



**Effects of Probiotic, Enzyme and Acidifier to
Substitute Antibiotic Growth Promoter on Productive
Performance, Blood Parameters and Carcass
Characteristics of Broiler**

DR NASIMA AKTER

Examination Roll No. 0116/02

Registration No. 285

Session: 2016-2017

**A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science in Animal and Poultry Nutrition**

**Department of Animal Science and Nutrition
Faculty of Veterinary Medicine
Chittagong Veterinary and Animal Sciences University
Chittagong-4225, Bangladesh**

December 2017

AUTHORIZATION

I hereby declare that I am the sole author of the thesis. I also authorize the Chittagong Veterinary and Animal Sciences University (CVASU) to lend this thesis to other institutions or individuals for the purpose of scholarly research. I further authorize CVASU to reproduce the thesis by photocopying or by other means in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

I the undersigned and author of this work declare that the **electronic copy** of this thesis provided to the CVASU Library is an accurate copy of the print thesis submitted within the limits of the technology available.

The Author
December 2017

Effects of Probiotic, Enzyme and Acidifier to Substitute Antibiotic Growth Promoter on Productive Performance, Blood Parameters and Carcass Characteristics of Broiler

DR NASIMA AKTER

Examination Roll No. 0116/02

Registration No. 285

Session:2016-2017

This is to certify that we have examined the above Master's thesis and have found that the thesis is complete and satisfactory in all respects and that all revisions required by the thesis examination committee have been made

(Dr. Md. Hasanuzzaman)

Professor

Department of Animal Science and Nutrition

Supervisor

(Dr. Md. Manirul Islam)

Professor and Head

Department of Animal Science and Nutrition

Chairman of the Examination Committee

**Department of Animal Science and Nutrition
Faculty of Veterinary Medicine
Chittagong Veterinary and Animal Sciences University
Khulshi, Chittagong-4225, Bangladesh**

December 2017

ACKNOWLEDGEMENT

Firstly, I am indebted to Almighty God who enables me to complete the research work and write up the dissertation successfully for the degree of Master of Science (MS) in Animal and Poultry Nutrition under the Department of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University (CVASU).

Secondly, I am grateful to my supervisor **Dr. Md. Hasanuzzaman**, Professor, Department of Animal Science and Nutrition, CVASU for his valuable supervision and guidance. It was really a great pleasure and amazing experience for me to work under his supervision. I really deemed it and I realized it was a rare opportunity for me to work under his creative guidance. I understand it was impossible to complete the dissertation without his constructive supervision.

It's my pleasure to convey my profound gratitude to **Dr. Goutam Buddha Das**, Vice chancellor, Chittagong Veterinary and Animal Sciences University (CVASU) and Ex. Professor, Department of Animal Science and Nutrition, for his valuable support.

It is my privilege to acknowledge **DR. Mukti Barua**, Department of Animal Science and Nutrition for his support, valuable advice and encouragement for the research work.

It's my pleasure to convey my profound gratitude to **DR. Mahbub Alam**, Assistant Professor, Department of Animal Science and Nutrition, CVASU for his valuable advice, scholastic guidance, suggestions and inspiration.

It is my privilege to acknowledge **Dr. Md. Manirul Islam**, Professor and Head, Department of Animal Science and Nutrition, CVASU for his support, valuable advice and encouragement for the research work.

I would like to thank **DR. Abu Sayeed**, Lecturer of Epidemiology, Department of Medicine and Surgery, ZGVC for his great support and valuable time during the experimental period.

I sincerely thank to all the members of the department of Physiology, Biochemistry and Pharmacology and Animal Science and Nutrition for their help in using their laboratory.

Last but not least, I express my deepest sense of gratitude to my beloved family members and my friends for their sacrifice, blessings and encouragement.

The Author
December 2017

Abstract

The study was conducted at CVASU poultry shed with one hundred Cobb 500™ day old chicks (DOC) for a period of 28 days to investigate the effects of water supplementation with probiotic, enzyme and acidifier as substitute to antibiotic on performance parameters, carcass characteristics and blood parameters in commercial broiler. The study population (DOC) were randomly divided into five dietary treatment groups as T₀, T₁, T₂, T₃ and T₄ having two replicates each containing 20 birds per replicate. Probiotic, enzyme, acidifier and antibiotic (additives) were supplemented @ 0, 1g, 1.5 g, 1.5 ml, & 1 g per 1.5 L for T₀, T₁, T₂, T₃ and T₄ treatment groups respectively in regular drinking water. Results indicated that the highest average weight gain (100.2 g/d/b) was recorded in T₁ group and the lowest average weight gain (88.9 g/d/b) was recorded in T₀ group at 4th week. Feed intake differed significantly ($p < 0.001$) at 2nd and ($p < 0.05$) at 4th week. At the same week the highest weekly average feed intake (174.0 g/d) was observed in T₁ group and the lowest weekly average feed intake (121.5 g/d) was in T₂ group. FCR was also statistically differed ($p < 0.001$) at 2nd and ($p < 0.05$) at 4th week. However, the best average FCR (1.4) was observed in the T₂ group and worst FCR (1.6) in T₀ and T₄ groups. In addition to performance parameter, all treatments had significant ($p < 0.05$) effect on dressing percentage, abdominal and neck fat weight. Similar to performance parameter, ESR differed significantly ($p < 0.01$) at 4th week of probiotic, enzyme and acidifier supplementation. Interestingly, PCV, ESR, TEC, Hemoglobin and all blood cell parameter remained unchanged ($p > 0.05$) throughout the whole experimental period. LDL differed significantly ($p < 0.05$) at 3rd week and Triglyceride differed significantly ($p < 0.05$) at 3rd and 4th week of age and had no influence ($p > 0.05$) on other biochemical parameters. However, supplementation of additives had no influence ($p > 0.05$) on composition of meat excluding ash. Maximum net profit per broiler was obtained from birds containing enzyme supplementation adding in regular drinking water.

Keywords: Broiler Probiotic, Enzyme, Acidifier, Growth performance, Carcass Characteristics and Serum parameter.

Chapter	List of Contents	Page No.
	Authorization	II
	Signature page	III
	Acknowledgements	IV
	Abstract	V
Chapter 1	Introduction	1-3
	1.1 Justification of the study	3
	1.2 Objectives	3
	1.3 Research questions	3
	1.4 Scope of the study	3
	1.5 Limitations of the study	3
Chapter 2	Review of Literature	4-18
	2.1 What is Probiotic?	4
	2.2 Criteria for Ideal probiotic	5
	2.3 Mode of action of probiotic	5
	2.4 Commonly used microbes as probiotics	5-6
	2.5 Applications of probiotics in poultry	6
	2.6 Effect of probiotic	7-8
	2.6.1 Effect on performance	7
	2.6.2 Effect on Immunity	7-8
	2.6.3 Effect of Reducing Ammonia production	7-8
	2.7 What is Enzyme?	8
	2.8 Source of enzyme	8
	2.9 Types of enzyme in poultry nutrition	9
	2.10 Effect on enzyme	9-13
	2.10.1 Effect on poultry nutrition	9-10
	2.10.2 Effect on reduction in digesta viscosity	10
	2.10.3 Effect on nutrient digestibility	10
	2.11 Factor affecting the benefits of enzyme	11
	2.12 What is Acidifier?	11
	2.13 Biochemistry of acidifier	11
	2.14 Acidifier and its characteristics	11-12
	2.15 Mode of action of acidifier	12
	2.16 Antibacterial activity of acidifier	12-13
	2.17 Effect of acidifier	13-18
	2.17.1 Effect on immunity	13-14
	2.17.3 Effect on nutrient digestibility	14-16
	2.17.4 Effect on broilers performance	16
	2.18 Additional probable effects	17
	2.19 Effect of Antibiotic compared to probiotic, enzyme and acidifier	17-18
Chapter 3	Materials and Methods	19-27
	3.1 Study area	19
	3.2 Study period	19
	3.3 Experimental birds	19
	3.4 Experimental medication	19-20

	3.5	Design of experiment	21
	3.6	Management	21-24
		3.6.1 Housing	21
		3.6.2 Brooder and cage space	22
		3.6.3 Brooding	22
		3.6.4 Temperature and humidity control of experiment	22
		3.6.5 Feeding and watering	22-23
		3.6.5 Vaccination	23
		3.6.6 Sanitation	24
	3.7	Laboratory work	24-27
		3.7.1 Carcass measurement	24
		3.7.2 Proximate analysis of meat	25
		3.7.3 Hematological analysis	25-26
		3.7.4 Serum analysis	26
	3.8	Data collection	27
		3.8.1 Weight gain	27
		3.8.2 Feed intake	27
		3.8.3 Feed conversion ratio (FCR)	27
	3.9	Statistical analysis	27
Chapter 4		Results	28-36
	4.1	Weight gain	28-29
	4.2	Feed intake	29
	4.3	Feed conversion ratio	30
	4.4	Hematological parameters	30-32
	4.5	Serum parameters	32-34
	4.6	Carcass characteristics	34-35
	4.7	Chemical composition of meat	35
	4.8	Cost-benefit analysis	36
Chapter 5		Discussion	36-45
	5.1	Weight gain	38-39
	5.2	Feed intake	40
	5.3	Feed conversion ratio(FCR)	41-42
	5.4	Hematological parameters	42
	5.5	Serum parameters	42-43
	5.6	Carcass characteristics	44-45
	5.7	Chemical composition of meat	45
Chapter 6		Conclusion	46
Chapter 7		Recommendation	47
Chapter 8		References	48-59
		Biography of Author	60
		Appendices	61-66

LIST OF FIGURES

FIGURE NO.	CONTENT	PAGE NO
Figure 3.1	Collection of Day old chicks	19
Figure 3.2	Brooder box with chicks	22
Figure 3.3	IBD vaccine, BCRDV vaccine, Vaccine diluting	24
Figure 3.4	Vaccination of chicks	24
Figure 3.5	Cutting of body parts	24
Figure 3.6	Weighing of the breast meat	24
Figure 3.7	Weighing of the drum stick	24
Figure 3.8	Chopping of meat	25
Figure 3.9	Digestion of sample	25
Figure 3.10	Extracting of ether	25
Figure 3.11	Ashing of sample	25
Figure 3.12	Collected blood sample	26
Figure 3.13	Mixing of serum	26

LIST OF TABLES

TABLE NO.	CONTENT	PAGE NO
Table 3.1.	Layout of experiment	21
Table 3.2	Nutritive value of basal diet in broiler feeding	23
Table 3.3	Vaccination schedule	23
Table 4.1	Live weight (gm/bird) of the experimental broiler birds	28
Table 4.2	Weight gain (gm/bird/day) of the experimental broiler birds	29
Table 4.3	Feed Intake (gm/bird/day) of the experimental broiler birds	29
Table 4.4	Feed conversion ratio (FCR) of the experimental broiler birds	30
Table 4.5	Hematological parameters of the experimental broiler birds	32
Table 4.6	Serum parameters of the experimental broiler birds	34
Table 4.7	Carcass characteristics of the experimental birds	35
Table 4.8	Chemical composition of meat of experimental birds	36
Table 4.9	Cost-benefit analysis of experimental birds	36

List of Abbreviation

<	-	Less than
>	-	Greater than
%	-	Percentage
AID	-	Apparent Ileal Digestibility
ALT	-	Alanin transaminase
ANOVA	-	Analysis of variance
AST	-	Aspartate transaminase
BBS	-	Bangladesh Bureau of Statistics
BCRDV	-	Baby Chick Ranikhet Disease Vaccine
BMD	-	Bangladesh Meteorological Department
Ca	-	Calcium
CF	-	Crude fibre
Co	-	Company
CP	-	Crude protein
CVASU	-	Chittagong Veterinary and Animal Sciences University
DCP	-	Digestible Crude Protein
DM	-	Dry Matter
DMD	-	Dry Matter Digestibility
DNA	-	Deoxyribonucleic acid
DOC	-	Day Old Chick
e.g	-	Example
EE	-	Ether Extract
ESR	-	Erythrocyte Sedimentation Rate
et al.	-	And his associates
etc.	-	Et cetera
F	-	Farenhite
FAO	-	Food and Agriculture Organization
FCR	-	Feed Conversion Ratio
Fig.	-	Figure
Ft	-	Feet
GDP	-	Gross Domestic Product
GIT	-	Gastrointestinal tract
Gm	-	Gram
Hb	-	Hemoglobin
i.e.	-	That is

IBD	- Infectious Bursal Disease
IU	- International Unit
KG	- Kilogram
L	- Litre
LCD	- Liquid Crystal Display
LDL	- Low Density Lipoprotein
Ltd	- Limited
LW	- Live weight
ME	- Metabolizable Energy
MJ	- Mega Jules
MS	- Master of Science
NRC	- National Research Council
NS	- Non-Significant
NSP	- Non Starch Polysaccharide
P	- Phosphorus
PCV	- Packed cell volume
pH	- Negative logarithm of hydrogen
Ref.	- Reference
SEM	- Standard error of mean
Sig.	- Significance
TEC	- Total Erythrocyte Count
TP	- Total Protein
US	- United State