INFLUENCE OF DIETARY POLYUNSATURATED FATTY ACIDS AND ANTIOXIDANTS SUPPLEMENTATION ON IMMUNE RESPONSE, PRODUCTIVE PERFORMANCE AND MEAT QUALITY OF BROILER CHICKENS

By

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B. Sc. Agric. Sc., (Animal Production), Benha University, 2007

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the requirements for the degree of

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Approval Sheet

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ABSTRACT

MOHAMED SHAFEY ABDEL-WAHED ELSHARKAWY: Influence of Dietary Polyunsaturated Fatty Acids and Antioxidants Supplementation on Immune Response, Productive Performance and Meat Quality of Broiler Chickens, Unpublished M.Sc. Thesis, Dept. of Poultry Production, Fac. of Agric., Ain Shams Univ., 2015.

The present experiment was carried out at the Poultry Physiology Researches Laboratory, Poultry Production Department, Faculty of Agriculture, Ain Shams University, and Laboratories of Animal Production Department, National Research Centre, Cairo, Egypt. The main objective of the study was to investigate the possibility to increase n-3 long chain PUFAs especially EPA and DHA fatty acids and to preserve meat quality in broiler by adding FO or LO and some of antioxidants to the diet. As well as, improving productive performance and immune response of broiler chicks. A total of 168 one-day-old, Cobb-500 broiler chicks were obtained from a local commercial hatchery. The birds were randomly divided into seven groups with three replicates, eight chicks each. The first group was fed on the basal diet containing 2% soy bean oil (control), the 2^{nd} , 3^{rd} and 4^{th} groups were given the basal diets containing 2% LO; 2% LO + 200 mg vitamin E (Vit. E)/ kg or 2% LO + 0.2% Sweet Chestnut Tannin (SCT), respectively. While the 5^{th}, 6^{th} and 7^{th} groups were offered the basal diet containing 2% FO, 2% FO + 200 mg Vit. E/ kg or 2% FO + 0.2% SCT, respectively. Results showed that live body weight and feed conversion ratio were significantly enhanced by addition of FO + 0.2 %SCT, LO + 0.2 %SCT followed by FO + 200mg/ kg Vit. E. Dietary inclusion of 2% FO + 0.2%SCT in broiler diets improved immune response and plasma lipids parameters of broilers and n-3 long chain PUFAs in broiler meat and enhance the antioxidant activity. However, the addition of 2% fish oil only had the least score of sensory traits. While, inclusion of 2%

linseed oil with the two sources of antioxidants increased broilers meat α linoleinc acid and enhanced the antioxidant activity, consequently protected lipid meat from lipid peroxidation

Key Words; Broiler, linseed oil, fish oil, antioxidants, PUFAs, meat, immune response, performance

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Mohamed Shafey Elsharkawy

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LIST OF FATTY ACIDS NAME

C12:0	Lauric acid
C14:0	Myristic acid
C14:1	Myristoleic acid
C16:0	Palmitic acid
C16:1	Palmitoleic acid
C18:0	Stearic acid
C18:1	Oleic acid
C18:2	Linoleic acid
C18:3	α-linolenic acid
C20:3	Eicosatrienoic acid
C20:4	Arachidonic acid
C20:5	Eicosapentaenoic acid
C22:6	Docosahexaenoic acid

LIST OF ABBREVIATION

ABBREVIATION	Mean
ALA	α-linolenic acid
BM	Breast muscles
BWG	Body weight gain
C	Control
CAM	camelina meal
CF	Crud fiber
CO	Corn oil
Conc.	Concentration
CP	Crud protein
CS	Canola seed
DHA	Docosahexaenoic acid
DM	Dry matter
DOA	Day of age
DPPH	1, 1-diphenyl-2picrylhydrazyl
EE	Ether extract
EPA	Eicosapentaenoic acid
FA	Fatty acids
FCR	Feed conversion ratio
FI	Feed intake
FO	Fish oil
g	Gram
GC	Gas chromatography
GLM	General linear model
HDL	High-density lipoprotein
HT	Hydrolysable tannins
Kg	Kilogram
LBW	Live body weight
LDL	Low-density lipoprotein

LNA	Linoleic acid
LO	Linseed oil
LS	Linseed
MDA	Malondialdehyde
ME	Metabolizable energy
MUFAs	Monounsaturated fatty acids
n-3	omega-3
ND	Newcastle disease
OLO	Olive oil
PBS	Phosphate buffered saline
PF	Poultry fat
PO	Palm oil
PUFAs	Polyunsaturated fatty acids
RO	Rapeseed oil
SCT	Sweet Chestnut Tannin
SFAs	Saturated fatty acids
SFO	Sunflower oil
SO	Soy oil
SRBCs	Sheep red blood cells
TBA	Thiobarbituric acid
TM	Thigh muscles
Vit. E	Vitamin E
VO	Vegetable oil
WOA	Week of age