



## Antimicrobial Activity of Plant Extract Against Seed Borne Pathogens: A Bio Pesticide Approach

Yadav S.G.<sup>1</sup>, Awasthi R. S.<sup>2</sup>

<sup>1</sup>Department of Botany, Shivaji Mahavidyalaya, Renapur Dist. Latur (413527) M.S.India

<sup>2</sup>Department of Microbiology, Shivaji Mahavidyalaya, Renapur Dist. Latur (413527) India

### ABSTRACT

Seeds associated to fungal pathogens are efficient vehicles for disease dissemination in the field. Such pathogens affect the seed quality and longevity, causing a decrease or loss of germination, discoloration, necrosis and decay in addition to leading to the production of mycotoxins in some pathosystems. Seeds of Groundnut are associated with number of fungi including *Aspergillus flavus*, *Aspergillus niger*, *Fusarium moniliforme*, *Rhizoctonia bataticola*, *Curvularia lunata* and *Rhizopus nigricans*. The seed were treated with aqueous extract, alcoholic extract and ethyl acetate extract of *Lantana camara* leaves for 5 minutes, 15 minutes and 30 minutes. It is evident that the treatment of ethyl acetate extract for 30 minutes inhibited the growth of dominant fungi like *Curvularia lunata*, *Aspergillus flavus*, *Aspergillus niger* and *Fusarium moniliforme*. So the ethyl acetate extract of leaves of *Lantana camara* can be utilized for the biological control of seed borne fungi of Groundnut. Seed is a source of origin and beginning of anything (Webster, 1962), and about 90 percent of all the food crops grown on earth are propagated by seed (Neergaard, 1977); Seeds being the source of plant may play a vital role in the total biological yield per unit time and per unit plant surface.

Seeds have been shown to harbor a number of Fungi. Many of them are known to cause important diseases (Suryanarayana & Bhombe, 1961, Siddiqui et.al). These fungi cause severe losses to seeds, seedlings and later stages of plant growth and finally affect quantity and quality of crops.

**Key words:** Antimicrobial, Plant extract, seed borne pathogens.

### MATERIAL AND METHODS

#### (i). Selection of Seeds:

Cultivars of groundnut seeds were collected from the Oil Seed Research Station, Latur.

#### (ii). Study of Mycoflora:

The surface mycoflora of the selected seeds was studied by incubating the seeds for 4 - 6 days on glucose nitrate agar medium (GNA)

#### (iii). Preparation of Plant extracts:

The leaves of the plant were cleaned and dried. The dried leaves were crushed into fine powder with the help of blender. 5% leaf extract in hot sterile distilled water was prepared.

#### i) Seed treatment:

The different groundnut seed cultivars were treated with leaf extract of *Lantana camara* by soaking seeds in it for 5 minutes, 15 minutes and 30 minutes.

#### ii) Study of Mycoflora of treated seeds.

The seeds with plant extract for the above time intervals were incubated in glucose nitrate agar medium for 4-6 days. They were studied for the growth of fungal forms from the seed surface.

**TABLE NO.1: MYCOFLORA OF GROUNDNUT CULTIVARS ON**

#### UNTREATED SEEDS

Sr. No.	Name of Fungus	Ground nut Cultivars		
		SB-XI	L-33	JL-24
1.	<i>Curvularia lunata</i>	++	++	++
2.	<i>Drechslera sps</i>	+	-	-
3.	<i>Alternaria alternata</i>	++	+	+

4.	<i>Fusarium moniliforme</i>	+	+	+
5.	<i>Aspergillus flavus</i>	++	++	++
6.	<i>Aspergillus niger</i>	+	+	+
7.	<i>Cladosporium sps.</i>	+	-	-
8.	<i>Rhizopus nigricans</i>	+	+	+
9.	<i>Rhizoctonia bataticola</i>	+	-	-

(+ Presence on 10% Seeds., ++ Presence on 20% Seeds., - Absence on Seeds.)

**TABLE NO. 2: EFFECT OF LEAF EXTRACTS ON SEED MYCOFLORA.**

Sr. No.	Ground nut cultivars	Mycoflora on treated Seeds		
		<i>Lantana camara</i> Ethyl acetate Extract		
		Exposure time		
		5 Min.	15 Min.	30 Min.
1.	SB-XI	<i>Curvularia sps.</i> <i>Fusarium sps.</i> <i>Drechslera sps.</i> <i>Rhizoctonia</i> <i>Bataticola</i>	<i>Curvularia sps.</i> <i>Drechslera sps.</i>	-
2.	L-33	<i>Curvularia sps.</i> <i>Fusarium sps.</i> <i>Alternaria sps.</i>	<i>Curvularia sps.</i> <i>Alternaria sps.</i>	-
3.	JL-24	<i>Curvularia sps.</i> <i>Fusarium sps.</i> <i>Alternaria sps.</i>	<i>Curvularia sps.</i> <i>Fusarium sps.</i> <i>Alternaria sps.</i>	-

## RESULTS

The most common fungi found to be growing on all untreated seeds were *Curvularia lunata*, *alternaria*, *alternata*, *Drechslera sps.*, *Fusarium moniliforme*, *Rhizopus nigricans*, *Rhizoctonia bataticola* etc. (Table No.1 & 2). The observation with seeds treated with the plant reveal that short treatment of 5 or 10 minutes had almost no effect over the seed Mycoflora. Many of the fungi grow when the seeds were treated for short period. The inhibition of fungal growth was observed when the seeds were soaked in the plant extract for 30 minutes. Not a single fungus grows after complete incubation period.

## DISCUSSION

The result indicates that the longer duration of seed treatment with plant extracts is effective in controlling the growth of all the surface borne seed Mycoflora.

Application of plant extracts for the control of seed borne diseases is a method devoid of any health hazard problem. Hill bunt of Wheat (*Tilletia foetida*) was effectively controlled by seed treatment with plant extracts of *Datura Stramonium*, *Thuja sps.* and *Eucalyptus* Singh et. al (1979). Dixit et. al 1983 have listed a number of oils isolated from plants like *Aegle marmelos* which exhibit Fungicidal properties against seed borne pathogens. Dharam Vir abnd Sharma (1985, 1985 b) obtained interesting results with neem oil (*Azadiracta indica*) against seed borne pathogens like *Fusarium*, *Aspergillus* & *Drechslera*. The anti- fungal effect of selected medicinal extracts can be applied at a larger scale to treat the seeds before sowing them in the field. The extract being of plant origin has least hazardous effects on the seeds as well as on soil. The seed treatment with plant extract does not have any adverse effect on the germination of seed even after the treatment for 30 minutes. So the seed treatment of plant extract will not create any problem of pollution and the chemicals of plant extracts are easily degraded in the soil, so, the plant extract of *Lantana camara* is used as bio pesticide.

## ACKNOWLEDGEMENT

The author is grateful to Dr. Jadhav M. J. Head Dept. of Botany, Sir Sayyad College Roshan Gate, Aurangabad, Dr. Talekar S.M. Head Dept. of Botany, K. S. K. College Beed, Dr.Smita G.Basole Head Dept. of Botany Balbhim Mahavidyalaya Beed, and Principal Dr. R. S. Awasthi, Shivaji Mahavidyalaya, Renapur for their constant encouragement and providing necessary lab facility.

## REFERENCES

1. Biswas, A.R. and Kshirsagar D.C.Pesticides Toxicity, Journal of IAEM Vol. 31, 87-92 (2004)
2. Elizebeth K.M. (2001) Antimicrobial Activity of *Allium sativum* on some Pathogenic bacteria Ind. J. Microbiology 41: 321-323
3. De Tempe (1970): Testing cereal seeds for *Fusarium* infection in Netherlands. Proc. ISTA 35: 193-206

4. ISTA (1966) : International rules of seed Testing 1966, International Seed Testing Association 31: J - 152.
5. Jha D.K. (1993) : A text book on seed pathology Vikas Publishing House Pvt. Ltd., New Delhi: pp. 132.
6. Neergaard, P. (1977) : Seed Pathology Vol. I & II Mac Millan Press Lt. London: pp 1187.
7. Subramanian C.V. (1971) : Hypomycetes ICAR, New Delhi : pp 930.
8. Suryanarayana D, B.B. Bhombe (1961) : Studies on the fungal Flora of some vegetables seeds. Indian Phytopath 32: 30-41.
9. Siddiqui et.al (1974) : Fungal Flora associated with the seeds of Cereals and Vegetables in India Seed Res 2: 46-50.
10. Webster N. (1962) : Webster New Twentieth Century Dictionary. The world Pub Co, Cleveland & New York.
11. Yadav R.N. Saxena V.K. & Nigam S.S. (1978) Antimicrobial activity of the essential oil of *Caesalpinia sappan* Linn. Indian Perfumer 22: 73-75