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Short Communication

The Influence of two medicinal feed additives (Coriander seeds and dry Peppermint leaves powder) in commercial feeds on the blood cholesterol and triglycerides of broiler chickens

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A B S T R A C T

The current experiment was constructed to performed the influence of two medicinal feed additives (Coriander seeds and dry Peppermint leaves powder) on the blood cholesterol and triglycerides of broiler chickens. In present experiment a total number of 90-day old broiler chicks (Ross308) were randomly assigned in the form of a completely randomized design (CRD) into five dietary treatments with three replicate pens (6 birds/pen). The experimental treatments were: (T1) the control diet (only commercial broiler feeds), treatments 2,3,4 and 5 respectively included control diet plus (1.5%+2.5%), (2%+2%), (2.5%+1.5%) and (1%+3%) coriander seeds and dry peppermint leaves powder per kg of diet. Biochemical parameters were determined at the end of experimental period (on 35th day of age). The results of this study have shown that, except uric acid other blood serum parameter concentrations were considerably decreased by (coriander seed and peppermint leaves powder) than the control group ($P<0.05$). Present study recommended that inclusion of 1% coriander seed and 3% dry peppermint leaves powder in per kg of broiler commercial feeds as a feed additive, significantly decreased blood parameters and caused decreased of cholesterol, glucose and triglyceride in the broiler chickens.

Introduction

Most medicinal herbs, spices, seeds, and aromatic plants play indispensable roles in making palatable of feed, smell, flavor, stimulate, digestible, and also have health benefits for animals and people. Hence, most of researcher effort to evaluate the use of herbal and plant extracts as feed additives to enhance performance and control gut health in poultry.

At present time, most of consumer's need to eat safe and healthy animal products specially poultry meats. Therefore, coriander seeds and dry peppermint leaves powder are the best medicinal feed additives that have significantly reduced the cholesterol and triglycerides of broiler chickens.

Some studies suggested that, plants and their extracts are photobiotic or phytogenic it can be used in animal traditional and alternative medicine (Kuralkar & Kuralkar, 2021). Medicinal feed additives have also been used in the treatment of several metabolic diseases (Barbalho *et al.*, 2011). Herbs and spices have recently shown as alternatives to antibiotics in animal and poultry production (Hosseinzadeh *et al.*, 2014) and therefore, these herbs and spices could be effectively utilized in poultry feed as feed additives (Khubeiz & Shirif, 2020; Soha, 2013). Thus, (Rahman *et al.*, 2021) reported that, various types of phytogenic products like: mentha, coriander, cinnamon, anise, garlic, oregano, chili, pepper, rosemary, rosehip and thyme can be used as additive in poultry.

(Naeemasa *et al.*, 2015) suggest that, coriander powder in the feed and coriander extract in drinking water could replace

synthetic antibiotics and could be regarded as natural feed additives and growth promoters in poultry diets. It has been used referred to as anti-parasitic, antiseptic, hypocholesteremia, antidiabetic, antioxidant (Abdullah Wafaa Sameer, 2018), diuretic, sedative, anthelmintic effect (Taha *et al*., 2019) and glucose, cholesterol, triglyceride lowering (Hafeez *et al*., 2021). According to the result of (Dhanapakiam *et al*., 2008; Hosseinzadeh *et al*., 2014), they stated that, coriander extract or powder can be used as antibiotic alternative in broiler feeds. Moreover, observed, birds that have received coriander extract in water (Hosseinzadeh *et al*., 2014) and 1-2 % coriander seeds in feeds (Al-Jaff, 2011) significantly ($P < 0.05$) decreased serum glucose and serum cholesterol concentration compared to the control birds.

Peppermint (Mentha piperita) is a member of the Labiate family and one of the world's oldest medicinal herbs (Asadi *et al*., 2017), these herbs planted in Europe, North America, Canada and other regions (Darabighane *et al*., 2017). It has been used in food, flavor, cosmetic, and pharmaceutical industries (Asadi *et al*., 2017), possess certain anti-oxidant, anti-tumor, anti-allergic, anti-viral and anti-bacterial properties (Abbass & Abid, 2023; Darabighane *et al*., 2017). (Mohanty *et al*., 2021) have shown that, supplementation of peppermint powder have decreased serum cholesterol and glucose levels among other treated groups that have not received such supplement. In addition, supplementation of mentha extract in the feed of laying hens (Abdel-wareth & Lohakare, 2014) and in drinking water decreased plasma total cholesterol, triglyceride, low density lipoproteins (LDL), and liver synthesis of lipid in broiler chickens.

With all these beneficial properties of coriander seeds and dry peppermint leaves powder, no or limit research reports are available about the medicinal feed additives in poultry nutrition especially on the blood cholesterol and triglycerides of broiler chickens. Therefore, the objective of this study was to investigate the Influence of two medicinal feed additives (Coriander seeds and dry Peppermint leaves powder) in commercial feeds on the blood cholesterol and triglycerides of broiler chickens.

Material and Methods

This research was conducted at the Agriculture research farm of Animal Science Department, University of Shaikh Zayed Khost, during summer months to study the effect of inclusion different levels of coriander seeds and dry peppermint leaves powder on blood cholesterol and triglycerides of broiler chickens. Day-old chicks were obtained from a dealer of Khost Province. In this experiment, a total of 90 unsexed one- day broiler (Ross308) were allocated in the form of a completely randomized design (CRD) into five treatments from 11-35 days of age, with three replicate pens (6 birds/pen). The experimental treatments were: (T1) the control diet (only commercial broiler feeds), treatments 2,3,4 and 5 respectively included control diet plus (1.5%+2.5%), (2%+2%), (2.5%+1.5%) and (1%+3%) coriander seeds and dry peppermint leaves powder per kg of diet.

Coriander seeds and dry peppermint leaves powder were purchased from the local market of Khost Province, both coriander seeds and peppermint leaves powder were mixed with commercial broiler feeds. The birds had free access to feed and water throughout the experimental period. Birds were received two types of commercial broiler feeds, the first was grower that had been feeding from the (11-20 days' age), afterwards finisher that had been feeding from (21-35 days' age). The initial brooding temperature was held at 32 – 33 ºC for the first week, then gradually lowered to 24 – 26 ºC by the end of the experiment. Chicks were kept in floor cages under similar management and hygienic system in a close house. Biochemical parameters like: blood glucose, cholesterol, triglycerides, and uric acid were determined at the end of experimental period (on 35th day of age).

All blood samples were gathered randomly from the wing vein of each replicate using a 5–ml syringe and were drawn into a simple test tubes without anticoagulant. After that serum samples were centrifuged for 5 minute/3500 rpm. The blood serums were analyzed for estimated concentration of glucose, cholesterol, triglycerides, and uric acid by using (Diasys company) kits. All serums were determined by BTS-350 semi-automatic analyzer machine. The assay was carried out according to manufactured protocols. The data were analyzed by using the General Linear Models (GLM) procedure in the SAS software (Statistical Analysis System, version 9.4, 2015). Significant differences among the treatment of means were declared at ($p<0.05$) using Duncan's Multiple Range Test.

Result and Discussion

The influence of two medicinal feed additives (coriander seeds and dry peppermint leaves powder) in commercial feeds on some of the serum blood parameters of broiler chickens at the end of experimental period (on 35th day of age) were presented in (Table 1). The results of this study have revealed that, coriander seeds and dry peppermint leaves powder in the broiler commercial feeds except uric acid the other serum parameters were significantly ($p<0.01$) decreased than the control group. In current study, the treatments birds (T2, T3, T4 and T5) were significantly ($p<0.01$) lowest glucose, triglyceride and cholesterol compared with the control birds. In addition, no statistical differences ($P>0.01$) were found in glucose, triglyceride and cholesterol between the (T2, T3, T4, and T5) treatments.

Table 1. The Influence of two medicinal feed additives (Coriander seeds and dry peppermint leaves powder) in commercial feeds on the blood cholesterol and triglycerides of broiler chickens at the end of finisher period 35 d of age.

Treatments	Blood Parameters			
Dietary Feeds	Glucose (mg/dl)	Triglyceride (mg/dl)	Cholesterol (mg/dl)	Uric Acid (mg/dl)
T1 Control (Commercial Feed)	212.500^{a}	134.500^{a}	151.000^{a}	4.1200
T2 (1.5+2.5)	180.500^{bc}	121.000^{ab}	128.000^{b}	3.2950
T3 (2+2)	191.200^{b}	127.500^{ab}	119.500^{b}	3.3350
T4 (2.5+1.5)	189.100^{bc}	111.000^{b}	117.000^{b}	3.3950
T5 (1+3)	172.000^{c}	116.000^{b}	128.500^{b}	3.5650
P-value	0.0141	0.0428	0.0131	0.1005
SEM	4.8621	4.6797	4.2308	0.1811

$^{a-c}$Similar letters in the same column indicate no significant different between the means in Duncan's test at the error level of 0.05%. SEM: standard error of mean. [1]Abbreviations: T1: control only commercial feed (without coriander seed and dry peppermint leaves), T2: commercial feed+(1.5% coriander seed+2.5% dry peppermint leaves), T3: commercial feed+(2% coriander seed+2% dry peppermint leaves), T4: commercial feed+(2.5% coriander seed+1.5% dry peppermint leaves), T5: commercial feed+(1% coriander seed+3% dry peppermint leaves).

Consequently, cholesterol and triglyceride were significantly ($p<0.05$) lowest by treatment four (T4) which was included (2.5% coriander seed+1.5% dry peppermint leaves powder) among the other treatments. Our result has shown that, included of coriander seeds and dry peppermint leaves powder as a feed additive in broiler commercial feeds decreased the concentration of cholesterol, triglycerides, glucose and uric acid in broiler chicks.

These findings are supported by the results of (Abbass & Abid, 2023) who illustrated that, dietary peppermint, fenugreek and their mixture on biochemical traits of broilers under heat stress had significant effect ($p\leq0.05$) on total cholesterol, triglycerides and low density lipoprotein (LDL). However, the findings of current study agreement with the study of previous researchers who verified that, use of herbs and spices and their extracts in the broiler diets caused the lowest amount of blood cholesterol, triglycerides and glucose in broiler chicken compared to the normal feeds (AL-Zuhairi Zahira Abul-Jabbar *et al*., 2018; Ameri *et al*., 2016; Gazwi *et al*., 2022; Hosseinzadeh *et al*., 2014).

On the other hand, (Kumar *et al*., 2014) reported that, Herbal feed additives play a significant role in health and nutrition. Moreover, (Barbalho *et al*., 2011) indicated that, use of peppermint in the form of juice for humans can be reduced the glycaemia, total cholesterol, triacylglycerides and blood pressure.

Parallel to the findings of the present study, (Gazwi *et al*., 2022; Saeid & AL-Nasry, 2010) observed that, the level of 0.3% coriander seeds significantly decreased the concentration of cholesterol and triglycerides in broiler chicks. In this respect, (Ameri *et al*., 2016) found that peppermint extract and also coriander seeds (Soha, 2013) at the different level (0.2, 0.4, and 0.6 %) significantly decreased the concentration of cholesterol, triglycerides, and serum LDL-cholesterol in broiler chicks.

This decrease of serum cholesterol, glucose, and triglycerides could be attributed to the anti-hyperglycaemic action, and presence of phenolic compounds in the coriander seeds and dry peppermint leaves powder like: menthol, menthyl acetate, menthofuran, limonene, polygene, cineole, and azolen.

Conclusion

The results of the present study have shown that, inclusion of coriander seeds and dry peppermint leaves powder as a feed additive in broiler commercial feeds decreased the concentration of cholesterol, triglycerides, glucose and uric acid in broiler chicks. Consequently, inclusion of 1% coriander seeds and 3% dry peppermint leaves powder in per kg of broiler commercial feeds as a feed additives during the grower and finisher period of broiler chickens, caused decreasing of cholesterol, glucose and triglyceride.

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