



EFFECT OF AQUEOUS EXTRACT OF PLANT MIXTURE ON CARCASS QUALITY OF BROILER CHICKS

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ABSTRACT

A research study was conducted to find the effect of *Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lyceum*, on the growth performance of broiler chicks. A total of 240 day old chicks were purchased and were reared for 35 days in summer month. Feed and water were provided ad libitum. Total numbers of chicks were divided into four groups (A, B, C and D) each having 60 chicks. Each group was further subdivided into three groups (replicates) each having 20 chicks. Aqueous extract of these plants was mixed at the rate of 5, 10 and 15 ml/lit with water offered to group B, C and D, respectively while group A served as a control. Mean weight gain, dressing percentage, breast weight and leg weight were significantly high ($P < 0.05$) in group C with lower FCR (Feed Conversion Ratio) while mean feed intake was significantly high in control group. It was concluded from this study that these locally available plants if offered as supplement to broiler may result in improvement of broiler efficiency.

Keywords: chicks, broilers, carcass, plants, growth, performance.

INTRODUCTION

Feed is a major component, affecting net return from the poultry business, because 80% of the total expenditure in term of cash is spent on feed purchase (Asghar *et al.*, 2000; Farooq *et al.*, 2001). To ensure more net return and to minimize high expenditure on feed are the main challenges, for which many research strategies have been practiced such as introducing feed supplements and feed additives (Pervez, 1992). In the past the major growth promoters were antibiotics. However the current research is looking for natural alternative to antibiotics because of their residue and subsequent resistance to bacteria (Lee *et al.*, 2004). At present the scientists are working to improve feed efficiency and growth rate of livestock using useful herbs (Banyaphatsara, 2007).

There is little published data concerning with using *Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lycium*, as a natural feed additive in poultry nutrition. These plants have been reported for various functions like antibacterial, antiseptic, anti-inflammatory, antiparasitic and immunomodulatory properties. Therefore the benefit of these medicinal plants is of great benefit and value and quite in need especially for broiler growers and for those interested in broiler production. The objective of this project was to evaluate the effect of medicinal plant using these plants as a natural feed additive on the performance of broiler chicks.

MATERIALS AND METHODS

In order to investigate the effect of *Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lycium*, powder on weight gain, feed intake, Feed Conversion Ratio (FCR) and dressing percentage, a study

was conducted at the poultry farm of N.W.F.P Agricultural University, Peshawar, Pakistan.

Experimental design

The experiment was conducted in completely randomized design (CRD). A total of 240 day-old commercial broiler chicks were obtained from the local market and were divided into four groups A, B, C and D. Each group was further divided into three replicates having 20 chicks / replicate. The birds were raised on conventional deep litter system, with open sided house. All the pens were located in one house to have identical environment. Each pen was provided with a feeder and drinker. The experiment lasted for 35 days. The composition of the diet given throughout the period of experiment is given in the Table-1.

Addition of plant mixture to drinking water

Experimental plants (*Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lycium*) were collected from local market. The plant parts (fruit, leaves, and root) were cut into small pieces, and then were dried and grinded into powder form. Five gm from each of plants powder was mixed in one liter of water. This infusion extract mixture of plant was then mixed in drinking water of chicks at the rate of @ 0, 5, 10 and 20% for group A, B, C and D, respectively.

The data was statistically analyzed with the standard procedures of analysis of variance (ANOVA), using Completely Randomized Design. Means were compared for significance of differences by least significance differences (LSD) as suggested by Steel and Torrie (1981). The statistical package (SAS, 1998) was used to perform the above analysis on computer.

**Table-1.** Ingredient and calculated composition of the basal diet.

Ingredient and composition	Starter	Finisher
Yellow corn (%)	63.8	72.2
Soy bean meal (44% CP)	28	21.5
Fish meal (72%CP)	5	3
Lime stone (%)	1.6	1.6
Dicalcium Phosphate (%)	1	1.2
Vitamin and Minerals* (%)	0.1	0.1
DL. Methionine (%)	0.2	0.1
Sodium Chloride (%)	0.3	0.3
Coccidiostat (5%)	0.05	0.05
Metabolizing Energy (Kcal/kg)	2921	2994
Crude Protein (%)	21.4	18.1
Lysine (%)	1.19	0.93
Methionine (%)	0.55	0.33
Methionine and Cysteine (%)	0.89	0.62
Calcium (%)	1.09	1.08
Total Phosphate (%)	0.98	0.68

* Supplied the required vitamins and minerals.

RESULTS

Data on body weight, feed intake, Feed Conversion Ratio (FCR), dressing percentage, breast, thigh and leg weight have been presented in Table-2. Average body weight gain per chick was recorded 916.00, 1101.2, 1396.08 and 1169.67 g for the groups A, B, C and D, respectively. Body weight gain was significantly ($P<0.05$) higher in group C as compared with other groups. Average feed intake per chick was recorded 1883.55, 1809.82, 1825.93 and 1825.0 g, respectively for the groups A, B, C and D, respectively. Significantly high ($P<0.05$) feed intake was registered in control group. Mean feed conversion ratio was 2.05, 1.64, 1.31 and 1.56 for groups A, B, C and D which was significantly high ($P<0.05$) in group A. Dressing percentage was also significantly high ($P<0.05$) in group C. Among body organ, mean breast weight were 170.50, 193.33, 203.16 and 192.0 g for groups A, B, C and D, respectively which was significantly high ($P<0.05$) in group C. Mean thigh weight was non significant among the control and treated groups, however, mean leg weight was significantly high ($P<0.05$) in group C with mean weight 50.16 g.

Table-2. Mean \pm SE of different parameters in response of aqueous extract of different plants.

Parameters	Groups			
	A 0 ml	B 5 ml	C 10 ml	D 15 ml
Body weight (g)	916 \pm 11.23 ^d	1101 \pm 10.98 ^c	1396.08 \pm 6.56 ^a	1169.22 \pm 8.34 ^b
Feed intake (g)	1883.5 \pm 15.45 ^a	1809.82 \pm 19.87 ^b	1825.28 \pm 15.89 ^c	1825.0 \pm 21.13 ^c
Feed conversion ratio	2.05 \pm 0.29	1.73 \pm 0.21	1.31 \pm 0.34	1.56 \pm 0.65
Dressing percentage (%)	51.11 \pm 5.56 \pm 1.76 ^d	55.4 \pm 2.21 ^b	62.3 \pm 1.78 ^a	54.33 \pm 1.21 ^c
Breast weight (g)	170.5 \pm 3.54 ^c	193.33 \pm 2.23 ^b	203.16 \pm 3.76 ^a	192.00 \pm 1.43 ^b
Thigh (g)	44.5 \pm 6.45	50.1 \pm 3.87	52.16 \pm 3.21	46.33 \pm 2.98
Leg (g)	40.8 \pm 1.21 ^b	40.83 \pm 1.56 ^b	50.16 \pm 2.32 ^a	41.21 \pm 1.32 ^b

a-d similar alphabets with the same superscripts in a row do not differ significantly ($P<0.05$)

DISCUSSIONS

The results of this experiment show clearly positive effect of *Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum-Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lycium*, on the performance of broiler chicks in term of weight gain, Feed Conversion Ratio, dressing percentage and

weight of some other organs. The feed intake was decreased in treated groups which is always desirable in poultry industry. On the other hand, net return in the form of cash money is also higher in treated groups. The positive results in this trial may be due to the plant contents. Chand *et al.*, (2005) and Mushtaq (2007) registered improvement in weight gain, feed efficiency



and reduced mortality in broiler chicks by feeding 2% *Berberis lycium* and *Withania somnifera* (20g/L) extract. It means that *Berberis lycium* give positive results whether given in feed or water. Both Chand *et al.*, (2005) and Mushtaq (2007) observed mortality in the treated group while no mortality was recorded in this trial. It means that collectively both these plants reduce mortality to null.

The positive net return in this trial can be attributed to the efficient feed utilization by the broilers at 10% extract of the studied plants. Previously Chand *et al.*, (2007) obtained the highest net return at 2% of *B. lycium* added feed. Mushtaq (2007) obtained better net return at 20% extract of *W. somnifera*. It is interesting that the net return in our trial is better than both Chand *et al.* (2007) and Mushtaq (2007) which indicate that combined effect of *B. lycium* and *W. somnifera* is better than their individual outcome.

The positive effect of broiler growth in this experiment indicates the nutritive effect of *Zingiber officinale*, *Carum apticum*, *withania somnifera*, *Trigonella Foenum Graecum*, *Silybum marianum*, *Allium sativum* and *Berberis lycium*. This is expected to be the main factor responsible for growth performance at the end of experiment. *Withania somnifera* has been reported to have antioxidative (Visavadiya and Narasimhacharya 2007), antistress (Grandhi *et al.*, 1994), anticocidal (Pangasa, 2005), immunomodulatory (Agarwal, 1999) and antilipidemic effect (Leyon and Kuttan, 2004). Moreover, it has also been reported to play vital role in lowering blood sugar, serum cholesterol, and stress induced gastric indigestion and ulcers (Hemalatha, 2004; Bhatnagar, 2005). Similarly *Berberis lycium* has also been reported for curing diseases (Khan *et al.*, 2001) have ascorbic acid (Khare, 2004). Blood sugar and cholesterol lowering properties and immunomodulatory effects have also been registered (Saeed, 1976; Birdsall and Kelly, 1997; Chand *et al.*, 2007). *Allium sativum* has been emerged as potent Hypocholesteremic, antifungal and antibacterial agent (Ikram, 1972). Similarly, *Zingiber officinale* has been reported for its various medicinal properties such as analgesic, antiemetic, Antiulcer, antipyretic and cardio depressant among others (Mascolo *et al.*, 1989; Philips *et al.*, 1993; Jana *et al.*, 1990). Silybin, isosilybin, silydianin and silycristin are active components of *Silybum marianum*, well known for their Hepatoprotective (Lang *et al.*, 1990), antioxidant and reducing free radicals mediated damage (Bosisio *et al.*, 1992), increase production and reproduction and improve livestock health status (Tedesco, 2001).

In conclusion it can be said that aqueous extract of *Berberis lycium* and *Withania somnifera* at the rate of 10 ml of drinking water produce positive results in broiler chicks. It will also decrease the market age of broiler and reduce their rearing cost.

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