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Supplementation of poly herbal and brown sea weed on carcass characteristics and serum biochemistry in broiler chickens

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Abstract
A biological study was carried out to investigate the effect of dietary incorporation of polyherbal and brown sea weed on the performance, carcass characteristics and serum biochemistry in broilers. A total of 360 newly hatched straight run broiler chicks were randomly divided into three treatment groups with three replicates of 40 chicks each per treatment. The chicks were fed with four experimental diets; Control diet, Control + 0.01% Poly herbal (T_1), Control+ 0.1% brown sea weed (T_3). The experiment was carried out for six weeks with standard managemental Practices. The eviscerated carcass weight, giblet weight and Ready-to-cook yield showed significantly (p<0.05) higher in birds fed with 0.01% poly herbal supplemented treatment group and there was no significant difference in pre slaughter weight and de bleeding weight. Intestinal length was significantly (p<0.05) higher in T_2 treatment group. Dietary inclusion of poly herbal and seaweed significantly (p<0.05) reduced total protein, glucose and cholesterol and there was no significant difference was observed in Triglycerides, ALT, AST, Albumin, urea and creatinine. The supplementation of polyherbal and brown sea weed resulted in reduced cholesterol level in serum, increased intestinal length and improved carcass characteristics in broiler chicken.

Keywords: Poly herbal, sea weed, broilers, intestinal length, carcass characteristics, serum bio chemistry

Introduction
Poultry industry has established its position as a faster growing segment in the agricultural sector with the total poultry population of over 729.20 million. In recent years, there has been tremendous growth (12 percent annual growth rate) in Indian broiler industry. India ranks third in egg and fifth in meat production. About 5.23 and 2.50% of world's egg and meat production was contributed by India.
Broiler meat is a quality item in human diet, which contributes around 35 percent of the total animal protein. Profitable broiler farming is highly specialized business which is affected by a large number of factors. Feeding management is one of the most important aspects in broiler production. The poultry sector is using various synthetic components for improvement of bird's production performance, meat quality and control of diseases. Maintenance of health and protection against diseases addition of antibiotics in to the poultry feed is commonly practised, nowadays for reducing the usage of antibiotics, we are searching for alternative antibiotics growth promotors (Yadav *et al*., 2016) [1] such as enzymes, pro and prebiotics, photobiotic in the mono gastric animal's diet (Wink, 2003) [2]. Brown Sea weed have a wide range of bioactive components (Wijesekara *et al*. 2011) and rich in vitamins and balanced essential amino acids which are essential for production and health. With many biological activities like antioxidant (Chandini *et al*. 2008) [4], anti-viral (Artan *et al*. 2008) [3], anti-inflammatory (Kim *et al*. 2009) [5]. In the present study, the supplementation of poly herbal and seaweed is assessed whether they could influence the serum biochemical parameters and carcass characteristics in broilers.

Materials and Methods

Location and climate

A biological experiment was designed and conducted during the month of April and May 2024 at (10°39'42.1"N 77°09'37.0"E) Livestock Farm Complex, Veterinary College and Research Institute, Udumalpet, Tirupur, Tamil Nadu.

Biological experiment

Period of study

The experiment was conducted in broilers from day old to five weeks of age.

Experimental birds

One day-old straight run broiler chicks obtained from a commercial broiler hatchery at Coimbatore were utilized for the biological trial.

Experimental design

An experiment was conducted by using 360-day old straight run commercial broiler chicks. These chicks were randomly divided into three treatment groups with three replicates of 40 chicks each per treatment. All the birds were reared under standard management practices up to six weeks of age. The experimental feed was prepared by adding Poly herbal (0.01%), Seaweed (0.1%) as detailed below all treatment groups were fed with treated broiler pre-starter, starter and finisher diet (BIS, 2007) up to the end of the experimental period (42 days). The treatment groups of the experiment were as follows:

The treatment groups of the experiment were as follows:

S. No	Dietary Treatment	No. of birds/Treatment
1	Control (basal diet)	120
2	Basal diet + Poly herbal (0.01%)	120
3	Basal diet + Seaweed (0.1%)	120

Collection of data

At the end of the feeding trail 9 birds/ treatment were randomly selected, weighed and slaughtered by cervical cutting after 12h fast. After slaughter pre-slaughter weight, debleeding weight, eviscerated weight, ready to cook weight, giblet weight was recorded.

Carcass characteristics

At the end of the experimental period (42^{nd} day), totally 9 birds per treatment group were randomly selected, blood samples were collected for analysing the serum biochemical parameters and slaughtered as per the method of Arumugam and Panda (1970) [14]. The pre-slaughter weight, de-bleeding weight, eviscerated carcass weight; giblets weight (Heart without pericardium, liver without gall bladder), ready-to-cook yield were recorded.

Biochemical profile

Separated serum was subjected to blood biochemical test, viz. serum total protein, total cholesterol, triglycerides, glucose, albumin, urea, creatinine, alanine transaminase, (ALT) and aspartate transaminase (AST) by using standard commercial kits (Cogent, SPAN diagnostic Ltd, India) (Kumar and Krupakaran 2014) [15].

Statistical analyses

The data obtained were subjected to one-way ANOVA using SPSS version 20.0 and the means were compared for significance using Tukey's multiple range test.

Results and Discussion

Carcass characteristics

The carcass characteristics were influenced by dietary supplementation of polyherbal and brown sea weed at the sixth week of age as presented in Table 1. The eviscerated carcass weight (1576.78 g), giblet weight (91.00 g) and Ready-to-cook yield (1627.89 g) were significantly (p<0.05) higher in birds fed with 0.01% poly herbal supplemented treatment group and there was no significant difference noticed in pre-slaughter weight and de bleeding weight. The result was in accordance with the findings of Chavan *et al*., 2022 [16]. They reported that supplementation of different levels (0.07%, 0.1% and 0.13%) brown sea weed to broilers diet showed significantly (p<0.05) higher values of eviscerated yield, ready-to-cook yield and giblet weight. Addition of Brown sea weed in to the broiler diets significantly improved broiler carcass traits Kumar, 2018 [6]; Mohammdigheisar *et al*. 2020 [8]; broiler quail (Hafsa *et al*. 2019) [7] and Turkey (Abdel-Ghany *et al*. 2020) [19]. Based on the results of present study higher value of carcass trait might be due to presence of secondary metabolites, which might be helpful for ideal environment to the gastro intestinal tract, increasing intestinal cell permeability for better utilization of nutrients, in that way increasing body weight and carcass trait. The result was contrary to the finding of Mahata *et al*., 2023 [10].

Intestinal length

The mean (±SE) intestinal length at the 6^{th} week of age as influenced by dietary supplementation of polyherbal and brown sea weed as furnished in Table 3. Intestinal length differs significantly (p<0.05) between the dietary treatment group. The higher in T_2 treatment group.

Serum biochemical

The findings related to serum biochemical are present in table 4. Dietary inclusion of poly herbal and seaweed significantly (p<0.05) reduced total protein, glucose and cholesterol and there was no significant difference observed in triglycerides, ALT, AST, Albumin, urea and creatinine. In our result was similar with the finding of Kumar, 2018 [6] and Chavan *et al*., 2022 [16]. They supplemented different levels (1%, 2%, 3% and 4%) brown sea weed to broiler diet and observed that higher dose of brown sea weed fed group showed significantly (p<0.05) reduced plasma cholesterol level. Brown sea weed had the properties of hypocholesterolemic activity due the presence of active ingredients such as saponin, hemicellulose, tannin *etc*. which may be helpful to reduce the blood cholesterol level by bile salts inhibition (Mukhtar, *et al.*, 2013a) [9]. Supplementation of *Licorice* in drinking water to broilers reduced cholesterol level (Naser, *et al*., 2017 and Sharifi, *et al*., 2013) [11, 12]. *Licorice* having the properties of inhibition of lipid peroxidation, lipoxygenease and cyclooxygenase enzyme activities as well as reduction of LDL oxidation. It contains active components of saponin and pytosteroids reduce the level of LDL associated carotenoids, inhibit the formation of lipid peroxidase and enhance the conversion of cholesterol to bile acids. Our findings contradicts with that of Mukhtar *et al*., 2013a [9]; Choi *et al*., 2014 [17], who reported that increased level of glucose and total protein in broilers. Supplementation of *Licorice* powder (0.5%, 1%, 1.5% and 2%) to layers did not show any significant result in blood parameters (Shahryar *et al*., 2018) [13].

Conclusion
From the current study, it could be concluded that dietary incorporation of poly herbal and seaweed reduced serum cholesterol level, improved carcass characteristics exhibited beneficial effect on reducing serum cholesterol, higher eviscerated carcass weight percentage and ready to cook yield in broiler chickens.

Conflict of Interest
Not available

Financial Support
Not available

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