Faculty of African Postgraduate Studies

Department of Natural Resources

EFFECT OF USING NANO SELENIUM, VITAMIN E AND LUTEIN ON BROILER PERFORMANCE IN EGYPT AND TUNISIA

BY

MARWA ABD EL-AZEAM EL-TYBE ALI EL-GARHE

B.Sc. Agric. Sci., Poultry Production Sci., Cairo University, 2004

Diploma of Natural Resources, Institute African Research and Studies, Cairo University, 2006

M.Sc. thesis (Natural Resources-Animal Resources), Institute African Research and Studies, Cairo University, 2013

Thesis Submitted in Partial Fulfillment of
The Requirement for the Degree of
DOCTOR OF PHILOSOPHY
African Postgraduate Studies (Natural Resources-Animal Resources)

SUPERVISORS

Prof. Dr. WAFAI ZAKI AZER MIKHAIL
Professor of Animal Resources,
Dept. of Natural Resources,
Faculty of African Postgraduate Studies, Cairo University.

Prof. Dr. KOUT ELKLOUB MOUSTAFA ELSAYED MOUSTAFA
Professor of Poultry Nutrition,
Animal Production Research Institute
Agricultural Research Center.

Prof. Dr. HANY MOHAMED RAMADAN EL-SHERIF
Professor of Poultry Nutrition,
Animal Production Department,
Faculty of Agricultural, Cairo University

2022

Name of Candidate: Marwa Abd El-Azeam EL-tybe **Degree** :Ph.D.
Title of Thesis: Effect of using nano selenium, vitamin E and lutein on broiler performance in Egypt and Tunisia.
Supervisors: Prof**.** Dr. Wfaei Zaki Azer Mikhail
Prof. Dr. Kout El-Kloub Moustafa El-Sayed Moustafa
Prof. Dr .Hany Mohame Ramadan EL-sherif
Department : Natural Resources **Branch :** Animal Resources

Approval: 26 /3 / 2022

ABSTRACT

The present work was conducted to study the effect of using nano-selenium, vitamin E and lutein as antioxidants on the productive performance of broiler chickens. A total number of 216 day-old Arber Acres broiler chicks were divided into 8 groups, each group containing 3 replicates in 9 chicks each. The experimental period started at 7 days of age and lasted at 35 days of age. The experimental diets were formulated to be nearly iso-nitrogenous (23, 21 and 19 % CP) and iso-caloric (3000, 3100 and 3200 kcal ME/kg diet) during starter, grower and finisher periods, respectively. Body weight, body weight gain, feed intake and feed conversion ratio were calculated weekly, carcass characteristics and blood constitutions were measured at the end of the experiment, mortality was recorded every day if happened. Experimental treatment diets were as follows: T1 = The basal diet (control with inorganic selenium).T2 = control without selenium + selenium nano particles (0.1 mg/kg diet).T3 = control with inorganic selenium + vitamin E (100 mg /kg diet). T4 = control without selenium + selenium nano particles (0.1 mg/kg diet) + vitamin E (100 mg /kg diet).T5 = control with inorganic selenium +Lutein (40 mg/kg diet).T6= control without selenium + selenium nano particles (0.1 mg/kg diet) + Lutein (40 mg/kg diet). T7 = control with inorganic selenium + vitamin E (100 mg /kg diet) +Lutein (40 mg/kg diet). T8 = control without selenium + selenium nano particles (0.1 mg/kg diet) +vitamin E 100 mg /kg diet) + Lutein (40 mg/kg diet).The chicks of T5 (lutein) recorded the highest significantly body weight compared to control. At 21 days (BW3) the same result of T5 (lutein) achieved the highest significantly body weight comparing to control group and T2 (SeNPS). There were no significant differences between all treatments for BWG3, BWG4 and overall BWG while, at the overall period all treatments numerically increased in body weight gain compared to the control group and T4 recorded the best value. The mortality percentage for control (T1) recorded 7.41%. While, no mortality was recorded at T4, T5 and T6. During overall period in FI T4 (SeNPS+Vit.E), and T2 (SeNPS) recorded the significantly lowest value compared to control group. At the overall period the best FCR ($P \leq 0.05$) was obtained by T4 (SeNPS+ Vit.E). In plasma calcium recorded that T7 (SeNPS+lutein) and T8 (SeNPS+Vit.E+lut.) were the highest value ($P<0.05$) compared to control. The highest value of plasma phosphorous was occurred by T2 (SeNPS) compared to all treatments. All treatments recorded significantly lowest plasma total cholesterol compared to control group. Regarding to carcass characteristics the results indicated that spleen and thymus had increased in all treatments compared to control group. It could be concluded that the supplementation of nano-selenium, Vit.E and lutein alone or in combination as antioxidants in broiler diets could improve broiler performance, and the best treatment was nano-selenium +Vit.E (T4).

LIST OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATION

ABBREVIATION	MEANS
ALP	alkaline phosphatase activity
ALT	Alanine Amino Transferees
AST	Aspartate Amino Transferees
BW	Body Weight
BWG	Body Weight Gain
CAT	catalase activity
CP	Crude Protein
DM	Dry Matter
FCR	Feed Conversion Ratio
FI	Feed Intake
IU	International Unit
LDL	Low Density Lipoprotein
LP	lipid peroxidation
ME	Metabolism Energy
Ppm	Part Per Million
Se	Selenium
SOD	superoxide dismutase activity
GSHPx	glutathione peroxidase
Vit.E	Vitamin-E
Kcal	Kilo calories.
Kg	kilo gram