The Bioscan 7(1) : 101-102, 2012
AN INTERNATIONAL QUARTERLY JOURNAL OF LIFE SCIENCES
www.thebioscan.in

BIOCHEMICAL CHANGES IN *ROSA FLORIBUNDA* INFECTED WITH CARBENDAZIM RESISTANT AND SENSITIVE ISOLATE OF *ALTERNARIA ALTERNATA*

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KEY WORDS
Alternaria alternata
Carbendazim
Rosa floribunda

Received on :
23.08.2011

Accepted on :
07.01.2012

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ABSTRACT
Leaf spot of rose caused by *Alternaria alternata* is one of the most wide spread disease. In the present study healthy and infected leaves were used to study biochemical changes in the host plant. The infected plant showed a decrease in the quantity of total sugar, reducing sugar, DNA and RNA content. While starch, total ash and phenol content significantly increased when compared to the healthy plant.

INTRODUCTION

Rose is an important ornamental and medicinal plant. It increases the aesthetic value of the garden, house and offices. The cut flower of rose is very commercial. Petals of these flowers used in the medicine. Such important plant suffering from leaf spot disease caused by *Alternaria alternata*. Plant pathogen interaction shown rapid increase in the phenol compounds and related enzymes (Khan, 1985). Similarly biochemical changes reported by other workers in different plants infected by different pathogens (Velazhahan and Vidhyasekaran, 1984; Wang *et al.,* 1991; Kamble, 1991; Khan *et al.,* 2001; Chattopadhayay and Bera, 1980). Biochemical and physiological changes reported by many workers in different plants, but there is no report seems to be available for biochemical changes in *Rosa floribunda*.

The aim of present work is to study the biochemical changes in *Rosa floribunda* infected with carbendazim resistant and sensitive isolates of *Alternaria alternata* causing leaf spot of rose.

MATERIALS AND METHODS

Samples exhibiting the leaf spot collected from different localities of Maharashtra. From the samples pathogen *Alternaria alternata* isolated on Czapek Dox Agar medium and pure culture maintain in BOD incubator at 23 $\pm$ 2ºC for further study. Total ten isolates obtained from different districts of Maharashtra. Determined the MIC (Minimum inhibitory concentration) of carbendazim against *Alternaria alternata* by food poisoning technique on CDA medium (Dekker and Gielink, 1979) and obtained the Sensitive and resistant isolates. For Biochemical analysis 1-2 months old plant of *Rosa floribunda* grown in the earthen pots using garden soil. Leaves were inoculated with spore suspension of resistant and sensitive isolates of pathogen. Without spore inoculated plants were served as control. After 10 days of inoculation infected leaves from tested plants and healthy leaves from control plants collected separately and dried in oven at 60ºC for 24h. The dried samples were crushed in grinder. 10g of samples were extracted in 100 mL of ethanol and analysed 8 biochemical parameters such as Starch, total ash reducing sugar and total soluble sugar (Sridhar, R. And Ou, 1974), DNA and RNA (Cherry, 1962).

RESULTS AND DISCUSSION

MIC (minimum inhibitory concentration) of isolates against carbendazim was more variable among the ten isolates.

MIC ranged from 1.5 to 5 %. MIC of isolate AA 1 was highest (5%) and MIC of AA 7 was very low (1.5%). Thus according to FRAC isolate AA-1 was resistant and isolate 7 was sensitive (Table 2). Similarly many workers reported the sensisitivity of different fungicides against different pathogen (Waghmare *et al.,* 2011; Patil, 2010).

The Results in (Table 1) indicated that when compared with healthy plant, total sugar, reducing sugar, DNA and RNA content of infected plant reduced due to infection of sensitive and resistant isolates of *Alternaria alternata*. These findings are in agreement with (Bhale *et al*., 2010). While starch, total ash and phenol content increased in the host plant which is

Table 1: Biochemical characteristic of the leaves infected with carbendazim resistant and sensitive isolates of *Alternaria alternata* after ten days

S.no	Estimation	Healthy	Sensitive	Resistant
1	Total sugar(g/100g)	1.90	1.27	1.17
3	Reducing sugar(g/100g)	0.47	0.37	0.32
4	Starch(g/100g)	0.110	0.130	0.215
5	Polyphenols (g/100g)	1.56	2.73	2.87
6	DNA (Mg/mL)	0.40	0.031	0.023
7	RNA(mg/mL)	1.32	1.22	1.15
8	Total ash (%)	7.00	8.50	10.16

infected by resistant isolate of *Alternaria alternata*. Similarly (Jagtap *et al.,* 2011), reported the biochemical changes in turmeric. Other several workers studied the biochemical changes in different plants infected by different pathogen. (Gangavane and Datar, 1978; Patil, 2010 and More, 2010).

ACKNOWLEDGEMENTS

The first author is very much thankful to U.G.C. WRO, Pune for financial assistance. He is also thankful to Shri D.B.Patil, Chairman, The Prince Shivaji Maratha Boarding House, Kolhapur and Principal, Dr. P.K.patil, The New College, Kolhapur for providing the laboratory facilities.

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Table 2: MIC (Minimum inhibitory concentration) of Carbendazim against *Alternaria alternata* isolates causing leaf spot of *Rosa floribunda*

Isolate	Locality	Isolate	*In vitro*	*In vivo*
1	Kolhapur	AA-1	5%	4%
2	Sangali	AA-2	3.5%	3%
3	Satara	AA-3	4%	3.5%
4	Solapur	AA-4	3%	1.5%
5	Nagpur	AA-.5	3.5%	2.5%
6	Aurangabad	AA-6	4.5%	3.5%
7	Ratnagiri	AA-7	1.5%	1%
8	Pune	AA-8	4.5%	3.5%
9	Shindudurg	AA-9	4%	3%
10	Osmanabad	AA-10	3.%	2.5%