



Management of *fusarium* wilt disease by phytoextract

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Abstract:

Lentil is a main crop of India. It is the oldest commonly consumed legumes in India. They contain all the nutrient require for growth like carbohydrates, proteins, minerals, fibers. But this lentil plant root get affected by the *fusarium* fungus. Out of *fusarium* fungus family *fusarium oxysporum* infect to lentil plant. It causes the *fusarium* wilt disease in lentil plant and completely damage thse plant. To overcome this problem different management strategies have been employed. Chemical are effective in managing *Fusarium* wilt, but are non-economics and non-ecofriendly. So to overcome this problem bioactive agent have been used, particularly plant extracts (Chand, and Singh, 2005). These phytoextract prom Neem, Garlic and Ginger show antifungal activity against *Fusarium* wilt dieses.

Key words: lentil plant, *fusarium wilt*, *fusarium oxysporum*, phytoextract.

Introduction:

The lentil (*Lens culinaris* Medik) is a small pale green hearbs which is a edible seed. It is rich in carbohydrates, proteins, minerals and fibers. (Meena etal.,2017). Lentils are a powerhouse of nutrition. They are a good source of potassium, calcium, zinc, niacin and vitamin K, but are particularly rich in dietary fiber, lean protein, folate and iron. The Centers for Disease Control and Prevention reports that, eating plenty of nutrient-dense foods like lentils can lessen your risk of many serious medical problems. Lentils are not only one of the oldest commonly consumed legumes in history, but they are also one of the simplest to prepare since they don't require a lengthy soaking time like other beans.

Fusarium oxysporum is a pathogenic fungus found all around the word. It is soil born ascomycete which causes fusarium wilt diease in a lentil plant. This disease completely damage the lentil plant. Infection start in a seeding stage and proceed later stage of growth and development of lentil plant (Mohammadi etal.,2012).

To control these disease various methods like chemical fertilizers or bio-control methods are available. But excessive use of chemical fertilizers may be harmful as it destroy the friability of soil. As chemical fertilizers contains acids, including sulfuric and hydrochloric acids. These acids dissolve “soil crumbs”, the material that holds rock particles together. Also affect the microorganism present in a soil, as fertilizers are acidic in nature so they change the pH of soil and thereby by effect on activity of soil. To overcome this problem it is beneficial to use bio control methods. As it has many advantages like it give protection to the crop throughout the crop period. Also do not cause toxicity to plant along with soil. It make the soil fertile and maintain the

microorganism present in a soil. Here I am going to treat the fusarium wilt disease of lentil plant by using the plant phytoextract.

Materials and Methods:

Samples were taken from infected roots of lentil plants. Collected samples were then brought to laboratory for isolation and identification of pathogen causing root rot. The samples were first surface sterilized twice with distilled sterilized water and then were treated with 0.5%NaOCl (Sodium hypochlorite) for 2 minutes. After surface sterilization the samples were dried on sterilized blotter paper placed in Petriplates containing sterilized potato dextrose agar medium. All the petridishes were incubated at $25 \pm 1^{\circ}\text{C}$ for about seven days. After seven days of inoculation the fungi isolated, were then identified with the help of colony character and microscopic observation. (P.K. Mwaniki , M.M. Abang ,et.al.).

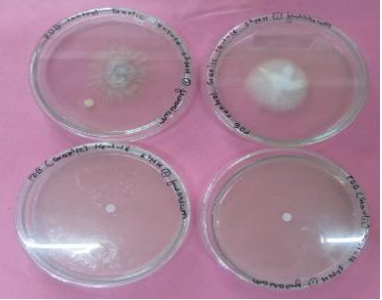


Preparation of Phytoextracts:

Bio efficiency of phytoextracts of eleven plant species having medicinal values was tested *in vitro* by poisoned food technique. Fresh and healthy 100 g plant parts of each plant species as mentioned in table were thoroughly washed with tap water and then with sterile distilled water. These were crushed in grinder mixer by adding 100 ml distilled water to obtain 1:1 extract. The phytoextracts thus obtained were then filtered through double layered sterile muslin cloth in conical flasks and were used without sterilization. The flasks were labeled and stored in the refrigerator for further use.

Name of phytoextract	Plant part used
Garlic	Bulb
Ginger	Rhizome
Neem	Leaves

Evaluation of Phytoextract against *Fusarium*:- Potato dextrose agar medium was taken repeatedly for fungal isolates in flasks of 150 ml capacity, plugged and sterilized by autoclaving at 121°C for 20min. After autoclaving and cooling to about 45°C , 10 ml of the respective extracts was mixed thoroughly in the flasks containing 100 ml of PDA medium. PDA medium without respective phytoextracts served as control. All these were poured aseptically into sterile Petri plates replicating four times per treatment. After solidification, the plates were inoculated separately with cultures of *Fusarium spp.* in the centre with the help of sterilized 5 mm Whatman's filter paper disc and were incubated at $28 \pm 2^{\circ}\text{C}$ temperature for seven days. (Prashant B. Sandipan).

Different phytoextracts like Ginger, Garlic, Tulsi and Neem were treated against *Fusarium spp.* out of which 10% extract of Garlic bulb was effective against *Fusarium spp.* Thus, among the different phytoextracts Garlic extract has significant antifungal properties against root rot pathogen of lentil.

Effect of Garlic phytoextract on <i>Fusarium</i>	Effect of Neem phytoextract on <i>Fusarium</i> :	Effect of Ginger phytoextract on <i>Fusarium</i> :
		
<p>fig 1. Garlic (<i>Allium sativum</i>) shows antifungal activity against <i>Fusarium</i></p>	<p>Fig. 2 Phytoextract from Neem (<i>Azadirachta indica</i>) do not show any antifungal activity against <i>Fusarium</i></p>	<p>Fig.3. Phytoextract from Ginger (<i>Zingiber officinale</i>) do not show any antifungal activity against <i>Fusarium</i>.</p>

Conclusion:

From the above observation and result it can be concluded that, from various phytoextracts like, Garlic, Ginger & Neem only Garlic bulb (10%) shows antifungal activity against *Fusarium* as there was no growth of *Fusarium*, seen on the PDA plate containing 10% Garlic phytoextract.(+ indicates antifungal activity and – indicates no antifungal activity in following table).

Garlic	+
Ginger	–
Neem	–

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