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INFLUENCE OF SOME COMMERCIAL PRODUCTS OF PLANT EXTRACTS ON THE PERFORMANCE OF LAYING HENS

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Abstract

A total of 144 Sina-laying hens aged 24 wks. were randomly distributed into 6 groups. Each group was divided into three replicates. The first group received a commercial layer diet containing 17.5% CP. and 280 K cal ME/Kg and served as a control (T1). Other groups were fed a diet supplemented with 0.1, 0.2, 0.3, 0.4% Egg plus (E^+) and 0.125% Fermacto 500 (F), respectively. The experimental diets were used from 24 till 48 wks of age.

Results showed that using 0.3% E^+ (T_4) improved the average of egg production percentage (EP%), egg mass (EM), feed conversion (FC) and economic efficiency (EEF). The dietary treatments didn't affect negatively on the average egg weight (EW), egg quality, serum total lipids and cholesterol. However, feed intake (FI) was decreased either by increasing the level of E^+ or by the presence of F, accordingly, feed conversion improved. Eiher Egg Plus or Fermacto - 500 could be used as an effective promoters for egg production.

INTRODUCTION

Herbal products are incorporated nowadays in live stock feeds instead of chemical products and antibiotics in order to stimulate or promote the effective use or feed nutrients, which result in more rapid gain, higher production and better feed efficiency. Chemicals sometimes had some unfavourable side effects; therefore, most producers tend to use natural extracts as alternative growth promoters. Some vegetable herbs, edible plants and seeds are used as tonics and restoratives, such as *Trigonella Foenurn Graeceum, Sessamum Indicum and Lepidium Sativum* (Boulas, 1983). Moreover, some plants were found to have an anti helminths and vermifuge action as *Punica Granatum* and *Pegavum Hermalo.* In addition, *Acacia* has been used in controlling diseases caused by *Clostridium Perfringens* (Schragla and Muller, 1990).

Few published data are concerning the use of Egg Pluds or Fermacto 500 in layer

diets, however, Dorgham *et al.* (1994) fed L.S.L. layers basal diet supplemented with Fermacto (F), Virginiamycin (V). and Egg PLus (E^+) solely or in combination (FV, FE and VE^+) . The best results of egg production were obtained from birds which received F, FV and FE^+ diets, the latter combination showed a highly synergistic effect. Radwan *et al.* (1995) fed Matrouh layers a commercial diet supplemented with 3 feed additives Egg plus (E^+) lacto Matrouh layers a commercial diet supplemened with 3 fed additives Egg plus (E^+) lacto Sacc (LS) and Prozyme (PZ) separately or in combination, and found that the addition of E^+ increased egg number and egg weight, improved relatively feed conversion with a decrease in yolk weight. Seemingly, Pet. Ag studies (1972-1975) found that Fermacto 500 improved henday egg production, total egg weight, feed conversion, apparent digestibility and hatchability. Besides, mortality was numerically lower in hens fed Fermacto diets compared to the conrol diet. Moreover, Harms and Miles (1980) showed that egg production and feed efficiency improved significantly when Farmacto 500 had been added to layers diet containing various levels of supplemented methionine. The aim of this work was to study the effect of either dietary Egg plus* (Herbal extracts) or Fermacto 500** (A natural feed supplement which contains a primary fermentation of Aspergillus) supplementation on laying performance, egg quality, and economic efficiency, also, estimation the optimum levels of Egg plus, which induced the better performance of laying hens.

MATERIALS AND METHODS

An experiment was conducted at El-Kanater El-Khairia Poultiy Research Station, Animal Production Research Institute, A.R.C Egypt.

A total of 144 Sina-laying hens of 24 weeks of age were used. Hens were randomly distributed into 6 groups, of three replicates each. Birds were kept under similar managerial and environmental conditions in layer batteries. Artificial light was used besides normal daylight to provide 16 hrs. of constant light daily. The first group received a commercial layer diet containing 17.5% CP and 2780K cal ME/Kg diet (Tabel 1) served as a control (T1). Other groups were fed diet supplemented with 0.1, 0.2, 0.3, 0.4% Egg plus (E^+) and 0.125% Fermacto 500 (F), respectively. Chemical analysis of the basal diet was carried out according to A.O.A.C (1990). Feed and water offered *ad libitum* through the whole experimental period. Data of egg production (EP), egg weight (EW), egg mass (EM), and feed intake (FI), were recorded to evaluate laying hen performance. At the end of the experiment, six digestion trails were conducted us-

* A product of Massoud group. Registration No. 9006.

** A product of Pet. Ag Inc. Registration No. 8149

ing 18 hens (three from each treatment) to estimate the digestion co-efficient of nutrients and nitrogen retention of the experimental diets.

Representative egg samples (324 eggs) were taken randomly from each treatment (three eggs from each replicate) every four weeks to determine egg quality in term of shape index (Romanoff and Romanoff, 1949) yolk index, albumen index, Haugh unit (Kotaiah and Mohapatra, 1974), shell percentage and thickness. Moreover, egg protein, egg fat, total lipids (Folch, and Sloanestanley, 1957) and total cholesterol (Watson 1960) were also determined. At the end of each period, (every four weeks) three blood samples each reatment was taken randomly from the wing vein of hens to provide 108 samples (3 samples x 6 treatments x 6 periods). The serum was separated from blood samples to determine serum total lipids (Zollner and kirsch 1962) and cholesterol (Watson 1960), by using calorimetric determination method using acetic anhydride and concentrated sulfuric acid for cholesterol and sulphuric acid and vanillin for total lipids.

Finally, the experimental treatmens were economically evaluated as the net revenue unit of feed cost as listed by (Salwa 1980).

Data of performance, egg quality and the blood analysis were statistically analyzed using the general linear model programme of S.A.S (1985). The significant mean differences between treatment were separated by Duncan's Multiple Range Test (Duncan, 1955).

RESULTS AND DISCUSSION

Data of laying hens perforomance fed the different diets used in the experiment are presented in Table 2.

The data showed that, adding E^+ to the diets up to 0.3% or F, at 0.125% showed EP% nearly similar to those given by control diet, while, adding 0.4 % E^+ depressed sinificantly EP%. These results are in line with those of Dorgham *et al.* (1994) who showed that adding 0.1% E^+ or 0.15% F didn't significantly affect egg production percentage (EP).

Although the dietary treatment didn't affect either egg weight or egg mass (Table 2), however increasing level of E^+ tended to decrease feed intake, that is may be due to the presence of some sedative materials in Egg Plus (Hussien, 1981).

The highest FI was recorded by the control diet and the least was recorded by hens having 0.4% E^+. This finding may be due to that Egg plus can improve digestibility of various nutrients through increasing the rate of secretions of digestive juices, activating enzymes production, consequently, improving the rate of absorption of nutrients which result in lower feed consumption (Massoud, 1992). Also, feeding T6 (F) resulted in a decrease in FI. Similar findings were observed by Pet. Ag studies (1972-1975). Results of Fc showed that, hens fed 0.3% E^+ recorded significantly the best FC (4.241) among all treatments, while, those having 0.4% E^+ showed the worst value, being 5.279. In this connection, Radwan *et al.* (1995) reported that the addition of 0.1% E^+ didn't show significant difference compared with the conrol. Data in Table 3 showed that the values of digestion coefficient improved by the addition of E^+ up to 0.3%, while, using 0.4% E^+ depressed those volues. On the other hand, the addition of 0.125% Fermacto gave slightly better values than the control or using 0.1% E^+ but still lower than using either 0.2 or 0.3% E^+. Results of nutrients digestibility were reflected on the TDN, ME K cal/g and N balance % which took the same trend. The depression in nutrients digistibilities due to the addition of 0.4% E^+ may be due to the presence of high amounts of some sedative materials in E^+ at such level which negatively affects hens activity (Hussien, 1981).

Values of egg quality, serum total lipids and cholesterol are presented in Table 4. Results obtained revealed that the dietary treatments didn't show significant effect on any of egg quality parameters, total lipids and cholesterol content of either egg or blood serum.

Economic efficiency (EEF)

From the economical point of view, results obtained showed that hens received 0.3% E^+ were in the first mattress, while, the least economical efficieny had been obtained by hens having 0.4% E^+ (Table 5).

It could be concluded that Egg plus has some important biological action due to the presence of linoleic C 18:2, linolenic C 18:3, arachidonic C 20:4, palmetic C 16:0 and stearic C 18:0 which represent the precursors of biosynthesis of prostaglandines which activates the production of LH and FSH hormones, and accordingly, increased EP and lowered EI per hen and accordingly, FC improved (Witehood 1980). Regarding shell quality, calcium contents in E^+ can easily bind with amino acids in alimentary tract, easily absorbed to be precipitated in pure form on the fibrous layer to form mamillary layer and a good egg shell formation (Massaud, 1992). Moreover, E^+ contains organic

source of manganese which is responsible for builing a good structure of shell matrix, so we can have a well built egg which helps having good egg shell quality and internal quality which minimizes microbial contents. On the other hand, using Fermacto (F) did not affect EP% but tended to reduce FI of layers which resulted in improving FC. This may be attributed to the presence of high levels of mycelial fibers and low levels of nucleic acids which stimulate the growth of intestinal microflora (Pet. Ag studies 1972-1975).

In conclusion, either E^{+} or F can be used as an effective layer promoter in laying hen diets from 24-48 weeks of age.

Table 1. The composition and calculated chemical analysis of commercial basal diet.

Ingredients	%
Ground yellow corn	65
Soybeen meal (44%)	14
Protein concentrate (50%)*	10
Ground limestone	5
Wheat bran	4
Bone meal	1.7
Salt	0.2
Vit and min premix**	0.1
Total	100
Determined analysis:	
CP%	17.5
CF%	3.11
EE%	2.95
Calculated analysis:	
MEK Cal/kg	2780
Calcium	2.27
Phosphorus % (AV.)	0.51
Lysine %	0.84
Methionine %	0.35
Met + cys %	0.62

* The protein concentrate contins 78% meat meal (55%CP) 14% fish meal (56% CP), 3.2% di-calcium phosphate, 2.1% sodium chloride, 1.8 vit and min premix, 0.6% D.L methionine, 0.3% probionic acid.

** Each 2.5 Kg of vitamins and minerals minture contains vit A 12.000.000 IU. Vit D_3 2.000.000 IU., vit E 10 gram, vit K2 gram, B11 gram, B_6 1.5 gram B12 10 mg, nicouic acid 20 gram, copper 10 gram, Iodine 1 gram, manganese 55 gram, Zinc 55 gram, seleniume 0.1 gram and iron 30 gram.

Table 2. Effect of dietary treatments on the performance of laying hens from 24-48 weeks of age.

Items	T1	T2	T3	T4	T5	T6
Performance	Control	0.1% E+	0.2%E+	0.3%E+	0.4%E+	0.125%F
Average EP%	45.75^{a}	44.74^{a}	46.23^{a}	46.61^{a}	37.46^{b}	43.03^{a}
Average EW g	42.77^{a}	44.33^{a}	43.72^{a}	43.56^{a}	42.91^{a}	43.06^{a}
Average Em/hen/day/gm	19.805^{a}	20.102^{a}	20.436^{a}	20.681^{a}	16.382^{b}	18.75^{a}
Average Fi/hen/day/gm	96.519^{a}	95.191^{a}	94.105^{ab}	87.716^{a}	86.482^{c}	88.87^{bc}
Average FC	4.873^{b}	4.735^{b}	4.605^{b}	4.241^{c}	5.279^{a}	4.74^{b}

abc means within row with the same letter don't difer significantly (P>0.05)

Table 3. Effect of dietary treatments on the digestibility coefficient and feeding values of laying hens from 24-48 weeks of age.

Items	T1	T2	T3	T4	T5	T6
Digestion coefficient%	Control	0.1% E+	0.2%E+	0.3%E+	0.4%E+	0.125%F
Crude protein	91.68	93.18	92.82	93.51	89.50	90.17
Ether extract	83.62	83.78	87.63	83.42	86.37	86.66
Crude fiber	15.75	15.83	16.0	15.42	15.98	15.54
Nitrogen free extract	79.8	80.91	84.47	86.28	79.44	82.43
Organic matter	80.08	81.23	83.73	84.94	79.46	81.65
Feeding value						
T.D.N.	69.47	70.32	72.73	73.34	69.94	70.9
ME Kcal/g*	2.917	2.953	3.055	3.08	2.937	2.978
Nitrogen Balance %	42.67	45.61	57.23	59.42	44.51	44.74

* According to Fraps. 1946.

Table 4. Effect of dietary treatments on the average egg qaulity, seruum total lipids and cholesterol of laying hens from 24-48 weeks of age.

Items	T1	T2	T3	T4	T5	T6
	Control	0.1% E+	0.2%E+	0.3%E+	0.4%E+	0.125%F
Shape Index	76.22	75.21	75.25	75.71	75.18	75.80
Shell percentage	10.72	11.08	11.13	11.07	11.04	10.43
Shell thickness (mm)	0.459	0.477	0.475	0.481	0.474	0.459
Haugh units	91.58	92.88	91.62	91.1	92.61	92.7
Yolk index	45.47	45.39	44.72	45.78	46.4	45.81
Albumen index	12.64	12.81	12.21	12.49	13.13	13.3
Egg protein %	13.892	13.768	13.836	13.765	13.868	13.853
Egg fat %	11.44	11.45	11.44	11.5	11.57	11.34
Egg Total lipids %	10.393	10.408	10.42	10.413	10.423	10.422
Egg Cholesterol (mg/g)	6.51	6.5	6.5	6.5	6.5	6.5
Serum total lipid (mg/100ml)	740.15	739.14	737.24	7368.13	735.9	735.03
Serum Cholesterol (mg/100ml)	167.1	168.31	171.22	168.47	168.79	169.72

No significant differences were observed among treatments

Table 5. Economic efficiency of different treatments and mony return of hens from 24-48 weeks of age.

Items	T1	T2	T3	T4	T5	T6
	Control	0.1% E+	0.2%E+	0.3%E+	0.4%E+	0.125%F
Total FI kg	16.212	15.99	15.81	14.736	14.532	14.928
Price of 1 kg feed LE	0.70	0.709	0.718	0.728	0.737	0.712
Feed cosrs LE	11.384	11.337	11.352	10.728	10.71	10.629
Total No. of egg/hen	76.86	75.16	77.67	78.3	62.93	72.29
Price of on egg LE	0.2	0.2	0.2	0.2	0.2	0.2
Price of total egg prod/hen/LE	15.372	15.032	15.534	15.66	12.586	14.458
Net revenue/hen LE	4.024	3.695	4.182	4.932	1.876	3.829
Economic efficiency (EEF)	0.354	0.326	0.368	0.459	0.175	0.360
Relative EEF*	100	92.09	103.95	129.66	49.44	101.69

* Assuming T_1 equals 100

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تأثير بعض المنتجات التجارية للمستخلصات النباتية على الأداء الإنتاجى للدجاج البياض

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أجريت هذه التجربة بمزرعة القناطر الخيرية - معهد بحوث الإنتاج الحيوانى -مركز البحوث الزراعية - وزارة الزراعة - الدقى - مصر. استخدم فيها عدد ١٤٤ دجاجة بياضة من النوع سينا عمر ٢٤ أسبوعا وزعت عشوائيا إلى ٦ معاملات كل معاملة ٢٤ دجاجة (٣ مكررات x ٨ طيور). تم استخدام عليقة تجارية تحتوى على ١٧,٥ ٪ بروتين خام وطاقة تمثيلية ٢٧٨٠ كليو كالورى / كجم علف خالية من أية إضافات واعتبرت عليقة المقارنة وفى المعاملات الأخرى تم إضافة ٠,١ ، ٠,٢ ، ٠,٣ ، ٠,٤ ٪ من المستحضر أج بلس ، ٠,١٢٥ ٪ مستحضر فرماكتو ٥٠٠ على التوالى إلى العليقة الأساسية (المقارنة) وغذيت عليها الطيور لمدة ٢٤ أسبوع تحت ظروف متماثلة من الإضاءة والرعاية.

وقد اظهرت النتائج تفوق العليقة المضاف إليها ٠,٣ ٪ أج بلس مقارنة بالمعاملات الأخرى من حيث إنتاج البيض ، إجمالى وزن البيض ، الكفاءة التحويلية لإنتاج البيض وكذلك الكفاءة الاقتصادية بينما لم تؤثر المعاملات المختلفة فى متوسط وزن البيضة وكذلك خصائص البيضة . أما بالنسبة للغذاء المأكول فقد انخفض بزيادة مستوى أج بلس أو وجود الفرماكتو بالمقارنة بعليقة المقارنة.

وعموما فان البحث يخلص الى إمكانية تغذية دجاج سينا البياض من عمر ٢٤-٤٨ أسبوعا على عليقة تحتوى على ٠,٣ ٪ أج بلس حيث أعطت أعلى كفاءة إنتاجية واقتصادية .