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"A NATURAL FUNGI TOXIC POTENTIAL OF SOME MEDICINAL PLANT EXTRACTS ON *SCLEROTIUM ROFLSII* CAUSING ROOT ROT OF CHILLI."

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Abstract

The medicinal plants used for their imperially antifungal properties. These natural resources with antifungal activity against different strains of fungus have been found, which great importance to environment and plants are. The inhibitory effect of extract from *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta), *Piper betle* Linn were studied against *Sclerotium rofsii* causing rot in chilli. In present studied the antifungal activity of medicinal plants leaves extract of different concentration were done by poisoning food technique. To determine their antifungal activity, different concentration of each plant extract of 10%, 25%, 50%, 75% and 100% (that is without treatment serve as control) of aqueous medium were tested against *Sclerotium rolfsii*. The higher inhibition effect of all extracts was recorded at 75 and 50 percent concentration of *Piper betle* Linn aqueous leaves extracts gave 54.70% & 52.98% if inhibition with 25.66mm & 24.33mm inhibited radial mycelium growth after 48 incubation period. The antifungal activity of *Bauhinia racemosa* (apta) had moderate, it showed 48.82% & 39.77% of inhibition with 28.66mm & 45.77mm inhibited radial mycelium growth after 48 & 72 hours of incubation respectively. The lowest inhibition 35.71% & 27.98% was recorded by *Caesalpinia bonducella* (sagar gotta) with 36mm & 27.98mm inhibited radial mycelial growth after 48 hours of incubation period. Result clearly indicates that these medicinal plants were used in this paper proved a promising source of antifungal compounds.

Keywords:

Bauhinia racemosa (apta);
Caesalpinia bonducella (sagar gotta);
Medicinal plant;
Plant extracts;
Piper betle Linn;
Sclerotium rolfsii.

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Introduction

Increased usage of different chemicals based products to control theses pathogens has result in problems like residual effect of chemicals in agric-based products, increased resistance for chemical in target pathogens and environmental pollutions. However there is a serious problem against the effective use of these chemicals in area where the fungi have developed resistance (Brent and Hollomon 1998) [1]. Use of botanicals instead of chemical fungicides is one of the recent approaches for plant diseases control, as fungicides may cause health hazards and may directly increase environmental pollution.

Perusal of earlier literatures indicates that attention has not been given for utilization of plant extracts in controlling fungal diseases losses and other plant pathogens, even if their effectiveness has been reported in reducing many diseases of various vegetable diseases. A large number of plants have been reported to possess fungi toxic properties against plant pathogens which could be exploited commercially with practically no residual or toxic effect on ecosystem (Kumar et al. 2008) [2]. Use of botanicals instead of chemical fungicides is one of the recent approaches for plant diseases control, as fungicides may cause health hazards and may directly increase environmental pollution. Various plant products like, gums, oil, resins etc, are used as fungicides (EL-Sheriff et, al., 1990; Asthana et, al, 1986; Chaturvedi et, al. 1987; Daoud et, al. 1990; Cowan, 1999; Al-Mughrabi et, al., 2001)[3], [4], [5], [6], [7], [8]. In recent years there has been a growing trend to evaluate the antimicrobial activity of the extracts and isolates of medicinal plants, because of resistance developed by pathogens, gross side effects of synthetic drugs due to indiscriminate use and their expensive treatment regimen (Nychas, 1995; Tauxe, 1997; Cowan, 1999; Smid and Gorris, 1999; Sharif, 2001; and Tomoko et al., 2002) [9], [10],[7] [11], [12], [13]. Therefore, plant extracts may be used as an alternative source for controlling soil-borne diseases since they comprise a rich source of bioactive substance. This study was carried out with an objective to investigate the antifungal potentials of leaves of *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta), *Piper betle* Linn. Therefore the objectives of antifungal activity determination of the selected medicinal valuable plant against plant pathogens *Sclerotium rolfsii* compared with the chemical fungicides.

Materials and Methods

Isolation of *Sclerotium rolfsii*.

Infected root rot disease of chilli plant caused by *Sclerotium rolfsii* was collected from the field of Aurangabad District. The cut the infected portion into small pieces of about 3-5mm thick and sterilized with 0.1% ($HgCl_2$) mercuric chloride solution for few seconds and rinsed thrice in sterilized distilled water, and then placed on filter paper at room temperature. The tissue sections were then placed on potato dextrose agar and incubated at room temperature for seven days. Ultimately the pure culture of the pathogen was isolated subsequently maintained on the potato dextrose agar medium. Potato dextrose agar medium was prepared and after room temperature poured in petriplates, mycelial disk 4mm diameter were cut from 4-5 day-old actively growing culture of *Slcerotium rolfsii* and each was placed in the center of petriplates containing PDA. The effect of plant extracts on inhibition of mycelial on the growth of *Sclerotium rolfsii* was studied using poisoning food technique, (Dhingra and Sinclair, 1985) [14].

Plant species with families selected.

The Plant species with families were selected for in-vitro evaluation used for this study was presented in the Table 1 below.

Table 1. The Plant species and their families.

Sr.No.	Botanical name of medicinal Plants	Families
1	*Bauhinia racemosa* (apta)	Fabaceae
2	*Caesalpinia bonducella* (sagar gotta)	Caesalpinaceae
3	*Piper betle* Linn.	Piperaceae

Preparations' of plant extract:

Fresh leaves of *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta) and *Piper betle* Linn were used medicinal plants leaves extract preparation. These leaves were collected from Phulambari fields and local vegetable market for (*Piper betle* Linn) during January, February 2015. These plants leaves, were rinsed in sterile distilled water in two to three times and dried in shied at room temperature, after which they were milled motor and pestle and electric blender to make powder. The powders were packed in to bottles and in air tight plastic pouches.

Preparation plant leaves extract medium for different concentration:

The plant leaves extract were made with at the rate of one ml/one gm or one gm / one ml of sterilized distilled water, autoclaved, cooled and then strained through muslin cloth. This formed a standard plant extract were made in aqueous medium of 10%, 25%, 50%, 75% and control (a without plant leaves extracts) concentrations.

Studies effect of plant leaves extracts of different concentrations:

The effect of plant leaves extracts of *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta) and *Piper betle* Linn on inhibition of mycelial on the growth of *Sclerotium rolfsii* was studied using poisoning food technique, (Dhingra and Sinclair, 1985). From standard stock solutions of plants leaves 10, 25, 50, 75 percentage concentrations was prepared separately by adding the required quantity of plants extract to the molten potato dextrose agar medium. One set is made without plant extract and keep it as controlled. All these poured in to sterilized petriplates. A mycelial disk cut from the periphery to 3-4 days old colony of *Sclerotium rolfsii* grown on potato dextrose agar medium were centrally placed in each of the petriplates containing the potato dextrose agar medium having different three above medicinal plant leaves of *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta) and *Piper betle* Linn at different 10%, 25%, 50%, 75% concentrations and control under aseptic conditions. The petriplates contains the PDA medium inoculated with the pathogen alone served as control. All these petriplates were incubated at room temperature. There are three replication were maintained for each treatment. The diameter of the colony was measured in two directions and average was recorded. The inhibition the growth of *Sclerotium rolfsii* was calculated by using the formula given below.

$$\text{Percentage of inhibition} = \frac{[\text{Diameter of colony}] - [\text{Diameter of colony in treatment}]}{\text{Diameter of colony control}} \times 100$$

Table 2- Medicinal plants in aqueous medium of following concentrations impression radial growth of *Sclerotium rolfsii* measured in mm after 24 hours.

Serial. No	Medicinal plants	Concentrations (%)	Growth extracts	*S.rolfsii* measured 24 hours	given in mm
			24	48 hr	72 hr
1	*Bauhinia racemosa* (apta)	10 %	17.7	47	72.99
		25 %	18.66	46.5	69.91
		50 %	17.33	35.66	54.10
		75 %	15.66	28.66	45.77
		Control			
2	*Caesalpinia bonducella* (sagar gotta)	10 %	18.66	44.33	66.32
		25 %	18	42.66	69.76
		50 %	18.33	40.33	59.86
		75 %	15	36	58.61
		Control			
3	*Piper betle* Linn.	10 %	16.83	45	*72.32*
		25 %	16	41.33	67.55
		50 %	13.66	26.33	43.22
		75 %	11.5	25.66	42.98
		Control			

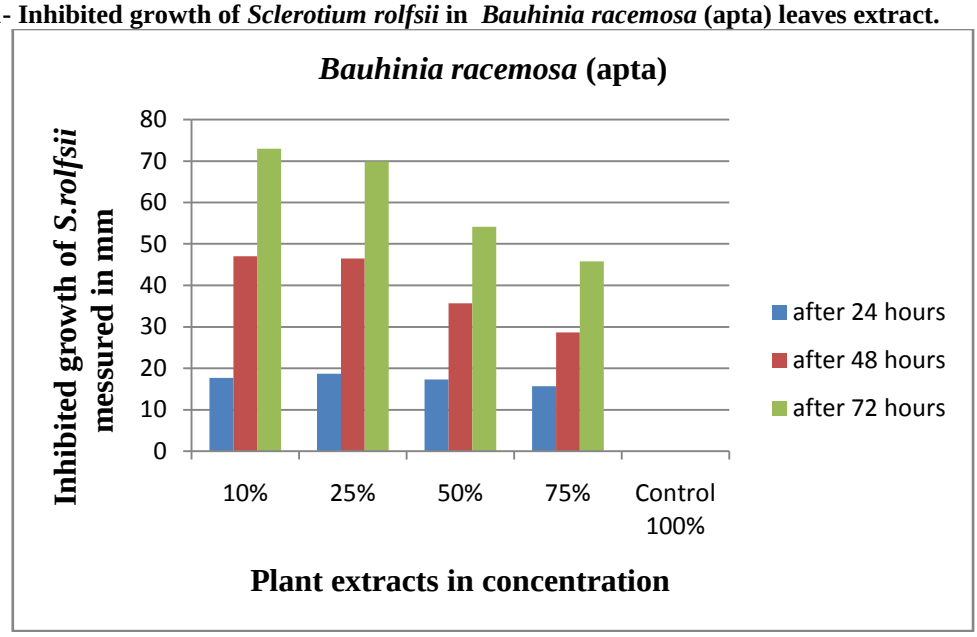
* Values are average of triplicate.
* Values measured after deducting or reducing 4mm mycelium disk.
* (I) is denoted for inhibition.
* Note 1- 10%, 25%, 50%, 75% and Control (100%) are aqueous medium leaves extract.

Table 3- The percentage of Inhibition (% of I) of *Sclerotium rolfsii* at given plant extract concentration in aqueous medium.

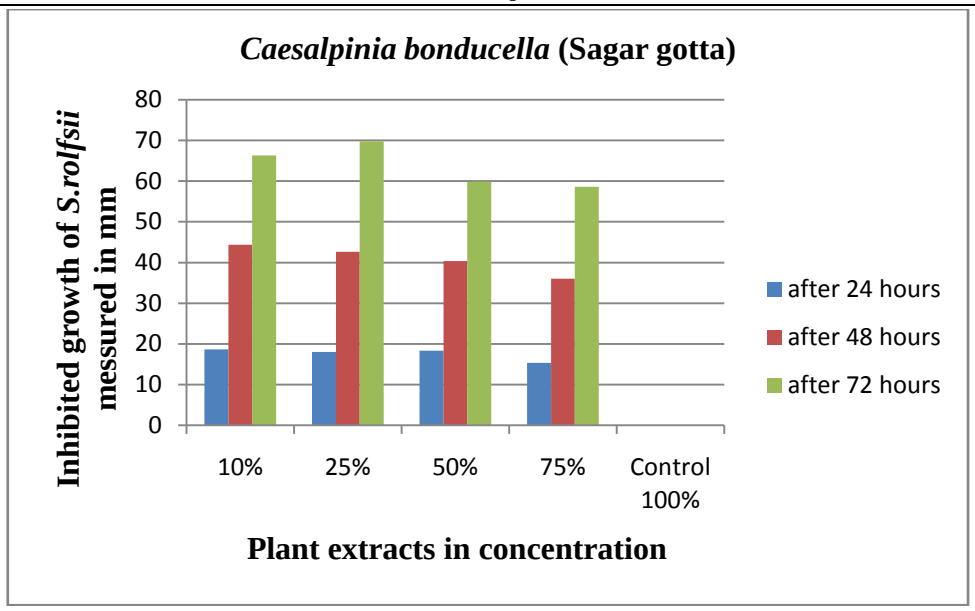
Serial. No	Medicinal plants	Concentrations (%)	Percentage given	of plant	Inhibition (I) extract	Of in	*S.rolfsii* following	at concentration
			24 hr	% of I	48 hr	% of I	72 hr	% of I
1	*Bauhinia racemosa* (apta)	10 %	17.7	15.17	47	16.07	72.99	3.960
		25 %	18.66	11.14	46.5	16.56	69.91	8.013
		50 %	17.33	17.47	35.66	36.32	54.10	28.81
		75 %	15.66	25.42	28.66	48.82	45.77	39.77
		Control						
2	*Caesalpinia bonducella* (sagar gotta)	10 %	18.66	11.14	44.33	20.83	66.32	12.73
		25 %	18	14.28	42.66	23.82	69.76	8.210
		50 %	18.33	12.71	40.33	27.98	59.86	21.23
		75 %	15.33	27	36	35.71	58.61	22.88
		Control						
3	*Piper betle* Linn.	10 %	16.83	19.85	45	19.64	72.32	4.842
		25 %	16	23.80	41.33	26.19	67.55	11.11
		50 %	13.66	34.95	26.33	52.98	43.22	43.13
		75 %	11.5	45.23	25.66	54.17	42.98	43.44
		Control						

* Values are average of triplicate.
* Values measured after deducting or reducing 4mm mycelium disk.
* (I) is denoted for inhibition.
* Note 2- 10%, 25%, 50%, 75% and Control (100%) are aqueous medium leaves extract.

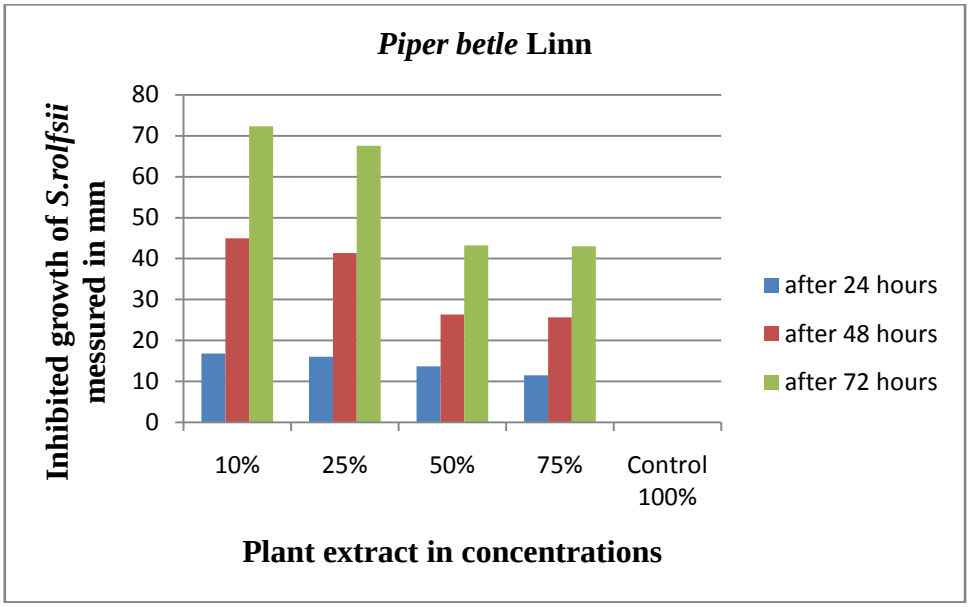
Graph 1- Inhibited growth of *Sclerotium rolfsii* in *Bauhinia racemosa* (apta) leaves extract.



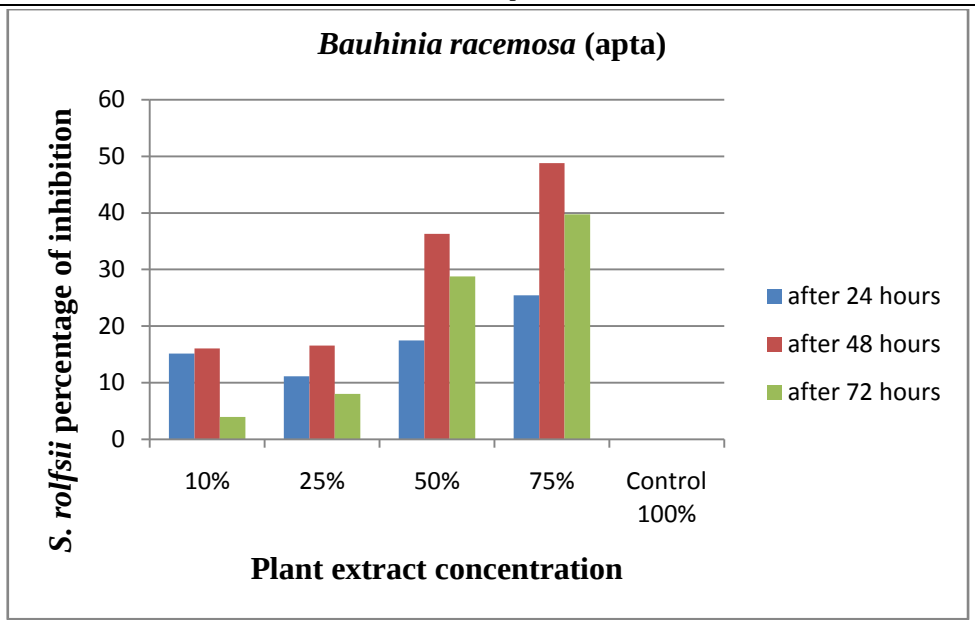
Graph 2- Inhibited growth of *Sclerotium rolfsii* in *Caesalpinia bonducella* (Sagar gotta) leaves extract.



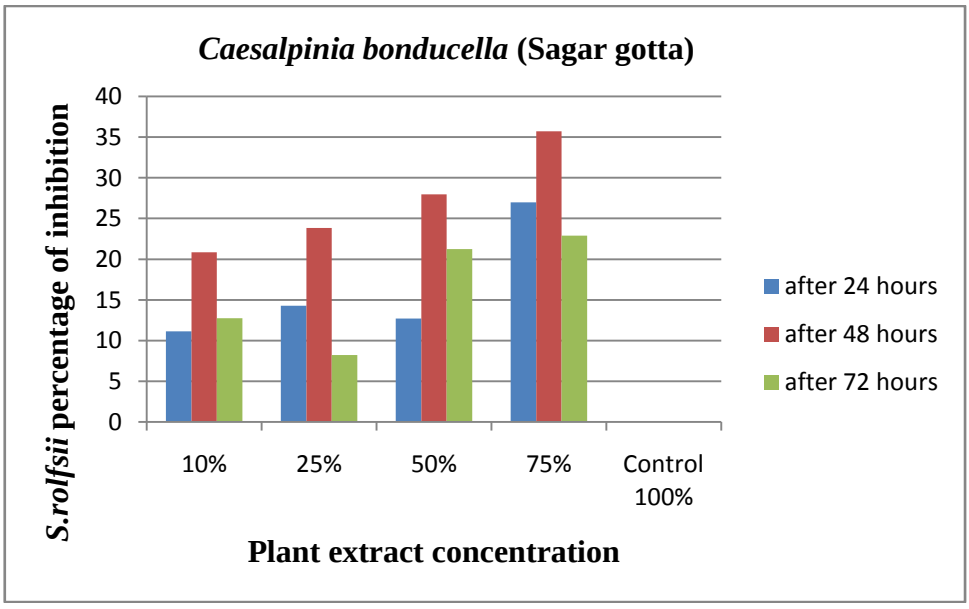
Graph 3- Inhibited growth of *Sclerotium rolfsii* in *Piper betle* Linn leaves extract.



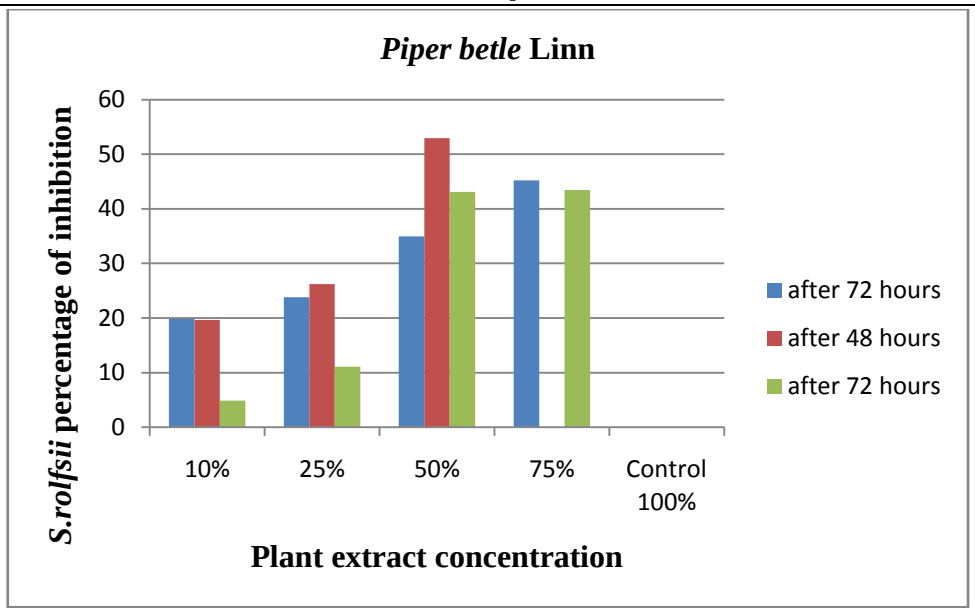
Graph 4- The percentage of inhibition of *Sclerotium rolfsii* of *Bauhinia racemosa* (apta).



Graph 5- The percentage of inhibition of *Sclerotium rolfsii* of *Caesalpinia bounducella* (Sagar gotta).



Graph 6- The percentage of inhibition of *Sclerotium rolfsii* of *Piper betle* Linn.



Result and Discussion:

The result obtained from Table 1, 2, 3 Figure 1 and Graph 1-6 these studies revealed that among three medicinal plants *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta) and *Piper betle* Linn plants, leaves extract *Bauhinia racemose* (apta) evident 48.43 percent of inhibition with minimum growth 37.8mm at 75 concentration, these followed by *Piper betle* Linn that observed by 42.75.percent of inhibition with 41.96mm growth at 75 percent concentration. However least inhibition found in *Bauhinia racemose* (apta) that is 1.91 with 71.96mm inhibited mycelia growth at 10 percent concentration followed by *Piper betle* Linn with 2.72 percentage of inhibition with 71.33mm inhibited mycelial growth. Lastly *Caeslpina bonducella* (sagar gotta) behave moderate percent of inhibition ranges between 8.210% to 35.71% and moderate mycelial growth possessed 69.76mm to 36mm.

Conclusion:

The medicinal plant leaves extract are important sources of compounds that are inhibits effectively against *Sclerotium rolfsii* growth, the present research work made conclude that leaves extracts of *Bauhinia racemosa* (apta), *Caesalpinia bonducella* (sagar gotta) and *Piper betle* Linn posses antifungal potential.

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