EFFECT OF NANOSILVER ON BROILER PERFORMANCE

By

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B.Sc. Agric. Sci. (General Agriculture Production), Fac. Agric., South Valley Univ., 2004

THESIS

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APPROVAL SHEET

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ABSTRACT

This study was carried out to investigate the effect of silver nanoparticles (AgNPs) on broiler growth performance, carcass traits, blood constitutes, histological studies and ceca counts of *E coli* and *lactobacillus*. Silver nanoparticles were prepared by the reduction of silver nitrate (AgNO3) with dilute aqueous solutions containing Cetyl trimethyl ammonium bromide (CTAB) which was used as a dispersing agent, and Hydrazine which acts as a reducing as well as adsorbing agent in the preparation of roughly spherical and non-agglomerated silver nanoparticles. Characterization is performed using a variety of different techniques such as transmission electron microscopy (TEM) and UV–Vis spectroscopy and atomic absorption spectroscopy. A total of 180 seven days old un-sexed broiler chicks (Hubbard) were divided into six groups of three replicates (10 birds in each replicate). Basal control diet was supplemented with different levels of AgNPs (2, 4, 6, 8 and 10 ppm/kg feed) throughout growth trial period (7-35 days). The results showed that the heaviest final body weight and the highest body weight gain was recorded by adding 4 ppm AgNPs/kg feed. The best feed conversion ratio (1.5) was obtained by using 4 ppm AgNPs/kg feed compared to all studied treatments. Serum total lipids were significantly decreased in all treatments compared to the control. Cholesterol was significantly decreased at 2, 4 and 6 ppm AgNPs/kg diet compared to the control. Total serum antioxidant capacity significantly increased in all supplemented levels of dietary AgNPs compared to the control, while 4ppmAgNPs/kg feed recorded the highest value. Histopathological examination of different tissues from each experimental treatment revealed normal histological structures without any detectable pathological alterations compared to the control group. In addition, silver nanoparticles increased the European production efficiency index (EPEE) in all treatments compared to the control and 4 ppm AgNPs/kg feed recorded the best EPEE compared to all treatments. AgNPs decreased the number of *E.Coli* compared to the control and had no effect on *lactobacillus*. It could be concluded that the best productive performance of broiler occurred by supplementing 4 ppm AgNPs/kg in broiler diets.

Key words: Silver Nanoparticles, performance, blood constituents, bacteria count, broiler.

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LIST OF ABBREVIATIONS

AF	aflatoxin
AFM	atomic force microscopy
Ag+	silver ions
AgBF4	silver tetrafluoroborate
$AgClO_4$	silver chlorate
$AgNO_3$	Silver nitrate
AgNPs	silver nanoparticles
ALT	alanine transferase
AP	alkaline phosphatase
AST	asparagine transferase
ATA	antibody titers against
BWG	Average body weight gain
Ca^{++}	Calcium
CF	crude fiber
Cfu	Colony forming units
CP	crude protein
CTAB	Cetyl trimethyl ammonium bromide
E.Coli	Escherichia Coli
EE	ether extract
EEF	economic efficiency
EPEI	European Production Efficiency Index
FCR	Feed conversion ratio
FGF	Fibroblast Growth Factor
FI	Feed intake
FN	fecal nitrogen
G	Globulin
GIT	gastrointestinal tract
Hb	hemoglobin
HC	hemoglobin concentration
HSP	heat shock protein
Ht	hematocrit

LA	Livability
LBW	Average live body weight
MCH	Mean corpuscular hemoglobin
MCHC	Mean corpuscular hemoglobin concentration
MCV	Mean corpuscular volume
ME	Metabolizable energy
NDV	Newcastle disease virus
NFE	nitrogen free extract
Nm	Nanometers
NR	nitrogen retention
NZ	zeolite_hydrocolloidal silver nanoparticles
OM	organic matter
PCNA	Proliferating Cell Nuclear Antigen
PP	Production period
PUE	protein utilization efficiency
PVP	poly vinyl pyrrolidone
RBCs	red blood cells
RGR	Relative Growth rate
SDS	sodium dodecyl sulfate
SEM	scanning electron microscopy
TCA	Trichloroacetic acid solution
TEM	transmission electron microscopy
TG	triacyl-glyceride
TP	Total protein
UN	Urinary nitrogen
VEGF	Vascular Endothelial Growth Factor
WBCs	white blood cells
XRD	X-ray diffractometry

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