



Evaluation of resistance for propiconazole against *Sclerotium rolfsii* sacc. causing fruit rot of ridge gourd

S L Soudagar¹, N K Khandare², M B Waghmare¹

¹Department of Botany, The New College, Kolhapur, Maharashtra, India

²Department of Botany, Krantisinh Nana Patil College, Walwa, Maharashtra, India

Abstract

Ridge gourd (*Luffa acutangula* L.) is a pantropical climbing herb belongs to cucurbitaceae. It is affected by fruit rot disease caused by *Sclerotium rolfsii* Sacc. The present investigation exhibits the sensitivity of *Sclerotium rolfsii* Sacc. against different concentration of propiconazole. There was quite a large variation in MIC (Minimum Inhibitory Concentration) of propiconazole among the 14 isolates of *S. rolfsii* collected and isolated from different districts of Maharashtra and Karnataka. MIC on agar plate (*In vitro*) was ranged from 40 µl/ml to 60 µl/ml, while on fruit (*In vivo*) ranged from 24 µl/ml to 35 µl/ml. The MIC result showed that, isolate Sr-6 was sensitive from Sangola (Solapur) and Sr-11 was resistant from Waddwadi (Kolhapur).

Keywords: fruit rot, *Luffa acutangula* L., MIC, propiconazole, *Sclerotium rolfsii* sacc.

Introduction

Ridge gourd is a pantropical climbing herb belongs to cucurbitaceae. It is believed to have originated in India. but has now spread pantropically to all areas with high rainfall. It is a healthy food with high amount of fiber, vitamins, minerals and antioxidants.

Ridge gourd get infected by many fungal pathogens causing diseases like, fusarium wilt, collar rot, pythium rot, powdery mildew, downy mildew, anthracnose, alternaria blight, stem and fruit rot. Among these diseases fruit rot caused by *Sclerotium rolfsii* Sacc. is the most severe disease. Which affect quality and quantity of fruit. So, there is urgent need to management of fruit rot disease. The aim of present investigation was to evaluate the sensitivity of *Sclerotium rolfsii* Sacc. to propiconazole causing fruit rot of ridge gourd.

Material and Methods

Isolation of pathogen *S. rolfsii* Sacc. from diseased samples

Isolation was made from the infected fruit of ridge gourd (*Luffa acutangula* L.) showing fruit rot were collected from different localities of Maharashtra (Sangli, Kolhapur, Satara, Solapur, Pune and Latur) and Karnataka (Bijapur and Belgaum). The diseased fruit showing symptoms were washed thoroughly with water, small pieces of infected fruit parts were cut with the help of sterilized blade. These pieces were surface sterilized with 0.1% mercuric chloride (HgCl₂) solution for 30 seconds followed by three washings with sterile distilled water to remove traces of HgCl₂. The pieces were then transferred aseptically to petri plates containing sterilized CDA (Czapek's Dox Agar) medium and incubated at 28±2^oc for seven days and examined at frequent intervals to see the growth of the fungus developing from different pieces. when fungal colony appeared, they were transferred to CDA slant for purification of culture. The isolated pathogen was identified by following relevant literature

(Subramanian, 1971., Sahana N. Banakar *et al.*, 2017) [3] and the isolates were numbered and abbreviated as Sr (*Sclerotium rolfsii*). The pathogenicity test was determined by Koch's postulates (Koch, 1893) [9].

In vitro evaluation of propiconazole against *S. rolfsii* Sacc. by food poison technique:

Evaluation of resistance for propiconazole to *Sclerotium rolfsii* Sacc. was determined by food poisoning test (Dekker and Gielink, 1979) [5]. For evaluation of MIC *In vitro* Czapek dox agar plates were prepared containing different concentration (40-60 µl/ml) of propiconazole (Trade name-Tilt). Seven days old mycelial mat (6 mm disc) inoculated at the center of the plate in triplicate. The inoculated plates were incubated at 28±2^oc in BOD incubator and radial growth was recorded at 24 hr. time interval. Plates without fungicide were served as control. Percent inhibition was calculated by (Vincent, 1949).

In vivo evaluation of propiconazole against *S. rolfsii* Sacc. by food poison technique

In vivo resistance was tested on healthy ridge gourd fruit by doing a well of 1cm deep with the help of cork borer. Healthy fruits (replicates of three) were treated with concentration of propiconazole solution. After 24 hours, these propiconazole treated fruits were inoculated with 10 ml. spore suspension (10⁶ spores/ml) of *Sclerotium rolfsii* Sacc., prepared from 7 days old culture in sterile deionized water. After inoculation percentage of infection was recorded by 0-4 scale (Kareem, 2007) [7].

Result and discussions

The fruit rot of ridge gourd was firstly reported by Kousik *et al.* (2016) [4]. The pathogen was responsible to cause severe infection to fruit and loss in quality and quantity. Propiconazole is used to manage fungal disease. There was variation in MIC of propiconazole among 14 isolates, under

In vitro and *In vivo* conditions. The MIC of propiconazole among 14 isolates of *Sclerotium rolfsii* Sacc. on agar plate (*In vitro*) and on fruit (*In vivo*) ranged from 24-60 µg/ml respectively (Table.1). The resistance was observed more in the isolate Sr-11 i.e., 60 µg/ml (*In vitro*) while there was 35 µg/ml of MIC was observed in Sr-6 (*In vivo*). There are many workers who determined sensitivity of a pathogen against different fungicides. Apte and Kamble (2008) [1], studied efficacy of carbendazim in combating castor blight

in western Maharashtra. Waghmare *et al.* (2011) [17] studied efficacy of carbendazim against *Botrytis cinerea*. Khandare and Kamble (2013) [8], observed sensitivity of carbendazim against *Alternaria alternata*. Rangarani *et al.* (2017) [18], observed sensitivity of different fungicides against *Sclerotium rolfsii* Sacc. Nattapatphon *et al.* (2020) [19], reported efficacy of fungicides in controlling rice blast and dirty panicle disease. The above study was very useful for further investigation of resistance.

Table 1: MIC of propiconazole against *Sclerotium rolfsii* Sacc. isolates causing fruit rot of ridge gourd (*Luffa acutangula* L.).

Sr. no.	Locality	Isolates	MIC of <i>Sclerotium rolfsii</i> (<i>In vitro</i>) µl/ml	MIC of <i>Sclerotium rolfsii</i> (<i>In vivo</i>) µl/ml
1	Shahuwadi (Kolhapur)	Sr-1	48	30
2	Jath (Sangli)	Sr-2	44	28
3	Panhala (Kolhapur)	Sr-3	52	30
4	Asta (Sangli)	Sr-4	42	26
5	Pandharpur (Solapur)	Sr-5	46	26
6	Sangola (Solapur)	Sr-6	40	24
7	Baramati (Pune)	Sr-7	48	32
8	Koregaon (Satara)	Sr-8	48	24
9	Walwa (Sangli)	Sr-9	58	30
10	Indi (Bijapur)	Sr-10	44	28
11	Waddwadi (Kolhapur)	Sr-11	60	35
12	Nipani (Belgaum)	Sr-12	52	28
13	Nilanga (Latur)	Sr-13	54	24
14	Barshi (Solapur)	Sr-14	44	26

Conclusion

It was observed that there was variation in the minimum inhibitory concentration of propiconazole. MIC on agar plates ranged from 40-60 µg/ml and 24-35 µg/ml on fruit. Isolate Sr-6 was sensitive to propiconazole and Sr-11 was resistant to propiconazole and showed 60 µg/ml. *In vitro* and *In vivo* bioassay study revealed that Propiconazole is very effective in management of *Sclerotium rolfsii* Sacc.

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