

34

**EFFECT OF DIETARY SUPPLEMENTATION OF *Bacillus subtilis*  
(DSM5750) AND *Bacillus licheniformis* (DSM5749) ON GROWTH  
PERFORMANCE OF COMMERCIAL BROILERS**



By

**M.A.M Thathsarani**



FTC298

Main Library, Eastern University, Sri Lanka

**Department of Biosystems Technology**

**Faculty of Technology**

**Eastern University, Sri Lanka**

**Chenkalady**

**2026**

## ABSTRACT

The main goal of this research was to understand how the economical and biological impact of commercial broiler growth performances by feeding with the supplementation of *Bacillus subtilis* (DSM 5750) and *Bacillus licheniformis* (DSM 5749) and four key variables referring to broiler husbandry with the changes of villus height (VH) of broiler gastrointestinal tract. A total of 270-day-old Ross 308 FF broiler chicks were randomly distributed into three separate groups with 90 chicks each. Each 90 chicks were divided randomly into six replicates each with 15 chicks. All chicks were subjected to rear under deep litter based open housing system. The experiment was laid out in a control randomized design (CRD) with having the following three treatments. The control group is designated as Treatment 0 (T0) which was given only the basal diet. The Treatment – 1 (T1) is given 400g / ton and Treatment - 2 (T2) was given 500g / ton of tested probiotics added broiler diet respectively. All broiler diets in different feeding phase up to 35 days of experimental period were formulated based on Ross 308 FF Nutritional Specifications 2022. All kinds of broiler diets were free of antibiotic growth promoters (AGP) and natural growth promoters (NGP) and feed form was crumbling from day 01 to 15 days and pelleted diet since day 16 to 35 respectively. Weekly data on mortality, feed intake, body weight and feed conversion ratio (FCR) were recorded. The samples of gastrointestinal tract (Duodenum, Jejunum & Ileum) of six sacrificed broilers of each treatment at 35 days were subjected to histological studies. The results showed that inclusion of 400g/ton of tested probiotic (*Bacillus subtilis* (DSM5750) and *Bacillus licheniformis* (DSM5749)) had significant effects on broiler growth performances parameters concluding as broiler performance efficiency index (BPEI) and duodenal morphometry of commercial broilers over the basal diet used in control group. Further studies under equal field conditions should be conducted to confirm these results.

**Key words:** Broiler Performance Efficiency Index (BPEI); Commercial Broilers; Duodenal Morphometry; Feed Conversion Ratio (FCR); Probiotics

# TABLE OF CONTENT

DECLARATION .....	iii
DEDICATION .....	iv
ACKNOWLEDGEMENT .....	v
ABSTRACT.....	vi
TABLE OF CONTENT .....	vii
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xii
ABBREVIATIONS .....	xiii
CHAPTER 01 .....	1
INTRODUCTION.....	1
1.1 General Introduction .....	1
1.2 Problem Statement .....	4
1.3 Research Gap.....	4
1.4 Objectives.....	5
1.4.1 General Objective .....	5
1.4.2 Specific Objectives .....	5
1.5 Significant of the Study .....	5
CHAPTER 02 .....	7
LITERATURE REVIEW .....	7
2.1 Global Broiler Industry .....	7
2.2 Broiler Production in Sri Lanka .....	7
2.3 Life Cycle of Broiler Chicken.....	8
2.4 Broiler Breeds .....	8
2.4.1 Ross-308 Broiler Breed .....	9
2.4.2 Performances of Ross-308 Broiler Breed.....	9

2.5 Growth Performances Parameters in Broilers .....	9
2.6 Commercial Broiler Feed .....	10
2.6.1 Types of Broiler Feed .....	10
2.6.1.1 Broiler Starter Feed.....	10
2.6.1.2 Broiler Pre-Starter (Booster) Feed .....	10
2.6.1.3 Broiler Finisher Feed .....	11
2.6.2 Effect of Feed Form on Broiler Growth Performances .....	11
2.6.3 Effect of Broiler Feed Processing on Growth Performances.....	11
2.7 Feed Additives in Broiler Feed .....	12
2.7.1 Antibiotics.....	12
2.7.2 Antioxidant .....	13
2.7.3 Enzymes.....	13
2.7.4 Probiotics .....	14
2.7.4.1 Gallipro® MS Probiotic Product .....	14
2.7.4.2 Mode of Action of Probiotic .....	15
2.7.4.3 Bacillus subtilis (DSM5750) & Bacillus licheniformis (DSM5749)....	15
2.7.4.4 Effect of Probiotics (Bacillus subtilis & Bacillus licheniformis) on the Growth Performances of Ross-308 Broiler Breed .....	16
2.7.4.5 Effect of Bacillus subtilis (DSM5750) & Bacillus licheniformis (DSM5749) on Growth Promoters in Broiler Growth Performances .....	16
2.8 Comparative Studies of Probiotic vs Antibiotic Growth Performances.....	16
2.9 Economic Impact of Probiotic Supplementation in Poultry Farming .....	17
2.10 Safety & Regulatory Aspects of Probiotic Use in Broilers .....	17
CHAPTER 03 .....	19
MATERIALS AND METHOD .....	19
3.1 Location of the Study .....	19
3.2 Experimental Design .....	19
3.3 Treatment 0 (Control).....	20

3.4 Treatment 1 .....	20
3.5 Treatment 2 .....	20
3.6 Broiler Cage Preparation .....	21
3.7 Experimental Diet .....	21
3.7.1 Preparation of Broiler Pre-Starter (Booster) Feed .....	21
3.7.2 Preparation of Broiler Finisher Feed .....	22
3.8 Adding Chicks to Replicates .....	23
3.9 Broiler Brooder Management.....	24
3.10 Feeding Procedure.....	24
3.11 Data Collection.....	25
3.11.1 Average Body Weight .....	25
3.11.2 Average Feed Intake.....	25
3.11.3 Chicks Mortality .....	26
3.11.4 Feed Conversion Ratio (FCR) .....	26
3.12 Proximate Analysis of Broiler Feed .....	26
3.12.1 Determination of Moisture Content.....	26
3.12.2 Determination of Ash Content.....	27
3.12.3 Determination of Crude Fat Content .....	27
3.12.4 Determination of Crude Protein Content.....	28
3.12.5 Determination of Crude Fiber Content.....	28
3.13 Histological Investigation .....	29
3.14 Broiler Performance Efficiency Index (BPEI) .....	30
CHAPTER 04 .....	31
RESULTS AND DISCUSSION.....	31
4.1 Effect of Probiotic on the Mortality of Broilers.....	31
4.2 Effect of Probiotic on the Feed Intake of Broilers .....	33
4.3 Effect of Probiotic on the Mean Body Weight of Broilers.....	35

4.4 Effect of Probiotic on the FCR of Broilers .....	37
4.5 Proximate Analysis of Broiler Pre-Starter (Booster) Feed.....	40
4.6 Proximate Analysis of Broiler Finisher Feed .....	41
4.7 Mean Intestinal Villus Height (VH) in Different Segments of Gastrointestinal Tract (GIT) .....	42
4.8 Effect of Probiotic on Mean Broiler Performance Efficiency Index (BPEI) at the Age of Day 35 .....	48
CHAPTER 05 .....	50
CONCLUSION AND RECOMMENDATION.....	50
5.1 Key Findings .....	50
5.2 Conclusion.....	50
5.3 Recommendation.....	50
5.4 Future Implication .....	51
5.5 Limitations .....	51
REFERENCES .....	52
APPENDICES .....	58