

Efficacy Of Plant Extracts Against Brown Spot Of Kharif Rice Caused By *Helminthosporium Oryzae*

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Abstract: Rice is one of the most important cereal crop which can be infected by many diseases among which brown spot of rice is also important. In the present research paper three plant extracts Ginger (rhizome)-Chloroform, Clerodendrum (leaves)- Chloroform and Polyalthia (leaves)- Methanol were tested in rice under field condition and it has been observed that after 20 days of second spraying there was 40% reduction in disease severity was given by polyalthia which was more than the chemical pesticide.

1. INTRODUCTION:

Rice (*Oryza sativa* L.) is the most important cereal crop worldwide and its cultivation takes place in almost all states of India and wholly or partially most of the world's population depends on rice (Nguyen 2006). Rice crop is suffering from number of different types of fungal, bacterial and viral diseases cause 10- 15% (Kandhari 2005). However, most important diseases of rice like False smut, Bacterial leaf blight, brown spot, rice blast, and leaf streak, sheath blight and rot, Bakane disease, stem rot, Tungro disease, false smut and many other post-harvest diseases (Sharma 2008; ChitraMani & Kumar, P. (2020); Sharma, M., & Kumar, P. (2020); Chand, J., & Kumar, P. (2020); Naik, M., & Kumar, P. (2020); Kumar, P., & Naik, M. (2020); Kumar, P., & Dwivedi, P. (2020); Devi, P., & Kumar, P. (2020); Kumari, P., & Kumar, P. (2020); Kaur, S., & Kumar, P. (2020); Devi, P., & Kumar, P. (2020); Sharma, K., & Kumar, P. (2020); Kumar, S. B. P. (2020); Devi, P., & Kumar, P. (2020); Chand, J., & Kumar, P. (2020). Moreover, the adequate use of fungicides are hazardous to human and plant health, biocontrol micro-organisms and biocontrol insects and develop fungicidal resistance in the system of plant pathogens and also caused toxicity in residues of plants and soil . So use of biopesticides and biological control agents have been proved to be most assured since decades as it will take long time to resistant by the pathogen but very less works have been moved from laboratory to market and these pesticides have no severe impact on the environment (Babar 2011). So in the present research paper use of botanical pesticides have been recommended for sustainable development which are collected from easily and locally available plants are used (Kumar, P. (2019); Kumar, D., Rameshwar, S. D., & Kumar, P. (2019); Dey, S. R., & Kumar, P. (2019); Kumar et al. (2019); Dey, S. R., & Kumar, P. (2019); Kumar, P., & Pathak, S. (2018); Kumar, P., & Dwivedi, P. (2018); Kumar, P., & Pathak, S. (2018); Kumar et al., 2018; Kumar, P., & Hemantaranjan, A. (2017); Dwivedi, P., & Prasann, K. (2016). Kumar, P. (2014); Kumar, P. (2013); Kumar et al. (2013); Prasann, K. (2012); Kumar et al. (2011); Kumar et al. (2014).

2. MATERIALS AND METHOD:

Collection of leaf samples: Easily available plant parts were selected and collected to prepare different plant extracts.

Field preparation for experiment: The selected field was prepared well as per the layout plan of the experiment in BCKV farm.

Methods of extraction:

Well dried powdered plant parts were used for hot extraction with solvent using Soxhlet apparatus for 6-8 hrs. The crude extract was collected, concentrated in a Buchi Rotavapor at 45 °C.

Preparation of plant extracts formulation:

2 g Extract were taken and added Surfactant mixture of (A) N-Alkaline Sulfonate and (B) K-Alkaline Sulfonate @ 4% of the total formulation (20 EC) and 76 % of light solvent naphtha (LSN) and the beaker was placed into the magnetic stirrer for 1min at 1100 r.p.m for thorough mixing. Then the beaker was placed into the homogenizer until the emulsion was mixed homogenously.

Testing of the selected plant extracts formulation on the sheath blight caused by *Helminthosporium oryzae*.

Field experiment were conducted to test the efficacy of the plant extracts against brown spot of rice. Along with this observation of leaf spot severity based on natural incidence were also taken at similar intervals using 0 – 9 disease scoring scales for brown spot of rice (IRRI, 1996).

Table. 1. Details of treatments followed under field condition against brown spot of rice.

Sl. No.		Treatment details	Conc ⁿ	Types of treatment
1	T ₁	Ginger chloroform	@ 0.2%.	1. spraying of plant extracts before inoculation with pathogen
2	T ₂	Clerodendrumchloroform	@ 0.2%.	
3	T ₃	Polyalthia methanol	@ 0.2%.	
4	T ₄	Carbendazim	@ 0.1%	2. spraying of plant extracts after inoculation with pathogen
5	T ₅	Mancozeb	@0.25%	
6	T ₆	Water (control)	-----	

All treatments have two sub-treatments i.e. inoculation 24hrs before spraying, inoculation 24 hrs after spraying

3. RESULTS AND DISCUSSION

Percent reduction of disease severity caused by *Helminthosporium oryzae* artificially inoculated in Kharif Rice (MTU 7029, kharif rice) following spraying with botanical formulation.

In both kharif rice inhibition of disease severity was calculated at 10 days after 1st spraying, 10 days after 2nd spraying and 20 days after 2nd spraying are presented in **table 2**. At 10 days after 1st spraying, highest disease inhibition was given by ginger extract (51.18%) in kharif season and lowest inhibition was given by clerodendrum extract (40.72%) in kharif rice

At 10 days after 2nd spraying, highest inhibition was given by clerodendrum extract (37.50%) in kharif rice and polyalthia methanol (43.29%) lowest inhibition was given by polyalthia methanol (25.01%) in kharif rice

At 20 days after 2nd spraying highest inhibition was given by Polyalthia methanol extract (40.31%) which is more than chemical pesticides.

Table. 2. Percent inhibition of disease severity caused by *Helminthosporium oryzae* in Rice following spraying with botanical formulation

Treatments	Percent disease inhibition		
	Kharif rice		
	10 Days after 1 st spraying	10 Days after 2 nd spraying	20 Days after 2 nd spraying
Ginger Chloroform	51.18 (45.68)	32.81 (34.95)	29.46(32.88)
Clerodendrum Chloroform	40.72(39.65)	37.50(37.76)	35.66(36.67)
Polyalthai Methanol	47.70(43.68)	25.01(30.01)	40.31(39.42)
Carbendazim (5ppm)	48.86(44.35)	23.45(28.96)	10.47(18.88)
Mancozeb (25 ppm)	46.54(43.02)	34.37(35.90)	10.85(19.24)
SEm	0.13	0.14	0.14
CD at 5%	0.32	0.33	0.34

The values are the mean of 4 replication

The values in the parenthesis indicate arc-sin transformed values

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