

# Qualitative evaluation of nutritional components of vetiver foliage



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# Background and Objective

- Vetiver is reputed as a multiuse grass among all its allies.
- It occupies a status of grasses which not only binds the soil, but also sequesters atmospheric carbon and increases soil fertility through enriching it with other macro and micronutrients (Vimala & Kataria, 2003). Owing to historical importance and demand of vetiver oil in aroma industry several improved varieties of vetiver grass have been developed in India (Lavania, 2008).
- In an experiment, it was recorded that most of the vetiver accessions are unpalatable due to the sharp edges of the leaves, rather than due to lack of nutrition. Although, there are indications that cattle can feed on young shoots, but no effort has been so far made to develop / identify a suitable clone for utilization as a forage material.
- The present work was therefore intended to screen a clone, for ecological plantations, that combines twin features of vetiver grass (1) for stabilization of degraded soil / slopes as well as (2) to serve as a suitable fodder for grazing animals onsite for sustainability of such plantations along the degrading lands, slopes, hills.

# Why evaluation of nutritional components of vetiver

- The current year has been declared by UNO as “International Year of Millets” .
- Several grasses which were in use earlier and others, are being re-explored under the present scenario.
- Vetiver is a common C-4 type grass growing in India, with multifarious uses and possibility of recovery of lost fertility of the soil.
- Its fertile spikes have created diverse forms in northern India.
- Mature foliage of Vetivers is generally not forageable, due to sharp edges. Yet, genetically diverse groups have been noted to be foraged by cattle.

# Experimental Plan

- Three rows of 5 plants each were sown along with 3 other accessions in RBD in the medicinal garden during March.
- Starting Every month, from May onwards, analysis from fresh as well as dry samples were carried out for micro and macronutrient accumulation, carbohydrates, fibre content, protein accumulation for 2,3 months to 2 years, respectively.
- Nutritional status was grossly compared with four warm-season grass forage species: *Urochloa mosambicensis* Hackel Dandy, *Cenchrus ciliaris* L., *Digitaria pentzii* Stent, and *Megathyrsus maximus* (Jacq.) B. K. Simon & S. W. L. Jacobs (spontaneous genotype from the region) (Coelho et al., 2018)

**Chemical composition of warm-season grasses with grazing management, under semiarid conditions (Coelho et al., 2018)**

Grass	Dry matter (%)	Crude protein (%)	NDF (%)	ADF (%)	Lignin (%)
<i>Cenchrus ciliaris</i>	31.8a	11.1b	68.8a	34.9a	3.7a
<i>Urochloa mosambicensis</i>	23.5bc	13.7a	63.2b	27.5b	1.9b
<i>Digitaria pentzii</i> *	<b>22.1c</b>	<b>14.4a</b>	<b>54.3c</b>	<b>24.0b</b>	<b>1.3b</b>
<i>Megathyrsus maximus</i>	23.3ab	14.5a	60.4b	26.7b	1.0b

\* Best digestibility

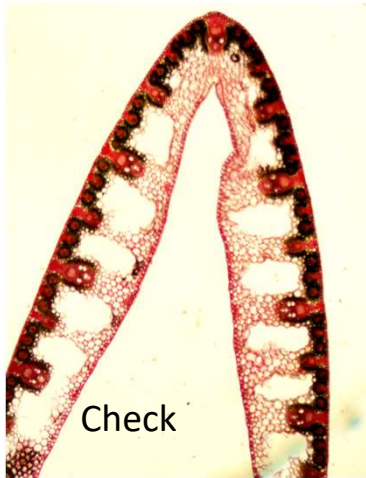
## Nutritional characteristics of various vetiver clones based on biochemical analysis of leaves at two / three months of growth after planting\*

SAMPLES	N	Protein s	Carbohydrate s	P	Crude fibre	Fe	Cu	Zn	Ca	K	Na
<b>at 2 months</b>											
TH	14.11	30.29	59.58	21.85	0.218	216.03	0.024	5.346	21	85	12
<b>Foragika</b>	6.6	36.03	32.13	29.78	0.205	262.1	0.031	6.048	17	197	7
S-2	7.37	29.64	143.8	48.64	0.154	262.82	0.033	7.112	21	191	12
SI	3.9	19.54	189.17	35.19	0.172	334.25	0.03	4.751	18	111	7
GRL	2.92	47.38	91.61	54.39	0.19	157.46	0.022	5.559	22	181	15
<b>at 3 months</b>											
TH	12.14	38.18	31.47	55.89	0.163	218	0.026	5.349	23	115	45
<b>Foragika</b>	3.77	41.17	31.15	26.22	0.244	263	0.032	6.049	22	145	21
S-2	3.99	27.19	138.53	41.74	0.206	262.98	0.032	7.114	42	161	22
SI	4.26	29.64	198.11	40.59	0.229	336.30	0.031	4.750	19	103	19
GRL	3.51	48.46	100.86	41.74	0.197	156	0.022	5.561	21	58	34

\* Estimated values measure as : N, Carbohydrate, P and Crude fibre as mg/ gm dry weight, Protein taken as mg/ gm fresh weight, K, Na, Fe, Cu, Zn as ppm/ 25 mg dry weight

## Results

- The best part of this plant is most of the amount of metallic elements get stored in the roots and only desired amounts are allocated to above ground parts.
- The soft and broad leaves of this clone (**Foragika**) are rich in protein (41 g / kg fresh weight) and crude fiber content (25 g/kg dry weight) but low in carbohydrates (31 g/ kg dry weight), thus providing desirable nutritional features



### **FORAGIKA : Nutritional Quality**

**Crude Protein= 14 %,**

**Carbohydrate =1.5%, Crude fibre 0.25 %**

**Ca = 0.17 %, K = 1.97%,Na = 0.07 %**

**VS of leaf exhibiting sclerenchymatous thickness, The selected clone FORAGIKA is soft/ less sclerenchyma, suitable for better palatability.**



# Conclusion

- Hence, the clone Foragika has been screened (under U.S. patent) to be used as a quality forage grass with suitable nutritional value for cows, donkeys, and other domesticated cattle.
- It has been recorded to be suitable with high protein, dry matter, mineral and crude fibre content at par with several other arid zone fodder grasses (*Cenchrus*, *Urochloa*, *Digitaria*, etc). It has high level of potassium to tone up the metabolism, with low Ca and Na levels in the leaves. Moderate Cu, Zn and Fe levels in the leaves keep major synthetic pathways to function harmoniously.
- The other clones of vetiver fared better as sturdy fence with sharp edges, though with moderate food value



