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Short Communication

To evaluate the antagonist potency of *Trichoderma viridae* on the fungal plant pathogen isolated from *Sesamum indicum L.*

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Abstract

Sesamum indicum is well known oil seed crop and rich in protein .The product and byproducts have the tremendous value. Fungal diseases causing infection to the root, foliage and seed decreases the quality and yield. To tackle this problem biological agent is effective and it is ecofriendly does not harmful. so that, for recent investigation Trichoderma viridae as bioagent was selected. Trichoderma viridae act as a potent bio control agent having lytic activity and antagonistic properties against the wide range of the plant pathogenic fungi. Work were initiated with the isolation and identification of antagonistic fungi as well as phytopathogenic fungi by microscopic examination using standard key(Barnet and Hunter).In present study Trichoderma viridae was screened for antifungal activity by dual plate culture method against Alternaria sesamae, Colletotrichum sp,Fusarium oxysporum isolated from oil seed crop Sesamum indicum L. Antagonist i.e. Trichoderma viridae maximally retarded growth of Alternaria sesame, followed by Colletotrichum sp, minimum growth of inhibition shown in Fusarium oxysporum.

Keywords: Bioagent, antagonist, phytopathogen, screen, ecofriendly.

Introduction

Sesamum indicum. L is belongs to the family Pedaliaceae. Sesamum, annual herb grown mostly for edible oilseed production. Tropical and subtropical climate is suitable for cultivation[1]. India grows nearly 30% of the world total Ssesamum in an area of about 2 millian hectares. Sesamum has been subjected to the loss due to the some important foliar and seed boarn diseases hence diseases are the limiting factors that affect the growth yield and quality of production[1]. The phytopathogen *Fusarium oxysporum, Alternaria sesamae, Colletotrichum* sp*, M. phaseolina* etc are reports from Sesamum[2,3]. Question raised in front of farmers regarding the disease problem to tackle this problem farmers use the fungicides and chemicals which is not ecofriendly and harmful to the users also. Thus to manage disease; besides use of fungicides bio control strategies is potential alternative[4-7].

Teichoderma is the one of the most important bio control agent which has property to recognize and attack plant pathogenic fungi[8]. At the molecular level *Trichoderma*has cell wall lysing or degrading enzyme[9], Secretion of secondary metabolite and lysis of fungus by forming penetrating structures all these sumarised as Antagonism and mycoparasitism[10,11].

Materials and methods

Isolation of Antagonist Fungi *Trichoderma viridae*: *Trichoderma viridae* isolated from soil sample. Collection were done from agriculture field from local area. Soil dilution technique was used for isolation of antagonist fungi[12]. 10ml of soil suspension was then transferred on the appropriate culture medium. The culture media evaluated were potato dextrose ager (PDA) medium[13]. Petridish containing sample of 10ml were incubated at 26±2°C for a week. The colonies were then transplanted for purification. The antagonist fungi identification was based on the microscopic observation as well as colony characterization following Taxanomic identification key of Barnet and Hunter[14].

Isolation of Phytopathogen: Plant part with reported symptoms were collected from the sesamum field and diseased part rinsed with water for removal of unwanted debris. Sterilization was done by immersion of plant part in 0.3% sodium hypochloride for 10 minites and then rinsed with 70% ethanol fallowed by sterilized distil water. Sterilised plant material transferred on culture medium (PDA) in to the petriplates fallowed by incubation at 26-+2°C for week. Colonies were observed under microscope. On the basis of morphology the phytopathogens were identified.

Evaluation assay of antigonastic activity: Fungal inhibition assey of *Trichoderma viridae* were tested by dual plate culture technique against the phytopathogen .here both the *Trichoderma* and pathogenic fungi were inoculated on the plate in front of each other at same distance from the periphery and petriplates were incubated at 26±2°C for week on potato dextrose agar. For

treatment duplicates were maintained. Plates without treatment of antagonist fungi act as a control plate.

Results and discussion

The result was calculated by evaluating the antifungal activity of antagonist fungi by using the fallowing equation by which it shows inhibition percentage of radial growth of test fungi[15].

$$L = \frac{C - T}{C} * 100$$

L=Percent inhibition of radial growth of pathogen, C=Radial growth of the pathogen (mm) in control, T=Radial growth of the pathogen (mm) in Treatment.

Inhibition Assay of *Trichodrema viridae* on *Alternaria sesamae:* Screening of inhibition assay is to look for the potential biocontrol agent against pathogenic fungi *A.sesamae.* Considerable result were observed regarding inhibition of pathogen growth. Radial growth of phytopathogan *Alternaria sesame* with antagonist fungi *Trichoderma viridae* was 20mm while in control it was 90mm. By using the above equation the % inhibition were calculated it was 78% (Table-1).

Inhibition Assay of *Trichoderma viridae* on *Colletotrichum sp*: In control plate the Pthytopathogen *Colletotrichum* shows 90 mm radial growth. While in presence of *Trichoderma* radial growth was 27mm. % inhibition were calculated it was 70% (Table-1).

Inhibition Aassay of *Trichoderma viridae* on *Fusarium oxysporum*: *Fusarium oxysporum* in control growth was 90mm and with the *Ttrichoderma viridae* growth was30mm. Here the least or minimum radial growth of inhibition were observed. It was 67% (Table-1).

Under the invitro condition from the dual culture test the result were found that there was a significant divergence in the way of radial growth inhibition[16]. Effect of *Ttrichoderma viridae* on the test pathogen *Alternaria sesame* was very effective. It retard the growth of *Alternaria sesame* (78%) fallowed by *Colletotrichum. Sp* (70%). The least growth of inhibition is shown in *Fusarium oxysprum* (67%).

Table-1: Antagonistic efficacy of *Trichoderma viridaeagainst Alternaria sesame, Colletotrichum* sp. *Fusarium oxysporum.*

Name of phytopathogen	Growth of pathogen against *Trichoderma* sp in (mm)	Growth of *T.viridae* in (mm)	Percent growth of inhibition (%)
Alternaria sesame	20	70	78%
Colletotrichum sp.	27	63	70%
Fusarium oxysporum	30	60	67%

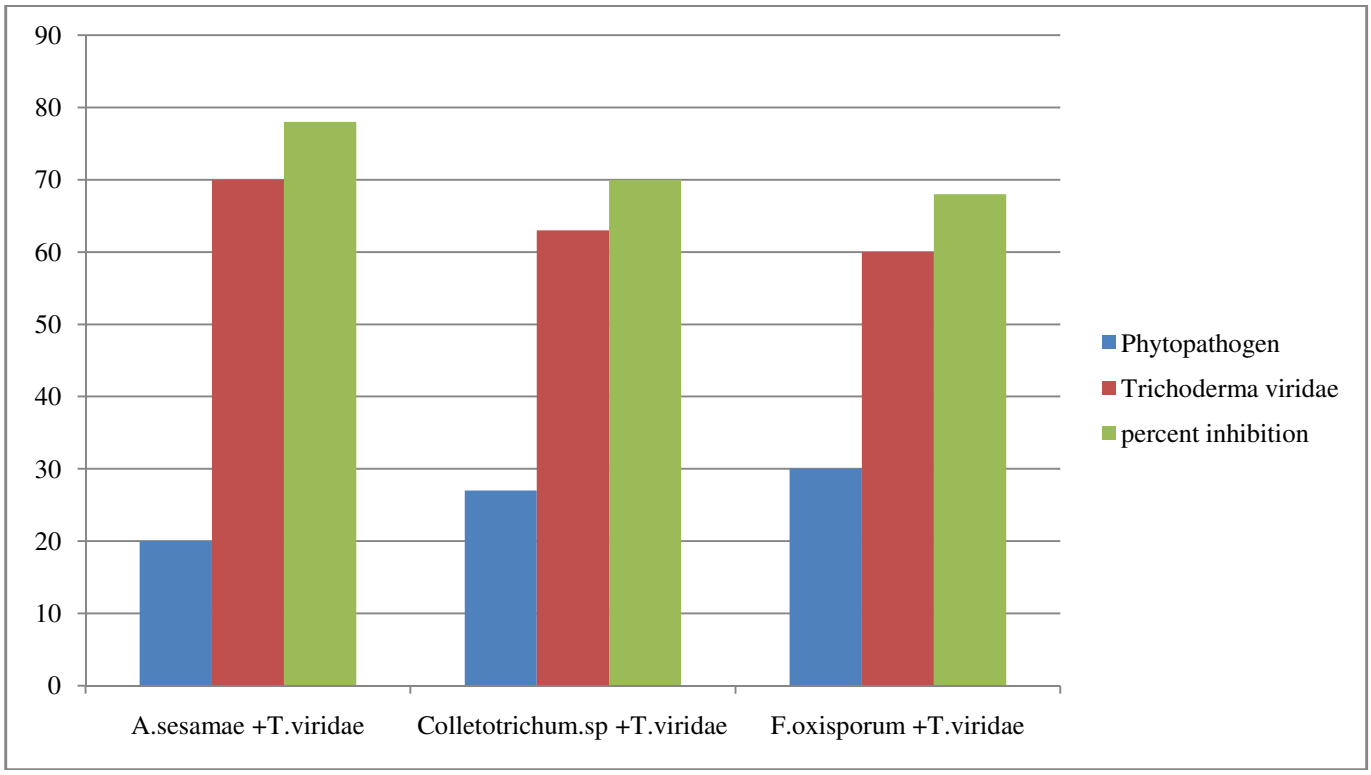

Figure-1: % Growth Inhibition of pathogen in presence of Antagonistic fungi *T.viridae.*

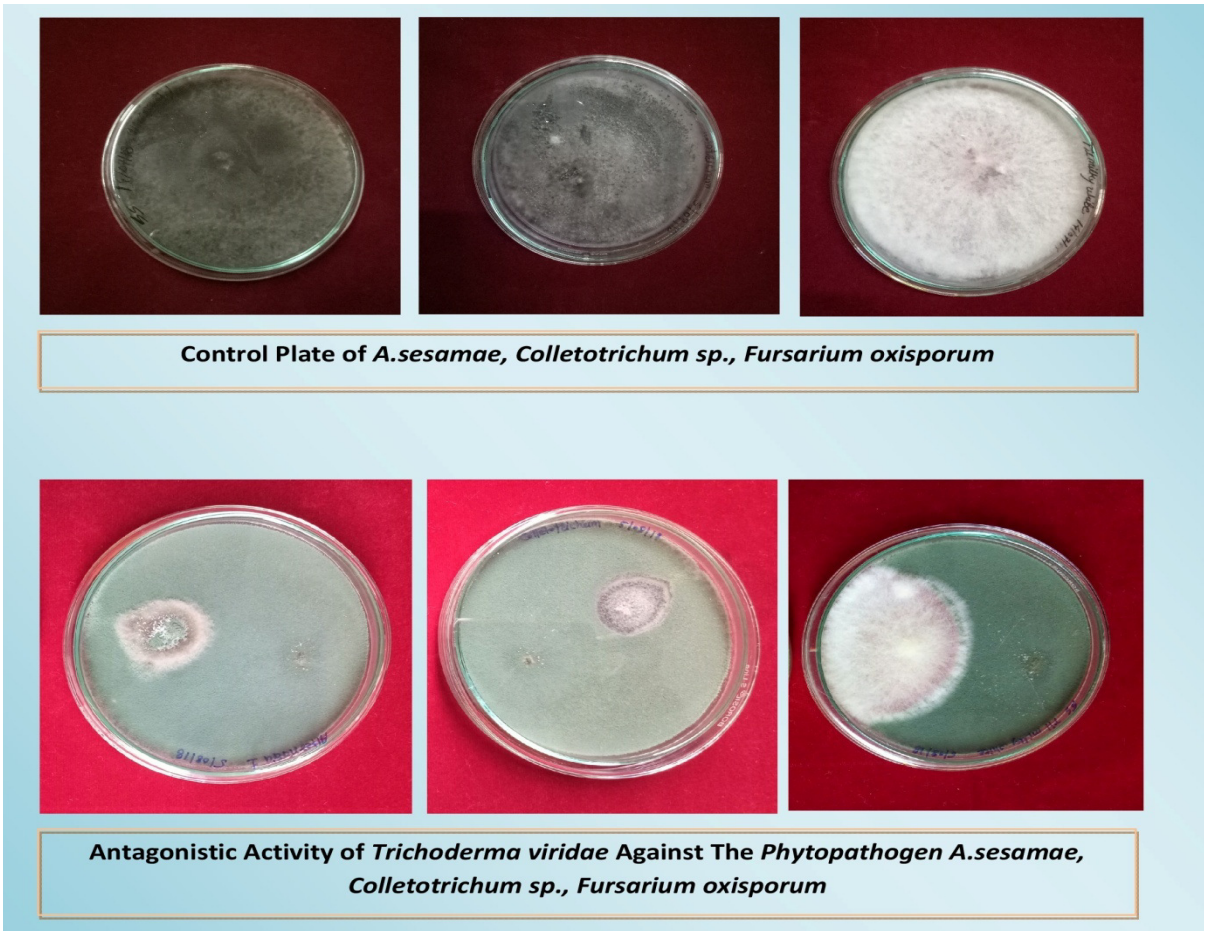

Figure-2:

Conclusion

Result were satisfied with the finding that *Trichoderma viridae* act as effective antagonist fungi as well as biological agent which control the growth of pathogenic fungi responsible to cause savior loss to the plant and agriculture. Further study should be determining the effect of antifungal metabolites and cell wall lysing enzymes of *Trichoderma sp* against plant diseases.

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References

1. Rangaswami G. and Mahadevan A. (2012). Diseases of crop plants in India. 4thed, PHI pvt ltd, India, 353-355. ISBN:978-81-203-1247-0

2. Kotle S.J. (1985). Diseases of annual oil seed crops. 2nd. Rapeseed-Mustard and Sesame diseases. CRC press. Inc., Roca, Raton Florida, USA

3. Richardson M.J. (1979). An annotated list of seed borne diseases. C.M.I. Kew, Eng-land, 320.

4. Chet I. (1987). Trichoderma: application, mode of action, and potential as biocontrol agent of soilborne plant pathogenic fungi. *Innovative approaches to plant disease control*, 137-160.

5. Chung H.S. and Choi W.B. (1990). Biological control of sesame damping off in the field by coating seed with antagonistic Trichoderma viride. *Seed Science and Technology (Switzerland)*, 18(2), 451-459.

6. Nema S., Bandyopadhyaya S. and Sharma N.D. (2001). Some studies on trichoderma as biocontrol agent. *J. Mycopatho. Res.,* 40(2), 81-87.

7. Ahmad J.S. and Baker R. (1988). Implications of rhizosphere competence of Trichoderma harzianum. *Canadian Journal of Microbiology*, 34(3), 229-234.

8. Pan S. and Bhagat S. (2007). Antagonistic potential of Trichoderma and Gliocladium spp. from West Bengal. *J Mycol Plant Pathol*, 37(2), 235-239.

9. Haran S., Schickler H. and Chet I. (1996). Molecular mechanisms of lytic enzymes involved in the biocontrol

activity of Trichoderma harzianum. *Microbiology*, 142(9), 2321-2331.

10. Bell D.K., Wells H.D. and Markham C.R. (1982). In vitro antagonism of Trichoderma species against six fungal plant pathogens. *Phytopathology*, 72(4), 379-382.

11. Howell C.R. (2003). Mechanisms employed by Trichoderma species in the biological control of plant diseases: the history and evolution of current concepts. *Plant disease*, 87(1), 4-10.

12. Johnson L.F. and Curl E.A. (1972). Methods for research on the ecology of soil borne plant pathogens. Burgress Publ.co., Minneapolis.

13. Dhingra O.D. and Sinclair J.B. (1995). Establishment of diseases and testing for resistance. In: basic plant pathology methods, 2nd ed., Boca Raton: CRC Lewis Publishers: 434.

14. Barnet H.L. and Hunter B.B. (1972). Illustrated genera of imperfect fungi. 3rdedition, burgess publishing Co., 237.

15. Vincent J.M. (1947). Distortion of fungal hyphae in the presence of certain inhibitors. *Nature*, 159, 850.

16. Perveen K. and Bokhari N.A. (2012). Antagonistic activity of Trichoderma harzianum and Trichoderma viride isolated from soil of date palm field against Fusarium oxysporum. *African Journal of Microbiology Research*, 6(13), 3348-3353.