
EXPERIMENT 10 PREPARATION OF SPRAY SOLUTION OF FUNGICIDE AND APPLICATION OF BIO- FORMULATION

Structure

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10.1 INTRODUCTION

Application of fungicides plays an important role in controlling of diseases. It is important to know the required concentration, volume of spray solutions and time of application for achieving the desired level of disease control. The concentration also changes with incidence level. Hence, it is essential to know the preparation of spray solution of recommended fungicide and its required volume for spraying in a specific area.

Application methods are very important for effective control of the diseases. The controlling agents/fungicides are applied to the soil along with FYM, water etc. A product formulated by using the bio-control agent is known as bio-formulation. Before application, the mixing of bio-formulation in FYM & water and storing for a week is essential to increase the colonies.

Objectives

After studying and performing this experiment, you should be able to:

- prepare and apply different fungicide spray solutions for control of different diseases of mulberry; and
- prepare and apply bio-formulations for control of different diseases of mulberry.

10.2 EXPERIMENT

10.2.1 Principle

Fungicide accumulation in the plant tissue requires 3 hours after spraying and later inhibits the growth of pathogens by interrupting their metabolic system and making them inactivate. Bio-formulations like Bionema (*V. chlamydosporium*) parasitises the eggs of *M. incognita* and stops further hatching whereas, Raksha (*Trichoderma harzianum*) and Nursery Guard (*T. pseudokoningii*) inhibit the growth of pathogens by production of antifungal compounds like chitinases, trichodermin and gluconase,

which arrest the growth of pathogens and make them inactivate. Hence, it is important to know correct method of application.

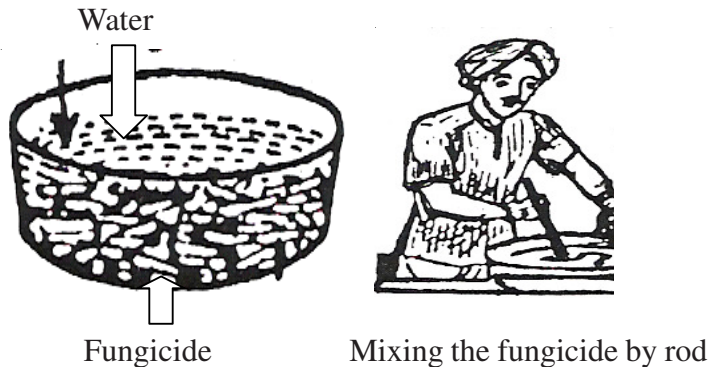
10.2.2 Requirements

- Recommended fungicide
- Buckets
- Measuring cup/spoon
- Stick
- Sprayer
- Bio-formulations and FYM

10.2.3 Procedure

(I) *Spraying of Fungicide Solution (for one acre garden)*

- Required solution of fungicide: 180 litres
- Required concentration: 0.2 %
- Required quantity of fungicide: 360 g
- Required volume of water: 180 litres (12 buckets)



- Add 360 g of fungicide in bucket/drum and make the solution up to 180 litres by adding water to get 0.2 % concentration for spraying in one acre mulberry garden.
- Mix the fungicide by rod/stick thoroughly.
- Spray the fungicide with the help of the sprayer till the foliage of the plants become fully wet.
- In case of powdery mildew disease, spray the fungicide solution on the lower surface of the leaves till it gets completely wet.



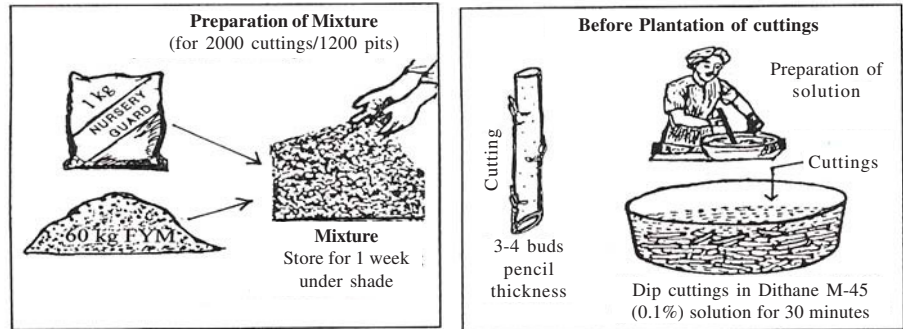
Spraying of the fungicide on foliage of the plants

(II) *Application of Bio-formulation*

(a) **Nursery Guard**

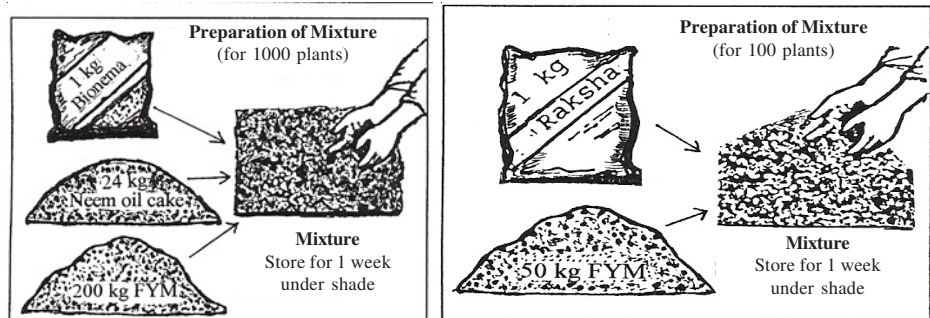
- Mix 1 kg Nursery-Guard with 60 kg FYM (sufficient for 2000 cuttings) and store the mixture in the shade for one week by adding 10 - 12 litres of water.

- After one week, broadcast the mixture in nursery beds @ 2 kg/m² and mix well in soil.
- Soak the cuttings in Dithane M-45 (0.1 %) solution for half an hour and plant the soaked cuttings in treated beds followed by irrigation.



(b) For Root Knot

- Mix one kg Bionema with 24 kg neem oil cake and 200 kg FYM (sufficient for 1000 plants) and store the mixture under the shade for about one week by adding 30-32 litres of water.
- Expose the roots of infected plants by digging to a depth of 15 cm and cut the bunch of knots from roots and destroy by burning.
- Apply the prepared mixture @ 200 g/plant around the exposed roots (3 times/year at an interval of 4 months) during cultural operations / fertilizer application followed by irrigation.



(c) For Root Rot

- Mix 1 kg of Raksha with 50 kg FYM (for 100 plants) and store the mixture under shade for one week by adding 8-10 litres of water.
- Apply the mixture @ 500g/plant in the root zone of the plant followed by irrigation.
- Continue application of Raksha for one year at an interval of 3 months.

10.2.4 Observations

(I) For Foliar Spray

- Before and after spraying the fungicide, record the incidence and severity of mulberry diseases and calculate the Disease Incidence (DI) as described in the next experiment.

(II) For Bio-formulation Application

- Record the severity of root diseases before and after application of bio-formulations as described in the next experiment.

10.2.5 Results

It can be tabulated as under:

Disease	Disease Incidence (%)		
	Control	Treated	Disease Control (%)
(A) Foliar Diseases			
Leaf spot			
Powdery mildew			
Leaf rust			
(B) Root Diseases			
Nursery diseases			
Root knot			
Root rot			

10.3 PRECAUTIONS

- Do not allow children and persons having cut/wound to spray.
- Do not mix the fungicide by hand, use rod/stick for mixing.
- Do not blow the nozzle with mouth, use needle for cleaning.
- Spray during cool hours either in the early morning or in late evening.
- Do not spray against the wind and during rainy days.