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Integrating management against fungi causing infection on different parts of tomato plant

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Abstract
In present survey an attempt has been made to evaluate the bio-control activity of plant extract against certain fungi causing infection on tomato plant during pre-harvesting and post-harvesting condition. The major infection causing fungi are *Fusarium oxysporum, Alternaria solani, Pythium ultimum, Phytophthora nicotianae, Aspergillus niger*. The plant extract (bulb) of Garlic (*Allium sativum* L.) proves effective to control the infection caused by above fungi.

Key words: integrating management, fungi, tomato, garlic (*allium sativum* L.)

1. Introduction
Tomato (*Lycopersicum esculentum*) is the second most popular and widely grown vegetable in the world after potato (Panthee and Chen 2010) [2]. A trend is set up for commercial cultivation of tomato (Chadhab 2008) [1]. The crop tomato is cultivated on large scale in the region of Maharashtra and also some parts of Marathwada. The production of this crop has tremendously increased due to its multifarious uses in raw, cooked and processed forms as soups, sauces, ketchups, preserves and pickles (Tiwari and Choudhary, 1986) [3]. Tomato is known for its outstanding nutritive values. It is a major source of vitamins A, B and excellent source of vitamin C. It is also a good source of minerals like Ca, Fe, Mg, K, and Zn. It is also known for its medicinal values. The pulp and juice is promoter of gastric secretion and blood purifier and considered to be intestinal antiseptic (Bose *et al.,* 1993) [4]. The association of phytopathogenic micro-organisms with all these varieties is perhaps as old as civilization. Among these organisms, fungi hold a significant place and are important as the pathogens. These fungal pathogens incite various types of diseases on their host crops and cause heavy economic losses annually throughout the Marathwada region. It was also noticed that the tomato cultivation in Marathwada region received a setback due to various disease of common occurrence such as bacterial wilt, leaf curl and early blight disease and root knot nematode fungal complex, (Rajput and Wagh, 1995) [5]. This disease attacks on leaves, stems and fruits, eventually defoliating the plants and ultimately reducing yield and fruit quality (Castro *et al*. 2000, Foolad *et al*. 2002, Chaerani *et al*. 2007) [8]. Mature tissues are more susceptible to early blight and are more common during the fruiting phase. Disease is more severe at physiological plant maturity, since older and senescing leaves are more susceptible (Barratt and Richards 1944, Barksdale 1971, Martin and Hepperly 1987, Nash and Gardner 1988, Maiero *et al*. 1990). For controlling the above diseases, the use of pesticides have increased greatly all over the world. It is only due to the misconception that more use of pesticides will be directly proportional to the yield of crop, but only trace amount of pesticides is useful for the crop and rest add to increasing pollution and infertility of soil. Considering all these aspect the investigation the present study based on integrating management.

2. Material Method
The in vitro studies regarding the pathogenic fungi causing damage to Tomato plant like *Fusarium oxysporum, Alternaria solani, Pythium ultimum, Phytophthora nicotianae, Aspergillus niger* were conducted in Plant Pathology laboratory, Department of Botany, Vivekanand Arts, Sadar Dilipsingh Commerce and Science C0pollege, Aurangabad. The extract of garlic was made using mixer and grinder. It was filtered using four folded muslin cloth. The concentration was made as 10%, 25%, 50%, 75%and 100%. The media used to screen the activity was Potato Dextrose Agar (PDA). The media of above concentration were sterilized using autoclave and poured in pre sterilized Petri plates. On solidification of media the test fungi were inoculated considering all the above concentration. For control test fungi were inoculated on plane PDA without garlic extract, triplate were maintained of each fungi and was incubated at $25^0 + 2^0$C. After 7 days the observation were made and diameter of control and test fungi was measured in millimetre (mm).

3. Result and Discussion
The integrating management by garlic extract against the fungi like *Fusarium oxysporum, Alternaria solani, Pythium ultimum, Phytophthora nicotianae, Aspergillus niger* was studied in *in vitro* condition. The data is presented in the table given below.

Garlic extract against test fungi

Table 1

S. No	Name of fungi	Control (mm)	Zone of inhibition(mm)					%of inhibition				
			10%	25%	50%	75%	100%	10%	25%	50%	75%	100%
1	*Phytopthora nicotianae*	57	25.2	23	22.2	14	2	56.14	59.65	61.40	75.44	96.49
2	*Alternaria solani*	50	23.4	22	21.3	19	4	54.00	56.00	58.00	62.00	92.00
3	*Fusarium oxysporum*	55	20	19	16	14	0	63.64	65.45	70.91	74.55	100.00
4	*Pythium ultimum*	60	19.1	17	13	9	4	68.33	71.67	78.33	85.00	93.33
5	*Aspergillus niger*	90	8	6	0	0	0	91.11	93.33	100.00	100.00	100.00

The main objective of this research work is to identify the best plant extract with a high level of inhibitory activity against root rot fungi of tomato and also is an important step in developing plant based pesticides which are eco-friendly for the management of fungi.

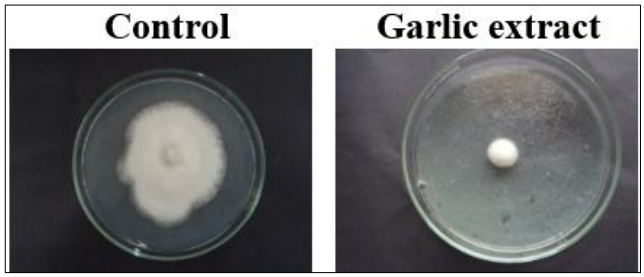

Fig 1: *Phytopthora nicotianae*

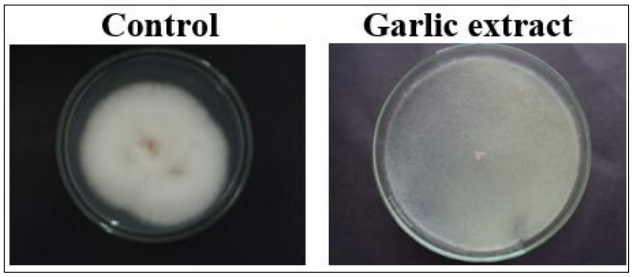

Fig 2: *Fusarium oxysporum*

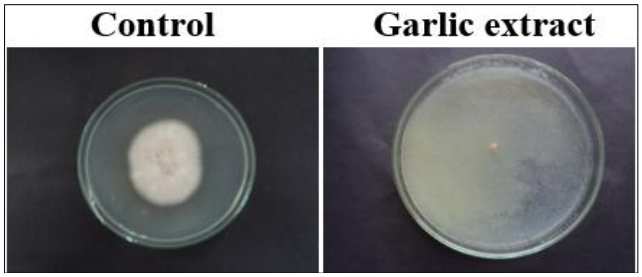

Fig 3: *Pythium ultimum*

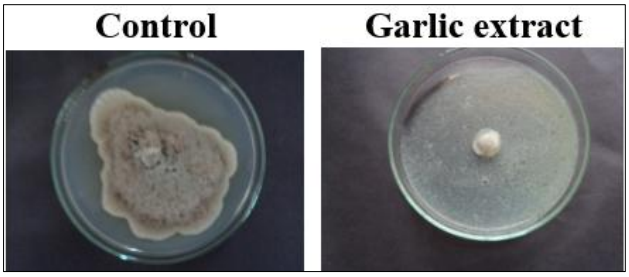

Fig 4: *Alternaria solani*

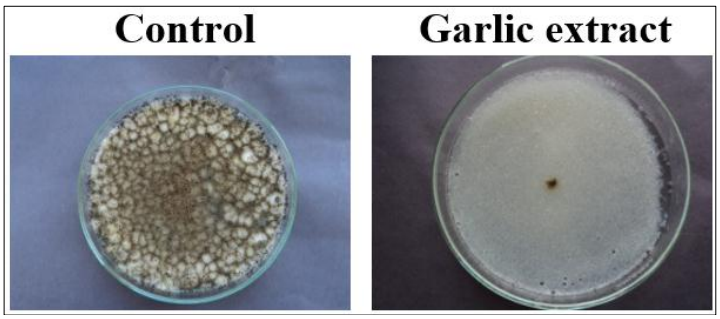

Fig 5: *Aspergillus niger*

4. References

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