

Journal of Phytology 2018, 10: 49-51
doi: 10.25081/jp.2018.v10.3558
<http://updatepublishing.com/journal/index.php/jp>



ISSN: 2075-6240

SHORT COMMUNICATION

EFFECT OF DIFFERENT LEVELS OF SOLUBLE FERTILIZERS ON NUTRIENT UPTAKE IN *SOLANUM MELONGENA* L.

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ABSTRACT

Field investigation was carried out to study the influence of quality parameters and nutrient uptake of brinjal hybrids due to application of various levels of water soluble fertilizer. Foliar spray of NPK (19:19:19) at 0.5 per cent and 1% along with 100 and 75% recommended dose of NPK (200:150:100 kg ha⁻¹) with 5 and 7 sprays, each starting from 30 DAT at 10 d interval, formed twenty treatments in two hybrids. Results showed that among the two different concentrations of foliar applied nutrients, 7 sprays of 1% NPK (19:19:19) along with 100 per cent recommended dose of fertilizer (200:150:100 kg ha⁻¹) recorded the ascorbic acid content, total soluble solids (TSS) and total phenol content. Uptake of major nutrients was found to be the highest due to foliar application of 1 per cent water soluble fertilizer (7 sprays) along with 100 per cent recommended dose of fertilizer.

Keywords: Water soluble fertilizers, Yield parameter, Brinjal

INTRODUCTION

Brinjal (*Solanum melongena* L.) is also popularly called as eggplant or aubergine. The brinjal hybrids are more responsive to fertilizer application. Since, hybrids have high yield potential, it needs uninterrupted supply of nutrients both during vegetative and reproductive stage of growth [1]. Water soluble fertilizers also plays an important role in preventing the flower and fruit drop and improves crop yield and quality. [2]. Water soluble fertilizers can advantageously be utilized for foliar feeding and fertigation, thus helping in precision agriculture. Foliar spray is the modern method of fertilizer in vegetable crops due to nature of heavy feeder of nutrients [3]. An application of nutrients through foliar spray has several advantages in supplementing the nutritional requirement of crops. Hence, the present research was undertaken to estimate the effect of water soluble fertilizers on quality parameters and nutrient uptake of brinjal hybrid.

MATERIALS AND METHODS

A field experiment was carried out at University Orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu to study the effect of water soluble fertilizer on growth parameters of brinjal. Two brinjal hybrids viz., Mahyco No.39 (Ravaiya) produced by Mahyco Seed Innovation P. Ltd Maharashtra and Indam Supriya produced by Indo-American Hybrid Seeds (India) P. Ltd Bengaluru were

used in the present study. The experiment was laid out in Factorial Randomized Block Design and replicated thrice. The treatments consisted of application of two levels of inorganic fertilizer (100 % and 75% Recommended Dose Fertilizer @ 200:150:100 kg NPK) along with the two concentrations of water soluble fertilizers viz., NPK (19:19:19) at 0.5% and 1% as in five and seven sprays. Seeds were sown in raised beds at a spacing of 5 cm across the beds and at a depth of 0.25 cm. Thirty-five days old healthy seedlings were transplanted in the main field. The seedlings were planted in a uniform spacing of 90 cm x 60 cm in the plot and immediately after transplanting. Intercultural operations and harvesting were done as per the recommendation. The required quantity of manures and fertilizers were applied as per the treatment. The inorganic fertilizers were applied in the form of urea, superphosphate and murate of potash as per the treatments. N was applied in two split doses, first dose was given as a basal application and the remaining N was given thirty days after sowing. The full dose of phosphorus and potassium were applied as basal application at the time of transplanting. Foliar application of required quantity of 19:19:19 NPK were given in five and seven sprays starting from thirty days after transplanting at ten days intervals. The observations on various quality parameters viz., Ascorbic acid, Total soluble solids (TSS), Total phenol content and nutrient uptake were recorded and statistically analysed as given by [4].

Received 29 March 2018; Accepted 20 May 2018

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RESULTS

The quality parameters viz., ascorbic acid and total phenol content did not show significant effect due to interaction of treatment x hybrids. The highest plant nutrient uptake was observed in T₁₀ H₂ (100% RDF+WSF 1.0%+7 Sprays in Ravaiya) with the mean value of 99.35: 33.52: 81.83 kg NPK ha⁻¹.

DISCUSSION

In the present study, application of various levels of inorganic and water soluble fertilizers significantly influenced the fruit yield per plant. Among the various treatments that tested maximum TSS content was recorded in T₁₀ (5.03 B °) which received 100% RDF+WSF 1.0%+7 Sprays and the minimum was recorded in 75% recommended dose of fertilizers in T₁ (4.22 °B). The interaction effect did not show significant variation.

The TSS content constitutes the organic and inorganic substances present in cell sap. They also contribute to the osmoregulation function. The turgidity maintenance is governed by the osmoregulatory mechanism. The increased TSS content evidently shows that the stored food materials undergo either partial or complete hydrolysis and provide substrate for respiration [5].

Whole plant testing is used to measure uptake of nutrients by plants [6]. Concentrated accumulation (or dilution) of a non-metabolized ion in a growing plant is obviously due to the results of imbalance between rates of net uptake.

In the present study, application of various levels of inorganic and water soluble fertilizers significantly influenced the nutrient uptake. Among the various treatments that tested more uptake of nitrogen (92.44 kg), phosphorus (30.94 kg)

and potassium (78.67 kg) uptake were recorded in T₁₀ which received 100% RDF+WSF 1.0%+7 Sprays and the minimum was recorded in 75% recommended dose of fertilizers in T₁ (63.13, 11.13 and 58.64 kg NPK ha⁻¹).

Among the hybrids tested H₁ recorded the highest uptake of 83.46: 23.15: 64.61 kg NPK ha⁻¹ and the least was recorded in H₂ (85.54: 28.36: 81.83 kg NPK ha⁻¹) with regard to interaction effect T₁₀H₁ recorded the highest uptake (99.35: 33.52: 81.83 kg ha⁻¹) and the least was recorded in T₁ H₂ (61.18: 10.20: 61.39 kg NPK ha⁻¹)

The increased uptake may be attributed to the cumulative effect of increased nutrient content and highest dry matter production. The results are in line with the findings of [7, 8] and [9]. The plant N, P and K uptake increased when the particular nutrient was applied at higher levels. The increased accumulation of NPK in the plant may be attributed to more availability of the respective nutrients and more absorptive area which resulted in the highest nutrient accumulation. Another reason might be due to steady and sustained effect of water soluble fertilizers in supplying proportionate nutrients at right time which resulted in uniform and higher growth rate throughout the crop period. These findings are in conformity with the results of [9].

CONCLUSION

Based on the present investigation, among the water soluble fertilizers and inorganic fertilizers tested foliar application of 7 sprays of NPK (19:19:19) along with the 100 % application of inorganic fertilizer (200:150:100 kg NPK ha⁻¹) recorded the highest quality parameters and nutrient uptake in brinjal.

Table 1: Effect of water soluble fertilizers on quality arameters and nutrient uptake in brinjal hybrid

Treatments	Days to 50 % flowering	TSS (°Brix)	Total phenol (g)	N uptake (kg ha ⁻¹)	P uptake (kg ha ⁻¹)	K uptake (kg ha ⁻¹)
F ₁ H ₁	0.46	3.88	0.10	65.08	12.06	61.39
F ₂ H ₁	0.63	4.00	0.11	68.84	16.38	65.44
F ₃ H ₁	0.71	4.04	0.11	71.81	18.78	67.05
F ₄ H ₁	0.67	4.06	0.12	76.82	21.23	69.55
F ₅ H ₁	0.75	4.09	0.13	84.73	22.28	73.60
F ₆ H ₁	0.67	4.36	0.12	87.15	24.34	72.65
F ₇ H ₁	0.73	4.39	0.11	90.2	26.13	76.15
F ₈ H ₁	1.38	4.47	0.12	93.25	27.38	79.75
F ₉ H ₁	1.68	4.51	0.13	97.31	29.44	77.50
F ₁₀ H ₁	1.98	4.52	0.14	99.35	33.52	81.83
F ₁ H ₂	1.30	4.57	0.10	61.18	10.20	55.88
F ₂ H ₂	1.76	5.12	0.10	64.23	14.05	57.34
F ₃ H ₂	1.98	5.24	0.10	66.28	16.51	59.41
F ₄ H ₂	1.89	5.29	0.11	69.13	17.77	61.46
F ₅ H ₂	2.10	5.33	0.12	71.33	19.82	63.54
F ₆ H ₂	1.91	5.41	0.11	74.47	20.18	64.56
F ₇ H ₂	2.04	5.45	0.11	76.42	22.21	67.54
F ₈ H ₂	2.13	5.49	0.10	78.47	23.23	69.62
F ₉ H ₂	2.19	5.52	0.14	81.49	25.30	71.19
F ₁₀ H ₂	2.56	5.55	0.13	85.54	28.36	75.51
S. Ed	0.05	0.25	0.08	1.26	1.07	1.34
CD (P= 0.05)	NS	NS	NS	2.52	2.15	2.68

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