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 antagonistic 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 sesamae, 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 cultivation1. India grows nearly 30% of the world total Sesamum in an area of about 2 millian hectares. Sesamum has been subjected to the loss due to some important foliar and seed boarm diseases hence diseases are the limiting factors that affect the growth yield and quality of production. The phytopathogen Fusarium oxysporum, Alternaria sesamae, Colletotrichum sp, M. phaseolina etc are reports from Sesamum2-3. 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 alternative4-7.

Trichoderma is the one of the most important bio control agent which has property to recognize and attack plant pathogenic fungi8. At the molecular level Trichoderma has cell wall lysing or degrading enzyme9. Secretion of secondary metabolite and lysis of fungus by forming penetrating structures all these summarised as Antagonism and mycoparasitism10,11.

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 fungi12. 10ml of soil suspension was then transferred on the appropriate culture medium. The culture media evaluated were potato dextrose ager (PDA) medium13. 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 Taxonomic identification key of Barnet and Hunter14.

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 minutes and then rinsed with 70% ethanol followed by sterilized distil water. Sterilised plant material transferred on culture medium (PDA) in to the petriplates followed 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 antagonistic activity: Fungal inhibition assay 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 following equation by which it shows inhibition percentage of radial growth of test fungi:\n
\[ L = \frac{C - T}{C} \times 100 \]

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 Trichodema viridae on Alternaria sesamae:** Screening of inhibition assay is to look for the potential biocontrol agent against pathogenic fungi A.sesame. Considerable result were observed regarding inhibition of pathogen growth. Radial growth of phytopathogen 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 Phytopathogen Colletotrichum shows 90 mm radial growth. While in presence of Trichoderma radial growth was 27mm. % inhibition were calculated it was 70% (Table-1).

**Inhibition Assay of Trichoderma viridae on Fusarium oxysporum:** Fusarium oxysporum in control growth was 90mm and with the Trichoderma 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. Effect of Trichoderma 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 oxysporum (67%).

<table>
<thead>
<tr>
<th>Name of phytopathogen</th>
<th>Growth of pathogen against Trichoderma sp in (mm)</th>
<th>Growth of T.viridae in (mm)</th>
<th>Percent growth of inhibition (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternaria sesame</td>
<td>20</td>
<td>70</td>
<td>78%</td>
</tr>
<tr>
<td>Colletotrichum sp.</td>
<td>27</td>
<td>63</td>
<td>70%</td>
</tr>
<tr>
<td>Fusarium oxysporum</td>
<td>30</td>
<td>60</td>
<td>67%</td>
</tr>
</tbody>
</table>

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

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