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EFFECT OF SUPPLEMENTATION WITH VARIOUS SOURCES OF ANTIOXIDANTS ON PRODUCTIVE AND REPRODUCTIVE PERFORMANCE OF LAYING HENS

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Abbreviations	Descriptions
%	Percent
ALT	Alanine aminotransferase
AOAC	Association of Official Analytical Chemists
AST	Aspartate aminotransferase
BW	Body weight
LCP	Low crude protein
CF	Crude fiber
CP	Crude protein
DM	Dry matter
EE	Ether extract
EP	Egg production
EW	Egg weight
EM	Egg mass
EST	Egg shell thickness
ESW	Egg shell weight
FCR	Feed conversion ratio
FI	Feed intake
g	Gram
HDL	High density lipoprotein
MET	Methionine
Kg	Kilogram
LDL	Low density lipoprotein
mg	Milligram
MDA	Malondialdehyde
HU	Haugh units
P value	Probability level
SEM	Standard error of the mean
TAC	Total antioxidant capacity
SeMet, SM	Selenomethionine
Wk	Week
YI	Yolk index

5- SUMMARY AND CONCLUSION

The present investigation was conducted at Faculty of Agriculture (Saba Basha), Alexandria University and EL-Sabahia Poultry Research Station in Alexandria, Animal Production Research Institute. Agricultural Research Center, Ministry of Agriculture.

The trail had carried out from July to September 2019 to explore the effect of supplementation low crude protein (LCP, 14%) with methionine (Met 1.0 g/kg diet), selenomethionine (SeMet, 0.5 gram/kg diet), Vit.E (VE, 0.75 mg/kg diet) and the combination of them on productive and reproductive performance in Golden Sabahia laying hens.

This trial included a total of 189 hens and 27 cocks from the Golden Sabahia local strain, all of which were 35 weeks old. The birds were leg-banded, weighed, and randomly assigned to 9 treatment groups, each containing 21 hens and 3 cocks, and 27 replicates (7 hen + one cock).

Throughout the experimental period (35-46 weeks of age), birds were fed and watered ad libitum, and a 15-9-hour light-dark cycle was assigned to the birds. Vaccination and medical programmes were carried out according to the various stages of age under the supervision of a veterinarian. The nutrient needs of the layer diet were satisfied, according to the feed composition table for animal and poultry feedstuffs in Egypt. The treatment and diet plans for the experimental treatments are listed in the table below:

Treatments and diets	Crude Protein in diet %	Methionine g/ kg diet	Selenomethionine g/ kg diet	Vitamin E mg /kg diet
1	16	0	0	0
2	14	0	0	0
3	14	1.00	0	0
4	14	0	0.5	0
5	14	0	0	75
6	14	1.00	0.5	0
7	14	0	0.5	75
8	14	1.00	0	75
9	14	1.00	0.5	75

The results of experiment could be summarized as follow:

1. Supplied LCP layer diet (14% CP) with 1gm Met, 0.5gm SeMet and 75 mgVE and their combination had no significant effect on BW compared to control Golden Sabahia laying diet (16% CP).
2. Egg production % (EP) was significantly affected during the all experimental intervals (35-38, 39-42 and 43-46 and the whole period (35-46 wks).
3. During the period (35-46 wks), laying hens fed 16% CP as control group had significantly highest EP (71.4%) compared with those fed on 14% CP and supplemented with (75 mg VE+ 0.5g SeMet , 1 g Met+ 75 mg VE or 1 g Met + 0.5g SeMet+ 75 mg VE).
4. The significantly highest EM was recorded for the control group fed (16% CP) followed by the groups which fed (75mg VE and 1g Met + 0.5 SeMet with 14% CP, respectively).
5. Feed intake (FI) during the most different intervals (35-38, 39-42, and 43-46 wks of age) of the experiment was not significantly affected by fed different agents compared to the control group fed (16% CP).

6. Feed conversion ratio (FCR), during the most different intervals (35-38 and 39-42, and 43-46 wks of age) of the experiment was significantly affected by fed (1gm) Met, (0.5gm) SeMet, (75 mg) VE and their combination with 14% CP, only the period between (43-46 wks) FCR was not significantly differed among all groups.
7. Dietary (1gm) Met, (0.5gm) SeMet and (75mg) VE and their combination with 14% CP had no significant effect in yolk weight %, yolk index, albumen weight %, shell weight %, eggshell thickness (mm), egg shape index and Haugh units.
8. Fertility and the hatchability of total eggs, fertile eggs, pip eggs and chick weights were insignificantly affected by dietary supplementation and there compensation with 14% CP among the experimental treatments.
9. Total protein, Albumin, Globulin and Alb/Glo Ratio, Serum ALT and AST concentrations in plasma had not significantly affected among different dietary treatments.
10. Plasma triglycerides, Total cholesterol, Plasma HDL, Plasma LDL and Serum creatinine concentrations were not significantly differed among different treatment group.
11. The Lymphocytes, Monocytes, Basophils, Eosinphils, Heterophils and H/L ratio were not significantly affected by dietary supplementations and their combination.
12. The highest significantly value of T.WBCs was recoded in the group that fed 14% CP (27×10^3/cmm) and 16% CP (26.7×10^3/cmm) followed by the groups which fed (1gm Met) (24.3×10^3/cmm). Moreover, the lowest value was significantly recorded in the group which fed 75mg VE with 14% CP (20.3×10^3/cmm). While, RBCs, Hb, PCV, PA and PI/10 were not significantly affected by dietary (1gm) methionine, (0.5gm) selenomethionine, (75 mg) vitamin E and their combination
13. The Glutathione peroxidase enzyme (GPX) in serum , Total antioxidant capacity (TAC) in serum and MDA in yolk storage after 30 days concentrations were not significantly affected by (1gm) methionine, (0.5gm) selenomethionine and (75 mg) vitamin E and their combination with 14% CP.
14. MDA concentration in fresh yolk was significantly decreased in the group that fed 14% CP and recorded (0.27 mg/kg) and the highest MDA concentration in fresh yolk recorded (0.39 mg/kg) in the group that fed 75 mg VE with 14% CP.
15. Dietary treatments and their combination had no effect on the levels of folicle-stimulating hormone (FSH), luteinizing hormone (LH). The FSH and (LH) results were in the range of (5.33 to 3.00 Iμ/ L) and (4.67 to 3.67 Iμ/L) respectively.
16. Dietary treatments and their combination had a significant effect on plasma Testosterone hormone levels. The cockers fed diet (1g Met + 0.5g SeMet+ 75mgVE with 14 % CP) had the highest testosterone hormone concentration (900.00 ng/dl).
17. The IgG concentration was significantly affected by dietary treatments and their combination. The highest value of IgG concentration was recorded (977mg/ml) in the group that fed (1g Met + 0.5g SeMet+ 75mgVE with 14% CP).
18. Dietary treatments and their combination had no influence on IgA and IgM concentrations.
19. The digestion coefficient values of OM, DM and CP showed a significant effect due to dietary treatments and their combination. The highest values of (OM, DM and CP) (91.4%, 86.2% and 88.7%) were recorded in the groups which fed (75mg VE, 1g Met and 1g Met + 75mg VE with 14% CP), respectively.
20. There were no significant effect in digestion coefficient values on EE, CF and NFE between the groups fed different dietary treatments and their combination. The (EE, CF and NFE) values were ranged between (86.9 to 76.7%, 85.5 to 71.2% and 85.9 to 78.8 %), respectively.

21. Ejaculate volume (ml) and sperm concentration ($\times 10^8$/ml) were significantly affected by dietary treatments and their combination.
22. Dietary treatments and their combination had no influence on sperm forward motility (%), live sperm (%), or dead sperm (%). The percentage of sperm forward motility (%), live sperm (%), and dead sperm (%) were (91.0 to 86 %, 94.7 to 89.7%, and 10.33 to 5.33 %), respectively.
23. Dietary supplementation in the group that fed (0.5g SeMet +75mg VE with low CP diet (14% CP) had the same economic efficiency (EE) as the control diet (16% CP) and the other supplementation had no improve in the economic efficiency (EE).

CONCLUSION:

It could be concluded that Golden Sabahia layer and cockers fed diets supplied with (1gm) methionine, (0.5gm) selenomethionine, (75 mg) vitamin E and their combination with 14% CP under the summer season during laying period significantly improved layer performance, digestibility of nutrients, some immune response and semen quality.