THE EFFECT OF SUPPLEMENT DRIED BASIL LEAVES ON GROWTH PERFORMANCE CARCASS TRAITS AND BLOOD PARAMETERS IN JAPANESE QUAIL

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FOREWORD

In the beginning I want to thank Allah most merciful, most gracious I am thankful to my supervisor, Dr. Bunyamin Sogut for his advice, for this study. My thank is also to my friend Ahmed Sami Shaker for providing all needs of the study. I am very grateful and thankful to my father, my sisters, and my brother Muhammad for their support during my study. Lastly, I offer my regards to all of those who supported and assisted me in any respect even by a word at certain the situation during the completion of my study.

Bakhan JALIL

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LIST OF ABBREVATIONS

G	: Gram
CM	: Centimeter
KG	: Kilogram
LBW	: Live body weight
BWG	: Body weight gain
FI	: Feed intake
FCR	: Feed conversion ratio
S.D	: Standard diet
ME	: Mint extract
IU	: International Unit
MG	: Milligram
RT	: Real time
NM	: Nanometer
SC	: Standard concentration

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KURUTULMUS REYHAN YAPRAKLARININ BILDIRCIN YEMİNE EKLENMESİNİN BÜYÜME PERFORMANSI KARKAS ÖZELLİKLERİ VE KAN PARAMETRELERİ ÜZERİNE ETKİSİ

ÖZET

Bu çalışma, 2016 yılında Bingöl Üniversitesi Ziraat Fakültesi Araştırma ve Uygulama çiftliğine ait Deney Hayvan Ünitesinde gerçekleştirildi. Bu araştırma, kuru reyhan yaprağıdoğal bir yem katkı maddesi olarak Japon bıldırcınlarının performansına etkisini araştırmak için planlanmıştır. Bu amaca yönelik olarak kuru reyhan bitkisinin bıldırcınların canlı ağırlık, canlı ağırlık kazancı, yem tüketimi, yem dönüşüm oranı, kümülatifyemi tüketimi, karkas verimi, but, göğüs, toplam kolesterol, kanda total protein ve hemoglobin üzerine etkisine bakılmıştır. Toplam 240 civciv şansa bağlı olarak 4 muamele grubuna 3 tekerrürlü olarak dağıtıldı. Bir günlük civcivler 42 günde beslendi. Taze yem ve su her zaman önlerinde bulunduruldu. Bıldırcın civcivleri her muamele grubunda 60 adet olmak üzere 4 gruba bölündü. Her muamele tekerrüründe 20 civciv bulunduruldu. Her muamele grubuna, öğütülmüş kuru reyhan yaprakları %0 (kontrol, T1), %0,3 (T2), %0,6 (T3) ve %1 (T4)oranında yemlere katıldı. Bütün hayvanlara denemenin başından sonuna kadar %23,90 ham protein ve 3025 kcal ME içeren ticari bir yem verildi. Kuru reyhan yapraklarının yeme ilavesi, canlı ağırlık, canlı ağırlık artışı, karkas ağırlığı, but ve göğüs yüzdesi, yem tüketimi üzerine etkisi önemsiz olarak gözlendi (P> 0,05). Dörtdüncü, 5. ve 6. haftalarda T4 grubunda kümülatif yem tüketimi T2, T3 ve T1 gruplarına göre anlamlı bir farklılık gösterdi (P <0,05). Dördüncü ve 6. haftalarda T4 ile T2 grupları arasındaki yemden yararlanma oranı önemli düzeyde farklıydı (P<0,05). Yem katkı maddesi olarak reyhan total kolesterolün azalmasına,toplam proteinin yükselmesine neden olmuştur. Sonuç olarak, bir bitkisel doğal yem katkı maddesi olan öğütülmüş reyhan yaprağı büyüme faktörü açısından göz önüne alındığında antibiyotiklere alternatif olarak Japon bıldırcınlarında herhangi bir olumsuz etkisi olmadan kullanılabileceği söylenebilir.

Anahtar Kelimeler: Japon bıldırcınları, kuru reyhan yaprağı.

THE EFFECT OF SUPPLEMENT DRIED BASIL LEAVES ON GROWTH PERFORMANTH, CARCASS TRAIT, AND BLOOD PARAMETERS IN JAPANESE QUAILABSTRACT

ABSTRACT

This study was carried out in 2016 at the experimental farm of the Faculty of Animal Since, belonging to the Research Station of the Bingol University. This research was conducted to find out the effect of dry basil leaves as natural feed additives on Japanese quail performance. The objective of the present study was to investigate the impact of dry basil leaves as a feed additive on live body weight, body weight gain, feed intake, feed conversion ratio, cumulative feed intake, carcass yield, thigh, breast, total cholesterol, total protein and hemoglobin of japans quail. A total of 240 chicks were selected and divided into 4 treatments and 3 replicates based on completely randomized design. One-day-old chicks were reared for 42 days. Feed and water were provided. Chicks were divided into four treatments 60 birds for each treatment. Each treatment contained three replicates of 20 birds. Each group of birds was supplied with T1 (control), T2 (0.3% basil), T3 (0.6% basil), and T4 (1% basil), of dry basil leaves. All birds were fed a commercial diet containing 23.90% crude protein and 3025 ME from beginning to end of the experiment. The dry basil leaves supplementation had no significantly ($P>0.05$) affected by live body weight and body weight gain, carcass weight, thigh%, and breast%, feed intake. There was a significant effect ($P<0.05$) on cumulative feed intake at T4 group compared to T2, T3 and T1 control groups at 4^{th}, 5^{th}, 6^{th} weeks. There was the significant effect on feed conversation ratio at 4^{th}, 6^{th} weeks between T4 and T2. There was decrease on total cholesterol, and improvement of total protein. As a result, it can be said that the herbal natural feed additives such as basil may be used as alternatives to an antibiotic growth promoter without any adverse effects on Japanese quail parameter.

Keywords: Japanese quail, dried basil leaves.

1. INTRODUCTION

The domestic Japanese quail (Coturnix japonica) was used as a laboratory animal for research in biomedical sciences and as a pilot animal for poultry production because of its small body size, short generation interval and high egg production (Padgett and Ivey 1959), (Wilson et al 1961), quail industry has been developed in many countries for both meat and egg production (Risse 1980), the Japanese quail was originally domesticated in Japan around the 11thcentury as a pet song bird (Crawford 1990). Also, quail is considered a good economical source for producing the animal protein (Singh et al 1981). Japanese quail (Coturnix japonica) is the smallest bodied birds in (Galliformes) family, It's easily handled, so large number of bird can be kept in a limited space, raised all over the world for egg and meat production (Minvielle 2004), and also it has assumed worldwide importance as laboratory animal, because it's used for biological and genetic studies (Narayan et al 1998). Quails have high potential for production because of their short generational interval such as their ability to produce 3 to 4 generations per year, adaptability to high genetic polymorphism and adaptability to laboratory conditions (Kayang et al 2004) make it an interesting laboratory animal. Both quail meat and eggs are characterized by a high nutritive value that is low in fat and cholesterol Garwood and (Diehl 1987). Several researchers estimated genetic parameters for various traits of domestics Japanese quail. (Kawahara and Saito 1976) reported the genetic parameters of different organs and body weight in Japanese quails and also (Toelle et al 1991) estimated genetic and phenotypic relationships between body weight, carcass and some of the organ parameters. Many factors affect carcass characteristics, including age, sex, line, brooding temperature. (Sezai et al 2010) found that sex had a significant effect on carcass weight and females had higher carcass weight than males; carcass yield was 75.5% for females and 73.4% for males. (Panda and Singh 1990) reported a slaughter yield of 66% for females and 65.2% for males at the age of 35 days.

The incessant rise in feed cost and the resultant short age in animal protein supply have encouraged the exploitation of locally, available and cheap animal and feed resources to forestall the threat to the future of poultry production (Runjaic-Antic et al 2010), (Obuzor and Ntui 2011), (Againget al 2011).

Ocimumbasilicum L. (basil) belonging to the plant family Lamiaceae, subfamily Nepetoideae, and the genus sensuality, comprises 65 species (Paton and Harley 1999). Basil is an annual, white-purple flowering plant, 20–60 cm long, which is originally native to India and other regions of Asia. Basil leaves containing essential oils of distinctive aroma can be used both fresh and dried to spice up various kinds of meals. Apart from culinary use, basil has been traditionally employed as a medicinal herb in the treatment of headaches, diarrhea, warts, constipation, coughs, and/or kidney malfunction (Grayer et al 2004), (Özcan, Arslan, and Ünver 2005), (Politeo, Jukica, and Milosa 2007).

Basil now grows in many regions throughout the world. It is prominently featured in varied cuisines throughout the world including Italian, Thai, Vietnamese and Laotian. The name "basil" is derived from the old Greek word basilikohn, which means "royal," reflecting that ancient culture's attitudes towards a herb that they held to be very sacred and noble. The tradition of reverence of basil has continued in other cultures. In India, basil was cherished as an icon of hospitality, while in Italy it was a symbol of love. In the last decade, many research ersused a basil as a feed adaptive in the poultry feed. They were observed significant differences in production performance, body measurements among different groups, growth performance, and performance immune system through elimination of pathogens. Also, dietary supplementation with basil essential oil decreased abdominal fat and did not induceanyadverse effects on chicks' lipid profiles.

The main objective of this study is to examine the effect of dry basil leaves on the body weight, feedintake, feed conversation ratio, cumulative feed intake, carcass traits, total cholesterol, total protein, and hemoglobin in Japanese quail.

2. LITRETURE REVIEW

2.1. Japanese quail

2.1.1. History of Japanese quail

Japanese quail:
Scientific classification
Kingdom: Animalia
Phylum: Chordata
Class: Aves
Order: Galliformes
Family: Phasianidae
Subfamily: Coturnixcoturnix
Species: C.coturnix japonica
(Takaoki 2007)

Japanese quail is hardy birds that develop in small cages and are in expensive to keep. They are affected by the common poultry disease resistant. Japanese quail matures in about 6 weeks and are usually in full egg productionby 50 days of age. With proper care, hens should lay 200 eggs their first year of lay. If the birds have not been subjected to genetics election for body weight, the adult male quail will weigh about 100-140 g, while the females are little heavier, weighting from 120-160 g. The Japanese quail, Coturnix japonica was known have been domesticated since the 12th century AD in Japan, Primarily for its ability to sing. Intensive production of the species started in Japan in the 1920s. And then laid the first egg lines by selection (Wakasugi 1984). They were successfully introduced from Japan to Europe, America, the near and Middle East between the 1930s and 1950s, wherespecificlineswerebredfor meat and egg production. Extensive research on Coturnixjaponica has shown that it was a valuable animal for avian research (Woodard et al 1973). The Japanese quail is found in Japan, Eastern China,

Mongolia, Korea, and Sakhalin as migrating birds. The plumage color of the wild type is predominantly dark cinnamon brown. However, adult males have uniform dark rusted feathers on the breast and cheek. Adult female shaves pale breast feathers that are speckled with dark colored spots (Mizutani 2003). The eggshell color of the wild quail is white, flesh- tint, light brown or speckled blue and \or brown. The shape, size and color pattern on the eggs differ considerably among females. These differences in eggcolorhavebeenproposed as a means of identifyinghens (Takaoki 2007). Japanese quail (Coturnixcoturnix japonica) is used as a model animal and also is one of the sources for eggs and meat, particularly for the niche market. Much research has been conducted to improve growth because Japanese quail responds quickly to selection for body weight (Anthony et al 1986), (Caron et al 1990), (Marks 1996).

2.1.2. Normal data of Japanese quail

In Japan, many Japanese quail strains were established and derived from commercial birds. Some of them are also registered in the International Registry of Poultry Stocks. Some standard biological data about quail egg production.

Table 2.1. Normal data of Japanese quail

Range	Trait
6 ~ 8 g	Body weight at one-day-old
100 ~ 130 g	Adult male
120 ~ 160 g	Adult female
9 ~ 10 g	Egg weight
80 ~ 90	Egg number/100 days
38 ~ 42 days of age	Age at sexual maturity
Max: 7 years in male	Life span
Mean: 3 ~ 4 years in female	

(Somes 1988)

2.1.3. Sex difference

Adult female: The female is similar to the male in color except that the feathers on the throat and upper breast are long, pointed, and much lighter cinnamon. Also, the tan breast feathers are characteristically black-speckled (Sanford 1957).

Adult male: The two sexes can be distinguished outwardly at about 3 weeks of age. The adult male is identified readily by the cinnamon colored feather on the upper throat and the lower breast region, the voice of the male as a loud, castanet-like crow, describing the sound as "pick-per'awick" or "ko-turro-neex". Young birds begin to grow at 5 to 6 weeks old. During the height of the normal breeding season, Coturnix males will grow throughout the night.

Figure 2.1. Japanese quail chicks and adults

2.1.4. Brooding and care of young birds

Hatched quail chicks are very small, and temperatures for young quail are very important. They need heat for about 3–4 weeks after hatching. A commercial brooder or any other heat resource that provides sufficient heat can be used successfully and should be placed 30–46 cm above the floor of the pen. Quantify the temperature at the level of the chicks. It is about 35°C during the first week of brooding. This temperature may bedecreased by about 3.5°C a week until the chicks are fully feathered at about 3–4 weeks. The best guide for adjusting the temperature is chick behavior. Chicks that crowd near the heat

source and seem cold indicate that the temperature is too low. When the chicks have a tendency to settle just outside the hottest area, the temperature is about right. Failure to provide adequate heat during the early days of the brooding period invariably results in increased mortality. Chicks should be protected from draughts of cold weather, especially at night. Care must be taken with small quail to prevent them from drowning in water troughs. Automatic chick mini-drinkers or a canning jar with a glass or plastic base, work well provided the drinking trough is filled with marbles or pebbles to stop the baby quail getting into the water. When the chicks reach 1 week, the pebbles can be removed with safety. It is important to provide clean water at all times; water containers or troughs should be cleaned daily. Litter is used to dilute the droppings and absorb moisture. Sawdust, wood shavings, and sand are good litter materials. Litter should be 5–10 cm deep on the floor and covered with paper for the first week for chicks. Use soft, rough types of paper, as chicks tend to spread on hard, smooth paper must be used. Old newspapers are satisfactory but not ideal. Paper to welling is better. Food should be sprinkled on the paper to encourage young chicks to eat. If chicks are raised on a wire floor or in wire cages the floor surface must be covered with coarse paper for the first week or so to prevent leg injuries. Feather picking or other forms of cannibalism may occur when. Japanese quail is kept on wire. Beak trimming may be necessary as early as 2 weeks of age and is usually done with a hot-blade-type commercial beak trimmer. The tip of the upper beak can be temporarily removed with nail clippers. After birds are beak trimmed, the level of water and feed in the troughs may need to be increased. Other generally effective preventive measures are to reduce the number of birds per pen to avoid crowding, reduce the light intensity and increase the dietary fiber and grit Japanese quail are territorial and will defend their home against intruders. If two groups of quail are to be combined, put them together in a new cage or pen (Randall and Bolla 2008).

2.1.5. Husbandry

Quail, like other species of poultry kept for commercial purposes, must be given attention and proper care. Environmental conditions should be adjusted according to the climatic conditions and the needs of stock of different ages. Dry food must be available at all times, and drinking water must be clean, cool and readily accessible. Care should be taken when working with the quail, as the birds are will struggle vigorously and easily

startled when caught. Rough handling or excessive may kill them. Disturbances and sudden noises should be avoided. Protection from cats, dogs, rats and predatory birds is essential. If laying hens moved to new quarters, apause in production of 2–3 weeks is likely. Should be avoided introducing new birds into the territory of an established group (Randall and Bolla 2008).

2.1.6. Economic importance to quail birds

Consolation bird's size needs to be small areas in rearing. Lack of rearing costs is a good area for investment. Quick turn over. Characterized by fast growth and higher metabolism and early sexual maturity were mature aged 5-6 weeks. Consumption of feed up to 20 g per day at the production stage. High egg production up to 250-300 eggs / year / female bird. High dressing percentage of up to 76%. A good source of animal protein lows in cholesterol. Disease-resistant compared with chicken. Does not need to intensive vaccination programs, such as chicken. The flesh of the rich sources and excellent in terms of the content of vitamins, minerals, and fatty acids. The advantage Balsafh marble, making it a good taste (Alkhilani et al 2011).

2.1.7. Characterization of quail meat

Quail meat is one of the best bird's meats for the following characteristic –

1. The content of the meat from low fat, therefore, is low in cholesterol, where high cholesterol causes heart diseases.
2. Quail meat characterized by distribution of fat droplets between the meat fibers making it with a good taste
3. Quail meat is soft, Low in fiber, easily chewing and palatable.
4. As a result of domestication of Quail body muscles become tender and soft (Abd-Majeed and Mahrus 2001).
5. Quail meat favored by kids and cook in many ways, which makes it good varieties to eat.

2.1.8. Health benefits of quail meat

1. Quail meat a remedy against digestive tract disorders such as gastritis, stomach ulcer, and duodenal ulcer.
2. May accelerate recuperation after blood stroke and help strengthen heart muscle.
3. Have strong anticancer effects and may help inhibit cancerous growth.
4. Can help cure anemia increasing hemoglobin level and remove toxins and heavy metals from the blood. .
5. Help eliminate and remove stones from liver, kidneys, and gallbladder.
6. If anybody eats quail meat it removed the hardness of the heart (Al-Antaki 2010).
7. Promote good memory, enhance brain activity and regulate the nervous system.
8. Help in the treatment of tuberculosis, diabetes, bronchial asthma, and vegetative-vascular dystopia.
9. Strengthen the immune system slows down the aging of organs and increases the life span. Improve strengthen hair and skin color making it shiny and voluminous. That's why quail eggs are used for facial and hair care masks. If child eats 2 quail eggs daily, they grow up better and are less likely to suffer fro infectious diseases CAD (2011).
10. It's a powerful stimulant of sexual potency. They nourish the prostate gland with useful substances, vitamins, proteins and phosphorus and therefore help restore sexual potency in men.

2.2. Basil

Scientific classification:
Kingdom: plantae
Unranked: Asterids
Order: Lamiales
Family: Lamiaceae
Genus: Ocimum
Species: O.basilicum
Binomial name: Ocimumbasilicum

Basil is possiblynativeto Indiaand has been cultivated there for more than 5.000 years. It was thoroughly familiar to the Greek authors Theophrastus and Discords. It is a hardy annual plant, best known as a culinary herb prominently featured in Italian cuisine, and also plays a major role in Southeast Asian cuisines of Indonesia, Thailand, Vietnam, Malaysia, Taiwan, Laos, andCambodia . Depending on the species and cultivar, the leaves may tastesomewhatlike anise, with a strong, pungent, often sweet smell. Basil leaf (Ocimumgratissimum) is a widely used local plant in the tropics of Africa and Asia for both nutritional and therapeutic purposes. It prefers moist and fertile soils during growth but will tolerate drought after flowering. To ensure more net returns and to minimize high expenditure on feed, many research strategies have been practiced such as introducing feed supplement and feed additives (Christaki and Bonos 2012). (Nweze and Ekwe 2012) concluded that Ocimumgratissimumleaf extracts can be used to improve growth performance, stabilize the blood components and reduce the gut and blood micro-organisms for finishing broilers In Nigeria, basil leaf is found throughout the year, although its yield in the dry season is lower compared to raining season. Utilization of basil leaf in livestock nutrition has not been widely and scientifically exploited. The use of basil leaf in growing pullets will increase the knowledge in the search for the natural herd and reduce a cost of production. Hence, the objective of this project was to evaluate the effect of basil leaf (Ocimumgratissimum) supplement on growth rate and carcass characteristics of growing pullets. Basil is either direct seeded or transplanted and may be propagated by cuttings. Most varieties germinate in 4-6 days and initiate flowering 14 weeks after germination (Darrah 1974). O. basilica (basil) is a tetraploid (2n=48) (Sobti and Pushpangadan 1977), (Ryding 1994). Forms within the species are interfertile, although differences in flower morphology may prevent natural out crossing (Darrah 1974), (Sobti and Pushpangadan 1977), and (Nation et al 1992). Basil is open-pollinated (OP) with honey bees being the most common pollinators (Darrah 1974), (Nation et al 1992). (Darrah 1974) found reduced seed set in manually selfed plants compared Toop plants, but no differences in germination rate, percentage, seedling growth or other indications of inbreeding depression were observed.

Basil is used in pharmacy for diuretic and stimulating properties, in perfumes and cosmetics for its smell, it is a part of many fragrance compositions (Bariaux et al 1992), (Khatri et al 1995). Its oil has been found to be beneficial for the alleviation of mental

fatigue, colds, spasms, rhinitis, and as a first aid treatment for wasp stings and snake. The leaves of basil are also used in folk medicine as a tonic and vermifuge. Also, basil tea taken hot is good for treating nausea, flatulence, and dysentery.

Figure 2.2. Fresh basil leaves

Figure 2.3. Flower of basil

Figure 2.4. Dry basil leaves

Figure 2.5. Powder dry basil leaves

2.2.1. Description of basil

Basil, Ocimumbasilicum, is a short-lived annual or perennial plant in the family Lamiaceaegrown for its leaves, which are used as a herb. The basil plant grows from a thick taproot and has silky green opposite (paired) oval leaves, which grow to be 3–11 cm (1.2–4.3) long and 1–6 cm (0.4–2.4), branching out from the central stem. The plant produces small white flowers, which are clustered on a single spike at the top of the plant. Basil plants are often grown as annuals but may survive for several seasons with some care and can reach heights between 30 and 130 cm (11.8 and 51.2) depending on the variety. Basil may also be referred to as sweet basil, St. Joseph's wort, Thai basil, lemon

basil or holy basil, depending on the variety and is native to India and other tropical regions of Asia.

2.2.2. Nutritional profile for basil

Basil is rich in vitamin K, vitamin C, vitamin A, calcium , potassium, iron, and magnesium. Nutritional value of basil per 100 g (3.5 oz).

Table 2.2. Nutritional profile for basil

Carbohydrates - 2.65 grams
Dietary fiber - 1.6 grams
Vitamin E - 0.80 milligrams
Sodium - 4 milligrams
Choline - 11.4 milligrams
Magnesium - 64 milligrams
Calcium - 177 milligrams
Protein - 3.15 grams
Riboflavin - 0.076 milligrams
Vitamin B6 - 0.155 micrograms
Phosphorus - 56 milligrams
Vitamin A - 264 micrograms
Energy - 94 kilojoules (22 kilocalorie)
Fat - 0.64 grams
Vitamin K - 414.8 micrograms
Zinc - 0.81 milligr
Vitamin C - 18.0 milligrams
Manganese - 1.148 milligrams
Iron - 3.17 milligrams
Water - 92.06 grams
Niacin - 0.902 milligrams
Folate - 68 micrograms
Potassium - 295 milligrams
Thiamine - 0.034 micrograms

2.2.3. Chemical composition and aroma profile of basil

Basil is composed of citronellol, linalool, myrcene, pinene, ocimene, terpineol, linalyl acetate, fenchyl acetate, trans-ocimene, 1, 8- cineole, camphor octane, methyl eugenol, eugenol and beta- caryophyllene (Klimankova et al 2008). The aromatic nature of basil is as a result of the presence of compounds such as 1, 8- cineol, Bergamotene, linalool, methyl eugenol, phenyl propanoids and trans-b-ocimene (Klimankova et al 2008).

2.2.4. Health benefits of basil

1. Acts as an anti-inflammatory.
2. Fights cancer.
3. Contains disease-fighting antioxidants.
4. Contains antimicrobial properties that fight viruses and infections.
5. Promotes cardiovascular health.
6. Fights depression.
7. Helps protect from diabetes and metabolic syndrome.
8. Helps alkalize the body and improve digestion.
9. Can act as a natural aphrodisiac.
10. Fights cancer.
11. Contains antibacterial properties
12. Supports liver function and helps detoxify the body.

2.3. Effect dry basil leaves on production traits

2.3.1. Effect on live body weight and body weight gaine

Today the poultry industry is witnessing a series of problems such as various disease outbreaks, harsh climatic conditions, and a high cost of feeding and day by day decreasing profit margin. Growth is very important trait in broiler production and is defined as an increase in weight per unit of time. Thirty years ago the average weight gain did not exceed 20 g per day. While it recently achieved about 40 g per day (Holeshheimer and Veerkamp 1992). By proper breeding, the time require for broiler

chicks to grow up to 2 kg has been reduced almost to half in the last 30 years, and between 1976 and 2007 it was likely to have reduced by 1 day every year (Turner et al 2005). The success of broiler production depends on maximum weight gain within the minimum period which can be fulfilled by proper nutrition and management practices. (Osman et al 2010), who did not report any significant, influence of dry basil leaf supplement on the relative weights of the carcass at slaughter age in broilers. In another previous experiment, (Abbas 2010) reported that organ weights and carcass characteristics were not affected by supplementing diet with 3g/ kg basil seed.

2.3.2. Effect on feed intake and feed conversion ratio

Feed intake and its efficient utilization are one of the major concerns in poultry industry as feed cost is one of the highest components (60 - 70%) of the total cost of production (FAO 2006). Feed conversion ratio is an index that associates both feed consumption and weight gain (Rosario et al 2007). (Abbas 2010), (Osman et al 2010) and (Onwurah et al 2011) reported that addition of basil leaf and seed to the diet had a beneficial effect on feed intake, and feed conversion ratio. Several researchers have also reported improved body weight, body weight gain, and feed conversion efficiency. Also, feed intake was not significantly ($P>0.05$) different. However, there are numerical differences in feed intake. The slight numerical differences in feed intake of the treatments over the control are in agreement with the Herb Society of (America 2004) which states that basil has appetizing properties. This has a positive implication to feed industries and farmers alike, as the feed miller is interested in profit accrued from bulk sales. Feed conversion and live weight were also found to be significant ($P<0.05$) different. There is the evidence to suggest that herbs, various plant extracts and spices have appetite and digestion, stimulating properties and antimicrobial effects (Kamel 2001). (Al-Kelabi and Al-Kassie 2013) reported that feed intake was affected by the addition of a sweet basil powder. (Amasaib et al 2013) showed the effect of spearmint on feed conversion ratio, which was found to be insignificant in the first five weeks of age, but it is significantly affected by the addition of spearmint in the sixth week. This may be due to change in the environment during this week and increasing of bird’s age.

2.3.3. Effect on blood parameters

Serum biochemistry is a labile biochemical system, which can reflect the condition of the body and the changes happening to it under the influence of external and internal factors. It is possible that both the relatively low and the short feeding period doses may have been implicated in the failure of basil essential oil to reduce plasma triglyceride and cholesterol level. Furthermore, it is well known that the presence or absence of cholesterolemic effects of dietary components in an animal dependson various factors such as breed, age, and gender, and also on the composition of the feed (Toghyani et al 2010). (Abbas 2010) reported that feeding basil seed (3 g /kg) significantly reduced the plasma cholesterol level in broilers.(Osman et al 2010) reported that feeding dietary basil leaves powder for 42 days did not significantly influence the triglyceride level and plasma cholesterol in broilers. However, the use of medicinal herbs has led to improvement intotal protein, albumin and led to lower cholesterol in the blood of birds that fed on diets of these additions. It was the best improvement in the concentration of globulin in the blood of birds fed on a diet of 0.3% basil.

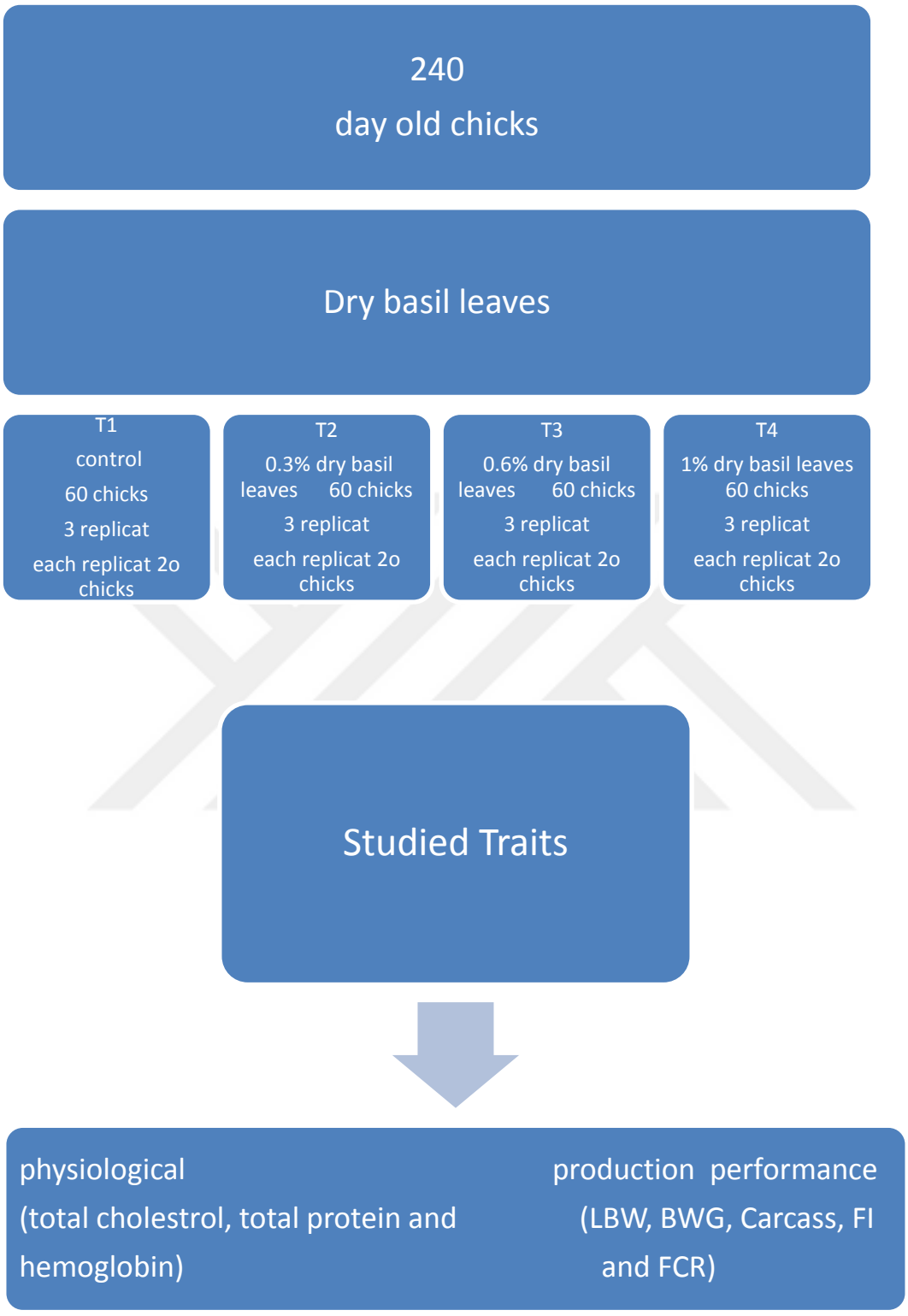
3. MATERIALS AND METHODS

3.1. Experiment location and the material resources

The experiment was carried out in 2016 at the experimental farm of the Faculty of Animal Science, belonging to the Research Station of the Bingol University. Totally 240-day old Japanese quail (male and female) were purchased from a commercial company in Elazığ/ Turkey. On arrival chicks were weighed and randomly assigned to 4 treatments with 3 replicates of 20 birds based on a completely randomized design (Table 3.1.).

Table 3.1. The experiment design of feed

Treatment	Description
T1	The control group chicks fed by the standard diet
T2	Chicks fed S.D include 0.3% Basil
T3	Chicks fed S.D include 0.6% Basil
T4	Chicks fed S.D include 1% Basil


240
day old chicks
Dry basil leaves
T1
control
60 chicks
3 replicat
each replicat 2o chicks
T2
0.3% dry basil leaves 60 chicks
3 replicat
each replicat 2o chicks
T3
0.6% dry basil leaves 60 chicks
3 replicat
each replicat 2o chicks
T4
1% dry basil leaves 60 chicks
3 replicat
each replicat 2o chicks
Studied Traits
physiological
(total cholestrol, total protein and hemoglobin)
production performance
(LBW, BWG, Carcass, FI and FCR)

3.2. Housing quail

Chicks were housed at poultry farm of Animal Science, Faculty of Agriculture, Bingol University, the house, and its equipment were washed, cleaned and prepared to insure proper (Closed) temperature, ventilation, light and humidity for 24 hours before chick's arrival. Chickens were raised in the cage (90*45*20 cm) for 6 weeks. The temperature was controlled by Thermostat. The temperature was ranged between 34-36 °C in the first week of age and reduced by 2°C/week and then kept constant. After that feed and water were introduced to the chicks and provided throughout the experimental period (42 days) the length of 90 cm feeder was applied of per each replicate and two automatic drinkers were placed into each compartment. The basil feed was purchased from commercial feed company, IsaşGıda San. ve Tic. A.Ş. Elazığ city in Turkey. All birds were fed a commercial diet containing 23.90% crude protein and 3025 ME until 42 days of the bird's Table 3.2. Unlimited water was supplied through the experiment. The basil added in diet for each treatment as following:

1. T1 control group chicks fed the standard diet (S.D)
2. T2 chicks fed standard diet include 0.3% basil (3g/kg).
3. T3 chicks fed standard diet include 0.6% basil (6g/kg).
4. T4 chicks fed standard diet include 1% basil (10g/kg)

Table 3.2. The analysis of feed ingredient

Ingredient	Nutrient Value
Manganese	120.000 mg
Iron	80.000 mg
Zinc	80.000 mg
Copper	16.000 mg
Anhydrous calcium iodate	1.250 mg
Selenium	300 mg
Vitamin A	15.000 IU
Vitamin D3	5.000 IU
Approximately analysis	
Corn	57.18%
Protein	23.90 %
Raw cellulose	3.75 %
Crude oil	5.75 %
Lysine	1.40 %
Calcium	1.00 %
Ash	5.68 %
Sodium	0.19 %
Phosphorus	0.50 %
Methionine	0.65 %

IsashGıdaSan.veTic.a.Sh.Elazığ, Turkey

3.3. Source of basil

The sample of basil was obtained commercially from market in Bingol / Turkey and then powdered in Agriculture Faculty laboratory, then after 10 g of basil leaves were analyzed in central laboratory of the Bingol University. As shown in (Table 3.3.).

Table 3.3. Analysis of basil leaf component

Peak	Constituents	RT	Area%
1	Sabinene	14.705	0.68
2	Myrcene	15.277	1.64
3	β-Ocimene	16.770	1.37
4	Eucalyptol	17.091	23.06
5	ϒ-Terpinene	17.926	0.17
6	Linalool	18.956	27.29
7	Fenchone	19.740	0.17
8	Anethole	23.385	28.54
9	Bicycloelemene	25.777	0.16
10	α-Cubebene	26.120	0.19
11	Anethole	26.475	0.28
12	Methyl Cinnamate	27.299	0.48
13	α-Copaene	27.425	0.49
14	Germacrene	27.631	0.16
15	β-Elemene	27.900	2.15
16	α-Bergamotene	28.809	0.42
17	β-Farnesene	29.090	0.38
18	α-Guaiene	29.267	0.84
19	Caryophyllene	29.427	0.25
20	Valencene	30.171	0.53
21	Methyl Cinnamate	30.434	2.88
22	α-Humulene	30.180	0.24
23	Germacrene	31.024	0.20
24	β-Guaiene	31.676	0.34
25	Viridiflorene	31.768	0.21
26	α-Bulnesene	31.928	0.89
27	δ-Amorphene	32.368	0.44
28	γ-Cadinene	32.637	2.07
29	Calamenene	33.135	0.52

3.4. Lighting program

All the bird were raised under 23L:1L lighting regiment through the experiment.

3.5. The measured trait

During the course of the experiment, the effects of dry basil leave supplementation on Japans quail performance and some physiological parameter were studied.

3.5.1. Live body weight and body weight gain

Live body weight was taken weekly by digital scale with 0.1 g sensitivity and recorded for each replicates. The weight gain was calculated by using this equation:

Body weight gain= Body weight at the end of the wk-Body weight at the beginning of the week.

3.5.2. Feed intake and feed conversion ratio

The feed consumption of per replicate was recorded on a weekly basis and cumulatively. The feed conversion ratio of per replicate was calculated at weekly intervals by taking into consideration the weekly body weight gains and the feed consumption of the respective replicate. Feed intake and the feed conversion ratio were calculated by the following equation (Ibrahim 2000), (Naji 2006).

(3.1)

(3.2)

3.5.3. Percentage of carcass part

At 42 days of age, totally 48 quails (2 male and 2 females) were randomly selected and slaughtered for each replication, these birds were starved overnight but the water was given for 8 hours .Their live body weights were taken before slaughter to obtain the live body weight by using a sensitive digital scale. Quails were slaughtered by bleeding the jugular vein then the feather removed manually. Each carcass was separated into breast, thigh and the rest.

3.5.4. Dressing percentage

The dressing percentage was calculated according to the following equation:

Dressing percentage=————————*.100 (3.3)

3.6. Serum and plasma separation (total cholesterol)

At 42 days of age, after 8 hours bird starvation , 5-7 ml blood samples were collected in a non-heparinized tube from 3 male and 3 female in each treatment by puncturing the brachial vein and the blood was centrifuged at speed 4000 r / min for 15 minutes to obtain serum and then stored at -20 C until using. Individual serum samples were analyzed for total cholesterol level by using an automatic analyzer Spectrophotometer machine and record absorbance at 500 nm and the kit Package Manufactured by BIOLABO SA, 02160, Maizy, France. The concentration of cholesterol extracted according to the following equation:

Cholesterol concentration (Result) =————————* SC (3.4)

3.7. Measuring total protein concentration

Protein tested by standard Kit. This kit is based on Package Manufactured by BIO LABOSA, 02160, Maizy, France to estimate the total protein. It is taken three test tubes Standard and Sample and Blank, placed in 1 ml of preparing standard after diluted to 400 ml with distilled water, put in a test tube Sample 0.02 ml of plasma, and tube Standard 0.02 ml of Standard and tube Blank 0.02 ml of distilled water. Left the tubes for half an hour at room temperature and read absorption wavelength of 550 nm and by the way (Henry et al 1974), and by total protein according to this equation:

Total protein concentration(Result)=————————* SC (3.5)

3.8. Blood hemoglobin test

After slaughtering chicks at 42 days of age took blood directly and transferred to capillary glass tube absorbent for hemoglobin purpose and then placed in the centrifuge speed 5000 r/min for 5 minutes to get rid of nuclei and membrane of red blood cells, and then read data by digital caliper.

3.9. Data analysis

Data were analyzed by using SAS, (2005) to account for effects of treatments. The Duncan's multiple range tests will be used to test the significance between means (Duncan 1955).

4. RESULTS

4.1. Effect of basil on the body weight

Table 4.1. Refers to the effect of basil on the live body weight. The treatment had no significant (P>0.05) effect on live body weight at 1st, 2nd, 3rd, and 5th weeks of age, however, among the treatments in terms of gender, there was a significant effect in female and mixed gender at 4th week, of age (P<0.05). There was no significant (P>0.05) effect in female and mixed gender at 6th week of age among all treatments at the ends of the experiment. The highest body weight of male at 5th week was observed in T4 group then followed by T1, T2, and T3 groups, for female at 5th week was observed in T1 group then followed by T4, T2 and T3 groups. The lowest body weight at 5th week of a male was observed in T2 and T3. The lowest body weight at 5th week of female and mixed gender was observed in T3 group then followed by T2, T4 and T1 control groups. While at 6th week of male and mixed gender the highest body weight was observed in T4, and then followed by T1, T2, and T3. The highest body weight of female was observed in T1 and T4 compared T2 and T3. The lowest body weight at 6th week of male and mixed gender was observed in T3 then followed by T2, T1, and T4. The lowest body weight of female was observed in T2 and T3 at the ends of the experiment.

Table 4.1. The effect of different treatments of basil on the body weight in both sexes

Week	Sex	T1 (control)	T2 (0.3%basil)	T3(0.6%basil)	T4 (1%basil)
1	M+F	20.66±0.22^{a}	20.16±0.22^{a}	20.33±0.22^{a}	20.2±0.22^{a}
2	M+F	43±1.11^{a}	43.66±1.11^{a}	46±1.11^{a}	46.16±1.11^{a}
3	M+F	86.43±3.35^{a}	86.83 ±3.35^{a}	95.83±3.35^{a}	96.56±3.35^{a}
4	M	138.17±2.64^{a}	133.00±3.27^{a}	134.53±3.51^{a}	140.46±3.27^{a}
	F	141.12±3.00^{a}	135.86±2.73^{ab}	132.55±2.73^{b}	137.45±2.64^{ab}
	M+F	139.68±2.05^{a}	134.88±2.10^{ab}	133.16±2.15^{b}	138.43±2.05^{ab}
5	M	171.69± 3.21^{a}	164.33±3.97^{a}	164.15±4.27^{a}	175.93±3.97^{a}
	F	179.04±3.33^{a}	176.96±3.03^{a}	173.17±3.03^{a}	178.19±2.93^{a}
	M+F	175.44±2.34^{a}	172.65±2.40^{a}	170.38±2.46^{a}	177.45±2.35^{a}
6	M	182.34±3.82^{ab}	177.53±4.73^{ab}	171.23±5.08^{b}	187.00±4.73^{a}
	F	205.70±4.1^{a}	201.31±3.7^{a}	201.55±3.74^{a}	205.87±3.62^{a}
	M+F	194.27±2.8^{a}	193.20±2.9^{a}	192.16±30^{a}	199.71±2.87^{a}

a, b: means within each row had the different subscript significantly (P<0.05).

4.2. Effect of basil on the carcass

Results of experiment indicated that carcass yields and relative weights (g) of the breast, thigh, of quails at 42 days were not affected by dry basil leaves (Table 4.2.). There were no significant effect (P>0.05) among all treatments and between the sexes in the same treatment. The highest carcass yields, breast, andthigh were observed in T1 group then followed by T2, T3 and T4 groups at the ends of the experiment. The highest carcass percentage of a male was observed in T3 and T4 compared to T1 and T2, while the highest carcass percentage of a female was observed in T4, and then followed by T2, T3 and T1 control group. Thehighest carcass percentage of mixed gender was observed in T4 and T3 compared T1 and T2. The lowest carcass percentage of male, female and mixed gender were observed in T1 group then followed by T2, T4 and T3 groups at the ends of the experiment.

Table 4.2. The effect of different treatments of basil on the carcass in both sexes

Treatment	Sex	Carcass	Carcass %	Thigh%	Breast %
T1	M+F	131.46±4.4^{a}	0.66±0.01^{a}	28.22±1.3^{a}	50.41±1.6^{a}
	M	127.16±5.3^{a}	0.67±0.01^{a}	26.98±1.6^{a}	50.19±2.3^{a}
	F	135.75±7.5^{a}	0.65±0.01^{a}	29.45±2.2^{a}	50.63±2.4^{a}
T2	M+F	129.53±4.4^{a}	0.67±0.01^{a}	27.27±1.3^{a}	48.32±1.6^{a}
	M	124.25±5.3^{a}	0.68 ±0.01^{a}	26.26±1.6^{a}	45.66±2.3^{a}
	F	134.80±7.5^{a}	0.67±0.01^{a}	28.28±2.2^{a}	50.97±2.4^{a}
T3	M+F	125.14±4.4^{a}	0.68±0.01^{a}	26.85±1.3^{a}	46.63±1.6^{a}
	M	118.06±5.3^{a}	0.69 ±0.01^{a}	25.88±1.6^{a}	45.1±2.33^{a}
	F	132.23±7.5^{a}	0.67±0.01^{a}	27.82±2.2^{a}	48.17±2.4^{a}
T4	M+F	128.78±4.4^{a}	0.68±0.01^{a}	27.52±1.3^{a}	47.62±1.6^{a}
	M	125.33±5.3^{a}	0.69 ±0.01^{a}	26.1±1.62^{a}	46.08±2.3^{a}
	F	132.23±7.5^{a}	0.68±0.01^{a}	28.94±2.2^{a}	49.16±2.4^{a}

a, within each column means non-significantly (P>0.05)

4.3. Effect of basil on the feed intake

Table 4.3. Refers to the effect of different levels of dry basil leaves on feed intake. There was no significant (P>0.05) effect on feed intake at 1th, 2th, 4th, 5th, and 6thweeks of age, amongthe T1 (control), T2 (0.3% basil dry leaves) and T4 (1% dry basil leaves) but significant effect (P<0.05) was observed among the treatments at 3rdweek of age. The highest feed intake was observed in T2 group then followed by T3, T4 and control groups at the ends of the experiment. The lowest feed intake was observed in T1 group then followed by T4, T3 and T2 groups at the ends of experiment.

Table 4.3. The effect of different treatments of basil on the feed intake for six weeks

week	T1 (control)	T2 (0.3% basil)	T3 (0.6% basil)	T4 (1% basil)
1	25.7 ±0.00^{a}	25.7 ±0.00^{a}	25.7 ±0.00^{a}	25.7 ±0.00^{a}
2	63.35±1.50^{a}	72.1±2.12^{a}	70.7±1.50^{a}	72.1±2.12^{a}
3	98±1.23^{b}	115.5±1.75^{a}	99.75±1.23^{b}	110.6±1.75^{a}
4	142.1±9.40^{a}	125.3±13.30^{a}	122.85±9.40^{a}	175±13.30^{a}
5	164.5±9.98^{a}	182±14.12^{a}	163.45±9.98^{a}	175±14.12^{a}
6	174.72±5.20^{a}	187.32±7.35^{a}	176.71±5.20^{a}	175.7±7.35^{a}

a, b: means within each line had the different subscript were different significantly (P<0.05)

4.4. Effect of basil on cumulative feed intake

Table 4.4. The effect of dry basil leaves on weekly of cumulative feed intake. The treatments had no significant (P>0.05) effect on cumulative feed intake at 1th, 2th, 3thweeks of age, among the T2 (0.3% dry basil leaves), T3 (0.6% dry basil leaves), T4 (1% basil dryleaves), and T1 (control). The difference was significant effect (P<0.05) at T4 group compared to T2, T3 and T1 control groups at 4th, 5th, 6thweeks at the ends of the experiment. The highest cumulative of feed intake at 5thand 6th was observed in T4 group then followed by T2, T3 and control groups. The lowest cumulative feed intake at 5thweek was observed in T1 group then followed by T2, T3 and T4 groups. The lowest cumulative of feed intake at 6thweek was observed in T2 group then followed by T1, T3, and T4 groups.

Table 4.4. The effect of different treatments of basil on the cumulative feed intake for six weeks

Week	T1(control)	T2 (0.3% basil)	T3 (0.6% basil)	T4 (1% basil)
1	25.7 ±0.00^{a}	25.7 ±0.00^{a}	25.7±0.00^{a}	25.7±0.00^{a}
2	91.26±3.6^{a}	90.56±3.6^{a}	98.96±3.60^{a}	99.2 ±3.60^{a}
3	191.6±10.55^{a}	188.8±10.55^{a}	200.23±10.55^{a}	205.13±10.55^{a}
4	323.66±11.7^{b}	310.36±11.70^{b}	326.93±11.70^{b}	378.5 ±11.70^{a}
5	484.66±16.56^{b}	485.25±16.56^{b}	496.33±16.56^{b}	564.46±16.56^{a}
6	646.31±22.08^{b}	637.86±22.08^{b}	649.29±22.08^{b}	725.31±22.08^{a}

a, b: meanswithineachrow had thedifferentsubscriptweredifferent significantly (P<0.05).

4.5. Effect of basil on feed conversation ratio

The results for feed conversion ratio of the quail were presented (Table 4.5.) These results suggested that the dry basil leaves had significant (P<0.05) effect on feed conversion ratio at 1stweek in T4 group compared T1, T2, and T3, then there was no significant (P>0.05) effect on feed conversion ratio at 2nd,3rd, amongall treatments. There was significant effect at 4th, 6thweeks between T4 and T2. The highest feed conversion ratio was observed in T4 group then followed by T3, T1, and T2 groups, and the lowest feed conversion ratio was observed in T2 group then followed by T1, T3, and T4 groups, at the ends of the experiment.

Table 4.5. The effect of different treatments of basil on feed conversation ratio for six weeks

week	T1 (control)	T2 (0.3%basil)	T3 (0.6%basi)	T4 (1%basil)
1	0.94±0.00^{b}	0.94±0.00^{b}	0.94±0.00^{b}	1.02±0.005^{a}
2	1.52 ±0.07^{a}	1.47±0.07^{a}	1.58±0.07^{a}	1.59±0.077^{a}
3	1.91±0.14^{a}	1.87±0.14^{a}	1.82±0.14^{a}	1.87±0.14^{a}
4	2.15±0.11^{ab}	1.99±0.11^{b}	2.26±0.11^{ab}	2.54±0.11^{a}
5	2.64±0.08^{b}	2.66±0.08^{b}	2.78±0.08^{ab}	3.03±0.08^{a}
6	3.37±0.07^{ab}	3.32±0.07^{b}	3.42±0.07^{ab}	3.62±0.07^{a}

a, b: means within each row had the different subscript were different significantly (P<0.05).

4.6. Effect of basil on the cholesterol

Table 4.6. The effect of dry basil leaves on the total cholesterol. The statistical analysis result showed that the dry basil leaves had no significantly (P>0.05) effect on serum cholesterol at 42 days of age, between the sexes at T2 (0.3% dry basil leaves), T3 (0.6% dry basil leaves), and T4 (1% dry basil leaves) at the ends of the experiment. The difference was significant among all

treatments at the ends of experiment. The highest total cholesterol for female and mixed gender was observed in T4 group then followed by T3, T2, and T1 control groups. The highest total cholesterol for male was observed in T1and T4 compared T2 and T3 groups. The lowest total cholesterol for male and mixed gender were observed in T2 then followed by T1, T3 and T4, but thelowest total cholesterol for female was observed in T1 then followed by T2, T3, and T4 at theends of the experiment.

Table 4.6. The effect of different treatments of basil on the blood cholesterol in both sexes

Sex	T1 (control)	T2 (0.3%basil)	T3 (0.6% basil)	T4 (1% basil)
M+F	173.17 ± 4.71^{bc}	161.89 ± 4.71^{c}	186.41 ± 4.71^{ab}	197.08 ± 4.71^{a}
M	194.34 ± 2.38^{a}	162.62 ± 2.38^{c}	184.05 ± 2.38^{b}	194.93 ± 2.38^{a}
F	152 ± 2.08^{d}	161.16 ± 2.08^{c}	188.76 ± 2.08^{b}	199.23 ± 2.08^{a}

a, b, c, d: means within each row had the different subscript were different significantly (P<0.05).

4.7. Effect of basil on the total protein

Table 4.7. The effect of dry basil leaves on the total protein of Japanese quail. The statistical analysis result showed that the dry basil leaves had significantly (P<0.05) effect on serum the total protein at 42 days of ageamong T4 (1% dry basil leaves), T1 (control) and T3 (0.6% dry basil leaves). The highest total protein of female was observed in T2 then followed by T4, T1, and T3 at the ends of the experiment. The highest total protein of male and mixed gender was observed in T4 then followedby T1, T2, and T3 groups. Thelowest total protein of male, female and mixed gender were in T3 then followed by T1, T2, and T4 groups at the ends of the experiment.

Table 4.7. The effect of different treatments of basil on the total protein in both sexes

Sex	T 1(control)	T2 (0.3%basil)	T3 (0.6%basil)	T4 (1%basil)
M+F	3.96 ± 0.17^{bc}	4.46 ± 0.17^{ba}	3.66 ± 0.17^{c}	4.92 ± 0.17^{a}
M	3.79 ± 0.12^{b}	3.66 ± 0.12^{b}	3.64 ± 0.12^{b}	4.64 ± 0.12^{a}
F	4.14 ± 0.20^{b}	5.25 ± 0.20^{a}	3.68 ± 0.20^{b}	5.20 ± 0.20^{a}

a, b, c: means within each row had the different subscript were different significantly (P<0.05).

4.8. Effect of basil on the hemoglobin

Table 4.8. the effect of dry basil leaves on the serum analysis of Japans quail. The statistical analysis result showed that the dry basil leaves had nosignificantly (P>0.05) effect on serum hemoglobin at 42 days of age between the sexes at T1 (control) and T3 (0.3% dry basil leaves), but at T4 (1% dry basil leaves) had significant (P<0.05) between the sexes. The highest hemoglobin for female and mixed gender were observed in T3 then followed by T4, T1, and T2 at the ends of the excrement. The highest hemoglobin for male was observed in T4 then followed by T3, T1, and T2 groups. The lowest hemoglobin for male and mixed gender was observed in T2 then followed by T1, T3, and T4 groups. The lowest hemoglobin for female was observed in T4 then followed by T2, T1, and T3 groups at the ends of the experiment.

Table 4.8. The effect of different treatments of basil on the hemoglobin in both sexes

Sex	T1(control)	T2 (0.3% basil)	T3 (0.6% basil)	T4 (1% basil)
F & M	52.23 ± 1.64^{ab}	49.85 ± 1.64^{b}	56.75 ± 1.64^{a}	50.26 ± 1.64^{b}
M	53.94 ± 0.95^{bc}	52.11 ± 0.95^{c}	55.54 ± 0.95^{ab}	58.11 ± 0.95^{a}
F	50.52 ± 1.10^{b}	47.58 ± 1.10^{b}	57.95 ± 1.10^{a}	42.41 ± 1.10^{c}

a, b, c: means within each row had the different subscript were different significantly (P<0.05).

5. DISCUSSION

5.1. Effect of basil on the body weight

Herbal plants and their extracted oil were used widely as an alternative to antibiotics as growth promoters for their antimicrobial effect on pathogenic bacteria and stimulating effect for benefit bacteria (Osman et al 2005). The herbal plant could stimulate the digestion system in poultry, improve the function of the liver and increase the pancreatic digestive enzymes. Enhancement of the metabolism of herbal plant proteins and carbohydrates in the major organs would increase the growth rate of these organs (Mellor 2000a) and (Mellor 2000b). The results of this study were in agreement with the finding of (Bahnas et al 2008) who found that the dried peppermint and peppermint oil had no significant effect on live body weight (Çabuk et al 2006) investigated that the herbal essential oil mixture supplementation of the diet had no effect on live body weight of the broilers at 21 and 42 days of age also. And our results are also in agreement with the finding of (Çabuk et al 2006) in the importance effect of active substances in the aromatic plants (cinnamate and eugenol) and the medicinal as an active substances and digestive stimulators, also its effect as antimicrobials, especially the intestinal microbes that located in the digestive system. Our result disagreement with (Murray et al 1999) reported that the improvement in body weight may be due to the presence of fat soluble, essential fatty acids and unidentified factors in a medicinal and aromatic plant, or due to stimulating effect on the digestive system of broilers (Hernandez et al 2004). Such improvement may be due to the anti-spasmodic and carminative properties of therapeutic and anti spasmodic, similarly antipyretic, stomachic antioxidant and antimicrobial activities of basil (Hussain el at 2008).Using the ratio of peppermint and basil showed no significant effect on broiler performance, butit is not an effect of harmful. The addition of peppermint to the diet could be an alternative to the use of antibiotics as a growth parameter in poultry production. But our results are in agreement with those (Ceylan and Çiftci 2003), (Gunalet al 2006), and (Eseceli et al 2010), who reported that the

supplementation of an antibioticora probioticgrowth parameter did not have any effect on weight gain and feed conversion ratio. The results showed that probiotic did not have any significant effect on performance in different periods. According to (Nunes et al 2012), probiotic do not always have positive outcomes in relation to weight gain and feed conversion of poultry; this is due to several variables, poultryhealth, duration of poultry house downtime and environmental contamination levels.This result disagrees with (Rabia 2010), who reported that chicks fed basil diets had significantly heavier body weights than those fed fenugreek diets and the control. They increased as inclusion level increased. This could be attributed to the presence of essential oils in basil. Our result is in disagreement with (Onwurah 2011), who reported that chicks fed basil diets had significantly different on body weight .The herbal plant could stimulate the digestion system in poultry, improve the function of the liverand increases the pancreatic digestive enzymes. Enhancement of the metabolism of herbal plantcarbohydrates and proteins in the major organs would increase the growth rate of these organs (Mellor 2000a) and (Mellor 2000b). The result was also in agreement with the findings of (Cross et al 2002) and (Bahnaset al 2008) who showed that the dietary supplementation of broiler and quail caused no significant differences in live body weight while organic acids caused significant differences at 42 days of age when compared with control.

5.2. Effect of basil on the carcass

Our result on carcass traits is in agreement with those of (Osman et al 2010), who did not report any significant influence of dry basil leaf supplement on the relative weights of the carcass at slaughter age in broilers. In another previous experiment, (Abbas 2010) reported thatorgan weights and carcass characteristics were not affected by supplementing the diet with 3g/kg basil seed. This result is in agreement with the results of (Ceylan and Çiftci 2003), (Chowdhury et al 2009) and (Eseceli et al 2010), who reported that there was no significant effect on carcass weight in broiler chicks fed a diet supplemented with avilamycin. Similarly, (Saleh 2014) reported that supplementation with avilamycin as an antibiotic did not significantly affect the liver weight of broilers. (Azadegan Mehr et al 2014) found no significant differences in carcass traits among a medicinal plant group, a probiotic group, and a control group. Similar results were observed in the study of (Nunes et al 2012) with the addition of probiotics to broiler diets.

Antimicrobial properties of basil essential oil ingredients such as methyl chavicol and pinenehave been shown in various papers (Sokovic and Van Griensven 2006), and (Hanifetal 2011).

5.3. Effect of basil on the feed intake and feed conversion ratio

Even though additional basil in the diet did not affect feed conversion ratio significantly in this study, chicks fed the diets supplemented with basil at levels 3 g/kg had the best feed conversion ratio value at the two ages as compared to control groups. These results agree with the finding of (El-Gendi et al 1994) who indicated that there was an improvement in feed conversion with feeding herbal products as feed additives that could be attributed to their effect on improving the digestibility of dietary protein in the small intestine. (Abbas 2010), (Osman et al 2010) and (Onwurah et al 2011) reported that addition of basil leaf and seed to the diet had a beneficial effect on feed intake, and feed conversion ratio. Our results agreed with the finding of (Nweze and Ekwe 2012), who found no difference in the performance of broilers when basil extract was supplemented in diets. Broiler fed basil, parsley and fenugreek seeds had the lower feed intake value during 42 days of age while there are insignificant differences appeared when chicks fed fenugreek seeds during 21 days as compared with control groups. The improvement in feed intake with the addition of aromatic plant could be due to essential oils and their main component, which stimulated the appetizing and digestive process in animals (Çabuk et al 2003). Our result is in disagreement with (Onwurah 2011), who reported that chicks fed basil diets had significantly different. The improvement of body weight gain and feed conversion are due to the active materials found in herbal, causing greater efficiency in the utilization of feed, resulting in enhanced growth. There was an evidence to suggest that these herbs, spices, and various plant extracts especially mints have a good test that increases the appetite and digestion stimulating factors, in addition to their antimicrobial activity against bacteria found in the intestine (Çabuk et al 2003) and (Hernandez et al 2004) in broilers.

5.4. Effect of basil on the cholesterol and the total protein and hemoglobin

Our finding was agreement with the finding of (Narimany et al 2011) said that the mixture of mentha, zizphora, and peppermint powder did not have any considerable

effects on broiler plasma biochemical measures such as total cholesterol, triglycerides, and glucose. (Osman et al 2010) reported that feeding dietary basil leaf powder for 42 days did not significantly influence triglyceride level and the plasma cholesterol in broilers. However, (Abbas 2010) reported that feeding dietary basil seed (3g /kg) significantly reduced the plasma cholesterol level in broilers. The results obtained do not agree with those reported by (Azadegan Mehr et al 2014) and (Hussain et al 2008). Serum biochemistry is a labile biochemical system which can reflect the condition of the body and the changes happening to it under the influence of external and internal factors. It is possible that both the short feeding period and the relatively low doses may have been implicated in the failure of basil.

Essential oil to reduce cholesterol and plasma triglyceride level. Furthermore, it is well known that the absence or presence of cholesterolemic effects of dietary components in an animal depend on various factors such as breed, age, and gender, and also of the composition of the feed (Toghyani et al 2010). Our finding is in agreement with the finding of (Narimany et al 2011) when said that the mixture of mentha, zizphora and peppermint powder did not have any considerable effects on broiler plasma biochemical measures such as total cholesterol, triglycerides and glucose. Our result is in disagreement with (Onwurah 2011), who said that basil (Ocimum Basilicum L.) had significantly different on coccidial infection, Hematological, and blood parameters in broiler chicks. (Bahie et al 2009) who studied of some performance and blood constituent’s traits in Japanese quail observed that total protein values of quail decreased with progressing age and increased the onset of egg production. Total protein including albumin and globulin indicates the body defense mechanism.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The results of the present study showed that dry basil leaves had no significant effect on Japanese quail performance, probably due to the composition of basal diet and hygienic conditions of the experiment. Even though not significant, Using 0.3% dry basil leaves improve feed intake, decrease of total cholesterol and improve total protein. Using 1% dry basil leaves group seemed to have a beneficial effect on most of the performance traits (live body weight, cumulative feed intake).

Recommendations

1. For the better production performance we recommend the use of 0.3% dry basil leaves and wait until 8 weeks of age to obtain the better production in Japanese quail.

2. More research is necessary to characterize the medicinal and aromatic plants like basil its fresh, dry herb, and the essential oil is an important which is used as a food additive because basil is antibiotic and herbal plant, it is rich vitamin (K, C, A) calcium, potassium, iron, and magnesium.

3. The attention of the Ministry of Agriculture to increase the production of species of herbs and its oil, because it contains important ingredients, which is used for medicinal purposes.

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BACKGROUND

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