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### RESEARCH ARTICLE

#### ANTIFUNGAL ACTIVITY OF SOME MEDICINAL PLANTS EXTRACTS AGAINST THE PATHOGEN CAUSING *PHOMOPSIS* BLIGHT OF BRINJAL (*SOLANUM MELONGENA* L.).

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#### Abstract

Brinjal or eggplant (*Solanum melongena* L.) is an important vegetable crop grown in Assam. *Phomopsis* blight or fruit rot disease of brinjal is one of the most devastating diseases of all brinjal growing field caused by *Phomopsis vexans*. In this context the present investigation has been undertaken with a view to studying *in vitro* efficacy of some antifungal plant extracts viz. bulb extracts of *Allium sativum*, leaf, roots and seeds extract of *Ricinus communis* and bark extracts of *Terminalia arjuna* against the mycelial growth of the pathogen. Among the tested plants, the aqueous extracts of 15% concentration of *Allium sativum* (100%), seed extracts of *Ricinus communis* (77.1%) followed by root extracts (55.5%), leaf extract (53.8%) and bark extracts (27.5%) inhibited the growth of the pathogen.

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#### Introduction:-

The brinjal (*Solanum melongena* L.) belongs to the family 'Solanaceae' is one the most common, highly productive and popular vegetable crop grown globally and widely cultivated in India. It is a major source of income for the common farmers as well.

This important food crop is affected by various diseases which causes damage in all growth stage limiting production. The diseases are caused by fungi, bacteria, viruses, nematodes. Among them *Phomopsis* blight or fruit rot of brinjal caused by *Phomopsis vexans*. (Sacc. and Syd.) is a most devastating disease (Das, 1998; Khan, 1999). Under suitable weather conditions this disease may cause 12-25% loss in crop yield due to flower drop and fruit rot (Kannan et al., 1998). *Phomopsis vexans* causes over 50% losses in production and productivity of brinjal in various parts of the world (Nolla, 1929). *Phomopsis vexans* causes fruit rot and leaf blight of brinjal and it reduces yield and marketable value of the crop nearly 20-30% (Jain and Bhatnagar, 1980; Kaur et al., 1985). In Assam, it has been reported that the disease has been found to be most serious and widely distributed. The inappropriate use of agrochemicals especially fungicides were found to possess adverse effects on ecosystems and a possible carcinogenic risk than insecticides and herbicides together (Osman and Al-Rehiayam, 2003; Sive et al. 2008). Moreover, resistance by pathogens to fungicides has rendered certain fungicides ineffective (Zhonghua and Michailides, 2005). Due to the aforementioned considerations, there may be a need to develop new management systems to reduce the dependence on the synthetic agrochemicals. Several higher plants and their constituents have been successful in plant disease control and have proved to be harmless and non-phytotoxic, unlike chemical

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fungicides present study was taken some commonly available plant extracts were evaluate under laboratory condition against the pathogen.

### Materials and Methods:-

The pathogen *Phomopsis vexans* isolated from the infected brinjal fruit collected from farmers' field of Goalpara district, Assam following tissue segmentation method. The pure culture was maintained in Potato Dextrose Agar slants at  $4^{\circ}\pm 1^{\circ}\text{C}$ .

### Invitro bioassay of Phytoextracts:-

Aqueous extracts of *Allium sativum* bulb and leaf, roots and seeds extracts of *Ricinus communis* and bark extracts of *Terminalia arjuna* were tested for their antifungal property against *Phomopsis vexans* by Poisoned Food Technique (Nene, 1971) under *invitro* condition. The test plants were taken for preparing crude extracts. They were thoroughly washed with water and fine slurry was prepared by taking 100 g with 100 ml of distilled water (1:1 w/v). The resultant slurry was filtered through muslin cloth and then through what man No. 1 filter paper and the extracts were used as stock solution. From the stock solution different concentration of aqueous extracts like 5 ml, 10 ml and 15 ml was added with 95 ml, 90 ml and 85 ml of PDA media to make 5%, 10% and 15% concentrations respectively. The media was thoroughly shaken for uniform mixing of extracts. 20 ml of media were poured into sterile petriplates. Mycelium of seven mm size discs from periphery of actively growing culture were cut out by sterile cork borer and one such disc was placed at the centre of each agar plate. Petriplates contain only pathogen on PDA media served as control. Percentage inhibition of radial growth by plant extracts was calculating using the formula: (Vincent, 1947)

$$I = \frac{C-T}{C} \times 100$$

Where, I = Percent inhibition over control

C = Radial growth in control

T = Radial growth in treatment

### Result and Discussion:-

Result indicated that plant extracts could cause growth inhibition of test fungi, although the rate of inhibition of tested fungi varied with different extracts and concentrations. Among them bulb extracts of *Allium sativum* was found most effective (100%) followed by seed extracts of *Ricinus communis* (77.1%), root extracts (55.5%) and leaf extracts (53.8%). Least inhibition was observed with bark extracts of *Terminalia arjuna* (27.5%). Table 1. Fig. 1 All concentrations of the tested plants extracts were found to be inhibitory against the fungus and the rate of inhibition increased generally by increasing the concentration. The plant extracts at 15 percent concentration were significantly superior over the other two concentrations i.e. 10 and 5 percent. The findings are in agreement with that of Islam (2004) who found that 76-100% inhibition of mycelial growth of *Phomopsis vexans* by garlic bulb. Aqueous extracts of *Ricinus communis* leaves was found most effective against *Candida albicans* (Khan and Yadav, 2011).

**Table 1:-**Effect of different concentration of aqueous extracts on mycelial growth of *Phomopsis vexans*.

S.L No.	Botanical extracts	Percent inhibition of mycelia growth			Mean $\pm$ S E
		Concentration			
		5	10	15	
1	<i>Allium sativum</i>	100	100	100	100 $\pm$ .00
2	<i>Ricinus communis</i> (leaf)	46.6	47.8	53.8	49.4 $\pm$ 2.22
3	<i>Ricinus communis</i> (root)	46.4	53.2	55.5	51.7 $\pm$ 2.73
4	<i>Ricinus communis</i> (seeds)	61	71.7	77.1	69.93 $\pm$ 4.73
5	<i>Terminalia arjuna</i>	13.2	21.1	27.5	20.60 $\pm$ 4.13

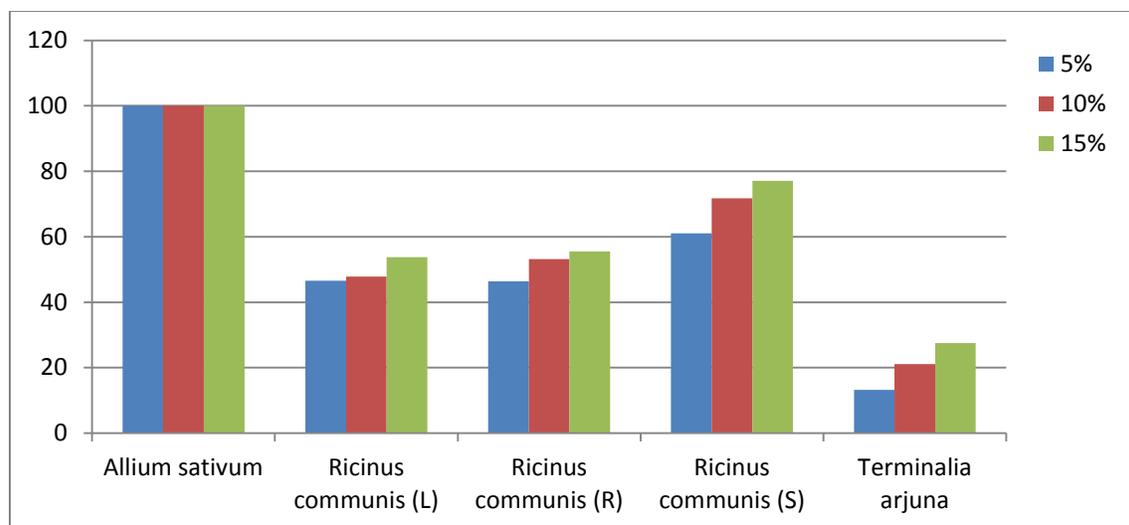


Fig. 1:-In vitro evaluation of plant extracts against *Phomopsisvexans*

### Conclusion:-

*Phomopsis* fruit rot disease can cause severe losses in brinjal. It has been concluded from the present research that certain plant extracts are a source of cheap and effective fungicide against the pathogen *Phomopsis vexans* and they don't have human and environment health implications. So some plant extracts such as garlic and seed extract of *Ricinus communis* extract could be a good replacement for fungicides.

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