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POST HARVEST PHYSIOLOGICAL AND NUTRITIONAL CHANGES IN *CENCHRUS CILIARIS*

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ABSTRACT

Forage production in arid region is seasonal and part of it has to be stored for lean period of the year. To meet the fodder requirement during lean month's adequate amount of surplus grasses must be conserved. *Cenchrus Ciliaris* L. commonly known as Buffel grass or African foxtail is an important pasture grass with high nutritive value. Study was conducted at the GEER Foundation Gandhinagar Gujarat, India to evaluate the post harvest nutritional changes in above ground biomass of *Cenchrus Ciliaris* which was grown in the plots laid down at the experimental site where regular irrigation practice was carried out. Harvested above ground material was divided into two parts and was stored at different temperature condition i.e. $25\pm 2^{\circ}\text{C}$ and $5\pm 2^{\circ}\text{C}$ respectively for one year and nutritional analysis was done after one year of storage. Statistical analysis of the treatment revealed that grass stored at $5\pm 2^{\circ}\text{C}$ was better in nutritive value.

Keywords: *Cenchrus Ciliaris*, Buffel Grass, Post Harvest, Nutritive Value, Biomass

INTRODUCTION

Knowledge of palatability, nutritive value and condition of the herbage is of great importance. Dabadghao *et al.*, (1962) estimated the relative palatability to cattle of the promising perennial grasses. The feeding value of forage, defined as its capacity to promote animal production, depends upon its ability to supply nutrients to the animal. It has three main components: the amount of forage the animal will eat (voluntary intake) the content of nutrients in the forage (nutrients content) and the ability of the animal to absorb and utilize the nutrients (nutrient availability).

Grasses and crop residues are the main source of dry fodder for the cattle in the lean period of the year in the arid region. *Cenchrus ciliaris* and *C.setigerus* are important species of pasture grasses. These natural grasses and forage crops are the cheapest source of cattle feed in the arid region. However, the forage production in arid region is seasonal and part of it has to be stored for lean period of the year. To meet the fodder requirement during lean month's adequate amount of the surplus grasses and crop residues must be conserved. Such measures are to be taken to get uniform supply of milk throughout the year and to achieve economic livestock production.

Nowadays, great emphasis is being laid on the evolvement of high- yielding nutritive and short-duration varieties of fodder crops. With the availability of high fodder yielding varieties of season bound and perennial fodder crops, there is a glut of fodder during the peak periods of growth and scarcity during other periods. The best way to regulate the supply of palatable and nutritive fodder during the lean periods is to store the surplus fodder.

A similar situation is also experienced in the case of grassland species which essentially comprise the monsoon grasses. These grasses give abundant fodder during the monsoon, but in the post-monsoon period and summer the forage production is almost negligible owing to their dormancy with the advent of winter and acute moisture stress. Thus it is essential that surplus fodder should be stored during the period of excess growth.

High quality forage is recognized as an important requirement for maintaining maximum production of dairy cows. Adequate roughage is needed in diets to provide good rumen function, but as more roughage is fed, the energy density of the diet is reduced. High quality forage allows the animal to consume more forage along with a high - energy intake to maximize production.

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MATERIALS AND METHODS

The experimental site was located at the Botanical Garden of GEER Foundation, Gandhinagar, Gujarat, India (latitude 23° 13'00" and longitude 78°42'00"). Gandhinagar has a monsoon climate with three main seasons: summer, monsoon and winter. Other than during monsoon the climate is generally dry and hot. The soil of the experimental site was sandy loam and slightly alkaline (pH 7.5) with 0.36% organic carbon, Electrical conductivity- 0.16mmho, Available Nitrogen – 285 kg/ha, Available Phosphorus- 24 kg/ha, Available Potash–356 kg/ha. The water was suitable for irrigation as its electroconductivity - 0.98, pH - 7.8 and Ca+Mg -5.57 M.e/L. The palatable fodder grass which was selected for the experiment was *Cenchrus ciliaris*. Study was conducted to evaluate the post harvest nutritional changes in above ground biomass of *Cenchrus Ciliaris* which was grown in the plots laid down at the experimental site. The material was sown in the experimental plots in randomized block design in five replications. The Plots size was 3m×3m and distance between the adjacent plots was 2 m and hundred tussocks were planted in each plot according to the row method, where row-to-row spacing was 30 cm and plant to plant spacing was 25 cm. Routine agronomic practices of fertilizer and irrigation were followed. Harvested above ground material was divided into two parts and both were stored at different temperature condition i.e. 25±2°C and 5±2°C respectively for one year and nutritional analysis was done after one year of storage. Evaluation of nutritive value was done in two replicates. The samples were oven-dried and ground through a 0.2 mm screen. According to (GAFTA, 1995) analysis using duplicate samples, of Crude Protein concentration, Nitrogen, Phosphorus, Potassium was done. Statistical analysis of all data was done to evaluate significance of the treatments given.

RESULTS AND DISCUSSION

The results of storage and its statistical analysis reveal that grass stored at cold temperature (5±2°C) temperature was better in nutritive value. It was observed that there is significant difference between nutritive value of Control (value obtained before storage) and the grass stored at 25±2°C temperature, whereas non significant difference between Control and grass stored at low temperature. Thus very meager nutritive changes were observed when grass was stored at low temperature (Table1). It can be explained as, microbial activity and the subsequent production of heat reduces the nutritive value of hay. Coblenz *et al.*, (1997) found that microbes preferentially oxidize nonstructural carbohydrates in alfalfa hay.

Table 1: Showing post harvest nutrient analysis (before and after storage) of *Cenchrus ciliaris* plant

Nutrient content	Before Storage	After 1 year of Storage	
		at (25 ± 2° c)	at (5 ± 2° c)
Nitrogen (%)	1.96	1.74	1.97
Phosphorus (ppm)	408.58	430.79	511.31
Potassium (%)	1.55	0.65	1.07
Protein (%)	12.35	10.77	12.4

Roberts *et al.*, (1984) associated the mold growth and production of associated toxins with increased spontaneous heating in hay bales during storage. Rotz and Muck (1994) indicated that increased microbial

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activity and the associated heating result in greater concentrations of fiber components and heat-damaged N in hay. Fiber components are not lost during hay storage; concentrations are thought to increase because of preferential oxidation of nonfiber components, particularly nonstructural carbohydrates (Rotz and Muck, 1994). All fresh moist crops start rapidly deteriorating just after harvesting, due to chemical changes within plant and spoilage caused by microorganism. The aim of conservation is to discourage this deterioration. Low temperatures or almost freezing the plant material results in near zero metabolism, so spoilage can be prevented. The cost-benefit ratio has to be worked out. A viable user friendly model that would encourage the farmers and those in agribusiness to prioritize the storage of fodder on a large scale would be appreciated. The climate change and problems, thereof have forced researchers all over the world to redefine the age old preservation methods.

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