



**ORIGINAL RESEARCH PAPER**

**Botany**

**STUDIES ON TOXIN PRODUCTION IN TOMATO FUNGI ON DIFFERENT CULTURE MEDIA**

**KEY WORDS:** Toxin production, tomato fungi, culture media.

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**ABSTRACT**

Tomato (*Lycopersicon esculentum* Mill.) is one of the common vegetables grown all over the country extensively almost the year round. The crop is reported to be affected by about twenty diseases of microbial origin. Among them, the fungal pathogens have been found to affect and damage severely the tomato fruits both in field at different developmental stages as well as in the market during storage. This may result in the qualitative and quantitative loss of tomato fruits. The fungi are known to produce different toxins during pathogenesis. In the present investigation, toxin production on three different culture media was studied in some fungi isolated from tomato fruits. Effect of fungal toxins on seed germination, root length and shoot length was studied. The media were found to affect the toxin production in the test fungi.

**INTRODUCTION:**

Tomato (*Lycopersicon esculentum* Mill.) is one of the common vegetables grown all over the country extensively almost the year round. The crop is reported to be affected by about twenty diseases of microbial origin. Among them, the fungal pathogens have been found to affect and damage severely the tomato fruits both in field at different developmental stages as well as in the market during storage. This may result in the qualitative and quantitative loss of tomato fruits.

Toxins are important metabolites of microorganisms. The role of toxins in pathogenesis has been discussed by various workers (Wheeler and Luke, 1963; Deverall, 1994 and Wood, 1967). The medium used for cultivation of fungi and its effect on toxin production was studied by different scientists like Vidyasekaran *et al.* (1970), Mishra and Kanujia (1973) and Charya and Reddy (1982). The effect of fungal toxins on seed germination in tomato was studied by Bakhariev (1978), in arhar by Kamal and Verma (1978), in mung by Sinha and Prasad (1981), in soybean by Singh *et al.* (1986) and Sharma (1990) and in groundnut by Reddy *et al.* (1991).

In the present investigation, toxin production on three different culture media was studied in the fungi isolated from tomato fruits. Effect of fungal toxins on seed germination, root

length and shoot length was studied.

**MATERIAL AND METHODS:**

**a) Production of phytotoxins:**

The test fungi isolated from tomato fruits were grown on three different culture media Viz. Glucose nitrate medium, Richard's medium and Czapek's medium. Twenty five ml of each medium was added in 100 ml conical flask and autoclaved at 15 lb pressure for 15 minutes. On cooling, the flasks were inoculated separately with 1ml of spore suspension of the test fungi prepared from 7 days old cultures grown on PDA slants. The flasks were incubated at 25 °C for 9 days and were harvested by filtering their contents through Whatman No. 1 filter paper. The filtrates were collected in pre-sterilized bottles and termed as crude toxin preparation. These preparations were tested for their toxicity.

**b) Assay of phytotoxins by seed germination method:**

Surface sterilized hundred seeds of tomato were soaked in crude toxin preparation for 24 hours. They were then placed on moist blotters in petriplates. Seeds soaked similarly in freshly prepared uninoculated liquid medium served as control. Percent inhibition of seed germination, root length and shoot length of seedlings were measured after 7 days of incubation at room temperature.

**RESULTS AND DISCUSSION**

**Table 1: Toxin production in tomato fungi on different media**

Fungi	Culture filtrates from media								
	Glucose nitrate medium			Richard's medium			Czapek's medium		
	Percent inhibition of seed germination	Root length (cm)	Shoot length (cm)	Percent inhibition of seed germination	Root length (cm)	Shoot length (cm)	Percent inhibition of seed germination	Root length (cm)	Shoot length (cm)
<i>Alternaria solani</i>	39	5.1	3.1	52	4.0	1.9	42	3.8	2.1
<i>Curvularia lunata</i>	32	4.6	1.8	48	4.7	1.2	40	2.9	1.7
<i>Geotrichum candidum</i>	33	5.0	3.2	50	3.8	2.1	34	4.1	3.1
<i>Rhizoctonia solani</i>	26	4.9	2.0	47	3.2	2.3	39	4.2	2.4
<i>Fusarium oxysporum</i>	29	5.3	2.3	59	2.3	1.7	42	4.9	1.5
<i>Phytophthora</i> sp.	27	5.1	2.7	53	2.9	2.2	47	5.0	3.3
Control	00	5.7	3.9	00	5.2	3.1	00	6.1	4.2

From Table-1, it becomes clear that, toxicity of culture filtrates all the fungi in case of all the fungi studied was variable in three different media. Maximum toxic effect was observed in case of fungi from Richard's medium, followed by Czapek's medium and poor in case of Glucose nitrate medium. The culture filtrates of *Alternaria solani*, *Fusarium oxysporum* and *Phytophthora* sp. showed maximum toxicity on seed germination. Similar types of toxic effects were seen on root and shoot length of germinating seeds. It clearly suggests the preference of specific nutrients by fungi during the process of toxin production. Enhancement of toxicity by Richard's medium was also reported by Vidyasekaran *et al.* (1970), Mishra and Kanujia (1973) and Charya and Reddy (1982).

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