



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(11): 720-721
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www.thepharmajournal.com

Received: 02-09-2023

Accepted: 08-10-2023

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Studies to improve the fruit quality of banana cv. Matti (AA) at Kanyakumari District

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Abstract

Field experiments were carried out with the objective of improve the fruit quality of banana cv. Matti at Kannyakumari district during the year 2014 - 15, 2015 - 16 and 2016 - 17 at D Block of Horticultural Research Station Pechiparai. The treatments are spraying 1.5% Sop (T₁), spraying 0.5% KH₂ PO₄ + 1% urea + 20 ppm 2,4- D (T₂), spraying of GA at 25 ppm (T₃), Spraying of brassinosteroids at 1 ppm (T₄) and no spray (control) (T₅). Spraying stage: Once at when the last hand opens and second at 30 days after the first spray. Mode of spray: Spraying the entire foliage and bunches in the case of T₁ alone and only on bunches in the case of T₂, T₃ and T₄ treatments. The result reveals that spraying of 1.5% SOP once at when the last hand opens and second at 30 days after the first spray recorded significantly higher mean bunch weight (13.0 kg) and finger weight (39.7 g). The quality parameters viz., bunch appeal, flavour, TSS, reducing sugars, non-reducing sugars and total sugars are also the highest in the same treatment.

Keywords: Matti banana, SOP, yield, quality

Introduction

Matti banana is indigenous to Kannyakumari District and it is known as Baby banana, stands out for its flavor and honey taste. Banana is the one of the economic crop grown in 6,256 ha in Kannyakumari District. The predominant cultivars grown in this district are Nendran, Red banana, Ney poovan, Singan and Matti. Among these varieties, Matti is highly prized in the market and is considered as a medicinal fruit in this district and fed to infants from early stages onwards. The flavor of this variety is unique. Certain chemicals such as sulphate of potash at 1.5% as foliar spray at post shooting stage is known to improve the quality of banana but its effects on Matti is not yet assessed. Hence, this investigation was carried out to improve the fruit quality of banana cv. Matti.

Materials and Methods

Field experiments were conducted at Horticultural Research Station, Pechiparai during 2014 - 2017 to improve the fruit quality of banana cv. Matti. The experiment was laid out in RBD and replicated 4 times with 5 treatments. The treatments are T₁ : Spraying 1.5% SOP, T₂ : Spraying 0.5% KH₂ PO₄ + 1% urea + 20 ppm 2,4- D, T₃ : Spraying of GA at 25 ppm, T₄ : Spraying of brassinosteroids at 1 ppm and T₅ : No spray (Control). Spraying stage is once at when the last hand opens and second at 30 days after the first spray. Mode of spray is spraying the entire foliage and bunches in the case of T₁ alone and only on bunches in the case of T₂, T₃ and T₄ treatments. One plant and two ratoon crop was cultivated in the field.

Weight of the bunch including the peduncle up to first bract leaf node above the first hand was recorded and expressed in kilogram (kg). Total number of hands and fingers in a bunch were counted and expressed in number. The middle fingers in the top and bottom rows of the second hand were selected as representative fingers to record average weight of the finger and expressed in gram (g) (Gottreich *et al.*, 1964) ^[1]. Representative fingers were allowed for natural and uniform ripening and these fruits were utilized for determining different quality parameters. Bunch appeal and fruit flavour was scored visually using the hedonic scale of 0-5. The Total Soluble Salts (TSS) was determined by using Carl-Zeiss Hand Refractometer and the results were expressed in percentage. The total, reducing and non-reducing sugars were estimated as per the method suggested by (Somogyi, 1952) ^[2] and expressed in gram (g). Bunch weight was recorded at the time harvest and the data was statistically analysed. One plant and two ratoon crop results was taken for this study. Pooled mean analysis was done and the mean value was presented in Table 1.

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Results and Discussion

Post shooting spray of nutrients significantly increased the bunch weight. Spraying of 1.5% SOP (T₁) treatment recorded the highest mean bunch weight of 13.0 kg and it was followed by T₂, T₃ and T₄ treatments. Potassium is a general metabolic activator, increasing the respiration and photosynthetic rate.

Thus additional K application as foliar spray induced faster development of bunches (Evans, 1971) [3]. The result was in accordance with (Ramesh Kumar and Kumar, 2010) [4]. The lowest mean bunch weight (8.6 kg) was recorded in no spray (T₅) treatment (control) (Table 1).

Table 1: Effect of post shooting spray of nutrients on yield and quality parameters of banana cv. Matti (AA) (pooled mean of 3 years : 2014-2017).

Treatments	Bunch Weight (kg)	Finger Weight (g)	Bunch Appeal*	Flavour*	TSS (%)	Reducing Sugars (%)	Non Reducing Sugars (%)	Total Sugars (%)
T ₁	13.0	39.7	5.0	4.0	21.9	13.49	8.52	22.0
T ₂	11.1	35.8	4.0	4.0	20.6	13.10	7.30	20.4
T ₃	10.3	33.1	3.3	3.3	20.3	13.00	7.24	20.3
T ₄	9.9	31.8	3.0	3.0	19.5	12.59	7.18	19.8
T ₅	8.6	27.1	2.3	2.3	17.5	11.29	7.10	18.4
S.Ed.	0.16	0.75	-	-	0.40	0.27	0.02	0.28
CD (p=0.05)	0.36	0.74	-	-	0.94	0.64	0.05	0.67

*Scored visually using the hedonic scale of 0 - 5.

The treatments had significant influence on finger weight. Spraying of 1.5% SOP (T₁) recorded the higher mean finger weight of 39.7 g and it was followed by spraying of 0.5% KH₂PO₄ + 1% urea + 20 ppm 2, 4-D (T₂) treatment. The similar result was observed by Ramesh Kumar *et al.* (2008) [5] in robusta (AAA - Cavendish) banana. The special characters of Matti banana is the flavour and honey like taste. Any management practices should aim to produce quality fruits, besides maximizing the productivity in Matti banana, fruit quality is mainly judged by flavour and sugar content. The higher mean score in bunch appeal (5.0) and mean flavour (4.0) was recorded in spraying of 1.5% SOP (T₁) treatment. The lowest mean score in bunch appeal and mean flavour was noticed in no spray (control) treatment (T₅) (Table 1).

The TSS content of Matti banana was significantly influenced by post shooting spray of nutrient spray. Spraying of 1.5% SOP (T₁) treatment recorded the highest mean TSS value of 21.9% and it was followed by 0.5% KH₂PO₄ + 1% urea + 20 ppm 2, 4-D spray (T₂) and spraying of GA at 25 ppm (T₃) treatments. The highest mean reducing sugar value of 13.49% was recorded in spraying of 1.5% SOP (T₁) treatment which was on par with T₂ T₃ treatments. The higher mean non reducing sugar value of 8.52% was registered in spraying of 1.5% SOP (T₁) treatment and it was followed by T₂, T₃ and T₄ treatments. No spray (control) (T₅) recorded the lowest mean non reducing sugars. Post shooting spraying of 1.5% SOP (T₁) treatment recorded the higher mean total sugar value of 22.0% and it was followed by spraying of GA at 25 ppm (T₃) treatment (Table 1). Higher fruit quality especially higher sugar content can be explained by the role of Potassium which is involved in carbohydrate synthesis, break down and translocation and synthesis of protein and neutralization of physiologically important organic acids (Tisdale and Nelson, 1966) [6]. Potassium is responsible for energy production in the form of ATP and NADHP in chloroplasts by maintaining balanced electric charges. Besides, K is involved in phloem loading and unloading of sucrose and amino acids and storage in the form of starch in developing fruits by activating the enzyme starch synthase (Mengal and Kirkby, 1987) [7]. Post shooting application of K also favours the conversion of starch in to simple sugars during ripening by activating sucrose synthase enzyme, resulting in higher sugar content in the fruits.

Conclusion

Post shooting spraying of 1.5% SOP once at when the last hand opens and second at 30 days after the first spray recorded significantly higher bunch weight, finger weight and improved the quality parameters *viz.*, bunch appeal, flavour, TSS, reducing sugars, non-reducing sugars and total sugars in Matti banana at Kanyakumari district.

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