EVALUATION CRUDE FIBRE CONTENT OF SOME PALATABLE GRASSES OF MELGHAT TIGER RESERVE, AMRAVATI, MAHARASHTRA STATE.

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Abstract

The study aim to determine the crude fibre content of by some palatable grasses from Melghat Tiger Reserve, Amravati, Maharashtra State. Early blooming stage and Mature stage leaf and stem of 14 species of grasses are selected from Melghat Tiger Reserve Dist. Amravati Maharashtra State was studied.
Study carried out by the selection of early blooming stage and mature stage of grasses leaf and stem it's shows variation in the Crude fiber content in the early blooming stage and mature stage of grasses leaf and stem. During this study in more of the grasses leaf and stem contained higher amount of crude protein content in the mature stage of grasses leaf and stem than the early blooming stage of grasses leaf stem respectively

Key words : *Wild some palatable grasses, Crude fibre content, Melghat Tiger Reserve Maharashtra State..*

Introduction:

Fibers are polysaccharides that are resistant to hydrolysis by mammalian digestive enzymes. These include substances such as cellulose, hemi-cellulose, pectin and lignin which are key structural components of plant cell walls. Although fiber is most commonly associated with plant materials, fiber like substances such as chitin are present in fungi, crustaceans and insects. Over recent years the definition of dietary fibre has been expanded to include substances such as resistant starch, inulin and non-digestible oligosaccharides. Fibers can be classified by their capacity to dissolve in water (soluble or insoluble), form a gel-like consistency (viscous or non-viscous), and/or for fermentation by colonic bacteria (fermentable or non-fermentable) fiber is the indigestible part of plant foods. It is classed as a complex carbohydrate that is resistant to digestion in the small intestine. Fiber is important to keep the digestive system healthy. As it is not digested in the small intestine, fiber passes through unchanged until it reaches the large intestine. In the large intestine, bacteria act on the fiber to ferment it. The primary function and benefit of fiber is to increase bulk and water in intestinal contents, maintain optimum levels of good bacteria and promote gut health. Some examples of fibre include cellulose, lignin, fructose.

Grasses are very important group of plants not only to human beings but also to animals. The grass family, scientifically known as Poaceae or Gramineae is a 5th largest family of flowering plants in the world, coming after Asteraceae, Fabaceae, Orchidaceae and Rubiaceae. Grasses range from tiny inconspicuous herbs less than an inch to the giant bamboos that grow up to 130 feet tall. It is difficult to calculate the exact number of species of family Poaceae; however, according to latest estimate by Tzvelev (1989), Poaceae consists of 10,300 species belonging to 898 genera. In India, it is represented by about 1200 species belonging to 268 genera (Karthikeyan*et al.* 1989; Moulik, 1997). Grasses are widely distributed than any other family of flowering plants and grow from sea level to the highest elevations. Grasses bind the soil and prevent loss of top-soil. About 25% of earth's vegetation is covered by grasslands.

Grasses play important role in man's economic activity and in the composition of natural plant communities. Grasses grow in various habitats and they are terrestrial, aquatic, lithophytic and epiphytic. The grasses show high adaptability with respect to changing environments, ability to coexist with grazing animals and with man.

The grass vegetation broadly divided into two types depending upon their life-span, Ephemeral vegetation consisting mainly of the grasses that complete the life cycle during rainy season or after rainy season. The species like *Arthraxon lancifolius* Trin., *Arundenella pumila* Hochst. *ex* A.Rich., *Sporobolus diander* (L.) R.Br., *Digitaria ternata* (A. Rich.) Stapf., are the chief components of farmers category. On the contrary the species like *Heteropogon contortus* (L.) P. Beauv. ex Roem.& Schult., *Andropogon pumulus* Roxb., *Chrysopogon fulvus* (Spreng.) Chiov. , *Dichanthium caricosum* (L.) A. Camus., *Setaria intermedia* Roem. & Schult., *Pennisetum pedicellatum* Trin. which form the autumn vegetation are either perennial vegetation forming large tufts.
Grasses belongs to family Poaceae. Poaceae is the largest family of the Monocotyledones in Angiosperms. Grasses are classified into two main parts annual and perennials, palatable and non-palatable. Grasses with more moisture content and less silica content in the upper aerial parts like stem, leaves are considered as the palatable grasses. Grasses with low moisture content and high percentage of silica are considered as non-palatable grasses. On the basis of morphological characters grasses are also classified palatable and non-palatable grasses.

The Melghat Tiger Reserve is one of the most important Tiger reserve of Vidarbha reagion of Maharashtra in, India with 2747 Square Km. area. The Melghat Tiger reserve is divided into five division i) Googamal wildlife division ii) Melghat wildlife iii)Sipna wildlife division and iv)Akot wildlife division and v) Akola wildlife division

The Melghat Tiger Reserve comprises herbivorous animals like Barking deer's, Spotted deers , Sāmbar , Bison ,Nil gai and omnivorous like sloth Bear. The dominant grasses are *Diachantium annulatum* (Forssk.) Stapf., *Diachantium caricosum* (L.) A. Camus., *Diachantium pertusum*(L.) Clayton., *Diachanthim tuberculatum* (Hack.) Cope., *Themeda quadrivalvis*(L.) Kuntze., *Themeda triandra* Forssk., *Heteropogon contortus* (L.) Beauv. ex Roem. & Schult.), *Chloris virgala* Swartz., *Chloris gyana* Kunth, *Cynodon dactylon* Roem. & Schult., *Eragrostis uniolides*(Retz.) Nees ex Steud., *Eragrostis. Viscose* (Retz.) Trin. These grasses shows the association with the wild leguminous plant. The grasslands in Melghat Tiger Reserve are of three types ,Taller grasslands, Intermediate grasslands and Smaller grasslands. On the basis of grasses distribution and composition grasslands are of two types Homogenous grasslands and Heterogeneous grasslands. The soil moisture content of the forest determines the palatability of the grasses

Review of literature

Grass family was recognized by Adanson as early as in 1763 by the name Gramineae which was later on named as Poaceae by Barnhart (1895).
Family Poaceae are represented by about 10,300 species belonging to 898 genera (Tzvelev, 1989).
Alasa M.C., Falola O.O. and Babayemi O. J., (2014). Evaluate nutritive value of Panicum maximum Jacq. ensiled with two cultivators of Lablab purpureus (L.) Sweet. He observed that Panicum maximum Jacq. content Dry matter, Crude protein, Crude fibre, Ether extract and Ash were 46.39%, 9.01%, 33.08%, 8.15%, and 10.01% respectively.

Cooke (1901-1908) provided an account of grasses in 'Flora of the presidency of Bombay'. Gamble (1896) compiled 'the Bombusaceae of British India' and 'Flora of presidency of Madras' in Fischer (1934) provided account of Madras presidency. An illustrated account of grasses of Bombay was published by Blatter and Mac Cann (1935). Achariyar and Madaliyar (1921) published an account of South Indian grasses.
Gawali A., Mayekar A.J., Kumar S., Desai B.G., Dhekale J.S. and Burte R.G., (2017). Nutritional evaluation of Themeda (Themeda mooneyi) grass in Konkan Kanyal Goats. Themeda (Themeda mooneyi) grass, harvested at mature stage, was fed to 4 Konkan Kanyal male goats for 28 day to assess the nutrient utilization and nutritive value. Themeda grass contained 23.73% dry matter (DM), 91.60% organic matter (OM), 6.83% crude protein (CP), 2.20% ether extract (EE), 8.40% total ash (TA), 4.20% acid insoluble acid (AIA), 48.57% nitrogen free extract (NFE), 72.30% neutral detergent fibre (NDF), 53.47% acid detergent fibre(ADF), 16.35% acid detergent lignin(ADL), 38.40% cellulose, 18.83% hemicellulose, 3.30% lignin, 1.63% tannin, 0.49% Ca and 0.32% P in DM basis.

Kauthale V., Kulkarni S. and Nalawade A., (2017). Nutritional evaluation of selected fodder species from Wardha District of Maharashtra, India. The study was carried out to evaluate the nutritional analysis of some fodder plant

species in Wardha district. Fourteen fodder species viz., Apluda mutica (L.) Hack., Sehima sulcatum (Hack.) A.Camus., Dichanthium sp., Themeda quadrivalvis (L.) Kuntze. , Spodiopogon rhizophorus (Steud.) Pilg., Chrysopogon fulvus (Spreng) Chiov., Cleistachne stocksii Hook. f., Sehima nervosum (Rottler) Stapf., Pennisetum pedicellatum Trin., Eulalia fimbriata (Hack.) Kuntze. , Heteropogon ritchiei (Hook.f.) Blatt. & McCann., Cymbopogon martini (Roxb.) Wats., Thelepogon elegans Roem. & Schult. and Stylosanthes hamata (L.) Taub. were analyzed for crude protein, crude fiber, oil/ether extract, ash and silica content. The crude protein content of the investigated fodder species ranged from 2.81% to 10.17%, the crude fiber content from 24. 56% to 35.73%, the ether extract from 0.59% to 1.01%, ash content from 8.17 % to 11.55% and silica content from 3.87% to 7. 47%. Findings of the present analysis indicated that fodder species showed variations in nutrients status before seed maturity stage and local fodder species provided partly required nutrients for indigenous livestock.

Kumar K. and Soni A., (2013). Study the nutrient content of commonly available species of forage in the region of Rajasthan. Common forage species such as Pennisetum Typholdenum Pers., Cenchrus ciliaris L., Cenchrus setigerus Vahl. and Lasiurus Sindicus Henrard. from Jodhpur district of Rajasthan were analysed for their nutritional constituent. The Crude protein content ranged from 6.5 to 9.0%, Cellulose from 28.6 to 30.8%, Hemicellulose from 28 to 32.5%, Lignin from 6.9 to 7.9%, Crude Fiber from 30.43 to 31.9%, Neutral detergent fiber from 68.8 to 71.3% and Acid detergent fiber from 38.1 to 40.8% on dry matter basis.

Muratkar G. D. and Kokate U. R. (2012), studied the Taxonomy of Palatable and non palatable grasses of Melghat Tiger Reserve, in this field work the exploration of grasses from Melghat Tiger Reserve with reference to the fodder value of the grasses for wild herbivorous animals of the protected areas of the MelghatTiger Reserve.

Material and Method-:

Plant collection-: Melghat Tiger Reserve possesses a unique position , the forest is of mixed dry deciduous with dominance of teak (*Tectona grandis* L). The annual rainfall varies from 1200 – 1400mm , humidity 67% – 89 % and the temperature range varies from 8˚C – 39˚C and there is various diversity of flora and fauna. Collection of the grasses plant species from selected areas of Melghat Tiger Reserve especially from Gugamal Wildlife division, Melghat wildlife division and Akot wildlife division. In the month of September, October and November by arranging the regular field visits in the protected area.

Grasses selected for study:

Sr. No.	Botanical Name	Common Name	Location
1	*Apluda mutica* L.	Motitura	Gullargaht
2	*Chloris barbata* Sw.	Gonde	Vairat
3	*Chloris virgata* Sw.	Gonde	Vairat
4	*Cynodon dactylon* (L). Pers.	Harali	Gullarghat
5	*Diahcanthium annulatum* (Forssk.) Stapf.	Mothi Marvel	Gullarghat
6	*Diachanthium caricosum* (L.) A. Camus.	Lahan Marvel	Gullarghat
7	*Digitaria bicornis* (Lam.) Roem. & Schult.	Rai Gavat	Pili
8	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	Kusal Kali	Pastalai
9	*Iseilema laxum* Hack.	Moshan	Bori
10	*Paspalidium flavedium* (Retz.) A. Camus.	Bodilya	Dhargad
11	*Setaria pumila* (Poir.)Roem. & Schutt.	Ran Bajara	Dhargad

12	*Spodiopogon rhizophorus* Trin.	Pochali	Pastalai
13	*Themeda triandra* Forssk.	Lahan Gondhal	Bori
14	*Themeda quadrivalvis* (L.) Kuntze.	Mothi Gondhal	Gullarghat

Determination of crude fiber content:

The crude fibre content is commonly used as a measure of the nutritive value of poultry and livestock feeds and also in the analysis of various food and food product to detect quality, quantity and adulteration. Crude fibre consist of largely of cellulose and lignin and some mineral matter.

Principle:

During the acid and subsequent alkali treatment, oxidative hydrolytic degradation of the native cellulose and considerable degradation of lignin occur.

Requirements: Beaker, muslin cloth, glass rod, muffle furnace, Sulphuric acid solution (1.25%), Sodium hydroxide solution (1.25%) , Silica crucibles, 95% alcohol and acetone.

Procedure:

1. Weigh exactly 2 g to 3g of dry and well ground sample into the refluxing beaker or flask containing boiling chip.
2. Add 200 ml of hot 1.25% H_2SO_4 and reflux for exactly 30 minutes with occasional shaking to prevent particles adhering to the sides of the beaker. The boiling should be steady and constant.
3. Filter through muslin cloth and wash with boiling water until washing are free of acid.
4. Discard the filtrate and transfer the residue quantitatively back into the same refluxing beaker with the help of a glass rod and boil the residue 1.25% sodium hydroxide for 30 min.
5. Filter through muslin cloth and wash with boiling water and wash the residue with about 10-15 ml of 95% alcohol.
6. Remove the residue and transfer in the crucible. Dry the crucibles in a hot air oven maintained at 100 ± 5 ˚C for 2-3hrs to constant weight. Record the final weight (W1).
7. Ignite the crucible in a muffle furnace at 550 ˚C for 30 min. to burn-off the carbonaceous matter.
8. Cool in a desiccator and weigh. Note the final weight (W2).

Calculations

$$\text{Crude fiber \%} = \frac{(W2 - W1) \times 100}{\text{Wt. of sample}}$$

Table 1. Showing Evaluation of Crude fibre content of early blooming stage of grasses.

Sr. No.	Botanical Name	Crude Fibre in % (Leaf)	Crude Fibre in % (Stem)
1	*Apluda mutica* L.	28.86	35.36
2	*Chloris barbata* Sw.	21.2	20.32

3	*Chloris virgata* Sw.	25.76	28.96
4	*Cynodon dactylon* (L). Pers.	27.28	32.25
5	*Diahcanthium annulatum* (Forssk.) Stapf.	25.32	30.28
6	*Diachanthium caricosum* (L.) A. Camus.	31.24	37.76
7	*Digitaria bicornis* (Lam.) Roem. & Schult.	21.44	37.08
8	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	37	40.16
9	*Iseilema laxum* Hack.	28.32	31.92
10	*Paspalidium flavedium* (Retz.) A. Camus.	31.28	35.61
11	*Setaria pumila* (Poir.)Roem. & Schutt.	22.32	29.8
12	*Spodiopogon rhizophorus* Trin.	20.44	24.12
13	*Themeda triandra* Forssk.	29.68	28.2
14	*Themeda quadrivalvis* (L.) Kuntze.	23.68	31.4

Table 2. Showing Evaluation of Crude fibre content of matured stage of grasses.

Sr. No.	**Botanical Name**	**Crude Fibre in % (Leaf)**	**Crude Fibre in % (Stem)**
1	*Apluda mutica* L.	33.84	25.84
2	*Chloris barbata* Sw.	27.32	30.96
3	*Chloris virgata* Sw.	24.6	35.2
4	*Cynodon dactylon* (L). Pers.	33.96	36.44
5	*Diahcanthium annulatum* (Forssk.) Stapf.	37.96	26.96
6	*Diachanthium caricosum* (L.) A. Camus.	38.68	34.52
7	*Digitaria bicornis* (Lam.) Roem. & Schult.	31.6	34.44
8	*Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult.	31.96	32.68
9	*Iseilema laxum* Hack.	36.92	29.2
10	*Paspalidium flavedium* (Retz.) A. Camus.	34.08	37.76

11	*Setaria pumila* (Poir.)Roem. & Schutt.	25.72	28.2
12	*Spodiopogon rhizophorus* Trin.	24.44	36.48
13	*Themeda triandra* Forssk.	31.52	30.36
14	*Themeda quadrivalvis* (L.) Kuntze.	24.4	29.76

Result & Discussion:-

Crude fibre content in early blooming stage of grasses leaf are presented in Table 1. *Apluda mutica* L. 28.86%, *Chloris barbata* Sw. 21.2%, *Chloris virgata* Sw. 25.76%, *Cynodon dactylon* (L). Pers. 27.28 %, *Diahcanthium annulatum* (Forssk.) Stapf. 25.32%, *Diachanthium caricosum* (L.) A. Camus. 31.24 %, *Digitaria bicornis* (Lam.) Roem. & Schult. 21.44 %, *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. 37%, *Iseilema laxum* Hack. 28.32%, *Paspalidium flavedium* (Retz.) A.Camus. 31.28%, *Setaria pumila* (Poir.)Roem. & Schutt. 22.32%, *Spodiopogon rhizophorus* Trin. 20.44%, *Themeda triandra* Forssk. 29.68% and *Themeda quadrivalvis* (L.) Kuntze. 23.68%

From the above observation of early blooming stage of grasses leaf it is concluded that more value of crude fibre content found in *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. 37%, *Paspalidium flavedium* (Retz.)A.Camus. 31.28%, *Diachanthium caricosum* (L.) A. Camus. 31.24 %, *Themeda triandra* Forssk. 29.68% and *Iseilema laxum* Hack. 28.32% respectively.
Crude fibre content in early blooming stage of grasses stem (Culm) are presented in Table 1. *Apluda mutica* L. 35.36%, *Chloris barbata* Sw. 20.32%, *Chloris virgata* Sw. 35.2%, *Cynodon dactylon* (L). Pers. 32.25%, *Diahcanthium annulatum* (Forssk.) Stapf. 30.28%, *Diachanthium caricosum* (L.) A. Camus. 37.76%, *Digitaria bicornis* (Lam.) Roem. & Schult. 37.08%, *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. 40.16%, *Iseilema laxum* Hack. 31.92%, *Paspalidium flavedium* (Retz.) A. Camus. 35.61%, *Setaria pumila* (Poir.)Roem. & Schutt. 29.8%, *Spodiopogon rhizophorus* Trin. 24.12%, *Themeda triandra* Forssk. 28.2% and *Themeda quadrivalvis* (L.) Kuntze. 31.4%.

From the above observation of early blooming stage of grasses stem(Culm) it is concluded that more value of crude fibre content found in *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. 40.16%, *Diachanthium caricosum* (L.) A. Camus. 37.76%, *Digitaria bicornis* (Lam.) Roem. & Schult. 37.08%, *Paspalidium flavedium* (Retz.) A. Camus. 35.61%, *Apluda mutica* L. 35.36% and *Cynodon dactylon* (L). Pers. 32.25% respectively.

Crude fibre content in matured stage of grasses leaf are presented in Table 2. *Apluda mutica* L. 33.84%, *Chloris barbata* Sw. 27.32%, *Chloris virgata* Sw. 24.6%, *Cynodon dactylon* (L). Pers. 33.96%, *Diahcanthium annulatum* (Forssk.) Stapf. 37.96%, *Diachanthium caricosum* (L.) A. Camus. 38.68%, *Digitaria bicornis* (Lam.) Roem. & Schult. 31.6%, *Heteropogon contortus*(L.) P.Beauv. ex Roem.& Schult. 31.96%, *Iseilema laxum* Hack. 36.92%, *Paspalidium flavedium* (Retz.) A. Camus. 34.08%, *Setaria pumila* (Poir.)Roem. & Schutt. 25.72%, *Spodiopogon rhizophorus* Trin. 24.44%, *Themeda triandra* Forssk. 31.52% and *Themeda quadrivalvis* (L.) Kuntze. 24.4%..

From the above observation of matured stage of grasses leaf it is concluded that more value of crude fibre content found in *Diachanthium caricosum* (L.) A. Camus. 38.68%, *Diahcanthium annulatum* (Forssk.) Stapf. 37.96%, *Iseilema laxum* Hack. 36.92%, *Paspalidium flavedium* (Retz.) A. Camus. 34.08%, *Cynodon dactylon* (L). Pers. 33.96% and . *Apluda mutica* L. 33.84% respectively.

Crude fibre content in matured stage of grasses stem (Culm) are presented in Table 2. *Apluda mutica* L. 25.84%, *Chloris barbata* Sw. 30.96%, *Chloris virgata* Sw. 35.2%, *Cynodon dactylon* (L). Pers. 36.44%, *Diahcanthium annulatum* (Forssk.) Stapf. 26.96%, *Diachanthium caricosum* (L.) A. Camus. 34.52%, *Digitaria bicornis* (Lam.) Roem. & Schult. 34.44%, *Heteropogon contortus*(L.) P.Beauv. ex Roem.& Schult. 32.68%, *Iseilema laxum* Hack29.2%, *Paspalidium flavedium* (Retz.) A. Camus. 37.76%, *Setaria pumila* (Poir.)Roem. & Schutt. 28.2%,

Spodiopogon rhizophorus Trin. 36.48%, *Themeda triandra* Forssk. 30.36%, and *Themeda quadrivalvis* (L.) Kuntze. 29.76%.

From the above observation of matured stage of grasses stem (Culm) it is concluded that more value of crude fibre content found in *Paspalidium flavedium* (Retz.) A. Camus. 37.76%, *Spodiopogon rhizophorus* Trin. 36.48%, *Cynodon dactylon* (L). Pers. 36.44%, *Chloris virgata* Sw. 35.2%, *Diachanthium caricosum* (L.) A. Camus. 34.52% and *Digitaria bicornis* (Lam.) Roem. & Schult. 34.44% respectively.

From the observation of Table 1. and Table 2. It concluded that there more % of crude fibre content present in Mature stage of grasses leaf and stem than the early blooming stage of grasses leaf and stem respectively.

Conclusion :-

The study of the Evaluation of Crude fibre content of Palatable grasses from Melghat Tiger Reserve Dist. Amravati, State Maharashtra.. Study carried out by the selection of early blooming stage and mature stage of grasses leaf and stem it's shows variation in the Crude fibre content in the early blooming stage and mature stage of grasses leaf and stem. During this study in some grasses leaf and stem contained higher amount of crude fibre in the mature stage of grasses leaf and stem than the early blooming stage of grasses leaf stem.

Crude fibre is important to keep the digestive system healthy. As it is not digested in the small intestine, fibre passes through unchanged until it reaches the large intestine. In the large intestine, bacteria act on the fibre to ferment it. The primary function and benefit of fibre is to increase bulk and water in intestinal contents, maintain optimum levels of good bacteria and promote gut health. of herbivores animal of Melghat Tiger Reserve Dist. Amravati State Maharashtra.

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