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Standardization of Concentration of Effective Botanicals against *Sclerotinia Sclerotiorum*

Pramod Kumar Fatehpuria*, Rajni S. Sasode, Devashish R. Chobe and Reeti Singh

Department of Plant Pathology, Rajmata Vijayaraje Scindia Krishi Viswavidhlya, Gwalior (M.P.) - 474002

*Corresponding Author E-mail: pramodfatehpuria@gmail.com

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ABSTRACT

Present investigation was aimed to identify the effective botanicals against Sclerotinia sclerotiorum. Investigation was laid out in a Completely Randomized Block design (CRBD) with 4 treatments including untreated control and replicated thrice. 3 botanicals viz. Allium sativum, Curcuma longa and Zingiber officinale were evaluate against S. sclerotiorum. Findings revealed that all the tested botanical viz, Allium sativum, Curcuma longa and Zingiber officinale significantly inhibited the growth of S. sclerotiorum in all the tested concentrations viz, 20, 40 and 60 percent; however they are effectively gradually increased with the increase in concentration. Allium sativum have present (Allicin, di-allyl di sulphide) chemical ingredient that having the property to inhibit the mycelium radial growth and formation of sclerotia of S. sclerotiorum in-vitro. The maximum inhibition was recorded in garlic crude extract followed by turmeric, and zinger. At 20% concentration the minimum growth (0.00 mm) was recorded in garlic crude extract followed by turmeric (25.60 mm) and zinger (31.00 mm), while maximum of 90 mm growth was recorded in control. At 40% concentration the minimum growth (0.00mm) was recorded in garlic crude extract followed by turmeric (18.40 mm), and zinger (31.60 mm), at 60% concentration the minimum growth (0.00 mm) was recorded in garlic crude extract followed by turmeric (12,80 mm), and zinger (13.80 mm), and maximum growth are recorded control plate. In all the three concentrations, the garlic crude extract was significantly superior over other extract .at 20, 40 and 60% concentration.

Key words: *Indian mustard, Sclerotinia sclerotiorum, Botanicals*

INTRODUCTION

Indian mustard (*Brassica juncea* (L.) Czernj. Cosson) is also known as Rai or Laha belong to *Brassicaceae* and Centre of origin Mideterian. Oilseed Brassicas, Rapeseed-Mustard are the world's third most important sources of vegetable edible oil. Rape seed and Mustard crops are being cultivated in 53 countries spreading over the six continents across the globe covered area. Madhya Pradesh contributed in rapeseed – mustard crops production area about 08.00 lakh hectares with production and productivity of 11.40 lakh tones and 1425 kg/ ha respectively during, (Farmer Welfare and Agriculture Development, Bhopal, Madhya Pradesh, 2013-14).

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Out of this Morena, Bhind, Gwalior and Sheopur jointly contribute >60% production of these crops in the state. Amongst the fungal diseases, Sclerotinia blight in mustard incited by *Sclerotinia sclerotiorum* (Lib.) de Bary earlier considered to be a minor problem in India but it has become a serious problem of rapeseed mustard over the years in some parts of country[2]. Infection and symptoms of Sclerotinia rot are visible after flowering. Sclerotinia infection may be observed as individual plants scattered throughout the field, or in patches in the field where moisture was greatest. Lodged crops are more susceptible to Sclerotinia mold development. Sclerotinia rot has become an economically important yield-reducing factor especially in raya (*Brassica juncea*) and is causing 40-80 per cent losses in yield[4]. The disease was of minor importance till few years back, but recently it has assumed a serious problem in major mustard growing areas in country[6]. Sclerotinia stem rot is a disease that has become significant in recent times in India and elsewhere. Hence, the aim of present investigation was undertaken to formulate the effective strategies to manage this emerging problem.

MATERIALS AND METHOD

The experiment was laid out in a Completely Randomized Block design (CRBD) with 4 treatments including untreated control and replicated thrice. 3 botanicals *viz.*, *Allium sativum*, *Curcuma longa* and *Zingiber officinale* were evaluated against *S. sclerotiorum.* The present study was under taken in the laboratory conditions to find out their relative efficacy to inhibit the radial growth of the pathogen on PDA (Potato Dextrose Agar) medium by poisoned food technique[5]. The calculated quantity of botanical was added to potato dextrose agar (PDA), mixed thoroughly and poured into sterilized Petri plates and allowed to solidify. After solidification, each plate was inoculated with a 5 mm diameter disc obtained from an actively growing margin of *S. sclerotiorum* colony on PDA. The Petri dishes were incubated at 25+1ºC in BOD incubator and allow to growth. The data of efficacy of botanicals against *S. sclerotiorum* was recorded after 7 days after inoculation (DAI) for growth of pathogen DAI at 25± 1°C. Per cent over control was calculated by the following formula suggested by Vincent[7].

Percent inhibition = C-T×100/C

C = growth of fungus in control

T = growth of fungus in treatment

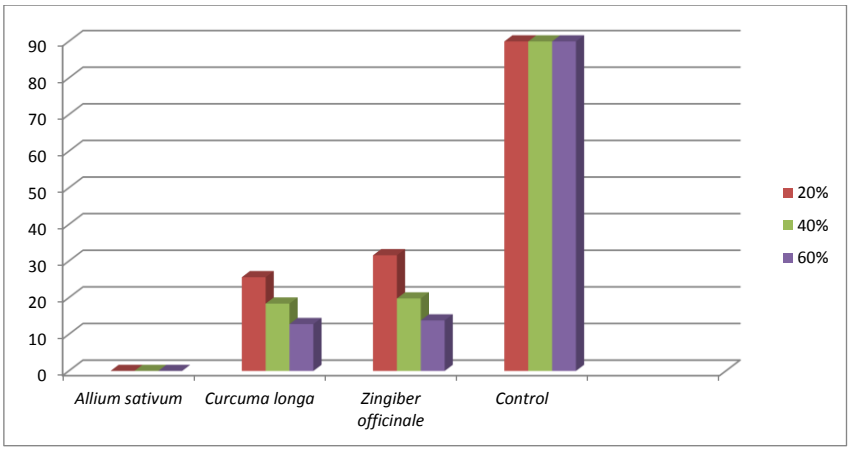
RESULTS

The result of present study reveals that the crude extract of garlic, turmeric, and zinger, garlic and turmeric significantly inhibited the growth of *S.sclerotiorum* in all three (20, 40 and 60%) tested concentration *Allium sativum* have present (Allicin, di-allyl di sulphide) chemical ingredient that having the property to inhibited the mycelium radial growth and formation of sclerotia of *S. sclerotiorum in-vitro.* Gradually increased with the increase in concentration. The maximum inhibition was recorded under the treatment garlic crude extract followed by turmeric and zinger, while maximum growth was recorded in control. Garlic crude extract significantly superior over turmeric and zinger and garlic crude extract can replace thiophynate methyl and carbendazim because of that there none of growth was recorded. The trend of effectively of the botanicals indicates that absolute inhibition of the fungal growth may be obtained at much higher concentration (Table: 1, Fig-1). The present finding is supported by Shivipuri *et al.*[3] reported that the higher dose of few botanicals were relatively more effective against the pathogenic fungi *viz.*, *Alternaria brassicicola*, *colletotrichum capsici*, *Fusarium oxysporum*, *Rhizotonia solani* and *Sclerotinia sclerotiroum*. Kapil and Kapoor[1] also evaluated six neem-based biopesticides at two concentrations (0.5 and 0.1%) against *Sclerotinia sclerotiorum*. Wanis completely inhibited the mycelia growth at both the tested concentrations while neem-gold completely inhibited the growth at higher concentration (0.5%).

Table 1: Standardization of botanicals against *Sclerotinia sclerotiorum*

Botanicals	Radial growth in (mm)		
	Concentration percent		
	20	**40**	**60**
Allium sativum	0.00	0.00	0.00
Curcuma longa	25.60	18.40	12.80
Zingiber officinale	31.60	19.80	13.80
Control	90.00	90.00	90.00
SE(m) ±	**0.529**	**0.274**	**0.265**
C.D. at 5 %	**1.600**	**0.828**	**0.800**

Fig-1: Standardization of concentrations of effective botanicals against *Sclerotinia sclerotiorum*



CONCLUSION

Among the evaluated botanicals Allium sativum were completely inhibited radial growth of mycelium Sclerotinia sclerotiorum under In-vitro.

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