HEMATOLOGICAL, BIOCHEMICAL, IMMUNOMODULATORY AND GROWTH PROMOTING EFFECT OF FEED ADDED WILD MINT (*Mentha longifolia*) IN BROILER CHICKS

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ABSTRACT

A research study was conducted at Peshawar to investigate the effect of Habek mint on the hematology, immunity and overall performance of broilers. One hundred and sixty day-old broiler chicks were purchased from a local hatchery and divided into four groups (A, B, C and D; each group representing four replicates with 10 chicks per replicate). Group A, B and C were respectively given Habek mint in feed at the rate of 5, 10 and 15 g/kg of feed and group D was kept control. Mean body weight, dressing percentage, gross return, heart weight, antibodies titer against IB was significantly (P<0.05) higher for broilers in group C. Mean feed and water intake, thigh, breast, gizzard and liver weight, abdominal fat deposition, feed cost, packed cell volume (PCV), Total leukocyte count (TLC), hemoglobin, albumin and protein levels were not significantly influenced by feeding mint to broilers. Findings of the present study suggested that feeding habek mint @ 15g/kg feed, improved growth performance, FCR, immunity and gross return of the broilers. Improvement in immunity of the broilers by feeding mint suggested that further investigations on mint would be better option to study status of various responses to variety of infectious diseases in broilers.

Key Words: Broilers, Growth Promotant, Immunostimulant, Wild mint

Citation: Durrani, F.R., Abidullah, N. Chand, Z. Durrani and S. Akhtar. 2008. Hematological, biochemical, immunomodulatory and growth promoting effect of feed added wild mint (*Mentha longifolia*) in broiler chicks. Sarhad J. Agric. 24(4): 661-664.

INTRODUCTION

Antibiotics are mostly used at sub therapeutic level to improve the production performance of poultry birds. However, consistent use of antibiotic will not only lead to various health issues, could be a major contributors to higher feed cost. Thus, it's imperative to sort out alternatives that could effectively and economically substitute antibiotics. Emphasize on herbal use as growth promoter and preventive remedies for several infections in poultry birds could be the best possible sources under subtropical environment that could result in economic and healthy gains keeping in view their easy availability and effective use as medicinal plants in large animals and human beings. Several herbal sources have been effectively in poultry production for better gains and health chicken production. Mentha species of the family labiatae are one of them, well known traditional medicines (Lewis and Lewis, 1977) that have been effectively used in broiler production. Wild mint (*Mentha Longifolia*) known as horse or habek mint, has too often been used in domestic herbal remedy, being valued for its antimicrobial, antiseptic, antispasmodic, choleratic, carminative and central nervous system, stimulant properties and its beneficial effects on the digestion (Chopra et al., 1986; Foster and Duke, 1999; Grieve, 1981). The major compounds in mint are carvone (67.3%), limonene (13.5%), I, 8-cineole (5.4%), menthone (2.9%), linalool (2.8%) and isomenthone (1.2%) that exhibit strong antibacterial and antioxidant activities.

The active virtues of the Habek mint depend on the abundant volatile oil, which contains a hydro carbon thymol and higher oxygenated compound. Mint was expected to produce similar results in broiler production, the present study would therefore, be an effort to investigate the effect of mint, on overall production and economic performance and immunity, hematological and biochemical parameters of the broilers fed various levels of mint in feed as supplement.

MATERIALS AND METHODS

Experimental Design

One hundred and Sixty (160) day-old broiler chicks were obtained from a local hatchery. The chicks were randomly divided into four groups A, B, C and D. Each group comprised four replicates and 10 chicks per replicate. Chicks were reared in separate pens in an open sided house under similar management conditions. The trail lasted for 35days, during which strict insecurity and sanitation measure were taken.

Dried habek mint was ground with a grinder and mixed in poultry feed, manually at the rate of 5, 10 and 15g per Kg feed for the chicks in to group A, B and C respectively. Chicks in group D were offered feed without mint (Control group).

DATA COLLECTION AND ANALYSIS

Data were recorded for body weight gain, feed intake, water intake, dressed weight, antibody titer against infectious bursa (IB) using ELISA as described by and Marquardt *et al*. (1980), hematological parameters including hemoglobin concentration, packed cell volume (PCV), white blood cell (WBC) counts (Benjamin, 1978), biochemical parameter i.e. (proteins and albumin) was worked out.

The data was statistically analyzed with the standard procedures of analysis of variance (ANOVA), using randomized complete block design. Means were compared by least significance differences (LSD) as suggested by Steel and Torri (1981). The statistical packages MSTAT- C was used to perform the above analysis on computer.

RESULTS AND DISCUSSION

Body Weight, Feed Intake and Feed Conversion Ratio

Mean delivered body weight is given in Table I. Significantly ($P<0.05$) higher body weight was recorded in broilers in group C fed Habek Mint @15 g/kg feed as compared to group D. No significant difference was observed in feed intake of treated and untreated groups (Table I). Iscan *et al*. (2002), Hagazi (2003) and of EL-Deek *et al*. (2001) also reported similar findings while findings of Esonu *et al*. (2006), Durrani *et al*. (2007), Mehmet *et al.* (2005) and Hernandez *et al.* (2004) were contrary to the present investigation. Although, differences in feed intake were not significant, the significantly better feed conversion ratio of broilers in group C, suggested better utilization of the feed and improved performance of broilers, that's also evident from the findings of Sharma *et al*. (1998) who linked feeding mint to broilers with increased enzymatic activities. Raman *et al.* (1996) also reported better feed efficiency of broilers fed mint. Thus, feeding mint @ 15 g/kg of feed to broilers would be a better option for economical gains.

Table I. ***Mean Body weight gain, Feed intake, Water intake, FCR, Dressing Percentage of Broilers Feed Different Level of Habek Mint***

Group	Level Habek Mint	Mean Body weight gain (g)	Mean Feed intake (g)	Mean Water intake (ml)	Mean FCR	Mean Dressing %
A	5	1722[a]	3031	7239	1.75 [a]	64.70[a]
B	10	1717[a]	2971	7271	1.72 [a]	65.10[a]
C	15	1777[a]	2943	7348	1.65[ab]	67.72[b]
D	Control	1582[b]	3008	7267	1.90 [c]	62.57[c]

Means in the same column with different superscripts are different ($P<0.05$)

Mean Feed Cost and Gross Return

No significant difference of feed cost was found for both treated and untreated groups (Table III). However, the higher gross return ($P<0.05$) of broilers in group C as compared to other groups suggested better utilization of mint for economical gains. Duranni *et al.* (2007) and Ismail *et al*. (2004) also reported non-significant difference in mean feed cost but higher gross return from broilers fed with herbal extract.

Water Intake

Mean water intake per chick for the four experimental groups A, B, C and D is given in Table I. Differences in water intake for both treated and untreated groups were non-significant (Table I).

Dressing Percentage

Mean dressing percentage of broilers in group C was significantly higher as compared to other groups (Table I). Higher dressing percentage in group C showed that feeding Habek mint at the rate of 15g/kg of feed to broilers resulted in more incorporation of meat, indicating better utilization of the feed. Izat *et al.* (1989) and Durrani *et al.* (2007) reported similar findings.

Mean Weight of Different Body Organs

Differences in breast and thigh muscles weight of both treated and untreated groups were not significant (Table I). Similar findings have been reported by Guo *et al.* (2004), Ismail *et al.* (2004), Chand *et al.* (2005), Durrani *et al.* (2007), and EL-Deek *et al. (*.2001) by feeding varying levels of herbal plants extracts to broilers. Contrary to the present findings, Izat *et al*. (1989) reported significant effect of feed supplements on breast weight deposition.

Mean Weight of Gizzard, Heart and Abdominal Fat

No differences in gizzard weight and abdominal fat deposition were found in treated and untreated groups (Table II). Findings of the present study are supported by Hernandez *et al*. (2004) and Ismail *et al.* (2004), who reported no influence of treatment on weight of liver, proventiculus, Gizzard and pancreas in broilers, fed herbal plants extracts.

Table II. ***Mean weight of different body organs of broilers feed different level of Habek Mint***

Group	Level of Habek mint (g/kg of feed)	Mean breast wt. chick^{-1} (g)	Mean thigh weight chick^{-1} (g)	Mean liver weight chick^{-1} (g)	Gizzard (g)
A	5	395.7	82.00	45.0	32.250
B	10	376.2	89.75	39.00	30.250
C	15	388.5	90.25	46.75	28.750
D	Control	360.5	79.50	42.25	27.250

Means in the same column with different superscripts are different (P<0.05)

Heart weight on the other hand was influenced by feeding mint to broilers. No conclusive evidence could be drawn from the findings with respect to heart weight.

Antibody Titer against ND and IB, Hemoglobin Concentration and Packed Cell Volume

Findings on mean hemoglobin concentration and packed cell volumes are presented in Table III and IV. Non-significant (P>0.05) differences were found in the aforementioned parameters for both treated and untreated groups. The numerically higher values for hemoglobin concentration and packed cell volume in treated groups however, suggested that addition of such stuff to feed will improve overall performance that was also evident from the better weight gain of treated broilers in this study.

Table III. ***Growth, immunity and economic traits of broilers fed different level of Habek Mint***

Group	Level Habek Mint	Mean Heart weight (g)	Mean Abdominal fat (g)	Mean anti body titer per chick (IB)	Mean feed cost chick^{-1} (Rs)	Mean Gross return chick^{-1} (Rs)
A	5	9.75 ^{a}	27.000	3.000 ^{a}	42.675	120.500
B	10	8.25 ^{b}	24.500	5.225 ^{a}	42.100	120.000
C	15	10.75^{ac}	32.000	8.475 ^{b}	43.525	124.000
D	Control	9.02^{ab}	26.500	5.500 ^{a}	41.050	110.250

Means in the same column with different superscripts are significantly different (P<0.05)

Table IV. ***Blood parameters of broilers feed different level of Habek Mint***

Group	Level of Habek Mint (g/kg feed)	Mean Hemoglobin concentration	Mean PCV	Total leukocyte counts (10^9/L)	Protein (g /dL)	Albumin (g /dL)
A	5	7.50	29.50	24650	2.600	4.200
B	10	8.25	27.50	26000	2.950	3.825
C	15	9.25	28.25	25000	2.575	3.275
D	Control	7.50	29.75	24150	3.075	3.700

Mean antibody titer of broilers against IB is given in Table III. Serum antibody titer for IB was found significantly (P<0.05) higher for broilers in group C as compared to others. The higher antibody titer of treated broilers in group C could probably be due the immunostimulant properties of the mint that was also reported by Saoo (1996). Ziauddin *et al.* (1995), Agarval *et al.* (1999), Sham *et al.* (2003) and Wheeler (1994) also reported that herbal plants (Withania somnifera) had anti stress and immunomodulatry properties.

***Protein, Albumin Levels and Total Leukocyte Counts* (10^9/L)**

Mean protein and albumin levels in gm/dl of broilers in group A, B, C and D are given in Table IV. No differences were found in mean protein and albumin levels of treated and untreated groups. Differences in leukocyte counts were also non-significant (Table IV). Contrary to the present findings, Esonu *et al*. (2006) observed significant increase in TLC by feeding neem to the laying hens.

CONCLUSION

Feeding habek mint @ 15 g kg^{-1} feed, improved growth performance, FCR, immunity and gross return of the broilers. It is suggested that status of various responses to variety of infectious diseases in broilers.

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