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# DETERMINATION OF EFFICACY OF SOME COMMON FUNGICIDES ON THE GROWTH AND SPORULATION OF CERTAIN PHYTOPATHOGENIC FUNGI

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Key words : Phytopathogenic fungi, Leaf spots, Spore germination, climatic conditions, latent period, chemicals.

Two important phytopathogenic fungi viz., *Fusarium semitectum* and *Alternaria barassicicola* were used to test the efficacy of selected fungicides belonging to Sulphur, Copper, Mercury and Systematic group. The two pathogens were isolated from the diseased fruits of *Lagenaria vulgaris*. Isolations were made by the usual methods. From the above isolates culture, single spore culture was done and two phytopathgenic fungi were obtained and maintained on Potato Dextrose Agar. Seven different temperatures, 15°C, 20°C, 25°C, 28°C, 32°C, 36°C and 40°C were tested *in vitro* to look into the influence of climatic conditions on the growth of the selected fungi. Here 28°C was found suitable. Germ tube initiation and percentage of spore germinations were completely investigated. To evaluate the efficacy of copper fungicides Blitox-50, kirty copper dry and kirty copper WP-50 were used at different concentrations and they were found more effective.

To evaluate the efficay of selected systematic fungicides such as Bavistan and Calaxin, experiments were set for further inoculations of two pathogens. Application of fungicides was effective in controlling the plant diseases. It has been reported that the efficacy of fungicides depends upon its formulation to improve their stability.

## INTRODUCTION

Parallel with the introduction of high yielding varieties of plants disease development and its management become a problem. Different methods and appliances have been developed to control phytopathogenic fungal infections and application of fungicides of various groups is one of them. Determination of the efficacy of some commonly used fungicides on the growth and sporulation of phytopathogenic fungi is an important area of investigation (Garg and Mehrotra, 1975, 1977).

Effective control of plant disease requires studies on the influence of different groups of fungicides under different climatic conditions and with reference to their chemical formulations. The present communication summarizes the results of such an investigation which may be effectively and profitably used for the control of fungal diseases.

## MATERIAL & METHODS

Investigations were caried out on two important phytopathogenic fungi *Alternaria brassicicola* and *Fusarium semitectum* from the diseased fruits Bottle gourd (*Lagenaria vulgaris),* tomato *(Lycopersicon esculentum)* and cabbage *(Brassica oleracea* var. *capitata).* Isolations were made by the usual method from the above isolates culture. Single spore culture was planted and in this way pure cultures of above two phytopathogenic fungi were obtained and maintained on PDA medium. The parameters of studies were dry mycelial weight in 100 ml of culture medium, spore density in one milliliter of spore suspension, germ tube initiation and percentage of spore germination. A laboratory study was carried out to evaluate the bioefficacy of ready mix proprietary for formulation of certain fungicides belonging to different groups. Three different fungicides viz., Dithane Z-78, Cosan and Unizeb belonging to sulphur groups at four different concentrations such as 0.05, 0.01, 0.5 and 0.1% were added separately in the culture medium and inocultion of the above two test pathogenic fungi were exercised. The inoculated culture tubes and flasks were incubated at 28°C. All the four elaboration methods were studied.

In fungicidal evaluation trial in field and laboratory of Rajendra College and nearby field area was taken for such observation under the environmental conditions. The fungicides Unizeb, Cosan and Dithane Z-78 were found efective in controlling *Alternaria brassicicola* and *Fusarium semitectum* on Tomato and Mustard when one prophylactive spray of respective fungicides was given during flowering/fruit setting stage and then after four sprays given at an interval of 20 days. Field trials were conducted at the experimental farm near Chapra during 2009-2010 for studying the role of various fungicides so far as management is concerned.

**TABLE -1 : Indicating percentage inhibition of elaboration process in two test organisms used in the present work, treated with different sulphur fungicides.**

| | | % inhibition | | |
|---|---|---|---|---|
| Fungicides | Test organisms | Mycelial Growth | Sporulation | Spore germination |
| Dithane Z-78 | A | 46 | 48 | 51 |
| | B | 38 | 34 | 32 |
| Cosan | A | 52 | 28 | 70 |
| | B | 34 | 21 | 46 |
| Unizeb | A | 38 | 24 | 100 |
| | B | 32 | 10 | 100 |

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**RESULT AND DISCUSSION**

Along with the introduction of high yielding varieties of plants, disease development becomes a problem. To control these phytopathogenic fungi different methods and applications were made and adopted (Grossmann, 1962; Rajpurohit and Prasad, 1982). One of them was application of listed fungicides and to test their efficiency. We have several types of such chemicals (Fungicides). To evaluate the efficacy of coper fungicides Blitox-50, Kriti Copper and Kriti Copper WP-50 were used at four different concentrations viz., 0.005, 0.01, 0.05 and 0.1% respectively. These fungicides were mixed in the culture medium in which inoculations were made.

Further three different fungicides, viz., Aretan-6, Cerasan and Emissan of Mercury group were used at 0.005, 0.01, 0.05 and 0.1% concentrations for their impact of the four elaborations such as mycelial growth, sporulation, germ tube initiation and % of spore germination of *Fusarium semitectum* and *Alternaria brassicicola.* For this, the above fungicides were incorporated separately in the culture medium in which the pathogens were inoculated. Based on the result it was concluded that Aretan 6 at 0.05 and 0.1% concentrations could inhibit mycelial growth and sporulation in *Fusarium semitectum* while it reduced the dry mycelial weight to 26.80 mg and spore density to $2x10^4$ / ml in case of *Alternaria brassicicola.* On the other hand cerasan at 0.05 and 0.1% concentration could inhibit both mycelial growth and sporulation in *Alternaria brassicicola.* Emissan was found more efficient at 0.05 and 0.01% concentrations, growth and sporulation were completely inhibited in both the phytopathogenic fungi.

**TABLE-2 : Impact of various concentrations of different sulhur fungicides on spore germination and germ tube elongation of the two test organisms.**

| %inhibition of spore germination in different (h) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fungicides | Concen tration | Germ Tube inhibition in minutes | | 0 | | 1 | | 2 | | 5 | | 24 | |
| | | A | B | A | B | A | B | A | B | A | B | A | B |
| Dithane | 0.005 | 158 | 157 | 8.25 | 9.00 | 28.25 | 24.50 | 38.60 | 42.60 | 52.50 | 63.00 | 78.50 | 72.40 |
| | 0.001 | 185 | 192 | 7.80 | 8.60 | 23.50 | 16.60 | 28.0 | 32.25 | 42.00 | 52.50 | 56.25 | 60.50 |
| | 0.05 | 238 | 246 | 6.20 | 6.70 | 12.25 | 11.30 | 20.50 | 11.60 | 28.00 | 24.25 | 42.50 | 40.70 |
| | 0.1 | 260 | 280 | 3.50 | 3.00 | 8.80 | 7.70 | 18.25 | 16.00 | 25.25 | 20.50 | 38.25 | 31.50 |
| Cosan | 0.005 | 188 | 148 | 8.80 | 10.40 | 26.80 | 23.60 | 36.25 | 40.25 | 43.50 | 52.20 | 60.40 | 68.50 |
| | 0.001 | 228 | 185 | 7.25 | 8.30 | 22.60 | 13.80 | 32.60 | 34.50 | 39.60 | 44.50 | 52.60 | 52.40 |
| | 0.05 | 250 | 230 | 5.50 | 5.25 | 13.70 | 10.25 | 26.50 | 18.25 | 28.50 | 26.20 | 40.30 | 28.25 |
| | 0.1 | 340 | 294 | 2.60 | 2.80 | 8.20 | 4.60 | 14.50 | 11.50 | 24.00 | 18.00 | 30.50 | 15.25 |
| Unizeb | 0.005 | 166 | 175 | 9.50 | 8.25 | 32.50 | 18.60 | 34.50 | 36.25 | 44.50 | 50.25 | 62.25 | 60.20 |
| | 0.001 | 180 | 235 | 8.30 | 7.50 | 26.25 | 14.30 | 28.25 | 25.50 | 40.30 | 41.50 | 44.50 | 50.25 |
| | 0.05 | – | – | 6.25 | – | 10.50 | – | 16.50 | – | 26.50 | – | – | – |
| | 0.1 | – | – | 2.25 | – | 6.80 | – | – | – | 18.50 | – | – | – |

Application of fungicides remains a highly effective and reliable method of direct control of crop plant diseases. This initiated production of fungicides at commercial level. Plant pathologists have evaluated the efficacy of these fungicides in laboratory and green houses as well as in government institutions. It has been reported that the efficacy of fungicides depends upon its formation which is mixed with inner substances to improve their stability. Chemicals for plant disease control will continue to be an important component of agricultural technology of both developed and developing countries.

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