

Effect of different nutrient combinations on quality of sweet corn (*Zea mays* L. var. *saccharata*.)

ABSTRACT

A field experiment was conducted at Post Graduate Instructional Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri, India, during Rabi season 2020. The trial was laid out in Randomised Block Design with nine treatments replicated thrice. The soil of the experimental plot was clay loamy, medium in available nitrogen, medium in available phosphorus, and high in available potassium. The sowing was done on 24 November 2020. The general recommended dose of fertiliser applied was 120:60:40 N: P₂O₅: K₂O kg ha⁻¹+ 10 t FYM ha⁻¹. Application of 125% general recommended dose of fertiliser along with a foliar spray of 2% 19:19:19 NPK at 30 and 45 DAS recorded significantly higher crude protein content in cob and stover (11.12%, 5.18%), Protein Yield (1878 kg ha⁻¹).

Keywords: Sweet corn, foliar spray, season, fertiliser

INTRODUCTION

One of the most often used varieties of maize is sweet corn. The first hybrid was created by breeder and seed producer Noyes Darling of New Haven, Connecticut. Widespread production of sweet corn did not begin until the turn of the 20th century. The plant was recognised for quite some time in Europe, but its commercial significance didn't really take off until after World War II. There is a huge market for sweet corn, popcorn, baby corn, high oil corn, and other specialty corn in India and abroad. These specialist corns have a high market value, which makes them perfect for para-urban agriculture. Among the several types of maize, sweet corn has a considerable commercial potential. Popcorn, baby corn, high oil corn, sweet corn and other. These specialist corns have a high market value, which makes them perfect for para-urban agriculture. Among the several types of maize, sweet corn has a considerable commercial potential. Modern agriculture must

minimise soil and water damage while supplying crops with enough nutrients at every stage of the development cycle. This can be achieved by applying precise and up-to-date nutrient management techniques, especially water-soluble fertilisers that have a low salt index and a high quantity of primary nutrients. Water-soluble fertilisers allow for the application of fertiliser foliarly as well as crop fertigation.

The production of maize is heavily dependent on the nutrient management system because it is a demanding crop that needs a lot of nutrients. Soil and environmental variables have a significant influence on the comparatively low nutrient usage efficiency (NUE) of fertilisers delivered through soil. Apart from enhancing the dietary needs of crops, prompt administration of vital nutrients via foliar sprays in combination with nutrient treatments applied to the soil provides several benefits, such as prompt and effective crop response. One popular method of adding extra nourishment to plants is through foliar spraying water-soluble **fertiliser. Because** foliage absorbs nutrients far more quickly than roots do, foliar nutrition is very effective.

The amount and quality of agricultural production will be greatly increased by using a balanced fertiliser during the key growth phases. More than 90% of fertiliser applied to leaves is utilised by the plant. However, only 10% of the fertiliser is used when the same amount is applied to the **soil.** When foliar nutrients are applied in conjunction with soil application, there are several benefits to augmenting crop nutritional needs. These benefits include quicker and more effective plant response, reduced fertiliser consumption, preservation of soil health, and resolution of nutrient fixation and immobilisation **issues. Considering** the nutrient requirement and nutrient use efficiency of foliar application of nutrients, the present investigation was carried out .

MATERIAL AND METHODS

The study was conducted during Rabi season of 2020 at the PGI Farm, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, and District, Ahmednagar. The soil texture of the experimental field was clay loam, medium in available nitrogen (298.18 kg ha⁻¹), medium in available phosphorus (27 kg ha⁻¹), and very high in available potassium (412 kg ha⁻¹). In reaction, the soil in the experimental field was mildly alkaline (pH 8.46) with 0.34 % organic carbon, soil electrical conductivity was 0.52 dSm⁻¹.

The experiments **was** laid out in randomised complete block design and comprised of nine treatments replicated thrice and the treatments are:

T₁: Control

T₂: 125% GRDF + 1% 19:19:19 NPK

T₃ : 100% GRDF +1% 19:19:19 NPK

T₄ : 75% GRDF + 1% 19:19:19 NPK

T₅ : 50% GRDF + 1% 19:19:19 NPK

T₆ : 125% GRDF+ 2% 19:19:19 NPK

T₇ : 100% GRDF + 2% 19:19:19 NPK

T₈ : 75% GRDF + 2% 19:19:19 NPK

T₉ : 50%GRDF + 2% 19:19:19 NPK

The foliar spray of 1% and 2% 19:19:19 NPK are applied at 30 and 45 DAS. The GRDF of Sweet corn is 120:60:40 N: P₂O₅: K₂O kg ha⁻¹+ 10 t FYM. The climatic conditions were favourable for sweet corn growth and development, according to the meteorological data. During the investigation of Rabi sweet corn in 2020, the following meteorological data were observed, relative humidity during morning hour (92.1– 70.7%), evening hour (47.4– 19.7 %). The rainfall distribution received during crop growth was uniform. In general, the weather conditions were found favourable for normal crop growth and development. The general recommended dose of fertiliser (GRDF) was applied in each plot to

treatments in the form of FYM, urea, single super phosphate, and muriate of potash, respectively. Sowing was done on 24 November, 2020, with the sweet corn seed variety Sugar -75; the crop duration was 80-90 days.

There was a total of 27 experimental plots in three replications in the layout. Nine experimental units were separated into each replication. Each experimental unit had a gross plot size of 6.0 x 5.0 m² and the net plot size was 4.8 x 4.6 m². Sowing was done by dibbling two seeds at each hill at the recommended spacing of 60 cm x 20 cm. The other practices of growing sweet corn were adequately taken for the management of experimental plots throughout the cropping season. Five plants from the net plot area were randomly selected at harvest and used for analysis of protein content and protein yield in cob and stover

RESULTS AND DISCUSSION

Data regarding crude protein content in cob and Stover of sweet corn at harvest as influenced by different nutrient combinations is presented in Table 1 . The mean crude protein content in cob and fodder is 9.71 and 3.98 %. The mean protein yield was 1236 kg ha⁻¹. All the treatments recorded increase in crude protein content than control. Crude protein content and protein yield was significantly influenced by different combinations of nutrient management practices. Significantly maximum crude protein content in cob and stover was noted in T₆ (11.12%, 5.18%) i.e., 125% GRDF+2% 19:19:19. However T₂ (10.35%, 4.50%) i.e., 125% GRDF+1% 19:19:19 NPK was at par with T₆ i.e., 125% GRDF+2% 19:19:19. The lowest crude protein content percentage was observed in T₁ control (7.35%, 2.62%).

Data regarding crude protein yield in cob and stover of sweet corn at harvest was influenced by different nutrient combinations are presented in Table 1. Significantly highest protein yield was obtained in T₆ (1878 kg ha⁻¹) i.e., 125%

GRDF+2%19:19:19 NPK . However T₂ (1639 kg ha⁻¹) i.e., 125% GRDF+1%19:19:19 NPK was at par with T₆ i.e., 125% GRDF+2%19:19:19 NPK .Lowest protein yield was observed in T₁ control (614 kg ha⁻¹). The results are in agreement with the Khan et al. (2006) and Drocelle et al. (2006).

Conclusion

The production of maize is heavily dependent on the nutrient management system because it is a demanding crop that needs a lot of nutrients. Soil and environmental variables have a significant influence on the comparatively low nutrient usage efficiency (NUE) of fertilisers delivered through soil. The amount and quality of agricultural production will be greatly increased by using a balanced fertiliser during the key growth phases. More than 90% of fertiliser applied to leaves is utilised by the plant.

Table.1 Crude Protein Content in Cob and Stover and Protein yield as Influenced by Different Nutrient Combinations

Tr. No.	Treatment Details	Crude protein in Cob (%)	Crude protein in Stover (%)	Protein yield (kg ha ⁻¹)
T ₁	Control	7.35	2.62	614
T ₂	125% GRDF + 1% 19:19:19 NPK	10.35	4.50	1639
T ₃	100% GRDF+ 1% 19:19:19 NPK	9.56	4.06	1333
T ₄	75% GRDF+ 1% 19:19:19 NPK	8.79	3.93	1114
T ₅	50% GRDF+ 1% 19:19:19 NPK	8.04	3.50	848
T ₆	125% GRDF+2% 19:19:19 NPK	11.12	5.18	1878
T ₇	100% GRDF+2% 19:19:19 NPK	9.62	4.18	1377
T ₈	75% GRDF+ 2% 19:19:19 NPK	9.39	3.97	1362
T ₉	50% GRDF+2% 19:19:19 NPK	8.35	3.89	961
	SE (m) ±	0.45	0.32	78.79
	C.D.at 5%	1.37	0.98	238.45
	General Mean	9.17	3.98	1236

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