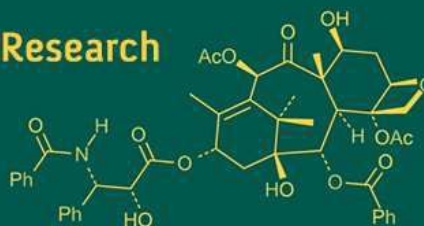


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Studies on effect of post shooting bunch treatment of different PGRs and nutrients on yield and quality attributes of banana (*Musa paradisiaca* L.) cv. Grand Naine

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Abstract

The present experiment was carried out during the year 2023-24 at Precision Farming Development Centre (PFDC), Department of Fruit Science, College of Agriculture, IGKV, Raipur (C.G.) with the objective of studies on effect of post shooting bunch treatment of different PGRs and nutrients on yield and quality attributes of banana (*Musa paradisiaca* L.) cv. Grand Naine. The experiment was employed in Randomized Block Design having eleven treatments, replicated thrice. Significant effect of PGRs and nutrients were observed on yield and quality parameter of banana. The maximum TSS, Total Sugar, Reducing Sugar and Non reducing Sugar was found in SOP 1.5% (23.03 °Brix, 14.89%, 6.09% and 8.91% respectively). Among PGRs and nutrients SOP 1% were found to next best treatments in improving all the yield and quality parameter in comparison to rest of the treatments.

Keywords: SOP, PGRs, nutrients, quality parameter

Introduction

Banana (*Musa paradisiaca* L.) is an important fruit crops and it is member of the Musaceae family under Scitamineae order with chromosome number $2n = 2x = 22$, $3x = 33$ and $4x = 44$. Origin of the banana is tropical region of South-East Asia. It is known as “Apple of Paradise”. Owing to its greater socio-economic significance and multifaceted uses, it is referred as “Kalpatharu” (plant of virtues). Botanically, banana fruit is a berry, which forms the staple food of millions of people across the world.

Nutrients play a significant role in boosting production and promoting quality of fruits. Banana absorb major nutrients in large quantities during the peak growth phase and after shooting the rate of nutrient uptake reduce. At the shooting stage nutrient affects production and quality of banana. Among the several factors influencing fruit quality, sufficient nutrients specially nitrogen and potassium application are considered to be of major importance in banana cultivation (Tandon and Sekhon, 1988) [7]. Bunch management is an important practice in banana performed through different methods to improve the yield and quality of banana. During the shooting stage banana needs the maximum amount of nutrients, but due to various soil characteristics and environmental factors it might not be able to uptake the required amount of nutrients from the soil (Rajan *et al.*, 2017) [5].

Materials and Methods

The present experiment was carried out during the year 2023-24 at Precision Farming Development Centre (PFDC), Department of Fruit Science, College of Agriculture, IGKV, Raipur (C.G.). Treatments are, T₀- control, T₁- GA₃ @ 100 ppm, T₂- GA₃ @ 150 ppm, T₃- NAA @ 100 ppm, T₄- NAA @ 150 ppm, T₅- SOP @ 1%, T₆- SOP @ 1.5%, T₇- KNO₃ @ 1%, T₈- KNO₃ @ 1.5%, T₉- Urea @ 1%, T₁₀- Urea @ 1.5%. The required concentration of plant growth regulators and nutrients were completely dissolved in water. Number of spray is two. The first spray was given after complete emergence of inflorescence and after removal of male flower of banana and second spray was given twenty days after first spray with using

of a hand sprayer. The observations on was taken from five randomly selected plants from each replication and statistically analyzed.

Results and Discussion

Quality parameter

TSS

The maximum TSS (23.03 °Brix) was recorded under the treatment T₆ (SOP 1.5%). This might be due to post shooting application of potassium promotes the conversion of starch into simple sugars during ripening by stimulating sucrose synthase enzyme, resulting higher sugar content in fruits. Similar results were also observed by Kumar *et al.* (2008) ^[3], Kumar and Kumar (2010) ^[2] and Gamit *et al.* (2018) ^[1] in banana.

Total sugar

The total sugar content (14.89%) was significantly influenced by application of treatment T₆ (SOP 1.5%) followed by treatment T₅ (14.68%), while the lowest Total sugar content (10.71%) was recorded in treatment T₀ (Control). The maximum total sugar (14.89%) was noted under treatment T₆ (SOP 1.5%) which might be due to potassium is involved in synthesis, breakdown and translocation of carbohydrate as well as synthesis of protein and neutralization of organic acids that are physiologically important. Besides potassium is involved in phloem loading and unloading of sucrose and amino acids and activating starch synthase enzyme and sulphur present in SOP which

help to absorption of potassium (Tisdale and Nelson 1966, Mengel and Kirkby 1987) ^[8, 4].

Reducing sugar

Maximum reducing sugar (6.09%) was recorded in treatment T₆ (SOP 1.5%), whereas minimum reducing sugar (4.44%) was observed under the treatment T₀ (control). This might be due to potassium play a role in carbohydrate synthesis, breakdown and translocation as well as synthesis of protein, post shooting application of potassium helps the conversion of starch into simple sugars during ripening by stimulating sucrose synthase enzyme, resulting in high sugar content of the fruit. Result of this experiment is in close confirmation with findings of Kumar *et al.* (2008) ^[3] in banana cv. Robusta and Gamit *et al.* (2018) ^[1].

Non reducing sugar

Maximum Non reducing sugar (8.91%) was recorded in treatment T₆ (SOP 1.5%). In plants appropriately supplied with potassium, the osmotic potential of the phloem sap and the volume flow rate are higher than in plants supplied with insufficient potassium level which leads sucrose concentration in the phloem sap is increased and sulphur present in SOP which is help to absorption of potassium. Such results were also supported by Singh and Varma (2011) ^[10] in mango cv. Kesar. This is in line with the findings of Shira *et al.* (2013) ^[6], Vivela *et al.* (2013) ^[6] and Gamit *et al.* (2018) ^[1].

Table 1: Effect of post shooting bunch of different PGRs and nutrients on Quality parameters of banana.

Treatment	TSS (°Brix)	Total sugar (%)	Reducing sugar (%)	Non reducing sugar (%)
T ₀ - Control	19.13	10.71	4.44	6.27
T ₁ - GA ₃ @ 100 ppm	21.09	13.72	5.56	8.46
T ₂ - GA ₃ @ 150 ppm	20.62	13.57	5.29	8.42
T ₃ - NAA @ 100 ppm	20.32	13.49	5.11	7.81
T ₄ - NAA @ 150 ppm	20.28	13.14	4.96	7.80
T ₅ - SOP @ 1%	22.02	14.68	6.01	8.80
T ₆ - SOP @ 1.5%	23.03	14.89	6.09	8.91
T ₇ - KNO ₃ @ 1%	20.03	12.02	4.58	7.45
T ₈ - KNO ₃ @ 1.5%	21.16	14.47	5.87	8.55
T ₉ - Urea @ 1%	19.16	11.98	4.53	6.43
T ₁₀ - Urea @ 1.5%	20.09	12.38	4.72	7.71
SEm (±)	0.45	0.36	0.14	0.21
CD at 5%	1.35	1.06	0.42	0.63
CV%	3.83	4.71	4.76	4.72

Note: GA₃- Gibberellic Acid, NAA- Naphthalene Acetic Acid, SOP-Sulphate of Potash and KNO₃- Potassium Nitrate

Conclusion

The present investigation suggested positive response post shooting bunch treatment of different PGRs and nutrients performed well for quality in banana. It was concluded that SOP 1.5% and 1%, KNO₃ 1.5% and GA₃ 100 ppm was superior to all other treatments in terms of Quality of banana like TSS, Total Sugar, Reducing Sugar and Non reducing Sugar.

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