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Effect of Carminative Mixture on Health of Broiler Chicks

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Abstract

Carminative mixture was given to broilers at the dose rate of 0, 2 and 4 mL/litre of drinking water. At the age of 5th week body weight was significantly higher in broilers receiving carminative mixture in drinking water as compared with the control group ($p<0.001$). This trend persisted upto 8th week of age. There was an improvement in feed conversion ratio in broilers receiving carminative mixture as compared with the control group. Indices of heart, liver, thyroid, kidney, thymus and spleen were not affected by carminative mixture. While indices of bursa and thymus of broiler receiving carminative mixture (4 mL/L) was significantly ($p<0.001$) greater than the control group. Nonsignificant effect of carminative mixture was observed on haemogram, leucogram and serum proteins of experimental broilers as compared with the control. Geometric mean titre (GMT) in primary and secondary responses against Newcastle disease was not affected by carminative mixture at the dose of 2 mL/liter of drinking water. However, it increased at the dose of 4 mL/litre in experimental broilers as compared with the control. No effect was observed on GMT against IBD in broilers receiving carminative mixture.

Introduction

The increased demand of poultry and its products has resulted in higher prices of poultry feeds which amounts to be more than 70 percent of production cost of poultry. Availability of agro-wastes is also becoming scarce thus questioning quality of feed ingredients. Besides this there is a great need to get maximum production out of the feed used. Many herbal products such as gentian violet, aniseed and ginger have potential to increase the digestibility of feed (Stewart *et al.,* 1980; Bhaskar *et al.,* 1987; Bremness, 1990) and thus may promote growth of broilers.

Keeping in view the aggravating problems of poor quality of feed ingredients for poultry use, measures need to be developed for their better utilization. For this purpose a carminative mixture was formulated but it is not known whether the carminative compounds have any deleterious effect on the health of broilers. The present project was therefore, designed to investigate the effect of the carminative mixture on broilers with particular reference to effect on their health.

Materials and Methods

Sixty, day-old, broiler chicks were procured from a commercial hatchery (SB chicks, Rawalpindi) and divided into three equal groups. Group A served as control, chicks in groups B and C were given carminative mixture in water at the rate of 2 and 4 mL/litre respectively, from day-old to eight weeks of age.

The composition of the carminative mixture was as follows:

Tincture cardamom compound	0.3 mL
Tincture gentian compound	0.3 mL
Tincture ginger	0.3 mL
Spirit chloroform	0.6 mL
Spirit ammonia aromatic	0.6 mL
Water Q.S.	30 mL

Live body weight was recorded weekly and feed conversion ratio was calculated at 8 weeks post-treatment. Ten birds were slaughtered at 8 weeks of age for ascertaining any effect of the carminative mixture on internal organs of the body from each group. Since organ weight is directly related to body weight, organ index i.e., percent weight of the organ to the body weight was calculated to create uniformity and avoid influence of variation in body weight. Organ index was calculated as follows.

$$\text{Organ index} = \frac{\text{Organ weight (g)}}{\text{Live body weight (g)}} \times 100$$

Blood was collected from wing vein of 10 randomly selected birds from each group for haematology using ethylene diamine tetra-acetic acid as an anticoagulant (at 1 mg/mL blood) and also without anticoagulant for serum protein at eight weeks of age.

Erythrocytes and leucocytes were counted following the procedure of Natt and Herrick (1952). Haemoglobin concentration was determined by Drabkin's solution (Benjamin. 1978). Packed cell volume was measured by microhaematocrit (capillary tube) method (Benjamin, 1978). Serum total proteins, albumin and globulin concentrations were estimated by the technique of Levinson and MacFate (1969).

Immunological studies: Newcastle disease vaccine virus (Lasota strain Bioteke, Itlay) was administered at 7 (eye drop) and 28 10.5 ml injection subcutaneously) days of treatment. Antibody titre was measured at 21 day after each vaccinations following the technique described in MAFF and ADAS (1984).

Infectious bursal disease vaccine was given in drinking water at 7 and 28 days of treatment and antibody titre was determined using indirect haemagglutination technique described by Rehman *et al.* (1994) at 14 and 7 days post-vaccination, respectively.

Results

Clinical signs: There were no clinical signs in broilers receiving carminative mixture in drinking water upto the dose of 4 mL/litre of drinking water. There was no mortality in any of the groups.

Body weight: Table 1 shows that live body weight of broilers given carminative mixture did not differ significantly from the control upto 4th week of age. However, body weight of broilers given carminative mixture was significantly greater than the control from 5th week of treatment onward ($p<0.001$).

Table 1: Effect of carminative mixture on body weight (g) in experimental broiler chicks

Age (weeks)	Doses of carminative mixture (mL/L of water) Control	2	4
48 hrs.	50.6±0.49	50.9±0.81	51.4±0.75
1	69.5±2.58	67.8±1.85	62.1±2.00
2	93.1±2.87	96.0±1.84	100.2±4.11
3	124.5±4.98	132.5±8.03	150.9±12.01
4	313.9±11.42	406.0±20.29	355.7±28.04
5	490.0±10.04	548.2±16.11**	651.7±18.65**
6	835.0±34.2	865.0±23.63	880.0±38.58
7	1130.0±38.87	1210.0±79.86	1325.0±57.28
8	1525.0±110.87	1625.0±106.26	1655.0±68.90

Each figure represents mean±SE of 10 chicks. Data subjected to analysis of variance revealed significant difference between treatments.
**p<0.001 compared with control

Feed conversion ratio (FCR): Fig. 1 shows that the FCR was 2.50 in the control group compared with 2.20 and 1.90, respectively, in broilers receiving carminative mixture at the dose of 2 mL and 4 mL/litre of drinking water.

Organ weights: Table 2 shows that difference in indices of visceral organ of broilers given carminative mixture and the control was non significant at 8th week post-treatment. However, indices of bursa and thymus were significantly ($p<0.001$) higher in broilers receiving carminative mixture at the rate of 4 mL/L of drinking water as compared with the control at 4th week of age ($p<0.001$).

Haematology and serum proteins: Table 3 shows nonsignificant effect of carminative mixture on erythrocyte and leucocyte count, hemoglobin concentration, packed cell volume and serum total proteins, albumin and globulin concentrations in experimental broilers as compared with the control group.

Immune response against Newcastle disease: Table 4 shows that Geometric mean titre (GMT) in primary (21 days post Ist-vaccination) and secondary responses (21 days post-1st-2nd-vaccination) against Newcastle disease (ND) in broilers receiving carminative mixture at the dose of 2 mL per litre of water did not differ significantly from the control group. The primary and secondary responses against ND were increased by carminative mixture at the dose of 4 mL/L of drinking water as compared with the control group.

Table 2: Effect of carminative mixture on indices of visceral and lymphoid organs of broiler chicks

Organs	Doses of carminative mixture (mL/L of water) Control	2	4
Visceral Organs (at 8 weeks of age)			
Liver	2.24±0.17	2.12±0.14	2.24±0.11
Heart	0.49±0.03	0.50±0.02	0.44±0.05
Thyroid	0.04±0.004	0.02±0.003	0.03±0.002
Kidney	0.80±0.07	0.76±0.05	0.78±0.05
Lymphoid Organs (at 4 weeks of age)			
Bursa of Fabricus	0.03±0.03	0.34±0.03	0.36 ± 0.03**
Thymus	0.46±0.05	0.46±0.04	0.62±0.07**
Spleen	0.11±0.02	0.11±0.01	0.14±0.02

Each figure represents mean (±Standard error of the mean) of 10 chicks. Data subjected to analysis of variance significant difference between treatments compared with the control
**p<0.001 compared with control

Table 3: Effect of carminative mixture on haematology and serum protriens of broiler chicks

	Doses of carminative mixture (mL/L of water) Control	2	4
RBC count ($10^G/\mu L$)	2.54±0.08	2.7±0.15	2.70±0.09
Hb Conc. (G/dL)	6.50±0.12	6.68±0.15	6.95±0.31
PCV (%)	27.60±1.05	26.80±0.84	26.80±0.57
TLC (10^3lμL)	18.30±1.13	21 .50±1.07	21.70±1.54
Serum total protein (g/dL)	6.61±0.13	6.76±0.12	5.96±0.12
Serum albumin (g/dL)	4.62±0.11	4.72±0.14	4.18±0.13
Serum globulin (g/dL)	0.98±0.09	1.07±0.18	0.58±0.12

Each figure represents mean±SE of 10 chicks. Data subjected to analysis of variance revealed non significant difference between treatments

Table 4: Effect of carminative mixture on geometric mean titre (GMT) against Newcastle disease vaccine virus in experimental broiler chicks

Response	Doses of carminative mixture (mL/L of water) Control	2	4
Primary	32.00	34.40	68.60
Secondary	55.70	64.00	93.30

Each figure represents GMT of 10 chicks. ND vaccine virus was administered on 7th (1st) and 28th (2nd) day of age. Antibody titre was determined on 28th and 56th day of age

Immune response against Infectious Bursal disease vaccine virus: Table 5 shows that GMT in primary (7th day post-

1st-vaccination) and secondary (21 days post-2nd-vaccinations) response against infectious bursal disease in broilers receiving carminative mixture was similar to the control group.

Table 5: Effect of carminative mixture on geometric mean titre (GMT) against infectious bursal disease (IBD) vaccine virus in experimental broiler chicks

	Doses of carminative mixture (mL/L of water)		
Response	Control	2	4
Primary	7.00	8.00	8.60
Secondary	3.70	4.60	3.50

Each figure represents GMT of 10 chicks. ND vaccine virus was administered on 11th (1st) and 21th (2nd) day of age. Antibody titre was determined on 28th and 56th day of age

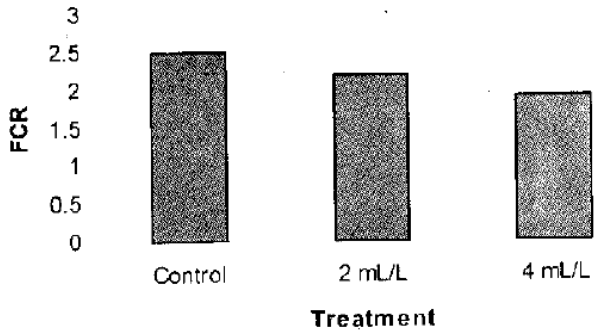

Fig. 1: Effect of carminative mixture on FCR at 8th week of age in experimental broiler chicks

Discussion

During the experimental trials, no clinical signs were observed by carminative mixture upto 4mL per litre in drinking water in broilers as compared with the control. However, laryngotracheitis was observed by Clark *et al.* (1993) in turkeys when gentian violet alone was given in drinking water. Ammonia used as fungal inactivating agent caused hyperaesthesia, hyperactivity and copious salivation in heifers when given *ad libitum* (Kamphues, 1991) and paralysis in fish (Lumsden *et al*., 1993).

There was significant increase in body weight of experimental broilers receiving carminative mixture in drinking water as compared with the control group at 5th week of age (Table 1, $p<0.001$). The significant increase in the body weight of experimental broilers indicate better utilization of feed. This increase may be due to the better digestibility of feed by the use of different compounds of carminative mixture (Bremness, 1990; Al-Zuhair *et al.,* 1996), but Stewart *et al.* (1980) reported no effect on growth rates or feed conversion ratio (FCR) by the use of only gentian violet in broilers. During the trial FCR was improved in experimental groups as compared with the control. In contrast to this study, Cross and Hughes (1976) reported that gentian violet had no effect on FCR as compared with control breeders. Similarly Ergun *et al.* (1985) observed no effect on feed consumption at the rate 0.5, 10 and 20 μg/g in layers and Stewart *et al.* (1980) reported no effect on FCR at dietary levels of 16, 32 or 64 micrograms per gram in broilers.

There was nonsignificant effect of carminative mixture on indices of liver, heart, thyroid, kidney and spleen of experimental broilers receiving carminative mixture in drinking water. However, indices of bursa and thymus was significantly higher in broilers receiving carminative mixture at the rate of 4 mL/L of drinking water. It indicates that carminative mixture upto 4 ml/litre of drinking water had no effect on visceral organs but it significant effect lymphoid organs at 4th week of age.

Nonsignificant effect was observed on haemogram, leucogram and serum proteins of experimental broilers receiving carminative mixture in drinking water as compared with the controls.

Newcastle disease is very common disease in Pakistan (Anjum, 1990). In the present study, geometric mean titre (GMT) in primary and secondary responses was not affected in broilers receiving 2 mL carminative mixture/litre of drinking water. GMT in primary and secondary responses was increased in broilers receiving 4 mL carminative mixture per litre of drinking water. No effect of carminative mixture was observed on GMT against IBD in experimental broilers. No reports are available for comparison.

In conclusion, carminative mixture at dose of 2 mL and 4mL/litre in the drinking water had improved the body weight along with improvement in feed conversion ratio. Carminative mixture at the dose of 4 mL/litre of the drinking water increased GMT against ND. It may indicate that carminative mixture at higher dose enhances the immune response of the broilers. however it needs further investigations under field conditions.

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