

**INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH
TECHNOLOGY****INTEGRATED MANAGEMENT OF DISEASES ASSOCIATED WITH POTATO
AND THEIR BIOCONTROL****Dr Manish Singh***

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ABSTRACT

In the present study an attempt has been made to check the late blight and early blight diseases associated with potato (*Alternaria solani*) by an integrated management of the diseases. *Phytophthora infestans*, the causal agent of late blight, is major threat of potato production. Although initial symptoms in some field indicates the presence of oospore as the primary inoculum and the viability and infectivity in soil decreases between 2-4 year crop rotation should be considered as a part of integrated control strategy against potato late blight.

The bio-control efficacy of *Trichoderma viride* in managing the early blight of potato caused by *Alternaria solani*. Three types of treatment: soil treatment, seed treatment and foliar treatment in combination with NPK were given. The result was recorded at sixty days after sowing and ninety days after sowing. *Trichoderma viride* effectively inhibits the growth of *Alternaria solani* and significantly reduces the disease intensity of early blight of potato. The best result was recorded in foliar treatment followed by soil treatment and seed treatment in comparison with control. Therefore from present investigation it is concluded that an eco-friendly biopesticide *Trichoderma viride* is very easy to use and having no adverse effect on crops, people or animals and they can be applied to prevent and control several pathogenic fungi. *Trichoderma viride* can be used as a bio-control agent as it is low cost and profitable dependent system and it also helps in conserving the natural resource.

KEYWORDS: *Trichoderma viride*, soil treatment, foliar treatment, pathogenic fungibio-control.

I. INTRODUCTION

Study on efficacy of chemical and biological treatment for the control of late and early blight of potato. Most of the studies carried out in India for selection of potential bioagent of plant pathogen were efficient test serious effort were not made really to look into the mechanism involved in biological control by selection of bioagent many researches reported mechanism like micro parasitism and antibiosis based on laboratory test from India.

India is fortunate enough to have vast diversity of land soil and agro climatic condition to grow various vegetable. Potato is the one of the most starchy food crops of the world. Today farmer are searching for resource efficient low cost and profitable dependent system, chemical pesticides when especially used indiscriminately have contaminated the environment. A number of plant diseases especially the soil and seed born could not be significantly controlled by chemical means and gain the resistance from the chemicals. So the substitute is only to apply cultural and biological practices, biological control methods are alternative means of disease control of the crop, which are the otherwise unprotected because of the involved expenses. An ecofriendly biopesticides viz. *trichoderma viride* product is very easy to use and having no adverse effects on environment (crop, people or animals). They can be applied to prevent and control several pathogenic fungi such as *Fusarium*, *Rhizoctania*, *Phythium*, *Phytophthora*, *Alternaria* etc.

Biological control mechanism involving *Tricoderma* species operated by way of microparasitism, antibiosis, combination, induced resistance and inactivation of host enzyme.

II. MATERIAL AND METHODS

Experimental site

The experiment was conducted in the farm of Kumarganj University during the Rabi season 2014-2013 & 2015-2016 immediately after harvest of the kharif crop, the experimental field was ploughed 20-25 cm deep with soil turning plough. Cross ploughing and one planking was also done to obtain the good till fifteen centimeters deep furrows were opened with the help of bullock drawn furrow smaker at the appropriate distance. Seed beds were prepared for respective treatment as per day lay out planned plot for each treatment 2 × 2 square meter.

The seed variety selected for the study was Kufri Bahar. NPK: - Nitrogen Phosphorus Potassium

- Urea: - Urea was applied @120kg/ha, half amount of urea was given at the time of sowing and half amount was given as top dressing after 30 days of sowing.
- Single Super Phosphate: - At the time of sowing single Super phosphate was given @ 100 kg/ha.
- Muriate of potash. At the time of sowing MOP was given @ of 70kg/ha.

III. TYPES OF APPLICATION

1. Seed Treatment

The seeds of potato were treated and then the seeds were sown on an airy and hygiene place. The uniform sized and well sprouted healthy tubers were collected for sowing.

2. Soil Treatment

Little amount of soil was taken and treated. 15 cm deep furrows were made with the help of hoe. Treated soil was broadcasted informally in to the furrows. Seeds were placed in the furrows and were later covered with soil.

3. Foliar Spray

Foliar spray was given by hand sprayer till the leaves became thoroughly wet. This treatment was given 30 days after sowing. This spray was repeated after 15 days of interval till February.

Detail of Treatments

- T₁- Soil application @ 3Kg/ha+NPK
- T₂- Seed application @ 200 g/500 tubers+NPK
- T₃-Foliar application @ 2.5kg/ha+NPK
- T₀-control

Observation recorded for the calculation of Disease intensity-

$$D.I = \frac{\text{Sum of diseases rating} \times 100}{\text{Total number of leaves} \times \text{max grading}}$$

IV. RESULT

Table 1- Effect of *Trichoderma viride* with NPK on early blight & late blight disease intensity (%) at different days after sowing

Treatment	Disease intensity early blight (%)		Disease intensity late blight (%)	
	60	90	60	90
T0 Control	20.48	26.48	7.46	16.84
T1 Soil T.V.+NPK	2.33	4.17	3.06	9.63
T2 Seed T.V.+NPK	11.32	18.04	3.27	11.74
T3 Foilar T.V.+NPK	2.25	3.84	1.23	8.67

T.V.- *Trichoderma viride*, NPK- Nitrogen, Phosphorus, Potassium

V. DISCUSSION

Effect of *Trichoderma viride* on disease intensity of early and late blight of potato. Significant reduction of the disease intensity of late and early blight of potato was found in treatment T₃ (foliar T.V.+NPK) as compared to

other treatment and all treatment showed significant reduction as compared to control. Tiwari and Srivastava (2010) reported that a combination treatment of *T. viride* as seed + soil + spray treatment gave more effected control of *P. infestans*. Srivastava et. Al., (2012) reported biological control of *Phytophthora infestans* causing late blight of potato by using four microorganisms viz *Trichoderma viride*, *Acremonium stricte*, *Penicillium viridicatum* and *Pencilium aurantiogriseum*. Among the bioagents *T. viride* was found to be the most effective and prevented differentiation of sporangial cytoplasm into zoospores. Singh et.al. (2014) also reported that *T. viride* treatment and seed treatment combined with soil application was most effective, recording the lowest disease incidence of tomato early blight mode of action need to be indentified and used along with compatible biocontrol agent to minimize the use of pesticides. As more and more information is being generated there is a need to develop appropriate disease management strategy based farmer friendly information From all the above result we can conclude that biocontrol agent when applied in combination with NPK reduced the disease intensity of early and late blight disease of potato.

VI. CONCLUSION

The biocontrol of plant pathogens can be successfully explained it is difficult to predict the full extent to which research on Tricoderma However the initial momentum is evident in some partical result are begning to appear because of space limitation an effect an practical biocontrol, late blight of potato is most cleared disease and will continue to remains as the pathogen is envolving at the fast rate and adapting to new environmental and host there is need to characterize the pathogen population with more roust molecular markers to study the epidemiology of isolate group in different categories

VII. REFERENCES

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