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EFFECT OF DIETARY PROBIOTIC SUPPLEMENTATION DURING REARING PERIOD ON SUBSEQUENT LAYING PERFORMANCE OF LOCAL LAYING HENS

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ABSTRACT: This study aimed to investigate the effect of dietary probiotic supplementation during rearing period on subsequent laying performance and physiological response of Sinai hens during laying period. A total number of 360 Sinai chicks, one old day were used in the current trail. Chicks were divided into 4 equal groups each of 3 replicates. Experimental groups were as follows, 1st group served as a control and fed the basal experimental diets, while, the 2nd, 3rd and 4th groups were fed the basal diets supplemented with 0.3, 0.4 and 0.5 g probiotic / kg, respectively from hatch up to 20 wks of age. The commercial probiotic used was Saltose Ex which is a thermo stable probiotic where it contains lactic acid bacteria (*Lactobacillus lactis*) 2.5x 10^8 CFU, *Bacillus subtilis* 1.8x 10^9 CFU/g product.

Results indicated that feed consumption and feed conversion ratio were significantly ($P \leq 0.05$) between the experimental treatments during rearing period (1-20 weeks of age). The relative weights of carcass, liver, giblets and length of jejunum and illeum at end of experimental period were significantly affected due to dietary treatment. The feeding on diet supplemented with 0.3 g probiotic /kg diet during rearing period resulted in a lower intestinal microbial count of both TCC and CC than control diet. Laying rate%, egg weight and egg mass were significantly increased due to dietary treatment as compared to the control. All dietary probiotic levels significantly reduced feed consumption within the whole laying period except the birds fed 0.4 g probiotic /kg diet as a subsequent effect during the laying period. Fertility % was significantly increased in eggs produced from birds fed diet supplemented with 0.4 and 0.5 g probiotic/kg diet, while, hatchability % was improved by feeding on diet with 0.3g probiotic/kg diet during rearing period as compared to the control diet. Therefore, these results indicate that dietary probiotic supplementation from 0.3 to 0.5 g/kg diet during rearing period could be used to improve welfare status to Sinai chicks and subsequent productive traits during laying period.

Key Words: Sinai chicks- hens - Probiotic- Productive- reproductive-Performance

INTRODUCTION

Various kinds of antibiotics have been used in poultry industry in order to treat the infectious diseases (Mansoub, 2010). In some countries, the usage of antibiotics haves been forbidden because of some problems caused by lavish usage of antibiotics such as bacterial resistance (Farmer and Gotto, 1997). Probiotics prescription is a good alternative for antibiotics. Probiotics are microbial supplements which can prevent host body from infection by several ways: microbial balance of intestine, synthesis of B group vitamins, immune system stimulating, competition with other microorganisms, digestive enzymes producing and decreasing the level of low density lipoproteins (Coates and Fuller, 1977; Fuller, 1989; Rolfe, 2000). Probiotics are one of the options that have been evaluated and shown to have potential in reducing the amount and severity of enteric infections in poultry and subsequent contamination of poultry products (Patterson and Burkholder, 2003). There are several microbial species that are utilized as probiotics including those of *Lactobacillus*, *Bifidobacterium*, *Enterococcus*, *Bacillus*, and *Pediococcus* (Gaggia et al., 2010). Probiotics may be composed of one or a combination of many strains. Probiotics are used to help maintain a healthy microbial balance within the intestine and promote gut integrity. This is accomplished through three main mechanisms: competitive exclusion, bacterial antagonism, and stimulation of the immune system (Ohimain and Ofongo, 2012). Traditionally, probiotics have been administered in the feed or water supply to 1-day-old chicks. However, as soon as the chick hatches and is exposed to the external environment, it quickly begins to establish the microbial community in the intestine (Pedroso et al., 2005). Also probiotics improve performance and feed conversion ratio 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. Therefore, this study aimed to investigate the effect of dietary supplementation of probiotic during rearing period on subsequent productive traits and physiological response of Sinai hens during laying period.

MATERIALS AND METHODS

This experiment was carried out at EL-Serw Poultry Research Station, Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture, Egypt. This study was conducted to investigate the effect of dietary probiotic supplementation (*Lactobacillus lactis* 2.5x 10^8 CFU/g and *Bacillus subtilis* 1.8 x 10^9 CFU/g) during rearing period on subsequent productive traits and physiological response of Sinai hen's during laying period. A total number of 360 chicks one day old were taken, weighted and divided into equal four experimental groups (each of three replicates). The experimental groups of chicks were arranged as follows, the first group served as a control and fed the basal experimental diets (starter layer diet from hatch up to 8 wks, growing layer from 9 up to 18 wks and fed pre-lay diet from 19-20 wks of age), while, the 2^{nd}, 3^{rd} and 4^{th} groups were fed the basal diets supplemented with 0.3, 0.4 and 0.5 g probiotic/ kg diet, respectively. All hens fed layer diet from 21-40 wks of age

without dietary treatment. All chicks were reared under similar hygienic and managerial conditions. During rearing period, chickens in all groups did not take any antibiotics. Composition and calculated analysis of the basal starter, grower, pre-layer and layer diets are shown in Table 1. The probiotic used in the current study was produced by pic-Bio, Inc Company – Japan and purchased from El-Youser Company for medicine trade- Cairo. It is a Saltose Ex which is a thermo stable probiotic where each 1 g contains lactic acid bacteria (*Lactobacillus lactis*) 2.5x 10^8 CFU, *Bacillus subtilis* 1.8x 10^9 CFU and calcium carbonate up to 1 gram as carrier.

Data collection and estimated parameters:

During rearing period: Live body weight (LBW) and feed consumption (FC) were recorded for each replicate per each treatment then were averaged and expressed in grams per chick throughout the overall experimental period (0-20 wks of age). Body weight gain (BWG) and feed conversion ratio (FCR) were calculated during the same period. After weighing pullets at the end of 20 wks of age, the adjusted number of birds (33 pullets for each dietary treatments) was continued in the same house for all treatments then fed on the same layer diet without supplement to evaluate the subsequent effect of dietary treatments during rearing period on sexual maturity and productive performance till 40 wks of age .Age of the sexual maturity recorded at the 1st egg laid.

Also, at the end of 20 wks of age, three hens/treatment were taken and slaughter, after complete bleeding, the birds were dressed and the carcass and some organs (liver, gizzard, heart, spleen, and pancreas) were weighed as well as the lengths of some small intestine parts (duodenum, jejunum and ileum) were also measured cm / 100 g of the carcass weight. Dressing percentage = [(Dressed carcass weight/Live body weight) × 100). Relative organ weights were calculated as percentages of carcass weight = [(Organ weight/carcass weight) × 100]. The microbial examination was carried out on samples of cecum contents (3 birds/ treatment) according to Mackie and Mc Carteny (1953), APHA (1960) and Difco Mannual (1977).

Body weight was recorded at sexual maturity and 40 wks of age. Subsequent laying traits such as egg number, egg weight, egg mass, feed consumption were recorded during studied laying period (28-40 wks of age) as well as egg quality parameters were estimated. Laying rate and feed conversion ratio were calculated as well as body weight change. Hatching traits such as fertility and hatchability were measured at 36- 40 wks of age

Statistical analysis: Data obtained were statistically analyzed using the General Liner Model of **SPSS**, (2008). The following model was used :$Yij = \mu + Ti + eij$ where: Yij = an observation, μ = overall mean, Ti = effect of treatment (i=1,2,3 and 4) and eij = experimental random error. Significant differences between means were tested by Duncan's Multiple Range Test Duncan (1955) at 5% level of significance.

RESULTS AND Discussion

Rearing period performance:

Results of Table 2 showed that insignificant improvement in body weight (BW) at 20 wks of age and body weight gain (BWG) during the period from hatch

up to 20 wks of age due to dietary probiotic supplementation during rearing period (1-20 weeks of age), while feed consumption (FC) and feed conversion ratio (FCR) were significantly ($P \leq 0.05$) differed comparing to the control group. Feed consumption revealed a significant increase for chicks fed diet supplemented with 0.3 and 0.5 g probiotic/kg by 4.92 and 1.06%, respectively than the control group at the whole period (1-20 wks of age), however, the best feed conversion ratio was obtained for chicks fed 0.4 g probiotic/kg diet than the other probiotic and control groups at the same period. Sexual maturity (based on first egg laid) was significantly affected due to dietary probiotic supplementation during rearing period (Table 2). Pullets fed 0.3 g probiotic/kg diet during rearing period reached the sexual maturity earlier than other treatments (150 day) while, pullets fed 0.5 g probiotic/kg diet reached at sexual maturity later than control group. These results agree with several reports demonstrated that probiotic supplemented to the birds improved the BWG and FCR of broiler chickens (Benites et al., 2008) and Khaksefidi and Ghoorchi, 2006). Moreover, biological B. subtilis and E. faecium supplementation is effective in promoting poultry growth and improving FCR (Hatab et al., 2016). The improvement of BW and FCR could be attributed to that probiotics improve absorption of nutrients and depressed the harmful bacteria causing growth depression (El-Nagmy *et al.*, 2007).

Organoleptic and morphometric measurements of pullets at 20 wks of age:

Data of Table 3 shows the effect of dietary probiotic supplementation during rearing period on the relative weights of some organs and lengths of small intestine and cecum (cm/100g BW) for the experimental groups. Relative carcass weight was significantly decreased for pullets fed diet supplemented with 0.3 and 0.4 g probiotic/kg by 7.63 and 7.37%, respectively lower than the control. Non-significant alternations were detected in relative weights of heart, gizzard, spleen and lengths of duodenum and cecum due to using different dietary probiotic levels, while relative weights of liver, giblets and the length of jejunum and illeum were significantly affected. Pullets fed 0.5 g probiotic/kg diet during rearing period had the highest relative weights of liver and total giblets by 23.9 and 9.56%, respectively than the control, while relative lengths of jejunum and ilium was significantly increased in pullets fed 0.4 g probiotic/kg diet by 15.6 and 19.68%, respectively than the control .

These results are in agreement with the findings of Hatab et al. (2016) who reported that probiotic *B. subtilis* and *E. faecum* supplementation significantly increases the relative weights of carcass, liver, heart, kidney, proventriculus, small intestine, thymus, spleen and bursa of fabricius in addition to small intestine length (cm). There were no significant changes in relative weights of heart, gizzard and spleen or lengths of duodenum and cecum among all groups. This results are in agreement with the findings of Chen et al (2015) who mentioned that the weights of liver, spleen, pancreas, bursa, gizzard and duodenum were not affected by probiotic addition.

Intestinal microbial count of pullets at 20 wks of age:

The effect of feeding different levels of dietary probiotic during rearing period on total colony count (TCC) and coliform count (CC) of Sinai hens is shown in

Table 4. It clear that hens fed 0.3 g probiotic/kg diet recorded the lowest intestinal microbial count of both TCC and CC, being (4.09 x 10^{11}) and (2.34 x 10^{11}), respectively when compared to control group. This is in agreement with the findings of Mulder et al. (1997) who reported that inoculation with probiotic strain of L. reuteri significantly reduce the number of Enterobacteria in broiler chickens. A similar finding was presented by Lan et al. (2003) with a mixture of L. acidophilus / gallinarum, *L. agilis*, L. *salivarius* and *Lactobacillus spp*. (4.37 x 10^{11}) and (2.93 x 10^{11}), respectively. Hens supplemented with 0.4 g probiotic/kg had the highest count in TCC and CC, being (8.10 x 10^{11}) and (5.03 x 10^{11}), respectively than the control, respectively. The reduction of pathogenic microbial species in the intestinal tract could be due to direct action of probiotic or indirectly through stimulation of the beneficial bacteria (Nicodemus et al., 2004).

In respect of inhibit pathogenic growth by probiotic supplementation in two, probiotic organisms compete with pathogens for nutrients, thus preventing them from acquiring energy to grow and function in the gut environment (Cummings and Macfarlane, 1997). In addition, probiotics produce a variety of organic acid end products, such as volatile fatty acids during metabolism of nutrients in the gut (Gibson, 1999)

Subsequent laying performance:

Results in Table 5 clearly demonstrate that the subsequent effect of the of dietary probiotic supplementation during rearing period which significantly affected as compared to control diet in the respect of laying rate% , egg weight and egg mass during some experimental intervals. Egg production % was significantly increased with birds fed diet supplemented with 0.4 g probiotic/ kg during rearing period comparing to the other and control groups at the period of 28-32 wks of age, however, this increase was non-significant at the whole experimental period (28-40 wks of age). Also, there is a significant improvement in egg mass for birds fed diet supplemented with 0.4 g probiotic/ kg during rearing period by 24.47, 19.78 and 12.87% compare to the control groups at the period of 28-32, 36-40 and 28-40 wks of age, respectively.

The improvement with probiotic supplementation may reflect the improvement in hormonal status and enhancement productivity as seen FSH hormone and enhancing the follicle growing which reflected an increase in the egg yolk weight, and the LH which enhance the ovulation rate which reflected an improvement of egg production % **(Khalid and Abdul-Rahman, 2011).**

Feed consumption was significantly affected by dietary treatment at different experimental periods (Table 6). It is clear that all dietary probiotic supplementation levels during the rearing period significantly reduced feed consumption within the whole laying period (28-40 wks of age) except the birds fed 0.4 g probiotic /kg diet during the rearing period than the control group. The least feed consumption was observed for hens fed diet supplemented with 0.5 g probiotic / kg followed by 0.3 g probiotic / kg compared to control at different periods.

Generally feed conversion ratio was significantly improved during the all periods by different dietary probiotic supplementation levels during the rearing periods except of 0.3 g/kg. The best record of feed conversion ratio was

recorded by feeding 0.50 g probiotic/kg diet followed by 0.4 g/kg by about 7.06 and 3.95% respectively as compared to the control group at the whole experimental period (28-40 wks of age).

Results in Table 5 illustrate that a significant effect was detected in change body weight (CBW) at 28-40 wks of age due to feeding diets supplemented with inclusion different probiotic levels during rearing period, but non-significant influenced in initial and final body weight at 28 and 40 weeks of age. The highest value of CBW was recorded for hens fed 0.5 g probiotic/kg diet by about 61.4 % compared with control group.

Subsequent effects of supplementing dietary probiotic during rearing period on eggs quality measurements are presented in Table 7. It is noticed that most pronounced subsequent effect was in egg weight, relative shell weight and Hough unit, while other measurements of egg quality (Egg shape index, albumin weight %, yolk index and shell thickness) were not differ significantly due to dietary treatments.

All studied hatching traits of Sinai hens eggs were significantly affected except for total embryonic mortality due to subsequence effect to dietary probiotic supplementation during the rearing period (Table 8). Fertility (%) was significantly improved by 21.0 , 25.0 and 25.0% for eggs produced from hens fed diet supplemented with 0.3,0.4 and 0.5 g probiotic /kg, respectively as compared with the control group. Hatchability of set eggs was significantly increased by all dietary probiotic treatments as compared to the control. Also, hatchability of fertile eggs (%) was significantly increased for eggs produced from hens fed 0.3 g probiotic/kg during rearing period than the control, but this elevation was not significant in eggs produced from hens fed 0.4 or 0.5 g probiotic/kg diet. Total embryonic mortality (%) did not significantly changed between all groups. Although, the lowest ratio was recorded for eggs produced from hens fed 0.3 g probiotic/kg while the highest ratio were recorded for eggs produced from hens fed 0.4 g probiotic/kg diet and the control group.

CONCLUSION

From the obtained results, dietary probiotic supplementation during rearing period could improve bird's health and growth performance during pullets rearing, and subsequent laying performance of Sinai chicks during laying period.

Table (1): ingredients composition and chimical analysis of the basal diet**s**

Ingredients %	**Starter 0-8 wks**	**Grower 9-18 wks**	**pre-layer 19-20 wks**	**Layer 21-40 wks**
Yellow Corn	64.00	71.25	69.69	68.00
Soybean meal (44 %)	32.10	18.50	22.45	22.45
Wheat bran	0.00	6.00	1.7	0.0
Di-calcium phosphate	1.80	1.35	1.5	1.5
Limestone	1.40	2.00	4.7	7.4
Vit. & Min. premix[1]	0.30	0.30	0.3	0.3
NaCl	0.30	0.30	0.3	0.3
DL. Methionine	0.10	0.30	0.05	0.05
Total	100	100	100	100
Calculated Analysis [2]				
Crude protein %	19.11	14.57	15.47	15.14
ME (Kcal / kg)	2863	2750	2836	2781
Crude fat%	2.91	3.00	3.4	3.2
Crude fiber %	3.82	3.65	3.03	2.92
Calcium (%)	1.06	1.14	2.18	3.2
Av. phosphorus (%)	0.47	0.40	0.405	0.398
Lysine %	1.10	0.82	0.80	0.82
Methionine %	0.43	0.33	0.336	0.33
Methio + Cyst %	0.75	0.58	0.600	0.587

1- Each 3 kg of the Vit and Min. premix manufactured by Agri-Vit Company, Egypt contains: Vitamin A 10 MIU, Vit. D 2 MIU, Vit E 10 g, Vit. K 2 g, Thiamin 1 g, Riboflavin 5 g, Pyridoxine 1.5 g, Niacin 30 g, Vit. B12 10 mg, Pantothenic acid 10 g, Folic acid 1.5 g, Biotin 50 mg, Choline chloride 250 g, Manganese 60 g, Zinc 50 g, Iron 30 g, Copper 10 g, Iodine 1g, Selenium 0. 10 g, Cobalt 0.10 g. and carrier CaCO3 to 3000 g.

2- According to Feed Composition Tables for animal and poultry feedstuffs used in Egypt (2001)**.**

Table (2): Effect of dietary probiotic supplementation on growth performance and sexual maturity age of Sinai pullets (1-20 wks of age).

Age (wks)	Dietary probiotic level, g/kg diet				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Body weight (g/pullet)						
20	1173.86	1234.00	1237.06	1179.1	12.02	NS
Live body weight gain(g/pullet)						
1-20	1138.3	1198.5	1201.0	1142.6	12.04	NS
Daily feed consumption (g/pullet)						
1-20	48.98^{b}	51.39^{a}	46.11^{c}	49.56^{b}	0.58	*
Feed conversion ratio (g.feed/BW gain)						
1-20	6.03^{a}	6.01^{a}	5.35^{b}	6.05^{a}	0.095	*
Age of sexual maturity (SM)						
Days	151^{b}	150^{b}	157^{ab}	161^{a}	1.66	*

a,b,c,..: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$).
NS= non-significant

Table (3): Effect of dietary probiotic supplementation on some carcass characteristics and intestinal morphometric of Sinai pullets at 20 wks of age.

Items	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Body weight, g	1207.3	1261.3	1267.6	1280.3	28.8	NS
Carcass weight, %	68.75^{a}	69.75^{a}	63.50^{b}	63.68^{b}	1.03	*
Heart weight, %	0.50	0.53	0.41	0.42	0.02	NS
Liver weight, %	2.05^{b}	2.15^{b}	2.23^{b}	2.54^{a}	0.06	*
Gizzard weight, %	2.25	2.17	2.25	2.3	0.05	NS
Spleen weight, %	0. 18	0.30	0.20	0.21	0.023	NS
Giblets, %[#]	4.81^{b}	4.8^{b}	4.9^{b}	5.27^{a}	0.068	*
Duodenum length, cm	2.44	2.25	2.7	2.25	0.114	NS
Jejunum length, cm	5.19^{ab}	4.49^{b}	6.00^{a}	5.41^{ab}	0.21	*
Ileum length , cm	5.08^{ab}	4.25^{b}	6.08^{a}	5.24^{ab}	0.23	*
Secum length ,cm	2.64	2.56	2.94	2.88	0.091	NS

^{a,b},..: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$). NS= non-significant; Giblets = liver +gizzard +heart

Table (4): Effect of dietary probiotic supplementation on total colony count (TCC) and coliform count (CC) of Sinai hens during laying period.

Items	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
TCC ($x10^{11c}$)	4.37^{c}	4.09^{c}	8.1^{a}	4.95^{b}	0.48	*
CC ($x10^{11c}$)	2.93^{c}	2.34^{d}	5.03^{a}	3.75^{b}	0.30	*

[a,b,c,d,..]: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$).NS= non-significant

Table (5): Effect of dietary probiotic supplementation on subsequent laying performance of Sinai hens (28-40 wks of age).

Age (wks)	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Egg production %						
28-32	73.09[b]	69.16[b]	89.28[a]	59.12[b]	3.81	*
32-36	80.71	71.38	77.61	75.59	2.08	NS
36-40	72.38	64.2	77.14	68.8	2.23	NS
28-40	75.4	68.25	81.35	67.86	2.46	NS
Egg weight(g)						
28-32	42.54[b]	43.72[a]	43.34[ab]	43.19[ab]	0.16	*
32-36	45.15[c]	46.64[a]	45.37[ab]	45.68[b]	0.18	*
36-40	46.34	48.1	52.32	47.25	1.34	NS
28-40	44.68	46.15	47.01	45.38	0.47	NS
Egg mass (g/hen)						
28-32	31.09[b]	30.21[b]	38.7[a]	25.54[b]	1.64	*
32-36	36.44	33.26	35.21	34.53	0.87	NS
36-40	33.56[ab]	30.86[b]	40.20[a]	32.54[ab]	1.52	*
28-40	33.7[ab]	31.45[b]	38.04[a]	30.87[b]	1.14	*
Daily feed consumption (g/pullet)						
28-32	111.80[a]	95.85[b]	100.63[b]	85.61[c]	2.94	*
32-36	123.02[b]	119.63[b]	139.53[a]	107.51[c]	3.6	*
36-40	122.11[c]	128.71[b]	148.54[a]	111.82[d]	4.06	*
28-40	118.98[b]	114.64[c]	129.56[a]	101.65[d]	3.04	*
Feed conversion ratio (g .feed/ g egg mass)						
28-32	3.6[a]	3.22[a]	2.61[b]	3.55[a]	0.133	*
32-36	3.38[ab]	3.63[ab]	3.98[a]	3.11[b]	0.131	*
36-40	3.66	4.25	3.74	3.45	0.155	NS
28-40	3.54	3.70	3.4	3.29	0.09	NS

[a,b,c,..]: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$).NS= non-significant

Table (6): Effect of dietary probiotic supplementation on initial and final live body weight (LBW) and the change of body weight (CBW) during 28-40 weeks of age.

Items	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Initial LBW at 28 wks , g	1462.67	1430.53	1451.3	1307.1	35.6	NS
Final LBW at 40 wks, g	1632.73	1622.16	1594.06	1581.7	34.47	NS
CBW (g)	170.06^{bc}	191.63^{b}	142.73^{c}	274.56^{a}	15.93	*

a,b,c,..: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$). NS= non-significant

Table (7): Effect of dietary probiotic supplementation on Subsequent egg quality traits of Sinai hens.

Items	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Egg weight, g	48.73^{ab}	48.1^{b}	49.56^{ab}	51.55^{a}	0.57	*
Egg shape index	81.59	79.14	79.88	80.51	0.82	NS
Shell weight, %	12.88^{b}	13.56^{ab}	14.93^{a}	14.34^{ab}	0.31	*
Albumin weight, %	53.5	56.7	54.5	54.8	0.85	NS
Yolk index	4.13	4.05	4.3	4.36	0.062	NS
Shell thickness	31.83	32.5	34.00	33.5	0.36	NS
Hough unit	83.3^{b}	87.5^{ab}	92.33^{a}	90.33^{ab}	1.45	*

$^{a,b,\cdot}$: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$).NS= non-significant

Table (8): Effect of dietary probiotic supplementation during rearing period on Subsequent hatching traits of Sinai hens.

Items	Dietary probiotic level, g/kg				Pooled SEM	Sig.
	Control	0.3	0.4	0.5		
Fertility, %	75.0^{c}	91.0^{b}	94.0^{ab}	94.0^{a}	2.43	*
Hatchability of set eggs, %	69^{b}	89^{a}	88^{a}	90.3^{a}	2.65	*
Hatchability of fertile eggs, %	92.1^{b}	97.7^{a}	93.6^{ab}	95.7^{ab}	0.93	*
Total EM.,%	6	2	6	4	0.77	NS

EM= embryonic mortality, NS= non-significant

$^{a,b,\cdot}$: means in the same row bearing different superscripts are significantly different ($p \leq 0.05$).

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Sinai chicks- hens - Probiotic- Productive- reproductive-Performance

الملخص العربى

تأثيرا ضافة البروبيوتك أثناء فترة الرعاية على الاداء اللاحق لإنتاج البيض لدجاج السينا

ياسر صديق رزق ، ملاك منصور بشاره و ايمن عبده موافى
معهد بحوث الإنتاج الحيواني- مركز البحوث الزراعية- الدقي- الجيزة

تهدف هذه التجربة دراسة تأثير اضافة البروبيوتك فى علائق الكتاكيت خلال فترة الرعاية على الأداء اللاحق لانتاج البيض لكتاكيت السينا المحلية . حيث استخدم 360 كتكوت سينا عمر يوم وتم تقسيمها الى أربع معاملات (90كتكوت / معاملة) في ثلاث مكررات متساوية لكل منها وتم ترتيب المعاملات الأربع على النحو التالي: الأولى كمجموعة مقارنة بينما المعاملة الثانية و الثالثة والرابعة تم اضافة 0.3 و0.4و0.5 جم بروبيوتك / كجم وذلك خلال الفترة من الفقس حتى 20 أسبوع من العمر ثم تمت تغذية الطيور على عليقة قبل انتاج في الفترة من 19- 20 اسبوع من العمر ثم عليقة بياض خلال فترة التجربة من 20-40 اسبوع بدون أى إضافات. البوبيوتك التجاري المستخدم يسمي Saltose Ex وهو يحتوي علي بكتريا نافعة تشمل (*Lactobacillus lactis*) $2.5x\ 10^8$ CFU, *Bacillus subtilis* $1.8x\ 10^9$ CFU/g.

واشارت النتائج الي أن كل من استهلاك العلف ومعدل التحويل الغذائي اختلف معنويا بين المعاملات التجريبية خلال فترة الرعاية (1-20 اسبوع من العمر). تأثر معنويا كل من الوزن النسبي للذبيحة والكبد و الأجزاء المأكولة والطول النسبي للصائم واللفائفي في نهاية الفترة التجريبية بالمعاملات التجريبية. أدت التغذية علي العليقة المضاف اليها 0.3 جم بروبيوتك/ كجم عليقة الي انخفاض محتوي البكتريا الكلي في الأعور.

لوحظ أن كل من معدل انتاج البيض ووزن البيض وكتلة البيض ذاد معنويا نتيجة المعملات التجريبية بالبروبيوتك مقارنة بالعليقة المقارنة. انخفض معنويا استهلاك العلف بالمعاملات المختلفة من البروبيوتك فيما عدا 0.4 جم/كجم علف وذلك كتأثير لاحق خلال فترة انتاج البيض. تحسنت نسبة الخصوبة باضافة 0.4 ، 0.5 جم بروبيوتك / كجم علف اثناء فترة النمو بينما اضافة 0.3 جم / كجم ادى الى تحس نسبة الفقس مقارنة بالعليقة المقارنة. لذلك تشير هذه الدراسة إلى ان امكانية اضافة البروبيوتك بمستوي من 0.3 الي 0.5جم/كجم عليقة اثناء فترة الرعاية لتحسين الحالة الصحية لكتاكيت دجاج السينا المحلى والتأثير اللاحق لها علي الأداء الأنتاجي خلال مرحلة انتاج البيض.