



EVALUATION OF IRON (Fe.) BY ATOMIC ABSORPTION SPECTROMETER OF SOME PALATABLE GRASSES OF SATPUDA TIGER RESERVE, MADHYA PRADESH STATE

G. D. Muratkar

U. R. Kokate

Department of Botany & Department of Environmental Science Research Laboratory
Arts, Science & Commerce College Chikhaldara Dist. Amravati.
Mb.08975750202, e-mail: gmuratkar@gmail.com

The study aim to determine the Iron (Fe.) by Atomic Absorption Spectrometer of some palatable grass from Melghat Tiger Reserve, Amravati, Maharashtra State. Early blooming stage and Mature stage leaf and stem of 14 species of grasses are selected from Satpuda Tiger Reserve Madhya Pradesh State. Study carried out by the selection of early blooming stage and mature stage of grasses leaf and stem it's shows variation in the Iron (Fe.) content in the early blooming stage and mature stage of grasses leaf and stem.

Key words: Wild fodder grasses, Iron (Fe.), Satpuda Tiger Reserve, Palatability of grasses.

Introduction:

Satpura Tiger Reserve (STR) also known as Satpura National Park is located in the Hoshangabad District (newly named Narmadapuram) of Madhya Pradesh in India. Its name is derived from the Satpura range. It covers an area of 524 km² (202 sq mi). Satpura National Park, along with the adjoining Bori and Pachmarhi wildlife sanctuaries, provides 2,200 km² (850 sq mi) of unique central Indian highland ecosystem. It was set up in 1981. The terrain of the national park is extremely rugged and consists of sandstone peaks, narrow gorges, ravines and dense forests. The altitude ranges from 300 to 1,352 metres (984 to 4,436 ft). Satpura National Park is rich in biodiversity. The animals here include leopard, sambar, chital, Indian muntjac, nilgai, four-horned antelope, Chinkara, wild boar, bear, black buck, fox, porcupine, flying squirrel, mouse deer, and Indian giant squirrel. There are a variety of birds. Hornbills and peafowl are common birds found here. The flora consists of mainly sal, teak, tendu, *Phyllanthus emblica*, mahua, bel, bamboo, and grasses and medicinal plants. Satpura Tiger Reserve has about 10% of the area which is classified as grasslands including natural blanks on Pachmarhi plateau, anthropogenic grassland due to relocation of villages and draw down areas of Tawa reservoir.

These grasslands are with 68 grasses species named as Neemghan, Madai, Keria, Geetkheda, Bori, Khakrapura, Dhari, Churana, Sakot, Rorigat, Binor East Pachmarhi with grasslands like Ghogri, Muwas, Naiakheda, Kesari, Tendukheda, Mogra, Pattan, Madai etc. In addition to these, some of the new grasslands have been created by relocation of 23 villages from the core area of the reserve. Mostly, all the available grasslands are of anthropogenic origin and are subjected to develop grazing grasslands of herbivores, the grasslands are invaded by woody plants and invasive weeds. High degree of protection and maintenance is done for these grasslands to support a size-able population of herbivores which are dependent on them by the Satpura Tiger Reserve. The dominant grasses are *Dichanthium annulatum* (Forssk.) Stapf., *Dichanthium caricosum* (L.) A. Camus., *Dichanthium pertusum* (L.) Clayton., *Dichanthium tuberculatum* (Hack.) Cope., *Themeda quadrivalvis* (L.) Kuntze., *Themeda triandra* Forssk., *Heteropogon contortus* (L.) Beauv. ex Roem. & Schult., *Chloris virgata* Swartz., *Chloris gyneria* Kunth, *Cynodon dactylon* Roem. & Schult., *Eragrostis unioloides* (Retz.) Nees ex Steud., *Eragrostis viscosa* (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.

The mineral is classified as an electrolyte because it's highly reactive in water. When dissolved in water, it produces positively charged ions. This special property allows it to conduct electricity, which is important for many processes throughout the animal body. The body needs many minerals; these are called essential minerals. Essential minerals are sometimes divided up into major minerals (macro-minerals) and trace minerals (micro-minerals). These two groups of minerals are equally important, but trace minerals are needed in smaller amounts than major minerals. The body needs trace minerals in very small amounts. Note that iron is considered to be a trace mineral, although the amount needed is somewhat more than for other micro-minerals. Iron (Fe.) is the most abundant element (by weight) on Earth, since it makes up most of the Earth's core, and is the fourth most common element in the Earth's crust. However, Fe is considered as a trace- or micro-element in nutrition, since it only makes up approximately 0.004% of the body by weight and is required in only very minute amounts in the diet. Iron was probably the first trace element recognized as important to human nutrition, as its importance in the diet has been known for over 2,000 years.

Iron deficiency in cattle is characterized by loss of appetite, poor growth rate, and lethargy. These symptoms are due to a deficiency of hemoglobin resulting in anemia, which can be diagnosed by a low hematocrit. This is mainly seen in pre-weaned calves, especially ones fed exclusively milk and housed indoors. Iron deficiency in adult cattle is extremely rare since Fe is abundant in the soil and most forage has some degree of soil contamination. The iron requirement for ruminating cattle is thought to be approximately 50 ppm of the diet. The exact level is difficult to determine since most feedstuffs have more than adequate amounts of Fe, with soil contamination and often water adding additional amounts to the diet. Milk-fed calves have a normal growth rate with 50 ppm Fe in the diet, but their muscles are pale due to lower than normal myoglobin. Therefore the requirement for milk-fed calves is believed to be around 100 to 150 ppm in the diet. For swine, the requirement for the piglet is 60 to 80 ppm of the diet, with older animals requiring 30 to 50 ppm Fe. The requirement for poultry is similar to that of swine

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., *Arundinella 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 (Graminae) Poaceae. Poaceae is the largest family of the Monocotyledons 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.



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 represented by about 10,300 species belonging to 898 genera (Tzvelev, 1989). Adeyeye E. I., (2005). Chemical analyzed the macro elements like Ca, K, Mg and Na. from the root, leaves, stem, and fruit of *Zea mays* L., *Corchorus olitorius* L. and *Celosia argentea* L. He observed *Zea mays* L. Mg, K, Na and Ca content 347,285, 472, and 187 ppm in the root, 534, 268, 531 and 169 ppm in the leaves.

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.

Garg M. R., Bhandari B. M., Kumar S. S. and Sherasia P. L., (2008). A study was conducted in the hilly zone of Kerala, to assess the status of certain macro and micro-minerals in dairy animals, by analyzing feed and fodder samples. Paddy straw was major dry roughage available for feeding dairy animals and found to be low in Ca 0.11 %, P 0.09%, S 0.11 %, Cu 1.79 ppm and Zn 11.69 ppm. Amongst green fodders, mainly local grasses and hybrid napier were available and found to be good sources of Ca 0.43%, Mg 0.34%, Cu 13.83 ppm, Mn 74.52 ppm and Fe 1379 ppm.

Muratkari 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 Melghat Tiger Reserve.

R. Hari Babu and N. Savithramma (2014). Studies on mineral analysis of grasses of Poaceae. The aim of the study is to screen the grasses of South India for mineral nutrition. Ten grass species *Eleusine indica* (L.) Gaertn., *Eragrostis amabilis* (L.) Wight & Arn. ex Nees., *Eragrostiella bifaria* (Vahl) Bor., *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult., *Panicum repens* L., *Perotis indica* (L.) Kuntze., *Pycnus flavidus* var., *Setaria pumila* (Poir.) Roem. & Schult. *Sporobolus coromandelianus* (Retzius) Kunth. and *Sporobolus wallichii* Munro ex Trim. were collected from different places of South India, in 2010, authenticated by BSI Coimbatore (Tamil Nadu). To analyzed Ca, K, Mg, P, B, Cu, Fe, Mn, Mo and Zn by Perkin Elmer 7000DV model ICP-OES was used for the determination of elements.

Soni A., Kumar K. and Mathur R., (2014). Study the micro and macro element concentration in different forage grasses viz. *Cenchrus ciliaris* L., *Cenchrus setigerus* Vahl., *Lasiurus indicus* Henr. and *Pennisetum typholdenum* Pers. The average concentration (% DM) of different macro and micro element in forage grasses analyzed in this study were ranged from 0.19-0.24, 0.19-0.25, 0.79-1.20, 0.35-0.48, 0.078-0.12, and 0.98-1.11 respectively for Sulfur, Phosphorus, Calcium, Magnesium, Sodium and Potassium (macro element) and 218-310, 26-37, 34-52 and 9-28 (µg/gm) respectively for, Iron, Zinc, Manganese, and Copper (micro element).

Objectives:

To observe and study the morphology of grasses, identification of grasses on the basis of morphological characters, to know the minerals, nutritive value of grasses, identification of palatable grasses useful for soft and course feeding herbivores.

**Hypothesis :**

The fodder value of grasses determines the utility index of grasslands in protected areas of Central India. The organic chemicals present in vegetative parts of grasses determine the fodder value of grasses. The morphology of grasses is not sufficient so micro and macro nutrients are to be analyzed by the researchers in the current era. The grasses are annuals and perennials also palatable and non palatable in grasslands. The nutrient value study is useful to know the richness of grasses with special respect to nutrient study.

Methodology:-

Satpuda Tiger Reserve possesses a unique position, the forest is of Tropical Dry Deciduous with dominance of Teak (*Tectona grandis* L.). The annual rainfall varies from 1300 – 1450mm, humidity – 67 – 89 % and the temperature range varies from 6°C – 38°C and there is various diversity of flora and fauna. The representative sample of grasses species collected from selected areas of Satpuda Tiger Reserve especially from rehabilitated sites of STR. The area selected from different grassland of Satpuda Tiger Reserve, the visits are arranged in month of August, October and December of every year of the span of research work.

The regular field visits are arranged in different season, before flowering of grasses and after flowering of grasses. The Collected grasses specimens are *Apluda mutica*, *Chloris barbata*, *Chloris virgata*, *Cynodon dactylon*, *Dichanthium annulatum*, *Dichanthium caricosum*, *Digitaria bicornis* (Lam.), *Heteropogon contortus* (L.), *Iseilema laxum* Hack., *Paspalidium flavedium* (Retz.), *Setaria pumila* (Poir.) Roem., *Spodiopogon rhizophorus* Trin., *Themeda triandra* Forssk., *Themeda quadrivalvis* (L.) Kuntze. These grasses are Selected from core area of Melghat Tiger Reserve are identified by using regional and National flora of Bombay Presidency by T. Cooke, Grasses of Maharashtra by Dr. Potdar and Dr. S. R. Yadav, Flora of Marathwada by Bhuktar and Sardesai, Flora of Nagpur District, Maharashtra by N. R. Ugemuge and Flora of Melghat by Dr. M.A. Dhore.

Sr. No.	Botanical Name	Common Name	Location
1	<i>Apluda mutica</i> L.	Fulera	Common in all areas
2	<i>Chloris barbata</i> Sw.	Gondali ghas	Pattan
3	<i>Chloris virgata</i> Sw.		Pattan
4	<i>Cynodon dactylon</i> (L.) Pers.	Duba	Common in marshy places
5	<i>Dichanthium annulatum</i> (Forssk.) Stapf.	Marvel/ kandi	Lower hills of Satpuda
6	<i>Dichanthium caricosum</i> (L.) A. Camus	Marvel/ kandi	Lower hills of Satpuda
7	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	Mathani ghas	Common grass
8	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	Sukra / lapha	Common in satpuda tiger reserve
9	<i>Iseilema laxum</i> Hack.	Muchel	Rare grass in satpuda
10	<i>Paspalidium flavedium</i> (Retz.) A. Camus.	Bodila	Pattan grassland
11	<i>Setaria pumila</i> (Poir.) Roem. & Schutt.	Ban Bajara	All grasslands of Satpuda
12	<i>Themeda quadrivalvis</i> (L.) Kuntze.	Ghuneri	Common grass in lower hillss of Satpuda Tiger Reserve



Determination of Fe by Atomic absorption spectrometer :

The elements aluminum (Al), calcium (Ca), copper (Cu), iron (Fe), magnesium (Mg), potassium (K), sodium (Na), and zinc (Zn) in a plant tissue digest brought into solution by one of several procedures for organic matter destruction can be determined by atomic absorption spectrophotometry (AAS). The plant tissue digest containing the elements to be determined is atomized into either an acetylene air or acetylene nitrous oxide gas mixture at a temperature between 2,000 to 2,900°C. The burner design and adjustment of the fuel/oxidant mixture provide conditions in which the elements to be determined are converted to non-excited, non-ionized, ground-state atoms.

Principle:

An atomic absorption spectrophotometer consists of a sample introduction system, an excitation source (hollow cathode lamp), nebulizer and flame burner, chopper, and detector. An atom of an element is capable of absorbing light energy characteristic of that element. Radiation (photons) is generated from a hollow cathode lamp whose cathode is made of the element for determination. When these photons pass through the flame containing atoms of the element, the photons are absorbed. The degree of absorption is proportional to the concentration of the element in the flame (the flame also serves as a means of supporting the atoms in the light path). The measured difference between the light intensity passing around the flame and that passing through the flame defines absorption and can be used to determine the concentration of the element in the atomized solution. The analyte containing the elements of interest must be a solution that can be atomized into the flame.

Requirement: Atomic absorption spectrophotometer, small crucible (nickel or porcelain) weighing balance, muffle furnace and volumetric flasks and perchloric acid hood.

Reagents:

Hydrochloric acid, nitric acid (16N HNO₃), and deionized water. Lanthanum (La) Solution (1,000 mg/L): Prepared from either lanthanum oxide (La₂O₃) or from lanthanum chloride (LaCl₃ · 7H₂O) containing 0.1N HCl. The La₂O₃ must be brought into solution using HCl, but is much cheaper than the more readily soluble hydrated chloride source. Using La₂O₃, prepare a slurry by adding a small volume of deionized water to 1.1727g La₂O₃ in a 1-L volumetric flask. Slowly add 8 ml concentrated HCl and stir. Dilute to final volume with additional deionized water. Starting with LaCl₃ · 7H₂O, dissolve 2.6738 g LaCl₃ · 7H₂O in deionized water. Slowly add 8 ml of concentrated HCl and bring to volume with additional deionized water.

Iron (Fe) Standard (1,000 mg/L): Weigh 1.000 g Fe wire into a 1-L volumetric flask. Dissolve with approximately 8ml deionized water and 8ml concentrated HCl. Bring to volume with deionized water.

Procedure:

1. Transfer filtrate from the dry ashing procedure into 20-ml beaker.
2. Read samples with atomic absorption spectrophotometer using appropriate standards and instrument settings. Set zero with reagent blank, which is 1.2N HCl solutions.
3. Report as ppm. Fe and Zn in the plant sample.

Calibration and Standards

1. 1000 ppm. Fe stock solution
2. 100 ppm. Fe and working stock solution dilute 10 ml of 1000 ppm. Stock solution each to 100 ml with deionized water, respectively.

**Working standards**

Pipette the following volumes of 100 ppm working stock solution into 500 ml volumetric flasks and dilute to volume with 1.2 N HCl solutions.

Calculations

Micronutrient ppm. in plant sample = ppm. in reading.

Table 1 - Evaluation of Iron (Fe.) by Atomic Absorption Spectrometer of early bloom stage of grasses

Sr. No.	Botanical Name	Iron (Fe.) In ppm. (Leaf)	Iron (Fe.) In ppm. (Stem)
1	<i>Apluda mutica</i> L.	214	186
2	<i>Chloris barbata</i> Sw.	287	141
3	<i>Chloris virgata</i> Sw.	331	293
4	<i>Cynodon dactylon</i> (L). Pers.	356	264
5	<i>Dichanthium annulatum</i> (Forssk.) Stapf.	485	354
6	<i>Dichanthium caricosum</i> (L.) A. Camus	576	391
7	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	355	267
8	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	419	346
9	<i>Iseilema laxum</i> Hack.	187	199
10	<i>Paspalidium flavedium</i> (Retz.) A. Camus.	492	347
11	<i>Setaria pumila</i> (Poir.)Roem. & Schutt.	297	121
12	<i>Themeda quadrivalvis</i> (L.) Kuntze.	368	295

Table 2. Showing Evaluation of Iron (Fe.) by Atomic Absorption Spectrometer of matured stage of grasses.

Sr. No.	Botanical Name	Iron (Fe.) In ppm. Leaf)	Iron (Fe.) In ppm. (Stem)
1	<i>Apluda mutica</i> L.	298	217
2	<i>Chloris barbata</i> Sw.	219	125
3	<i>Chloris virgata</i> Sw.	197	267
4	<i>Cynodon dactylon</i> (L). Pers.	317	201
5	<i>Dichanthium annulatum</i> (Forssk.) Stapf.	504	198
6	<i>Dichanthium caricosum</i> (L.) A. Camus	511	326
7	<i>Digitaria bicornis</i> (Lam.) Roem. & Schult.	274	189
8	<i>Heteropogon contortus</i> (L.) P. Beauv. ex Roem. & Schult.	386	391
9	<i>Iseilema laxum</i> Hack.	198	188
10	<i>Paspalidium flavedium</i> (Retz.) A. Camus.	498	324
11	<i>Setaria pumila</i> (Poir.)Roem. & Schutt.	201	119
12	<i>Themeda quadrivalvis</i> (L.) Kuntze.	236	198

Iron (Fe.) content:

Leaf -: Iron (Fe.)content (DM basis) of early bloom stage of grasses leaf and mature stage of grasses leaf are presented in Table 1. and Table 2. Respectively.

From the table 1. revealed that value of Iron (Fe.) content (DM basis) of early bloom stage of grasses leaf of *Apluda mutica* L., *Chloris barbata* Sw., *Chloris virgata* Sw., *Cynodon dactylon* (L).Pers., *Dichanthium annulatum* (Forssk.) Stapf., *Dichanthium caricosum* (L.)

A. Camus., *Digitaria bicornis* (Lam.) Roem. & Schult. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Iseilema laxum* Hack., *Paspalidium flavedium* (Retz.) A. Camus., *Setaria pumila* (Poir.) Roem. & Schult., and *Themeda quadrivalvis* (L.) Kuntz. grasses are reported values are 214, 287, 331, 356, 485, 576, 355, 419, 187, 492, 297, 197, 282 and 368 ppm. Iron (Fe) content respectively.

From the table 1. Revealed that the Iron(Fe.) content (DM basis) of early bloom stage of grasses leaf of fourteen species of grasses. The higher value Iron (Fe.) content reported in grasses leaf of *Dichanthium caricosum* (L.) A. Camus. 576ppm., *Paspalidium flavedium* (Retz.) A. Camus. 492ppm., *Dichanthium annulatum* (Forssk.) Stapf. 485ppm., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. 419ppm. and *Themeda quadrivalvis* (L.) Kuntz. 368ppm. than the other early bloom grasses leaf while lower value of Iron(Fe.) content reported in grasses leaf of *Iseilema laxum* Hack. 187ppm.

Table 2 reveals that, value of Iron (Fe.) content (DM basis) matured stage of grasses leaf of *Apluda mutica* L., *Chloris barbata* Sw., *Chloris virgata* Sw., *Cynodon dactylon* (L.) Pers., *Dichanthium annulatum* (Forssk.) Stapf., *Dichanthium caricosum* (L.) A. Camus., *Digitaria bicornis* (Lam.) Roem. & Schult. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Iseilema laxum* Hack., *Paspalidium flavedium* (Retz.) A. Camus., *Setaria pumila* (Poir.) Roem. & Schult., *Spodiopogon rhizophorus* Trin., and *Themeda quadrivalvis* (L.) Kuntz. grasses are reported values are 298, 219, 197, 317, 504, 511, 274, 386, 198, 498, 201, 168, 311 and 236ppm. Iron (Fe) content respectively.

From the table 2. revealed that the Iron(Fe.) content (DM basis) of matured stage of grasses leaf of fourteen species of grasses. The higher value Iron(Fe.) content reported in grasses leaf of *Dichanthium caricosum* (L.) A. Camus. 511ppm., *Dichanthium annulatum* (Forssk.) Stapf. 504ppm., *Paspalidium flavedium* (Retz.) A. Camus. 498 ppm., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. 386ppm., *Cynodon dactylon* (L.) Pers. 317ppm. and *Themeda triandra* Forssk. 311ppm than the other matured stage grasses leaf while lower value of Iron(Fe.) content reported in grasses leaf of and *Iseilema laxum* Hack. 198ppm. respectively.

Stem(Culm) : Iron(Fe.) content (DM basis) of early bloom stage of grasses stem(culm) and matured stage of grasses stem(culm) are presented in Table 1. and Table 2. respectively. From the table 1. revealed that value of Iron(Fe.) content (DM basis) of early bloom stage grasses stem (Culm) of *Apluda mutica* L., *Chloris barbata* Sw., *Chloris virgata* Sw., *Cynodon dactylon* (L.) Pers., *Dichanthium annulatum* (Forssk.) Stapf., *Dichanthium caricosum* (L.) A. Camus., *Digitaria bicornis* (Lam.) Roem. & Schult. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Iseilema laxum* Hack., *Paspalidium flavedium* (Retz.) A. Camus., *Setaria pumila* (Poir.) Roem. & Schult., and *Themeda quadrivalvis* (L.) Kuntz. grasses are reported the values are 186, 141, 293, 264, 354, 391, 267, 346, 199, 347, 121, and 295ppm. Iron(Fe) content respectively. From the table 1. revealed that the Iron(Fe.) content (DM basis) of early bloom stage of grasses stem (Culm) of fourteen species of grasses. The higher value the Iron(Fe.) content is reported in *Dichanthium caricosum* (L.) A. Camus. (391ppm.), *Dichanthium annulatum* (Forssk.) Stapf. (354ppm.), *Paspalidium flavedium* (Retz.) A. Camus. (347ppm.) and *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. (346ppm.)

From the table 2. revealed that value of Iron(Fe.) content (DM basis) of matured stage grasses stem (Culm) of *Apluda mutica* L., *Chloris barbata* Sw., *Chloris virgata* Sw., *Cynodon dactylon* (L.) Pers., *Dichanthium annulatum* (Forssk.) Stapf., *Dichanthium caricosum* (L.) A. Camus., *Digitaria bicornis* (Lam.) Roem. & Schult. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Iseilema laxum* Hack., *Paspalidium*



flavedium (Retz.)A.Camus., *Setaria pumila* (Poir.) Roem.& Schutt., *Themeda quadrivalvis* (L.) Kuntz. grasses are reported the values are 217, 125, 267, 201, 198, 326, 189, 391, 188, 324, 94 and 198ppm. Iron(Fe) content respectively.

Table 2 reveals that, the Iron(Fe.) content (DM basis) of matured stage of grasses stem (Culm) of fourteen species of grasses. The higher value the Iron (Fe.) content was reported in *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult. (391ppm.), *Diachanthium caricosum*(L.)A.Camus.(326ppm.), *Paspalidium flavedium* (Retz.)A.Camus.(324ppm.) and *Chloris virgata* Sw.(267ppm.) while lower value of Iron (Fe.) content was found in the *Spodiopogon rhizophorus* Trin. (92ppm.) and *Themeda triandra* Forssk.(94ppm.) respectively.

From above Table 1. and Table 2. observation it is concluded that early bloom stage grasses leaf and stem (Culm) of *Chloris barbata* Sw., *Chloris virgata* Sw., *Cynodon dactylon* (L.) Pers., *Dichanthium annulatum* (Forssk.) Stapf. (stem), *Dichanthium caricosum* (L.) A. Camus., *Digitaria bicornis* (Lam.) Roem. & Schult., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.(leaf), *Iseilema laxum* Hack.(stem), and *Themeda quadrivalvis* (L.) Kuntze. (leaf) was contained the higher value of Iron(Fe.) content than matured stage of grasses leaf and stem (Culm), while matured stage grass leaf and stem (Culm) of *Apluda mutica* L., *Dichanthium annulatum* (Forssk.) Stapf. (leaf) Schult., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult.(stem), *Iseilema laxum* Hack.(leaf) and contained the higher value of Iron(Fe.) content than early bloom stage of grasses leaf and stem (Culm) respectively.

Conclusion :-

The study of the Evaluation of Iron (Fe.) by Atomic Absorption Spectrometer of Palatable grasses from Satpuda Tiger Reserve the survey and phytochemical study was carried out by the selection of early blooming stage and mature stage of grasses leaf and stem(Culm) it's shows variation in the of Iron (Fe.) content in the early blooming stage and mature stage of grasses leaf and stem(Culm).These values also determines the fodder value of selected grasses for herbivores of the Protected Areas of the Forest Department.The grasses like *Cynodon dactylon* (L.) Pers. *Dichanthium annulatum* (Forssk.) Stapf. *Dichanthium caricosum* (L.) A. Camus, *Digitaria bicornis* (Lam.) Roem. & Schult. *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Heteropogon contortus* (L.) P. Beauv. ex Roem. & Schult., *Paspalidium flavedium* (Retz.) A. Camus, *Themeda quadrivalvis* (L.) Kuntze. are with high iron content in early and after flowering stages, these grasses are medicinally and physiologically most important for herbivores in forest ecosystems. Mineral value of grasses determines the nutritional value and fodder value of wild grasses useful for soft and course feeding herbivores in all protected areas.

Recommendations :

Grasslands are the basic habitats for each and every wildlife like grazing, nesting, breeding, hiding ; therefore maintain the grasslands with biomass management, enrichment of grasslands with fodder valued or nutritive grasses in proper time. Avoid burning of grasses with reference to topography, landscape and environmental parameters. There should be identification and enrichment of wild leguminous protein riched flora with good association of grasses in grasslands. The frontline staff should monitor the grasslands changes in every year with reference to climate change and to know the carrying capacity of each grassland with respect to movement of herbivores.

Acknowledgement :- The authors are thankful to Field Director, Satpuda Tiger reserve Madhya Pradesh to permit us to work on grasslands of Satpuda range.



References

- Achariyar, K. R. and Mudaliyar, C. T. 1921. A Handbook of South Indian Grasses. 318-Madras.AOAC, 1995 : Official Method of Analysis, 15th edn. Association of Official Analytical Chemists.
- Cooke T.1901-1908 (Rpr.).The Flora of the Presidency of Bombay. Vol. I-III. Botanical Survey of India. Calcutta.
- Gamble, J. S. (James Sykes), (1896) Flora of Presidency of Madras. Publication info: London :West, Newman and Adlard,1915-
Holding Institution: University of California Libraries (archive.org)
- Kokate U.R. and Muratkar G.D., 2014. Study of the effect of invasive species on the development of grass meadows of Melghat Tiger Reserve, Amravati Maharashtra.Online International Interdisciplinary Research Journal, ISSN2249-9598, Volume-IV, pp 155-165.
- Muratkar G. D. and Kokate U. R., 2012. Study the palatable and non palatable grasses of Tadoba Andhari Tiger Reserve, Chandrapur (M.S.). An International Refreed & Indexed Quarterly Journal Vol II, ISSN 2277-7601, pp 50-52.