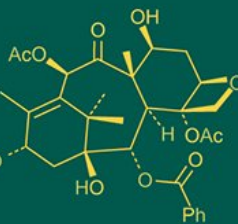
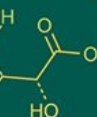
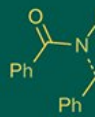


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Effect of foliar application of calcium and iron chelates on growth, yield and quality of strawberry (*Fragaria* × *ananassa* duch.) under polyhouse condition

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Abstract

A field trial was carried out at the Department of Horticulture, SHUATS, Prayagraj during 2024-25 to evaluate the impact of foliar-applied calcium and iron chelates on growth, yield and fruit quality of strawberry (*Fragaria* × *ananassa* Duch.) cv. Winter Dawn under polyhouse conditions. Seventeen treatments—including an untreated control—were imposed with varying concentrations and combinations of Ca-EDTA and Fe-EDTA. The layout followed a randomized complete block design with three replications.

Among all treatments, T₁₄ (1,250 ppm Ca-EDTA + 500 ppm Fe-EDTA) produced the most vigorous plants and highest yields. It achieved the greatest plant height (30.41 cm), plant spread (38.43 cm), leaf number per plant (39.48) and fruit number per plant (15.40). Yield reached 381.96 g per plant (116.88 kg per 250 m²), while fruit quality improved markedly—total soluble solids climbed to 10.73 °Brix, ascorbic acid to 60.17 mg/100 g and juice content to 96.23 %. This treatment also delivered the top benefit-cost ratio (4.20), confirming that foliar application of Ca and Fe chelates substantially enhances strawberry productivity and quality under protected cultivation.

Keywords: Ca-EDTA, Fe-EDTA, strawberry, growth, yield, quality, polyhouse

Introduction

Strawberry (*Fragaria* × *ananassa* Duch.) is a high-value, nutrient-dense fruit crop in the Rosaceae family. Developed in Europe through hybridization of *F. virginiana* and *F. chiloensis*, it is now cultivated worldwide for its fragrant aroma, vibrant color, and broad adaptability.

In India, strawberry cultivation has expanded rapidly in states such as Maharashtra, Himachal Pradesh, Punjab, and Uttar Pradesh, driving annual production beyond 13.5 thousand tonnes (NHB, 2021-22). The fruit delivers 40-120 mg vitamin C per 100 g, alongside folic acid, potassium, calcium, iron, and antioxidants like anthocyanins and ellagic acid—compounds linked to anti-cancer, anti-inflammatory, and cardio protective benefits.

Strawberries flourish in cool to temperate climates, and polyhouse systems extend their growing season by providing a controlled microclimate and protection from adverse weather. However, the restricted soil volume and altered humidity under roof canopies often impair nutrient mobility, leading to deficiencies—particularly of calcium (Ca) and iron (Fe).

Calcium maintains cell-wall integrity, delays ripening, reduces fruit softening, and enhances resistance to mechanical damage during storage and transport. Iron is critical for chlorophyll synthesis, respiration, and enzyme activities that underpin both vegetative growth and reproductive development. Soil applications alone may fall short under polyhouse conditions, as reduced soil-water movement limits the availability of nutrients.

Foliar feeding with chelated forms such as Ca-EDTA and Fe-EDTA overcomes soil constraints by: Delivering nutrients directly to leaf tissue for rapid uptake, ensuring stability and sustained availability of Ca and Fe, and triggering improved physiological responses that translate into higher growth, yield, and fruit quality. Empirical studies have shown that foliar sprays of Ca-EDTA and Fe-EDTA significantly enhance plant height, spread, leaf and flower number, fruit set, yield, and quality traits- including total soluble solids, juice content,

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ascorbic acid, pH, specific gravity, and shelf life. Building on this foundation, the present investigation aims to evaluate the combined effects of Ca-EDTA and Fe-EDTA foliar applications on growth, yield, and fruit quality of Strawberry cv. Winter Dawn under the agro-climatic conditions of Prayagraj, and to estimate the economics of various treatments.

Materials and Methods

The field investigation titled “Effect of Foliar Application of Calcium and Iron Chelates on Growth, Yield, and Quality of Strawberry (*Fragaria x ananassa* Duch.) under Polyhouse Conditions” was conducted during the Rabi season of 2024-2025. The research took place at the Horticulture Research Farm of the Department of Horticulture at Sam Higginbottom University of Agriculture, Technology, and Sciences (SHUATS) in Prayagraj, Uttar Pradesh. The site was selected due to its favorable agro-climatic conditions for protected cultivation and its established infrastructure for horticultural research.

The strawberries were grown in a naturally ventilated polyhouse covering a total area of 250 m², which provided a controlled environment that supported consistent growth, minimized biotic and abiotic stress, and enabled precise measurement of treatment effects. The polyhouse was covered with UV-stabilized polyethylene film and featured adequate ventilation with side nets and roof openings, as well as raised beds to facilitate proper drainage. This setup allowed for an accurate evaluation of the treatment impacts on plant growth, yield, and fruit quality under controlled conditions.

The soil at the experimental site was sandy loam in texture, which is ideal for strawberry cultivation due to its good drainage and aeration properties. A detailed pre-sowing soil analysis showed that the soil was moderately acidic, with a pH of 6.5. The organic carbon content was low (0.34%), indicating limited microbial activity and organic matter availability. Additionally, the soil was deficient in essential macronutrients, with available nitrogen at 0.016%, phosphorus at 0.022%, and potash at 0.018%. These findings highlighted the necessity for external nutrient supplementation, particularly in the form of foliar-applied micronutrients.

The climatic conditions in Prayagraj are classified as subtropical, featuring extreme temperature variations between seasons. During the cropping period (November to March), temperatures ranged from a minimum of 8.0°C in January to a maximum of 35.4 °C in March. Relative humidity levels fluctuated between 31.4% and 92.4%, offering moderate to high atmospheric moisture. This microclimatic data was collected from the SHUATS Agro-Meteorological Observatory and was utilized to plan the timing of treatments and other field operations.

The entire experimental area was divided into 51 uniform plots, each measuring 1 m². The trial was arranged in a Randomized Block Design (RBD) with 17 treatments, each replicated three times to ensure statistical reliability and reduce experimental error. Each treatment plot contained six plants, spaced 30 cm apart between rows and 50 cm between plants, which maintained an optimal plant population while allowing sufficient space for canopy development and ease of foliar applications.

Table 1: Treatment details

Symbols	Treatment Combination
T ₀	Control
T ₁	Fe-EDTA @ 500ppm
T ₂	Fe-EDTA @ 750ppm
T ₃	Fe-EDTA @ 1000ppm
T ₄	Fe-EDTA @ 1250ppm
T ₅	Ca-EDTA @ 750ppm
T ₆	Ca-EDTA @ 750ppm+ Fe-EDTA @ 500ppm
T ₇	Ca-EDTA @ 750ppm+ Fe-EDTA @ 750ppm
T ₈	Ca-EDTA @ 750ppm+ Fe-EDTA @ 1000ppm
T ₉	Ca-EDTA @ 1000ppm
T ₁₀	Ca-EDTA @ 1000ppm+ Fe-EDTA @ 500ppm
T ₁₁	Ca-EDTA @ 1000ppm+ Fe-EDTA @ 750ppm
T ₁₂	Ca-EDTA @ 1000ppm+ Fe-EDTA @ 1000ppm
T ₁₃	Ca-EDTA @ 1250ppm
T ₁₄	Ca-EDTA @ 1250ppm+ Fe-EDTA @ 500ppm
T ₁₅	Ca-EDTA @ 1250ppm+ Fe-EDTA @ 750ppm
T ₁₆	Ca-EDTA @ 1250ppm+ Fe-EDTA @ 1000ppm

Management Practices

Before transplanting, the land was meticulously prepared through thorough ploughing, harrowing, and leveling to create a fine tilth suitable for strawberry cultivation. Raised beds were constructed with proper bunds and irrigation channels to ensure adequate drainage and facilitate intercultural operations. Well-rotted farmyard manure (FYM) was incorporated into the soil at a rate of 25 tons per hectare to enhance soil structure and fertility. The recommended dose of fertilizers (RDF), which included nitrogen (N), phosphorus (P), and potassium (K), was applied uniformly to all plots in the form of urea, single super phosphate (SSP), and muriate of potash (MOP).

Healthy, disease-free runners of the strawberry cultivar ‘Winter Dawn’ were manually transplanted into the prepared beds during the cool evening hours to reduce transplant shock. The spacing was set at 30 cm between plants and 50 cm between rows. Immediately after transplanting, light irrigation was applied to help the plants establish. Regular irrigation was provided through hosepipes or sprinklers according to the crop's needs, especially during critical stages such as flowering and fruit development.

Three foliar sprays of calcium and iron chelate, based on the treatment combinations, were applied using a hand-held sprayer at 30, 60, and 75 days after transplanting. The foliar solutions were freshly prepared before each application to maintain effectiveness and were sprayed in the evening to enhance leaf absorption and minimize nutrient loss due to evaporation.

Routine intercultural practices, such as weeding, hoeing, and removing old leaves, were carried out to keep the plots clean and reduce competition for nutrients. Pest and disease control was implemented using integrated pest management (IPM) practices. Neem oil and other recommended bio pesticides were used as preventive measures, while chemical sprays like chlorpyrifos, Bavistin, and Blitox were applied as needed, following safety intervals and proper dilution ratios.

To ensure uniform growth, any weak or dead plants were replaced within the first 15 days after transplanting. Throughout the cropping season, periodic monitoring of plant health and soil moisture was conducted. Fruits were manually harvested at peak maturity, indicated by uniform red coloration and full fruit size. The harvested fruits were immediately sorted and weighed to record yield and quality parameters.

Results and Discussion

The current investigation demonstrated the positive effects of foliar applications of calcium and iron chelates on various growth, yield, and quality parameters of strawberry (*Fragaria x ananassa* Duch.) under polyhouse conditions. The combined application of Ca-EDTA and Fe-EDTA resulted in significant improvements compared to the control and individual applications, with treatment T₁₄ (Ca-EDTA @ 1250 ppm + Fe-EDTA @ 500 ppm) proving to be the most effective.

Plant Height (cm)

Plant height increased significantly with the foliar application of calcium and iron chelates. At 90 days after transplanting (DAT), the highest plant height (30.41 cm) was observed in T₁₄, followed by T₆ (30.17 cm), while the lowest was recorded in the control group (T₀) at 15.70 cm. This increase in plant height can be attributed to enhanced cell division and elongation facilitated by calcium, along with improved photosynthetic efficiency due to iron. These findings align with those of Abou El-Yazied (2011) [3], who noted similar improvements in vegetative growth with foliar-applied micronutrients.

Plant Spread (cm)

The maximum plant spread (38.43 cm) was recorded under treatment T₁₄, followed closely by T₆ (38.16 cm), while the minimum was noted in T₀ (23.14 cm). The improved spread may result from enhanced cell wall strength and leaf expansion due to calcium (Tomala, 1997) [19] and increased chlorophyll synthesis and metabolic activity due to iron (Favaro *et al.*, 2007) [12]. These results support the observations of Asfanani *et al.* (2008) [20], who found that calcium ions promote better structural development of plant tissues.

Number of Leaves per Plant

A significant increase in the number of leaves per plant was observed across the treatments. T₁₄ recorded the highest number of leaves per plant (39.48), followed closely by T₆ (38.40), while T₀ had the lowest (15.97). Calcium contributes to meristematic activity and structural rigidity in plants, while iron ensures adequate enzymatic function and chlorophyll biosynthesis. Similar trends were reported by Al-Shammari (2016) [21], who noted that the combined application of calcium and iron enhanced vegetative development in strawberries.

Petiole Length (cm)

The highest petiole length was observed in T₁₄ at 13.72 cm, followed by T₆ at 13.39 cm, while the minimum was recorded in T₀ at 7.74 cm. This maximum petiole length in treatment T₁₄ aligns with findings by Lokesh Kumar and Bairwal (2021) [17], who reported that a combined foliar spray of FeSO₄ (0.2%), ZnSO₄ (0.2%), and boron significantly increased petiole length along with other vegetative traits in Winter Dawn strawberries under greenhouse conditions.

Number of Flowers per Plant

The flowering response was positively influenced by foliar nutrient treatments. T₁₄ exhibited the highest number of flowers per plant (23.37), followed closely by T₆ (21.84), indicating improved reproductive growth. This increase is likely due to balanced nutrient availability enhancing

hormonal signaling pathways and assimilate distribution, as noted by Rani and Ahmad (2012) [22].

Number of Fruits per Plant

The maximum number of fruits per plant was found in T₁₄ (15.40), followed by T₆ (13.63), which was significantly higher than the control (T₀) at 6.35. The improved fruit set can be attributed to reduced flower drop, enhanced pollination, and better fruit retention. These results are corroborated by Duarte *et al.* (2017) [23], who emphasized the role of micronutrients in enhancing reproductive success in strawberries.

Fruit Weight (g)

The foliar application of calcium and iron chelates significantly influenced the fruit weight of strawberries under polyhouse conditions. Among the treatments, T₁₄ (Ca-EDTA @ 1250 ppm + Fe-EDTA @ 500 ppm) recorded the highest average fruit weight of 24.78 g, followed by T₆ (Ca-EDTA @ 750 ppm + Fe-EDTA @ 500 ppm) at 23.37 g. The minimum fruit weight was observed in the untreated control (T₀) at 15.33 g. These results indicate the positive role of calcium and iron in enhancing cell enlargement and nutrient translocation, contributing to better fruit development. These findings are consistent with those of Pandey *et al.* (2024) [24] and El-Masry *et al.* (2019) [25], who reported that foliar sprays of Ca and Fe significantly increased fruit weight and quality by improving nutrient uptake and chlorophyll synthesis in strawberries.

Fruit Length (cm)

Foliar application of calcium and iron chelates significantly increased the fruit length of strawberries under polyhouse conditions. The longest fruit was recorded in T₁₄ (Ca-EDTA @ 1250 ppm + Fe-EDTA @ 500 ppm) with an average length of 4.19 cm, followed by T₆ (Ca-EDTA @ 750 ppm + Fe-EDTA @ 500 ppm) at 4.14 cm, while the shortest fruits were observed in the untreated control (T₀) at 1.85 cm. The positive impact on fruit elongation can be attributed to calcium's role in strengthening cell walls and iron's contribution to enhancing chlorophyll formation and enzymatic activity, which are critical for growth.

Fruit Diameter (cm)

The foliar application of calcium and iron chelates had a significant and consistent impact on the fruit diameter of strawberries grown under polyhouse conditions. The largest fruit diameter was recorded in treatment T₁₄ (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm), measuring 3.77 cm, closely followed by treatment T₆ at 3.72 cm. In contrast, the smallest fruit diameter was observed in the untreated control (T₀), which measured just 1.51 cm. These results are consistent with findings from Chandrakar *et al.* (2018) [8], who noted an increase in fruit diameter with the foliar spray of FeSO₄ in protected strawberry cultivation. Additionally, Sidhu *et al.* (2020) [26] reported improvements in fruit size through the application of Ca-EDTA in the cultivar Winter Dawn strawberries.

Fruit Yield per Plant (g)

The data indicate a highly significant impact of foliar-applied calcium and iron chelates on the fruit yield per plant in strawberries grown under polyhouse conditions. The highest yield was recorded in treatment T₁₄ (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm), with an impressive 381.96 g per plant. This was followed closely by treatment T₆, which yielded 318.50 g per plant. In contrast, the lowest

yield was observed in the untreated control (T_0), yielding only 97.34 g.

These results are consistent with the findings of Pandey *et al.* (2024), who reported a significant increase in strawberry yield following the application of Ca-EDTA, and Lokesh Kumar and Bairwa (2021) [17], who noted that combined foliar sprays of calcium and iron substantially improved fruit productivity in protected cultivation systems.

Fruit Yield per Plot (kg)

The foliar application of calcium and iron chelates also showed a significant positive effect on the fruit yield per plot in strawberries cultivated under polyhouse conditions. The highest yield per plot, 2.292 kg, was recorded in treatment T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm), while treatment T_6 yielded 1.911 kg. The lowest yield was found in the untreated control (T_0), which produced only 0.584 kg.

Similar results were reported by Bakshi *et al.* (2013) [27], who found that the foliar application of calcium, iron, and zinc significantly improved yield in the strawberry variety Chandler. Additionally, Bopparaju *et al.* (2022) [6] observed that foliar sprays of zinc and iron enhanced both per-plant and per-hectare yields in the 'Winter Dawn' strawberry variety.

Total Fruit Yield (kg/250 m²)

The data indicate a significant increase in the total fruit yield of strawberries (*Fragaria × ananassa* Duch.) per 250 m² under polyhouse conditions following foliar application of calcium and iron chelates. The highest yield was recorded in treatment T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm) with 116.88 kg/250 m², followed by treatment T_6 with a yield of 97.46 kg. The lowest yield was observed in the untreated control T_0 , which recorded only 29.79 kg. These findings are consistent with Bakshi *et al.* (2013) [27], who reported increased productivity in the strawberry cv. Chandler due to foliar application of calcium, iron, zinc, and with Bopparaju *et al.* (2022) [6], who found that foliar sprays of iron and zinc significantly enhanced yields in 'Winter Dawn' under protected conditions.

Total Soluble Solids (°Brix)

The foliar application of calcium and iron chelates significantly influenced the total soluble solids (TSS) content in strawberries grown under polyhouse conditions. Among all treatments, T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm) recorded the highest TSS value of 10.73 °Brix, closely followed by treatment T_6 with 10.61 °Brix and treatment T_8 with 10.42 °Brix. The lowest TSS (7.41 °Brix) was observed in the untreated control T_0 . These results align with Bakshi *et al.* (2013) [27], who reported enhanced TSS in the strawberry cv. Chandler as a result of calcium and iron sprays. Similarly, Chandrakar *et al.* (2018) [8] noted higher TSS in cv. Nabila under protected cultivation with the foliar application of micronutrients, including calcium and iron.

Acidity (%)

The foliar application of calcium and iron chelates significantly affected the acidity (%) of strawberries (*Fragaria × ananassa* Duch.) under polyhouse conditions. The highest acidity was recorded in treatment T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm) at 1.10%, closely followed by treatment T_6 with 1.09% and T_8 at 1.05%. The lowest acidity was noted in the control T_0 , which had an acidity of 0.48%. This indicates a substantial

difference attributable to foliar nutrient applications. These observations are supported by Bakshi *et al.* (2013) [27], who found that foliar application of calcium and iron improved the sugar-acid ratio in the strawberry cv. Chandler, suggesting enhanced metabolic regulation. Similarly, Chandrakar *et al.* (2018) [8] observed reduced acidity in protected cultivation of cv. Nabila due to calcium and iron foliar treatments, resulting from better physiological responses and nutrient uptake efficiency. The use of chelated forms (Ca-EDTA and Fe-EDTA) ensures better foliar absorption and internal mobility of nutrients, particularly in controlled environments like polyhouses, which contributes to balanced acidity and improved fruit quality.

Ascorbic Acid Content (mg/100g)

The foliar application of calcium and iron chelates significantly affected the ascorbic acid content in strawberry (*Fragaria × ananassa* Duch.) cv. Winter Dawn, grown under polyhouse conditions. A marked increase was observed across different treatments. The highest ascorbic acid content was recorded in treatment T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm), which measured 60.17 mg/100g. This was followed by treatment T_6 at 59.54 mg/100g and T_8 at 59.17 mg/100g. In contrast, the control treatment T_0 had the lowest content at 50.90 mg/100g. These results align with the findings of Singh *et al.* (2021) [17], who reported an increase in vitamin C levels in strawberry cultivars following the foliar application of calcium and iron, attributing this enhancement to increased antioxidant enzyme activity. Additionally, Verma and Sharma (2021) [21] noted that chelated micronutrients improved the antioxidant content and nutritional quality of cv. Nabila fruits. The application of calcium and iron in chelated forms (Ca-EDTA and Fe-EDTA) facilitates better foliar absorption and translocation, leading to more efficient physiological activity and increased vitamin C accumulation in fruits.

Specific Gravity

The foliar application of calcium and iron chelates also had a significant and consistent impact on the specific gravity of strawberry (*Fragaria × ananassa* Duch.) cv. Winter Dawn under polyhouse conditions. The highest specific gravity value (1.56) was recorded in treatment T_{14} (Ca-EDTA at 1250 ppm + Fe-EDTA at 500 ppm), followed closely by treatment T_6 at 1.43. The untreated control T_0 had the lowest specific gravity at 1.05. These findings are supported by Harika *et al.* (2024) [15], who observed that calcium foliar sprays contributed to denser fruits by enhancing cell wall rigidity and reducing water loss in strawberries. Furthermore, Niu *et al.* (2020) [28] emphasized that the foliar application of chelated micronutrients like calcium and iron improves nutrient-use efficiency, leading to better fruit firmness, density, and overall quality, particularly in controlled environments such as polyhouses.

Juice Content

The foliar application of calcium and iron chelates significantly impacted the juice content (%) of strawberry (*Fragaria × ananassa* Duch.) cv. Winter Dawn, grown under polyhouse conditions. The highest juice content was observed in treatment T_{14} , with 96.23%, followed closely by T_6 at 95.78%. In contrast, the lowest juice content was recorded in the control treatment T_0 , which had no foliar nutrients applied, yielding only 80.67%. These findings align with those of Sharma *et al.* (2022), who demonstrated that foliar sprays of calcium and iron chelate significantly

increased juice percentage in strawberries by enhancing cell turgor. Similarly, Bahmani and Goudarzi (2019) [7] reported that the application of Ca-EDTA and Fe-EDTA improved juice content and succulence in strawberry fruits by promoting better osmotic balance and water regulation.

PH

The foliar application of calcium and iron chelates also had a significant effect on the pH of strawberry (*Fragaria × ananassa* Duch.) cv. Winter Dawn grown under polyhouse conditions. The lowest pH value was recorded in treatment T₁₄ at 2.80, followed by T₆ at 2.85, indicating higher acidity and potentially better flavor quality. The highest pH was observed in the control treatment (T₀), which had a pH of 3.48, where no foliar application was made. These results are consistent with those of Cieniawska (2023) [10], who noted that calcium sprays help stabilize the acidity and pH of strawberries. Erdal *et al.* (2004) [29] also found that foliar iron applications, particularly in chelated form (Fe-EDTA),

led to more stable and desirable pH levels in strawberry fruits by improving nutrient availability.

Economic Parameter

Economic analysis indicated that the foliar application of calcium and iron chelates significantly enhanced the profitability of strawberry production under polyhouse conditions. The highest fruit yield was achieved with treatment T₁₄, producing 22.92 t/ha, along with a net return of ₹93.61 lakh/ha and a benefit-cost ratio of 3.66, making it the most cost-effective treatment. Other profitable treatments included T₆, which had a benefit-cost ratio of 2.89. In contrast, the control treatment (T₀) yielded the lowest economic return at ₹4.87 lakh/ha and a benefit-cost ratio of 0.19, highlighting the importance of nutrient application. Overall, the combination of Ca and Fe chelates proved to be the most economically beneficial for strawberry production in protected conditions.

Table 1: Effect of Different Treatments on Growth, Floral, and Fruit Traits of the Crop

Treatments	Plant Height	Plant spread	No. of leaves	Petiole length	No. of flowers	Number of fruits per plant	Fruit weight (g)	Fruit length (cm)	Fruit diameter (cm)
T ₀	15.70	23.14	15.97	7.74	11.01	6.35	15.33	1.85	1.51
T ₁	25.18	28.51	27.35	9.77	16.50	8.71	18.48	3.27	2.22
T ₂	26.30	28.52	28.28	9.33	17.14	8.75	18.84	3.18	2.44
T ₃	23.34	35.41	30.71	10.05	18.44	9.12	16.72	3.19	2.51
T ₄	20.52	27.85	30.54	9.60	17.43	7.70	18.45	3.34	2.69
T ₅	22.37	28.62	29.11	9.98	18.27	7.79	18.78	3.31	2.54
T ₆	30.17	38.16	38.40	13.39	21.84	13.63	23.37	4.14	3.72
T ₇	29.19	29.41	30.59	9.55	18.11	10.17	20.50	3.32	2.61
T ₈	30.10	37.48	37.16	13.20	20.28	12.41	22.47	4.05	3.64
T ₉	26.21	36.51	30.02	9.44	19.00	10.66	17.69	3.51	2.29
T ₁₀	26.94	36.18	32.08	9.57	17.84	8.65	21.27	3.61	2.31
T ₁₁	27.30	35.84	28.99	10.48	17.20	10.33	20.57	3.83	3.13
T ₁₂	27.35	35.65	26.48	10.58	17.03	9.65	21.41	3.76	2.83
T ₁₃	29.40	35.77	33.16	12.26	16.12	8.47	17.38	3.83	3.40
T ₁₄	30.41	38.43	39.48	13.72	23.37	15.40	24.78	4.19	3.77
T ₁₅	27.91	34.65	38.75	13.09	18.45	8.77	20.16	3.63	3.42
T ₁₆	26.51	33.50	37.65	12.00	12.28	9.52	20.48	3.36	3.34
F- Test	S	S	S	S	S	S	S	S	S
S. EM+-	0.381	0.445	0.332	0.106	0.454	0.238	0.164	0.043	0.036
C.D@ 5%	1.103	1.287	0.962	0.307	1.314	0.690	0.475	0.125	0.105
C.v	2.522	2.323	1.830	1.698	4.364	4.225	1.436	2.147	2.209

Table 2: Effect of Different Treatments on Fruit Yield and Quality Parameters of the Crop

Treatments	Fruit per plant (g)	Fruit yield per plot (kg)	Fruit yield (kg 250m2)	TSS 0Brix	Acidity (%)	Ascorbic acid (mg/100g)	Specific gravity	Juice Content (%)	pH
T ₀	97.34	0.584	29.79	7.41	0.48	50.90	1.05	80.67	3.48
T ₁	160.96	0.966	49.25	8.48	0.87	54.18	1.28	88.96	3.26
T ₂	164.81	0.989	50.43	8.80	0.88	56.19	1.31	88.17	3.28
T ₃	152.41	0.914	46.64	9.09	0.94	55.88	1.37	91.95	3.22
T ₄	142.15	0.853	43.50	9.68	1.02	56.79	1.27	92.31	3.30
T ₅	146.23	0.877	44.75	9.17	0.97	53.70	1.34	91.21	3.17
T ₆	318.50	1.911	97.46	10.61	1.09	59.54	1.43	95.78	2.85
T ₇	208.59	1.252	63.83	8.85	0.81	56.14	1.32	92.04	3.15
T ₈	278.97	1.674	85.36	10.42	1.05	59.17	1.47	95.58	2.92
T ₉	188.60	1.132	57.71	9.25	0.73	52.63	1.24	93.70	3.22
T ₁₀	184.23	1.105	56.37	9.40	0.74	55.84	1.28	92.02	3.27
T ₁₁	212.59	1.276	65.05	8.74	0.75	57.20	1.27	91.88	3.30
T ₁₂	206.54	1.239	63.20	9.30	0.85	56.19	1.20	92.14	3.27
T ₁₃	147.13	0.883	45.02	9.37	0.78	55.43	1.28	92.13	3.16
T ₁₄	381.96	2.292	116.88	10.73	1.10	60.17	1.56	96.23	2.80
T ₁₅	176.88	1.061	54.13	9.45	0.80	55.43	1.21	94.81	3.23
T ₁₆	194.87	1.169	59.63	9.40	0.84	58.20	1.28	93.46	3.21
F- Test	S	S	S	S	S	S	S	S	S
S.EM+-	6.190	0.037	1.894	0.059	0.016	2.174	0.025	0.167	0.015
C.D@ 5%	17.913	0.108	5.480	0.172	0.046	0.751	0.073	0.484	0.043
C.v	5.420	5.427	5.419	1.107	3.155	2.320	3.373	0.315	0.811

Conclusion

Based on the results of the present study, it is concluded that treatment T₁₄ Ca-EDTA @ 1250ppm + Fe-EDTA @ 500ppm performed the best in terms of growth, yield, and quality of the strawberry, which was also observed for this treatment. Meanwhile, the maximum benefit-cost ratio (3.66) was found in treatment T₁₄ Ca-EDTA @ 1250ppm + Fe-EDTA @ 500ppm.

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