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Effect of integrated nutrient management on quality and biochemical parameters of pomegranate cv. Bhagwa under central dry zone of Karnataka

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Abstract

A field experiment was conducted in the farmer's field Somerhalli village, Hiriya taluk Chitradurga district on pomegranate cv. Bhagwa during 2015-16 entitled as Studies on integrated nutrient management in relation to quality and biochemical characters in Mrig bahar season. Contributed favourable effect on quality and biochemical parameters. Results revealed that application of 100% recommended dose of fertilizers (RDF) along with vermicompost + poultry manure + *Azospirillum* + PSB + KSB -T₉ has recorded the maximum Aril weight (212.47 g) Aril per cent (72.53%) and lowest Seed: Aril ratio (0.016). whereas, maximum TSS (15.30 °Brix), TSS/TA ratio (46.48%), reducing sugars (12.79%), non-reducing sugars (1.65%) total sugars (14.39%), and lowest titratable acidity (0.33%) was recorded in 100% recommended dose of fertilizers (RDF) along with vermicompost + poultry manure + *Azospirillum* + PSB + KSB -T₈.

Keywords: Pomegranate, integrated nutrient management, central dry zone, quality parameters

Introduction

Pomegranate (*Punica granatum* L.) belongs to family Lythraceae, regarded as 'fruit of paradise', an ancient favorite fruit of tropical and sub-tropical regions of the world. The fruit rind, seeds and pulp comprises of rich medicinal properties. Present global pomegranate consumption ranks 18th place annually and expected to move onto 10th place within the decade in view of its innumerable nutraceutical importance. The fruit contains nearly about 153 phytochemicals like ellagic acid, catechin and procyanidins, fatty acids and triglycerides, sterols and terpenoids, flavonols etc. The fruit juice contains tannins, anthocyanin, polyphenols and antioxidants A, E and C which plays major role in maintenance of heart blood vessels, and proper blood circulation. Among the various factors which contribute towards the growth, yield and quality of pomegranate, nutrition is the most important and it has direct effect on production and quality. Integrated nutrient management includes, use of inorganic and organic sources of nutrients to ensure balanced nutrient proportions by enhancing nutrient response efficiency and maximizing crop productivity of desired quality. In view of this present experiment entitled as "Studies on integrated nutrient management on growth and yield of pomegranate (cv. Bhagwa) under central dry zone of Karnataka" has been designed.

Material and Methods

The investigation conducted during 2015-16 in the farmer's field of Somerhalli village, Hiriya taluk of Chitradurga district, entitled as "Studies on integrated nutrient management in pomegranate (cv. Bhagwa) under central dry zone of Karnataka". Uniformly aged 135 plants spaced 10 ft x 10 ft were selected during Mrig bahar (june-july) of 2015. There were nine treatments along with control and each treatment was replicated thrice in a Complete Randomized Block Design. The recommended dose of fertilizers for pomegranate 400:200:200 g NPK per tree with FYM 5 tonnes per acre (12.5 tonnes per hectare 5.4 kg/ plant) was applied during the course of experimentation. Biofertilizers and organic manures were procured from KVK Babbar farm, hiriya. The biofertilizers like *Azospirillum*, PSB, and KSB were applied at the rate of 5 kg/ acre, (12.5 kg/ hectare, 13.61 g/ plant), poultry manure at

The rate of 3.3 kg/ tree and vermicompost at 2 kg/ tree. The recommended dose of NPK were applied in the form of urea, diammonium phosphate and muriate of potash, respectively. The biochemical parameters TSS, Titratable acidity and TSS/TA and the postharvest parameters like shelf life and fruit firmness were recorded.

Result and Discussion

The aril weight aril per cent and seed: aril ratio of pomegranate fruit differed significantly (Table-1). Among the different treatments T₉ showed the increase in aril weight and aril per cent might be due to optimum supply of proper plant nutrients and ultimately production of more photosynthates and the nutrient combinations that accelerates the metabolic activities of the plant.

The reducing sugar and total sugars of pomegranate fruit differed significantly (Table-2). Among the different treatments T₈ showed increase in reducing sugars and total sugars (12.79% and 14.39% respectively), While the least reducing sugar and total sugars (9.70% and 11.04%) was recorded in control T₁ (control). The significant improvement in sugars might be due to combined effect of biofertilizers

have exerted regulatory role and affecting the quality of fruit in which carbohydrate reserves of the roots and stem are drawn upon heavily by fruits. The similar result was obtained by Mandeep *et al.* (2013) ^[2] in guava, Hazarika and Ansari (2008) ^[1] in banana. The higher TSS and TSS/TA ratio (15.23 °Brix and 46.17%) and lowest titratable acidity (0.33%) was observed in the treatment T₈ (Table 2), while the lowest TSS and TSS/TA ratio (12.60 °Brix and 20.35) and the higher titratable acidity (0.66%) was recorded in T₁ (control). The reduction in acidity might be due to more accumulation of sugars in the fruit. Increase in the TSS might be due to more rapid translocation of sugars from leaves to developing fruits. The similar results were obtained by Mustaffa *et al.* (2004) ^[3] in banana and Sharma *et al.* (2008) ^[4] in pomegranate.

Thus from the present study, it may be concluded that application of biofertilizer Treatment T₈ is superior than the other treatments with respect to improvement in important attributes contributing towards the better biochemical parameters and on par with quality parameters in Mrig bahar pomegranate cv. Bhagwa under central dry zone of Karnataka.

Table 1: Effect of integrated nutrient management on aril characters of pomegranate cv. Bhagwa

Treatments	Aril weight (g)	Aril (%)	Seed : Aril ratio
T ₁ -100%RDF (control)	169.32	68.68	0.026
T ₂ -75% RDF + vermicompost	173.36	68.80	0.020
T ₃ -75% RDF + vermicompost + AzO + PSB	176.74	69.68	0.022
T ₄ -75% RDF + vermicompost + AzO + PSB + KSB	179.70	70.72	0.020
T ₅ -100%RDF + poultry manure	183.82	72.26	0.022
T ₆ -100%RDF + poultry manure + AzO + PSB	185.40	70.90	0.023
T ₇ -100%RDF + Poultry manure + AzO+ PSB+ KSB	192.36	72.24	0.021
T ₈ -75% RDF + vermicompost + poultry manure + AzO + PSB + KSB	209.74	72.12	0.018
T ₉ -100% RDF + vermicompost+ poultry manure + AzO + PSB + KSB	212.47	72.53	0.016
S. Em.±	0.98	0.75	0.01
C.D. at 5%	2.93	2.25	0.02

Table 2: Effect of integrated nutrient management on biochemical parameters of pomegranate cv. Bhagwa

Treatments	Reducing sugars	Total sugars (%)	TSS (°Brix)	TA (%)	TSS/TA ratio (%)
T ₁ -100%RDF (control)	11.41	13.68	14.67	0.43	34.13
T ₂ -75% RDF + vermicompost	11.60	13.81	14.83	0.38	39.03
T ₃ -75% RDF + vermicompost + AzO + PSB	10.64	12.64	13.73	0.44	31.22
T ₄ -75% RDF + vermicompost + AzO + PSB + KSB KSB	11.11	12.32	13.87	0.42	33.03
T ₅ -100%RDF + poultry manure	11.21	13.61	14.60	0.40	36.52
T ₆ -100%RDF + poultry manure + AzO + PSB	11.42	13.74	14.70	0.39	37.68
T ₇ -100%RDF + Poultry manure + AzO+ PSB+ KSB	11.22	13.04	14.53	0.41	35.41
T ₈ -75% RDF + vermicompost + poultry manure + AzO + PSB +KSB	11.35	13.22	14.67	0.42	34.94
T ₉ -100% RDF + vermicompost+ poultry manure + AzO + PSB +KSB	10.32	11.73	13.60	0.45	30.23
S. Em.±	10.68	12.13	13.50	0.43	31.39
C.D. at 5%	12.71	14.65	15.23	0.33	46.17

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