

**Effects of Sources of Protein on Productive Performance and Immune Response in Commercial Broiler**

**Sabuj Kanti Nath**

**Roll No. 0214/03**

**Reg. No. 189**

**Session: 2014-15**

**A thesis submitted in the 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**

**Khulshi, Chittagong-4225, Bangladesh**

**December, 2016**

**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 the 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.

**Sabuj Kanti Nath**

**December, 2016**

**Effects of Sources of Protein on Productive Performance and Immune Response in Commercial Broiler**

**Sabuj Kanti Nath**

**Roll No. 0214/03**

**Reg. No. 189**

**Session: 2014-15**

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

|  |  |
| --- | --- |
| **Dr. Goutam Buddha Das**  **Professor**  Department of Anima Animal Science and Nutrition  Supervisor | **Dr. Abdul Ahad**  **Professor**  Department of Microbiology and Veterinary Public Health  Co-supervisor |

**Md Emran Hossain**

**Associate Professor and Head**

**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, 2016**

**DEDICATED TO MY BELOVED PARENTS AND ALL WELL WISHERS**

**Table of Contents**

|  |  |
| --- | --- |
| **Subjects** | **Page No.** |
| Authorization | ii |
| List of tables | vii |
| List of abbreviations and Symbols Used | viii |
| Acknowledgements | ix |
| Abstract | x |
| **Chapter-I: Introduction** | **1-3** |
| **Chapter-II: Review of Literature** | **4-13** |
| 2.1. Plant protein source | 4 |
| 2.2. Animal protein source | 4 |
| 2.3. Amino acids | 6 |
| 2.4. Anti-nutritional factors | 6 |
| 2.5 Amount of soybean meal in ration | 8 |
| 2.6. Soybean protein concentrate (SPC) or Soybean protein isolates (SPI) | 8 |
| 2.7. Blood meal as a source of protein | 9 |
| 2.8. Spray-dried plasma | 10 |
| **Chapter-III: Materials and Methods** | **14-22** |
| 3.1. Description of study area | 14 |
| 3.2. Duration of study | 14 |
| 3.3. Sampling strategy | 14 |
| 3.4. Study design and management | 14 |
| 3.5. Vaccination of the experimental broiler | 14 |
| 3.6. Criteria of measurement or response | 15 |
| 3.6.1. Live body weights and body weight gain (gm)  3.6.2. Feed intake and protein intake (gm/birds)  3.6.3. Feed conversion ratio (FCR)  3.6.4. Cumulative feed consumption ratio  3.6.5. Mortality rate  3.6.6. Immunological test | 15 |
| 3.7. Statistical analysis | 16 |
| 3.8. Ration formulation | 16 |
| **Subjects** | **Page No.** |
| **Chapter-IV: Results** | **23-26** |
| 4.1. Effect of different protein on growth performance of broiler strain | 23 |
| 4.2. Feed intake | 24 |
| 4.3. Feed conversion ratio (FCR) | 25 |
| 4.4. Mortality rate | 25 |
| 4.5. Effect of different protein supplement on antibody titers to Newcastle Disease virus of broiler chicks | 26 |
| **Chapter-V: Discussion** | **27-28** |
| **Chapter-VI : Recommendations** | **29** |
| **Chapter-VII: References** | **30-39** |

**List of Tables**

|  |  |  |
| --- | --- | --- |
| **Serial No.** | **Titles** | **Page No.** |
| 1 | Animal protein supplemented ration for broiler starter | 17 |
| 2 | Animal protein supplemented ration for broiler grower | 18 |
| 3 | Plant protein supplemented ration for broiler starter | 19 |
| 4 | Plant protein supplemented ration for broiler grower | 20 |
| 5 | Broiler starter ration supplemented with both animal and plant protein | 21 |
| 6 | Broiler grower ration supplemented with both animal and plant protein | 22 |
| 7 | Effect of different protein supplementation on live weight of broiler | 23 |
| 8 | Effect of different protein supplementation on weight gain of broiler | 24 |
| 9 | Amount of feed consumed by birds in experimental groups | 24 |
| 10 | Feed conversion ratio | 25 |
| 11 | Mortality of birds in each group | 25 |
| 12 | Antibody titers against Newcastle Disease (ND) virus | 26 |

# List of Abbreviations and Symbols Used

|  |  |
| --- | --- |
| **Abbreviations and Symbol** | **Elaboration** |
| EAA | Essential amino acids |
| SBM | Soybean meal |
| ANFs | Anti-nutritional factors |
| CP | Crude protein |
| SPC | Soybean protein concentrate |
| SPI | Soybean protein isolate |
| HP | Hamlet protein |
| SDP | Spray-dried plasma |
| IgG | Immunoglobulin-G |
| GIT | Gastrointestinal tract |
| NRC | National research council |
| NDV | Newcastle Disease Virus |

**Acknowledgements**

I would like to express my all sorts of praises and thanks to Almighty**,** Who teaches the use of the pen to man, who bestowed me with the potential and the ability for making a humble contribution / addition to the existing knowledge.

It’s my honor to express the heartiest gratitude and deep sense of obligation to my respectable and considerate supervisor **Dr. Goutam Buddha Das**, Professor of the department of Animal Science and Nutrition, Faculty of Veterinary Medicine of Chittagong Veterinary and Animal Sciences University for his keen help for the successful accomplishment of the present study.

I am grateful to my Co-supervisor **Dr. Abdul Ahad,** Professor**,** Department of Microbiology and Veterinary Public Health, Chittagong Veterinary and Animal Sciences University, for his cooperation and full technical support and guidance in this research.

Special thanks to **DR. Avijit Dutta,** Lecturer**,** Department of Microbiology and Veterinary Public Health and **DR. Mohammad Bayazid Bostami,** MS student in Surgery, Department of Medicine And Surgery, Chittagong Veterinary and Animal Sciences University for their constant help during research work.

**The Author**

**Abstract**

The study was conducted to investigate the effect of different protein supplemented feed (animal protein, plant protein and combination of animal protein and plant protein) on the growth performance of broiler and the immune response of the birds against Newcastle Disease (ND). A total of 99 broiler birds were divided into 3 groups, each group consist of 33 individuals. Rations supplemented with animal protein, plant protein and combination of animal protein and plant protein were formulated for 3 treatment groups. ND vaccine was administered according to the vaccination schedule. Growth performance was measured using Feed Conversion Ratio (FCR) and immune response against ND using Haemaglutination Inhibition (HI) test. The study revealed that there was significant difference in growth performance due to variation in protein source of the supplied ration FCR was found 2.06, 1.64 and 1.68 for group A, B and C respectively. Antibody titre of the birds against ND vaccine virus was highest at day 7 is 7.10 and at day 28 is 6.90 in group-A birds supplemented with animal protein. The finding shows that immune response in broilers against ND depends on the protein source of the ration and animal protein is the best to have strong immunity.

**Key words:** Ration, protein source, growth performance, immune response.