

Assessment of *per se* performance of tomato (*Solanum lycopersicum* L.) hybrids TNAU Tomato Hybrid CO4 and Arka Vishesh in Salem District of Tamil Nadu

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Abstract: In Salem district of Tamil Nadu, tomato is cultivated in an area of 526ha in Panamarathupatti block. The major villages cultivating tomato are Panamarathupatti, Kammalapatti, Thumbalpatti, Mallur, Nalikkalpatti etc., Most of the farmers are cultivating private tomato hybrids with lesser productivity and yield loss due to diseases like leaf curl, early and late blight and bacterial wilt was upto 30 %. Hence it is proposed to conduct an on farm trial to assess the *per se* performance of tomato hybrids with high yield and multiple disease resistance like TNAU Tomato Hybrid CO4 and Arka Vishesh. A field experiment was conducted as an on farm trial in five different locations of Panamarathupatti block of Salem district during Kharif season of 2019 in tomato using hybrids IIHR hybrid Arka Vishesh and TNAU Tomato Hybrid CO 4 with Sivam private hybrid as check hybrid. TNAU Tomato Hybrid CO 4 recorded an average yield of 95 t/ha and Arka Vishesh recorded an average yield of around 87 t/ha. The private hybrid Sivam recorded an yield of 62 t/ha. TNAU Tomato Hybrid CO 4 recorded more average number of fruits per cluster (5-6) and higher fruit yield per plant (2.5 to 2.75kg) when compared to Arka Vishesh with average number of fruits per cluster (4-5) and higher fruit yield per plant (2.25 to 2.50kg). The seed cost of the private variety grown by the farmer is higher and the hybrids such as TNAU CO4 and IIHR hybrid Arka Vishesh performed better with regard to higher cost benefit ratio (BCR for TNAU Tomato Hybrid CO 4 is 1:3.81 and for Arka Vishesh 1:3.41). But the market preference for CO4 is comparatively higher due to the large sized fruits with green shoulder at breaker stage with more acidity (0.7%) which enhances the consumer preference in the market. In general the consumers prefer CO4 hybrid rather than Arka Vishesh hybrid and hence marketability is also comparatively easier and better in TNAU Tomato Hybrid CO 4.

Keywords—Tomato, *Solanum lycopersicum* L., hybrids, performance, on farm trial

INTRODUCTION

Tomato (*Solanum lycopersicum* L.) belongs to the family Solanaceae. Tomato has acquired the status of World's most popular vegetable crop due to its wider adaptability to various agro climatic conditions (Gupta *et al.*, 2015). Tomato is a perennial plant but commonly cultivated as an annual (Rick, 1978) and ranks second to potato in many countries. In Tamil Nadu, tomato is cultivated in an area of 29,000 hectares with a production of around one million tonnes and productivity of 30.51 tonnes per hectare. Tomato is considered as protective food crop because of having rich in mineral, vitamins and organic acids. It is an important source of lycopene, ascorbic acid and carotene valued for their colour, flavour and antioxidant properties. The increasing consumption of tomato makes it, a high value crop for generating income to the farmers. It is an important crop both for production and industry point of view, there is a

necessity to improve the productivity per unit area to achieve the increased production from a limited land. Generally diverse parents are expected to give high hybrid vigour and it is also often possible to combine desired alleles in regular fashion without waiting for longer term (Shankar *et al.*, 2015). Hence, usually hybrids show better fitness and breeding value than their parents. Higher yield and better fruit quality are universally desired (Triveni *et al.*, 2017 and Vilas *et al.* 2015).

In Salem district, the area under horticultural crops is 39765 ha and area under tomato cultivation is around 3000 ha in the year 2019-20. Private hybrids are ruling in the market. Most of the farmers are cultivating private tomato hybrids with lesser productivity and yield loss due to diseases like leaf curl, early and late blight and bacterial wilt was upto 30 %. Hence, an investigation is needed to assess the performance of high yielding tomato hybrids in Salem district.

1. EXPERIMENTAL METHODS OR METHODOLOGY

The experimental material consists of three different hybrids of tomato namely, TNAU Tomato hybrid CO 4 (CTH 4), Arka Vishesh and Sivam hybrid.

CTH 4 is released from Horticultural College and Research Insititute, Tamil Nadu Agricultural University, Coimbatore and the special charectistics of CTH 4 is a F1 hybrid of LE 1226 X LE 1249, in which fruits are flat round with thick pericarp (5.84 mm), the fruits have green shoulder at breaker stage which turns to red colour at ripening. Fruits are borne in clusters of 5-6, with an average fruit weight of 75.3 g. The hybrid has long harvesting period with 20-22 harvests in 150 days with a yield of 2.94 kg per plant. It is having a capacity of yielding 92.3 t/ha (27.31 % increase over TNAU tomato hybrid CO3 and 40.91% over Lakshmi) with ascorbic acid content: 26.13 mg/100 g and TSS: 6.1o brix and titrable acidity: 0.70 %.

Arka Vishesh is a F1 hybrid released from Indian Institute of Horticultural Research, Bengaluru and its special charecteristics are It has the yield potential of 75-80 t/ha. It is suitable for processing into puree, paste, ketchup, sauce, tomato crush. TSS: 4- 4.6⁰ Brix, colour value of crushed tomato juice (a/b, Hunter Lab scale): 1.98-2.12, average fruit weight: 70-75gm, acidity of crushed tomato juice: 0.32-0.36, pH: 4.21-4.41, lycopene content: 8.5-10.5 mg/100g, lycopene content in tomato paste: 14.14 mg/100g, firmness: 4.09-5.41 kg/cm², seed content 0.4 to 0.5 and peel content: 5.96.

Sivam is a private semi determinate hybrid from Hyveg Company and it is tall determinate to semi determinate plants with good foliage cover and vigour. Days to first harvest 62-67 days. Flat round fruits with green with very firm structure and acidic taste. Colour of the fruit is deep red with a average weight of 100-120 g and it is having intermediate resistance to tomato leaf curl virus. Shoulder of the fruit is green, mild ribbing with deep oblate shape and it sets fruits upto 38⁰C.

A field experiment was conducted as an on farm trial in different locations in Salem district during Kharif season of 2020 in tomato using hybrids TNAU Tomato Hybrid CO 4 and Arka Vishesh and with Sivam Hybrid as check hybrid. The experiment was laid out in a Randomized Block Design with seven replications. The mean performance of different traits such as plant height, days to first flowering, days to first harvest, number of fruits per cluster, fruit yield per plant, yield per hectare, net returns per hectare and benefit cost ratio have been recorded and data was subjected to statistical analysis (Panse and Sukhatme, 1985).

2. RESULTS AND DISCUSSION

The results (Table 1.) showed that TNAU Tomato Hybrid CO 4 recorded an average yield of 95 t/ha and Arka Vishesh recorded an average yield of around 87 t/ha. The private hybrid Sivam recorded an yield of 62 t/ha. TNAU Tomato Hybrid CO 4 recorded more average number of fruits per cluster (5-6) and higher fruit yield per plant (2.5 to 2.75kg) when compared to Arka Vishesh with average number of fruits per cluster (4-5) and higher fruit yield per plant (2.25 to 2.50kg). The seed cost of the private variety grown by the farmer is higher and the hybrids such as TNAU CO4 and

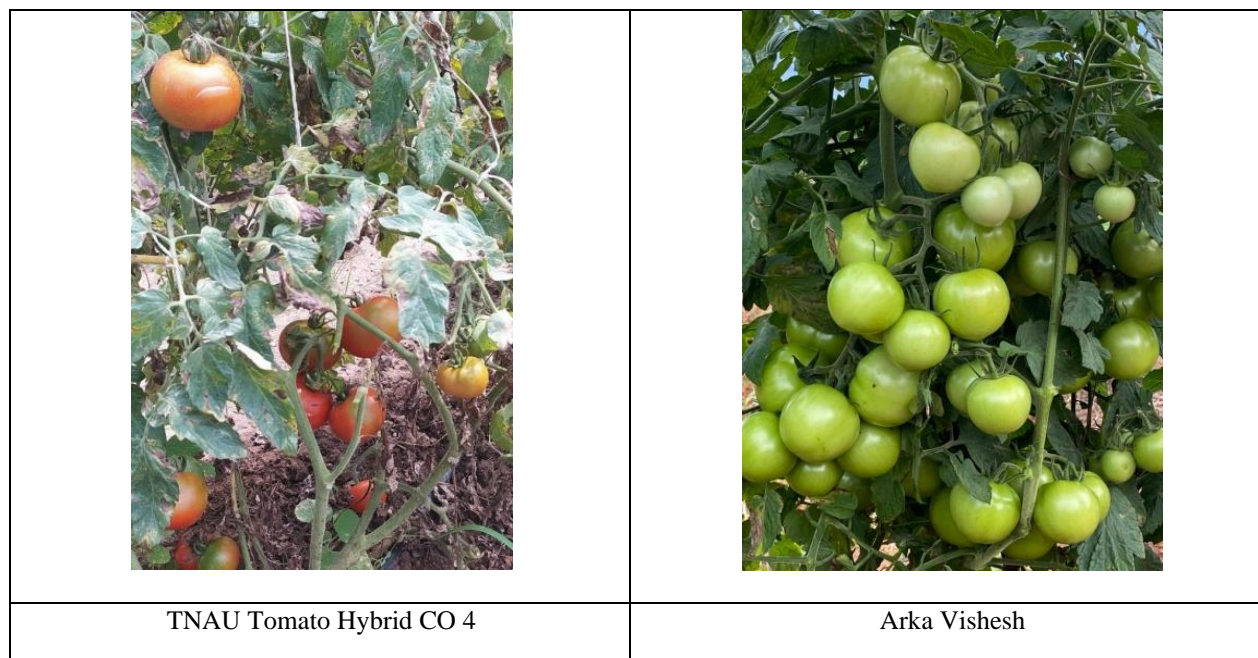
IIHR hybrid Arka Vishesh performed better with regard to higher cost benefit ratio (BCR for TNAU Tomato Hybrid CO 4 is 1:3.81 and for Arka Vishesh 1:3.41). But the market preference for CO4 is comparatively higher due to the large sized fruits with green shoulder at breaker stage with more acidity (0.7%) which enhances the consumer preference in the market.







Table 1. Per se performance of different hybrids of tomato in Salem Districts

Technology Option	Plant height (cm)	Days to first flowering	Days to 50% flowering	Number of fruits per cluster	Yield per plant (kg)	Yield (t/ha)	Net Returns(Rs. in lakh./ha)	B:C ratio
TO 1 – TNAU Tomato Hybrid CO4	90	32	36	5.5	2.50	95	380000	3.81
TO 2 – Arka Vishesh	92	33	37	4.5	2.25	87	326000	3.41
FP – Sivam hybrid	96	35	40	4.5	2.15	62	217000	2.55
Mean	93.14	33.3	37.6	5.02	2.29	81.3		
CD5%	1.77	1.03	0.95	0.37	0.11	1.26		
CD1%	2.49	1.44	1.33	0.51	0.16	1.76		
SEd	0.81	0.47	0.43	0.17	0.05	0.58		
CV(%)	1.6	2.65	2.16	6.26	4.28	1.3		

In general, apart from higher yield in TNAU tomato hybrid CO 4, the consumers preference if more for it than Arka Vishesh hybrid and hence marketability is also comparatively more easier and better in TNAU Tomato Hybrid CO 4 than Arka Vishesh and Sivam Hybrid.

Photos



	
<p>Sivam Hybrid Tomato</p>	<p>Field view of the Experiment in farmers field</p>
	
<p>Field visit of the Experiment in farmers field by the Scientists</p>	<p>Fruits of Arka Vishesh, Sivam and CO4 hybrid</p>
	
<p>Farmer in his tomato field</p>	<p>Harvested fruits ready for marketing at farmers holdings</p>



CONCLUSION

In Salem District of Tamil Nadu the TNAU Tomato Hybrid CO 4 recorded higher fruit yield of 95 t/ha whereas the Arka Vishesh recorded an yield of 87 t/ha. Hence TNAU Tomato Hybrid CO 4 hybrid is suitable for Salem farmers to get higher yield in tomato as well as higher net income and benefit cost ratio.

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