

Chemical Composition of Some Ber Cultivars Leaves

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Abstract Chemical composition of leave of five year old Ber cultivars showed highest content of Ca (2.66%) followed by N (2.19%), K (1.38%), Mg (0.94%) and P (0.144%). Amongst the micronutrients, higher concentration of Fe ($289 \mu\text{g g}^{-1}$) was recorded compared to Mn ($85 \mu\text{g g}^{-1}$), Zn ($24 \mu\text{g g}^{-1}$) and Cu ($3.9 \mu\text{g g}^{-1}$). Correlation of yield was positive with N, Ca, Mg and Mn and negative with P, K, Fe, Zn and Cu. and Mn and negative with P, K, Fe, Zn and Cu.

Key words Ber cultivar, Yield, Chemical composition of leaves.

Ber (*Zizyphus mauritiana Lamk*) is an important fruit crop of arid and semi-arid region. An 8944 ha in Gujarat is area under fruit crops, out-of which Ber constitute 40 %. The nutritional requirement of Ber varies with variety because of their differential growth habit and canopy cover. In order to make a precise fertilizer recommendation, it is necessary to know the chemical composition leaves (Smith 1962). There is no report on chemical composition of leaves of different ber cultivars from this region. Therefore, studies were undertaken and the results are reported here.

Materials and Methods

The experimental soil of Arid Zone Fruit Farm, GAU, Sardar Krushinagar is low in available N (175 kg ha^{-1}) and medium in available P (45 kg ha^{-1}) and K (223 kg ha^{-1}). The DTPA extractable micronutrients (Fe 3.58, Zn 0.84, Cu 0.78 & Mn 7.47 $\mu\text{g g}^{-1}$) show that Fe and Zn were marginal, whereas Cu and Mn content was sufficient as per the limits suggested by Dangrwalla *et al.* (1983). Recently matured leaf samples from current season shoots of five year old ber Plants of 39 cultivars were collected during the month of October as described by Ahlawat *et al.* (1984). For each variety, one composite sample was obtained. The processed leaf samples were digested in diacid mixture and analysed for the nutrients. The estimation of N by colourimetric method (Nessler's reagent), P by yellow colour method, K by flame photometer, Ca and Mg by versenate titration and micronutrients on Atomic Absorption Spectrophotometer was done

Jackson (1973). Data were statistically analysed (Gomez and Gomez 1984).

Results and Discussion

The yield values ranges from 3.0 to 86.5 kg plant⁻¹ with an average of 35.8 kg plant⁻¹ (Table 1). The highest yield was recorded with *Gola Gurgaon*, whereas, the minimum was obtained with *Deshi Alwar*.

The content of N, P, K Ca and Mg varied from 1.68 to 2.83, 0.09 to 0.201, 1.09 to 1.82, 1.60 to 3.68 and 0.58 to 1.84%, respectively. Among the macronutrients Ca content (2.66%) was highest followed by N, K, Mg and P (Table 1). Comparatively higher N (2.83 %) and Ca (3.68%) contents were observed in the leaves of *Surtikatha* and *Ajmeri* varieties, while lower concentration of both the elements were in *Safeda-1*. However, Mg, P and K contents in *ber* leaves were comparable to the values reported by Ahlawat *et al.* (1990) and Khanduja and Garg (1984).

The concentration of Fe, Mn, Zn and Cu in *ber* leaves ranged from 184 to 380, 30 to 172, 9 to 46 and 1.7 to 10.4 $\mu\text{g g}^{-1}$, respectively (Table 1). Iron content was much higher than other nutrients. Amongst the varieties, highest contents of Fe, Mn, Zn and Cu were found in *Badami*, *Kaithli*, *Safeda-1*, *Mehrun* respectively and lowest with *Shamber*, *Mehrun*, *Gola* and *Seo* (Table 1). The micronutrient concentration (Table 1) are comparable with those reported by Yamdagni *et al.* (1987).

Table 1 Mineral composition of Ber leaves

Cultivar	Fruit yield (kg plant ⁻¹)	Content								
		Per cent					$\mu\text{g g}^{-1}$			
		N	P	K	Ca	Mg	Fe	Mn	Zn	Cu
Mundia Mehra	58.9	2.05	0.144	1.51	3.36	1.82	300	143	21	4.6
Kaithli	47.4	1.86	0.151	1.35	2.92	0.70	286	172	21	3.1
Umran	36.8	1.98	0.151	1.40	2.44	0.65	315	170	19	2.7
Gola	68.7	2.24	0.158	1.32	2.92	0.70	239	120	09	2.9
Seo	66.8	2.05	0.131	1.74	2.00	1.06	281	66	14	1.7
Mundia	24.9	1.75	0.131	1.10	3.20	1.34	243	93	21	3.4
Banarasi karaka	49.1	1.80	0.144	1.28	2.76	0.62	283	59	17	2.0
Laddu	45.8	2.17	0.173	1.24	3.24	0.79	204	89	23	3.0
Chinese	38.0	2.05	0.138	1.51	2.60	1.20	374	128	41	6.3
Manukhi	7.2	2.56	0.201	1.82	1.84	0.86	287	138	35	5.9
Dandan	21.6	2.30	0.131	1.21	3.02	1.84	338	76	28	4.8
Safeda - 1	19.9	1.68	0.158	1.29	1.60	0.62	292	50	46	9.1
Jogia	22.2	1.98	0.131	1.28	3.08	0.84	291	55	25	4.7
Vikas	6.1	2.05	0.151	1.32	2.28	1.32	310	52	29	6.9
Mehrun	14.0	1.98	0.124	1.39	3.32	0.77	343	30	38	10.4
Ajmeri	30.1	2.05	0.131	1.10	3.68	0.82	276	70	25	4.9
Sanaur - 1	44.3	2.17	0.090	1.17	2.56	0.62	283	95	20	3.2
Chanchal	21.6	2.30	0.131	1.43	2.20	0.60	374	75	45	3.9
Sundhura narqual	17.1	1.82	0.117	1.47	2.76	0.94	370	61	28	4.0
Shamber	43.8	2.17	0.124	1.20	2.40	0.67	184	70	25	3.5
Surti kantha	37.6	2.83	0.144	1.25	2.48	0.84	249	59	23	2.8
Badami	29.0	1.98	0.117	1.14	2.40	0.62	380	80	39	6.8
Bavnagari	29.3	2.56	0.131	1.25	3.24	0.77	259	73	15	2.2
Safeda Rohtak	51.0	2.56	0.144	1.70	3.12	0.70	330	74	16	2.8
Deshi Alwar	3.9	2.70	0.158	1.68	2.32	0.80	360	78	19	2.9
Jallandhari	24.3	2.17	0.151	1.36	2.32	1.17	235	131	16	2.7
Chhuara	19.1	2.17	0.144	1.39	2.48	0.86	246	54	17	2.7
Illaichi	22.4	2.50	0.175	1.66	2.00	0.98	335	76	38	2.7
Kadaka	24.5	2.30	0.151	1.51	2.64	1.06	256	106	19	2.2
Reshmi	19.5	1.86	0.138	1.14	2.80	1.03	272	53	16	2.3
Akhrot	56.3	2.43	0.131	1.09	2.48	1.05	285	75	23	3.3
Golagurgaon	86.5	2.43	0.138	1.32	2.46	1.48	300	69	23	3.6
Kala Gola	5.5	2.30	0.158	1.77	1.88	0.58	314	64	16	2.6
Noki	23.5	2.30	0.131	1.51	1.85	0.80	245	53	24	4.0
Mirchia	59.5	2.30	0.144	1.53	3.44	0.53	221	93	21	2.7
Banarasi Pewandi	62.7	2.24	0.151	1.14	3.08	1.06	238	70	14	3.1
Jhajjar special	65.9	2.30	0.144	1.51	2.72	1.44	286	87	21	2.9
Tasbataso	28.0	1.80	0.151	1.28	2.56	0.58	280	63	29	4.6
Glori	62.1	2.76	0.201	1.57	2.88	1.68	305	131	17	3.4
Mean	35.8	2.19	0.144	1.38	2.66	0.94	289	85	24	3.9
SD (\pm)	20.2	0.28	0.02	0.20	0.49	0.34	47	33	9	1.6
"r"	-	+ .136	- .256	- .117	+ .264	+ .239	- .297	+ .261	- * .402	- * .353

The correlation pattern (Table 1) indicate that there was a positive but non-significant association between yield and N, Ca, Mg and Mn content and

negative in the case of P, K, Fe, Zn and Cu contents. However, the negative correlation coefficient (r) was significant between yield and Zn as well as Cu

content. This suggest that rate of biomass production had counter balanced the content of these elements i.e. "dilution effect."

Further, it is rather difficult to design a common package of fertilizer recommendation because of wide variability in yield potential and nutrient content. In addition to the yield and chemical composition of leaves, nutrient removal through fruit and pruned biomass may also be necessary for computing the more precise fertilizer doeses.

References

- Ahlawat VP, Khera AP & Dahiya SS 1984 Foliar sampling technique in Ber. *Annals of Arid Zone* **23** 75-79
- Ahlawat VP, Sindhu SS, Gupta OP & Thareja RK 1990 Nutrient element status of soil and leaves of Ber (*Zizyphus mauritiana* Lamk) trees in Haryana. *Haryana Journal of Horticultural Science* **19** 106-111
- Dangarwala RT, Trivedi BS, Patel MS & Mehta PM 1983 *Micronutrient Research in Gujarat*. Annad Campus, Anand
- Gomez AK & Gomez AA 1984 *Statistical Procedures for Agricultural Research* (II.Edn.) John Willey and Sons, New York
- Jackson ML 1973 *Soil Chemical Analysis*. Prentice Hall of India Pvt. Ltd. New Delhi
- Khanduja SD & Garg VK 1984 Micronutrient elements composition of leaves from jujube trees in North India. *Indian Journal of Horticulture* **41** 22-29
- Smith PF 1963 Mineral analysis of plant tissues. *Annual Review of Plant Physiology* **9** 81-100
- Yamdagni R, Dahiya SS & Ahlawat VP 1987 Assessment of some Ber (*Zizyphus mauritiana* Lamk) cultivars for their mineral composition. *Annals of Arid Zone* **26** 119-112

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