

POTASH FERTILIZERS:

TOWARDS HIGH YIELDS OF PAPAYA AND BETTER FRUIT QUALITY



INTERNATIONAL POTASH INSTITUTE

Optimizing Crop Nutrition

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Importance of balanced fertilization



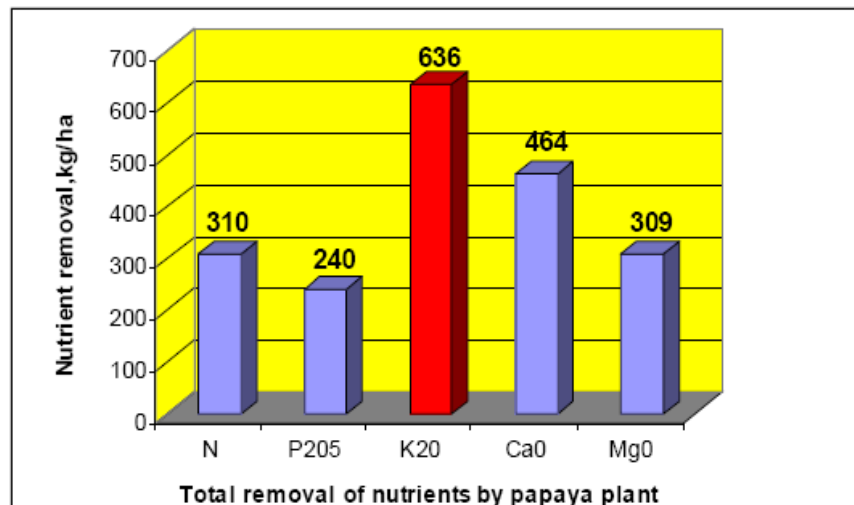
The recommended use of potash fertilizers in balance with nitrogen and phosphate fertilizers in fruit crops guarantees:

- ④ Highest yield of fruits
- ④ Best size, shape, colour and hygienic properties
- ④ Better sweetness and vitamin C content
- ④ Highest juice content
- ④ Decreased storage losses, enhanced shipping quality and extended self life
- ④ Improved drought resistance of plants
- ④ Increased plant immunity to pest and diseases

Nutrient removal by papaya

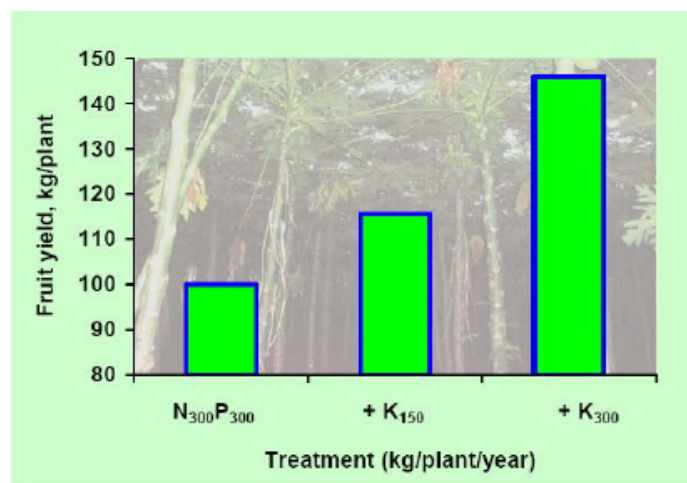
The nutritional demand of papaya differs from other fruit crops because of tremendous yielding potential due to precocious bearing and indeterminate growth habit with simultaneous vegetative growth, flowering and fruiting.

Nutrient removal studies conducted at TNAU (Coimbatore, Tamil Nadu, India) revealed that at the time of harvest with the fruit yield of 270 t/ha a whole plant removes the following amounts of nutrients:

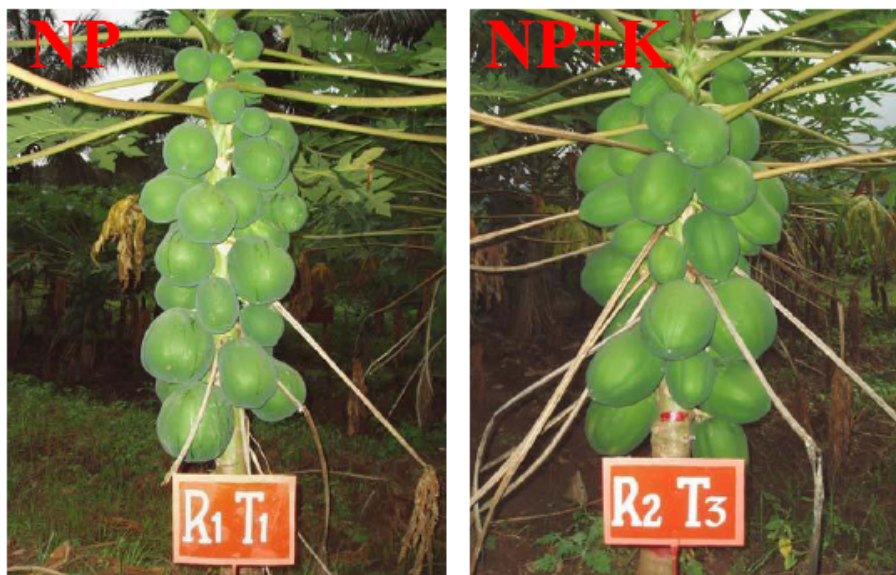


Efficiency of potash fertilizer use to papaya

Demonstration experiments laid out at farmers fields at four districts of Tamil Nadu state of India revealed high response of papaya to potash fertilizer application in balance with nitrogen and phosphate fertilizers:



**Effect of potash fertilizer application on fruit yield of papaya:
Average for four locations in Tamil Nadu, India
(2004-06; 15-20 months after planting)**



**Papaya response to potash fertilizer at Vadipatti,
Theni District, Tamil Nadu, India (2005)**

Potash fertilizers and papaya fruit quality parameters

Potassium is recognized as a quality element. In the above mentioned experiments potash fertilizer use improved major quality parameters of papaya fruits:

- Pulp thickness, i.e. edible part size of papaya fruits, was increased
- The sweetness of papaya, the prime fruit quality parameter, mainly judged by Total Soluble Solids (TSS) content, was improved
- The acidity content was decreased

Effect of potash fertilizer application on fruit quality of papaya at K.K. Patti, Theni District, Tamil Nadu, India (2004-05: 11 months after planting)

Treatment (kg/plant/year)	Fruit weight, kg	Pulp thickness, cm	TSS, ° Brix	Acidity, %
N ₃₀₀ P ₃₀₀	1.14	1.67	10.93	0.51
+ K ₁₅₀	1.21	2.40	12.03	0.34
+ K ₃₀₀	1.77	2.60	11.43	0.47

Potash fertilizers and papaya resistance to diseases

The beneficial effect of potash fertilizers on plant resistance to diseases (and pests) is due to the following mechanisms involved:

- ④ Decreased attack severity in plants through improved plant internal metabolism
- ④ Suppressed establishment of the pathogen and its spreading within the plant
- ④ Increased plant ability to recover from pest or disease attack
- ④ Suppressed direct effect of potassium on the pathogens



PRSV disease

Effect of potash fertilizer application on Papaya Ring Spot Virus (PRSV) disease incidence at TNAU Farm, Coimbatore, Tamil Nadu, India (2005: 6 months after planting)

Treatment (kg/plant/year)	PRSV disease incidence, %
N ₃₀₀ P ₃₀₀	44
+ K ₁₅₀	36
+ K ₃₀₀	39

Importance of potash fertilizer use for latex production and quality

Demonstration experiments laid out at farmers fields at two districts of Tamil Nadu state of India indicated that integrated nutrient management is very much important for papaya latex production and quality. Potash fertilizer use in balance with nitrogen and phosphorus noticeably increased the output of latex.

The quality of latex is assessed in terms of Total Soluble Solids (TSS) content. It's the important quality criterion by which the latex procuring industries make the payment to the growers. With increased potash fertilizer level, there was an increase in the TSS content, highlighting the role of potassium nutrition on the TSS of the latex.



Effect of potash fertilizer application on the yield of papaya latex and its quality at (a) Thondamuthur and (b) Chandrapuram Coimbatore District of Tamil Nadu, India

(a) Thondamuthur (2004-05: 11 months after planting)

Treatment (kg/plant/year)	Yield, kg/ha	TSS, °Brix
N ₃₀₀ P ₃₀₀	32.0	15.84
+K ₁₅₀	36.6	15.76
+K ₃₀₀	35.0	16.62

(b) Chandrapuram (2004-05: 14 months after planting)

N ₃₀₀ P ₃₀₀	181.2	16.7
+K ₁₅₀	181.0	16.8
+K ₃₀₀	155.2	16.9

Papain produced from papaya latex is useful in tenderizing meat and other proteins through the process of hydrolysis (or breakdown) of proteins. Thus, enzyme activity is an important quality parameter of papain.

Effect of potash application on the enzyme activity (Tyrosine unit / mg of papain) collected from Devanampalayam, Coimbatore District

Treatment	Tyrosine (Tu / mg)
N ₃₀₀ P ₃₀₀	99.54
+ K ₁₅₀	100.44
+ K ₃₀₀	136.62
+ K ₄₅₀	195.90

Fertilizer recommendations for papaya

Starting from the 3rd month of planting, TNAU recommends the following rates of mineral fertilizers to papaya in the state of Tamil Nadu, India:

Nutrient recommendations at bimonthly intervals, g/plant

N	P ₂ O ₅	K ₂ O
50	50	50

Fertilizer recommendations at bimonthly intervals, g/plant

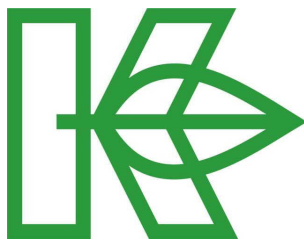
Urea	SSP	MOP
110	310	80



Instead of direct fertilizers, complex NPK fertilizers may be applied. For example, 330 g per plant of 15-15-15 NPK fertilizer at bimonthly intervals starting 3rd month of planting. If feasible, the indicated rates of mineral fertilizers can be splitted at monthly intervals. This is the best practice.

The fertilizers can be also applied at monthly intervals (g/plant) as shown below:

Urea	SSP	MOP
55	155	40



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