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Micropropagation of *Solanum lycopersicum* (Utkal kumari) - a variety of tomato cultiver

■ **PALLAVI D. JOGI AND I.C. MOHANTY[1]**

Members of the Research Forum

Associated Authors:
[1]Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA

Author for correspondence :
PALLAVI D. JOGI
Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA

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Tomato (*Lycopersicon esculentum*) Family – Solanaceae is one of the important vegetable crop in the world after patato (Mohamed *et al.*, 2010).Tomato is edible,often red fruit/berry of the nightshade *Solanum lycopersicum*,commonly known as a tomato plant.It is relatively short duration crop and gives high yield, tomato is one of the most widely cultivated crop in the world as a whole (Peirce,1987 and Opena and Kyomo,1990). It is economically attractive and the area under cultivation is increasing (Naika *et al*., 2005). Tomato occupied an area about 3.9 million hectores all over world, tomato is one of the most important protective food crop of India. It is grown in 0.458M ha area with 7.277 M mt production and 15.9 mt/ha productivity. Tomato is ranked among the top three vegetable crops namely cabbage, tomato, onions in their order of importance (TAHALA report, 2000). It is ranked at the top of all fruits and vegetables as a source of vitamins and minerals in (Stevens, 1974).Tomato plays a major role in human nutrition. It is an excellent source of phosphorus, iron and vitamine A,B,and C (Cobley and Steele, 1976; Varela *et al.*, 2003 and Naika *et al*., 2005). Regeneration studies in tomato *in vitro* regeneration of tomato using protocols or adventitious shoot regeneration from cotyledon segments has been reported (Van Roekel *et al.*, 1993).The system is based on the three culture steps (Dong and Jia, 1991):a bud induction phase,culturing the explants medium supplemented with cytokine (Compton and Gray, 1993); an elongation phase transferring the shoot buds to medium with a lower concentration of cytokines (Dong and Jia, 1991); and a rooting phase,using a culture medium supplemented with auxin (Compton and Gray, 1994 and Abu El-Heba, 2004). Researcher have reported about adventitious regeneration in tomato deal with induction of shoots on hypocoyls, apical meristem, cotyledon stems, petioles, leaves, anther and inflorescence explants (Moghaleb *et al.*, 1999, Raziuddin *et al.*, 2004, Brichkova *et al*., 2002 and Compton and Veillux 1991). Most of the reports about adventitious regeneration tomato deals with induction of regeneration in hypocotyles or cotyledone explants (Moghaleb *et al.*, 1999; Brichkova *et al.*, 2002 and Raziuddin *et al.*, 2004). Hille *et al.* (1989); Gubis *et al.* (2003) and Raj *et al.* (2005) observed that callus is generally induced on medium with high cytokinin to moderate level of auxin.Studies about the effect of variety and plant growth regulatoron callus proliferation and regeneration of three tomato cultivars has been reported (Chaudhary *et al.*, 2007).Various hormonal combinations are used to induce callus and regeneration like BAP and

Table 1 : Day to initiation of adventitious shoots

Treatments	Hormonal combination(mg/lit.)	Day to initiation of adventitious shoots	
	BAP	Shoot tip	Hypocotyl
1	1.0	17.7	16.85
2	1.5	16.2	13.35
3	2.0	14.86	12.55
4	2.5	14.25	12.4
5	3.0	16.4	14.95
C.D. (P=0.05)		0.6	0.72
CV%		10.35	11.41

Table 2 : Average number of shoots produced/explant

Treatments	Hormonal combination(mg/lit.)	Average number of shoots produced/explant	
	BAP	Shoot tip	Hypocotyle
1	1.0	9.15	9.2
2	1.5	10.2	11.7
3	2.0	12.62	14.35
4	2.5	14.6	16.42
5	3.0	10.2	11.06
C.D. (P=0.05)		0.56	0.85
CV%		7.00	7.73

Table 3 : Effect of plant growth regulators on rooting of multiple root

Response of shoots on different rooting media	No. of shoots producing roots	Percentage response	Type of roots
MS control	8.50	85.00	Long and thin
MS+NAA (0.5mg/lit.)	9.50	95.00	Long and thin (Adventitious root)
MS+NAA (1.0 mg/lit.)	8.75	87.00	Short and thin
C.D. (P=0.05)	0.68		
CV%	5.42		

IAA, IAA and Kin (Chen *et al.*,1999).

The seed of tomato (Utkal Kumari) :

Explant source- Four different types of explants from 12-14 days old seedling of cultivar Utkal Kumari were used for *in-vitro* regeneration *i.e*. hypocotyl, cotyledon, cotyledonary nodal region/shoot tip.

Plant nutrient medium - Murashige and Skoog (1962) basal salt (Source-Merck) were used. Plant growth regulator- Auxins, cytokinins

Seeds were surface sterilized with 0.1 per cent mercuric chloride ($HgCl_2$) for 5 minutes, washed thoroughly with sterilized water 4 to 5 times to remove the traces of $HgCl_2$.Sterilized seeds were used for raising seedling *in vitro* on MS-medium with different concentration of phytohormones. Different explants were cultured on MS medium supplemented with different level of BAP(1.0,1.5.2.0,2.5 mg/lit.) and NAA(0.05,0.5,1.0 mg/lit.) to obtain multiple shoots (Table 1).

In vitro of different explants like hypocotyle and cotyledonary leaf in the MS medium.In the present study, MS medium supplemented with different concentration of BAP was used for multiple shoot were induced in MS medium with 2.5 mg/lit. BAP and 1.0mg/lit. NAA, exhibited the best induction of multiple shoots (Table 1), multiple root (Table 3), among 5 treatments.

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