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Evaluation of Phytoextracts Against Pathogens of Black Point Disease of Wheat Grains

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Abstract – The black point of wheat is an important disease caused mainly by Alternaria alternata and Helminthosporium Sativum. It leads to the blackening of the germinal end of wheat grain and causes a significant loss in grain germinability, seedling growth, and nutrient quality of wheat. Phytoextracts of leaves of 10 plants caused variable inhibition of mycelial growth of aforesaid two pathogens. Phytoextracts of Azadirachta India caused 97.8% and 98.2% inhibition of mycelial growth of Alternaria alternata and Helminthosporium sativum respectively and adjudged best for control of black point disease of wheat. Further extract of leaves of Eucalyptus globus caused 84.8% and 96% inhibition of mycelial growth of two pathogens. However, the leaf extract of Tridex Sp caused minimum inhibition of mycelial growth of Alternaria alternata and Helminthosporium sativum. The phytoextracts have no residual toxicity and are ecologically safe, hence they can be used for a safe and cheap method of control of black point of wheat.

Keywords; Wheat Black Point, Alternaria Alternata, Helminthosporium Sativum

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INTRODUCTION

In India, wheat occupies the prime position among food crops. It is the second important food crop being next to rice in the world. The whet grains are exposed for a fairly long period during the growth of crops and are easily vulnerable to the attack of fungi as compared to the seeds born in pods or other kinds of fruits. Amongst the various fungi which invade wheat grain in the field, infection by *Alternaria alternata* and *Helminthosporium sativum* has been found associated with blackening of the germinal end of wheat grain and causes a disease commonly referred to as “Black Point”. In India, this disease is prevalent in almost all the states, where wheat crop is grown (gaur 1986). It causes a significant loss in grain germinability, seedling growth, and nutrient quality of wheat.

The different strategies for plant disease control include the use of fungicides, biological control, and cultural practices. In the recent past, plant-based products have been found to possess antifungal, antibacterial, and antiviral properties. The use of phytoextracts has been added advantage of little interference to biological equilibrium and no residual toxicity, hence hold a great promise to manage various diseases (Cook & Baker 1983; Sarvamangla et al 1993). It was, therefore, considered worthwhile to study the efficacy of phytoextracts of 10 wild plants found near wheat fields.

MATERIALS AND METHODS

The pathogens of black point disease viz., *Alternaria alternata,* and *Helminthosporium sativum* were obtained by plating 100 discolored grams on PDA medium following agar plate technique (ISTA, 1966). The pathogens were purified and maintained in PDA slants. Aqueous extracts of leaves of 10 wild plants viz., *Adhatoda vasaca*, *Azadirachta indica*, *Arzemone Mexicana*, *Cassia tora*, *C. occidentalis*, *Eucalyptus globus*, *Sonchus as para*, *Senebiera Didyma*, *Solanum nigrum* and *Tridex* sp with 50 ml sterile water by grinding 50-gram leaves and then filtered through the double layer of muslin cloth were obtained these extracts were added to PDA to obtain the desired conclusion and was autoclaved 5mm mycelial disc taken from the periphery of the fresh culture of pathogens was placed in the center of Petri dish and incubated at 28 +- 1 degree C for 8 days B.O.D incubator. The untreated set served as control. After the incubation period, the diameter of the colony was recorded and present inhibition in fungal growth was calculated. Suitable replications were maintained for each treatment as adopted by Sarvamangla *et al*, (1993).

RESULTS AND DISCUSSIONS

TABLE 1

Effect of phytoextracts on the growth of *Alternaria alternata* and *Helminthosporium sativum*

S. No.	Name of Plants (Phytoextracts)	Inhibition %age of Mycelial growth	
		Alternaria Alternata	Helminthosporium Sativum
1	Adhatoda Masaka	74.5	77.2
2	Azadirachta indica	97.8	98.2
3	Arzemone Mexicana	63.4	74.0
4	Cassia tora	60.0	65.7
5	Cassia occidentalis	80.8	88.2
6	Eucalyptus globus	84.8	96.0
7	Sonchus aspara	62.8	70.2
8	Senebiera didyma	53.6	56.7
9	Solanum Nigrum	47.2	48.8
10	Tridex sp	45.5	48.0
11	Control	-	-

A perusal of Table 1 indicates that phytoextracts of leaves of 10 plants caused variable inhibition of mycelial growth of 2 test pathogens. However, significant inhibition of mycelial growth was noted in phytoextracts of *Azadirachta indica*, *Eucalyptus globus*, *Cassia occidentalis,* and *Adhatoda Masaka*. The maximum inhibition was observed with phytoextracts of *Azadirachta indica* and the minimum inhibition was recorded in the case of *Tridex* sp.

Antifungal activities of phytoextracts have been reported by several workers (Dayaram, 1997, Kumar & Shabana 2002, Singh, 2008 and Ghasolia & Shivpuri, 2008). The plant species having more antifungal activities viz., *Azadirachta indica*, *Eucalyptus globus*, *Adhatoda Masaka,* and *Cassia occidentalis* are widely available near wheat fields in March when flowering occurs. So, the leaf extracts can be sprayed twice at a 15-day interval to avoid infection of developing grains, which will serve as the cheap and safe management of black point disease of wheat.

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