International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(4): 1209-1211

Received: 07-07-2019
Accepted: 15-07-2019

BP Lodaya
Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat, India

MM Masu
Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat, India

Correspondence
BP Lodaya
Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand, Gujarat, India

Effect of biofertilizer, manures and chemical fertilizers on fruit quality and shelf life of guava (*Psidium guajava* L.) cv. Allahabad safeda

BP Lodaya and MM Masu

Abstract
The research experiment was conducted at Horticultural Research Farm, Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, Anand during the year 2018 on "Effect of biofertilizer, manures and chemical fertilizer on fruit quality and shelf life of guava (*Psidium guajava* L.) cv. Allahabad Safeda". The experiment was laid out in Completely Randomized Design with 09 treatments. The soil of the experimental site was loamy sand. The soil application of full dose of biofertilizers manures and chemical fertilizers were given as basal dose in last week of June and remaining half dose of chemical fertilizer given in first week of September. Among all the treatments, the soil application of 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree treatment was most effective treatment and which was recorded significantly maximum total soluble solids (11.93 ^{0}Brix), reducing sugar (6.35 %), non-reducing sugar (1.72 %), total sugar (8.07 %), ascorbic acid (177.67 mg/100 g pulp). Whereas, the soil application of 40 % RDF through chemical fertilizers + 40 % RDN through Poultry manure + 10 ml Bio NPK Consortium per tree treatment was most effective treatment for extending shelf life of guava fruit and which was recorded significantly maximum shelf life (8.17 days).

Keywords: Biofertilizer, poultry manure, total soluble solids, total sugar, shelf life

Introduction
Guava (*Psidium guajava* L.) is one of the important fruit crop of tropical and sub-tropical regions of India. It is a hardy crop and can be grown satisfactorily on marginal soil with minimum care. Guava is the most important member of the Myrtaceae family. Guava is classified under genus Psidium, which consists of 150 species but only *Psidium guajava* has been exploited commercially. It is also called as 'Apple of the Tropics'. Fruits produce almost continuously under tropical climate due to availability of sufficient heat and moisture. However, there are three distinct periods of growth and fruiting. I.e. Ambe bahar, Mrig bahar and Hast bahar in subtropical climate (Shukla *et al*., 2008) [6]. Low productivity of guava may be due to less adoption of improved crop management technology in respect of planting system, nutrition, plant protection and irrigation etc. In view of this, there is an increasing awareness worldwide about alternative agricultural systems known as integrated plant nutrient management, which implies the maintenance or adjustment of soil fertility and plant nutrients supply for sustaining desired crop integrated manner. Use of organic manures along with biofertilizers and crop residues as a cheap source of available nutrients to plants has resulted in beneficial effects on growth, yield, quality and nutrient concentration in plant of various fruit crops. The occurrence of multi-nutrient deficiencies and overall decline in productive capacity of soil has been widely reported due to non- judicious fertilizer use (Chhonkar, 2008) [1]. Fertilizer experiments conducted in India showed that guava has given good response to balanced use of inorganic and organic fertilizers along with biofertilizer.

Materials and Methods
The research experiment was carried out during Kharif-Rabi season of the year 2018 at Horticultural Research Farm, Department of Horticulture, B. A. College of Agriculture, Anand Agricultural University, and Anand. The experiment was laid out in Completely Randomized Design with 09 treatments *viz.*, T_1 - 100 % RDF through chemical fertilizers + 50 Kg FYM, T_2 - 80 % RDF through chemical fertilizers + 40 Kg FYM + 10 ml Bio NPK Consortium per tree, T_3 - 40 % RDF through chemical fertilizers + 40 % RDN through Vermicompost + 10 ml

Bio NPK Consortium per tree, T_4 - 40 % RDF through chemical fertilizers + 40 % RDN through Poultry manure + 10 ml Bio NPK Consortium per tree, T_5 - 40 % RDF through chemical fertilizers + 40 % RDN through Castor cake + 10 ml Bio NPK Consortium per tree, T_6 - 60 % RDF through chemical fertilizers + 30 Kg FYM + 20 ml Bio NPK Consortium per tree, T_7 - 30% RDF through chemical fertilizers + 30 % RDN through Vermicompost + 20 ml Bio NPK Consortium per tree, T_8 - 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree and T_9 - 30 % RDF through chemical fertilizers + 30 % RDN through Castor cake + 20 ml Bio NPK Consortium per tree. The experimental site soil was loamy sand. The soil application of full dose of biofertilizer, manures and chemical fertilizer were given as basal dose in last week of June and remaining half dose of chemical fertilizer given in first week of September. The mature and uniform sized fruits were harvested from the respective trees and observations were recorded regarding the quality parameters and shelf life of the fruits.

Result and discussion

The results obtained from the research experiment on effect of biofertilizer, manures and chemical fertilizers on fruit quality and shelf life of guava are presented in Table 1. There was non-significant effect of biofertilizer, manures and chemical fertilizers on acidity. Whereas, there were significant effect of biofertilizer, manures and chemical fertilizers on quality parameters *viz.*, total soluble solids (°Brix), reducing sugar (%), non-reducing sugar (%), total sugar (%), ascorbic acid (mg/100g pulp) and shelf life (days).

The significantly highest total soluble solids (11.93 °Brix) was found with the soil application of 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree. It might be due to absorption of nitrogen may have exerted regulatory role as an important constituent of endogenous factors in affecting the quality of fruit in which carbohydrate is important and during ripening of fruits the carbohydrate reserves of the roots and stem are drawn upon heavily by fruits which might have resulted into higher TSS contents in fruits. The similar result was also in accordance with the findings of Devadas and Kuriakose (2002) [2], Sharma *et al*. (2009) [5], Osman and EI-Rhman, I. A. (2010) [4] and Devi *et al.* (2012). There was significant effect of biofertilizer, manures and chemical fertilizers on reducing sugar, non-reducing sugar and total sugar. The soil application of 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree treatment was most effective treatment and which was recorded significantly highest reducing sugar (6.35%), non-reducing sugar (1.72 %) and total sugar (8.07 %). It is might be due to the quick metabolic transformation of starch and pectin into soluble compounds and rapid translocation of sugars from leaves to the developing fruits. Application of nitrogen fixing bacteria with lower dose of inorganic fertilizers might have exhibited regulatory role on the absorption and translocation of various metabolites, in which carbohydrates are most important which affects the quality of fruits. The similar result was also in accordance with the findings of Devadas and Kuriakose (2002) [2], Sharma *et al.* (2009) [5], Osman and EI-Rhman, I. A. (2010) [4] and Devi *et al.* (2012).

Table 1: Effect of biofertilizer, manures and biofertilizer on fruit quality and shelf life of guava cv. Allahabad Safeda

Treatments	Total Soluble Solids (°Brix)	Reducing sugar (%)	Non-reducing sugar (%)	Total sugar (%)	Ascorbic acid (mg/100g pulp)	Acidity (%)	Shelf life (Days)
T_1	10.53	6.15	1.56	7.71	136.67	0.83	7.27
T_2	11.43	5.98	1.41	7.39	144.87	0.85	5.50
T_3	10.93	5.84	1.53	7.37	144.87	0.77	6.40
T_4	11.70	6.23	1.49	7.72	150.33	0.83	8.17
T_5	11.83	5.88	1.52	7.40	142.13	0.80	6.83
T_6	10.87	6.17	1.64	7.81	169.47	0.83	5.67
T_7	11.77	6.07	1.63	7.70	158.53	0.76	7.63
T_8	11.93	6.35	1.72	8.07	177.67	0.75	7.50
T_9	10.90	6.07	1.67	7.74	174.93	0.76	6.83
SE m±	0.24	0.10	0.04	0.10	5.90	0.03	0.20
C.D. at 5%	0.70	0.29	0.12	0.31	17.54	NS	0.60
C.V. %	3.62	2.82	4.59	2.37	6.58	6.02	5.11

The soil application of biofertilizer, manures and chemical fertilizers was significantly influenced on ascorbic acid content of guava. The significantly maximum ascorbic acid (177.67 mg/100g pulp) was obtained with the soil application of 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree. The significant effect of biofertilizer, manures and chemical fertilizers on ascorbic acid improvement in fruit quality by continuous supply of nutrients, higher concentration of soil enzymes, soil microorganism, more friable and pours soils made by poultry manure and biofertilizers which resulted in higher quantities of photosynthates and the translocation to the fruits, thus increasing the various contains of fruit hence quality improvement reflected in fruit chemical character. The similar result was also in accordance with the findings of Devadas and Kuriakose (2002) [2], Sharma *et al.* (2009) [5] and Osman and EI-Rhman, I. A. (2010) [4]. There was significant effect of biofertilizer, manures and chemical fertilizers on shelf life (days). The soil application of 40 % RDF through chemical fertilizers + 40 % RDN through Poultry manure + 10 ml Bio NPK Consortium per tree treatment was most effective treatment for extending shelf life of guava and which was recorded significantly maximum shelf life (8.17 days). It is might be due to poultry manure contains all essential plant nutrients that play significant role in improving quality and shelf life as reported by Prabakaran and Pichal (2003). The increased fruit quality may be explained from the fact that these biofertilizers enhances the nutrient availability by enhancing the capability of plants to better solute uptake from rhizosphere and also helped in mitigating stresses in plants. The result was also in accordance with the findings of Devadas and Kuriakose (2002) [2], Osman and EI-Rhman, I. A. (2010) [4] and Devi *et al.* (2012).

Conclusion

The result obtained from research experiment concluded that, the soil application of 30 % RDF through chemical fertilizers + 30 % RDN through Poultry manure + 20 ml Bio NPK Consortium per tree treatment recorded significantly maximum total soluble solids (ºBrix), reducing sugar (%), non-reducing sugar (%), total sugar (%) and ascorbic acid (mg/100g pulp). Whereas, the soil application of 40 % RDF through chemical fertilizers + 40 % RDN through Poultry manure + 10 ml Bio NPK Consortium per tree treatment obtained significantly maximum shelf life of guava cv. Allahabad Safeda.

Reference

1. Chhonkar PK. Organic farming and its relevance in India. Organic agriculture. Ind. Soc. of Soil Sci., Jodhpur, 2008, 5-33.
2. Devadas VS, Kuriakose KP. Evaluation of different organic manures on yield and quality of pineapple var. Mauritius. In IV International Pineapple Symposium. 2002; 666:185-189.
3. Devi HL, Mitra SK, Poi SC. Effect of different organic and biofertilizer sources on guava (*Psidium guajava* L.) 'Sardar'. Acta Hort. 2002; 959:201-208.
4. Osman SM, El–Rhman IA. Effect of organic bio N-fertilization on growth, productivity of fig tree (*Ficus carica* L.). *Res.* J Agric. & Biol. Sci. 2010; 6(3):319-328.
5. Sharma A, Kher R, Wall VX, Baksm P. Effect of biofertilizers and organic manures on physico-chemical characteristics and soil nutrient composition of guava (*Psidium guajava* L.) cv. Sardar. J of Res., SKUAST-J. 2009; 8(2):150-156.
6. Shukla AK, Kaushik RA, Pandey D, Sarolia DK. In: Guava. Published by Maharana Pratap University of Agriculture and Technology, Udaipur, 2008, 7.