EFFECT OF FUNGICIDES ON SEED GERMINATION

Project Report

under

DBT Star College Scheme

Department of Biotechnology, New Delhi

By

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Certificate

This is to certify that the work incorporated in the project report **Fungicide Effect on Seed Germination and Seedling Growth,** by Miss. Donde Rani Haribhau, Miss. Chaudhari Manisha Balasaheb, Miss. Doiphode Seema Sainath, Miss. Dhanak Pooja Ashok, are students of Arts, Commerce and Science College Sonai, Tal. Newasa, Dist. Ahmednagar. Affiliated to the Savitribai Phule Pune University Pune successfully completed project.

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Declaration

We hereby declare that the work done in this thesis entitled on **Fungicide Effect on Seed Germination and Seedling Growth,** is submitted to Department of Botany, Arts, Commerce and Science College Sonai. This project is completed under the DBT Star College Scheme and the supervision **Prof. (Miss.) V. N. Rawade** The works is original and not submitted in part or full by me or any other to this or any other University.

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INTRODUCTION:

The mungbean, *Vigna radiata* (L.) has been grown in India since ancient times. It is still widely grown in southeast Asia, Africa, South America and Australia. It is also referred to as green gram, golden gram and chop suey bean. Mung beans are grown widely for use as a human food (as dry beans or fresh sprouts), but can be used as a green manure crop and as forage for livestock. Virtually all the domestic production of mung bean is in Oklahoma. Fifteen to twenty million pounds of mung bean are consumed annually in the United States and nearly 75 percent of this is imported.

Mung beans are in the Legume family of plants and are closely related to adzuki and cowpea (in the same genus but different species). They are warm season annuals, highly branched and having trifoliate leaves like the other legumes. Both upright and vine types of growth habit occur in mungbean, with plants varying from one to five feet in length. The pale yellow flowers are borne in clusters of 12–15 near the top of the plant. Mature pods are variable in color (yellowish-brown to black), about five inches long, and contain 10 to 15 seeds. Self-pollination occurs so insect and wind are not required. Mature seed colors can be yellow, brown, mottled black or green, depending upon variety. These round to oblong seeds vary in size from 6,000 to over 12,000 per pound, depending upon variety. Germination is epigeal with the cotyledons and stem emerging from the seedbed.

Mung bean (*Vigna radiata* L.) is an important pulse consumed all over the world, especially in Asian countries, and has a long history of usage as traditional medicine. It has been known to be an excellent source of protein, dietary fiber, minerals, vitamins.

Seeds of *Vigna radiata* L.

Vigna aconitifolia:

Moth beans or Matki is a staple legume in various cuisines across India, often consumed either as a sprout or in the cooked form. Quite popular in the Maharashtrian cuisine, Moth beans are also known as mat bean, dew bean or Turkish gram. These tiny beans oblong in shape, available in brown, reddish brown and green colours are rich in protein and go with the botanical name Vigna aconitifolia

Just like moong dal, matki is also a good source of digestive fibre which plays a major role in regulating bowel movement. Moth beans not only prevent constipation but also help in flushing out toxins.

Moth beans are an amazing source of protein that not only repair muscles but also aid in losing weight without compromising on the health and stamina

Seeds of *Vigna aconitifolia*

The pathogen is already present within or on the seed surface, and can thus cause seed rot and seedling damping-off . Treatment of vegetable seeds has been shown to prevent plant disease epidemics caused by seed borne fungal pathogens. Furthermore, seed treatments can be useful in reducing the amounts of pesticides required to manage a disease, because effective seed treatments can eliminate the need for foliar application of fungicides later in the season. Although the application of fungicides is almost always effective, their non-target environmental impact and the development of pathogen resistance have led to the search for alternative methods, especially in the past few years.

Seed treatment is the use and application of biological and chemical agents that control or contain primary soil and seed borne infestation of insects and diseases which pose devastating consequences to crop production and improving crop safety leading to good establishment of healthy and vigorous plants resulting better yields. Seed treatment may increase the germination,ensure uniform seedling emergence, protect seeds or seedlings from early diseases and insect pests thereby improve the crop emergence and growth, improve plant population and thus increase productivity.

OBJECTIVES:

1. To study effect of fungicide on seed germination.
2. Study of average length of plumule and radical.
3. To study which conc. of fungicide shows the great effect on seed germination.

MATERIAL AND METHOD:

Collection of Seeds: Seeds of both *Vigna radiata)* and same.*Vigna aconitifolia* were collected from the vendor. Seeds were carefully selected with no apparent infections.

The solution of M45 Solution were prepared at different concentrations of 0.5%, 1%, 2 % respectively. Then the selected seed of *Vigna radiata* and *Vigna aconitifolia* were soaked in M45 fungicide solution (i.e. 1 hours) in different beakers containing germination, the treated seeds were placed uniformly in Petri- dishes lined with germinating paper and wetted with 10ml of different concentration of the fungicide test solution. Four Petri plates for each of the treatment including control was maintained. In each Petri plates 10 no. of seeds are used for treatment. One control treatment was run as control and treated with distilled water only. All the Petri-dishes were maintained under room temperature. The seeds were kept under dark condition for seed germination condition with the test solutions and equal volume (i.e. 10ml) The number of seeds germinated in each treatment was counted at the end of the observation (i.e. 3 rd) days after sowing .

The radicle growth of the seedlings exposed to various concentrations of fungicide solution were measured with the help of a scale for each germinating seed and the observations were made one time in one day

OBSERVATIONS:

Table: The effect of various concentrations of fungicides on the germination of seed of *Vigna radiata* and *Vigna aconitifolia*

Treatment on the seeds	Treatment of fungicide M45	Total average length of radical in cm		
		1st Day	2nd Day	3rd Day
Vigna radiata	0.5%	5.1	5.3	5.4
	1%	3.8	3.8	3.8
	2%	3.7	3.7	3.7
	Control	4.0	4.6	5.1

Treatment on the seeds	Treatment of fungicide	Total average length of radical in cm		
		1st Day	2nd Day	3rd Day
Vigna acconitifolia	0.5%	2.4	2.5	2.8
	1%	1.8	1.9	1.9
	2%	2.3	2.5	2.9
	Control	4.3	4.9	5.3

RESULT AND DISCUSSION:

From the total results of these experiments and with attention to the main goal of seed treatment with fungicide (protection of seedling from cause's disease)

It has been observed that the use of fungicide cause serious detrimental effect on the seed germination and seedling growth. The Fungicide used in the study viz,M_{45} inhibitory effect as well as growth promoting effect on the germination and seedling growth of radicle and plumule of *Vigna aconitifolia* and *Vigna radiata*. In both the cases of *Vigna aconitifolia* and Vigna radiata M_{45} has shown the highest growth promoting effect on the germination and growth of radicle and plumule. The improvement ingrowth parameters may be because of its application suppressed and /or elimination of pathogenic population.

Treatment of fungicide in M_{45} on the *Vigna radiata* shows the 100% of seed germination and show the more length of and radicle at 0.5 % fungicide solution. In which when the concentration will increase from 0.5% to 2% it will show the decrease in length of plumule and radicle.

Treatment of fungicide in M45 on the *Vigna aconitifolia* shows the 100% of seed germination and show the more length of plumule and radicle at 2 % fungicide solution. In which when the concentration will increase from 0.5% to 2% it will show the increase in length of plumule and radicle.

In other observation there is slow seed germination in control seed (without Fungicide treatment) it will show the plumule and radicle formation will occurs slow or in Second or third day.

According to the study, it can be seen that the systemic fungicides viz., M45 application gave best germination.

The germination percentage was 100% in all different concentration of fungicide and in control.

The length of radical in *Vigna radiata* of control treatment is medium. The 0.5 % fungicide solution shows maximum radical growth and other concentration shows less growth as compare to control and 0.5 concentrations. Whereas *Vigna acconitifolia* has maximum growth in control treatment.

CONCLUSION:

The data obtained indicates that germination percentage of seeds and plumule radicle formation affected with the differences in the two crops under investigation. The fungicide M45 with 0.5% concentration shows high growth rate in *Vigna radiata* and The fungicide M45 with 2% concentration shows high growth rate in *Vigna aconitifolia*.

It was observed that all the concentrations used had significant effect on the germination and growth of seedling (radicle and plumule). It was also observed that these fungicides have showed decrease in growth with the increase in concentration in *V.radiata* and at 1% &2% M45 solution shows there is no effect on the growth of seedling. Other hand fungicides have showed increase in growth with the increase in concentration in *V. aconitifolia* and at 1 % solution shows there is no effect on the growth of seedling

It has shown better stimulating effect on the seed germination and plant growth (radicle and plumule) as compared to Control. Significant differences in the growth values of seeds between treated and control plants were observed.

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