ESTIMATION OF BIOCHEMICAL AND HAEMATOLOGICAL PARAMETERS AFTER TREATMENT WITH BIOVET IN DIFFERENT STRAINS OF LAYING HENS

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ABSTRACT

This experiment was conducted to study effect of Biovet (E.M. Technology) on biochemical and haematological parameters of four genetically different strains of laying hens including Cross, Desi, Fayoumi and Nick Chick. A total of 60 laying hens were involved in the trial giving 15 birds under each strain. Prior to administration of Biovet (2 ml/litre) birds were maintained in controlled environment for 2 weeks, five blood samples were taken from each strain and analysed for biochemical and haematological parameters. The same birds were then administered Biovet in drinking water and after 2 weeks of treatment, five blood samples from each strain of chickens were collected and tested as was done before treatment. Serum glucose was markedly ($P<0.05$) increased due to treatment and there was also significant ($P<0.05$) inter strain variation. Serum protein levels were only affected ($P<0.05$) due to treatment but there was no inter strain variation. Serum albumin and cholesterol were not affected by treatment. The haematological parameters such as Hb, WBC, Eosinophils, Lymphocytes, PCV, MCH, MCHC, and Heterophils were not affected by treatment. There was significant ($P<0.05$) difference in RBCs concentration in serum which also caused an increase ($P<0.05$) in MCV values. The Biovet supplementation presumably stimulated haemopoietic system to improve performance of birds.

Key words: Biovet treatment, biochemical and haematological paramters, laying hens

INTRODUCTION

The use of probiotics in poultry feeds has been common in recent years to promote growth in broilers and improve laying performance in hens. In addition to probiotics, dietary enzymes are also being used to improve feed conversion efficiency. Inclusion of a multi-carbohydrase in diet enabled replacement of yellow maize with wheat without loss of productivity and quality parameters (Um *et al.*, 1998). Supplementation of ration with probiotic (*Bacillus subtilis*) decreased feed consumption and increased feed conversion in pullets and in laying hens, egg weight and egg shell thickness were improved (Pedroso *et al.*, 1999). On the contrary the supplementation of ration with dietary probiotics revealed no significant effect on growth, feed conversion efficiency, carcass yield or immune response in broilers (Panda *et al.*, 1999). In male Ross chickens, use of *Bacillus coagulans* as probiotic produced growth promoting and prophylactic effects (Cavazzoni *et al.*, 1998). Supplementation of broiler ration with dietary multiple probiotics (MS-102) was found to reduce caecal coliform species count. Blood cholesterol level in such birds was lower than control and relative size of small intestine was increased (Kim *et al.*, 2000).

This study was conducted to investigate effect of probiotic (E.M Biovet) on biochemical and haematological parameters in different strains of chickens such as cross (Rhode Island Red X Fayoumi), Desi, Fayoumi and Nick Chick in order to understand the physiological changes caused by the probiotics.

MATERIALS AND METHODS

This study was conducted on 60 birds of different strains such as Cross (RIR X Fy), Desi, Fayoumi and Nick Chick, giving 15 birds under each strain. The birds were maintained in Breeding section of Poultry Research Institute, Rawalpindi. Birds were housed in open sheds on deep litter system. They were fed experimental ration prepared in the Nutrition Division of the Institute. The ration contained 16 percent protein, 6 percent crude fibre, 5 percent fat and 8 percent moisture. There was 3.0 percent calcium and 0.5 percent phosphorus. E.M Biovet (containing photo

synthetic and lactic acid bacteria and yeast) was administerd to all birds in the recommended dose of 2 ml/litre of drinking water. Probiotics are viable micro-organisms used as feed supplement and have the beneficial effect for host animal (Simon, _*et al*, 2001). Same number of birds under each strain of chickens served as control groups. Five blood samples were collected from each control group of Cross (RIR X Fy), Desi, Fayoumi and Nick Chick before the administration of E.M. Biovet. After 2 weeks of treatment five blood samples were collected from birds of each group and analysed for the estimation of biochemical parameters such as serum glucose, albumin, total protein, cholesterol and haematological parameters. Enzymatic colorimetric test was used for the determination of cholesterol (Richard, 1973), colorimetric test was used on the basis of trinder reaction for serum glucose (Josephson, and Gyllen Sward, 1975). The colorimetric determination of total protein based on principle of Biuret reation method and the colorimetric determination of serum albumin using Bromocresol green method at pH 4.2 (Webster, 1974) was adopted. The data collected in respect of each blood parameter were subjected to statistical analysis (Steel and Torrie, 1980) to draw inference.

RESULTS AND DISCUSSION

The findings of the experiment are given in Tables 1 and 2. The results of biochemical parameters indicate that there was no effect of Biovet administration on serum albumin and cholesterol concentration in different strains of chickens, whereas protein contents tended to increase and crude fat and total cholesterol decreased in meat of chickens (Pietras, 2001). Probiotic supplementation, however, leads to an increase in antibody production in response to SRBC (Panda *et al.*, 2000). The serum protein contents were equally increased irrespective of strains of chickens, which can be attributed to a reaction of the immune system consequent to modified bacterial population (Simon et *al.*, 2001). The serum glucose concentration was significantly ($P<0.01$) increased in all strains of chickens as a result of administration of Biovet. The overall effect of Biovet treatment was predominant ($P<0.01$) as compared with non treated groups. When further assessed (LSD = 29.188) it was found that serum concentration of glucose in Cross chickens (RIR X Fy) was markedly increased as compared with other three strains of Chickens including Desi, Fayoumi and Nick Chick. The Cross birds presumably had higher genetic potential for carbohydrate metabolism and improved digestibility of dry matter and crude protein (Kim *et al.*, 2001).

Table 1: Mean values (± SD) of biochemical parameters in different strains of chicken after treatment with Biovet for 2 weeks.

Type of chicken strain	Serum glucose (mg/dl)		Serum albumin (g/dl)		Serum protein (g/dl)		Serum cholesterol (mg/dl)	
	Control	Treated	Control	Treated	Control	Treated	Control	Treated
Cross	228.18 ±66.09	307.73 ^{a**} ±25.32	1.49 ± 0.22	1.123 $^{a\ NS}$ ± 0.66	5.49 ± 0.34	5.85 ^{a*} ± 0.37	147.42 ±72.96	170.61 $^{a\ NS}$ ± 52.05
Desi	214.34 ±35.38	235.82 ^{b**} ± 0.15	1.54 ± 0.34	1.50 $^{a\ NS}$ ± 0.49	6.03 ± 0.93	6.46 ^{a*} ± 0.36	145.72 ±62.17	153.37 $^{a\ NS}$ ± 3.433
Fayoumi	192.17 ±16.29	283.63 ^{b**} ±13.61	1.14 ± 0.09	1.11 $^{a\ NS}$ ± 0.06	6.31 ± 0.48	6.45 ^{a*} ± 0.70	140.99 ±61.42	150.83 $^{a\ NS}$ ± 7.014
Nick Chick	226.61 ±18.86	225.10 ^{b**} ±33.72	1.26 ± 0.12	1.33 $^{a\ NS}$ ± 0.05	5.17 ± 0.90	5.74 ^{a*} ± 0.40	130.77 ±50.55	134.95 $^{a\ NS}$ ± 14.93

* = Significant ($P<0.05$) w.r. treatments ** = Significant ($P<0.01$) w.r. treatments
NS = Non significant w.r. treatments
Means with different superscripts in a column indicate significant difference between strains.

The response on haematological parameters consequent to Biovet treatment are given in Table 2. The haemoglobin (Hb) concentration of blood was different ($P<0.05$) in different strains of chickens under both non treated and treated situation but there was no overall effect of Biovet treatment on Hb levels of chickens. The concentration of erythrocytes (RBCs) in blood of all strains of chickens was markedly ($P<0.01$) increased within the strains as well as consequent to Biovet administration which can be attributed to

Table 2: Mean values (±SD) of haematological parameters in different strains of chickens before and after treatment with Biovet for 2 weeks

Heamatological Parameters	Cross		Desi		Fayoumi		Nick chick	
	Control	Treated	Control	Treated	Control	Treated	Control	Treated
Hb (gm)%	11.80 ±0.76	12.30 $^{a\ NS}$ ±0.67	12.40 ±0.55	7.68 $^{b\ NS}$ ±0.86	13.08 ±0.87	13.97 ^{cNS} ± 1.14	10.8 ± 0.84	13.78 $^{a\ NS}$ ± 0.56
RBC (mil/mm3)	4.24 ±0.25	4.78 ^{a**} ±0.23	4.48 ±0.16	3.64 ^{b**} ±0.21	4.36 ±0.26	5.34 ^{c**} ± 0.31	4.18 ± 0.20	5.46 ^{c**} ± 0.24
WBC (Thousand mm3)	14.00 ±0.35	11.90 ±0.65	13.8 ±1.04	12.38 ±1.05	13.32 ±0.58	14.3 ± 1.60	12.9 ± 0.89	14.42 ± 0.60
Eosinophils (%)	4.20 ±0.84	3.20 $^{a\ NS}$ ±0.84	2.8 ±0.84	3.60 $^{ab\ NS}$ ±0.55	2.2 ±0.84	3.40 $^{bc\ NS}$ ± 0.55	1.8 ± 0.84	2.60 $^{c\ NS}$ ± 1.14
Lymphocytes (%)	42.60 ± 2.51	39.60 $^{a\ NS}$ ±1.14	48.2 ±1.48	52 .0 $^{b\ NS}$ ± 2.34	40.4 ±2.70	40.8 $^{a\ NS}$ ±4.15	41.8 ± 0.02	43.00 $^{a\ NS}$ ± 3.87
PCV (%)	36.10 ±0.89	37.40 ±0.82	37.2 ±0.84	34.30 ± 1.59	36.1 ±0.89	37.4 ±0.82	35.8 ± 0.48	36.88 ± 1.22
MCV (Mu)	82.94 ±3.05	75.79 ^{a*} ±1.73	83.11 ±3.30	92.30 ^{b**} ± 4.50	82.94 ±3.05	69.94 ^{a**} ±3.6	85.74 ± 0.84	67.58 a^{**} ± 1.9
MCH (mm/gm)	27.85 ±1.39	25.92 $^{a\ NS}$ ±0.65	27.69 ±0.94	21.10 $^{b\ NS}$ ± 1.91	30.0 ±1.01	35.58 $^{c\ NS}$ ±2.51	5.84 ± 0.65	25.48 $^{ab\ NS}$ ± 0.86
MCHC (%)	31.92 ±1.21	33.58 $^{a\ NS}$ ±1.57	33.34 ±1.41	22.35 $^{b\ NS}$ ± 1.55	36.21 ±1.62	35.58 $^{c\ NS}$ ±2.51	0.14 ± 1.16	37.37 $^{a\ NS}$ ± 0.21
Heterophils (%)	10.6 ±0.89	9.60 $^{a\ NS}$ ±1.52	8.80 ±1.64	11.0 $^{a\ NS}$ ± 1.41	9.6 ±1.52	9.0 $^{a\ NS}$ ±1.58	6.0 ± 2.24	9.2 $^{b\ NS}$ ± 1.09

* = Significant (P<0.05) w.r. treatments ** = Significant (P<0.01) w.r. treatments

NS = Non significant w.r. treatments

Means with different superscripts in a row indicate significant difference between strains.

increased stimulation of haemopoietic system by the microbial flora contained in the Biovet. The higher but variable concentration of Hb in individual strains of chickens responded equally under Biovet treatment. The Mean Corpuscular Volume (MCV) and Mean Corpuscular Haemoglobin Concentration (MCHC) values were markedly (P< 0.01) increased presumably due to increase in RBCs. There being no effect of treatment on leucocytes (WBCs) concentration which did not cause any change in Packed Cell Volume (PCV) values consequent to Biovet treatment. There was no effect of Biovet treatment on concentration of WBCs, eosinophils, lymphocytes and heterophils which implies that microbial contents of Biovet do not exert any antigenic effect to enable avian system to defend except stimulation of haemopoietic system which produced positive impact on the performance of birds. The overall improvement in digestibility of nutrients under the influence of intestinal microflora is of economic importance to the end users of Biovet or products of similar nature.

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