INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

**ISSN: 2454-132X**
**Impact factor: 6.078**
***(Volume 7, Issue 1)***
Available online at: https://www.ijariit.com

# In Vitro Toxicity of Bavistin (Carbendazim 50% Wp) On Sclerotium Rolfsii Sacc.

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## ABSTRACT

***When the hosts are susceptible and the environment is feasible the viable fungal pathogens causes many plant diseases. The diseased plant fails to produce healthy yield and also decline its viability. To inhibit the effect of fungal pathogens either natural or synthetic fungicides are applied. The present investigation deals with In vitro antifungal activity of the synthetic fungicide Bavistin (50% WP) on Sclerotium rolfsii Sacc. using poisoned food technique. Mainly 0.2mg, 0.4mg, 0.6mg and 0.8mg of fungicide were incorporated into four different 100ml PDA media and obtained specific concentrations such as 10ppm, 20ppm, 30ppm and 40ppm respectively and then poured into four different petriplates. It was found very toxic at 40ppm and the growth was completely inhibited where as the lower concentrations such as 30ppm, 20ppm and 10ppm showed various degrees of inhibition on soil borne fungus Sclerotium rolfsii Sacc.***

***Keywords***: *In Vitro, Sclerotium Rolfsii, Bavistin, PDA Medium, Poisoned Food Technique.*

## 1. INTRODUCTION

For the past several years, the use of chemicals as fungicides are being tried for their efficacy in the laboratory as well as in the field. Some of them have been effective for certain period and after which they become ineffective giving way for newer and competitive ones. Several attempts have been made in recent years to control plant diseases with chemicals and achieved considerable success. The availability of sufficient evidences indicates the potentiality of systematic treatment as a more reliable means of control. Yet a knowledge of the necessary relationship between the lethal or static effect of some chemicals on certain fungi are often over looked in developing new fungicides at the time of recommendation. In vitro studies of chemicals against specific pathogens provide sufficient evidences confirming fungitoxicity as a reliable basis for field application. To be an antifungal compound, a substance has to be detrimental to the fungus. Often this is accomplished by preventing spore germination. Sometimes by preventing the growth or by the destruction of mycelium or preventing reproduction. In addition to this the puzzling phenomenon encountered by pathologists in the specificity of the fungicide against a required organism. The application of fungicides over a long period may result in plant pathogenic fungi developing resistance (Benítez et al., 2004, Agrios, 2005; Kim and Hwang, 2007). When this happens other fungicides must be used for effective disease control. Keeping this in view and the application of Bavistin (Systemic fungicide) does not seem to have been evaluated to an applicable degree against the control of root pathogen *Sclerotium rolfsii* Sacc. So, the present investigation was under taken in vitro condition in order to find out the effective concentration to control this fungal pathogen.

*Sclerotium rolfsii* Sacc. a common soil borne fungus is known to be a pathogenic on nearly 500 plant species (Sulladmath et al 1977) and known to cause seedling bligt, root rot and wilt symptoms. In india these diseases caused by *Sclerotium rolfsii* Sacc. is known to occur on crop plants in almost all states (Aycock, 1966). The wide host range of this pathogen makes the search for resistance futile; hence there is a need for an effective chemical which is feasible for farmers. Bavistin (Carbendazim 50% WP) a broad spectrum systemic fungicide is known to prevent as well as cure a large number of diseases of field, plantation, fruit, vegetable and ornamental crops.

## 2. MATERIAL AND METHODS

The root rot affected plants of *Sesamum indicum* L. Were collected from the fields near Bhosga tank of Gulbarga district, Karnataka, India.. The infected portions were cut in to 4cm bits and incubated on moist blotter for 3 days under laboratory part profusely it was transferred to petriplates containing PDA ( Potato Dextrose Agar) medium for further growth. The fungus thus isolated from the diseased tissues were purified by subculturing the hyphal tips on to a fresh PDA medium to obtain pure cultures. The purified culture was then allowed to grow further till it produced sclerotial bodies of identification.

 

Commercially available form of the Bavistin (Carbendazim 50% WP) a broad spectrum systemic fungicide (50% W/W wettable powder containing 500g/Kg of 2-(methoxycarbamoyl-benzimidazole) obtained from local dealer is used in the present investigation.

Petriplates of 9 cm diameter were used in poisoned food technique to evaluate the fungicide and fungistatic effects of fungicide. Corning conical flasks of 250ml capacity were used for the preparation of different concentrations of the fungicide in PDA medium. All the glasswares were kept in the cleaning solution for a day (Composition 60g of potassium dichromate, 60ml of $H_2SO_4$ and 1000 ml water). They were than washed with tap water, rinced with distilled water and dried.

200gm Peeled Potato, 250 g Dextro ($C_6H_{12}O_6$), 20g Agar agar and 1000ml distilled water. Peel patato was made into thin chips boiled in 500ml of water and extracted. To the extract the weighed quantity of dextrose was added. The agar was melted in the other half of the water and mixed in potato dextrose solution and the volume made upto a litre before sterilization.

All the glasswares used in the present investigation were sterilized in hot air oven at $160^0$ C for two hours. The medium was sterilized by autoclaving at $121^0$ C and 15lb pressure for 15 minutes.

The antifungal activity of the fungicide Bavistin against *Sclerotium rolfsii* Sacc. was tested by using the modified poisoned food technique of Kothari and Bhatnagar (1966). A known quantity of the fungicide based on its active ingredients was carefully incorporated to each of the 250 ml conical flask containing 100ml of autoclaved PDA medium at $45^0$C. Then the fungicide incorporated medium after thorough mixing was plated in 9cm diameter petriplates for each concentration and one Petriplate containing Unamended Potato Dextro Agar medium served as control. After allowing the plates to solidify, 4mm diameter inoculums discs cut from the margins of the actively growing cultures of *Sclerotium rolfsii* Sacc. was transferred to the centre of the petriplates. The plates were incubated for 7 days at laboratory temperature ($25+2^O$ C). The inhibitory effect of the fungicide was assessed by recording average radial growth of the fungus.

## 3. RESULTS AND DISCUSSION

In the present investigation *In vitro* toxicity of Bavistin (50% WP) proved to be a very effective fungicide against *Sclerotium rolfsii* Sacc. by using poisoned food technique. It was found very toxic at 40ppm and the growth was completely inhibited where as the lower concentrations such as 30ppm, 20ppm and 10ppm showed various degrees of inhibition on soil borne fungus *Sclerotium rolfsii* Sacc. (Figure-1 and Table-1).

The present investigation results (Figure-1 and Table-1 are very much contrary when compared with the results of Sharma and Verma (1985), because they have shown that the tolerance of *Sclerotium rolfsii* Sacc. was in the range of 500ppm to 1000ppm. Many researchers have worked on *In vitro* toxicity of both natural and synthetic fungicides on different fungi. Antimicrobial activity and the major components of the essential oil of Plectranthus cylindraceus (MarwahR.G. et al., 2007). The efficacy of plant extracts against Sclerotium rolfsii, causative agent of root rot of sugar beet and observed maximum inhibition of the fungus by Azadirachta indica followed by Cassia fistula and Cannabis sativa (Farooq et al., 2010). In vitro evaluation of antifungal activity of some agricultural fungicides against two saprolegnoid fungi infecting cultured fish (Ashraf Abdel-Fattah Mostafa, et al., 2020)

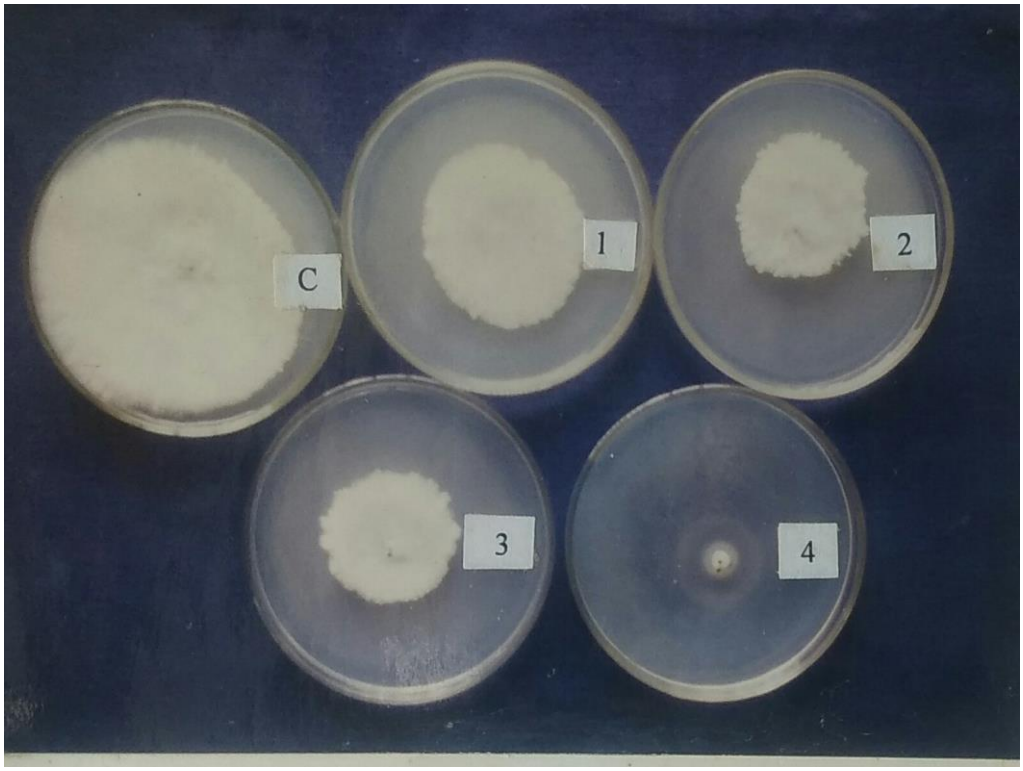


**Fig. 1: The fungi static effect of Bavistin (50% WP) incorporated in PDA medium on the growth of *Sclerotium rolfsii* Sacc. (C: Control; 1:10ppm; 2:20ppm; 3:30ppm; 4: 40 ppm)**

 

**Table 1: Average colony diameter of *Sclerotium rolfsii* Sacc. at four different concentrations of the fungicide Bavistin (50% WP).**

| S no. | Concentration (ppm) | Average Colony diameter (cm) |
|---|---|---|
| 1 | Control | 7.7 |
| 2 | 10 | 5.1 |
| 3 | 20 | 4.1 |
| 4 | 30 | 3.81 |
| 5 | 40 | 0.41 |

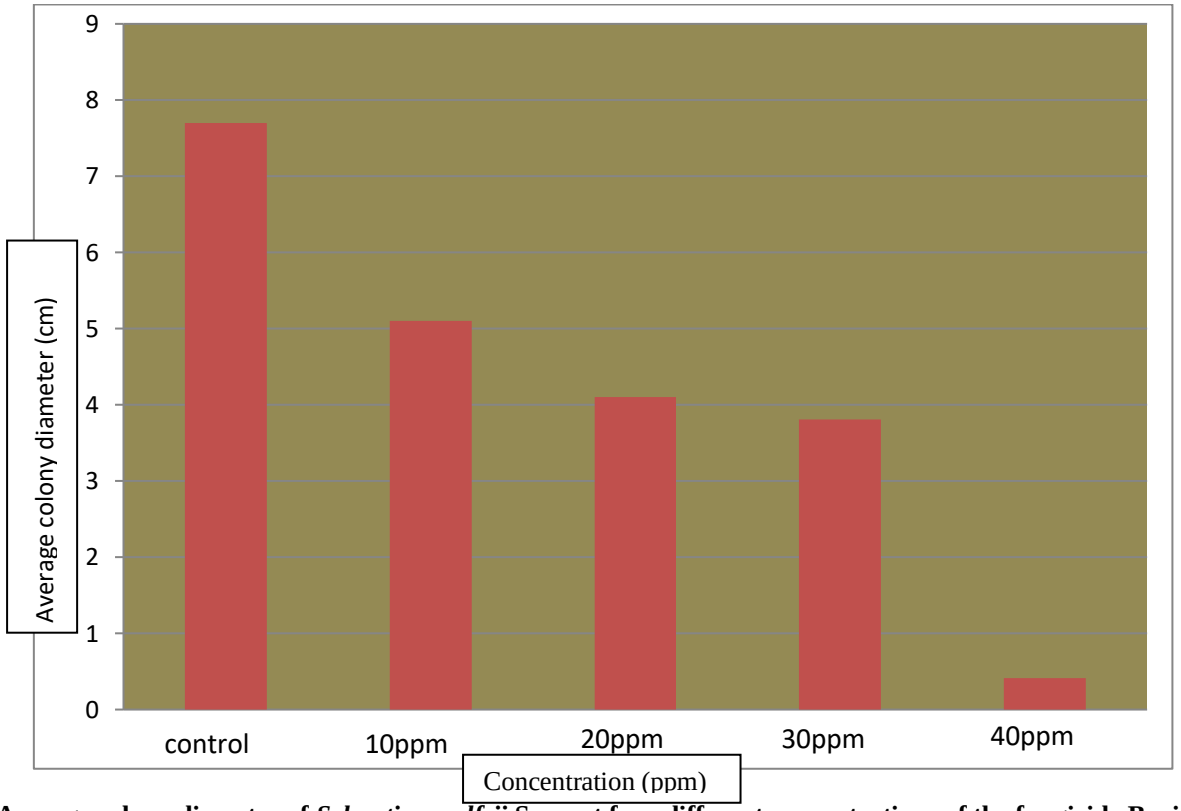


**Fig. 2: Average colony diameter of *Sclerotium rolfsii* Sacc. at four different concentrations of the fungicide Bavistin (50% WP).**

## 4. CONCLUSION

Bavistin (50% WP) a broad spectrum systemic fungicide when tested in vitro condition has proved that a very promising chemical inhibiting *Sclerotium rolfsii* Sacc. .This fungicide has shown different degrees of inhibition at different concentrations. The initial inhibitory effect was observed at 10ppm but the complete inhibition recorded at 40ppm.

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