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Influence of Soil Series and Potassium Levels on Quality Parameters of Sweet Corn in Soils of Konkan, Maharashtra, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

A pot culture experiment was conducted to study the potassium behavior in *Konkan* soils under exhaustive crop like sweet corn by application of potassium. This experiment was laid out in factorial randomized block design, the factor A were different soil series and factor B were different potassium levels. The pots filled with air dried, ground, sieved and well mixed soil @ 30 kg pot^{-1}. Recommended dose of nitrogen, phosphorus (200:60 kg N:P ha^{-1}) and FYM (10 t ha^{-1}) were applied for each pot. The objective of the experiment was to study the effect of different soil series and potassium levels on quality of sweat corn in soils of Konkan region of Maharashtra.

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The experimental results revealed that, the maximum values of quality parameters of sweet corn recorded by Palghar series (S_2) *viz*., reducing sugar 1.71 and 1.70 %, non-reducing sugar 6.02 and 5.94 %, total sugar 7.72 and 7.64 %, protein content 13.04 and 12.77 % and starch content 78.51 and 78.01 %, respectively during the year 2014-15 and 2015-16. The application of potassium @ 90 kg K_2O ha^{-1} (K_3) recorded maximum values of quality parameters (*viz*., reducing, non-reducing, total sugar, protein and starch content) in sweet corn.

Keywords: Soil series; potassium levels; quality of sweet corn.

1. INTRODUCTION

Potassium is a major essential nutrient element which is denoted by K (*Kalium* in Latin) which is involved in many physiological, biochemical functions of plant growth and development. Potassium also involved in many metabolic pathways that affect crop quality, it is often called as "the quality element". The quantity of K consumed by high yielding varieties equals or in many times exceeds that of nitrogen and phosphorus. India has no indigenous source of potash. Although potash is consumed in 150 countries in the world, only about a dozen countries are blessed with reserves of potash. Canada is world's largest producer having about 53 per cent of world's potash reserves. Other leading producers are Germany, Israel and Jordan. Indian companies import potash from Canada, Belarus, Jordan, Israel, UK and Germany.

Intensive cropping with high yielding varieties and large input of fertilizers depict the recent trend in agricultural production in the country (Muchhadiya et al., 2024; Woodruff et al., 2019). One may therefore, expect to observe noticeable changes in soil potassium status under such high intensity cropping carried out for a result in depletion of potassium reserves in soils (Lone et al., 2022). Under this condition, build up in soil fertility and sustained crop yields can be achieved by judicious use of manures and fertilizers Muthuswamy et al*.* (1995). In Maharashtra, depletion of available potassium due to intensive cropping with high yielding varieties of crops has been reported by Pharande and Raskar (1995).

The present investigation was undertaken to generate comprehensive information about the influence of quality of sweet corn by potassium levels and different soil series of the Konkan region of Maharashtra (India) due to growing of exhausting crop like sweet corn.

2. MATERIALS AND METHODS

The pot culture research conducted at 17^0 44' 58" N and 73^0 10' 43" E having an elevation of about 250 m above the mean sea level, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, during rabi 2014-15 and 2015-16 with sweet corn (*Zea mays saccharata L*.) as test crop. The surface soil sample was collected from eight locations characterized on the basis of different soil series. The selection soil series from Technical Bulletin "Soil Series of Maharashtra" written by Challa et al*.* (2008), approximately 400 kg soil sample were collected from each location All the pots were filled with 30 kg of processed soil.

The experiment laid out in factorial randomized block design arrangement, the factor A were soil series [Shahapur (S_1), Palghar (S_2), Roha (S_3), Repoli (S_4), Shirgaon (S_5), Lanja (S_6), Deogad (S_7) and Vengurla (S_8)] and factor B were different potassium levels [0 (K_0), 30 (K_1), 60 (K_2) and 90 kg K_2O ha^{-1} (K_3)]. The details of the surface soil samples are given in Table 1 and their locations are shown in map (Fig.1). The climatic conditions were moderate during both the years. The mean maximum temperatures ranged from 28.80 ^{0}C to 33.40 ^{0}C and 28.90 ^{0}C to 34.70 ^{0}C and mean minimum temperatures from 9.60 ^{0}C to 19.00 ^{0}C and 11.40 ^{0}C to 20.60 ^{0}C during the crop season in the years 2014-15 and 2015-16, respectively.

The quality parameters of sweet corn i.e. Sugar (reducing, non-reducing and total sugar), protein and starch content in the kernels of sweet corn from the individual treatment were determined as the quality parameters of sweet corn.

Reducing sugar per cent was determined by Lane and Eynon (1923) method with modifications by Ranganna (1997), The non-reducing sugar per cent was recorded in respect of each treatment by substituting the reducing sugar from the total sugar per cent or by using following formula;

Non-reducing sugar (%) = total sugar (%) - reducing sugar (%).

The total sugars were estimated by the same procedure as thatreducing sugars. After acid hydrolysis of an aliquot, de-leaded sample with 35 per cent hydrochloric acid, followed by neutralization with sodium hydroxide (40%). This filtrate was used for titration against standard Feling's mixture (Feling's A and B) using methylene blue as an indicator to brick red end point Ranganna (1997).

The individual treatment wise kernel samples were subjected to nitrogen content analysis by modified Kjeldahl method suggested by Jackson (1973). Then the protein content was calculated by multiplying the nitrogen content (%) in the kernels by the factor 6.25.

Starch content in corn is determined using enzymatic colorimetric assays, AOAC (2003) developed a procedure that involved fermenting the corn sample and using a D-glucose to estimate the glucose content in the ground corn and back-calculating the unreacted starch.

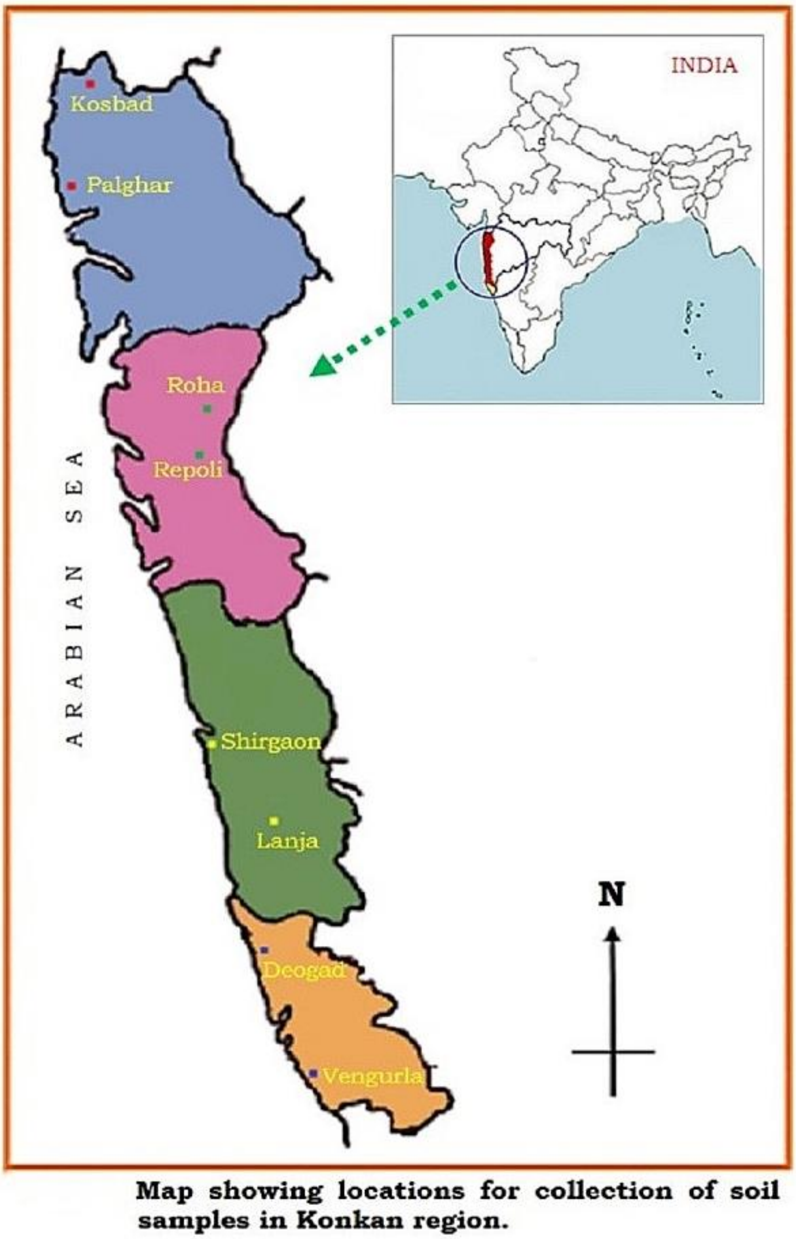

Fig. 1. Location map of Study Area

Chart 1. Selection of site for Collection of soil samples

Sl. No.	Soil Series		Location
1.	Shahapur Series (S_1)	:	KVK, Kosbad (Thane)
2.	Palghar Series (S_2)	:	ARS, Palghar (Thane)
3.	Roha Series (S_3)	:	Roha (Raigad)
4.	Repoli Series (S_4)	:	Repoli (Raigad)
5.	Shirgaon Series (S_5)	:	ARS, Shirgaon (Ratnagiri)
6.	Lanja Series (S_6)	:	KVK, Lanja (Ratnagiri)
7.	Deogad Series (S_7)	:	Deogad, (Sindhudurg)
8.	Vengurla Series (S_8)	:	RFRS, Vengurla (Sindhudurg)

3. RESULTS AND DISCUSSION

Effect of different soil series and potassium levels on reducing sugar (%), non-reducing sugar (%) and total sugar (%) of sweet corn: The data regarding to the reducing sugar, non-reducing sugar and total sugar content in kernels of sweet corn as influenced by the different treatments, during the year 2014-15 and 2015-16 is presented in Table 1.

Soil series Effect: The data revealed that, there was significant difference due to different soil series on the reducing sugar, non reducing sugar and total sugar content in sweet corn kernels, during both the years of experimentation.

Year 2014-15: The sugar (reducing, non-reducing and total sugar) contents in kernels of sweet corn significantly differed by soil series. Palghar series (S_2) found the significantly highest, reducing sugar content (1.71 %), non reducing content (6.02 %) and total sugar content (7.72 %) in kernels of sweet corn, which was at par with Shahapur series (S1) i.e. 1.55 per cent in respect of reducing sugar. However, sweet corn grown from Deogad series recorded lowest reducing sugar content (0.96 %), non reducing content (2.88 %) and total sugar content (4.11 %).

Year 2015-16: The sugar (reducing, non-reducing and total sugar) contents in kernels of sweet corn significantly differed by soil series. Palghar series (S2) found the significantly highest, reducing sugar content (1.70 %), non-reducing content (5.94 %) and total sugar content (7.64 %) in kernels of sweet corn, which was at par with Shahapur series (S1) i.e. 1.51 per cent in respect of reducing sugar. However, sweet corn grown from Deogad series recorded lowest reducing sugar content (0.90 %), non reducing content (2.87 %) and total sugar content (4.05 %).

These results are in accordance with those of Singh and Biswas (2008). They attributed the differences within a soil series could be due to texture as well as amount of mica is another important factor in the K release behavior of soils.

Potassium levels effect: The perusal of data furnishes that sugar (reducing, non-reducing and total sugar) content was influenced due to various potassium levels during the year 2014-15 and 2015-16.

Year 2014-15: The results presented in Table 1 indicate that the qualitative value of sweet corn kernel gradually and significantly increased by increasing the levels of potassium up to 90 kg K_2O ha-1. Increasing levels of K significantly increased the sugar (reducing, non-reducing and total sugar) content in kernels of sweet corn from 1.18 to 1.36 per cent (reducing sugar), 4.00 to 4.60 per cent (non-reducing sugar) and 5.14 to 6.01 per cent (total sugar) at K_3 (90 kg K_2O ha-1), while K_2 is at par with K_3 with respect to reducing sugar content of sweet corn kernels.

Year 2015-16: Sugar (reducing, non-reducing and total sugar) contents determines the quality of the sweet corn. Sweet corn plants treated with different levels of potassium applications showed statistically different contents of the sugar (reducing, non-reducing and total sugar) in the present experimental study. The significantly higher reducing sugar content (1.39 %), non reducing (4.60 %) and total sugar (5.95 %) recorded at K_3 (90 kg K_2O ha-1) except K_2 (60 kg K_2O ha^{-1}) which was at par with K_3 in respect of reducing and non reducing sugar content of the sweet corn kernel and minimum reducing sugar (1.10 %), non reducing (3.99) and total sugar content (5.11 %) were recorded in K0 (Control).

Table 1. Effect of different soil series and potassium levels on reducing sugar (%), non-reducing sugar (%) and total sugar (%) of sweet corn kernels during 2014-15 and 2015-16

2014-15															
	Reducing sugar (%)					**Non-reducing sugar (%)**					**Total sugar (%)**				
	K_0	**K_1**	**K_2**	**K_3**	**Mean**	**K_0**	**K_1**	**K_2**	**K_3**	**Mean**	**K_0**	**K_1**	**K_2**	**K_3**	**Mean**
S_1	1.17	1.28	1.70	2.04	**1.55**	5.15	5.46	5.92	5.96	**5.62**	6.53	6.93	7.27	7.48	**7.05**
S_2	1.60	1.65	1.60	1.98	**1.71**	5.85	5.92	6.15	6.17	**6.02**	7.34	7.49	7.76	8.28	**7.72**
S_3	1.38	1.47	1.35	1.52	**1.43**	4.50	4.72	5.02	5.40	**4.91**	5.48	5.76	6.29	6.82	**6.09**
S_4	1.13	1.16	1.20	0.86	**1.09**	3.12	3.20	3.31	3.76	**3.35**	4.12	4.43	4.64	4.82	**4.50**
S_5	1.11	1.18	1.24	1.16	**1.17**	3.16	3.23	3.29	3.76	**3.36**	4.24	4.37	4.51	4.62	**4.43**
S6	0.99	1.00	0.90	1.10	**1.00**	3.69	3.84	4.10	4.37	**4.00**	4.53	4.86	5.01	5.45	**4.96**
S_7	0.91	0.94	1.01	0.98	**0.96**	2.74	2.85	2.87	3.07	**2.88**	3.92	4.04	4.14	4.34	**4.11**
S_8	1.17	1.19	1.26	1.27	**1.22**	3.81	3.98	4.17	4.27	**4.06**	4.98	5.26	5.87	6.31	**5.61**
Mean	**1.18**	**1.24**	**1.28**	**1.36**		**4.00**	**4.15**	**4.35**	**4.60**		**5.14**	**5.39**	**5.69**	**6.01**	
			S	K	S x K			S	K	S x K			S	K	S x K
	SE±		0.07	0.04	0.14	SE±		0.10	0.07	0.21	SE±		0.01	0.01	0.03
	CD 5%		0.20	0.11	NS	CD5%		0.30	0.21	NS	CD5%		0.04	0.03	NS
2015-16															
S_1	1.13	1.26	1.65	2.01	**1.51**	5.17	5.45	5.91	5.95	**5.62**	6.58	6.90	6.93	7.59	**7.00**
S_2	1.49	1.57	1.61	2.12	**1.70**	5.55	5.93	6.13	6.14	**5.94**	7.15	7.57	7.73	8.12	**7.64**
S_3	1.40	1.45	1.02	1.64	**1.38**	4.46	4.71	5.02	5.40	**4.90**	5.37	5.70	6.26	6.80	**6.03**
S_4	0.91	0.99	1.24	1.40	**1.14**	3.43	3.59	3.63	3.79	**3.61**	4.35	4.53	4.64	4.77	**4.57**
S5	1.09	1.11	1.15	0.85	**1.05**	3.41	3.58	3.63	3.81	**3.61**	4.24	4.34	4.44	4.62	**4.41**
S_6	0.90	1.02	0.86	0.87	**0.91**	3.54	3.86	4.11	4.35	**3.96**	4.60	4.87	4.96	5.18	**4.90**
S_7	0.90	1.02	0.86	0.81	**0.90**	2.71	2.83	2.90	3.05	**2.87**	3.84	4.01	4.14	4.21	**4.05**
S_8	0.99	1.04	1.27	1.42	**1.18**	3.63	3.93	4.17	4.28	**4.00**	4.75	5.18	5.81	6.27	**5.50**
Mean	**1.10**	**1.15**	**1.21**	**1.35**		**3.99**	**4.23**	**4.44**	**4.60**		**5.11**	**5.39**	**5.61**	**5.95**	
			S	K	S x K			S	K	S x K			S	K	S x K
	SE±		0.08	0.06	0.16	SE±		0.10	0.07	0.20	SE±		0.03	0.02	0.06
	CD5%		0.23	0.16	NS	CD5%		0.29	0.21	NS	CD 5%		0.09	0.07	NS

Table 2. Effect of different soil series and potassium levels on protein (%) and starch content (%) of sweet corn kernels during 2014-15 and 2015-16

	Protein content(%)					Starch content(%)				
2014-15										
	K_0	**K_1**	**K_2**	**K_3**	**Mean**	**K_0**	**K_1**	**K_2**	**K_3**	**Mean**
S_1	11.96	12.56	12.75	12.92	**12.55**	56.32	61.60	81.60	97.76	**74.32**
S_2	13.00	13.15	13.05	12.96	**13.04**	73.60	75.75	73.60	91.08	**78.51**
S_3	10.71	10.83	10.96	10.85	**10.84**	68.83	73.67	67.67	76.00	**71.54**
S_4	9.06	9.52	9.63	9.73	**9.48**	65.35	67.47	69.60	49.54	**62.99**
S_5	11.67	11.75	11.98	11.85	**11.81**	61.05	64.90	68.20	63.80	**64.49**
S_6	11.06	11.19	11.31	11.21	**11.19**	61.59	62.21	55.80	67.99	**61.90**
S_7	10.06	10.21	10.27	10.19	**10.18**	57.54	59.22	63.42	61.95	**60.53**
S_8	10.21	10.33	10.42	10.35	**10.33**	63.36	64.26	68.22	68.40	**66.06**
Mean	**10.97**	**11.19**	**11.30**	**11.26**		**63.45**	**66.13**	**68.51**	**72.07**	
			S	K	S x K			S	K	S x K
	SE±		0.07	0.05	0.14	SE±		3.03	2.14	6.07
	CD5%		0.20	0.14	NS	CD5%		8.75	6.19	NS
2015-16										
S_1	11.83	12.02	12.23	12.35	**12.11**	54.24	60.64	79.04	96.48	**72.60**
S_2	12.52	12.73	12.88	12.94	**12.77**	68.54	72.22	73.91	97.37	**78.01**
S_3	10.35	10.48	10.63	10.58	**10.51**	70.17	72.33	50.83	82.00	**68.83**
S_4	9.06	9.17	9.27	9.21	**9.18**	52.78	57.61	72.11	81.39	**65.98**
S_5	11.38	11.54	11.67	11.60	**11.55**	59.77	61.23	63.25	46.93	**57.80**
S_6	10.71	10.88	10.98	10.96	**10.88**	56.01	63.45	53.11	53.94	**56.63**
S_7	9.92	10.06	10.15	10.08	**10.05**	56.91	64.47	53.97	51.24	**56.65**
S_8	9.85	10.29	10.40	10.50	**10.26**	53.28	55.98	68.40	76.50	**63.54**
Mean	**10.70**	**10.90**	**11.02**	**11.03**		**58.96**	**63.49**	**64.33**	**73.23**	
			S	K	S x K			S	K	S x K
	SE±		0.04	0.03	0.08	SE±		3.87	2.74	7.75
	CD5%		0.11	0.08	NS	CD5%		11.18	7.90	NS

Potassium is a regulator for many of the metabolic processes in the cells, playing an important role on promotion of enzymatic activity and enhancing the translocation of assimilates and protein synthesis Lawton and Cook (1954). Potassium fertilizer application is the most important factor affecting the ear quality of sweet corn. The optimum K fertilizer requirement to obtain the best quality of sweet corn differed according to soil content of potassium.

Interaction effects: The interaction effect between soil series and potassium levels was found to be non significant in respect of reducing, non reducing and total sugar content in kernel of sweet corn during both the years of the investigation.

Effect of different soil series and potassium levels on protein content (%) of sweet corn kernels: The data pertaining to the protein content in kernels of sweet corn as influenced by the different treatments, during the years 2014-15 and 2015-16 is presented in Table 2.

Soil series effect: Protein content in kernels of sweet corn was significantly influenced due to the different soil series during both the years of the experiment.

Year 2014-15: The differences in per cent protein content in kernels of sweet corn varied widely among the different soil series found to be significant. The highest protein content in kernels (13.04 %) of sweet corn was observed from Palghar (S_2) series. While the lowest protein content (9.48 %) was found in kernels of sweet corn grown in Repoli (S_4) series.

Year 2015-16: The protein content in kernels of sweet corn ranged between 9.18 and 12.77 per cent when grown on different soils. It was highest in kernels of sweet corn in a soil from Palghar series (S_2) followed by soils from Shahapur series (S_1). While it was lowest in kernels of sweet corn when grown in Repoli series (S_4).

Potassium levels effect: The data revealed that, the protein content in kernels of sweet corn was significantly influenced due to various potassium levels during both the years of the experimentation.

Year 2014-15: Increasing levels of potassium significantly increased protein content in sweet corn kernels from 11.30 per cent with 60 kg K_2O ha^{-1} (K_2). The increasing in protein content were significant up to 60 kg K_2Oha^{-1} (K_2) over control.

Year 2015-16: Increasing levels of potassium significantly increased protein content in sweet corn kernels from 10.70 to 11.03 per cent, the maximum protein content recorded with 90 kg K_2O ha^{-1} (K_3). The increasing in protein content were significant up to 90 kg K_2O ha^{-1} (K_3) over control.

Potassium is involved directly or indirectly in plant protein metabolism. It can begin with the stimulation of nitrate uptake and transport within the plant, as potassium serves as the accompanying counter action Ahmad et al. (2012). Mengel (1980) also showed that transport of amino acids is enhanced by higher potassium levels, especially the transport of amino acids to developing seeds. Potassium involvement is crucial for most steps of the protein synthesis process, beginning with enzyme activation and counting through ribosome synthesis and mRNA turnover.

Interaction effects: The interaction effect between soil series and potassium levels was found to be non significant in respect to protein content in kernels of sweet corn during both the years of the investigation.

Effect of different soil series and potassium levels on starch content (%) of sweet corn kernels: The data pertaining to the starch content in kernels of sweet corn as influenced by the different treatments, during the years 2014-15 and 2015-16 is presented in Table 2.

Soil series effect: Starch content in kernels of sweet corn was significantly influenced due to the different soil series during both the years of the experiment.

Year 2014-15: The differences in per cent starch content in kernels of sweet corn varied widely among the different soil series found to be significant. The highest starch content in kernel (78.51 %) of sweet corn was observed from Palghar (S_2) series. While the lowest starch content (60.53 %) was found in kernels of sweet corn grown in Deogad (S_7) series.

Year 2015-16: The starch content in kernels of sweet corn ranged between 56.63 and 78.01 per cent when grown on different soils. It was highest in kernels of sweet corn in a soil from Palghar series (S_2) followed by soils from Shahapur series (S_1). While it was lowest in kernels of sweet corn when grown in Lanja series (S_6).

Potassium levels effect: The data revealed that, the starch content in kernels of sweet corn was significantly influenced due to various potassium levels during both the years of the experimentation.

Year 2014-15: Increasing levels of potassium significantly increased starch content in sweet corn kernels from 63.45 to 72.7 per cent with 90 kg K_2O ha^{-1} (K_3). The increase in starch content was significant up to 90 kg K_2O ha^{-1} (K_3) over control.

Year 2015-16: Increasing levels of potassium significantly increased starch content in sweet corn kernels from 58.96 to 73.23 per cent with 90 kg K_2O ha^{-1} (K_3). The increase in starch content was significant up to 90 kg K_2O ha^{-1} (K_3) over control. Mahmood et al. (2000) the potassium levels significantly greater grain starch content than the control. Greater starch content with potassium application may be due to the activation of starch synthesis, which is key enzyme controlling the rate of starch synthesis and potassium is required for its activation.

Interaction effects: The interaction effect between soil series and potassium levels was found to be non significant in respect to starch content in kernels of sweet corn during both the years of the investigation.

4. CONCLUSION

Based on data obtained from the present investigation, it could be concluded that the quality parameters *viz*., sugars (reducing, non-reducing and total sugar), protein and starch content of sweet corn kernels significantly differed by soil series and potassium levels during both the years of experimentation. The Palghar series found significantly highest sugars [reducing sugar (1.71 and 1.70 %), non-reducing sugar (6.02 and 5.95 %) and total sugar (7.72 and 7.64 %)], protein content (13.04 and 12.77 %) and starch content (78.51 and 78.01 %), respectively during both the years of the investigation.

During 2014-15 and 2015-16, sweet corn plant treated with potassium @ 90 kg K_2O ha^{-1} (K_3) recorded maximum sugars [reducing sugar (1.36 and 1.35 %), non-reducing sugar (4.60 and 4.60 %) and total sugar (6.01 and 5.95 %), protein content (11.26 and 11.03 %) and starch content (72.07 and 73.23 %), respectively during both the years of the investigation.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare by that NO generative AI technologies such as Large Language Models (Chat GPT, COILOT etc.) ant text to text image generators have been used during writing or editing of this manuscript.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

Ahmad, M., Bukhsh, A., Ahmad, R., Iqbal, J., Mudassar, M., Ali, A., Ishaque, M., & Hussain, S. (2012). Nutritional and physiological significance of potassium application in maize hybrid crop production. *Pakistan Journal of Nutrition, 11*(2), 187–202.

AOAC. (2003). *Method 991.43: Total, soluble, and insoluble dietary fiber in foods*. In *Official Methods and Analysis of the Association of Official Analytical Chemists International* (17th ed.). Gaithersburg, Md.: A.O.A.C.

Challa, O., Gajbhiye, K. S., & Velayutham, M. (2008). *Soil Series of Maharashtra, Technical Bulletin, NBSS Publ. 79*.

Jackson, M. L. (1973). *Soil chemical analysis*. Prentice Hall of India Pvt. Ltd.

Lane, J. H., & Eynon, L. (1923). Methods for determination of reducing and non-reducing sugars. *Journal of Sciences, 42*, 32–37.

Lawton, K., & Cook, R. L. (1954). Potassium in plant nutrition. *Advances in Agronomy, 6*, 254–298.

Lone, A. H., Sheikh, T. A., Lone, B. A., Ahngar, T. A., Baba, Z. A., Bashir, M., Sheikh, M. A., Mir, M. S., Rashid, Z., Majid, S., Rasool, F. U., & Dar, Z. A. (2022). Performance of sweet corn hybrids (*Zea mays* saccharata) as influenced by soil and foliar application of zinc. *Journal of Experimental Agriculture International, 44*(12), 167–174. https://doi.org/10.9734/jeai/2022/v44i122090

Mahmood, T., Saeed, M., & Ahmad, R. (2000). Impact of water and potassium management on yield and quality of maize. *Pakistan Journal of Biological Sciences, 3*(3), 531–533.

Mengel, K. (1980). Effect of potassium on the assimilate conduction to storage tissue. *Berichte der Deutschen Botanischen Gesellschaft, 93*, 353–362.

Muchhadiya, R. M., Kumawat, P. D., Sakarvadia, H. L., & Chovatia, P. K. (2024). Response of sweet corn to nano urea under precision nitrogen management. *J. Sci. Res. Rep., 30*(8), 950–963.

Muthuswamy, P., Santhy, P., & Ramnathan, G. (1995). Long-term use of fertilizer on soil fertility and yield of crops in irrigated inceptisol. *Journal of Indian Society of Soil Science, 38*(3), 541–542.

Pharande, A. L., & Raskar, B. N. (1995). Potassium availability and release in Typic Chromusterts and Udic Halpustals of Western Maharashtra. State level seminar on *Integrated Nutrient Management for Sustainable Agriculture*. Mahatma Phule Krishi Vidyapeeth, Rahuri.

Ranganna, S. (1997). *Handbook of analysis and quality control for fruits and vegetable products* (2nd ed.). Tata McGraw Hill Publishing Company, Ltd.

Singh, P. K., & Biswas, A. K. (2008). Determining the potassium releasing power of the acid soils of Nagaland. *Journal of Indian Society of Soil Science, 56*(3), 305–308.

Woodruff, L. K., Habteselassie, M. Y., Norton, J. M., Boyhan, G. E., & Cabrera, M. L. (2019). Yield and nutrient dynamics in conventional and organic sweet corn production systems. *Agronomy Journal, 111*(5), 2395–2403.

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