Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(3): 2340-2341
Received: 24-03-2019
Accepted: 25-04-2019

S Kamalakannan
Assistant Professors,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu, India

Sheik Roohi Tasleema
Research Scholar,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu, India

R Rajeswari
Assistant Professors,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu, India

R Sudhagar
Assistant Professors,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu, India

S Kumar
Assistant Professors,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu, India

Correspondence
S Kamalakannan
Assistant Professors,
Department of Horticulture,
Faculty of Agriculture,
Annamalai University,
Annamalai Nagar,
Tamil Nadu. India

Leaf nutrient content in sapota as influenced by integrated nutrient management

S Kamalakannan, Sheik Roohi Tasleema, R Rajeswari, R Sudhagar and S Kumar

Abstract
The experiment was conducted in the orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University. The study was initiated in a twenty-year-old sapota orchard of cv. Kirthabarthi under normal planting density (8 m x 8 m). The experiment was laid out in Randomized Block Design with eight treatments comprising various combinations of FYM, vermicompost, RDF and EM with three replications. The treatments are T_1 - Control, T_2 - FYM alone @ 50 kg tree^{-1}, T_3 - Vermicompost alone @ 12.5 kg tree^{-1}, T_4 - RDF alone (1000:1000:1500 g NPK tree^{-1}), T_5 - FYM+ RDF, T_6 - Vermicompost + RDF, T_7 - FYM+ RDF+ EM and T_8 - Vermicompost + RDF+ EM. The results of the present study revealed that the leaf nutrients content increased with the application of different treatments as compared to control. The treatment T_8 recorded the maximum leaf nutrient content of nitrogen (1.69%), phosphorus (0.098%) and potassium (0.99%).

Keywords: INM, sapota, leaf nutrient, nitrogen, phosphorus, potassium

Introduction
The present day emphasis is on the sustaining agriculture which recommends less of chemical fertilizers and pesticides and more of biological inputs including microbial inoculants. Integrated nutrient management is the best practice for maintenance of soil fertility and of plant nutrient supply at an optimum level for sustaining the desired productivity. Integrated supply of nutrients through organic and inorganic source is the need of the hour for sustainable productivity and to maintain better soil health. In orchards, the uptake of nutrients of trees is determined through the analysis of nutrients present in the leaves. Among the various fruit trees, sapota (*Manilkara zapota* (L.) P.Royen) is an evergreen fruit originated in tropical America. Cultivation of sapota is highly suited to humid tropical climate. Therefore, it is mainly cultivated in coastal regions of India. It is commercially grown in states like Maharashtra, Gujarat, Karnataka, Andhra Pradesh, Tamilnadu and West Bengal. The area under sapota is fast expanding in India every year. It occupies an estimated area of 1, 06,490 ha with an annual production of 13, 39, 010 metric tonnes in India. In fruit crop like sapota, the integrated use of organic and inorganic fertilizers, offer good opportunity to increase the uptake of nutrients. Hence, an attempt has been made to study the influence of integrated nutrient management on leaf nutrient content in sapota.

Materials and methods
The research work was conducted in the orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University during the year 2016-2017. Twenty year old sapota trees of cultivar 'Kirthabarthi' which were planted in a spacing of 8 m x 8 m were used for this experiment. The principle of Randomized Block Design was followed with eight treatments replicated thrice. The treatments are T_1 - Control, T_2 - FYM alone @ 50 kg tree^{-1}, T_3 - Vermicompost alone @ 12.5 kg tree^{-1}, T_4 - RDF alone (1000:1000:1500 g NPK tree^{-1}), T_5 - FYM+ RDF, T_6 - Vermicompost + RDF, T_7 - FYM+ RDF+ EM and T_8 - Vermicompost + RDF+ EM. The recommended dose of fertilizers for sapota in Tamilnadu is 1000:1000:1500 g NPK tree^{-1} was prepared and applied in two split doses in July and February as a basal dose. The activated EM solution @ 1:250 dilutions was mixed with the FYM and vermicompost separately and kept for three days. Then the FYM and vermicompost with and without EM inoculation were applied as basal to the trees according to the treatment schedule. Observations on leaf nitrogen, phosphorus and potassium content were recorded. Standard plant protection measures were done as and when necessary. Uniform cultural practices were adopted for all the trees. The data recorded during the investigation were statistically analyzed following the standard procedures using AGRISTAT software in a personal computer.

Results and discussion

The major nutrients viz., nitrogen, phosphorus and potassium play a vital role in the plant physiology and growth and these elements cannot be replaced by any other. Nitrogen is a major constituent of proteins, enzymes, chlorophyll and nucleic acid. It is involved in the cell division, cell enlargement and in respiration. Phosphorus plays a major role in the development of reproductive parts and root formation. Potassium plays a major role in activating many enzymes to induce flowering, fruit set, and in translocation of carbohydrates.

The computed data pertaining to the nutrient content of the leaves due to the effect of various organic inputs are presented in Table 1. In the present study, the leaf nutrients content increased with the application of different treatments as compared to control. Significant differences were observed between the treatments for this trait. The highest nitrogen content (1.69 per cent), phosphorus content (0.098 per cent) and potassium content (0.99 per cent) were recorded in the treatment T_8 which received the application of vermicompost @ 12.5 kg tree^{-1}+ RDF (1000:1000:1500 g NPK tree^{-1}) + EM (1:250 dilution) and was followed by the treatment T_7 which received the application of FYM @ 50 kg tree^{-1} + RDF (1000:1000:1500 g NPK tree^{-1}) + EM (1:250 dilution). The lowest content of nitrogen, phosphorus and potassium were recorded in the treatment T_1 where no fertilizers were applied.

The significant effect of NPK in combination with vermicompost, FYM and effective microorganisms was noted on the N, P and K content of sapota leaves. Accumulation of any nutrient in the leaves depends considerably on the uptake of that nutrient from the soil. This may be the reason due to that, vermicompost when added to soil, with the action of microorganisms, complex nitrogenous compounds slowly breakdown and its availability in the form of nitrate N is steady throughout crop growth (Bhudhawant, 1994) [1]. Earlier reports by Subbiah *et al*. (1982) [2] also revealed that increased uptake of N, P and K with the application of vermicompost, which could be attributed to the solubilisation effect of plant nutrients by the addition of vermicompost.

Further, vermicompost containing higher available N, P and K contents and rich population of microbes might have degraded and mobilized the occluded soil nutrients to available form. Several enzymes and hormones present in vermicompost resulted in increased availability and uptake of nutrients by the plants. This could also be attributed to the more rapid decomposition of organic matter and greater nutrient release due to the application of EM. Further, effective microorganisms might have created certain microbial environment in the rhizosphere zone for better uptake of nutrients**.** Weinbaum *et al*. (1978) [3] reported that nitrate uptake in prunes trees was dependent on the presence of leaves and discussed this phenomenon in the context of leaf carbohydrate supply. It may be stated that level of soil nutrients record a positive relationship with the leaf nutrient status. Shashibala *et al.* (2011) [4] opined that uptake of nutrients, in general, follow a somewhat similar pattern and is usually affected by the quantity applied, quantity liquefied, the root exudates and bacterial activity which facilitates movement of such nutrients. Further use of biofertilizers is always beneficial in integrated nutrient management for sustainable productivity and to a considerable extent in reducing the input cost.

It may be concluded that application of vermicompost @ 12.5 kg tree^{-1}+ RDF (1000:1000:1500 g NPK tree^{-1}) + EM (1:250 dilution) was found to be beneficial in increasing nutrient uptake in sapota which inturn will increase the yield in sapota.

Table 1: Effect integrated nutrient management on leaf nutrient in sapota (*Manilkara zapota* (L.) P.Royen) cv. Kirthabarthi.

Treatments	Leaf nutrient (%)		
	Nitrogen	Phosphorus	potassium
T_1- Control	0.93	0.065	0.69
T_2- FYM alone @ 50 kg tree^{-1}	1.26	0.074	0.74
T_3- Vermicompost alone @ 12.5 kg tree^{-1}	1.28	0.075	0.75
T_4- RDF alone (1000:1000:1500 g NPK tree^{-1})	1.35	0.080	0.80
T_5-FYM+RDF	1.48	0.086	0.87
T_6- Vermicompost+ RDF	1.60	0.091	0.93
T_7-FYM+RDF+EM	1.63	0.092	0.94
T_8-Vermicompost +RDF+EM	1.69	0.098	0.99
SEd	0.092	0.002	0.02
CD (p=0.05)	0.184	0.004	0.04

References

1. Bhudhawant HB. Nitrogen management through organic and inorganic sources in chilli cv. Parbhani Tejas. M. Sc (Ag.). Thesis, Maharashtra Agricultural University, Parbhani, 1994.
2. Subbiah K, Sundarajan, Muthusami S. Effect of varying levels of organic and inorganic fertilizers on the yield and nutrient uptake in brinjal. South Indian Hort. 1982; 31(4):287-290.
3. Weinbaum SA, Merwin ML, Muraoka T. Seasonal variation in nitrate uptake efficiency and distribution of absorbed nitrogen in non-bearing prune trees. J Amer. Soc. Hort. Sci. 1978; 103:516-519.
4. Shashibala VR. Chaudhary, Shukla HS. Effect of organic manure and biofertilizers with graded dose of NPK on soil and leaf nutrient status of anola (*Emblica officinalis Gaertn.*) cv. Banarasi. Karnataka J Agric. Sci. 2011; 24(5):709-711.