



Nutrient Requirement Of Papaya (*Carica Papaya L.*): A Study For Enhancing Fruit Production

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ABSTRACT

Considering the dietary and medicinal value, isolated attempts have been made by some progressive farmers for commercial cultivation of papaya. Inadequate nourishment is one of the reasons for its low production. The present trial was undertaken to study the response of balanced nutrition on yield of papaya and also to find out the optimum dose of NPK for commercial cultivation under Kerala conditions. Three different levels of nitrogen, phosphorus and potassium (200, 250 and 300) gram per plant per year were applied to papaya plants in six equal split doses at two month interval. The trial was conducted in 33 confounded factorial RBD, confounding NPK in replication-1 and NP2K2 in replication-2. Results revealed that balanced nutrition had a positive effect on fruit yield and application of nitrogen, phosphorus and potassium at the rate of 250:250:500 grams per plant per year resulted in the maximum yield and BC ratio in papaya

KEYWORDS

papaya, nitrogen, phosphorus, potassium, yield

INTRODUCTION

Papaya has gained commercial importance over the years because of its varied uses, mainly for table purpose. Nutritive value, high yielding potential, year round fruiting behaviour and short pre-bearing period make papaya unique among fruit crops. Its fruits are recognized for papain, a proteolytic enzyme extensively used in cosmetics and pharmaceutical industries. Due to awareness of multifold uses of papaya for table, processing and papaya extraction purposes, it is slowly emerging from the status of a homestead crop to that of commercial crop. The major production constraint encountered in papaya is difficulty in maximizing yield with in unit time. Balanced nutrition plays a vital role on plant growth, yield and fruit quality. Papaya is very responsive to the application of inorganic fertilizers along with organic manures. Understanding the interrelationships among vegetative growth, yield and nutrient uptake will help to exploit the high yielding potential of papaya plants. However under Kerala conditions, no systematic attempts have been made on the requirement of nutrition of papaya. The experiment was carried out to study the response of balanced nutrition on yield and yield attributes of papaya and also to find out the optimum dose of NPK for commercial cultivation of papaya under Kerala conditions.

EXPERIMENTAL DETAILS

The experiment was carried out at College of Agriculture, Vellayani, Thiruvananthapuram using papaya variety CO-2. The trial was conducted in 33 confounded factorial Randomized Block Design; confounding NPK in replication-1 and NP2K2 in replication-2. Three different levels of nitrogen (200 (n0), 250 (n1), 300(n2) gram per plant per year), phosphorus (200(p0), 250 (p1), 300 (p2) gram per plant per year) and potassium (300 (k0), 400 (k1), 500 (k2) gram per plant per year) were applied to papaya plants in six equal split doses at two months interval. The treatments involved 27 different combinations of N, P and K at different levels and control. Urea, Rock Phosphate and Muriate of potash were used as source of N, P and K respectively. Biometric characters like height of plants, girth of plants, number of leaves, time of first flowering and time for harvest were noted. Yield characters like number of fruits per plant, fruit weight, fruit length and girth, fruit volume, pulp percentage, total yield per plant and papain yield were recorded. Benefit : Cost ratio was worked out. Soil samples from the experimental area were analysed before and after experiment for available nitrogen, phosphorus and potassium (Jackson, 1973; Subbiah and Asija,

1956). N, P and K content of leaf petioles were also assessed (Bray and Kurtz, 1945; Hanway and Heidal, 1952).

RESULTS AND DISCUSSION

Results revealed that during early growth stages nitrogen requirement was at 250g plant⁻¹ up to eight months after planting and at 300 g plant⁻¹ thereafter. Phosphorus at was required at 250 g plant⁻¹ up to 10 MAP and there after there was no significant effect. During 4MAP to 12 MAP potassium was required at 500g plant⁻¹. It was observed that nitrogen at 300g plant⁻¹ influenced leaf number positively (Table 1). Phosphorus at 300 g plant⁻¹ and potassium at 500 g plant⁻¹ influenced number of leaves per plant. Nitrogen at 250 g plant⁻¹, phosphorus at 250 g plant⁻¹ and potassium at 500g plant⁻¹ had increased the number of (Table 2) fruits plant⁻¹ by way of mean effect as well as interaction effect of nutrients. This result was in conformity with the findings of Purohit (1977) who observed that in papaya variety Coorg Honeydew application of 500 g potassium gave significantly more number of fruits plant⁻¹. Medium dose of nitrogen and phosphorus (250 g plant⁻¹) combined with highest dose of potassium (500 g plant⁻¹) gave maximum fruit weight. Awada and Long (1980) reported in papaya variety Solo that nitrogen application increased the weight of each marketable fruit. Fruit length was not significantly affected by various treatments. Maximum fruit girth was obtained from 200 g N, 200 g P and 500 g K (Figure 1). Biswas et al., (1989) noted that in papaya variety Ranchi, application of potassium increased breadth of fruit. Highest pulp percentage and fruit volume was obtained from 250 g N, 250 g P and 500 g K (T15). Medium dose of nitrogen and phosphorus (250 g plant⁻¹) along with highest dose of potassium (500g plant⁻¹) gave maximum fruit and papain yield per plant. Jauhari and Singh (1970) reported that in papaya variety Coorg Honey dew application of potash increased yield significantly. Highest benefit : cost ratio (3.55) was obtained from the combination of 250 g N, 250 g P and 500 g K plant⁻¹ year⁻¹.

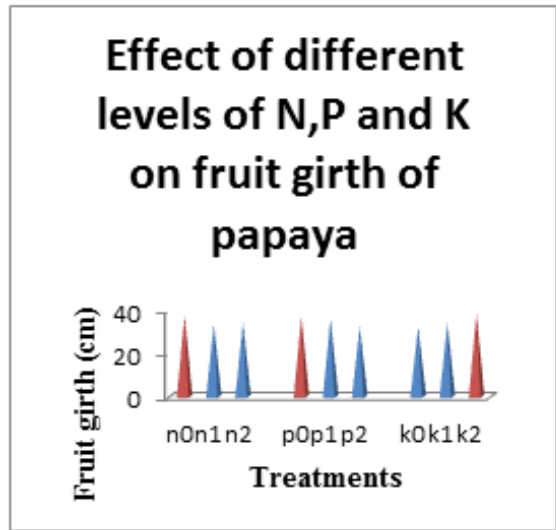


Figure1. Effect of different levels of nitrogen, phosphorus and potassium on fruit girth of papaya

Table 1. Effect of different levels of nitrogen, phosphorus and potassium on leaf number of papaya

Treatments	4MAP	8MAP	12MAP
N levels			
N0	9.58	22.15	29.71
N1	10.38	23.11	29.86
N2	11.14	23.98	33.02
CD (0.05)	0.44	0.26	0.59
P levels			
P0	10.16	23.79	31.73
P1	10.13	22.15	29.65
P2	10.81	23.30	31.2
CD (0.05)	0.44	0.26	0.59
K levels			
K0	9.31	21.14	28.55
K1	9.07	22.19	28.84
K2	12.72	26.01	35.20
CD(0.05)	0.44	0.26	0.59

Table 2. Effect of different levels of nitrogen, phosphorus and potassium on yield of papaya

Treatments	No. of fruits per plant	Total yield per plant	Papain yield kg ⁻¹ ha ⁻¹
N levels			
N0	23.54	24.88	329.98
N1	28.60	30.63	460.65
N2	26.06	30.04	322.53
CD (0.05)	1.39	1.61	21.23
P levels			
P0	22.93	27.27	369.62
P1	27.30	31.49	360.47
P2	27.96	26.70	383.07
CD (0.05)	1.39	1.61	NS
K levels			
K0	26.97	27.70	359.10

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K1	23.28	27.50	325.03
K2	27.94	30.36	492.02
CD(0.05)	1.39	1.61	21.23

CONCLUSION

Over all assessment indicated that application of nitrogen , phosphorus and potassium at the rate of 250 : 250 : 500 g plant-1 year-1 in six equal split doses was economically viable and improved yield and yield attributes of papaya.