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Effect of different levels of gibberellic acid (GA₃) on growth and yield of two varieties of cucumber (*Cucumis sativus* L.) cv. Malini, Nazia F₁

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Abstract

The present investigation was carried out with title “Effect of different levels of gibberellic acid (GA₃) on growth and yield of two varieties of cucumber (*Cucumis sativus* L.) cv. Malini, Nazia F₁” at Research Farm, Department of Horticulture, Naini Agricultural Institute, SHUATS, Naini, Prayagraj, Uttar Pradesh during the Zaid-2023-24 with a view to identify the effects of different combinations of PGR doses and its role in growth, yield and quality of two varieties of cucumber. The experiment was laid in Randomized block design with 10 treatments and 3 replications. Under this experiment, overall, 10 treatment was taken T₁ (Malini + Control), T₂ (Malini + (GA₃) @ 5 ppm), T₃ (Malini + (GA₃) @ 10 ppm), T₄ (Malini + (GA₃) @ 15 ppm), T₅ (Malini + (GA₃) @ 20 ppm), T₆ (Nazia F₁ + Control), T₇ (Nazia F₁ + (GA₃) @ 5 ppm), T₈ (Nazia F₁ + (GA₃) @ 10 ppm), T₉ (Nazia F₁ + (GA₃) @ 15 ppm) and T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm). From the above experimental finding it may be concluded that the treatment T₁₀ (Nazia F₁ + (GA₃) was found to be best in the terms of growth, yield and quality of Cucumber. The highest net return was found in the T₁₀ (Nazia F₁ + (GA₃) with (Rs 1,76,507/ha) and the highest B:C ratio was found in the same with 2.39.

Keywords: *Cucumis sativa*, GA₃, benefit cost ratio

Introduction

Throughout history, fruits and vegetables have been highly regarded for their nutritional value, particularly for their abundance of essential vitamins such as A and C, minerals including electrolytes, and more recently recognized phytochemicals, notably antioxidants. In 2020, India emerged as the world's second-largest producer of fruits and vegetables, with a staggering output of 82.85 million tons of fruits and 166.18 million tons of vegetables, contributing nearly 14.0% to global vegetable production. Despite this impressive production, significant amounts, approximately 25% go to waste annually, highlighting the challenge of agricultural waste management (Anonymous, 2015) [3].

The Cucurbitaceae, also called cucurbits or the gourd family, are a plant family consisting of about 965 species in around 95 genera, of which the most important to humans are:

Cucurbita – squash, pumpkin, zucchini, some gourds

Lagenaria – calabash, and others that are inedible

Citrullus – watermelon (*C. lanatus*, *C. colocynthis*) and others

Cucumis – cucumber (*C. sativus*), various melon

Momordica – bitter melon

Luffa – the common name is also luffa, sometimes spelled loofah (when fully ripened, two species of this fibrous fruit are the source of the loofah scrubbing sponge).

The plants in this family are grown around the tropics and in temperate areas, where those with edible fruits were among the earliest cultivated plants in both the Old and New Worlds. The family Cucurbitaceae ranks among the highest of plant families for number and percentage of species used as human food. Cucurbits are the largest group of summer vegetables crops belonging to the family Cucurbitaceae. Most of the cucurbits are monoecious in nature except *Coccinia* and pointed gourd (Parval) which are dioecious. Several hermaphrodites and andro-monoecious cultivars are also available in some crops (melons). Fruit is Pepo botanically.

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Botanically Cucumber is known as *Cucumis sativus* L. Belongs to family Cucurbitaceae. It is a diploid self-pollinated species with chromosome number $2n=2x=14$. Cucumber probably originated from Indo-Burma region of Hindustan centre (Vavilov, 1935). It is mainly cultivated in China, India, Turkey, Iran, and other parts of south-east Asia. Progenitor of cucumber is "*Cucumis hardwickii*". Economic sex ratio is 15:1. The area under Cucumber production in India accounts to 94 million ha with production of 1608.29 million tonnes in year 2020-21 (Source: NHB, Ministry of Agriculture & Farmers Welfare, Government of India, 2021-22). West Bengal ranks first in area and production of Cucumber in year 2021-22 followed by Madhya Pradesh and Haryana. The production of Cucumber in Jammu & Kashmir is 20.68 million tonnes for year 2021-22. The cucumber is used as salad, pickles, and as cooked vegetable. It has many uses in ayurvedic medicines. According to 'Unani' medicines, the oil from its seed is God for the brain and the body. Cucumber has 96.3 g water, magnesium 11 mg, sodium 10.2 mg, Vitamin C 7 mg, 2.5g Carbohydrates, Oxalic acid 15 mg, Calcium 10 mg, Sulphur 17 mg, Potassium 50 mg and many other nutrients out of 100 g of edible portion. (Choudhary, 2013) [9]. It is considered as quality dietary food due to its excellent digestibility and rich water content (96.3 g/100 g). Cucumber is a dependable laxative for those who suffer constipation. The juice of cucumber is a valuable food in the treatment of hyper acidity, gastric and duodenal ulcers. Cucumber is well adapted crop for warm season crop, and it does not withstand even light frost. The crop performs well in temperature range between 18 °C- 24 °C and soil having pH ranging between 5.5-6.7 irrespective of its kind from sandy to heavy clay soil. It is grown as sole crop in India in *Zaid* and *Kharif* season. It is well suited to hot and warm climate with annual rainfall of 60-75 cm. However, cucumber cannot withstand water lodging.

Role of plant growth regulators (PGRs) on crop plants

Plant Growth Regulators (PGRs), or plant hormones, are crucial for regulating plant growth and development, thereby influencing crop yield. PGRs have various key roles in crop growth:

Stimulating cell division and elongation: PGRs like auxins and cytokinin promote shoot and root growth by stimulating cell division and elongation, leading to larger and more productive crops.

Regulating flowering and fruiting: PGRs such as gibberellins and cytokinin affect flowering initiation, flower development, and fruit set. They synchronize flowering, ensuring successful pollination and fertilization, resulting in improved fruit formation and increased crop yield.

Regulating senescence and ripening: PGRs like ethylene and abscisic acid influence leaf senescence and fruit ripening. Ethylene is a key regulator of fruit ripening, initiating changes in colour, texture, flavour, and aroma. Proper PGR management optimizes fruit maturation, post-harvest quality, and extends the shelf life of crops. PGRs have been found to alleviate the adverse effects of various abiotic stresses on chilli plants, including drought, salinity, and extreme temperatures. They can enhance stress tolerance and improve the plant's ability to withstand challenging environmental conditions.

Materials and Methods

The present investigation entitled "Effect of different levels of gibberellic acid (GA_3) on growth and yield of two varieties of cucumber (*Cucumis sativus* L.) cv. Malini, Nazia F_1 " was done to understand the effect of plant growth regulators (GA_3) on fruit

growth, yield and quality of Cucumber. The details of the materials used, and the procedures adopted in the investigation, which was carried out at Research Farm, Department of Horticulture, Naini Agricultural Institute, SHUATS, Prayagraj during the *Zaid* season of 2022-23 are described under the following heads.

Experimental Site

The study was conducted at the Horticultural Research Farm within the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, U.P., during the *Zaid* seasons of 2022-23. The university is positioned alongside the Prayagraj – Rewa National Highway, approximately 5 kilometres from Prayagraj City. All essential facilities required for successful crop cultivation, including field preparation, inputs, irrigation provisions, and labour, were provided by the Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, U.P., India.

Location and climatic conditions of the experimental farm

Prayagraj lies within the central plain sub-zone of Agro-climatic zone V, as per the Perspective and Strategic Plan (SPSP) for IWMP of Uttar Pradesh by the Department of Land Development and Water Resources, Government of U.P. The geographical coordinates for Naini range between 20° 33' 40" to 21° 50" N latitude and 73° 27' 58" to 73° 56' 36" E longitude. The region features a tropical climate characterized by relatively hot summers, moderately cold winters, and humid, warm monsoons. Rainfall is abundant, primarily occurring from June to September, predominantly driven by the south-west advancing monsoon. The bulk of precipitation concentrates in July and August. Detailed meteorological data for the cropping seasons are provided in Tables 1.

Tables 1: Detail of treatment combination

SL. No.	Treatment Symbols	Treatment combination
1	T ₁	Malini + Control
2	T ₂	Malini + (GA_3) @ 5 ppm
3	T ₃	Malini + (GA_3) @ 10 ppm
4	T ₄	Malini + (GA_3) @ 15 ppm
5	T ₅	Malini + (GA_3) @ 20 ppm
6	T ₆	Nazia F_1 + Control
7	T ₇	Nazia F_1 + (GA_3) @ 5 ppm
8	T ₈	Nazia F_1 + (GA_3) @ 10 ppm
9	T ₉	Nazia F_1 + (GA_3) @ 15 ppm
10	T ₁₀	Nazia F_1 + (GA_3) @ 20 ppm

Statistical analysis the statistical analysis of the data was carried out using STATISTICA (7.0) software.

Results and Discussion

Plant Height

It was also found that T₁₀ (Nazia F_1 + GA_3 @ 20 ppm) had maximum plant height at 15,30, 45 DAS (4.07, 18.27, 69.75 cm) which was at par with T₅ (Malini + GA_3 @ 20 ppm) having 61.84 cm whereas the minimum plant height was observed in treatment T₁ (Malini + Control) with (2.8, 12.27, 45 cm) Nazia F_1 cucumber variety demonstrates superior growth at a GA_3 concentration of 20 ppm due to its genetic predisposition and responsiveness to this specific hormone level. At 20 ppm, GA_3 effectively stimulates cell elongation processes, particularly in the internodes, resulting in increased plant height. Similar

findings were reported by Anayat *et al.*, (2020) ^[4] in bitter gourd.

Number of Branches

The results pertaining to the effect of GA₃ on number of branches per plant of two different varieties of cucumber observed at 15, 30 and 45 DAS.

It is evident that the number of branches per plant was influenced by different treatments for plant growth regulators. There was significant difference present among the treatments applied. It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum number of branches per plant at 15, 30, 45 DAS (1.85, 6.63, 15.98 branches) whereas the minimum number of branches per plant was observed in treatment T₁ (Malini + Control) with (1.18, 3.80, 12.67 branches). Similar findings were reported by Duhan *et al.*, (2022) ^[12] in bottle gourd.

Days to first flowering

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) took minimum days to first flowering (38.21 days) which was at par with T₃ (Malini + GA₃ @ 10 ppm) and T₇ (Nazia F₁ + GA₃ @ 5 ppm) having 40.60 days whereas the maximum days to first flowering was observed in treatment T₁ (Malini + Control) with 42.03 days. Similar findings were reported by Jeevitha and Vasudevan (2019) ^[5] in sponge gourd.

Days to first fruit setting

The results pertaining to the effect of GA₃ on number of branches per plant of two different varieties of cucumber observed.

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) took minimum days to first fruit setting (42.52 days) which was at par with T₈ (Nazia F₁ + GA₃ @ 10 ppm) having 43.23 days whereas the maximum days to first fruit setting was observed in treatment T₁ (Malini + Control) with 45.22 days. Similar findings were reported by Jishnu *et al.*, (2023) ^[15] in Sponge gourd.

Days to first fruit picking

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) took minimum days to first fruit picking (50.07 days) which was at par with T₈ (Nazia F₁ + GA₃ @ 10 ppm) having 50.33 days whereas the maximum days to first fruit picking was observed in treatment T₁ (Malini + Control) with 55.70 days. The Malini variety may exhibit different genetic or hormonal sensitivities, resulting in variations in fruit maturity responses even at similar GA₃ doses. Similar findings were reported by Kumar *et al.*, (2019) ^[16]; Pandey *et al.*, (2021) ^[17] in cucumber.

Number of pickings

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum number of pickings (3.83) which was at par with T₅ (Malini + GA₃ @ 20 ppm) having whereas the minimum number of pickings was observed in treatment T₃ (Malini + GA₃ @ 10 ppm) with 2.33. The Malini variety may exhibit different genetic or hormonal sensitivities, resulting in variations in fruit maturity responses even at similar GA₃ doses. Similar findings were reported by Kumar *et al.*, (2019) ^[16]; Pandey *et al.*, (2021) ^[17] in cucumber.

Number of fruits per plant

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum number of fruits per plant (12.90 fruits) which was at par with T₅ (Malini + (GA₃) @ 20 ppm) having 12.20 fruits

whereas the minimum number of fruits per plant was observed in treatment T₁ (Malini + Control) with 10.40 fruits. Similar findings were reported by Rosales and Galinato (2015) ^[18] in bitter gourd.

Average 10 fruit weight

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum average 10 fruit weight (3175.10 gram) which was at par with T₅ (Malini + GA₃ @ 20 ppm) having 3048.34 gram whereas the minimum average 10 fruit weight was observed in treatment T₁ (Malini + Control) with 1582.65 gram. The Malini variety may exhibit different genetic or hormonal sensitivities, resulting in variations in fruit weight even at similar GA₃ doses. Similar findings were reported by Shah *et al.*, (2023) ^[19] in bitter gourd.

Fruit length

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum fruit length (20.00 cm) which was at par with T₉ (Nazia F₁ + GA₃ @ 15 ppm) having 19.00 cm whereas the minimum fruit length was observed in treatment T₁ (Malini + Control) with 15.00 cm. Similar findings were reported by Shukla *et al.*, (2023) ^[20] in Ridge gourd.

Fruit diameter

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum fruit diameter (13.05 mm) which was at par with T₇ (Nazia F₁ + GA₃ @ 5 ppm) having 12.82 mm whereas the minimum fruit diameter was observed in treatment T₁ (Malini + Control) with 9.74 mm. The Malini variety may possess different genetic or hormonal traits, resulting in variations in fruit diameter even at similar GA₃ doses. Similar findings were reported by Shukla *et al.*, (2023) ^[20] in Ridge gourd.

Fruit yield per plot

It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum fruit yield per plot (12.31 kg/plot) which was at par with T₅ (Malini + GA₃ @ 20 ppm) having 12.15 kg/plot whereas the minimum fruit yield per plot was observed in treatment T₁ (Malini + Control) with 8.09 kg/plot. Similar findings were reported by Shukla *et al.*, (2023) ^[20] in Ridge gourd.

Fruit yield per hectare

Fruit yield per hectare had significant influence under GA₃ on different varieties of cucumber at different GA₃ doses. It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum fruit yield per hectare (143.86q/ha) which was at par with T₅ (Malini + GA₃ @ 20 ppm) having 135.35q/ha whereas the minimum fruit yield per hectare was observed in treatment T₁ (Malini + Control) with 86.76q/ha. Similar findings were reported by Vyas *et al.*, (2023) ^[21] in Ridge gourd.

TSS

TSS had significant influence under GA₃ on different varieties of cucumber at different GA₃ doses. It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum TSS (5.74°Brix) which was at par with T₃ (Malini + GA₃ @ 10 ppm) having 5.63°Brix whereas the minimum TSS was observed in treatment T₂ (Malini + GA₃ @ 5 ppm) with 4.26°Brix. Similar findings were reported by Shukla *et al.*, (2023) ^[20]; Vyas *et al.*, (2023) ^[21] in Ridge gourd.

Ascorbic acid content

Ascorbic acid content had significant influence under GA₃ on

different varieties of cucumber at different GA₃ doses. It was also found that T₁₀ (Nazia F₁ + GA₃ @ 20 ppm) had maximum ascorbic acid content (5.38 mg/100 g) which was at par with T₅ (Malini + GA₃ @ 20 ppm) having 5.35 mg/100 g whereas the

minimum ascorbic acid content was observed in treatment T₁ (Malini + Control) with 3.47 mg/100 g. Similar findings were reported by Shukla *et al.*, (2023) ^[20]; Vyas *et al.*, (2023) ^[21] in Ridge gourd.

Table 2: Effect of GA₃ on the plant height of Cucumber

Treatment Notation	Treatment details	Plant height (cm)		
		15 DAS	30 DAS	45 DAS
T ₁	Malini + Control	2.80	12.27	53.39
T ₂	Malini + (GA ₃) @ 5 ppm	3.30	13.47	61.41
T ₃	Malini + (GA ₃) @ 10 ppm	3.67	16.07	60.51
T ₄	Malini + (GA ₃) @ 15 ppm	3.03	13.27	53.39
T ₅	Malini + (GA ₃) @ 20 ppm	3.82	17.37	61.84
T ₆	Nazia F ₁ + Control	3.31	14.81	53.86
T ₇	Nazia F ₁ + (GA ₃) @ 5 ppm	3.33	16.04	60.27
T ₈	Nazia F ₁ + (GA ₃) @ 10 ppm	3.10	15.27	58.71
T ₉	Nazia F ₁ + (GA ₃) @ 15 ppm	3.20	17.51	58.70
T ₁₀	Nazia F ₁ + (GA ₃) @ 20 ppm	4.07	18.27	69.75
'F' Test		S	S	S
SE. m (±)		0.15	0.59	1.42
CD. at 5%		0.43	1.73	4.16
CV.		8.23	7.24	4.56

In this table we observed that maximum plant height are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) (4.07, 18.27, 69.75 cm) and

minimum plant height are found in T₀ (Malini + Control) (2.80, 12.27, 53.39 cm)

Table 3: Effect of GA₃ on the number of branches of Cucumber

Treatment Notation	Treatment details	No of branches per plant		
		15 DAS	30 DAS	45 DAS
T ₁	Malini + Control	1.18	3.80	12.67
T ₂	Malini + (GA ₃) @ 5 ppm	1.40	4.34	13.91
T ₃	Malini + (GA ₃) @ 10 ppm	1.50	4.27	14.58
T ₄	Malini + (GA ₃) @ 15 ppm	1.37	4.49	12.83
T ₅	Malini + (GA ₃) @ 20 ppm	1.67	5.73	14.20
T ₆	Nazia F ₁ + Control	1.50	4.32	12.88
T ₇	Nazia F ₁ + (GA ₃) @ 5 ppm	1.72	5.00	14.38
T ₈	Nazia F ₁ + (GA ₃) @ 10 ppm	1.37	5.80	12.87
T ₉	Nazia F ₁ + (GA ₃) @ 15 ppm	1.53	5.66	13.93
T ₁₀	Nazia F ₁ + (GA ₃) @ 20 ppm	1.85	6.63	15.98
'F' Test		S	S	S
SE. m (±)		0.08	0.17	0.47
CD. at 5%		0.23	0.49	1.37
CV.		9.69	6.28	6.40

In this table we observed that maximum number of branches are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) (1.85, 6.63, 15.98)

and minimum number of branches are found in T₀ (Malini + Control) (1.18, 3.80, 12.67).

Table 4: Effect of GA₃ on days to first flowering, days to first fruit setting, days to first picking and number of picking of the Cucumber

Treatment Notation	Treatment details	Days to first flowering	Days to first fruit setting	Days to first fruit picking	Number of pickings
T ₁	Malini + Control	42.03	45.22	55.70	2.67
T ₂	Malini + (GA ₃) @ 5 ppm	40.81	43.97	51.18	3.33
T ₃	Malini + (GA ₃) @ 10 ppm	40.89	43.70	51.64	2.33
T ₄	Malini + (GA ₃) @ 15 ppm	41.36	44.03	51.69	3.33
T ₅	Malini + (GA ₃) @ 20 ppm	41.55	44.55	51.27	3.67
T ₆	Nazia F ₁ + Control	41.58	44.36	50.46	2.67
T ₇	Nazia F ₁ + (GA ₃) @ 5 ppm	40.60	43.49	53.03	3.00
T ₈	Nazia F ₁ + (GA ₃) @ 10 ppm	40.48	43.23	50.33	2.67
T ₉	Nazia F ₁ + (GA ₃) @ 15 ppm	41.83	43.43	50.80	2.33
T ₁₀	Nazia F ₁ + (GA ₃) @ 20 ppm	38.21	42.52	50.07	3.83
'F' Test		S	S	S	NS
SE. m (±)		0.82	0.81	0.53	0.32
CD. at 5%		2.40	2.36	1.55	-
CV.		3.18	3.50	1.95	19.99

In this table we observed that minimum days to first flowering are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) (38.21) and maximum days to first flowering are found in T₀ (Malini + Control) (42.03 days).

In this table we observed that minimum days to first fruit setting

(42.52 days), days to first fruit picking (50.07 days) and number of picking (2.67) are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) and maximum days to first fruit setting (45.22 days), days to first fruit picking (55.70 days) and number of picking (23.83) are found in T₀ (Malini + Control).

Table 5: Effect of GA₃ on Number of fruits per plant, Average 10 fruit weight (g), fruit length (cm) and fruit diameter (mm) of the Cucumber

Treatment Notation	Treatment details	Number of fruits per plant	Average 10 fruit weight (g)	Fruit length (cm)	Fruit diameter (mm)
T ₁	Malini + Control	10.40	1582.65	15.00	9.74
T ₂	Malini + (GA ₃) @ 5 ppm	10.90	2078.65	15.33	9.91
T ₃	Malini + (GA ₃) @ 10 ppm	11.20	2995.99	17.00	12.74
T ₄	Malini + (GA ₃) @ 15 ppm	10.80	2061.84	18.67	9.90
T ₅	Malini + (GA ₃) @ 20 ppm	12.20	3048.34	18.67	11.43
T ₆	Nazia F ₁ + Control	11.00	2170.99	15.67	10.58
T ₇	Nazia F ₁ + (GA ₃) @ 5 ppm	11.80	2426.01	17.67	12.82
T ₈	Nazia F ₁ + (GA ₃) @ 10 ppm	11.40	1619.37	17.33	12.76
T ₉	Nazia F ₁ + (GA ₃) @ 15 ppm	10.80	2401.77	19.00	12.80
T ₁₀	Nazia F ₁ + (GA ₃) @ 20 ppm	12.90	3175.10	20.00	13.05
'F' Test		S	S	S	S
SE. m (±)		0.56	3.22	0.90	0.23
CD. at 5%		1.65	9.45	2.64	0.68
CV.		9.40	0.26	9.79	3.80

In this table we observed that maximum number of fruit per plant are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) (12.90) and minimum number of branches are found in T₀ (Malini + Control) (10.40).

In this table we observed that maximum average fruit weight

(3175.10 g), fruit length (20m) and fruit diameter (13.05 mm) are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) and minimum average fruit weight (1582.65g), fruit length (15 cm), and fruit diameter (9.74 mm) are found in T₀ (Malini + Control).

Table 6: Effect of GA₃ on Fruit yield per plot, fruit yield per hectare, TSS and Ascorbic acid of the Cucumber

Treatment Notation	Treatment details	Fruit yield per plot (kg/plot)	Fruit yield per hectare (q/ha)	TSS (°Brix)	Ascorbic acid content (mg/100 g)
T ₁	Malini + Control	8.09	86.76	4.66	3.47
T ₂	Malini + (GA ₃) @ 5 ppm	9.13	105.94	4.26	3.87
T ₃	Malini + (GA ₃) @ 10 ppm	12.02	131.25	5.63	4.07
T ₄	Malini + (GA ₃) @ 15 ppm	8.24	114.15	5.43	4.10
T ₅	Malini + (GA ₃) @ 20 ppm	12.15	135.35	5.42	5.35
T ₆	Nazia F ₁ + Control	9.73	94.03	4.81	3.90
T ₇	Nazia F ₁ + (GA ₃) @ 5 ppm	10.12	122.25	5.27	4.74
T ₈	Nazia F ₁ + (GA ₃) @ 10 ppm	10.12	122.81	5.21	5.21
T ₉	Nazia F ₁ + (GA ₃) @ 15 ppm	10.00	107.42	4.81	4.42
T ₁₀	Nazia F ₁ + (GA ₃) @ 20 ppm	12.31	143.86	5.74	5.38
'F' Test		S	S	S	S
SE. m (±)		0.41	1.21	0.28	0.17
CD. at 5%		1.22	3.54	0.81	0.51
CV.		7.72	1.97	3.26	7.39

In this table we observed that maximum fruit yield per plot are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) (12.31kg) and minimum fruit yield per plot are found in T₀ (Malini + Control) (8.09 kg).

In this table we observed that maximum fruit yield per q/ha (143.86 q/ha), TSS (5.74) and Ascorbic acid (5.38) are found in T₁₀ (Nazia F₁ + (GA₃) @ 20 ppm) and minimum fruit yield per q/ha (86.76 q/ha), TSS (4.66), Ascorbic acid (3.47) are found in T₀ (Malini + Control)

Conclusion

From the above experimental finding it may be concluded that the treatment T₁₀ (Nazia F₁ + (GA₃) was found to be best in the terms of growth, yield and quality of Cucumber. The highest net return was found in the T₁₀ (Nazia F₁ + (GA₃) with (Rs 1, 76,507/ha) and the highest B: C ratio was found in the same with 2.39.

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