

**A report on effect of different concentration of mulberry leaves
on napier silage**



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**A report on effect of different concentration of mulberry leaves
on napier silage**



**A production report submitted as per approved styles and
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List of abbreviations

M=Moisture

CP=Crude Protein

CF=Crude Fiber

Abstract

The study was carried out to observe effect of different concentration of mulberry leaves on napier silage. The study was conducted Chattogram Veterinary and Animal Sciences University, Chattogram. The effect of mulberry leaves on the physical properties and proximate analysis of napier silage was evaluated. Napier grasses sample collected from field of Chattogram at pre-harvesting stage and chopped into small pieces before ensiling into container T1(5% molasses) and T2 (5% molasses and 30% mulberry leaves) and T3 (5% molasses and 25% Mulberry leaves). The container sealed and stored for 30 days at room temperature 25⁰ C. Result showed that T1, T2, T3 containers had desirable physical properties except T1 had more fungus and T2 had undesirable bad odor. The proximate analysis revealed that T3 container have highest percentages of crude protein (19.87%) and crude fiber (40.63%) and lowest percentages of moisture (74.95%) and ash (12.19%) compare to T1 and T2. The addition of 25% mulberry leaves with napier grasses increased Crude protein and Crude fiber and decreased moisture and ash percentages. Therefore, mixing napier grasses with 25% mulberry leaves and 5% molasses yielded the greatest fermentation quality in this study. In the conclusion, mixing with 25% mulberry leaves could be reasonable way to improve the quality of napier silage.

Keywords: Napier grass; mulberry leaves; molasses; proximate analysis.

Chapter 1: Introduction

In the agricultural economy, fodder crops play essential role by provided cheapest source of feed for livestock. In Bangladesh, livestock is major sub sector of agriculture and plays a pivotal role in the economy of the country particularly in rural economy. Dairy cattle performance depends on the consistent adequate amount availability of quality fodder. In developing countries like Bangladesh, there are critical limitation on profitable animal production due to inadequacy of quality forage (Sarwar et al., 2002).

Ensiling has become universal method for preserving fresh forage and suppling moist feedstock all year round (Wang et al.,2021). With the increasing demand for livestock products, more attention has been paid to silage production especially in developing country. Napier is an important animal feed source. It is widely cultivated for ruminant feed in tropical and subtropical regions because of its short life cycle, high biomass and strong adaptability in warm, humid and rainy areas (Tao et al.,2021). Mulberry represents an alternative feed source for ruminants. It characterized by good productive capacity, high protein, proper balance of amino acids, low fiber content, high energy content, high leaf digestibility, perennial growth and adaptation to various types of soils and climates (Schimidek et al., 2002).

However, mulberry leaves have relatively high moisture content and high buffering energy, it is difficult to store them for a long time. It is known that gramineous forage is better preserved than legumes due to high percentage of soluble carbohydrates but relatively lower nutritional value and higher fiber content, making them difficult to promote animal production. On the other hand, leguminous plants contain greater protein and mineral content and have less amount fermentable carbohydrate (Santana P et al.,2015).

Therefore, mixed silage of certain proportion of mulberry leaves and napier grass could increase success rate of silage and contain complementarity of nutrients. The study conducted to examine effect of different concentration of mulberry leaves on.

Napier silage on the basis of following objectives-

- 1.To assess the physical and nutritional qualities of mulberry and napier mixed silage.
2. To compare nutritional quality of three different concentration of mulberry leaves on napier silage

Chapter 2: Materials and methods

2.1 Study area

The study performed in department of Animal Sciences and Nutrition Laboratory, Faculty of Veterinary Medicine at Chattogram Veterinary and Animal Sciences University (CVASU), Khulshi, Chattogram -4202, Bangladesh during February to August 2023.

2.2 Collection of samples

Mulberry leaves collected from Research and Farm Based Campus, Hathazari. Napier grasses collected from grass field of Chattogram Veterinary and Animal Sciences University at pre-flowering stage.

2.3 Preparation of Silage

Napier grass without stem and mulberry leaves chopped into small pieces as chopping grass and leaves easy to compact and remove air. Then chopped leaves were filled into container layer by layer continuous treading all time help to remove air from container. After fulfill the container sealed quickly that speed up fermentation process. Finally, stored it for 30 days.

The types of silage prepared using following composition:

T1: Napier grasses with 5% molasses. After chopping 5% molasses mixed with napier grasses. Then filled the container and prepared silage.

T2: 70% napier grasses with 30% mulberry leaves and 5% molasses.

T3: 75 napier grasses with 25% mulberry leaves with 5% molasses.

2.4 Physical properties

Appearance, color, odor, fungus, water content evaluated immediately after opening container.

2.5 Proximate analysis

Samples randomly took from container approximately 200gm dried over night at 60⁰C and grind the dried sample finely.

2.6 Moisture

Samples kept into oven at 105⁰ C and record the loss of weight until constant weight found. Reference of AOAC, dry matter calculated.

2.7 Crude Protein

Crude protein determined by Micro Kjeldahl method. This method involves 3 steps. For digestion 0.5 gm sample oxidize with sulphuric acid in presence of catalyst. 2nd step Distillation, digestible solute distilled with 2% boric acid in presence of indicator. Then the solution titrated with standard alkali and then nitrogen amount calculated. The percentages of crude protein obtained by multiplying nitrogen value by 6.25.

2.8 Crude Fiber

2gm sample hydrolyzed with 1.25% sulphuric acid and 1.25% NaOH to estimate crude fiber by employing methods of AOAC.

2.9 Ash

For determining Ash percentage, incinerate dried sample at 600⁰ C for 24 hours. The residue weighed and reported as ash.

Chapter 3: Result

Table 1: Physical properties of silage

Properties	T1	T2	T3
Color	Greenish	Blackish	Light brown
Odor	Sweetish	Bad	Sweetish
Fungus	More+++	No	+
Water	No	No	No

Table 2: P^H value

Value	T1	T2	T3
p ^H	5.95	4.89	3.82

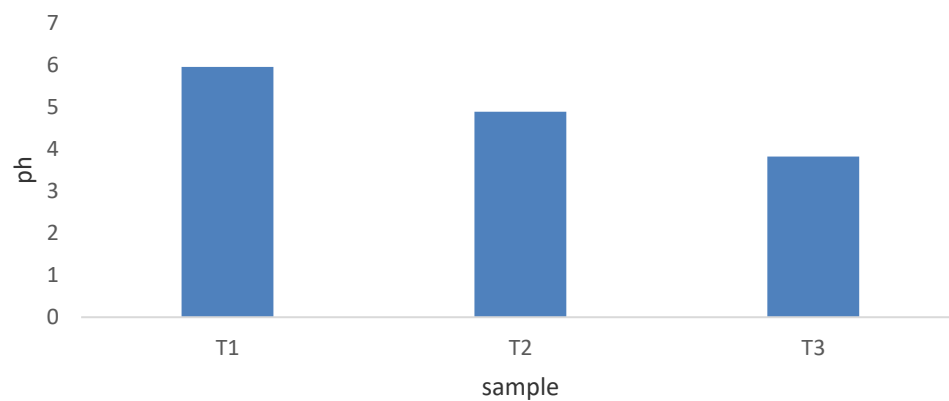


Table 3: Chemical components of silage

Components	T1	T2	T3
Moisture (%)	79.95	79.76	74.95
CP (%)	10.38	19.81	19.88
CF (%)	34.05	19.33	40.62
Ash (%)	14.52	13.18	12.19

Physical properties of silage depicted in the table-1. The physical color of T₁ and T₂ silage was greenish and light brown respectively whereas T₃ silage was blackish color. For all type silage aroma was pleasant except T₃ silage. It had that odor. There was no water inside a container. fungus growth was more in T₁. No and less fungus growth observed in T₂ and T₃. Chemical properties of three samples of napier grass with no, 25% and 30% mulberry leaves particularly moisture, CP, CF, ASH contents have been presented in (table 3).

3.1 Moisture

The average moisture percentage of samples estimated in this study was 78.22% (Table3). The highest moisture percent obtained in T₁ (79.95%) and lowest moisture percent obtained in T₃ (74.95%).

3.2 Crude Protein

The maximum and minimum crude protein percent obtained in current study were T₃ (19.88%) and T₁ (10.38%) respectively. The average CP percentage estimated in this study was 16.69% (Table 3).

3.3 Crude Fiber

The highest and lowest percentage of crude fibre obtained in current study were T₃ (40.63%) and T₂ (19.33%) respectively. The average CF percentage of this study was 31.33% (Table 3)

3.4 Ash

Silage has high biological value not only as protein source but also source of minerals. The maximum and minimum ash percent obtained in current study were T₁(14.53%) and T₃ (12.19%) respectively (Table 3).

Chapter 4: Discussion

The color of 3 different silage were not same. The silage color T₁ was greenish and T₂ was Blackish and T₃ was Light brown in color. The above result indicated that this difference may be due to comparatively less chlorophyll Content in Mulberry leaves than Napier grass (Huhtnen et al, 2002). T₁ and T₃ silage had pleasant aroma while T₂ had bad odor. The above result indicates that the silage with 30% percentage mulberry leaves showed lightly odd of bitter of other than other silages. More Fungus growth observed in T₁ Comparatively T₂ and T₃. T₃ silage was more acidic which indicate superior quality of silage. As standard p^H value of silage below 4 - 4.5. Though Moisture content highest 79.95% in T₁. But CP and CF Content highest in T₃. Because Mulberry leaves is a good protein supplement for animals. ASH content is highest T₁ that indicate T₁ content Na, Mg and Ca at greater amount than T₂ and T₃. Divyashree HJ and Chandrashekar S reported that 100% Napier silage without molasses contain Crude Protein (3.92%), crude fiber (1.46%), and ash (9.09%) and 75% naiper grasses and 25 % mulberry leaves without molasses contain Crude protein (11.04%), Crude fibre (4.73%), Ash (9.64%). On the other hand, my conducted study showed that T₁ contain Crude Protein (10.38%), crude fibre (34.05%) and ash (14.53%) and T₃ contain crude protein (19.88%), crude fiber (40.63%) and ash (12.19%). The CP, CF and Ash percentage observed in this study higher than that determined by Divyashree HJ and Chandrashekar S. This difference was due to Geographical location, Season, crop ensiled timing, climatic factors, soil manure application and fertilizer application in crops (Mtui et al., 2009).

Conclusion

The study revealed that mixing with mulberry leaves could be an alternative approach to improve the quality of Napier silage and the combination of 25% mulberry leaves was the most effective.

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Biography

I am Joynti Saha, elder daughter of Shankar Saha and Mitu Saha. I passed my Secondary School Certificate (SSC) examination from Basurhat A.H.C. Govt High School Noakhali in 2015 and Higher Secondary Certificate (HSC) examination from Shaheed Bir Uttam LT. Anwar Girls College, Dhaka in 2017. I enrolled for Doctor of Veterinary Medicine (DVM) degree in Chittagong Veterinary and Animal Sciences University (CVASU), Bangladesh. I have immense interest to work in the field of Microbiology.