

## Abstract

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Ornamental birds are being very popular day by day. People are becoming more interested in ornamental bird production. In case of production feed & nutritional management is an important issue. It is very important to maintain the feed quality as quality is the main determinant factor for assessing feed staff. The quality of feed mainly depends on the proper nutrient contents of the feed. The study was undertaken to investigate the variations in the chemical compositions of different feed available in different markets of Chittagong, Bangladesh. In this regard, ten different feed samples of ornamental birds such as Sunflower seed, Kusum seed, Foxtail millet seed, Canary seed, Rice seed, Linseed, Guji sesame seed, Chia seed, Varagu millet seed and Hempseed were analysed for dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE) and total ash (TA) in the Animal Nutrition Laboratory of Chittagong Veterinary And Animal Sciences University, Chittagong, Bangladesh during 10<sup>th</sup> April 2018 to 18<sup>th</sup> September 2018 were collected, compiled and analysed. Results indicated that there were wide ranges of variations in chemical compositions for different parameters for different feeds. DM varied from 86.3 to 94.6 g/100g and CP varied from 8.1 to 24.9 g/100g. Similarly CF varied from 1.8 to 35.0 g/100g and EE varied from 2.8 to 34.2 g/100g. TA varied from 2.6 to 6.8 g/100g. It was concluded that chemical composition of different ornamental bird feed were widely variable. The results obtained from this study will be helpful for the people for proper feed management of ornamental birds which leads to the improvement of bird rearing.

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**Key words:** Proximate analysis, Nutrient, Ornamental bird, Ash, Crude protein, Crude fibre, Dry matter, EE.

## Introduction

Ornamental birds are attractive colorful birds of various characteristics, which are rearing for fancy purpose and kept as pets in confined space for fun and exhibition. Now-a-days the number of ornamental birds is increasing day by day in Chittagong, Bangladesh. People are becoming more interested in rearing these ornamental birds. In Bangladesh the common ornamental birds are love birds, finch, cocktail, budgerigar, java, macaw, diamond dove, grey parrot, pigeon etc. People rear these birds for fancy purpose, companion purpose, breeding purpose, commercial purpose, exhibition purpose etc. It is good news for us that ornamental bird trade is developing currently in our country (**Mostafizur *et al.*, 2009**).

Various associations are involved in this sector for the improvement of these ornamental birds in Chittagong. Most of ornamental birds found in Bangladesh also exotic species like ornamental fishes. Ornamental bird feeds are plant material intended for consumption by pet bird. Ornamental bird foods normally contain macronutrients, trace elements and vitamins necessary to keep bird in good health.

The management of ornamental birds differs from the other poultry management. For example the feeding habit of ornamental birds differs from other commercial poultry. The requirement of feeds and nutrient contents is also differs. Many factors are liable for the appropriate ornamental birds' production. Feed is one of the vital factors amongst the numerous inputs required for the successful ornamental birds rearing. Feed is the most important factor of all managements in ornamental birds' production. The most commonly used ornamental birds feeds are seeds such as sunflower seeds (*Helianthus annuus*), linseed seeds (*Linum usitatissimum*), canary seeds (*Phalaris canariensis*), kusum seeds (*Schleicherao leosa*), hemp seeds (*Cannabis sativa*), guji sesame seeds (*Sesamum indicum*), rice seeds (*Oryza sativa*), millet seeds (*Setaria italica*), chia seeds (*Salvia hispanica*), varagu millet (*Paspalum scrobiculatum*) etc. Plant seeds are a good source of food for birds since they contain nutrients necessary for plant's growth, including many healthy fats, such as omega fats. Seeds are typically high in unsaturated fats and, in moderation are considered a

healthy food (**Wikipedia, 2011**). So, it is very important to know the nutrient contents of these seeds.

Moreover, the maintenance, growth, production and reproduction performance of birds are highly depended on feeds. It is necessary to know both of the nutritional requirement of each ornamental bird and the nutritional composition of their feeds.

Both in rural or urban area, people are not conscious enough about the feeding of ornamental birds which results in poor growth and poor reproduction. So, people are getting unsatisfactory results when they feed various diets to the ornamental birds without knowing the nutritional composition of those feeds.

As a result, ornamental birds' raisers or integrators are being failure to get optimum production. The knowledge and ideas retrieved from this study might be beneficial to the people, or could have a potential to improve the ornamental birds productivity. Considering this view in mind, the present study was undertaken to meet the following objectives.

Though the sector of ornamental birds and their feed is a developing sector in Bangladesh, there are very few literature found about the species and price of their feeds. More study will be required to know about the different parameters of nutritional composition of different feeds supplied for ornamental birds.

**Objectives:**

- To determine the nutritional status of commercially available ornamental bird feeds available in Bangladesh.

## **Materials and methods**

### ***Study area***

The study was carried out in Department of Animal Science and Nutrition, Faculty of Veterinary Medicine, Chittagong Veterinary and Animal Sciences University (CVASU), Khulshi, Chittagong-4202, Bangladesh during April to September 2018.

### ***Collection of sample***

Samples were collected from different shops of Riazuddin Bazar, Rail station, Chittagong. During April to June, data related to proximate analysis of 10 different feed samples were collected. The experiment was conducted in April to June, 2018. Each sample was collected min 100g amount. Samples were wrapped up by polythene bag and sent to the Animal Nutrition Laboratory, Chittagong Veterinary and Animal Sciences University, Chittagong.

### ***Preparation of sample***

Fresh samples were used for measuring moisture by hot air oven. Then samples were subjected to grinder to make it homogenous powder. Later on, it was mixed properly and exposed for sampling. Individual samples were kept in air tight polythene bag and identified by marker and subjected to chemical analyses.

### ***Analysis of sample***

Chemical analyses of the samples were carried out for DM, CP, CF, NFE, EE and TA in the animal nutrition laboratory, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh (AOAC, 2006).

### ***Data analysis***

Data related to chemical composition of ornamental bird feeds were compiled by using Microsoft Excel 2007 for descriptive statistics i.e., mean median, mode, standard deviation and standard error for DM, CP, CF, EE and TA. One sample t-test was carried out using reference value to analyze the data in stata (Stata/SE 14.1, StataCorpLP, 4905 Lakeway drive, College Station, TX77845, USA). CP was

predicted from TA, DM, and EE using simple linear regression. Association between CP, TA, DM and EE were determined using Pearson's correlation coefficient. Statistical significance was accepted at 5 % level ( $P < 0.05$ ).

## **RESULTS**

### ***Dry matter (DM)***

The DM contents differed ( $p>0.05$ ) among different feed samples. The average DM content of different feed samples in this study was 90.7% (Table 1). The maximum and minimum DM percent were 94.6% in case of Sunflower seed and 86.3% in case of Chia seed respectively.

### ***Crude protein (CP)***

The CP contents differed ( $p<0.001$ ) among different feed samples. The average CP content of different feed samples in this study was 17.1% (Table 1). The maximum and minimum CP percent obtained in current study were 8.1% in case of Rice seed and 24.9% in case of Hemp seed respectively.

### ***Crude fibre (CF)***

The CF contents differed ( $p<0.001$ ) among feed samples. The average CF content of feed samples in this study was 10.3% (Table 1). The maximum and minimum CF percent obtained in current study were 1.8% in case of Canary seed and 35.0% in case of Chia seed respectively.

### ***Ether extracts (EE)***

The EE contents differed significantly ( $p<0.001$ ) among the samples. The average EE content of feed samples in this study was 13.7% (Table 1). The maximum and minimum EE percent obtained in current study were 1.6% in case of Rice seed and 34.2% in case of Sunflower seed respectively.

### ***Total ash (TA)***

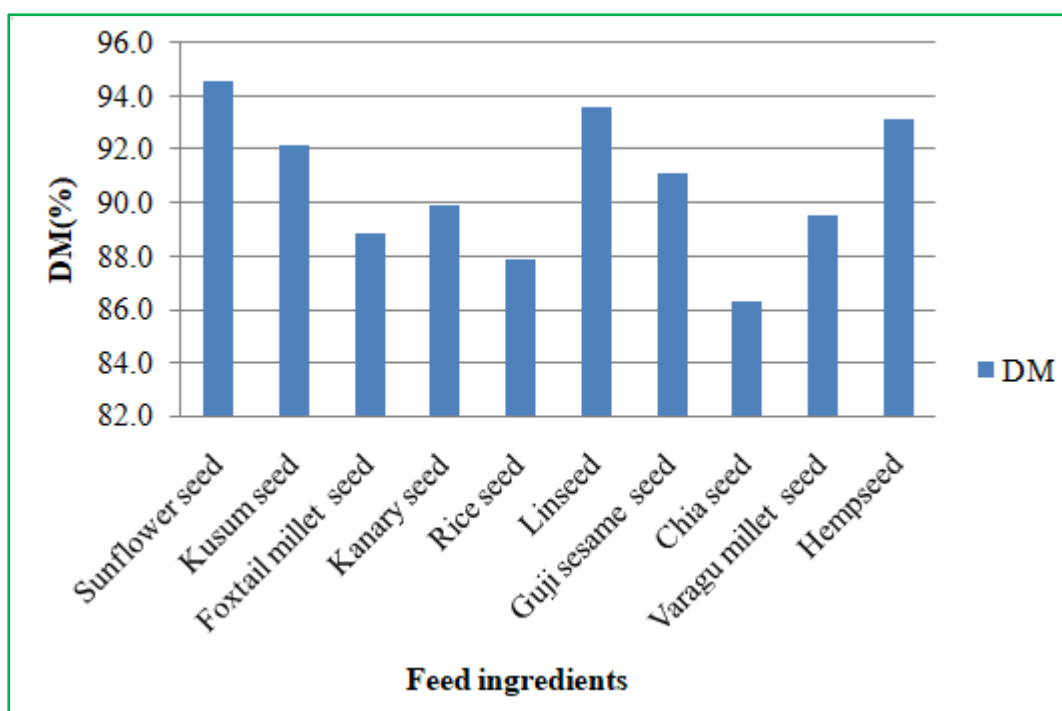
TA contents differed significantly ( $p>0.05$ ) among feed samples. The average TA content of feed samples in this study was 4.0% (Table 1). The maximum and minimum TA percent obtained in current study were 2.6% in case of Sunflower seed and 6.8% in case of Guji sesame seed respectively.

**Table 1. Chemical composition (g/100g) of different ornamental bird feeds ingredients (N=10)**

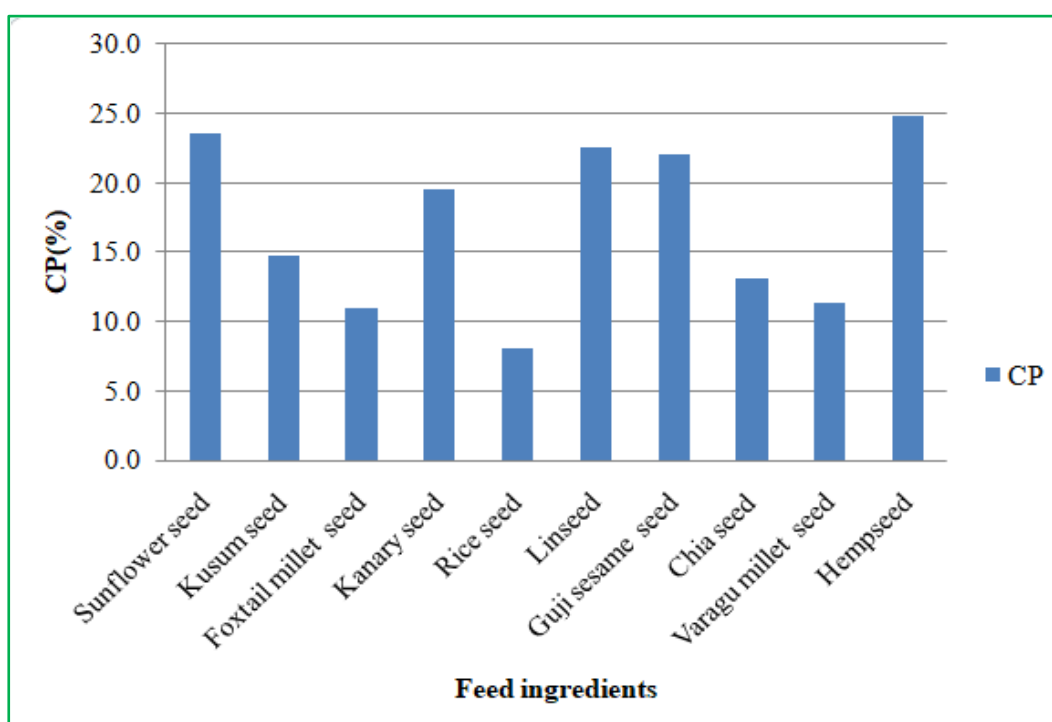
| Name of ingredients | Chemical components (g/100g) |      |      |      |     |
|---------------------|------------------------------|------|------|------|-----|
|                     | DM                           | CP   | CF   | EE   | ASH |
| Sunflower seed      | 94.6                         | 23.6 | 3.5  | 34.2 | 2.6 |
| Kusum seed          | 92.1                         | 14.7 | 9.5  | 19.8 | 3.0 |
| Foxtail millet seed | 88.9                         | 11.0 | 4.0  | 2.8  | 3.0 |
| Kanary seed         | 89.9                         | 19.6 | 1.8  | 4.4  | 3.9 |
| Rice seed           | 87.9                         | 8.1  | 2.3  | 1.6  | 4.7 |
| Linseed             | 93.6                         | 22.6 | 4.5  | 16.7 | 3.2 |
| Guji sesame seed    | 91.1                         | 22.1 | 11.0 | 26.6 | 6.8 |
| Chia seed           | 86.3                         | 13.1 | 35.0 | 3.2  | 5.0 |
| Varagu millet seed  | 89.6                         | 11.4 | 10.5 | 3.3  | 2.8 |
| Hempseed            | 93.1                         | 24.9 | 20.6 | 24.6 | 4.4 |

**Table 2. Statistical analysis of chemical composition of different ornamental bird feeds (N=10)**

| Parameter  | Min. | Max. | Mean  | Median | STD   | SE   | P value |
|------------|------|------|-------|--------|-------|------|---------|
| <b>DM</b>  | 86.3 | 94.6 | 90.71 | 90.5   | 2.66  | 0.84 | 1.00    |
| <b>CP</b>  | 8.1  | 24.9 | 17.11 | 17.15  | 6.12  | 1.94 | 0.020   |
| <b>CF</b>  | 1.8  | 35   | 10.27 | 7      | 10.40 | 3.39 | 0.000   |
| <b>EE</b>  | 1.6  | 34.2 | 13.72 | 10.55  | 12.19 | 3.83 | 0.000   |
| <b>Ash</b> | 2.6  | 6.8  | 3.94  | 3.55   | 1.31  | 0.42 | 0.923   |

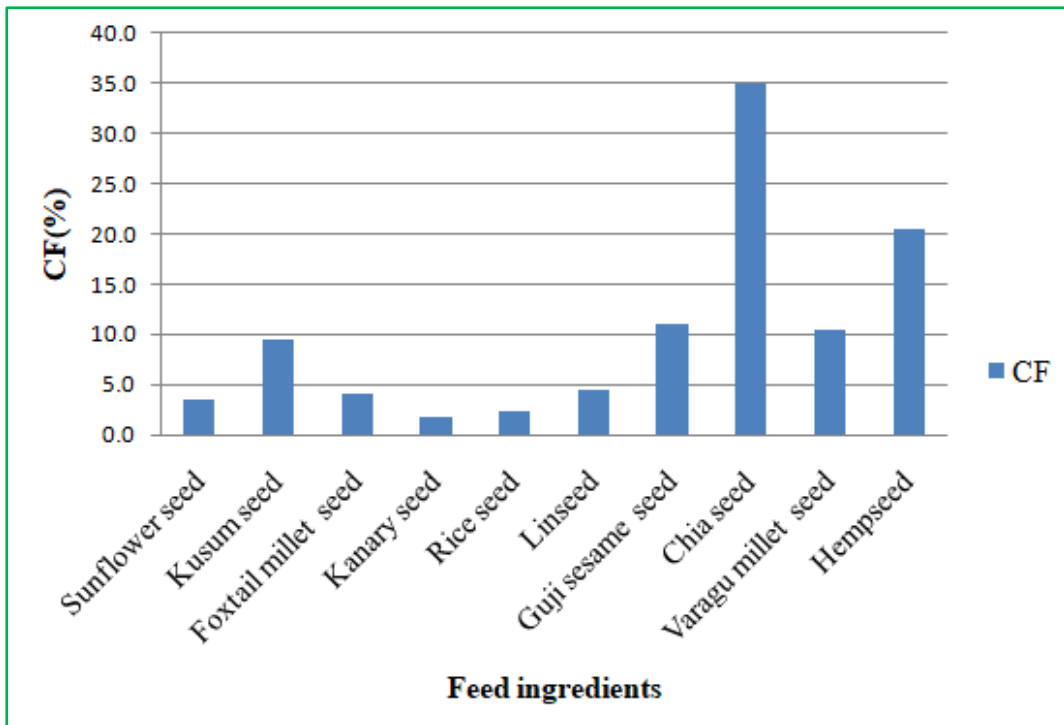


**Figure 1: DM content (%) in different feed ingredients**

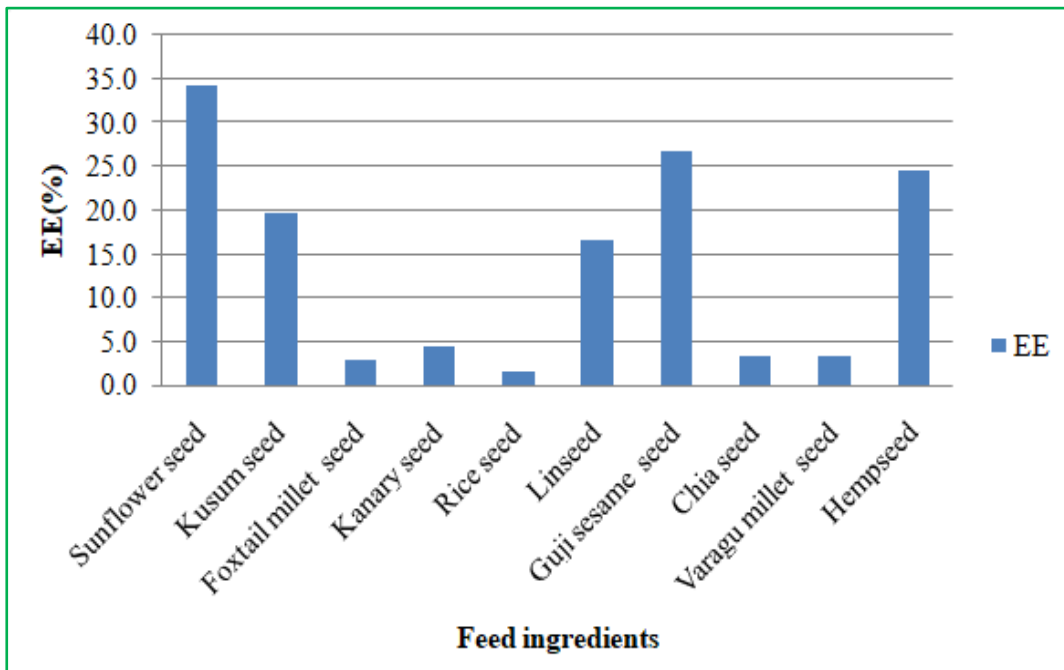


**Figure 2: CP content (%) in different feed ingredients**

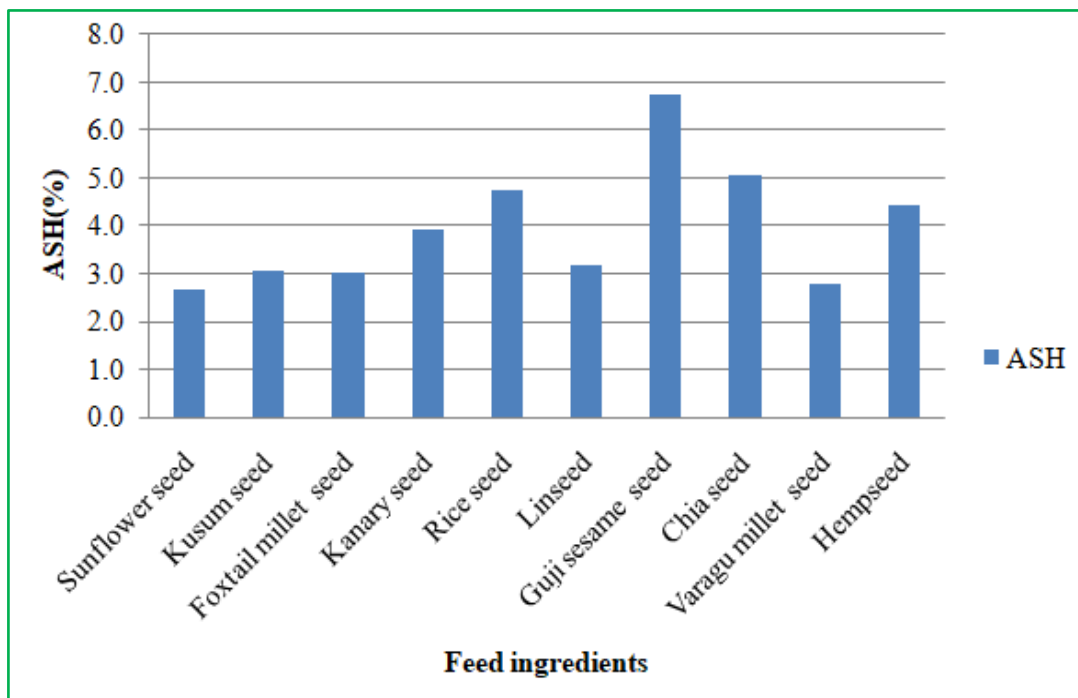




**Figure 3: CF content (%) in different feed ingredients**



**Figure 4: EE content (%) in different feed ingredients**



**Figure 5: ASH content (%) in different feed ingredients**

## Discussion

Chemical composition of different samples of ornamental bird feeds particularly DM, CP, CF, EE, TA contents have been presented in Table: 01. These feeds are used throughout the world for their good nutritive value.

In present study wide range of variations in the DM contents of different feed samples were observed. In our study the moisture content is higher in chia seed. (**Hook *et al.*, 1982**) reported that the moisture level of a food influence the texture and the more ordered the endosperm structure, the lower the rate of moisture content. The low moisture content (2-4%) of samples is well accepted by pet food producers because of low risks for microbial contamination.

Seeds from different plant source are good source of macronutrients and trace minerals for ornamental or fancy birds throughout the world. However CP contents in feed samples are widely variable. The average CP content in present study was 17.1% which is in variable with earlier studies where it was reported. From the study of (**Ravindran, G., 1991**) the average protein contents of foxtail millet was 15.9% but in our study Foxtail millet seed contain 11.0% CP. So, it was comparatively less than that study.

The CF contents in feed samples may also vary. The variation of CF obtained in present study and previous studies are widely variable. The average CF in present study was 10.3. The chia seed presented a good source of protein (25.32 g/100 g) and total dietary fiber (37.50 g/100 g) with predominant insoluble fiber (35.07 g/100 g) (**Marineli *et al.*, 2014**). In our study the analytical crude protein of chia seed is 13.1g/100g and crude fiber is 35gm/100gm which is same as the predominant insoluble fiber value of that study. (**House, 2010**) reported that CP and fat of whole hemp seed were 24.0 and 30.4 respectively. The CP content of hempseed from our report is almost same.

It is assumed that, some decrease in protein quality with increased ash will occur due to the changes in amino acid concentration. In addition, an increase in ash could further decrease protein quality if bioavailability of amino acid is reduced. The

effects of ash content on amino acid digestibility are unknown. (**Johnson and Parsons, 1997; Johnson *et al.*, 1998**)

## **Conclusion**

Demands of ornamental birds become very popular in our country day by day. The deficiency of a nutrient in birds ration can greatly affect on its health. So it is very important to know about their feed ingredients for making a balanced ration. Current study indicates that the quality of different ornamental bird feeds is variable. Therefore, to formulate least cost balanced ration, feed must be analyzed first in the laboratory and then incorporate it into the practical aspect. But all the feed can be up to the standard if the owner can maintain a good management for their bird.

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## **Acknowledgements**

It goes without saying that all praises goes to Almighty “**God**”, the omnipotent, omnipresent and omniscient, Who has enabled the author to complete this manuscript successfully.

The author doesn't have adequate words to express deepest sense of gratitude, respect and immense indebtedness to his honorable teacher and internship supervisor, **MD. Emran Hossain**, Professor, Dept. of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University for his scholastic guidance, sympathetic supervision, valuable advice, continuous inspiration, radical investigation and constructive criticism in all phases of study.

The author would like to express his deep sense of gratitude and heartfelt appreciation to **Professor Md. Abdul Halim**, Dean, Faculty of Veterinary Medicine, Chittagong Veterinary and Animal Sciences University.

The author would like to thanks all the staff of the Dept. of Animal Science and Nutrition, Chittagong Veterinary and Animal Sciences University, for their active cooperation and support in this course of study.

The author also expresses gratitude to his parents and friends for their inspiration and sacrifice from the beginning to the end of this work.

## **The Author**



## **Biography**

Joya Dhar Mumu, an intern student at Chittagong Veterinary and Animal Sciences University (CVASU), originate from Chittagong. After completing one year intern period, she will receive her Doctor of Veterinary Medicine (DVM) degree with lots of real life experiences. As an intern student she has received clinical training from Madras Veterinary College and Veterinary College & Research Institute, Namakkal, Tamilnadu, India. She has more interest on poultry nutrition. She has immense interest to be a Veterinary Practitioner and try to develop her sector in her country.