Proximate evaluation of Durva grass (*Cynodon dactylon*) and Dhal grass (*Paspalum dilatatum*) in different upazila of Chattogram District

A PRODUCTION REPORT SUMITTED

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ABSTRACT

An experiment was conducted to compare the nutritive value of two local grasses in different Upazilas of Chattogram district in Bangladesh. It is essential to improve the animal nutrition of these area and to gain knowledge that how these grasses can fulfill the requirements of animals. Chemical analyses of the samples were carried out for moisture, dry matter (DM), crude protein (CP), crude fiber (CF), ether extracts (EE), total ash and nitrogen free extract (NFE) at the Nutrition laboratory in the department of animal sciences and nutrition, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh. Data was calculated for all samples by using standard formula. The nutritive value of Durva grass of Raozon and lohagara upazila was analyzed and found CP 11.13% and 9.63%, CF 26.6% and 22.6%, and NFE 53.8% and 54.96%, respectively. The nutritive value of Dhal grass of Boalkhali and Mirsharai was also analyzed and found significant amount of CP 8.4% and 10.3%, CF 31.63% and 36%, and Ash 15.12% and 10.6% respectively. Durvagrass of Raozon upazila showed the higher CP and CF content than that of Lohagara upazila and also Dhal grass of Boalkhali upazila showed higher Ash and NFE content than that of Mirsharai upazilla. All the proximate contents showed significant ($P<0.05$) variations in the same grass of different upazila in Chattogram district. Based on the results it can be concluded that native grasses in chattogram showed good contents of nutrients which are suitable for livestock production.

Key words: Durva, Dhal, Grasses, Proximate components.

CHAPTER 1: INTRODUCTION

Bangladesh has an area of 1, 47,570 sq. Km with net cropped area of 1.2 million hectares. There is 0.03 million hectares of cultivable land lying fallow and 0.29 million hectare is unavailable for cultivation. About 80% of the total cultivable land is used for cultivation of cereal crops and only 0.03% for cultivation of fodder crops and the rest for other crops (BBS 2009). Scarcity of animal feeds and fodder has been identified as a major constraint for the development of livestock in Bangladesh. In Bangladesh, cattle live mostly on straw based ration. So livestock development in Bangladesh is mainly depending upon the improvement of animal nutrition through improved feeding and availability of fodder. In this situation, it is of prime consideration to introduce suitable high yielding varieties of perennial fodder crops to the farmers (Ali et al., 1987). On a straw-based diet, supplementation of small amount of green grass is often recommended for optimization of rumen environment (Preston and Leng, 1987) or even to meet the maintenance requirement of animal (Ranjhan and Singh, 1993). Durva and Dhal grass are two important fodders suitable for production in the context of Bangladesh climate. The most significant feature of these three fodders is that, they can grow both high and low lands or in water logging condition (Khan et al., 2009). But no research work was undertaken on comparison between these fodders in respect of places, nutritive value etc. It is also essential to find out some potential fodder germplasm at Chattogram, Bangladesh.

And recommend for extensive cultivation by the farmers for feeding their livestock was conducted to compare the nutritive value of above two fodders in respect of places. Proximate analysis provide meaningful information and also helpful in accessing the sample's Quality. The analysis gives basic information about moisture content, crude protein, crude fiber, ash content and nitrogen free extract. The difference in content is due to the environmental changes and physiological setup (Bashir et al., 2017). Therefore, the objective of this present study was to explore the nutritional status of locally available weedy grasses to meet up the increasing demand for green fodder.

CHAPTER 2: MATERIALS AND METHOD

Study Site: The current investigation was carried out at Raozon, Lohagara, Boalkhali, Mirsharai upazila in Chattogram district, Bangladesh. The Chattogram district is one of the well-known hilly regions of Bangladesh.

Chittagong lies at 22°20′06″N 91°49′57″E. It straddles the coastal foothills of the Chittagong Hill Tracts in southeastern Bangladesh. The Karnaphuli River runs along the southern banks of the city, including its central business district.

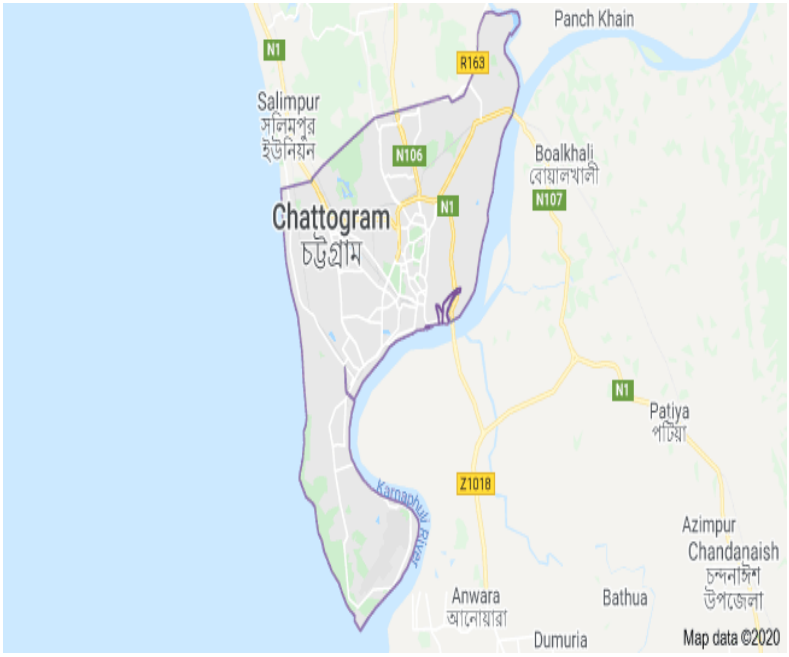

Figure 1. Study site

Table 1. Plants with scientific, family and common names.

Plant species	Family	Common name	English name
Cynodon dactylon	Poaceae	Durva grass	Bermudda grass
Paspalum dilatatum	Poaceae	Dhal grass	Dallis grass

Plant Sample Collection

Two types of fodder were collected randomly from the different upazila, Chattogram district, Bangladesh. Each plant has 3 replicates of different sites. Plants are collected which was not damaged by any material. Stems, leaves and other part of plants were collected. Diggers and knifes were used for obtaining the parts of plants. Plants are stored in small brown paper bags. Plants identification was also done at sites and after collection. The selected forage plant samples were clean with distilled water to rinse dust particles and other impurities. These samples were dried in air and place in oven at 70ºC temperature for 5 to 7 days. Dried samples were used for further processes.

Plant Sample Identification

Identification of samples was done in the department of Animal Science and Nutrition, Chattogram Veterinary and Animal Sciences University. Table of these plants with scientific, family and common name is given in Table 1.

(a) **(b)**

Picture 1 (a, b): Durva grass (*Cynodon dactylon*).

(a) **(b)**

Picture 2 (a, b): Dhal grass (*Paspalum dilatatum*).

Proximate Analysis

This method was used for the study of crude protein, crude fibers, moisture, ether extract, ash and dry matter contents. Proximate analysis procedure including the percentage of moisture, crude protein, ash contents and crude fiber content in the sample were determined by AOAC (2006).

Dry Matter Detection: The amount of dry matter was investigated by using the formula,

Dry matter in percentage = 100 - moisture amount.

Moisture Contents: The amount of moisture was also find out by using the following formulae,

$$\% \text{ Moisture} = \frac{(\text{weight of fresh sample} - \text{weight of dried sample})}{\text{weight of dried sample}} \times 100$$

Crude Protein Detection

Crude protein was detected by taking 1g sample in the flask and digested it with sulphuric acid and potassium sulfate. Boil the sample till it became transparent. Dilute the sample by adding distilled water. About 10 ml of this sample was taken and distilled it with 50 mg of zinc and sodium hydro oxide. Add methyl red as indicator and titrated it

with sulphuric acid until light pink color appeared. The amount of protein is measured by the amount of acid used.

Crude Fibers Detection

Crude fibers were measured with the help of a method of acid base digestion. 1.25% of diluted sulfuric acid and 1.25% of sodium hydroxide used. Put the sample in a beaker. 200 ml of sulfuric acid was added. For half an hour boiled the sample and chilled the sample and filter them by using filter paper. The material was washed three times by using distilled water. The material was then transferred in to the beaker and again digested by using 200 ml of sodium hydroxide, boil it for 30 minutes, cooled and then filtered to obtain residues of the sample, washed three times by using 25 ml of ethanol. This material was dried by putting it in to the oven, cooled and weight. The difference between the weights of the sample was the contents of crude fibers.

Ether Extract

A dried sample was extracted with petroleum ether (4 to 60º centigrade) in soxhlet apparatus to remove the ether soluble component present in it. The extracted materiel was dried to a constant weight in an oven at 70º centigrade.

Ash Detection

Take a sample of 1g and burn it at 600 ºC to organic contents. Ash contents were investigated by using formulae,

Ash % = (Weight of ash devided by weight of sample) x 100

Nitrogen Free Extractable Substance (NFE)

% NFE = 100 - (% Crude protein + % Mineral matter + % Ether extract + % Crude fiber).

CHAPTER 3: RESULTS AND DISCUSSION

Table 1. Proximate components of Durba and Dal grass in different upazilas.

Parameters	Durba grass		Dal grass		SEM	P-value
	Raojan	Lohagora	Boalkhali	Mirsorai		
DM	37.42[a]	27.68[b]	20.38[c]	15.54[d]	0.15	<.0001
CP	26.59[c]	22.64[d]	31.63[b]	36.01[a]	0.11	<.0001
CF	11.11[a]	9.63[ab]	8.40[b]	10.68[a]	0.58	0.04
EE	7.49[d]	11.73[b]	15.13[a]	10.62[c]	0.17	<.0001
ASH	0.95[b]	1.09[b]	1.48[a]	1.00[b]	0.09	0.02
NFE	53.80[b]	54.91[a]	43.26[c]	42.07[d]	0.22	<.0001

Moisture Content

Chemical composition of grasses is presented in Table 1. Highest moisture content observed in dhal grass (84.57%) and lowest in durva grass (62.58%). Moisture content of lohagara durva grass (72.3%) is higher than that of Raozon upazila (62.58%) as well as moisture content of Boalkhali dhal grass (79.68%) is lower than that of Mirsharai upazilla (84.57%).

The findings of present study shows no differences in moisture content of durva grass with the previous study of Manzoor et al. (2013) but the moisture content of dhal grass in present study shows higher with the previous study of Kanak et al. (2012). Due to different environmental effect and different soil composition, moisture content varies in different upazila of same district.

Crude Protein

The crude protein contents in Durva grass, ranged from 11.13% to 9.6% and in dhal grass ranges from 8.4% to10.7%. The highest CP (11.13%) was observed in Durva grass and the lowest in Dhal grass (8.4%). The CP content of Raozon durva grass is higher than that of Lohagara upazila as well as CP content of Mirsharai dhal grass is higher than that of Boalkhali upazilla. Promising difference from regularity was exhibited in the

observation below 11.13% crude protein content and above 9.63% crude protein content. Recent experiment shows higher CP content than that of prior investigation.

The CP content of durva grass of present study shows higher in Raozon upazila and lower in Lohagara upazila than that of previous study of Manzoor et al. (2013) and in dhal grass, present study shows highest CP with the previous study of Kanak et al. (2012). The presence of high protein concentration in these grasses shows that these grasses can involve significantly to the daily animal protein.

Ash

The Ash contents ranges from 7.5 % to 11.73% in Durva grass and also 10.6% to 15.1% in dhal grass. The highest ash was observed in dhal grass and lowest in durva grass. The ash content of Boalkhali dhal grass is higher than that of Mirsharai upazila and the ash content of Raozon upazila is lower than that of Lohagara upazilla. There is no significant differences found in ash content of durva grass between present and future study but in case of dhal grass, there is found significant differences with the previous study of Kanak et al. (2012). By nature ash are devoid of protein, calories, energy or nutrients. If Ash contents of forage are unusually high, it specifies that forage is contaminated with soil which is not indispensable.

Dry Matter

Dry matter contents varied from 37.5% to 27.7% in durva grass and 21.3% to 15.4% in Dhal is grass. Durva grass of raozon shows the maximum dry matter contents and Dhal is grass of mirsharai shows lower drymatter content. The Dry matter of raozon durva grass is higher than that of lohagara upazila as well as the DM content of Mirsharai upazila's dhal grass is lower than that of Boalkhali upazilla. Dry matter contents of the current study showed no significant variation with the previous study.

Crude Fiber

Crude fiber contents showed highly significant ($P<0.05$) variations in this two types of fodder. Crude fiber concentration ranges from 22.6%% to 36% in all plant species. The maximum Crude fiber contents were observed in dhal is grass of mirsharai and the minimum in durva grass of boalkhali. The difference from normality was due to the values low from 22.6% crude fiber content and high from 10.68% crude protein content.

Significance of crude fiber was due to these values. The Crude fiber concentrations of dhal grass of the present study were much lower than that of previous study of Kanak et al. (2012)

Ether Extract

Ether Extract values varied from 0.95% to 1.08% in durva grass and 1% to 1.5% in dhal grass. The highest Ether Extract concentration was investigated in dhal is grass and the minimum Ether Extract concentration in dhal grass. The EE content of Lohagara Durva grass is higher than that of Raozon upazila and the EE content of Boalkhali upazila's dhal grass is higher than that of Mirsharai upazila. Ether Extract contents showed no significant ($P < 0.05$) variation in all plants species.

Nitrogen Free Extractable Substance (NFES)

NFES values ranges from 41.73% to 43.37% in dhal grass and %3.8 % to 55.9% in durva grass. The highest NFE was observed in Durva grass and lowest in Dhal grass. The NFE content of durva grass of mirsharai is lower than that of Boalkhali upazila and the NFE content of lohagara durva grass is higher than that of Raozon upazila. In the present work, similar findings were present with the findings of Kanak et al. (2012). High level of NFES is available in plant due to nitrogen deficiency in soil and plant tissues. High quantities of NFES also cause to increase the food energy of seed. Furthermore, higher alkaloids showed some sort of nutritional stress or composite relations between environment and soil.

CHAPTER 4: CONCLUSIONS

Recent investigation on the proximate composition of two local grass of different upazilia of chattogram district were nearly similar. In respect of nutritive value, Durva grass shows the best result. Therefore, it may be concluded that Durva and Dhal grasses are suitable for animal production and we easily suggest people of this areas to harvest these fodder of different upazila of chattogram district to accomplish their nutrient requirement on these grasses.

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The Author

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Biography

I am **Ripta Moni**, daughter of **Akkas Ahamad** and **Ayesha Begum**. I passed my Secondary School Certificate examination in 2011 (GPA 5.00) followed by Higher Secondary Certificate examination in 2013 (GPA 5.00). Now I am an intern Veterinarian under the Faculty of Veterinary Medicine in Chattogram Veterinary and Animal Sciences University, Bangladesh. In the future, I would like to work as a Veterinary practitioner & do research on animal health improvement in Bangladesh.