

## NUTRITIVE VALUE OF HELENCHA (*Enhydra fluctuans*)

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**ABSTRACT:** The study was undertaken to find out the chemical composition and nutritive value of Helencha (*Enhydra fluctuans*) available in Chittagong, Bangladesh. *Enhydra fluctuans* were collected from three different remote places of the study area. Chemical analyses of the samples were carried out in triplicate for dry matter (DM), crude protein (CP), crude fiber (CF), nitrogen free extracts (NFE), ether extracts (EE) and total ash (TA) in the animal nutrition and poultry research and training centre (PRTC) laboratory, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh. Results indicated that, there were no significant variations ( $P>0.05$ ) in the DM, CP, CF, NFE, EE and TA and ME contents of the samples collected from different places. DM content varied from 86.5 to 87.4%, CP content varied from 20.7 to 23.8%, CF content varied from 20.1 to 21.6%, EE content varied from 0.1 to 0.2%, NFE content varied from 28.3 to 34.4% and TA content varied from 10.4 to 13.5%. Similar to proximate components, metabolizable energy (ME) content also varied from 1991.9 to 2073.4 Kcal/kg DM. It could therefore be inferred that, the nutrient contents of *Enhydra fluctuans* does not vary due to variation in places. Results also indicated that, the nutritive value of *Enhydra fluctuans* is comparable with other available grasses in Bangladesh. Therefore, *Enhydra fluctuans* could be a promising unconventional feed resource for livestock.

**Keywords:** Chemical Composition, Enhydra Fluctuans, Helencha, Metabolizable Energy, Nutritive Value.

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### INTRODUCTION

Helencha (*Enhydra fluctuans*) is commonly grown perennial forage in Bangladesh. It is popularly known as Helencha shak. It is used for feeding cattle, buffalo, goats, sheep, horses and pigs. It is one of the most persistent forage adapted to wet soils of coastal areas, low lands, ponds and lakes. Mature *Enhydra fluctuans* is nutritious like other grasses and a good source of crude protein. It has several advantages including higher biomass yield in spring, winter and fall when temperatures are cooler and higher digestibility even at maturity. It is palatable and easy for digestion. It keeps the animal in good health and improves reproductive efficiency. It has cooling effect on the body. It is mild laxative, hence prevents constipation. In Bangladesh, high scarcity of fodder is observed during winter. Due to the shortage



of forage in winter, production performance of cattle becomes decreased. However, this situation may be overcome by adding *Enhydra fluctuans* as it has higher digestibility and higher productivity in spring, winter and fall. So, if *Enhydra fluctuans* can be used as cattle feed in scarcity period it will minimize the shortage of feed especially forage and improve production performance of cattle. Therefore, present study was undertaken to find out the chemical composition and nutritive value of *Enhydra fluctuans* available in Chittagong, Bangladesh.

### MATERIAL AND METHODS

#### Study area

*Enhydra fluctuans* is well adapted to poorly drained clay soils where standing water is common during wet weather. In Bangladesh, *Enhydra fluctuans* is available in almost all the low lands and aquatic areas. Therefore, three different remote places, such as, Raozan, Fatikchari and Khulshi areas were selected for study purposes.

### Collection of sample

*Enhydra fluctuans* were collected from three different places i.e., Raozan, Fatikchari and Khulshi area. Immediate after collection, samples were packed into the air tight polythene sacs and sent to the animal nutrition laboratory, Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh for chemical analysis.

### Preparation of sample

Fresh samples were chopped to 3.0 cm in length and mixed uniformly. Mixed samples were subjected to hot air oven for estimation of dry matter. The remaining samples were sundried for 7 days at an environmental temperature of 22.8-33.8°C and relative humidity of 54.0 - 96.0%. Approximately 500 g of dried samples were collected, chopped and ground uniformly for proximate analysis.

### Chemical analysis

Chemical analyses of *Enhydra fluctuans* samples were carried in triplicate for DM, CP, CF, NFE, EE and TA in the Animal Nutrition laboratory, Chittagong Veterinary and Animal Sciences University, Chittagong as per AOAC (2006).

### Estimation of ME

All samples were subjected to proximate analysis in triplicate. Later on, ME available in all *Enhydra fluctuans* samples was estimated by using a standard mathematical formula as per Lodhi et al. (1976).

### Data analysis

Data related to chemical composition and nutritive value of *Enhydra fluctuans* were compiled by using Microsoft Excel 2007. Chi-square ( $\chi^2$ ) test was performed to analyze the data by using SPSS 16.0 (Winer et al., 1991). Statistical significance was accepted at 5% level ( $P < 0.05$ ).

## RESULTS AND DISCUSSION

Helencha belongs to Kingdom-Plantae, Phylum-Magnoliophyta, Class-Magnoliopsida, Order-Asterales, Family-Asteraceae, Genus-Enhydra, Species-*Enhydra fluctuans*. This is a Perennial herb that grows in the swampy ground of coastal areas, low lands, ponds and lakes. The leaves of are somewhat bitter and eaten as a salad or vegetable in several tropical countries. The stems are fleshy, 30 centimeters or more in length, branched, rooting at the lower nodes and somewhat hairy. The leaves are stalkless, linear, oblong, 3 to 5 centimeters in length, pointed or blunt at the tip and usually truncate at the base, somewhat toothed at the margins. Flowers are white to greenish white in color.

*Enhydra fluctuans* originated from tropical Indian subcontinent and now found in most tropical and subtropical wetlands, along with river banks, seasonally flooded areas, swamps and lakes of Southern Europe, Africa, Southern Asia and South-east Asia. It grows in soils of any texture, provided moisture is adequate. It tolerates acid soils down to pH 4.5 but is best between 5.5 and 6.5. It can withstand short, seasonal dry periods, but does not tolerate long droughts. The range of temperature for proper growth of *Enhydra fluctuans* is 16-27°C. The optimum temperature for growth is 31-35°C. However, growth rate gradually declines above 38°C.

**Table 1 - Seasonal variation in the chemical composition of Helencha (*Enhydra fluctuans*)**

Month of harvest	DM (%)	CP (%)	Ash (%)	Ca (%)	P (%)
February	4.7	25.3	18.3	0.7	0.7
March	9.7	27.9	15.4	0.6	0.6
April	9.6	32.6	14.2	0.4	0.5
May	13.5	25.8	15.6	0.5	0.6
June	9.9	26	13.7	0.7	0.6
July	8.2	29.8	14.8	0.6	0.7

Reference: Dewanji and Banik (1992)

Wide variations between seasons were observed in the crude protein content of the plant which could be related to seasonal differences in their growth rates. Crude protein is the component that is reported to exhibit most drastic variation both between sites and with the stage of maturity. *Enhydra fluctuans* contained 25.3% CP in February and 32.6% in April. The average DM content of *Enhydra fluctuans* was 87.0 % (Table 2) in present study

which is similar to most of the perennial grasses available in Bangladesh. The average CP content was 22.5%. This observation is in well agreement with Dewanji et al. (1992) who observed 25.9% CP in *Enhydra fluctuans*. The CF content was 24.0% which is almost similar as most of the perennial grasses available in Bangladesh. The CF content of *Enhydra fluctuans* in this study was almost similar with the findings of Dewanji et al. (1992) who found 22.9% CF in *Enhydra fluctuans*.

**Table 2 - Chemical composition and nutritive value of *Heléncha (Enhydra fluctuans)* available in Chittagong, Bangladesh**

Parameters	Chemical composition (g/100g Air DM)						
	DM	CP	CF	Ash	EE	NFE	ME (Kcal/kg)
Raozan area	86.5	23.9	24.3	12.0	0.1	39.7	2073.4
Fatikchori area	87.4	27.2	24.7	15.4	0.2	32.4	1951.9
Metropolitan area	87.1	26.3	23.1	15.0	0.2	35.4	2019.3
Mean	87.0	25.9	24.0	14.1	0.1	35.9	2013.1
Std. Deviation	0.4	1.4	0.7	1.5	0.1	3.0	49.7
Sig.	NS	NS	NS	NS	NS	NS	NS

DM=Dry matter; CP=Crude protein, CF=Crude fibre, NFE=Nitrogen free extract, EE=Ether extract; NS=Non-Significant (P>0.05)

The TA content of *Enhydra fluctuans* was 14.1% which is similar to the available perennial grasses in Bangladesh. The TA content of *Enhydra fluctuans* in this study was positively supported by Dewanji et al. (1992) where they reported 15.7% TA in *Enhydra fluctuans*. The EE content in present study was 0.1%. This observation is contrasting with TA contents in most of the perennial grasses available in Bangladesh. However, EE content in this study was in line with Dewanji et al. (1992) where EE was reported to be 0.7%. The ME content of *Enhydra fluctuans* varied from 1991.9 to 2073.4 Kcal/kg according to this study. The NFE content of *Enhydra fluctuans* was 35.9%. The NFE content in this study was closely related with Dewanji et al. (1992) where NFE was reported to be 36.3%.

## CONCLUSION

*Enhydra fluctuans* is a tropical aquatic plant adapted to wide range of poorly drained high moisture area. The plant is highly productive when well fertilized and competes well with broadleaf and grassy weeds. The proximate components of the plant are satisfactory. This is good source of crude protein. As a result, *Enhydra fluctuans* may be supplemented for animals fed straw based protein deficient diet.

### Competing interests

The authors declare that they have no competing interests.

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