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Economics of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) cultivation

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Abstract
The present investigation entitled "Economics of cherry tomato (*Solanum lycopersicum* var. *cerasiforme*)" was conducted at the research farm of the department of soil science and water management, Nauni, Solan during two kharif seasons of 2014 and 2015. The study was conducted to investigate the benefit cost ratio of different treatments. The fruit yield of 1.45 kg per plant (439.56 q ha-1) was found under T_6. The BC ratio of 8.09 was found highest for T_6 (125 % RDF) and followed by 7.91 for T_5.

Keywords: Cherry tomato, economics, B:C ratio

Introduction
Cherry tomato (*Solanum lycopersicum* var. *cerasiforme*) is a botanical and small sized garden variety of cultivated tomato (Lenucci *et al*., 2006) [9]. It is also known as probable ancestor of tomato. Cherry tomatoes are more closely related to wild tomato and may contain more beta-carotene than lycopene (Potaczek and Michalak, 1994) [14]. Cherry tomato is grown for its edible fruits, which can be consumed either fresh, (its small size makes it very appetizing in salad) as a salad and as a garnish for numerous dishes or after cooking as snacks, which is much appreciated in international markets. It is becoming a miniature product consumed on a daily basis in many countries. Cherry type tomato with determinant growth habit and high total soluble solid content is a new perspective in improving processed tomato product quality, which might be suitable to improve the quality of tomato-based food products. It is mostly considered as "protective food" based on its nutritive value, antioxidant molecules such as carotenoids, particularly lycopene, ascorbic acid, vitamin E and phenol compounds-particularly flavonoids (Sepat *et al*., 2013) [15]. Lycopene has important dietary properties since it reduces the risk of several types of cancer and heart attacks (Dorgan *et al*., 1998; Clinton, 2005) [4, 3]. In recent years, consumption of tomato is also suggested for lowering the risk of human diseases (Massot *et al*., 2010; Al-Amri, 2013) [10, 2].

Tomato is cultivated all over the world and is one of the most consumed vegetables in recent days. It is a significant food crop with more than 161.8 million tonnes harvested in the world in 2012 (FAO, 2012) [5] and characterized by high consumption, year round availability and significant health benefits. Tomato is one of the most important crop all around the world due to its wide range of consumption, i.e. frozen, tomato sauce, canned, and trading (Keskinand Gul, 2004) [7]. On the other hand, the characteristic property of cherry tomato is the much higher fruit quality than that of standard tomato fruit (Picha 1987; Hobson and Bedford, 1989) [13, 6].

Kumar (2002) [8] conducted an experiment in tomato and observed the maximum benefit cost ratio of 3.88 in T_8 (200:112:50 kg ha^{-1} NPK) followed by T_{16} (200:75:100 kg ha^{-1} NPK) whereas minimum benefit cost ratio of 3.04 was observed in treatment T_{12} (100:150:100 kg ha^{-1} NPK). Pandey and Chandra (2013) [12] studied the impact of integrated nutrient management on tomato yield under farmers' field conditions. The benefit cost ratio was found to be maximum in case of recommended dose of INM (10 t ha^{-1} + NPK @ 150:80:60 kg ha^{-1} + 1% Azotobacter + 20 ppm ferrous ammonium sulphate) for both seasons; Rabi, 2008 (4.25) and Kharif, 2009 (4.23).

Nangliya (2014) [11] conducted an experiment in tomato and obtained maximum benefit cost ratio of 8.81 in T_6 (112:90:45 kg ha^{-1} NPK + 10 kg ha^{-1} vermicompost + 10kg ha^{-1} FYM) and minimum benefit cost ratio of 3.37 in control (no fertilizer). Alam (2014) [1] observed the highest (2.59) benefit cost ratio (BCR) in 75% RDCF+VC @ 2.0 t ha^{-1} fertilizer combination followed by 100% RDCF (2.45); and 75% RDCF+CC at 2.0 t ha^{-1} (2.34). The least BCR (0.58) was obtained in control (no fertilizer) followed by 0% RDCF + CC @ 10 t ha^{-1} (1.10) and 0% RDCF+VC at 10 t ha^{-1} (1.21) in case of tomato.

Now days, cherry tomato is gaining popularity amongst Indian consumers and farmers due to its different uses i.e. salad, pizza and pasta sauce and nutritive value. However, scientific information on the response of cherry tomato to fertilizer doses is lacking. Therefore, a study was proposed to investigate the effect of different levels of NPK on the yield and quality of cherry tomato with following broad objective to work out cost economics of different treatments.

Material and Methods

Benefit-Cost (B:C) Ratio

The benefit-cost ratio was calculated by considering the cost of variable as well as fixed inputs and prevailing market rates, the expenditure incurred on various inputs and operations. Simultaneously, gross returns were worked out for each treatment based on quality and market prices of the produce. The net returns were worked out by deducting the cost incurred from the gross returns of the particular treatment.

Statistical Analysis

The data generated from present investigation were subjected to statistically analysis using the statistical package SPSS (16.0) and Microsoft Excel. Critical difference (CD) at 5 per cent level was used for testing the significant difference among the treatment means. An outline of analysis of variance based on randomized block design (RBD) with 't' treatment and 'r' replication was prepared.

Results and Discussion

The data regarding economics of the crop presented in table 1, calculated as per norms showed that the maximum net return of Rs. 11, 73, 559.30/- per hectare was obtained under treatment T_6 and the minimum return of Rs. 8, 55, 113.32/- per hectare was obtained under T_1. The maximum benefit cost ratio (BC ratio) of 8.09 was recorded under treatment T_6, whereas, the minimum benefit cost of 6.22 was recorded under treatments T_1

Table 1: Economics of cherry tomato crop grown under different levels of N, P and K

Treatment	Fruit yield (q ha^{-1})	Gross income (Rs. ha^{-1})	Cost of cultivation For treatments (Rs. ha^{-1})	Net income (Rs.)	B:C Ratio
T_1	330.84	992513.32	137400.00	855113.32	6.22
T_2	361.85	1085545.77	138941.39	946604.38	6.81
T_3	386.28	1158849.43	140482.79	1018366.64	7.25
T_4	409.52	1228549.51	142024.18	1086525.33	7.65
T_5	426.19	1278572.33	143565.58	1135006.75	7.91
T_6	439.56	1318666.28	145106.98	1173559.30	8.09

Any agricultural enterprise/practice can be adopted only when its benefit-cost analysis is worked out from the point of view of the farming community. In agriculture, a benefit-cost ratio of 2.5 is considered optimum for the recommendation of a package for the farmers. The cost of the inputs and the fruit yield was calculated. The present results are in agreement with those of Kumar (2002) [8] and Nangliya (2014) [11].

Conclusion

The results emanating from aforementioned study were that the fruit yield of 1.45 kg per plant (439.56 q ha^{-1}) was also recorded under T_6 followed by T_5 with a total yield of 426.10 q ha^{-1}. The BC ratio of 8.09 was also highest for T_6 (125 % RDF).

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