The Pharma Innovation Journal 2022; 11(8): 310-313

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(8): 310-313

www.thepharmajournal.com
Received: 03-06-2022
Accepted: 06-07-2022

R Aravinda Sai
MSc. Student, Department of Vegetable Science, Sri Konda Laxman Telangana State Horticultural University, College of Horticulture, Rajendra Nagar, Hyderabad, Telangana, India

Dr. J Cheena
Senior Scientist and Head, Department of Horticulture. Sri Konda Laxman Telangana State Horticultural University, Medicinal and Aromatic Plant Research Station, Rajendra Nagar, Hyderabad, Telangana, India

Dr. K Venkatalaxmi
Scientist and Head, Department of Horticulture, Sri Konda Laxman Telangana State Horticultural University, Grape Research Station, Rajendra Nagar, Hyderabad, Telangana, India

Dr. CH Raja Goud
Vice Principal, Department of Entomology, Sri Konda Laxman Telangana State Horticultural University, Horticulture Polytechnic College, Adilabad, Telangana, India

Dr. B Naveen Kumar
Scientist, Department of Soil Science, Sri Konda Laxman Telangana State Horticultural University, Grape Research Station, Rajendra Nagar, Hyderabad, Telangana, India

Corresponding Author:
R Aravinda Sai
MSc. Student, Department of Vegetable Science, Sri Konda Laxman Telangana State Horticultural University, College of Horticulture, Rajendra Nagar, Hyderabad, Telangana, India

To study the effect of integrated nutrient management on quality of muskmelon (*Cucumis melo* L.)

R Aravinda Sai, J Cheena, K Venkatalaxmi, CH Raja Goud and B Naveen Kumar

Abstract
A field investigation on the “Study of integrated nutrient management on growth, yield and quality of muskmelon (*Cucumis melo* L.) Was carried out in randomized block design with seven treatments and three replications during *summer* 2021 at PG research block, College of Horticulture, Rajendranagar, Hyderabad (Southern Telangana Zone). The treatments comprising of integrated nutrient management *viz.*, T_1: RDF (200:100:100) kg/ha, T_2: 75% RDF + 25% RDN through FYM @ 5 t/ha + AMC @ 12.5 kg/ha, T_3: 75% RDF + 25% RDN through vermicompost @ 2.5 t/ha + AMC @ 12.5 kg/ha, T_4: 75% RDF + 25% RDN through neemcake @ 2.5 t/ha + AMC @ 12.5 kg/ha, T_5: 50% RDF + 50% RDN through FYM @ 10 t/ha + AMC @ 12.5 kg/ha, T_6: 50% RDF + 50% RDN through vermicompost @ 5 t/ha + AMC @ 12.5 kg/ha, T_7: 50% RDF + 50% RDN through neemcake @ 5 t/ha + AMC @ 12.5 kg/ha of treatment were evaluated in randomized block design with concept with three replications.

Keywords: FYM, vermicompost, AMC, RDF, RDN, Neem cake

Introduction
Muskmelon (*Cucumis melo* L.) is a popular and an important vegetable crop, grown as “Dessert Crop” throughout the warmer region of the world which is now grown in temperate regions also. In India, it is popular in Northern states such as Uttar Pradesh, Punjab, Rajasthan and Madhya Pradesh. Muskmelon (2n=24) belongs to the family Cucurbitaceae, commonly known as cucurbits (Schaefer *et al*., 2009) [8]. Muskmelon is said to be native of Tropical Africa with secondary centres of origin Central Asia comprising some parts of Southern Russia, Iran, Afghanistan and North- West India (Whitaker and Davis, 1962) [9]. Muskmelon is a good source of vitamins and minerals. Apart from this for every 100 g edible portion, melon provides 26-41 calory energy, 0.6-1.0 g protein, 5-10 mg calcium, 0.2-0.4 mg iron, 8.17 mg magnesium and 7.39 mg Phosphorus (Howard *et al*., 1962) [3].
Organic manures and bio fertilizers are the important components of integrated nutrient management. There is a need to seek alternative nutrient sources which could be cheap and eco-friendly so that farmers may be able to reduce the investment on chemical fertilizers along with maintaining good soil environment conditions leading to ecological sustainable farming.

Material and Methods
Organic manures *viz*., well decomposed farmyard manure, vermicompost and neem cake were incorporated in to the respective experimental plots uniformly, before sowing as basal application. Similarly N, P and K @ 200:100:100 kg ha^{-1} were applied in the form of urea, single super phosphate and muriate of potash respectively. Urea was applied in two splits, the first dose as basal application and another dose at 30 days after sowing. The entire dose of single super phosphate and muriate of potash were applied at the time of sowing as basal dose. The bio fertilizer AMC (Arka Microbial Consortium) was applied as soil application. The crop was harvested at 75 days after sowing, when the fruits are still tender and it is harvested after ripening at half-slip and full slip stage. One day before harvesting, a light irrigation was given. Harvesting done when netting was visible and colour changes from green to brown. Before taking the observations, fruits were cleaned with fresh water to remove the adhering soil particles.

Qualitative characters

Total soluble solids (^{0} Brix)

It was determined by using ERMA Hand Refractometer. 2-3 drops of juice was placed on the prism of refractometer and reading was observed on scale and averages were expressed in ºBrix.

Total sugars (%)

Total sugars were also determined by Lane and Eynon method (Ranganna, 1986) [7]. A quantity of 50 ml lead free filtrate was taken in a 100 ml volumetric flask and 5 ml of concentrated HCl was added to it, mixed well and kept for 24 hours at room temperature. Acid was then neutralized with NaOH using a drop of phenolphthalein as an indicator till the pink colour persisted for at least few seconds. Then volume was made up to 100ml. Total sugars were then estimated by taking this solution into a burette and titrating it against standard Fehling's solution mixture of A and B (1:1) using methylene blue as an indicator to a brick red colour as an end point. The results were calculated and expressed as percent total sugars with the following formula. (10 ml Fehling's solution = 0.052 glucose).

$$\text{Total sugars (\%)} = \frac{\text{Factor x Dilution 1 x Dilution 2}}{\text{Titre x Wt. of sample x Aliquot taken}} \times 100$$

Reducing sugars (%)

The per cent reducing sugars in fully matured muskmelon fruit juice were determined by Lane and Eynon method (AOAC, 1965). 25 grams of the sample of fruit juice was taken into 250 mlvolumetric flask and add 100 ml of distilled water and 2 ml of lead acetate solution (45%) was added to the flask to precipitate colloidal matter and wait for 30 mins. Later 2 ml of potassium oxalate (22%) was added to the solution to precipitate the lead acetate and the volume was made up to 250 ml by using distilled water. The contents were then filtered through Whatman No.1 filter paper. A little of filtrate was tested for its freedom of lead acetate by adding a drop of potassium oxalate. The filtrate was taken into a burette and titrated against 10 ml of standard Fehling's solution mixture of A and B (1:1) by using methylene blue as an indicator till the formation of brick red precipitate. The titration was carried out by keeping the Fehling's solution mixture on boiling water bath. The per cent reducing sugars in muskmelon fruit juice was calculated by using the following formula.

$$\text{Reducing sugars (\%)} = \frac{\text{Factor} \times \text{volume made up} \times 100}{\text{Titre value} \times \text{weight of sample taken (g)} \times 1000}$$

Non-reducing sugars (%)

Non reducing sugars were estimated by subtracting the reducing sugars from total sugar content of the sample.

Results

TSS content as influenced by integrated nutrient management was given in the Table 1. The data revealed that there was a significant difference among treatments by application of INM in muskmelon at harvest on TSS content. Maximum TSS content(4.12ºbrix) was recorded in treatment T_6 (50% RDF + 50% RDN through vermicompost @ 5 t/ha + AMC @ 12.5 kg/ha)followed by the treatments T_5(50% RDF + 50% RDN through FYM @ 10t/ha + AMC @ 12.5 kg/ha), T_7(50% RDF + 50% RDN through neemcake @ 5 t/ha + AMC @ 12.5 kg/ha), T_3(75% RDF + 25% RDN through vermicompost @ 2.5 t/ha + AMC @ 12.5 kg/ha),T_2(75% RDF + 25% RDN through FYM @ 5 t/ha + AMC @ 12.5 kg/ha), T_4 (75% RDF + 25% RDN through neemcake @ 2.5 t/ha + AMC @ 12.5 kg/ha). While the minimum content of (3.11ºbrix) TSS was recorded in T_1 (100% RDF).

The data with respect to the study of INM were presented in Table 2. Significant difference was observed by the application of integrated nutrient management in muskmelon at harvest on total sugars. The highest total sugar content (10.16%) was observed in T_6 (50% RDF + 50% RDN through vermicompost @ 5 t/ha + AMC @ 12.5 kg/ha) followed by the treatments T_5(50% RDF + 50% RDN through FYM @ 10t/ha + AMC @ 12.5 kg/ha), T_7(50% RDF + 50% RDN through neemcake @ 5 t/ha + AMC @ 12.5 kg/ha), T_3(75% RDF + 25% RDN through vermicompost @ 2.5 t/ha + AMC @ 12.5 kg/ha), T_2(75% RDF + 25% RDN through FYM @ 5 t/ha + AMC @ 12.5 kg/ha)and T_4(75% RDF + 25% RDN through neemcake @ 2.5 t/ha + AMC @ 12.5 kg/ha)while minimum total sugar content (6.50%) was observed in T_1(100% RDF).

The data with respect to the study of integrated nutrient management on reducing sugar are presented in Table 3. Significant difference was observed by the application of effect of integrated nutrient management in muskmelon at harvest regarding of reducing sugars. Highest reducing sugar content (7.24%) was recorded in T_6 (50% RDF + 50% RDN through vermicompost @ 5 t/ha + AMC @ 12.5 kg/ha) followed by the treatments T_5 (50% RDF + 50% RDN through FYM @ 10t/ha + AMC @ 12.5 kg/ha), T_7(50% RDF + 50% RDN through neemcake @ 5 t/ha + AMC @ 12.5 kg/ha), T_3(75% RDF + 25% RDN through vermicompost @ 2.5 t/ha + AMC @ 12.5 kg/ha), T_2(75% RDF + 25% RDN through FYM @ 5 t/ha + AMC @ 12.5 kg/ha)and T_4(75% RDF + 25% RDN through neemcake @ 2.5 t/ha + AMC @ 12.5 kg/ha). While the minimum reducing sugar content (4.26%) was noticed in T_1 (100% RDF).

The data with respect to the study of integrated nutrient management on reducing sugar are presented in Table 4. Significant difference was observed by the application of effect of integrated nutrient management in muskmelon at harvest regarding of non-reducing sugars. Highest non-reducing sugar content (2.92%) was recorded in T_6 (50% RDF + 50% RDN through vermicompost @ 5 t/ha + AMC @ 12.5 kg/ha) which was on par with the treatment T_5(50% RDF + 50% RDN through FYM @ 10t/ha + AMC @ 12.5 kg/ha). The treatments T_7(50% RDF + 50% RDN through neemcake @ 5 t/ha + AMC @ 12.5 kg/ha), T_3(75% RDF + 25% RDN through vermicompost @ 2.5 t/ha + AMC @ 12.5 kg/ha), T_2(75% RDF + 25% RDN through FYM @ 5 t/ha + AMC @ 12.5 kg/ha)and T_4 (75% RDF + 25% RDN through neemcake @ 2.5 t/ha + AMC @ 12.5 kg/ha)which have intermediate effects, while the minimum non-reducing sugar content (2.24%) was noticed in T_1(100% RDF).

Discussion

TSS (º brix) content

The maximum TSS might be due to the higher accumulation of carbohydrates, proteins and captured energy by the abundant supply of nitrogen, phosphorus and potassium through mineral nutrient sources and organic sources of nutrients.

The similar results were also reported by Jagraj *et al*. (2020) [4] in cucumber where TSS significantly affected by various INM doses of organic manure and fertilizers during the crop growth period and Daudhat *et al*. (2020) [2] in bitter gourd their findings clearly indicated that INM played a significant role on enhancing the quality.

Total sugars (%)

The improvement in the quality attributes may be due to the better availability and uptake of nutrients which might have led to the balanced C/N ratio and increased activity of plant metabolism. The superior effect of vermicompost may be due to higher level of various plant growth regulating minerals and humic acids, produced by the increased activity of microbes.

These results corroborated with the findings of Meena *et al*. (2017) [5] in broccoli where they obtained highest total sugar content with the application of organic manures along with inorganic fertilizers and Pranali *et al*. (2018) [6] in ridge gourd reported similar findings of increased total sugar content with combined application of organic and inorganic fertilizers.

Reducing sugars (%)

The improvement in the quality attributes may be due to the better availability and uptake of nutrients which might have lead to the balanced C/N ratio and increased activity of plant metabolism. The superior effect of vermicompost may be due to higher level of various plant growth regulating minerals and humic acids, produced by the increased activity of microbes

These results are in agreement with the findings of Meena *et al*. (2017) [5] in broccoli where they obtained highest reducing sugar content with the application of organic manures along with inorganic fertilizers and Pranali *et al*. (2018) [6] in ridge gourd reported similar findings of increased reducing sugar content with combined application of organic and inorganic fertilizers.

Non-reducing sugars (%)

The improvement in the quality attributes may be due to the better availability and uptake of nutrients which might have lead to the balanced C/N ratio and increased activity of plant metabolism. The superior effect of vermicompost may be due to higher level of various plant growth regulating minerals and humic acids, produced by the increased activity of microbes.

These results are in close conformity with the findings of Meena *et al*. (2017) [5] in broccoli where they obtained highest non-reducing sugar content with the application of organic manures along with inorganic fertilizers and Pranali *et al*. (2018) [6] in ridge gourd reported similar findings of increased non-reducing sugar content with combined application of organic and inorganic fertilizers.

Table 1: TSS (ºBrix) content

Treatment	Details	TSS (ºBrix)
T_1	RDF (200:100:100) NPK/ha	3.11^f
T_2	75% RDF + 25% RDN through FYM (5t/ha) + AMC (12.5kg/ha)	3.54^d
T_3	75% RDF + 25% RDN through vermicompost (2.5t/ha) + AMC (12.5 kg/ha)	3.71^c
T_4	75% RDF + 25% RDN through neemcake (2.5t/ha) + AMC (12.5kg/ha)	3.36^e
T_5	50% RDF + 50% RDN through FYM (10t/ha) + AMC (12.5kg/ha)	3.96^b
T_6	50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5kg/ha)	4.12^a
T_7	50% RDF + 50% RDN through neemcake (5t/ha) + AMC (12.5kg/ha)	3.80^c
	CD@5%	0.12
	S.Em ±	0.04
	CV%	8.83

Table 2: Total sugars (%) content

Treatment	Details	Total sugars (%)
T_1	RDF (200:100:100) NPK/ha	6.50^g
T_2	75% RDF + 25% RDN through FYM (5t/ha) + AMC (12.5kg/ha)	7.68^e
T_3	75% RDF + 25% RDN through vermicompost (2.5t/ha) + AMC (12.5 kg/ha)	8.44^d
T_4	75% RDF + 25% RDN through neemcake (2.5t/ha) + AMC (12.5kg/ha)	7.04^f
T_5	50% RDF + 50% RDN through FYM (10t/ha) + AMC (12.5kg/ha)	9.72^b
T_6	50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5kg/ha)	10.16^a
T_7	50% RDF + 50% RDN through neemcake (5t/ha) + AMC (12.5kg/ha)	9.32^c
	CD@5%	0.25
	S Em ±	0.08
	CV%	15.35

Table 3: Reducing sugars (%) content

Treatment	Details	Reducing sugars (%)
T_1	RDF (200:100:100) NPK/ha	4.26^g
T_2	75% RDF + 25% RDN through FYM (5t/ha) + AMC (12.5kg/ha)	5.17^e
T_3	75% RDF + 25% RDN through vermicompost (2.5t/ha) + AMC (12.5 kg/ha)	5.80^d
T_4	75% RDF + 25% RDN through neemcake (2.5t/ha) + AMC (12.5kg/ha)	4.59^f
T_5	50% RDF + 50% RDN through FYM (10t/ha) + AMC (12.5kg/ha)	6.86^b
T_6	50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5kg/ha)	7.24^a
T_7	50% RDF + 50% RDN through neemcake (5t/ha) + AMC (12.5kg/ha)	6.62^c
	CD@5%	0.11

	S. Em ±	0.04
	CV%	18.58

Table 4: Non-reducing sugars (%) content

Treatment	Details	Non-reducing sugars (%)
T_1	RDF (200:100:100) NPK/ha	2.24[d]
T_2	75% RDF + 25% RDN through FYM (5t/ha) + AMC (12.5kg/ha)	2.51[bc]
T_3	75% RDF + 25% RDN through vermicompost (2.5t/ha) + AMC (12.5 kg/ha)	2.64[b]
T_4	75% RDF + 25% RDN through neemcake (2.5t/ha) + AMC (12.5kg/ha)	2.45[c]
T_5	50% RDF + 50% RDN through FYM (10t/ha) + AMC (12.5kg/ha)	2.86[a]
T_6	50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5kg/ha)	2.92[a]
T_7	50% RDF + 50% RDN through neemcake (5t/ha) + AMC (12.5kg/ha)	2.70[bc]
	CD@5%	0.17
	S.Em ±	0.06
	CV%	8.42

Conclusion

The highest total soluble solids, total sugars, reducing sugars, non-reducing sugars were obtained in T_6: 50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5 Kg/ha). It could be concluded from the present investigation that the Integrated Nutrient Management significantly influenced the quality in muskmelon. Among the different levels of integrated nutrient management optimum quality was obtained from 50% RDF + 50% RDN through vermicompost (5t/ha) + AMC (12.5 Kg/ha)

References

1. AOAC 1965 - Official methods of analysis. Association of official analytical chemist. Washington D.C. USA, 2001.
2. Daudhat MA, Patel KD. Evaluation of integrated nutrient management on the performance of quality and yield attributes of hybrid bitter gourd VNR 22 (*Momordica charantia* L.). Journal of Pharmacognosy and Phytochemistry. 2020;9(2):1643-1645.
3. Howard FD, Macgillivray JH, Yamaguchi M. Bull.no.788. California Agric. Exp.sm. Univ. of California, Berkeley, 1962. Google scholar.
4. Jagraj S, Manoj KS, Mukesh K, Vipin K, Pratap KS, Abdul QO. Effect of Integrated nutrient management on growth, flowering and yield attributes of cucumber (*Cucumis sativus* L.). International journal of chemical studies. 2018;6(4):567-572.
5. Meena ML, Jal Singh M, Nirmal Kumar M, Rakesh Kumar. Impact of integrated nutrient management on yield and quality of Broccoli (*Brassica oleracea* L. var. *italica*). Journal of Plant Development Sciences. 2017;9(4):371-374.
6. Pranali R, Salvi VG, Sayali J. Growth, yield and quality of ridge gourd as influenced by integrated nutrient management in coastal region of Maharashtra. International Journal of Chemical Studies. 2018;6(5):2357-2360.
7. Ranganna. Manual of analysis of fruit and vegetable products. Tata McGraw Hill Publishers, New Delhi, 1986, 89-90pp.
8. Schaefer H, Heibl C, Renner SS. Gourds afloat: A dated phylogeny reveals an Asian origin of the gourd family (Cucurbitaceae) and numerous overseas dispersal events. Proceedings of Royal Society of London Biological Research. 2009;276:843-851.
9. Whitaker TW, Davis GN. Cucurbits. New York, NY: Inter science, 1962.