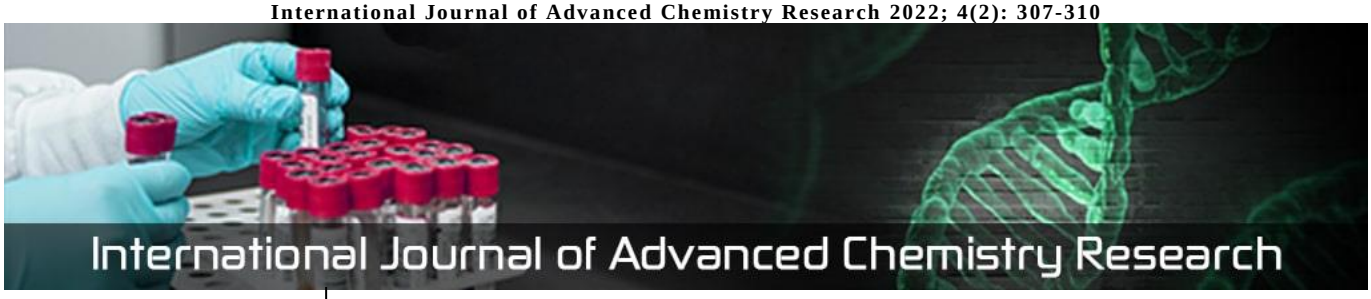

ISSN Print: 2664-6781
ISSN Online: 2664-679X
Impact Factor: RJIF 5.32
IJACR 2022; 4(2): 307-310
www.chemistryjournals.net
Received: 06-07-2022
Accepted: 03-09-2022

Pallavi Tiwari
Senior Scientist, Department of Agronomy College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarhi, India

Dr. Sunil Kumar
Senior Scientist, Department of Agronomy College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarhi, India

Corresponding Author:
Pallavi Tiwari
Senior Scientist, Department of Agronomy College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarhi, India

Effect of different organic nutrient management practices on yield and yield attributes of sweet corn (*Zea mays* L. var. *Saccharata)*

Pallavi Tiwari and Dr. Sunil Kumar

Abstract
The present experiment entitled "Effect of different organic nutrient management practices on yield and yield attributes of sweet corn (*Zea mays* L. var. *Saccharata)*" was carried out at Indira Gandhi Krishi Vishwavidyalaya, Instructional cum Research Farm, Raipur (C.G.) during 2021 *Rabi* season. The main motto was to explore out the effect of different organic treatments of nutrient application on yield and yield attributes of sweet corn crop. Variety 'Sugar-75' of sweet corn was taken as the test crop for the experiment. The test crop was sown on 20th December 2021 and the research experiment comprising with 14 treatments of different organic nutrient management combinations with 3 replications in RBD design. The spacing assigned for the crop was 60 x 20 cm. The recommended nutrient dose was 100:60:40 kg ha^{-1} which was incorporated into soil according to various treatments through organic and inorganic sources.

Treatment consists of T_1: 150% RDN through FYM, T_2: 100% RDN through FYM, T_3: 75% RDN through FYM, T_4: 50% RDN through FYM, T_5: Foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS, T_6: *Beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_7: 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS, T_8: 75% RDN through FYM + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_9: 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_{10}: 50% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS, T_{11}: 50% RDN through FYM + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_{12}: 50% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_{13}: 100% RDN through inorganic, T_{14}: Control.

The results of experiment on response of various organic nutrient management practices showed that number of grains row^{-1}, number of rows cob^{-1}, number of grains cob^{-1}, green cob yield and fodder yield with the incorporation of 75% RDN through FYM + foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9) showed significantly maximum results among organic nutrient treatments although the treatment 100% RDN through inorganic (T_{13}) significantly showed highest values as compared to all other treatments.

Keywords: Organic nutrient management, yield and yield attributes, sweet corn

Introduction
Maize (*Zea mays* L. var. *Saccharata)* belongs to family Poaceae and used both as food and fodder crop. In India after wheat and rice, maize is grown as the third most important cereal grain crop. Sweet corn is the result of a naturally occurring recessive mutation in the genes which control conversion of sugar to starch inside the ENO of the corn kernel. Unlike field corn varieties, which are harvested when the kernels are dry and mature (dent stage), sweet corn is picked when immature (milk stage) and prepared and eaten as a vegetable, rather than as grain. Since the process of maturation involves converting sugar to starch, sweet corn stores poorly and must be eaten fresh, canned, or frozen, before the kernels become tough and starchy. It is a short duration crop having wider adaptability under varied agro-climatic conditions and is considered as the "Queen of Cereals".

Sweet corn (*Zea mays* L. var. *Saccharata)* is a maize variety popularly referred to as Indian maize, sugar maize and pole maize with a high sugar content. Sweet corn is a hybridized variety of maize (*Zea mays* L.) specially bred to increase the sugar content.

The protein content of sweet corn ranges from 2.86 to 3.70 per cent. Cooking sweet corn increases levels of ferulic acid, which has anti-cancer properties.

The soil health deteriorates due to the excess use of inorganic fertilizers in crop production which imbalances the normal soil physical, chemical and biological properties thereby reducing the quality of food. The adverse effects of these chemicals result in poor soil health, micro-flora, quality of water, food and fodder. The quality of produce is deteriorated by the entry of harmful chemicals to the plants which also get transferred into the next food chain level. Hence, to overcome the disastrous situation it is necessary to adopt the practices that can maintain the soil health by moving to organic farming and a sustainable system in order to supply qualitative and nutritious food to human beings. The attention of people has increased towards organic farming due to their consciousness about crop quality and soil health. (Sharma *et al*., 2008) [5].

In this context, it is worth studying nutrient management practices through organics. The soil health is maintained by the use of organics by improving the soil organic matter, physio-chemical properties and beneficial microbes. The role of organic manure is to sustain the soil fertility and crop productivity which mainly includes, vermicompost, farmyard manure, cow urine *etc*. The fermented liquid organics *viz*. cow urine, *jeevamrit*, *ghanjeevamrit* contain nutrients, growth promoting substances and beneficial microbes which helps in improving the metabolic activity, plant growth, development and resistance to diseases and pests.

So, for a proper growth of a crop there should be proper requirement of nutrient management of the crop. So here trails are done on the basis of dose of nutrients like FYM, cow urine, *jeevamrit* and *ghanjeevamrit*.

Material and Methods

An experiment entitled "Effect of different organic nutrient management practices on yield and yield attributes of sweet corn (*Zea mays* L. var. *Saccharata)*" was carried out during *Rabi* season of 2021-22 at Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). The soil was *Inceptisol* being neutral in reaction (7.1 pH) with organic carbon content of 0.53%, low available nitrogen (221.6 kg ha^{-1}), medium in phosphorus (18.1 kg ha^{-1}) and high potassium (337.0 kg ha^{-1}) status. The experiment was laid out in randomized design having 14 treatments and 3 replications. The treatments were T_1: 150% RDN through FYM, T_2: 100% RDN through FYM, T_3: 75% RDN through FYM, T_4: 50% RDN through FYM, T_5: Foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS, T_6: *Beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_7: 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS, T_8: 75% RDN through FYM + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_9: 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_{10}: 50% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS, T_{11}: 50% RDN through FYM + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval, T_{12}: 50% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @500 l ha^{-1} at 15 days interval, T_{13}: 100% RDN through inorganic, T_{14}: Control. Irrigation given 5 times during the period of growth to the crop. Weeding was done twice manually. The number of grains row^{-1}, number of rows cob^{-1}, number of grains cob^{-1} was counted by taking 5 observations mean and green cob yield and fodder yield was recorded from net plot area after removing the border area. All the data were subjected to analysis of variance as suggested by Panse and Sukhatme (1967) [2].

Result and Discussion

Number of rows cob^{-1} (No.)

The data related to number of rows cob^{-1} differed significantly among the various organic nutrient management practices are presented in Table 1. Significantly more number of rows cob^{-1} (17.3) was observed under 100% RDN through inorganic (T_{13}) over all other treatments which was significantly at par with 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9).

Although among organic nutrient treatments, 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval showed highest value (16.5). It was noted that (T_9) was at par with (T_1), (T_2), (T_3), (T_7), (T_8), (T_{10}), (T_{11}) and (T_{12}) with mean value (16.2), (15.9), (15.8), (15.8), (16.3), (15.7), (16.0) and (16.1) respectively. The lowest number of rows cob^{-1} (12) was recorded under control treatment (T_{14}). The result was similar to the conclusions of Ramesh *et al*. (2018) [3].

Number of grains row^{-1} (No.)

It is evident from the Table 1 that out of all treatments significantly maximum number of grains $rows^{-1}$ (27.5) was recorded under 100% RDN through inorganic (T_{13}). Although among organic nutrient treatments significantly maximum number of grain $rows^{-1}$ (25.4) was recorded under 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9) which was comparable to 75% RDN through FYM + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_8). Significantly, a lowest number of grain row^{-1} (16.4) was recorded under control (T_{14}) treatment.

Number of grains cob^{-1} (No.)

The data presented in Table 1 indicates that organic nutrient management practices significantly affected the total number of the grains cob^{-1} of sweet corn. A significantly highest number of grains cob^{-1} was found under 100% RDN through inorganic (T_{13}) with mean value (544.5). It was noted that among organic nutrient treatments significantly maximum number of grains cob^{-1} (485.3) with the application of 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9). This might be due to the better supply of combined application of *ghanjeevamrit* as well as *jeevamrit* and foliar spray of cow urine hence helped for availability of macro and micro nutrients, enzymatic activity and physiological process of the plant, which results in

better translocation of the photosynthates and partitioning of the dry matter to the sink (grain). The minimum number of grains cob^{-1} was observed in control (T_{14}) which (245). The results obtained was similar to the findings of Veeresha *et al*. (2014) [6].

Table 1: Number of rows cob^{-1}, number of grains row^{-1} and number of grains cob^{-1} of *Rabi* sweet corn as influenced by various organic nutrient management practices

Treatments	Number of rows cob^{-1}	Number of grains row^{-1}	Number of grains cob^{-1}
T_1: 150% RDN through FYM	16.2	23.1	422.1
T_2: 100% RDN through FYM	15.9	22.0	395.1
T_3: 75% RDN through FYM	15.8	21.5	375.5
T_4: 50% RDN through FYM	15.2	20.8	343.7
T_5: CU	13.7	17.7	307.0
T_6: B + GJ + J	14.9	20.0	328.1
T_7: 75% RDN FYM + CU	15.8	21.7	387.7
T_8: 75% RDN FYM + B + GJ + J	16.3	23.5	430.6
T_9: 75% RDN FYM + CU + B + GJ + J	16.5	25.4	485.3
T_{10}: 50% RDN FYM + CU	15.7	21.3	383.7
T_{11}: 50% RDN FYM + B + GJ + J	16.0	22.7	396.5
T_{12}: 50% RDN FYM + CU + B + GJ + J	16.1	23.0	398.1
T_{13}:100% RDN through inorganic	17.3	27.5	544.5
T_{14}: Control	12.0	16.4	245.0
SEm±	0.28	0.62	15.32
CD (P=0.05)	0.83	1.86	46.65

CU = Foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS
B = Seed treatment with beejamrit
GJ = Application of ghanjeevamrit @250 kg ha-1 as basal
J = Application of jeevamrit @500 l ha-1 at 15 days interval

Green cob yield (t ha^{-1})

The data presented in Table 2 showed that organic nutrient management practices significantly affect the green cob yield of sweet corn. Significantly the highest cob yield of sweet corn (11.56 t ha^{-1}) was obtained under 100% RDN through inorganic (T_{13}) over all the other nutrient management treatments. The highest cob yield in (T_{13}) was obtained since, the balanced inorganic fertilizers supplied nutrients more readily to the plants which ultimately leads to better plant growth yield parameter and highest yield among entire treatments.

Although, among organic nutrient treatments application of 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9) showed significantly superior green cob yield (10.31 t ha^{-1}). The highest cob yield in (T_9) was obtained since, yield parameter like number of grains row^{-1}, number of rows cob^{-1} and number of grains cob^{-1} were found highest in this treatment. The basal application of organic manures FYM and *ghanjeevamrit*, foliar spray of cow urine and application of *jeevamrit* with irrigation water is expected to increase microbial activity into the soil, supply of nutrients and growth hormones in a more continuous manner which increased the availability and uptake of macro and micronutrients by plant roots, translocation of water and nutrient, photosynthesis, formation of starch and synthesis of protein and sugars etc. and also enhanced the process of differentiations of tissues i.e. from vegetative to reproductive phase leading to higher green cob yield. The lowest cob yield was recorded (4.89 tha^{-1}) in control treatment (T_{14}). The results obtained was similar to the findings of Barod and Dhou (2012) [1].

Green fodder yield (t ha^{-1})

The data presented in Table 2 indicates that green fodder yield of sweet corn was significantly affected by various organic nutrient management practices. Significantly highest fodder yield of sweet corn (28.54 t ha^{-1}) was recorded under 100% RDN through inorganic (T_{13}) in overall treatments. Highest fodder yield obtained in (T_{13}) was mainly due to readily availability of nutrients throughout the crop growth period, which are required for good vegetative growth and ultimately gives higher fodder yield. On the other hand, among organic nutrient treatments under 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9) has given significantly highest green fodder yield (26.07 t ha^{-1}) and it was mainly due to higher vegetative growth such as plant height, number of leaves plant^{-1}, dry matter accumulation plant^{-1}, leaf area index in treatment as compared with other organic nutrient treatments. The lowest green fodder yield (14.25 t ha^{-1}) was recorded in control treatment (T_{14}). The results obtained was similar to the findings of Safiullah *et al.* (2018) [4].

Table 2: Green cob yield and green fodder yield of *Rabi* sweet corn as influenced by various organic nutrient management practices

Treatments	Green cob yield (t ha^{-1})	Fodder yield (t ha^{-1})
T_1: 150% RDN through FYM	9.14	23.63
T_2: 100% RDN through FYM	8.45	22.5
T_3: 75% RDN through FYM	7.85	21.68
T_4: 50% RDN through FYM	7.16	20.74
T_5: CU	6.21	19.09
T_6: B + GJ + J	6.81	19.97

T_7: 75% RDN FYM + CU	7.99	21.9
T_8: 75% RDN FYM + B + GJ + J	9.18	23.84
T_9: 75% RDN FYM + CU + B + GJ + J	10.31	26.07
T_{10}: 50% RDN FYM + CU	7.61	21.35
T_{11}: 50% RDN FYM + B + GJ + J	8.68	22.99
T_{12}: 50% RDN FYM + CU + B + GJ + J	8.97	23.39
T_{13}:100% RDN through inorganic	11.56	28.54
T_{14}: Control	4.89	14.25
SEm +	0.35	0.72
CD (P=0.05)	1.08	2.11

CU = Foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS
B = Seed treatment with beejamrit
GJ = Application of ghanjeevamrit @250 kg ha-1 as basal
J = Application of jeevamrit @500 l ha-1 at 15 days interval

Conclusion

- Significantly maximum number of rows cob^{-1}, grains rows^{-1}, and grains cob^{-1} was attained in treatment (T_{13}) as compared to other treatments but among organic nutrient treatments, the maximum value (16.5), (25.4) and (485.3) respectively, was found in 75% RDN through FYM + foliar spray of 20% cow urine at 15, 30, 45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9).However it was noted that number of rows cob^{-1} value of (T_9) treatment was at par with (T_1), (T_2), (T_3), (T_7), (T_8), (T_{10}), (T_{11}) and (T_{12}) with mean value (16.2), (15.9), (15.8), (15.8), (16.3), (15.7), (16.0) and (16.1) respectively. The lowest number of rows cob^{-1}, number of grains rows^{-1} and number of grains cob^{-1} was found in control treatment (T_{14}).
- Different treatment levels relevantly influenced the cob and fodder yield of sweet corn. The significantly highest green cob and fodder yield were obtained in treatment (T_{13}) as compared to other treatments. Among organic nutrient treatments, the maximum value (10.31 t ha^{-1}) and (26.07 t ha^{-1}) respectively, was found in 75% RDN through FYM + foliar spray of 20% cow urine at 15,30,45 and 60 DAS + *beejamrit* + *ghanjeevamrit* @ 250 kg ha^{-1} as basal + *jeevamrit* @ 500 l ha^{-1} at 15 days interval (T_9). It might be due to application of all types of nutrient treatment combination in one treatment which ultimately leads to better growth and highest vegetative growth attained by this treatment. The lowest cob and fodder yield was recorded in control treatment (T_{14}).

References

1. Barod NK, Dhou S. Residual soil fertility and nutrient uptake in baby corn as influenced by nutrient sources and weed control measures. Annals of Agricultural Research. 2012;36(3):22-24.
2. Panse, Sukhatme. Statistical Methods for Agricultural Workers, 2nd Edition, Indian Council of Agricultural Research, New Delhi; c1967.
3. Ramesh S, Sudhakar P, Elankavi S. Effect of organic foliar nutrition on growth and yield of maize (*Zea mays* L.). International Journal of Research and Analytical Reviews. 2018;3:2349-5138.
4. Safiullah K, Durani A, Durrani H, Ansari MA. Effect of solid and liquid organic manures on growth, yield and economics of sweet corn (*Zea mays* L. Var. *Saccharata* Sturt) under south Gujarat condition. International Journal of Pure and Applied Bioscience. 2018;6(2):567-574.
5. Sharma DK, Prasad K, Yadav SS. Effect of integrated nutrient management on the performance of dwarf scented rice (*Oryza sativa* L.) grow in rice-wheat sequence. International journal of Agricultural Sciences. 2008;4(2):660-662.
6. Veeresha S, Gopakkali P. Effect of organic production practices on yield and soil health of irrigated maize (*Zea mays* L.) as influenced by various levels of FYM and cattle urine application, Environment & Ecology. 2014;32(2A):627-630.
7. Jagajjanani G, Haripriya A. Formulation and evaluation of sweet corn milk (*Zea Mays*) based mayonnaise. Int. J Agric. Food Sci. 2021;3(1):33-38. DOI: 10.33545/2664844X.2021.v3.i1a.49