

Effect of major nutrients on growth and yield of *Jatropha curcas**

India is the second most populous country in the world and meeting its energy requirements in a sustainable manner continues to be a major challenge. The huge gap between demand and supply may be met by import. The net import burden was increased from Rs. 1,01,963 crores in 2004-05 to Rs. 1,50,557 crores in 2005-06. During the current year, the import bill for 2006-07 could be of the order of Rs. 1,90,000 crores (Punia *et al.*, 2006). In this context, generating biofuels as potential energy sources for the future is the most logical step. Despite its focus as an important economic biofuel crop, little is known about the nutritional requirement of *Jatropha*. Being an energy plantation, *Jatropha* utilize large quantities of nutrients from soil itself and will definitely deplete soil fertility if not properly fertilized.

Therefore it is necessary to maintain soil fertility status for sustainable production of *Jatropha*. Hence, the present investigation was carried out to find suitable dose of fertilizers and to evaluate the effect of nutrients on growth and yield of *Jatropha*.

A field experiment was conducted to study the effect of major nutrients on growth and yield of *Jatropha curcas* at the Main Agricultural Research Station, College of Agriculture, Dharwad during *kharif* 2007-08. The soil pH is 7.50, organic carbon content 0.76 per cent and the available N, P₂O₅ and K₂O were 305, 31.3 and 346.6 kg ha⁻¹ respectively. The experiment was laid out in Factorial Randomized Block Design with three replications. There were 27 treatment combinations and one control (Table 1) constituting of three factors with three levels of nitrogen (50, 100 and 150 kg N ha⁻¹) three levels of phosphorus and potassium (100, 150 and 200 kg P₂O₅ and K₂O ha⁻¹) with an absolute control (0:0:0 kg N:P₂O₅:K₂O ha⁻¹). Ring basins were prepared all around each plant at radii of one and a half feet distance to facilitate better storage of water and efficient utilization of nutrients. Nitrogen, Phosphorus and Potassium were applied (in the form of Urea, Single Super Phosphate and Muriate of Potash respectively) as per treatments around the basin at one feet distance from the trunk and common dose of

Table 1. Effect of major nutrients on growth and yield of *Jatropha*

Sl. No.	Treatment combinations kg N:P ₂ O ₅ :K ₂ O ha ⁻¹	Plant height (m)	Collar diameter (cm)	Number of primary branches	Number of secondary branches	Number of leaves plant ⁻¹	Seed yield (kg ha ⁻¹)
1	50:100:100	1.8 ^{f-h#}	12.9 ^{b-h}	4.29 ^b	41.56 ^{c-i}	1813.7 ^{ij}	2525.00 ^b
2	50:100:150	1.8 ^{d-h}	13.0 ^{b-h}	4.29 ^b	42.29 ^{c-i}	1868.3 ⁱ	2555.00 ^b
3	50:100:200	2.3 ^b	13.4 ^b	4.45 ^b	51.82 ^b	2926.5 ^b	2770.83 ^b
4	50:150:100	2.1 ^{b-c}	13.1 ^{b-g}	4.30 ^b	44.69 ^{b-i}	2200.2 ^h	2635.00 ^b
5	50:150:150	2.3 ^b	13.3 ^{b-c}	4.45 ^b	50.42 ^{bc}	2789.0 ^{bc}	2765.00 ^b
6	50:150:200	2.0 ^{b-h}	13.3 ^{bc}	4.30 ^b	44.15 ^{b-i}	1952.5 ^{hi}	2610.00 ^b
7	50:200:100	1.7 ^{gh}	12.7 ^{gh}	4.15 ^b	36.59 ⁱ	1414.6 ^k	1885.00 ^{bc}
8	50:200:150	1.7 ^{f-h}	12.8 ^{c-h}	4.29 ^b	38.09 ^{g-i}	1745.2 ^{ij}	2498.33 ^b
9	50:200:200	1.7 ^{fh}	12.9 ^{b-h}	4.29 ^b	40.69 ^{fi}	1755.7 ^{ij}	2525.00 ^b
10	100:100:100	1.7 ^h	12.5 ^h	4.15 ^b	36.46 ⁱ	1294.4 ^k	1850.00 ^{bc}
11	100:100:150	2.7 ^a	13.9 ^a	5.62 ^a	60.35 ^a	3407.7 ^a	3937.50 ^a
12	100:100:200	2.2 ^{bc}	13.2 ^{b-f}	4.31 ^b	47.09 ^{b-f}	2451.4 ^{d-f}	2715.00 ^b
13	100:150:100	2.2 ^{bc}	13.2 ^{b-g}	4.31 ^b	46.35 ^{b-g}	2440.9 ^{d-f}	2675.00 ^b
14	100:150:150	2.2 ^{bc}	13.1 ^{b-g}	4.30 ^b	46.02 ^{b-h}	2437.4 ^{d-f}	2669.17 ^b
15	100:150:200	1.9 ^{c-h}	13.0 ^{b-h}	4.30 ^b	42.75 ^{c-i}	1945.1 ^{hi}	2585.00 ^b
16	100:200:100	2.2 ^{bc}	13.2 ^{b-c}	4.31 ^b	47.19 ^{b-f}	2526.3 ^{c-e}	2770.83 ^b
17	100:200:150	1.7 ^{fh}	12.8 ^{c-h}	4.22 ^b	37.15 ⁱ	1549.0 ^{jk}	1975.00 ^b
18	100:200:200	1.7 ^{fh}	12.8 ^{d-h}	4.29 ^b	37.72 ^{hi}	1731.1 ^{ij}	2200.00 ^b
19	150:100:100	1.7 ^{fh}	12.8 ^{d-h}	4.25 ^b	37.15 ⁱ	1726.2 ^{ij}	1987.50 ^b
20	150:100:150	2.2 ^{b-d}	13.1 ^{b-g}	4.30 ^b	45.69 ^{b-h}	2333.2 ^{c-g}	2644.17 ^b
21	150:100:200	2.1 ^{b-g}	13.1 ^{b-g}	4.30 ^b	44.29 ^{b-i}	2137.8 ^{gh}	2620.00 ^b
22	150:150:100	2.2 ^{bc}	13.3 ^{b-c}	4.31 ^b	48.49 ^{b-f}	2583.88 ^{c-e}	2715.00 ^b
23	150:150:150	2.3 ^b	13.3 ^{b-d}	4.33 ^b	50.02 ^{b-d}	2694.1 ^{b-d}	2775.00 ^b
24	150:150:200	1.7 ^{f-h}	12.7 ^{fh}	4.15 ^b	36.82 ⁱ	1452.6 ^k	1908.33 ^{bc}
25	150:200:100	2.3 ^b	13.0 ^{b-h}	4.31 ^b	49.29 ^{b-c}	2624.5 ^{cd}	2775.00 ^b
26	150:200:150	1.8 ^{c-h}	13.0 ^{b-h}	4.29 ^b	41.69 ^{d-i}	1830.3 ⁱ	2545.00 ^b
27	150:200:200	2.1 ^{b-f}	13.1 ^{b-g}	4.30 ^b	44.32 ^{b-i}	2144.7 ^{gh}	2630.00 ^b
	0:0:0	1.3 ⁱ	11.1 ⁱ	3.42 ^c	27.52 ^j	1045.0 ^l	875.00 ^c
	S.Em±	0.11	0.14	0.12	2.47	85.25	335.90

The means followed by the same lower case letter/letters did not differ significantly by DMRT

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