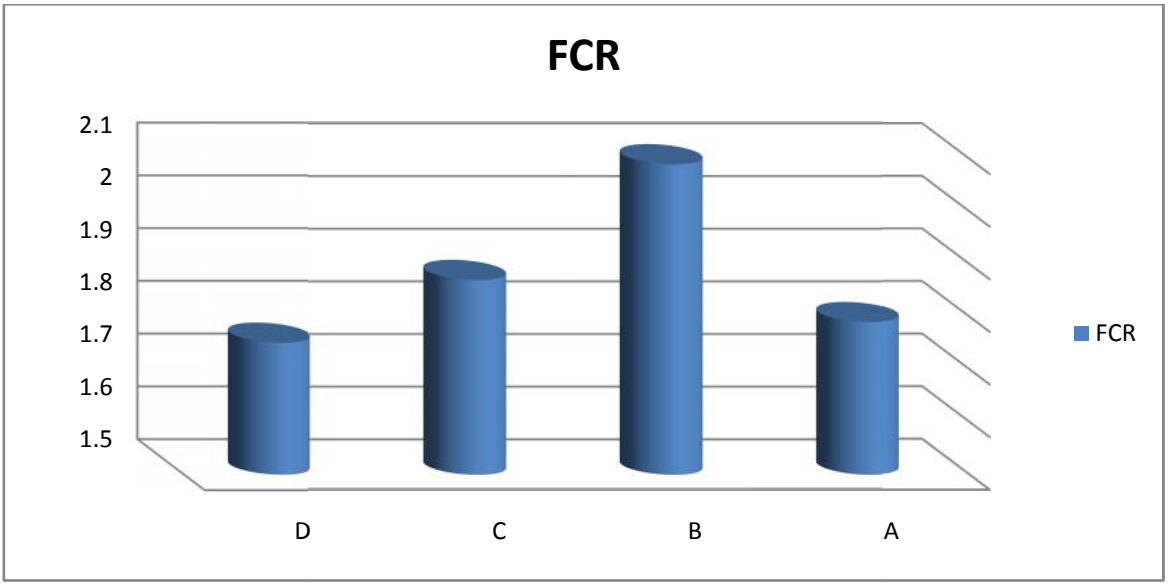
D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

Figure 2: Effect of Feeding Different levels of Anise seed on Feed Conversion Ratio during period 5 weeks:



Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

Table 4: Effect of Feeding Broiler Chicks Different levels of Anise seed on Non Carcass Components as% of Hot Carcass:

Item	D	C	B	A	SE
Dressing%	76.75^{a}	71.65^{b}	72.05^{b}	74.87^{a}	0.0913
Liver%	2.75	2.75	2.24	2.23	N.S
Heart%	0.5	0.69	0.49	0.49	N.S
Gizzard%	2.25	3.22	2.25	2.34	N.S
Abdominal fat%	0.75^{c}	0.9^{b}	1.74^{a}	0.99^{a}	0.0429
Feet%	4^{a}	4.14^{a}	3.74^{b}	3.23^{c}	0.0858
Intesting%	4	5.52	5.22	4.97	N.S
Neck	4.03	4.36	4.22	3.98	N.S
Head	2.25	2.76	2.24	2.23	N.S

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

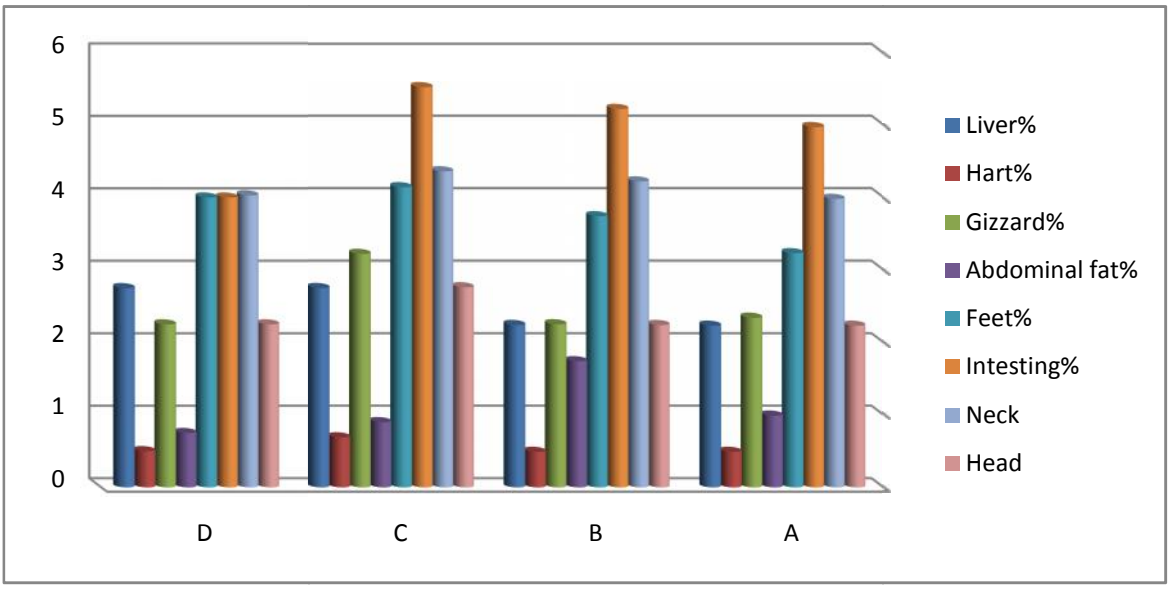
B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure 3: Effect of Feeding Broiler Chicks on Diets Containing Different Levels of Anise seed on Non Carcass Components as% of Hot Carcass:



Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

Table 5: The Effect of Adding Different Levels of Anise seed on the Commercial Cuts Percentage of Broiler Chicks for 5 weeks:

Item	D	C	B	A	SE
Breast%	34.5	32.27	40.11	36.05	N.S
Thigh%	13.73	14.87	14.28	15.73	N.S
Drumstick%	6.7	6.01	6.8	6.55	N.S

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure 4:The Effect of Adding Different Levels of Anise seed on the Commercial Cuts Percentage of Broiler Chicks for 5 weeks:

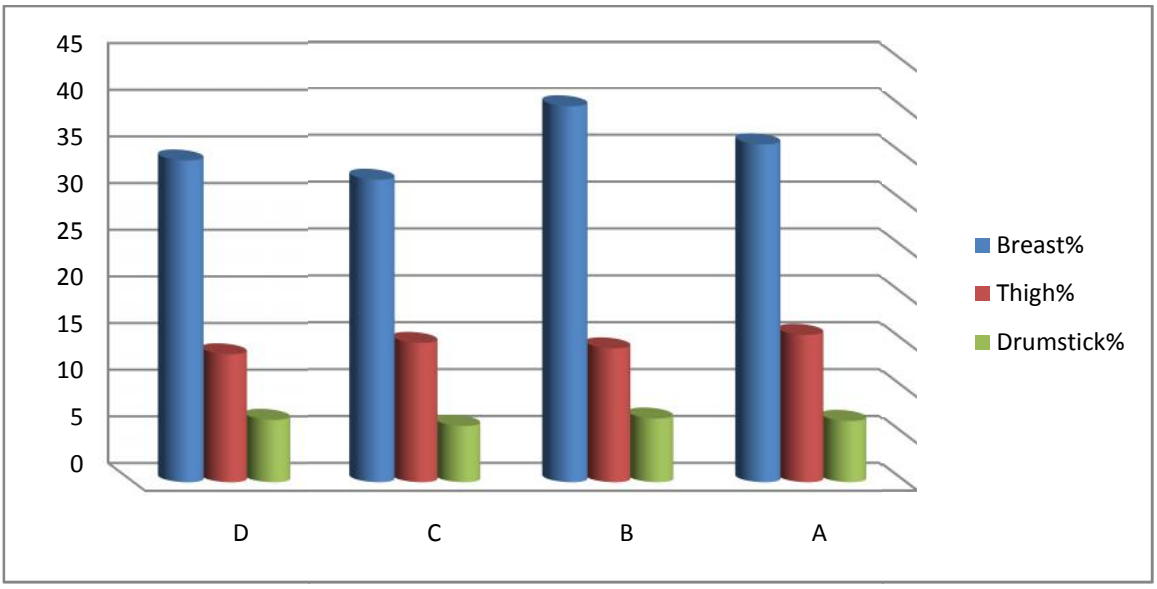


Table 6: Means of separate Meat and bone percentage in selected carcass cuts of the treatment

Item	D	C	B	A	SE
Breast%					
Meat%	92.59	90.16	88.11	92.72	N.S
Bone%	7.4	9.8	11.86	7.27	N.S
Thigh%					
Meat%	86.04	85.13	88.06	85.41	N.S
Bone%	13.95	14.89	11.93	14.58	N.S
Drumstick%					
Meat%	80.95	78.94	85	80	N.S
Bone%	19.04	21.06	15	20	N.S

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure 5: Means of separate Meat and bone percentage in selected carcass cuts of the treatment

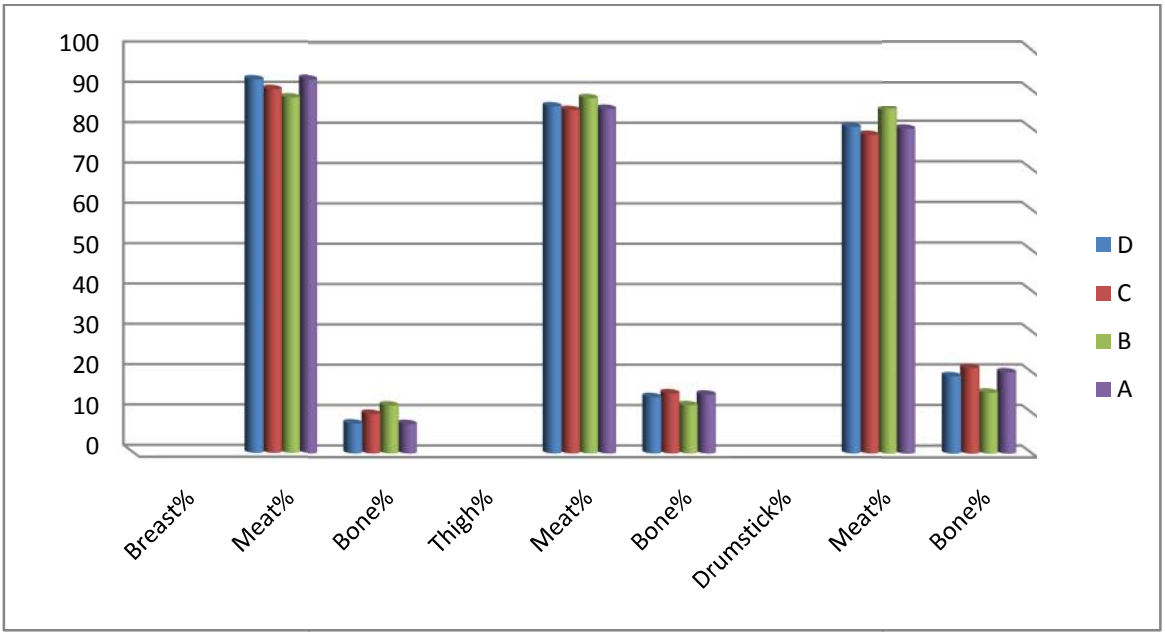


Table 7: Effect of Feeding Different Levels of Anise seed on Blood Serum Analysis:

Items	**D**	**C**	**B**	**A**	**SE**
Cholesterol	99.32	89.93	74.47	99.32	2.034
Uric acid	5	5.31	6.57	6.47	1.098
Phosphor	8.87	9.7	11.18	11.02	2.09
Glucose	192.93	119.08	160.77	128.97	8.098
Triglycerol	27.27	61.36	50	30.3	3.45
Albumin	1.77	1.54	1.26	1.84	1.089
Urea	52.5	53	53	52	2.087
Protein	2.9	2.7	2.9	2.5	1.067
Calcium	8.05	7.8	9.49	10.42	2.056

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

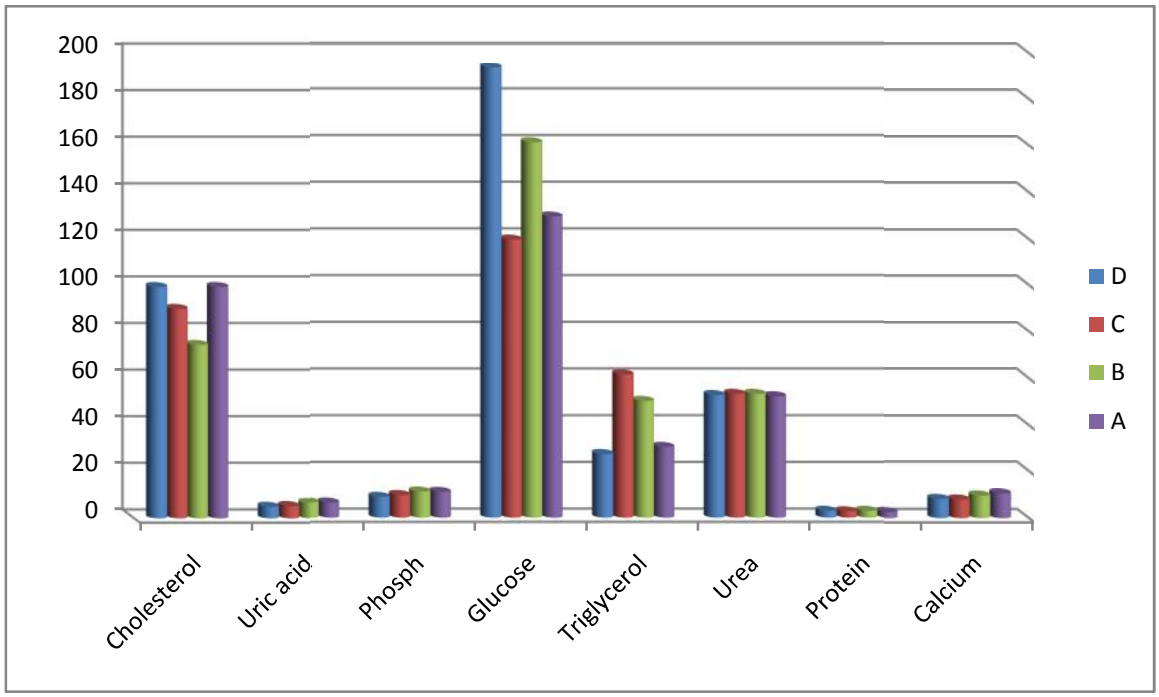
B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure6: Effect of Feeding Different Levels of Anise seed on Blood Serum Analysis:



Key

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

Table 8: Effect of Feeding Broiler Chicks on Diets Containing Different Levels of Anise seed on subjective meat attribute

Item	D	C	B	A	SE
Tenderness	6.6^{a}	6.2^{b}	6.3^{b}	5.4^{c}	0.0816
Color	6.5^{a}	5.8^{b}	5.2^{c}	5.2^{c}	0.0816
Flavor	6.4^{a}	6.4^{a}	5.8^{b}	5.5^{c}	0.0816
Juiciness	5.6^{a}	5.4^{a}	4.1^{c}	4.8^{b}	0.0816

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

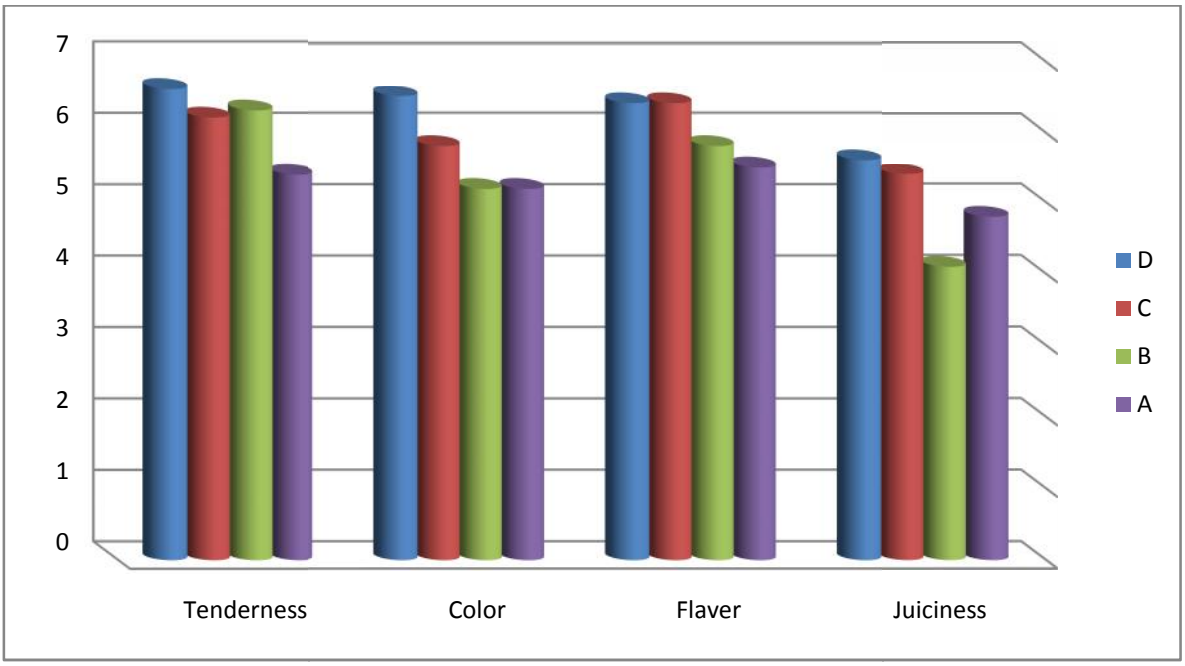
B= sample treated with 0.6% Aniseed

A=control sample (without addition)

S.E= standard error of the means

N.S= Not statistically significant different ($p \geq 0.05$)

Figure 7: Effect of Feeding Different Levels of Anise seed on subjective meat attributes



Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

Table 9: The economic appraisal of dietary Aniseed for broiler chicks

Items	**D**	**C**	**B**	**A**
Cost				
Chicks	6	6	6	6
Feed	14.77	14.75	16.21	14.08
Management	2	2	2	2
Total cost	22.77	22.75	24.21	22.08
Revenues				
Average weight Carcass	1868.3	1727.7	1700	1750
Price of kg	29	29	29	29
Total Revenues	54.18	50.1	49.3	50.75
Profits				
Total Revenues	54.18	50.1	49.3	50.75
Total cost	22.77	22.75	24.21	22.08
Profit/chick	31.41	27.35	25.09	28.67
Profitability Ratio	1.09	0.95	0.87	1

Key:

D= sample treated with 0.2% Aniseed

C= sample treated with 0.4% Aniseed

B= sample treated with 0.6% Aniseed

A=control sample (without addition)

CHAPTER FIVE

DISCUSSION

Various plant extract and herbs are being used as growth promoters for seeking alternative to antibiotics and many researchers recorded that herbs essential oils extracted from aromatic plants, probiotic and prebiotic Seleem *et al*., 2006; Tabidi *et al*., 2013).

The experimental chicks health was good although out the experimental period was recorded ferry light mortality rate, this is may be due to good sanitation measures or biosecurity also Aniseed contain volatile fatty acid which protect digestive system and improve immunity system (EL-Ghamry – *et al*, 2002) and Aniseed powder contain antibacterial and laxative in gastrointestinal. (Asie and Mehri 2012).

The experimental was conducted to evaluate the effect of Aniseed of different level of supplement on performance of broiler chicks.

The Aniseed was added to the basal diet of level (0.2, 0.4 and 0.6%); where is the basal diet as control group without any feed additives.

Results of this study showed no significant ($P \geq 0.05$) difference in the performance parameters (Body weight gain, feed intake and final body weight) of broiler chicks feed diet containing 0.2% Aniseed showed numerically heavy body weight gain compare to those fed on control diet. This result were in line with findings (Muhammed *et al*., 2014;) which found that the good effect of aniseed on performance of broiler chickens at lower doses. However, the result of beneficial effect of these additive on weight gain. EL-Deek, *et al* (2001)who investigated that the higher body weight was found in chicks fed with aniseed .The increased in body weight may be due the presence of active material such asanethole which stimulating effects on

the digestive system as report previously (Tucker , 2002; Cabuk *et al*., 2003; Giannenas *et al*., 2003).

Result obtained by feed intake in broiler chicks recorded no significant different between groups by consuming Aniseed powder.

This results in line of investigations Proudfoot *et al* (1990) Jamroz and Kamel (2002) and Ramarkrsa *et al* (2003) who reported the non significant differences in feed of supplemented and non supplemented groups with aniseed .The results of present study are in contrast to findings of Guo *et al* (2004) who found increase in feed intake of the aniseed supplemented group.

Feed conversion ratio was no significant by addition aniseed in the study .However, results revealed better feed efficiency in level0.2%. Authors in concluded that aniseed growth promoting effect might be due to digestive stimulating effect and antimicrobial effect .Similar findings have been reported by Mehmet *et al*, (2005).

Dressing percentage of the broiler chicks was significant by all dietary treatments, which was significant higher in D, flowed by A, and C, and B,. this result are different to the finding of EL-Deek, *et al* (2001) Hernandez *et al*. (2004) and sarica *et al*., (2005) but are similar to that of Ather (2000) Botsoglou *et al* (2002).

Result of the same blood samples constituent for chicks received different level of aniseed in their diets had significant increase at A, cholesterol compare to supplemented groups. While aniseed powder had no effect on albumin, but showed significant difference in parameters (uric acid, phosphorous, total glycerol, urea, protein and calcium) aniseed is rich by volatile oil trans-anethole and palmitic and oleic acids Besharati-Seidani *et. al.*, (2005). This means that it can be stimulate mucus membrane and protected digestive system.

Conclusion and Recommendation

Conclusion

Based on the results obtained it may be concluded that aniseed powder at level of 0.2 improved the performance (Body weight gain an FCR) Add aniseed powder improves the tenderness and juiciness of the meet. Aniseed powder increase percentage the breast, thigh and dressing percentage.

Recommendation

According to above conclusion the following recommendations by drowning:

More experimental needed to be run to investigate the effect f different levels of anise seed supplementation in broiler diets.

The lower doses which recommended add aniseed 0.2% recorded better results in compare with rest proportion.

In the future we need to study the effect of adding aniseed in poultry diets in the immunity system.

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Appendices

Drinkers

Distribution of litter

Experimental Site

Distribution of chicks in the house

Appendix

Appendix (1)

Card used for judgment of subjective meat quality attributes.

Sensory evaluation card

Evaluation these sample for color, flavor, juiciness and tenderness. For each sample, use the appropriate scale to show your attitude by checking at the point that best describes your felling about the sample. If you have any question please ask. Thanks your cooperation.

Name: ……Date: ……

Tenderness	Flavor	Color	Juiciness
8-Extremely tender	8- Extremely intense	8-Extremely desirable	8-Extremely juicy
7-Very tender	7-Very intense	7-Very desirable	7-Very juicy
6-Moderately tender	6-Moderately intense	6-Moderately desirable	6-Moderately juicy
5-Slightly tender	5-Slightly intense	5-Slightly desirable	5-Slightly juicy
4-Slightly tough	4-Slightly bland	4-Slightly desirable	4-Slightly juicy
3-Moderately tough	3-Moderately bland	3-Moderately undesirable	3-Moderately dry
2-Very tough	2-Very bland	2-Very undesirable	2-Very dry
1-Extremely tough	1-Extremely bland	1-Extremely undesirable	1-Extremely dry

Serial	Sample Code	Tenderness	Flavor	Color	Juiciness	Comment