

Effect of different sources and levels of nitrogen on physico-chemical characteristics of papaya cv. COORG HONEY DEW under U.P. sub-tropic conditions

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SUMMARY

The present experiment was carried out at Sam Higginbottom Institute of Agriculture, Technology and Sciences, Deemed University, Allahabad, U.P to study the effect of different sources and levels of nitrogen on physico-chemical characteristics of papaya cv. COORG HONEY DEW. The experiment was laid out in a Randomized Block Design with seven treatments consisting of nitrogen ($T_1=150g$, $T_2=250g$ and $T_3=350g$ per plant per year as urea), nitrogen ($T_4=150g$, $T_5=250g$ and $T_6=350g$ per plant per year as ammonium sulphate) and T_0 =control (no application of fertilizers), each treatment was replicated four times. The maximum length of fruits (26.57 cm), width of fruits (47.65 cm), specific gravity (0.88) was noted under treatment T_2 followed by treatment T_6 . The maximum total soluble solids (13.5 %) were noted under the treatment T_4 followed by treatment T_5 and treatment T_1 . The total sugar (12.5%) and titrable acidity (0.15%) was recorded maximum with the treatment T_1 followed by treatment T_4 . The maximum ascorbic acid content (50mg/100g) was noted under treatment T_1 followed by treatment T_6 . The maximum pH (5.6) of papaya fruit juice was recorded under treatment T_1 followed by treatment T_6 .

Key Words : Papaya, Fruit, Coorg honey dew, Physico-chemical, Nitrogen

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The papaya (Melon tree or papita), a native of Tropical America is widely grown all over India in kitchen gardens as well as in commercial orchards. It is a herbaceous, quick growing plant usually unbranched stem and crown of palmately lobed leaves with long hollow

petioles. The fruit has 0.5 per cent protein and an equivalent amount of minerals (Fe, Ca and P), 2500 IU of vitamin A and 70 mg of vitamin C per 100 g of fruit (Anand and Bhattacharya, 1964 and Bhatia and Siddapa, 1996). Papaya contains substantial quantities of carbohydrates, minerals, calcium, vitamins, phosphorus and iron etc. It also has vitamin B₁ and B₂. Unripe fruit is a rich source of papain, an enzyme helpful in digestion of proteins besides removing skin blemishes, useful in the treatment of stomach ulcers, diphtheria and even cancer. Among its industrial uses, clarification of beer, tanning and manufacture of chewing gums are common. The ripe fruits help in proper functioning of the liver, spleen and the digestive tract. Nutrient management in papaya is essential to get quality fruits (Purohit, 1986 and Reddy and Kohli, 1989). Keeping in view the above facts, however, information is not available under Uttar Pradesh sub-tropics. The study was conducted to evaluate the effect of different sources and levels of nitrogen on physico-chemical characteristics of papaya cv. Coorg Honey Dew under U.P. sub-tropics.

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MATERIAL AND METHODS

A field experiment on effect of different sources and levels of nitrogen on the physico-chemical characteristics of papaya (*Carica papaya* L.) cv. COORG HONEY DEW was conducted at Research Farm, Department of Horticulture, Allahabad Agricultural Institute-Deemed University, Allahabad, U.P. Two and a half month old seedlings of papaya cv. Coorg Honey Dew were transplanted in 2 x 2 m beds at a spacing of 1.5 x 1.5m in 28 beds @ 2 plants/bed. The experiment was laid out in a Randomized Block Design with seven treatments consisting of nitrogen (T₁=150g, T₂=250g and T₃=350g per plant per year as urea), nitrogen (T₄=150g, T₅=250g and T₆=350g per plant per year as ammonium sulphate) and T₀=control (no application of nitrogenous fertilizers), each treatment was replicated four times. A general doze of phosphorus and potassium (500g/plant/year each) was applied to all the treatments and subjected to strict schedule of cultural operations. The fruit length and width were recorded using a thread and a meter scale. Specific gravity of the fruit was measured by water displacement method and was calculated by dividing fruit weight (g) with volume of the water displaced by the fruit (ml). pH value of the papaya fruit of respective treatments was recorded by using a digital pH meter model “Systronics MK-VI”. Ascorbic acid content (mg/100g of fruit) and titrable acidity (%) was estimated as per the method suggested in AOAC (1990). The total sugar content (%) was estimated with the help of brix hygrometer. Total soluble solids (%) were determined by using a hand refractometer (0-32^o Brix range) ERMA, Japan. The data thus, obtained during the course of the study were subjected to statistical analysis.

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Physical characteristics :

Different sources and levels of nitrogen treatments significantly influenced the characteristics of papaya cv. Coorg Honey Dew during the course of present studies (Table 1). The highest length of fruit (26.57 cm) was recorded with treatment T₂ (N@250g/plant/year as urea) followed by treatment T₅ (24.87cm) and T₆ (24.25cm) and minimum fruit length (19.20 cm) was recorded under T₀ (control). Similarly maximum fruit width (47.65 cm) was recorded under treatment T₂ followed by the treatment T₅(45.60 cm) and T₆ (43.67 cm) whereas minimum fruit width (39.85 cm) was noticed under control(T₀). As far as specific gravity of the papaya fruit is concerned, maximum specific gravity (0.88) was recorded under treatment T₂ followed by the treatment T₆ (0.86) and minimum specific gravity (0.79) was noted under treatment T₁(0.79) and T₀ (0.79). These results are in close agreement with Reddy and Kohli (1989) who found that increase in nitrogen levels enhanced fruit quality of the papaya fruit. Awada and Long

Table 1: Effect of different sources and levels of nitrogen on physico-chemical characteristics of papaya cv. Coorg Honey Dew

Treatments (N levels and sources)	Length of fruit (cm)	Width of fruit (cm)	Specific gravity	T.S.S (%)	Total sugar (%)	pH value	Ascorbic acid content (mg/100g)	Titrable acidity (%)
T ₀	19.20	39.85	0.79	9.75	8.0	5.5	42.00	0.10
T ₁	22.30	41.62	0.79	13.0	12.5	5.6	50.00	0.15
T ₂	26.57	47.65	0.88	12.0	11.5	5.3	47.50	0.13
T ₃	23.17	43.25	0.83	10.5	9.0	5.4	43.00	0.12
T ₄	21.82	42.45	0.81	13.5	12.0	5.3	47.00	0.13
T ₅	24.87	45.60	0.83	13.0	11.0	5.4	41.20	0.12
T ₆	24.25	43.67	0.86	11.0	8.5	5.4	48.00	0.11
S.E.±	1.69	3.59	0.025	0.59	0.72	0.15	1.06	0.011
C.D.	3.55	7.55	0.053	1.24	1.52	NS	2.23	0.023

NS= Non-significant

(1980) reported that increase in the rate of nitrogen resulted in larger number of fruits.

Chemical characteristics :

It is clear from the data presented in the Table 1 that there were significant differences between the treatments of different sources and levels of nitrogen on chemical characteristics of papaya cv. Coorg Honey Dew except pH value of papaya fruit. The maximum total soluble solids (13.5%) was recorded under the treatment T_4 followed by the treatments T_1 (13%) and T_5 (13%) and minimum TSS (9.75%) was recorded under control (T_0). The highest total sugar (12.5%) was recorded with the treatment T_1 followed by treatment T_4 (12%) and T_2 (11.5%) whereas minimum total sugar content was observed with control (T_0). The treatments of nitrogen showed non-significant effect on pH value of papaya cv. COORG HONEY DEW but maximum pH value (5.6) was noted under treatment T_1 . The maximum ascorbic acid content of the papaya fruit (50mg/100g fruit) was recorded under the treatment T_1 followed by the treatment T_6 (48.0 mg/100g fruit) and T_2 (47.50mg/100g fruit) and minimum ascorbic acid content (42.00mg/100g fruit) was recorded under control (T_0). Similarly, the maximum acidity content (0.15%) of papaya fruit was noted with the treatment T_1 and minimum acidity content was noticed under the treatment T_0 (0.10%). Similar results were reported by Reddy and Kohli (1989) who found that increase in nitrogen levels enhanced fruit quality of the papaya fruit. Awada and Long (1980) also reported that increase in the rate of nitrogen resulted in larger number of fruits and greater yield of marketable fruits. The effect of nitrogen was also observed by Jagirdar and Sheikh (1970) who

reported that nitrogen improved the fruit quality in mango.

It can be concluded from the above studies that nitrogen enhanced the physico-chemical characteristics of papaya fruit and is a vital nutrient for the production of healthy fruits with marketable qualities. The optimum doze of nitrogen as standardized for U.P. sub-tropics proved to be beneficial for the quality fruit production of papaya fruit.

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