



Comparative Studies of Tomato and Cherry Tomatoes Different Varieties under Poly House Condition

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ABSTRACT: Research was carried out at Vegetable Research Farm, Department of horticulture, SHUATS, Prayagraj (U.P.) during winter season of 2020 - 2021, to evaluate different varieties of poly house condition traits of 7 Hybrids, with three replications in Randomized Block Design (RBD). Analysis of variance in the present investigation indicated that the genotypes evaluated differed significantly among all the treatment for all Thirteen traits. The hybrids Arka rakshak (887.01 kg) yield/hac and Total cost of cultivation (INR ha⁻¹) 72,250.00. Cost Benefit Ratio of different varieties of tomato, Variable cost and total cost of cultivation of different varieties, Economics of cherry tomato and tomatoes, Yield per hectare & plant height (cm).

Keywords: Tomato, Yield and Quality

INTRODUCTION

The tomato covers about 3.55 lakh hectares area (2007) in India with a production of 54.41 lakh tonnes and productivity of 15.32 tonnes/ ha (NHB : 2019). The leading states for tomato production in India are U.P. Karnataka, Maharashtra, Haryana, Punjab and Bihar in our country growing of vegetables are 4-8 times more remunerable than cereals and other field crops and also the vegetables cultivation generates more employment in the rural areas. Thus India has to go a long way to accelerate the vegetable production. It plays unique role in vegetable diet and stands next to potato in importance.

The area under tomato cultivation is 4.66 lakh hectares with a production of 82.71 lakh tonnes, contributing 7.95 percent of total area and production (Chadha, 2001). Besides, sufficient vitamins



like carotene 35 ug, thiamine 0.12 mg, riboflavin, 0.06 mg, niacin 0.4 mg and vitamin C 27 mg are available /100g fruit, as reported by **Gopalan *et al*. (2001)**. It is preferably consumed in skin response to UV-exposure, therefore may represent a first line protection against UV- induced oxidative damage. The green raw tomatoes turn into red when it ripens as the form of lycopene present in tomato gradually changes into transform of lycopene with maturity **Xianquan *et al* (2005)**. Lycopene is carotenoid it is the main pigment of tomatoes, conferring to the fruit its red colour. Antioxidants in foods have recently emerged as the bimolecules of almost interest to human health. Dietary antioxidants inactivate reactive oxygen species, reduces oxidative damage lead to improve immuno functions and reduce risk of infectious diseases- increasing intake of dietary oxidant may help to maintain adequate antioxidants status and therefore, the normal physiological functions of living system Kaur and Kapoor (2007)

Sauce and puree are popular tomato products in India. Sauce is used with many foods to enhance the palatability and aesthetic value. The children are very fond of tomato sauce. Puree is a form of concentrated juice which acts as convenience food and used in preparation of curries during shortage as well as costliest tomato accessible in the market. Nowadays, many national and multinational companies are involved in preparing sauce and puree with wide dimensions of branding and quality standard too. Tomatoes have a rich flavor, high liquid content, very soft flesh which breaks down easily, and the right composition to thicken into a sauce when they are cooked (without the need of thickeners like roux).

MATERIALS AND METHODS

Research was carried out at Vegetable Research Farm, Department of horticulture, SHUATS, Prayagraj (U.P.) during winter season of 2020 - 2021, to evaluate the Comparative Studies of Tomato and cherry Tomatoes different varieties under poly house Condition traits of 7 Hybrids, with three replications in Randomized Block Design (RBD).with the spacing of plot length size of 2.25m and plot width size of 1 m.. Cost Benefit Ratio of different varieties of tomato, Variable cost and total cost



of cultivation of different varieties, Economics of cherry tomato and tomatoes, Yield per hectare & plant height (cm).

RESULTS AND DISCUSSION

The present studies on the “**Comparative Studies on Tomato and Cherry Tomato Under Polyhouse Condition**” was carried out at the field of Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during the year 2020-2021. The observations recorded and results obtained during the period of investigation have been presented in this chapter under the following headings.

The maximum plant height at 30 days after transplanting was recorded by the genotype Sweet Girl i.e. (30.08) followed by Arka Rakshak i.e. (22.08). The maximum plant height at 60 days after transplanting was recorded by the genotype Sweet Girl i.e. (30.08) followed by Arka Rakshak i.e. (22.08). The maximum plant height at 90 days after transplanting was recorded by the genotype Sweet Girl i.e. (30.08) followed by Arka Rakshak i.e. (22.08). These results were in concurrence with the earlier findings of Renuka *et al.* (2014), Prema *et al.* (2011a) and Kumar *et al.* (2014)

Table.1 Plant height (cm) at 30,60 and 90 days after transplanting.

Treatment No.	Varieties	Plant height (cm) in 30 days	Plant height (cm) in 60 days	Plant height (cm) in 90 days
T ₁	Arka rakshak	22.08	67.50	87.50
T ₂	Arka vikas	20.50	64.58	82.50
T ₃	Arka abhed	17.92	64.17	85.00
T ₄	Arka samrat	18.00	60.42	77.50
T ₅	Sweet boy	21.08	87.92	110.00
T ₆	Sweet girl	32.08	115.00	187.50
T ₇	Local	21.75	100.00	142.50
F-test		S	S	NS



S.Ed (\pm)	0.85	0.76	0.00
C.D. (P = 0.05)	2.63	2.35	0.00

Table. 2 Yield /plant (kg)

Treatment No.	Varieties	Yield /plant in 30 days	Yield/plant in 60 days	Yield /plant in 90 days
T1	Arka rakshak	2.25	3.22	4.11
T2	Arka vikas	2.13	3.11	3.95
T3	Arka abhed	2	2.58	3
T4	Arka samrat	1.25	1.8	2.5
T5	Sweet boy	1.18	2.2	2.75
T6	Sweet girl	1.5	1.95	2.4
T7	Local	1.17	1.85	2.2
F-test		S	S	S
S.Ed (\pm)		0.04	0.05	0.21
C.D. (P = 0.05)		0.08	0.11	0.46

The Maximum yield at 30 days after transplanting was found to be the genotypes arka rakshak i.e (2.25) followed by arka vikas i.e (2.0).The Maximum yield at 60 days after transplanting was found to be the genotypes arka rakshak i.e (2.25) followed by arka vikas i.e (2.0)The Maximum yield at 90 days after transplanting was found to be the genotypes arka rakshak i.e (2.25) followed by arka vikas i.e (2.0)Thus, the present result correlates with the outcome of , Kumar *et al*. (2014), Renuka *et al*. (2014).



Table.3 Yield per hectare

Treatment No.	Varieties	Yield/hectare (quintal)
T ₁	Arka rakshak	887.01
T ₂	Arka vikas	850.90
T ₃	Arka abhed	701.83
T ₄	Arka samrat	513.87
T ₅	Sweet boy	567.58
T ₆	Sweet girl	541.65
T ₇	Local	483.32
F-test		S
S.Ed (±)		5.00
C.D. (P = 0.05)		10.89

Among the seven varieties of the study, the genotype arka rakshak (624.9) registered the highest yield hectare⁻¹ followed by arka vikas (555.5). These results were agreement with the reports of Renuka *et al.* (2014) and Ramya *et al.* (2016) in cherry tomato.

Table. 4 Economics of cherry tomato and tomatoes

Sl. No.	Particulars	Quantity	Unit	Unit Rate (INR)	Amount (INR)
A.	Land preparation				
1	Ploughing with mould board	3	Hours	500	1,500
2	Disc harrowing	3	Hours	500	1,500
3	Planking and leveling	2	Hours	300	600



4	Man days for layout	8	Man days	250	2,000
B.	Fertilizer, Manures and seed				
1	FYM (Recommended)	10	Ton	600	6,000
2	Urea (100 kg N ha ⁻¹)	250	Kg	6	1,500
3	SSP (50 kg P ₂ O ₅ ha ⁻¹)	315	Kg	10	6,000
4	MOP (50 kg K ₂ O ha ⁻¹)	80	Kg	10	800
5	Mandays for fertilizer application	20	Mandays	250	5,000
C.	Other material				
1	Wire	20	Kg	35	700
2	Jute rope (Sutli)	20	Kg	25	500
3	Bamboo sticks	700	Nos.	6	4,200

Sl. No.	Particulars	Quantity	Unit	Unit Rate (INR)	Amount (INR)
D.	Irrigation				
1	Tube well charges (2 hrs. per irrigation)	8	Hours	400	3,200
2	2 Man days per irrigation	10	Man days	250	2,500
E.	Intercultural operations				
1	Weeding and hoeing (2 Nos.)	10	Man days	250	2,500
2	Insecticides and Pesticides	5	Litre	250	1,250
2	Spraying of chemicals	5	Man days	300	1,500



F.	Harvesting				
1	10 Man days per day for 4 days	40	Man days	300	12000
2	Transportation charges		L. S.		3,000
G.	Overhead cost				
1	Supervision charges	4	Months	3000	12,000
2	Rental charges of land	4	Months	1000	4,000
Total cost of cultivation (INR ha⁻¹)					72,250.00

The economics of the tomatoes and cherry tomatoes of all the variety was calculated by summed cost of all agronomical practices, protection measure, land rent etc. including labour and farm machinery. The total cost of cultivation is (INR 71,100) and the variable cost of cultivation varies between (INR 78,800 to INR 80,100). The total yield of particular varieties is multiplied by market price of tomatoes and cherry tomatoes at a time. The total cost of cultivation is subtracted from total income, all the middleman margin and market charge was subtracted from total income for determining the net return.

Gross return hectare⁻¹

The maximum gross return hectare⁻¹ was obtained by (Arka rakshak) i.e. INR 3,54,804 and followed by (Arka vikas) i.e. INR 3,40,360 and the minimum gross return hectare⁻¹ was obtained by (local cherry tomatoes) i.e. NR 1,93,328.

Net return per hectare⁻¹

The maximum net income per hectare was obtained by (Arka rakshak) i.e. INR 2,79,554 and followed by the (Arka vikas) i.e. INR 2,65,110 and the minimum net return per hectare was obtained by (local cherry tomatoes) i.e. INR 1,18,078.



Cost Benefit Ratio

Among the different varieties (Arka rakshak) has the highest cost benefit ratio (3.72) followed by (Arka Vikas) i.e. (3.52) and the minimum cost benefit ratio was showed by (local) i.e. (1.57).

Table. 5 Variable cost and total cost of cultivation of different varieties.

Treatment Symbol	Varieties	Seed cost			Fixed cost INR/ha	Total cost of cultivation
		Qty. Kg/ha	Rate INR/ha	Amount INR		
T ₁	Arka rakshak	0.15	20,000	3,000	72,250	75,250
T ₂	Arka vikas	0.15	20,000	3,000	72,250	75,250
T ₃	Arka abhed	0.15	20,000	3,000	72,250	75,250
T ₄	Arka samrat	0.15	20,000	3,000	72,250	75,250
T ₅	Sweet girl	0.15	20,000	3,000	72,250	75,250
T ₆	Sweet boy	0.15	20,000	3,000	72,250	75,250
T ₇	Local	0.15	20,000	3,000	72,250	75,250

Table. 6 Cost Benefit Ratio of different varieties of tomato and cherry tomatos

Treatment	Hybrids	Total cost of cultivation/ha	Yield q/ha	Selling Rate INR/q	Gross return @ INR/ha	Net Return INR/ha	Benefit Cost Ratio
T ₁	Arka rakshak	75,250	887.01	400	354804	279,554	3.72
T ₂	Arka vikas	75,250	850.90	400	340360	265,110	3.52
T ₃	Arka abhed	75,250	701.83	400	280732	205,482	2.73
T ₄	Arka samrat	75,250	513.87	400	205548	130,298	1.73



T ₅	Sweet girl	75,250	567.58	400	227032	151,782	2.02
T ₆	Sweet boy	75,250	541.65	400	216660	141,410	1.88
T ₇	Local	75,250	483.32	400	193328	118,078	1.57

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