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ANTIFUNGAL ACTIVITY OF AQUEOUS EXTRACTS OF *DATURA INOXIA* AGAINST FUNGAL PATHOGENS OF VEGETABLE BEANS

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ABSTRACT

Plant extracts are useful for the control of fungal diseases of plants since many years. The present study was conducted for evaluating the in vitro antifungal activity of aqueous extract of *Datura innoxia* of family Solanaceae against *Alternaria alternata*, *Curvularia lunata*, *Fusarium pallidoroseum* and *Macrophomina phaseolina*. Thus *Datura innoxia* can be used as biofungicide against fungal pathogens of vegetable beans. Preliminary phytochemical analysis of aqueous extract revealed the presence of alkaloids, saponins, phenols, flavonoids and reducing sugars in all plant parts while glycosides, terpenoids, triterpenoids and Steroids were present in aqueous leaf and stem extracts. Thus the leaf, stem and root extracts of *Datura innoxia* in distilled water can be exploited for the development of potential antimicrobial agents.

KEYWORDS

Datura innoxia, Antifungal, Phytochemical and Soxhlet assembly.

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INTRODUCTION

Datura innoxia is used for many medicinal purposes. Natural distribution of *Datura innoxia* is uncertain, owing to its extensive cultivation and naturalization throughout the temperate and tropical regions of the globe. It is native to Central and South America and introduced in Africa, Asia, Australia and Europe. It contains atropine alkaloids such as scopolamine, hyoscyamine, hyoscyne, norscopolamine, meteloidine, flavonoids, cardiac glycosides, Essential oils, saponins and phenols. Traditionally, flowers, leaves and seed of *Datura innoxia* are used to treat skin eruptions, colds, and nervous disorders. It has been used in the past as a antispasmodic,
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hallucinogenic, hypnotic and narcotic and also in the treatment of insanity, impotence, asthma, diarrhea, as an analgesic, to control fever.

Plant extracts are useful for the control of fungal diseases of plants since many years. The present study was conducted for evaluating the in vitro antifungal activity of aqueous extract of *Datura innoxia* at different concentration viz. 50, 100, 150 and 200mg/ml against *Alternaria alternata*, *Curvularia lunata*, *Fusarium pallidroseum* and *Macrophomina phaseolina*. Thus *Datura innoxia* showed antifungal activity against fungal pathogens of vegetable beans. Thus the leaf, stem and root extracts of *Datura innoxia* distilled water can be exploited for the development of potential antimicrobial agents.

MATERIAL AND METHODS

Collection of medicinal plant material

Fresh healthy leaves, stem and roots of *Datura innoxia* were collected from different locations of Ajmer, washed with tap water, surface sterilized with 2% sodium hypochlorite for 5 min and washed thoroughly 2-3 times with sterile distilled water then shade dried. Dried leaves, stem and roots were grinded in fine powder.

Preparation of leaf, stem and root extract

20gm of powder of each plant part viz. leaf, stem and root of *Datura innoxia* were filled in thimble and extracted with distilled water in Soxhlet extractor for 72 hrs. The extract was concentrated under reduced pressure and preserved at 4°C in airtight bottles for further use.

Plant pathogenic fungi

Different samples of vegetable beans were collected from market as well as from different vegetable growing parts of Ajmer and Jaipur regions of Rajasthan. Fungal pathogens were isolated on Potato dextrose agar (PDA) (Ricker and Ricker, 2006)¹ medium and cultured. The fungal isolates thus purified were subjected to morphological, cultural and microscopic examination and identified accordingly using the methods given by pathologists (Agrios, 2005², Baudoin, 1997³, Barnett, 1955-1960⁴, Cappuccino, 2009⁵, Clements,

1973⁶, Ellis, 1971⁷) The culture samples were also sent to plant pathology laboratory, IARI, Pusa, New Delhi for their confirmation. They were identified as *Fusarium pallidroseum*, *Curvularia lunata*, *Macrophomina phaseolina* and *Alternaria alternata*.

Disc- diffusion method (Omenka and Osouha, 2000)⁸

20ml of PDA medium was poured in sterilized petridishes and allowed to solidify. Then pure culture of fungi were spread in petridishes. Disc prepared by aqueous extracts of leaf, stem and roots of *Datura innoxia* were then put in the petriplates. These petriplates were incubated for 6 days at 30±2°C temperature and the inhibition in growth were recorded in mm. as diameter of zone of inhibition.

Phytochemical analysis of leaf, stem and root extracts

The leaf, stem and root extracts of *Datura innoxia* prepared in aqueous extract were screened for the presence of phytochemicals namely, alkaloids, glycosides, saponins, terpenoids, phenols, tannins, flavonoids, triterpenoids, steroids and reducing sugars by standard phytochemical tests (Iyenger, 1995⁹, Trease and Evans, 1989¹⁰, Singleton *et al*, 1999¹¹, Siddiqui and Ali, 1997¹², Singh *et al*, 2007¹³).

RESULTS AND DISCUSSION

The medicinal plant *Datura innoxia* is rich in bioactive phytoconstituents and exhibited antifungal activity against phytopathogens of vegetable beans showing different sensitivity with different concentrations viz. 50, 100, 150 and 200mg/ml. the results are summarized in Table No.1. Table No.1 showed a zone of inhibition of leaf, stem and root extracts of *Datura innoxia* in distilled water against tested fungi. In 50mg concentration of root extract zone of inhibition not detected. Graph No.1 showed comparison of leaf, stem and root extracts at concentration 200mg/ml. This figure showed that leaf extract was highly effective followed by stem and root extract was less effective. Similarly (Hanif *et al*, 2022)¹⁴ showed that leaf extract of *Datura*

metal was more effective as compared to the stem extract. (George and Mathur, 2022)¹⁵ also showed that ethanolic and methanolic extract of *Datura innoxia* has antibacterial potential against the tested pathogenic; *Staphylococcus aureus* and *Escherichia coli*.

The results of preliminary phytochemical analysis of aqueous extracts of leaf, stem and roots of *Datura innoxia* are seen in Table No.2. This table shows presence of Preliminary phytochemical analysis of aqueous extract revealed the presence of a alkaloids, saponins, phenols, flavonoids and reducing sugars in all plant parts viz. Leaf, stem and root while glycosides, terpenoids, triterpenoids and Steroids were present in aqueous leaf and stem extracts. Thus the leaf, stem and root extracts of *Datura innoxia* in distilled water can be used for the development of potential antimicrobial agents.

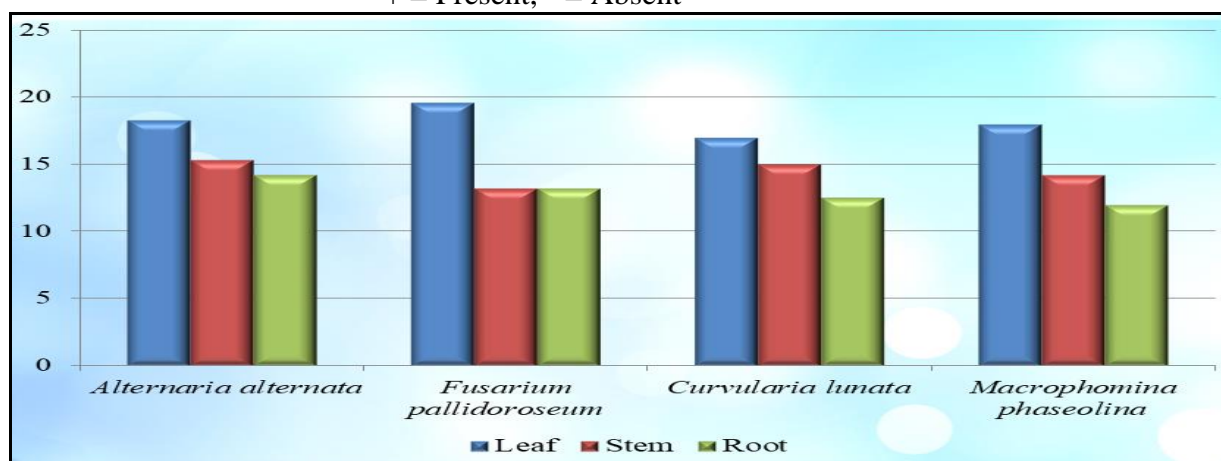
Table No.1: Antifungal activity of aqueous extracts of *Datura innoxia*

S.No	Plant part	Concentration mg/ml	<i>Alternaria Alternata</i>	<i>Fusarium pallidoroseum</i>	<i>Curvularia lunata</i>	<i>Macrophomina Phaseolina</i>
			Zone of inhibition diameter in mm			
1	Leaf	50	8.0	9.5	6.8	7.8
		100	12.2	13.4	10.5	11.9
		150	16.4	17.7	14.6	16.0
		200	18.3	19.6	17.0	18.0
2	Stem	50	6.0	5.0	5.5	5.2
		100	9.5	7.2	9.4	6.6
		150	13.6	11.8	13.2	11.2
		200	15.3	13.2	15.0	14.2
3	Root	50	4.5	ND	ND	ND
		100	6.5	4.0	3.9	4.2
		150	11.0	10.0	8.5	8.7
		200	14.2	13.2	12.5	12.0
ND = Not detected						

Table No.2: Preliminary phytochemical screening of plant parts of *Datura innoxia* in aqueous extract

S.No	Chemical constituent	Distilled water		
		Leaf	Stem	Root
1	Alkaloids	+	+	+
2	Glycosides	+	+	-
3	Saponins	+	+	+
4	Terpenoids	+	+	-
5	Phenols	+	+	+
6	Tannins	-	-	-
7	Flavonoids	+	+	+
8	Triterpenoids	+	+	-
9	Steroids	+	+	-
10	Reducing sugars	+	+	+

+ = Present, - = Absent



Graph No.1: Comparison of aqueous extract of *Datura innoxia* plant parts on test fungi

CONCLUSION

It is concluded from the present investigation that aqueous extracts of *Datura innoxia* can be used as antifungal agents on fungal pathogens of Vegetable beans.

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CONFLICT OF INTEREST

There is no conflict of interest.

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