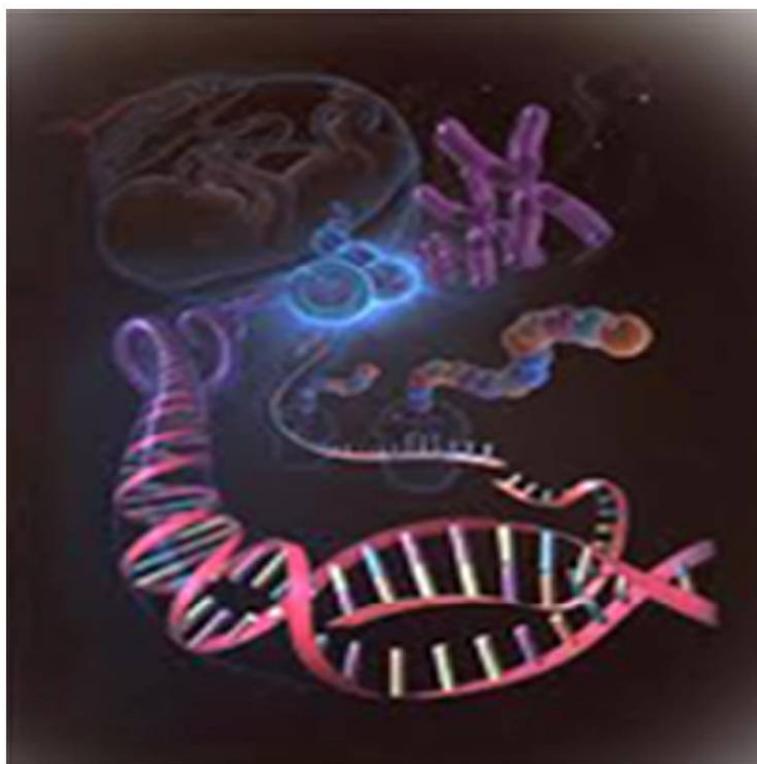


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Research Paper

## EFFECT OF *Trichoderma viride* ON GERMINATION OF MUSTARD AND SURVIVAL OF MUSTARD SEEDLINGS

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*Trichoderma viride* has been in use as a biopesticide for over five decades. Research has substantiated its potential in inducing several plant growth promoting hormones as well. In this paper we have investigated its potential in enhancing the seed germination of mustard (*Brassica juncea*). We have observed a 93.9% increase in the root length of treated mustard seeds in comparison to the control.

**Keywords:** *T. viride*, mustard, seed germination.

### INTRODUCTION

Mustard is a crop of great economic importance in India. India is one of the leading oil seed producing countries in the world. Mustard is the second important edible oil seed crop after groundnut. It accounts for 24.7 per cent of area (7.1 m ha) and 27.5 per cent of production (6.0 mt) with a productivity of 977 kg per ha. (Chhidda Singh *et al.*, 2005). There is a lot of research being carried out to increase the yield of mustard. Efforts are also being made to transfer the useful trait to other related crops. Use of hybrid varieties is also in practice. ( Melchinger *etal* 1998, Becker *etal* 1999 and Miller *etal* 1999). But use of hybrid varies have problems of pest resistance associated.

There is a heavy loss of mustard crop due to pests. On the basis of economic importance mustard aphids are considered to be the key pests, out of three species of aphids namely *Lipaphis erysimi* Kalt., *Myzus persicae* Sulzer and *Brevicoryne brassicae* Linn., the first one is the most serious, cosmopolitan and has attained the importance of national pest and causes yield loss from 35.4 to 91.3% (Brar *et al.*, 1987 and Singh *et al.*, 1994) The seed is also small in size and has limited nutrients for nourishing the embryo. The crop production is influenced by many factors. However, the initial condition for seedlings development is fundamental to get a good stand. The uses of less vigorous seedlings decrease

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the general plant development. Thus, it is important to increase the productive potential of seedlings. Auxins play a very important role during germination of any seed. *T. viride* is known to induce the production of auxins.

There is ample data regarding the effect of *T. viride* on germination of several crops like cabbage, cauliflower, groundnut etc which are seasonal. But the data pertaining to fertilizer applications of *T. viride* to mustard is scanty.

*T. viride* being both a biopesticide and a biofertilizer, proves to be a panacea to all agricultural problems. The current paper deals with the effect of *T. viride* on germination and seedling growth of mustard seeds.

## MATERIALS AND METHODS

### Culture Maintenance

A pure culture of *T. viride* was maintained on Sabouraud's dextrose agar in an environmental chamber at  $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ , 90% relative humidity and 16:8-h light: dark regime.

### Seeds

Mustard seeds were procured from local market from three different locations.

**Seed Treatment:** An aqueous conidial suspension of *T. viride* was prepared in and spore count was performed using haemocytometer. The spore suspension was so diluted as to obtain  $10^7$  spores per ml.

A set of 100 seeds were taken in triplicates in space and time and treated with *T. viride* spore suspension ( 1ml/seed) for one hour. Treatment with water served as control Following treatment the seeds were placed on moist whatmann filter paper no. 1. The seeds were observed for germination every 24 hours. The root length was recorded.

### Effect on Seedling growth

The 3 day old seedlings were transferred to the field in a completely randomized plot with the control and treated seeds sown. The plant growth was observed for 15 days. During this experiment the plants were not supplemented with any nutrients except water.

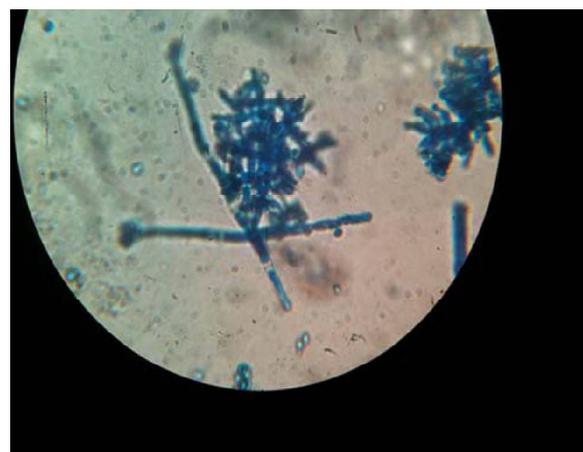
The experiments were carried out in triplicates in space and time.

## Results

### Culture

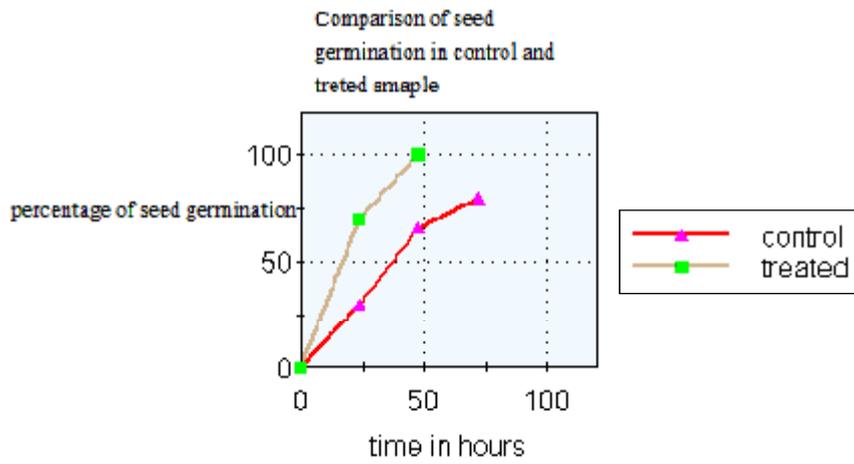
The image below is a photograph of the fungus *T. viride* stained with Lactophenol cotton blue and focussed under oil immersion objective.

**Figure 1: Stained Specimen of *T. viride***



In the treated sample, 70 % seeds germinated on the first day and 100 % by second day. Where as in the control, there was only 30%germination within 24hrs and 65.5%in 48 hrs, and 80%germination in 72 hrs. However there was a significant difference in the root length of treated and control. The average root length of treated sample was 93.9% more in comparison to the control. The results are graphically represented below.

**Figure 2: xxxxxxxxxxxxxxxxxxxxxxx**



**Figure 3: Top-Treated Seeds, Bottom, Control Seeds**



### Effect on Seedling Growth

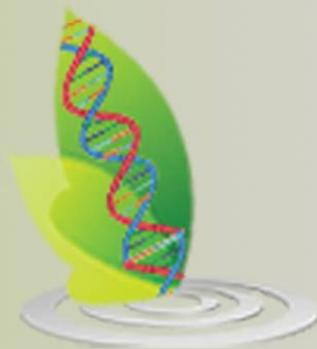
The seedlings in the control sample were eaten away ( probably by rodents) after one day when sown in soil. Whereas the seedlings in the treated sample were unaffected. The treated plants showed healthy growth for a period of 15 days. On the sixteenth day, the treated plants were also consumed by some nocturnal animals. This clearly indicated that *T. viride* possessed pest/ rodent repelling activity for 15 days from the treatment. Hence a treatment once on 15 days is mandatory to protect the crop.

### CONCLUSION

In the light of the above results it can be said that *T. viride* can be used as an enhancer of mustard growth. A periodic application of *T. viride* will not only stimulate growth of the plant but also prevent attack by pests and rodents. This finding can also be applied in tissue culture. In our future wish, we wish to quantify the growth hormones induced in treated seeds and identify the pest repelling factors induced by *T. viride*

### REFERENCES

1. Becker H C, H Loptien and G Robbelen (1999), "Breeding: An overview", pp. 413-460. In C. Gomez-Campo, (eds.) Biology of Brassica coenospecies, *Elsevier Science BV*, Amsterdam.
2. Brar N S, Bakhetia D R C and Sekhon B S (1987), "Estimation of losses in yield of rapeseed and mustard due to mustard aphid, *Lipaphis erysimi* (Kalt.)" *Journal of Oilseeds Research*, Vol. 4, No2, pp. 261-264.
3. Chhidda Singh, Prem Singh and Rajbir Singh (2005), "Modern Techniques of Raising Field Crops", *Oxford and IBH Publishers*, New Delhi, India, pp. 559.
4. Melchinger A E and R K Gumber (1998). "Overview of heterosis and heterotic groups in agronomic crops", pp. 29-44, In K R Lamkey and J E Staub, (eds.) *Concepts and breeding of heterosis in crop plants*. CSSA, Madison, WI
5. Miller J F (1999), "Oilseeds and Heterosis", pp. 399-404. In J.G. Coors and S.Pandey, (eds.) *The genetics and exploitation of heterosis in crops*, ASA, CSSA and SSA. Madison, WI
6. Singh C P and Sachan G C (1994), "Assessment of yield losses in yellow sarson due to mustard aphid, *Lipaphis erysimi* (Kalt)", *Journal of Oilseeds Research*, Vol. 11, No. 2, pp. 179-184.



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