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## Efficacy of some plants and animal byproducts against some fungal plant pathogens

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Among four test compounds prepared from different plant and animal products, aqueous solution of Neem oil, Pungam oil, Amla oil and Mustard oil in sodium lauryl sulphate (TC<sub>I</sub>) could significantly inhibit the growth of *Fusarium solani*, *Rhizoctonia solani*, *Rhizoctonia solani* and *Sclerotium rolfsii*.

**Key words :** *Fusarium solani*, *Rhizoctonia solani* and *Sclerotium rolfsii* plants and animal by products.

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### INTRODUCTION

More food production, new high yielding varieties, new techniques for method of cultivation of crops and field management are being constantly evolved resulting in parallel increase in the disease occurrence which calls for their efficient management. The indiscriminate use of chemical fertilizer has various adverse effects as excess of nitrogen in plant cause diseases (methanoglobinemia) in infants. The amines released from nitrogenous fertilizer cause cancer in human beings. Residues of pesticides affect central nervous system, respiratory system and gastrointestinal system of human beings, water pollution and depletion of ozone layer of the atmosphere. Many advanced countries therefore, have shifted to organic farming for sustainable agriculture which includes the use of indigenous plant and animal product of dead and decayed matter, botanicals of insecticide value and bio-agents for efficient management of plant disease in an Integrated Disease Management System (Kazmi *et al.*, 1993; Miah *et al.*, 1990).

Recent technology like biotechnology has already helped to solve the problems of environmental pollution to certain extent but question arises whether to adopt new intensive technology or to go back to traditional agricultural practices. Therefore

use of natural resources offers unlimited scope towards the solution of environmental problems. Exploitation of antimicrobial herbal plant products for sustainable development in agriculture and management of plant diseases which is being thought seriously (Dohroo and Gupta, 1995 ; Ganapathy and Narayanswamy, 1990 ; Gupta *et al.*, 1996 ; Prusty, 1991 ; Singh *et al.*, 1996). In fact the use of botanical in plant disease control is still in its preliminary stage and needs further studies on its practical under field conditions.

### MATERIALS AND METHODS

Among four different test compounds, test compound-I (TC<sub>I</sub>) was prepared from Asafoetida, milk powder, yeast, nutgall, garlic, Vit-C in identical manner as test compound-III (TC<sub>III</sub>) which was prepared from tobacco, mustard and embelia and were soaked, grinded, mixed together so as to get volume of 250 ml. Test compound-II (TC<sub>II</sub>) was prepared by adding Sodium lauryl sulphate to neem oil, pungam oil, amla oil and mustard oil and mixed them to maintain volume up to 250 ml. Test compound-IV (TC<sub>IV</sub>) was prepared from agave, neem cake, pongamia cake and nuxvomica leaf, grunded, soaked in 500 ml cow urine, filtered and diluted.

Three different important soil borne plant pathogenic fungi viz. *Fusarium sp.*, *Rhizoctonia solani* and

*Sclerotium rolfsii* were isolated from root rot of oat, sheath blight of rice and pod rot of groundnut. For isolation of fungus, disease samples along with healthy tissue were cut into small pieces, washed and surface sterilized with 0.1% mercuric chloride. These pieces were put on the PDA plates and incubated at  $28 \pm 1^\circ\text{C}$ . The growth of the fungus was periodically observed and subsequently transferred to PDA slants in order to get pure culture of the fungus. The pathogenicity of the fungus was successfully proved following Kock's postulates.

The efficacy of above compounds was tested against above mentioned three test fungi following poison food technique method. For this experiment, three replications were maintained for each treatment and the plate without test compound taken as control. Fungal growth after seventh day or when control plate totally was covered by test fungus, was measured and percentage inhibition of fungal growth was calculated by the following formula (Carpenter, 1942). Per cent of inhibition =  $\frac{dc-dt}{dc} \times 100$ , where dc-colony diameter of the test fungus in control plates, dt-colony diameter of the test fungus in treated plates. Above experiment was conducted in laboratory following completely randomized design (CRD).

## RESULTS AND DISCUSSION

It may be seen from the Table 1 that maximum inhibition on the rate of the growth of three test fungi was seen from TC<sub>II</sub> and TC<sub>III</sub>. In case of *Fusarium sp.* maximum inhibition rate of the growth was found in TC<sub>II</sub>. There was complete inhibition of growth in TC<sub>II</sub> and other treatments were significantly different. All the test compounds taken in the form of different

**Table 1 :** Per cent inhibition<sup>@</sup> of *in vitro* growth of test fungi in poisoned medium with different test compounds.

Treatment	Test fungi		
	<i>Fusarium sp.</i>	<i>Rhizoctonia solani</i>	<i>Sclerotium rolfsii</i>
TC <sub>I</sub>	42.05	15.78	14.44
TC <sub>II</sub>	90.28	68.95	100
TC <sub>III</sub>	61.76	87.40	98.80
TC <sub>IV</sub>	34.29	63.20	57.20
Control	0.00	0.00	0.00
Sem $\pm$	1.0417	0.7624	0.623
CD (0.05)	3.2817	2.4018	1.9626

@ Each reading in the average of three replications of each treatment.

treatments were found to be significant for reducing growth *in vitro* compared to the control. However, there was no sclerotia formation in any of the poisoned media of different test compounds and profuse formation of sclerotia were found in untreated media.

Four different compounds prepared by mixing different plant and animal products and abbreviated as TC<sub>I</sub>, TC<sub>II</sub>, TC<sub>III</sub> and TC<sub>IV</sub> were tested for their antifungal activities against growth and sporulation of above mentioned pathogens by poisoned food technique.

The growth and sporulation of *Sclerotium rolfsii* was completely inhibited (100%) by treatment TC<sub>II</sub>. Maximum growth inhibition of *Fusarium sp.* and *Rhizoctonia solani* was observed by treatment TC<sub>II</sub> and TC<sub>III</sub> respectively.

Finally antifungal characters of neem oil, mustard oil, the ingredient of TC<sub>II</sub> had already been noticed against above fungi. Other ingredient also showed antifungal characters taken in the experiment. Earlier workers have also compared antifungal properties of some of the related compounds taken under this investigation.

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