



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; 10(4): 1110-1111  
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[www.thepharmajournal.com](http://www.thepharmajournal.com)

Received: 15-02-2021

Accepted: 18-03-2021

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## Nutritional survey of Ber orchards in Rajasthan

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#### Abstract

The ber orchards located at Bharatpur, Chomu, Jobner, Asalpur, Dholpur, Ajmer, Dausa, Alwar and Sikar districts of Rajasthan were surveyed in 2007 to 2018. The soil and leaf samples were collected from ber orchards of these districts of Rajasthan. These samples were dried, grinded and analyzed for nutrient analysis. Results showed that the nitrogen, phosphorous, potassium, calcium, magnesium content in soil and leaf samples were recorded higher in Bharatpur district followed by Chomu and Dholpur district. The ber yield was also recorded more in Bharatpur district as compared to other districts of Rajasthan.

**Keywords:** Ber, yield, nitrogen, phosphorus, potassium, calcium, magnesium

#### Introduction

Indian Jujube or ber is a common fruit endogenous to India. Its fruits are palatable and delicious with high concentration of vitamin A, B and B complexes. Ber leaves contain 10-19 % crude protein with about 40% digestibility. The leaves are commonly used as a fodder for animals (Pareek, 1983) [6], compared to other agricultural and horticultural crops, Indian Jujube is known to grow successfully under a low erratic rainfall. Temperature extremes and saline soils with low fertility (Meena *et al.*, 2003) [3]. The results were validated by estimating various nutritional parameters; macro nutrient analysis in soil and leaf samples collected from Sirohi, Nagaur and Jalore districts of Rajasthan. This experiment was carried out to find out the nutrients status of soil and leaf samples of ber orchards located in different districts of Rajasthan and compare with their yield.

#### Materials and Methods

The ber orchards located at Bharatpur, Chomu, Jobner, Asalpur, Dholpur, Ajmer, Dausa, Alwar and Sikar districts of Rajasthan were surveyed in 2007 to 2018. The soil and leaf samples were collected from these orchards. The samples were collected from three places randomly in a ber orchard of each district. These samples were dried, grinded and analyzed for nutrient analysis by using standard analysis methods. The samples of soil and leaf were collected at the time of pre-anthesis stage. The mature leaves were taken for nutritional analysis work. The soil samples were collected from up to depth of 60 cm and mixed properly.

#### Plant and soil analysis

After collecting the soil samples were dried and grinded, sieved by 1mm pore size sieve and mixed homogenously. After plant sample collection, the fresh tissue decontaminated from dust and other foreign materials by adopting the following procedure. Three plastic container are taken in which 0.2% liquid detergent, N/10 Hcl solution and deionized or distilled water solutions are added separately. The fresh tissues should be washed sequence in these three plastic containers. The samples are dried in an oven at 70 °C. The nitrogen content in soil and in leaf samples were estimated by using Kjeld-Tek Nitrogen Analyzer. The phosphorus was determined colorimetrically in soil and leaf samples following the methods of (Olsen *et al.*, 1954) [5] and (Jackson, 1973) [3]. The potassium content were estimated by the method of (Metson, 1956) [4] in soil samples whereas in plant samples by the method of (Bhargava and Raghupati, 1993) [1] using flame photometer. Likewise, the concentration of Calcium and magnesium in soil and leaf samples were determined according to (Richards, 1954) [7].

## Results and Discussion

The data (table 1) showed that the nitrogen and phosphorus content were recorded higher in soil samples of Bharatpur district followed by Chomu, Dholpur and other districts of Rajasthan. The calcium and magnesium content were also

seen more in the soil samples of Bharatpur district as compared to Chomu, Dholpur and other districts of Rajasthan. The potassium content was also recorded more in soil samples of Bharatpur district followed by Chomu, Dholpur and other districts of Rajasthan.

**Table 1:** Soil samples analysis data

Districts surveyed	Parameters					
	Nitrogen (kg/ha)	Phosphorus (kg/ha)	Potassium (kg/ha)	Calcium (ppm)	Magnesium (ppm)	Yield (kg/ha)
Bharatpur	223	39.2	286	532	355	165
Chomu, Jaipur	195	34	272	458	307	158
Jobner, Jaipur	86	8.34	166	152	92	30
Asalpur, Jaipur	72	7.78	142	142	78	25
Dholpur	185	32.2	220	428	238	150
Ajmer	172	27.1	217	369	276	113
Dausa	157	23.2	185	366	267	100
Alwar	142	21.2	170	274	231	80
Sikar	67	7.12	171	125	70	20
S.Em ±	6.47	2.19	6.54	8.07	2.91	5.94
CD(P=0.05)	18.2	6.16	18.4	22.7	8.2	16.7

The datas of table 2 indicating that the maximum nitrogen and phosphorus content were recorded in leaf samples of Bharatpur district followed by Chomu, Dholpur and other districts of Rajasthan. The calcium and magnesium content were also seen more in the leaf samples of Bharatpur district

over Chomu, Dholpur and other districts of Rajasthan. The potassium content was also noticed more in leaf samples of Bharatpur district followed by Chomu, Dholpur and other districts of Rajasthan.

**Table 2:** Leaf samples analysis data

Districts surveyed	Parameters					
	Nitrogen (%)	Phosphorus (%)	Potassium (%)	Calcium (%)	Magnesium (%)	Yield (kg/ha)
Bharatpur	2.69	0.35	2.21	1.56	0.88	165
Chomu, Jaipur	2.43	0.34	2.13	1.38	0.45	158
Jobner, Jaipur	1.22	0.22	1.12	0.21	0.16	30
Asalpur, Jaipur	1.32	0.16	0.82	0.22	0.14	25
Dholpur	2.41	0.28	1.65	1.21	0.55	150
Ajmer	2.35	0.22	1.47	1.20	0.49	113
Dausa	2.39	0.27	1.46	1.32	0.52	100
Alwar	2.38	0.19	1.46	1.18	0.37	80
Sikar	1.1	0.1	1.1	0.21	0.11	20
S.Em ±	0.08	0.13	0.1	0.08	0.1	5.94
CD(P=0.05)	0.22	0.37	0.28	0.21	0.27	16.7

The data of ber yield were collected by asking the farmers of these ber orchards. The ber yield was recorded higher in Bharatpur district followed by Chomu, Dholpur, Ajmer, Dausa, Alwar, Jobner, Asalpur and Sikar districts of Rajasthan. The possible reason of more ber yield in Bharatpur may be due to higher content of nitrogen, phosphorus, Potassium, calcium and magnesium in soil as well as in leaf samples. The nutrient status of ber orchards of lower yielded districts should be increased by applying higher dose of N, P, K, Ca and Mg fertilizers according their content in soil.

## Acknowledgement

The realization of this experiment is thanks to all authors whose works are consulted and AICRP on Arid Zone Fruits Scheme of CIAH for providing funds to make nutritional survey of ber orchards in various districts of Rajasthan and even providing chemicals for analysis work are equally acknowledged.

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