

## **Effect of plant growth regulators and micronutrients on physical and chemical characters of banana (*Musa spp*) cv. GRAND NAIN**

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### **ABSTRACT**

A field experiment was conducted to find out the effect of growth substances, micronutrients and waxol on quality of banana (*Musa spp*) cv. GRAND NAIN. Higher concentrations of IAA (80 ppm), GA3 (80 ppm) and micronutrients mixture 1% two spray affected on weight of mature finger (145.30g) pulp to peel ratio (2.87) and weight of ripe finger (137.49g). Minimum per cent loss in weight during ripening was observed in waxol 6% (3.44) and maximum was recorded in control (7.17). Maximum TSS (23.50%) was recorded in waxol 6% and which was superior all over the treatments. The maximum increasing in reducing sugar was recorded in two sprays of 1% micronutrients mixture (12.97%) and minimum in control (12.65 %). The maximum non reducing sugar was recorded in two sprays of 1% micronutrients mixture (3.58) and minimum in waxol 6% (3.05 %). The maximum increase in Vito C was recorded by GA3 80ppm (0.97) which was significantly superior over all the treatments while minimum in control (0.63). Slightly increase in PH was found in waxol 6% (4.89), remaining treatments were similar to each other. It is found that application of IAA 80 ppm, GA3 80 ppm and two sprays of 1 % micronutrients mixture, waxol 6% were effective for physical and chemical characters of banana cv. GRAND NAIN.

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**Key words :** Micronutrients mixture, ppm, Foliar application, Ripening.

**T**he edible Banana (*Musa spp*) is believed to have originated in hot tropical regions of South- East Asia (Spiden, 1926 and Suar, 1952). It is dessert fruit for millions, and is used in different regions as staple food owing to its rich and easily digestible carbohydrates. It is rich source of vitamins minerals and has several medicinal properties. It is grown across the country in tropical and subtropical region. In Maharashtra total area under banana is 72.20 thousand ha and production is 4.45 million tones. The productivity of banana is 60.00 tonnes ha<sup>-1</sup> being highest in the country (Anony, 2001 b).

In India, people prefer fresh fruits instead of canned products. Banana is also one of the fruits, people prefer fresh, the economics of banana depends on the cost of transportation and storage. However, low shelf life and bad transportability are two major problems in case of banana. It is generally harvested when green between 70 to 100 per cent maturity and ripened before consumption (Paul *et al.*, 1968). Pre harvest and post harvest handling of banana fruits is an important aspect of banana trade. Early and even maturity of bunches are the immediate needs of the banana growers of the region. In view, above investigation was conducted to find out the effect of plant growth substances and micronutrients on quality of banana cv. GRAND NAIN.

### **MATERIALS AND METHODS**

A field experiment was conducted at College of

Horticulture, Marathwada Agricultural University, Parbhani during 2002-2003. The experiment was laid out in randomized block design with 8 treatments, viz. T<sub>1</sub>- Control, T<sub>2</sub>- GA340ppm, T<sub>3</sub> GA380 ppm, T<sub>4</sub>-IAA 40ppm, T<sub>5</sub>- IAA 80 ppm, T<sub>6</sub>-micronutrients mixture 1 % one spray, T<sub>7</sub> micronutrients mixture 1% two spray and T<sub>8</sub>- waxol 6%.

All recommended cultural practices has been followed after plantation of banana. The stock solutions of IAA and GA3 were prepared by dissolving 1 g of respective growth regulator in 50 ml alcohol and added distilled water to make volume of 1 lit. The required concentration of micronutrients mixture were prepared by directly mixing required quantity of micronutrient mixture in water and those spray solutions were used for spraying immediately after preparation. Spray was given at flag leaf stage *i.e.* just before flowering by using a hand sprayer. Growth regulators and micronutrients mixture on leaves of both the sides of plant were sprayed. Precautions were taken to avoid the drizzling of the sprays on the other treatments. After harvesting the banana, bunches were completely dipped in 6 % waxol solution for. 30 to 40 seconds. The ripened fruits were peel with hands and pulp was chopped, blended to homogeneous mixture in a mortar and pistle and this mixture was used for chemical analysis. Observations were recorded and statistically analysed as per the methods given by Panse and Sukhatme (1967).

## RESULTS AND DISCUSSION

### Effect on physical characters:

It is evident from the data shown in Table 1 that there was significant effect of plant growth regulators and micronutrients on weight of mature finger, weight of ripe finger, and per cent loss in weight during ripening. Non significant influence was noticed in pulp to peel ratio. Maximum weight of mature finger (145.30 g) was recorded in IAA 80 ppm which was at par with micronutrient mixture 1 % two spray (145.12g), GA3 80 ppm (1.44.50 g), IAA 40 ppm (141.87 g), one spray of 1 % micronutrients mixture and minimum was recorded in control (137.47 g). Maximum weight of ripe finger (137.49 g) was recorded in two sprays of 1 % micronutrient mixture which was at par with IAA 80 ppm

(137.25 g), GA3 80 ppm (136.35 g), waxol 6% (134.57 g), IAA 40 ppm (133.57 g), one spray of 1 % micronutrient mixture (133.56 g) and lowest was recorded in control (127.63 g). These results are in conformity with the reports of Chellappan (1983), Abdel Kader (1992), Ulthaih *et al.* (1993).

Minimum per cent loss in weight during ripening was observed in waxol 6% (3.44) significantly superior over the all treatments and maximum was recorded in control (7.17). Rest of the treatments are statistically similar. Maximum pulp to peel ratio (2.87) was recorded in GA3 80 ppm followed by IAA 80 ppm (2.84) and minimum was found in GA3 40 ppm (2.29). Similar results were also reported by Chattopadhyay and Jana (1982). Ulthaih *et al.* (1993), Patil and Hulmani (1998).

**Table 1 : Effect of plant growth regulators and micronutrients on physical characters of banana (*Musa spp*) cv. GRAND NAIN**

Treatment No.	Treatments	Weight of mature finger (g)	Weight of ripe finger (g)	% loss in weight during ripening	Pulp to peel ratio
T <sub>1</sub>	Control	137.49	127.63	7.17	2.67
T <sub>2</sub>	GA3 40 ppm	140.87	132.71	5.79	2.29
T <sub>3</sub>	GA3 80 ppm	144.50	136.35	5.64	2.87
T <sub>4</sub>	IAA 40 ppm	141.87	133.57	5.85	2.69
T <sub>5</sub>	IAA 80 ppm	145.30	37.25	5.54	2.84
T <sub>6</sub>	Micronutrient mixture 1 % 1 spray	141.62	133.56	5.69	2.64
T <sub>7</sub>	Micronutrient mixture 1 % 2 spray	145.12	137.47	5.27	2.69
T <sub>8</sub>	Waxol 6 %	139.37	137.57	3.44	2.71
S.E.±		1.46	1.41	0.24	0.14
C.D. (P=0.05)		4.30	4.15	0.71	N.S.

**Table 2 : Effect of plant growth regulators and micronutrients on chemical characters of banana (*Musa spp*) cv. GRAND NAIN**

Treatment No.	Treatments	TSS (%)	Total sugar %	Reducing sugar %	Non reducing sugar %	Vit. C (mg/100g Pulp)	pH
T <sub>1</sub>	Control	19.50	15.87	12.65	3.22	0.63	4.80
T <sub>2</sub>	GA3 40 ppm	19.80	15.93	12.80	3.13	0.91	4.84
T <sub>3</sub>	GA3 80 ppm	19.85	15.85	12.70	3.15	0.97	4.88
T <sub>4</sub>	IAA 40 ppm	20.65	16.03	12.78	3.25	0.78	4.85
T <sub>5</sub>	IAA 80 ppm	20.81	16.35	12.95	3.40	0.71	4.89
T <sub>6</sub>	Micronutrient mixture 1 % 1 spray	20.40	16.05	12.79	3.26	0.67	4.83
T <sub>7</sub>	Micronutrient mixture 1 % 2 spray	20.75	16.55	12.97	3.58	0.70	4.87
T <sub>8</sub>	Waxol 6 %	23.50	15.90	12.85	3.05	0.75	4.89
S.E.±		0.69	0.24	0.22	0.12	0.02	0.23
C.D. (P=0.05)		2.03	N.S.	N.S.	N.S.	0.05	N.S.

**Effect on chemical characters:**

The data presented in Table 2 in respect of T.S.S., V it. C was significantly affected by plant growth regulators and micronutrients. Non- significant influence was noticed on total sugar, reducing sugar, non reducing sugar and pH. Maximum TSS (23.50%) was recorded in waxol 6% and which was superior all over the treatments. Remaining treatments were recorded statically similar TSS. Maximum total sugar was recorded in two sprays of 1 % micronutrients mixture (16.55 %) and minimum in GA3 80 ppm (15.85%). Similar results were also reported by Aziz and Wahab (1970), Rao *et al.* (1971), Srinivasan (1971), Sharma (1976), Jadhav and Kadam (1990), Ghanta and Dwivedi (1993), Das (1995) and Deo (1996).

The maximum increase in reducing sugar was recorded in two sprays of 1 % micronutrients mixture (12.97%) and minimum in control (12.65 %). The maximum non reducing sugar was recorded in two sprays of 1 % micronutrients mixture (3.58) and minimum was recorded in waxo16% (3.05 %). Similar results were also reported by Aziz and Wahab (1970), Rao *et al.* (1971), Srinivasan (1971), Sharma (1976), Jadhav and Kadam (1990).

The maximum increase in Vito C was recorded by GA3 80ppm (0.97) which was significantly superior over all the treatments. Next increase in Vito C was recorded in GA3 40ppm (0.91) while minimum in control (0.63) and which was at par with micronutrient mixture 1 % two spray (0.67). Slightly increase in pH was found in waxol 6% (4.89), remaining treatments were similar to each other. Similar result was also obtained by Lodh *et al.* (1971), Rao *et al.* (1971), Srinivasan (1971), Jadhav and kadam (1990), Ghanta and Dwivedi (1993).

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