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Effect of Probiotic on Some Physiological Parameters in Broiler Breeders

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Abstract: The study was conducted to evaluate the effect of probiotic diet supplementation on some physiological parameters in Broiler Breeders. 30 Cobb Breeder hens were used (46 week aged), divided into 3 groups (10 hens each). The 1st group was reared on standard ration (control), the 2nd and the 3rd groups were given 10 and 20 gm of probiotic/kg ration for 4 weeks. The results revealed that the probiotic treatment causes a significant increase in LH and FSH serum levels (3rd group) and in T_3 levels in (2nd and 3rd group) as compared with control group at $p \leq 0.05$. Also the probiotic treatment causes a significant decrease in serum triglyceride levels and a significant increase in serum Uric acid level as compared with control. The above effects reflected in improvement of the egg weight, yolk weight and egg production % as compared with control. In conclusion, the probiotic supplementation of Broiler Breeders diet will improve the hormonal status and enhance the productivity.

Key words: Probiotic, physiological, broiler breeders

INTRODUCTION

The first attention for the probiotic importance was viewed by Elie Metchnikoff (Bibel, 1988), he hypothesized that the long healthy life of Bulgarian peasants was resulted from consuming the fermented milk products. Probiotic is a live microbial feed supplement that improve the intestinal microbial balance of the host (Fuller, 1989). Probiotic microorganisms inhibit growth of pathogenic microorganisms by competitive exclusion (Nurmi and Ratala, 1973) by the occlusion of the receptor sites on the gut lining and also stimulate the immune system (Sanders, 1999). Also probiotics improve performance and feed conversion ration of poultry (Santos and Ferket, 2006).

Recently, probiotics were used to improve production performance of Broiler (Younis, 2008; Beski, 2010) and improve the physiological and biochemical parameters (Abdulmajeed, 2010; Sallah and Al Hussary, 2009).

The aim of this study was to investigate the probable effects of probiotics on some hormonal, biochemical and productive aspects of Cobb Breeder hens.

MATERIALS AND METHODS

The study was carried out on the animal resources research field - college of Agri. and forestry - University of Mosul and conducted on 30 Cobb Broiler Breeders (aged 46 weeks), the hens were divided into 3 groups (10 hens each). The 1st group (control) was reared on standard ration, the 2nd and 3rd groups were given 10 gm and 20 gm of probiotic/kg ration respectively and the treatment continued for 4 weeks.

Bloods samples were collected at the end of treatment from the wing vein into plan tubes, serum was separated by centrifugation and divided into tow parts,

the 1st part was used for biochemical parameter assay and the 2nd was used for hormonal assay.

The serum glucose, triglyceride levels were measured using colorimetric assay kits (Syrbio - France) at 505 nm wave length for glucose and at 546 nm wave length for triglycerides and Uric acid was measured by using kit (Biolab - France) at 520 nm. Serum hormonal levels were measured by enzyme immunoassay test kit based on quantitative tests of a solid phase Enzyme-Linked Immunosorbent Assay (ELISA), for follicle stimulating hormone (FSH), the kit was prepared by (Lake Monobind.Inc) and for Leutenizing Hormone (LH), the kit was prepared by (Biochech, Inc) and for thyroxin (T_4) and tri iodo thyronine (T_3), the kit was prepared by (Biochech, Inc). Egg weight and Yolk weight and egg production percentage were also measured.

Statistical analysis was done by one-way analysis of variance, specific groups differences were determined using Duncan's multiple range test (Steel and Torrie, 1960) at $p \leq 0.05$ significant level.

RESULTS AND DISCUSSION

The probiotic supplementation to the Breeders diet stimulate the release of gonadotropins as shown by the significant increase in the serum LH and FSH levels in the 3rd group (5.14 and 1.0 miu/ml) as compared with 2nd group (3.73 and 0.69 miu/ml) and the 1st group (control) (3.51 and 0.61 miu/ml) (Fig. 1, 2). Probiotic treatment also causes a significant increase in the serum T_3 levels as compared with control (1.59, 1.44 and 1.16 ng/ml) (Fig. 3). The significant increase in the gonadotropins may be due to the beneficial effect of probiotics on the gut microflora which may enhance the synthesis of vitamin C, which reduce the corticosterone

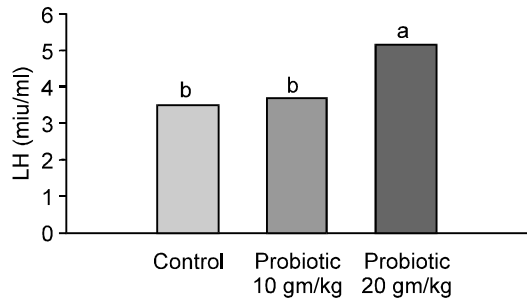


Fig. 1: Effect of probiotic treatment on LH level (miu/ml) in serum of broiler breeders

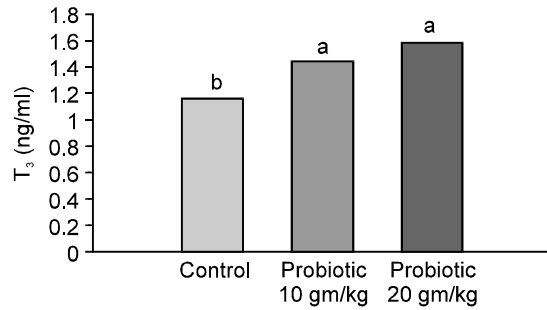


Fig. 3: Effect of probiotic treatment on T₃ level (ng/ml) in serum of broiler breeders

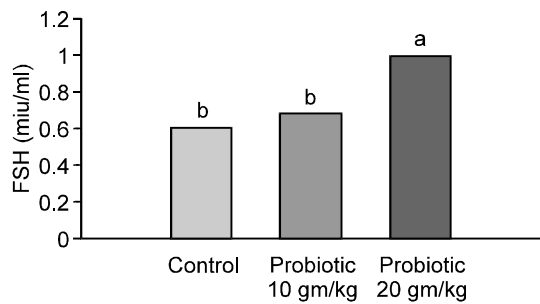


Fig. 2: Effect of probiotic treatment on FSH level (miu/ml) in serum of broiler breeders

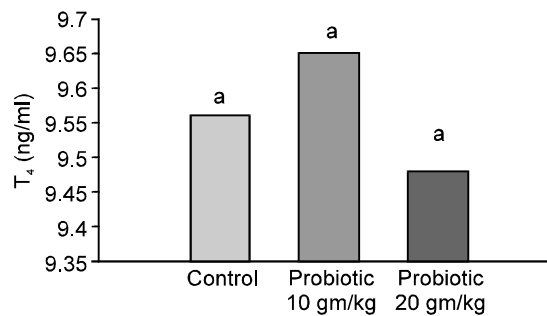


Fig. 4: Effect of probiotic treatment on T₄ level (ng/ml) in serum of broiler breeders

release from the adrenal cortex due to the inhibition of Hydroxylase enzymes (Pardue, 1983) and since there are a negative correlation between corticosterone and gonadotropins (AL-Daraji, 1998) so that this may be the main factor in enhancing the LH and FSH release, also (Taha, 2008) showed a positive correlation between LH and FSH levels, so that both LH and FSH levels are in paralleled in this study.

Also many researchers viewed the probiotic effect on improving the food assimilation (Stanley *et al.*, 1993; Abdulrahim *et al.*, 1996) may be related to the significant increase in T₃ levels which is responsible for the calorigenesis (Sturkie, 2000) and enhance the basal metabolic rate. Table 1 revealed that probiotic treatment causes a significant decrease in serum triglyceride

(412.2 and 414.2 mg/dl) as compared with control (515.2 mg/dl) and a significant increase in serum uric acid level (9.38 and 9.42 mg/dl) as compared with control (7.36 mg/dl), whereas no differences in glucose level was recorded.

The probiotic effect on triglyceride level was in agreement with (Beski, 2010) and this may be due to that some of the probiotic microflora as *Bacillus subtilis* decrease the activity of the acetyl - CoA carboxylase which is the limiting enzyme in Fatty acid synthesis, the building units for triglycerides (Santose *et al.*, 1995), also may be due to increased demand for triglycerides in the egg yolk as shown by the increased egg yolk weight in the current study (Table 2).

Table 1: Effect of probiotic on some biochemical parameters in broiler breeders serum

Treatments	Glucose (mg/100 ml)	Triglycerides (mg/100 ml)	Uric acid (mg/100 ml)
Control	277.40 ^a ±5.69	515.20 ^a ±14.57	7.36 ^b ±0.15
Probiotic 10 gm/kg ration	282.70 ^a ±6.38	414.20 ^b ±15.96	9.42 ^a ±0.26
Probiotic 20 gm/kg ration	282.20 ^a ±5.20	412.20 ^b ±16.27	9.38 ^a ±0.27

*± = Standard error/n =10. *Small english letters vertically mean their is a significant difference at p<0.05 significant level

Table 2: Effect of probiotic on egg weight, yolk weight and egg production in broiler breeders

Treatments	Egg weight (gm)	Yolk weight (gm)	Egg production (%)
Control	58.36 ^b ±0.40	18.22 ^a ±0.23	65.0
Probiotic 10 gm/kg ration	60.52 ^a ±0.48	19.47 ^b ±0.15	69.6
Probiotic 20 gm/kg ration	61.59 ^a ±0.46	20.12 ^a ±0.22	73.5

*± = Standard error/n = 10. *Small English letters vertically mean their is a significant difference at p<0.05 significant level

The non significant effect of probiotic on serum glucose level was in agreement with many previous studies as (Silvia *et al.*, 2008; Singh *et al.*, 2009; Beski, 2010). Meanwhile, as related to the probiotic effect on uric acid level in the current study, it is obscure and it need to be illustrated by other studies.

Table 2 showed that the probiotic treatment significantly increase the egg weight (61.59 and 60.52 gm) as compared with (58.36 gm) for control and the yolk weight (20.12 and 19.47 gm) as compared with (18.22 gm) for control, also increase the egg production % (73.5% and 69.6%) as compared with (65%) for control. The improvement in egg production traits was agreed with (Softon, 1990; Hargis and Creger, 1978) and we can postulate that this improvement may be due to the hormonal status improvement specially the FSH which enhance the follicle growing which reflected in the observed increase in the egg yolk weight and the LH which enhance the ovulation rate which is reflected in the improvement of egg production %, also it may be related to the probiotic effect that improve the gut ecosystem and as a result the metabolic activities (digestion, absorption and assimilation of a available nutrient) will be better.

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