The Pharma Innovation Journal 2022; 11(12): 6377-6379

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 6377-6379

www.thepharmajournal.com
Received: 28-09-2022
Accepted: 30-10-2022

Shakunthala L
M.sc(Ag), Department of Agronomy, PJTSAU Rajendranagar, Hyderabad, Telangana, India

Madhavi Lata A
Professor, Department of Agronomy, College of Agriculture, Rajendranagar, Hyderabad, Telangana, India

Veeranna G
Senior Scientist, Department of Agronomy, Cotton Section, RARS, Warangal, Telangana, India

Ramulu Ch.
Scientist, Department of Soil Science and Agricultural Chemistry, RARS, Warangal, Telangana, India

Corresponding Author:
Shakunthala L
M.sc(Ag), Department of Agronomy, PJTSAU Rajendranagar, Hyderabad, Telangana, India

Effect of integrated nutrient management on quality of sweet corn hybrid

Shakunthala L, Madhavi Lata A, Veeranna G and Ramulu Ch.

Abstract
Field experiment entitled "Effect of integrated nutrient management on quality of sweet corn hybrid" was conducted during *rabi*, 2015 at Regional Agricultural Research Station, Warangal. The experiment was laid out in a randomized block design with eight treatments replicated thrice *viz*., 100% recommended NPK (180:60:50 kg N,P_2O_5, K_2Oha^{-1}) (T_1), 75% RDF+FYM @ 5 t ha^{-1} (T_2), 50% RDF+FYM @ 5 t ha^{-1} (T_3), 75% RDF+ Vermi compost @ 2. 5 t ha^{-1} (T_4), 50% NPK + vermicompost @ 2.5 t ha^{-1} (T_5), 75% RDF + poultry manure @ 2. 5 t ha^{-1} (T_6), 50% RDF + poultry manure @ 2.5 t ha^{-1} (T_7) and control (T_8) (no applied fertilizers). Results showed that the protein content did not differ significantly among the treatments whereas the sugar content proved to be significantly higher in treatment receiving 75% of the recommended dose through fertilizers along with poultry manure @ 2.5 t ha^{-1} (T6) which was on par with application of 100% RDF (T_1).

Keywords: Indian mustard, path coefficient analysis

Introduction
In India, about 35% of maize produced is used for human consumption, 25% each as poultry and cattle feed and 15% in food and remaining used in industries for production of corn flakes, popcorn, starch, dextrose, corn syrup and corn oil *etc*. (Channabasamma *et al*., 2013) [1].
Recently, sweet corn is gaining popularity among nutritive and health conscious urban masses in India with an immense potential in domestic and international market. Sweet corn is an excellent source of sugars, dietary fibre, vitamin-C, beta-carotene, niacin, in addition to calcium and potassium. It is highly prized by corn fanciers due to succulent and tender kernels with sweet flavour. Sweet corn is marketed fresh, roasted or boiled and canned for future use. Due to its extra sweetness (14-20% sugar), short duration and impressive returns, sweet corn is gaining attractiveness and ample awareness has been created among the farming community. Sweet corn contains 13 to 15% sugar in immature grains. Sweet corn consumed at the soft dough stage with succulent grains, emerged as an alternative dish of urbanities *viz*., vegetable, roasted ears, soups, corn syrup, sweeteners *etc*. It also found a special niche in the preparation of native beer. Sweet corn can be harvested within 80 to 90 days after sowing there by the crop duration could be reduced earlier by 35 to 45 days compared to normal grain corn.
Since there is a limited scope to increase the area under cultivation, the only alternative is through enhancement of productivity by various management factors.
The use of organic fertilizers such as animal manures and composted materials has been proposed as one of the main pillars of sustainable agriculture as they provide large amounts of macro and micro nutrients for crop growth and eco-friendly besides being renewable alternatives to mineral fertilizers. Inorganic fertilizer on the other hand have high concentration of nutrients and readily available to crops but its excessive use is harmfull to the crop as well as to the environment. Although increased levels of production can be achieved by increased use of inorganic fertilizers alone but it may lead to deterioration in soil quality besides pollution problems. It is an established fact that the higher grain yield depends on different nutrient management practices. Integration of different organic and inorganic manures effects the yields. However, no systematic research has been conducted to study the effect of integrated nutrient management on sweet corn quality.

Material and Methods
Field experiment entitiled "Integrated nutrient management in sweet corn hybrid" was conducted during *rabi*, 2015 at Regional Agricultural Research Station, Warangal. The experiment was laid out in a randomized block design with eight treatments replicated

thrice *viz*., 100% recommended NPK (180:60:50 kg N,P_2O_5, K_2Oha^{-1}) (T_1), 75% RDF+FYM @ 5 t ha^{-1} (T_2), 50% RDF+FYM @ 5 t ha^{-1} (T_3), 75% RDF+ Vermi compost @ 2. 5 t ha^{-1} (T_4), 50% NPK + vermicompost @ 2.5 t ha^{-1} (T_5), 75% RDF + poultry manure @ 2. 5 t ha^{-1} (T_6), 50% RDF + poultry manure @ 2.5 t ha^{-1} (T_7) and control (T_8) (no applied fertilizers).

The experimental soil and manures used in the study were analyzed before the initiation of experiment. Organic manures viz., Poultry manure, FYM and vermicompost were applied to the respective plots ten days before sowing. Recommended dose of fertilizer nitrogen @ 180 kg ha^{-1} was applied in three equal split doses as per the treatments. at basal, 45 and 60 DAS. Entire quantity of P_2O_5 (60 kg ha^{-1}) and K_2O (50 kg ha^{-1}) was applied as basal.

The experimental soil was clay loam in texture, slightly alkaline p^H (8.05) in reaction, non saline (EC 0.54), lower in organic carbon content (0.46) and available nitrogen (268 kg ha^{-1}) and higher in available phosphorus (63.42 kg ha^{-1}) and potassium (868 kg ha^{-1}).

The important parameters of kernel were analysed in the laboratory as per the standard procedures.

Results

Protein content (%)

Application of organic and inorganic source of nutrients combination on quality parameters indicated that protein content of sweet corn did not differ significantly among various treatments (Table 1 and Fig 1). The numerically highest protein content of 12.1 per cent was noticed with the application of 100% RDF (T_1) and 12.2 per cent was noticed with the application of 75% RDF + poultry manure @ 2.5 t ha^{-1} (T_6) followed by 75% RDF + vermi compost @ 2.5 t ha^{-1} (T_4), which was significantly higher over all those treatments. The lowest protein content of 10.4 per cent was recorded in control.

This might be due to increased availability of nitrogen and its uptake and storage in grain. Nitrogen being the essential constituent which makes upto 16 per cent by weight of protein is found to influence the protein content, if it is available in abundance. Thus, better physiological and bio chemical activity of sweet corn under adequate and balanced nutrient supply might have enhanced the protein content of kernel as was also confirmed by Kar *et al*. (2006) [2], Khadtare *et al*. (2006) [3], Sunitha and Reddy (2012) [4], Keerthi *et al*. (2013) [5].

Sugar content (%)

Application of organic and inorganic source of nutrient combination on quality parameters (Table 1 and Fig 1) indicated that sugar content of sweet corn differed significantly among various treatments. The numerically highest sugar content of 14% was noticed with the application of 75% RDF + poultry manure @ 2.5 t ha^{-1} (T_6) and it was on par with 100% RDF (T_1) followed by 75% RDF + vermi compost @ 2.5 t ha^{-1} (T_4) and 75% RDF + FYM @ 5 t ha^{-1} (T_2), 50% RDF + poultry manure @ 2.5 t ha^{-1} (T_7). These are on par with each other and significantly superior to other treatments. The lowest sugar content of 9.9% was recorded in control.

The rise in the total soluble sugar content of sweet corn might be due to starch protein hydrolysis to soluble sugar and carbon skeleton has been used for amino acid synthesis and subsequently protein biosynthesis and increase in photosynthesis rate and chlorophyll content which enhanced total soluble sugar of sweet corn. These are in agreement with the findings of Khadtare *et al*. (2006) [3], Masako *et al*. (2010) [6], Singh *et al*. (2010) [7].

Table 1: Protein and sugar content (%) of sweet corn hybrid as influenced by integrated nutrient management practice

Treatment	Protein content (%)	Sugar Content %
T_1 -100% RDF (180:60:50 N: P_2O_5: K_2O Kg ha^{-1})	12.1	13.8
T_2 -75% RDF + FYM @ 5 t ha^{-1}	11.5	12.3
T_3 -50% RDF + FYM @ 5 t ha^{-1}	10.9	11.0
T_4 - 75% RDF + Vermicompost @ 2.5 t ha^{-1}	11.8	12.9
T_5 - 50% RDF + Vermicompost @ 2.5 t ha^{-1}	10.9	11.2
T_6 - 75% RDF +Poultry manure @ 2.5t ha^{-1}	12.2	14.0
T_7 -50% RDF + Poultry manure @ 2.5 t ha^{-1}	11.2	12.2
T_8 – Control (No fertilizer Applied)	10.4	9.9
S.Em ±	0.7	0.2
CD (p=0.05)	NS	0.7

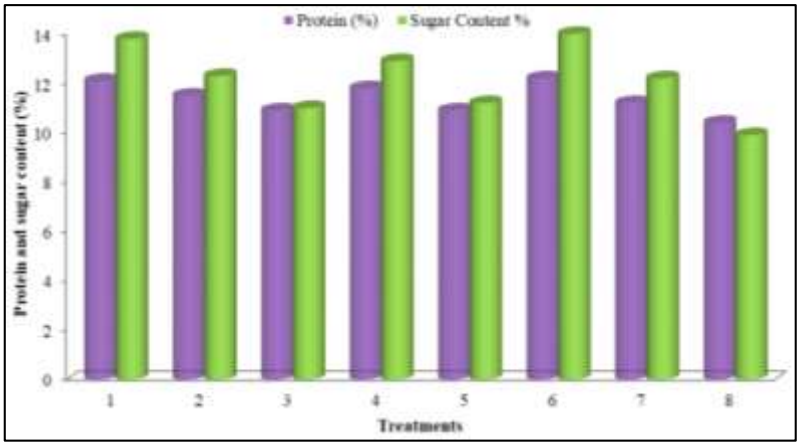

Fig 1: Protein and sugar content (%) of sweet corn hybrid as influenced by integrated nutrient management practices

Discussion

Application of organic and inorganic source of nutrients combination on quality parameters indicated that protein content of sweet corn did not differ significantly among various treatments whereas sugar content has a significant difference among the treatments. The numerically highest sugar content of 14 per cent was noticed with the application of 75% RDF + poultry manure @ 2.5 t ha^{-1} and it was on par with the application of entire dose of recommended NPK through fertilizers (T_1) followed by 75% of the recommended dose through fertilizers along with vermicompost @ 2.5 t ha^{-1} (T_4) and 75% recommended dose through fertilizers along with FYM @ 5 t ha^{-1} (T_2), 50% RDF + poultry manure @ 2.5 t ha^{-1} (T_7). These are on par with each other and significantly superior to other treatments.

References

1. Channabasamma A, Habsur NS, Bangaremma SW, Akshaya MC. Effect of nitrogen and sulphur levels and ratios on growth and yield of maize. Molecular Plant Breeding. 2013;4(37):292-296.
2. Kar PP, Barik KC, Mahapatra PK, Garnayak LM, Rath BS, Bastia DK, *et al*. Effect of planting geometry and nitrogen on yield, economics and nitrogen uptake of sweet corn (*Zea mays*). Indian Journal of Agronomy. 2006;51(1):43-45.
3. Khadtare SV, Patel MV, Mokashi DD, Jadhav JD. Influence of vermicompost on quality parameters and soil fertility status of sweet corn. Journal of Soils and Crops. 2006;16:384-389.
4. Sunitha N, Reddy M. Effect of graded nutrient levels and timing nitrogen application on yield and quality of sweet corn (*Zea mays* L.). Madras Agricultural Journal. 2012;99(4-6):240-243.
5. Keerthi S, Upendra Rao A, Ramana AV, Tejeswara Rao K. Effect of nutrient management practices on cob yield, protein content, NPK uptake by sweet corn and post harvest N, P_2O_5 and K_2O. International Journal of Advanced Biological Research. 2013;3(4):553-555.
6. Masako T, Okazaki K, Norikuni O, Karasawa T, Komada M. Nitrogen uptake rate with compost application and its effect on the sugar content of sweet corn (*Zea mays* L.) 19th World Congress of Soil Science, 1 -6 August, Brisbane, Australia; c2010.
7. Singh MK, Singh RN, Singh SP, Yadav MK, Singh VK. Integrated nutrient management for higher yield, quality and profitability of baby corn (*Zea mays* L.). Indian Journal of Agronomy. 2010;55(2):100-104.