Appraisal Of Plants Extract Against Okra Yellow Vein Mosaic Virus (OYVMV)

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Abstract: Plants extract (*Eucalyptus camaldulensis, Azadirachta indica, Melia azedarach* and *Cassia fistula*) were applied on five okra cultivars (Pmf Beauty, Laxmy, Okra-7100, Okra-7080, and Jk-tetra-6), cultivated in field area of Department of plant pathology under RCBD design to determine their response against okra yellow vein mosaic virus (OYVMV). Maximum reduction in disease (29.08%) was expressed by *Azadirachta indica* followed by *Eucalyptus camaldulensis* (31.41%), *Melia azedarach* (33.01%), and *Cassia fistula* (34.62%) as compared to control (46.07%). Among varieties minimum disease incidence was expressed by okra-7100 followed by pmf beauty, laxmy, okra7080 and Jk-tetra-6 respectively after spray of *A. indica*, *Eucalyptus camaldulensis, Melia azedarach, Cassia fistula* as compared to control.

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Introduction

Okra (*Abelmoschus esculentas L. Moench*), commonly known as Bhindi is an important vegetable crop due to its nutritional value, belongs to the Malvaceae family and is originated from tropical Africa (Akanbi *et al.,* 2010).). A number of pathological factors are involved for its low production (Prakasha *et al.,* 2010). Various growth stages of the crop are susceptible to the different insect pests and diseases (Ek-amnuay 2007, Fasunwon & Banjo 2010). Okra yellow vein mosaic virus (OYVMV) is one of the major factors (Fajinmi and Fajinmi, 2010). Plants are, in effect, natural laboratories in which a great number of chemicals are biosynthesized. Many plants have developed natural and biochemical mechanisms to defend themselves from microbial attack (Bpia 2009). By studying the diverse chemistry of many different plant species, scientists have discovered many useful compounds that can be used as biopesticides (Bpia 2009). Plant extracts of many higher plants have been reported to exhibit antimicrobial and insecticidal properties (Okigbo and Ogbonnaya, 2006; Shariff *et al*., 2006; Bouamama *et al*., 2006; Ergene *et al*., 2006; Kiran and Raveesha, 2006; Mohana and Raveesha, 2006). It is obvious that recently, there has been a considerable interest in plant extracts and essential oils from aromatic plants with antimicrobial activities for controlling pathogens (Soliman and Badeaa, 2002; Valero and Salmeron, 2003). Crops treated with some plant extracts produce and accumulate elevated levels of specialized proteins and other compounds which triggered the defense system of the plant against destructive diseases (Bpia 2009).

Materials And Method

Four plant extracts neem (*Azadirachta indica*), Eucalyptus, (*Eucalyptus camaldulensis*), Bakain (*Melia azedarach*) and Amaltas (*Cassia fistula*) @ S/20 with one control was evaluated against okra yellow vein mosaic virus on five cultivars i.e., Pmf Beauty, Laxmy, Okra-7100, Okra-7080, and Jk-tetra-6 which were sown in the research area of Department of Plant Pathology, University of Agriculture Faisalabad during 2011. Each variety was sown in three replications with 60 cm (RxR) and 20 cm (PxP) distance under randomized complete block design (RCBD). The disease on each test entry was assessed by disease rating scale (Bashir *et al*., 2004).

Standard dose of extracts were prepared by taking 75g plant leaves and 25ml water (Ilyas *et al*., 1997). Plant leaves were soaked in a 1% solution of sodium hypochlorite for 2-3 minutes rinsed with sterile water and were macerated in 25mL of distilled water to get their extract. Extracts were passed through three folds of Maslin cloth for filtration filter paper. This prepared dose was considered as (S.D) standard dose. S/20 concentrations of all plant extracts were prepared from standard solution and were stored at 4^{o}C to inactivate the activities of microbes. Data regarding okra yellow vein mosaic virus (OYVMV) was recorded after 15, 30 and 45 days of spray and was subjected to statistical analysis. All possible interactions were determined through ANOVA and

treatments means were compared by LSD at 5% level of probability (Steel *et al*., 1997).

T_1= *Azadirachta indica* (S/20)
T_2 = *Eucalyptus camaldulensis* (S/20)
T_3 = *Melia azedarach* (S/20)
T_4 = *Cassia fistula* (S/20)
T_5 = Control

Results

All Treatments (T), Varieties (V), Days (D) and their interactions (TxV), (TxD) and (VxD) expressed significant results against OYVMV while interaction between treatment, Variety and Days (TxVxD) exhibited non-significant results. (Table.1). Maximum reduction in disease was expressed by *A. indica* (29.08%) followed by *Eucalyptus camaldulensis* (31.41%), *Melia azedarach* (33.01%), *Cassia fistula* (34.62%) as compared to control as shown in fig.1 and table.2. Minimum disease was observed on Okra 7100 (21.72%) followed by followed by laxmy (35.96%), okra-7080 (38.13%), Jk-tetra-6 (38.30%) and pmf beauty (40.09%) as shown in fig.2 and table.3.

Table.1 **Evaluation of different plant extracts against Okra yellow vein mosaic virus (OYVMV)**

SOV	DF	SS	MS	F	P≥F
Replication (R)	2	496.3	248.16		
Treatment (T)	4	7854.1	1963.53	1452.22	0.000*
Variety (V)	4	10069.5	2517.38	1861.84	0.000*
Dates (D)	2	914.1	457.06	338.04	0.000*
Treatment x Variety (TxV)	16	1207.9	75.49	55.84	0.000*
Treatment x Days (TxD)	8	143.4	17.92	13.25	0.000*
Variety x Days (VxD)	8	85.4	10.67	7.89	0.000*
Treatment x Variety x Days (TxVxD)	32	38.0	1.19	0.88	$0.658^{N/S}$
Error	148	200.1	1.35		
Total	224	21008.8			

* = Significant; Ns = Non- significant

Table.2. **Comparative efficacy of different plant extracts on growth of Okra yellow vein mosaic virus YVMV**

Sr#	Treatment	Reduction in disease incidence (%)
T_1	*Azadirachta indica* (S/20)	29.08e
T_2	*Eucalyptus camaldulensis* (S/20)	31.41d
T_3	*Melia azedarach* (S/20)	33.01c
T_4	*Cassia fistula* (S/20)	34.62b
T_5	Control	46.07a
	LSD	0.484

*Mean values sharing similar letter do not differ significantly as determined by the LSD test at 5% level of probability.

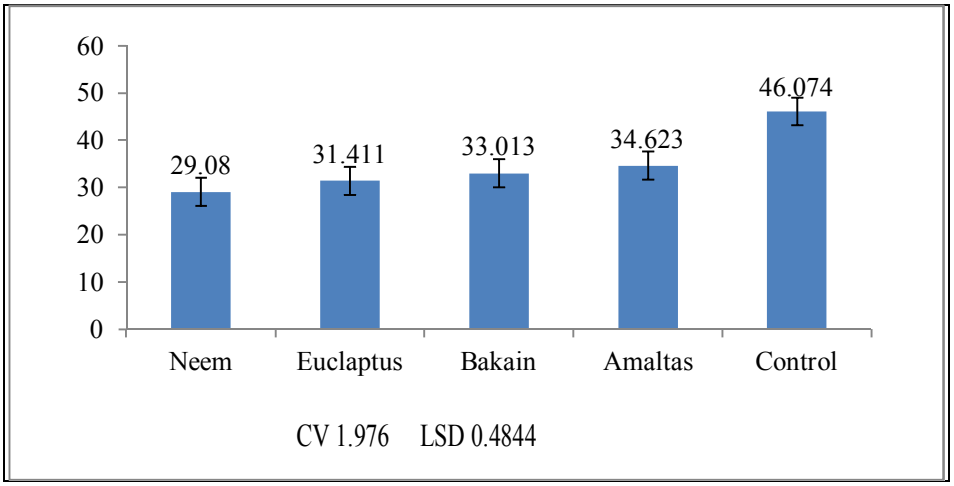


Fig.1 **Effect of plant extracts against Okra yellow vein mosaic virus**

Table.3. **Response of different varieties against Okra yellow vein mosaic virus after spray of different plant extracts**

Sr#	Treatment	Reduction in disease incidence (%)
1	Pmf Beauty	40.092 a
2	Jk-tetra-6	38.302 b
3	Okra-7080	38.129 b
4	Laxmy	35.958 c
5	Okra 7100	21.720 d
	LSD	0.484

*Mean values sharing similar letter do not differ significantly as determined by the LSD test at 5% level of probability.

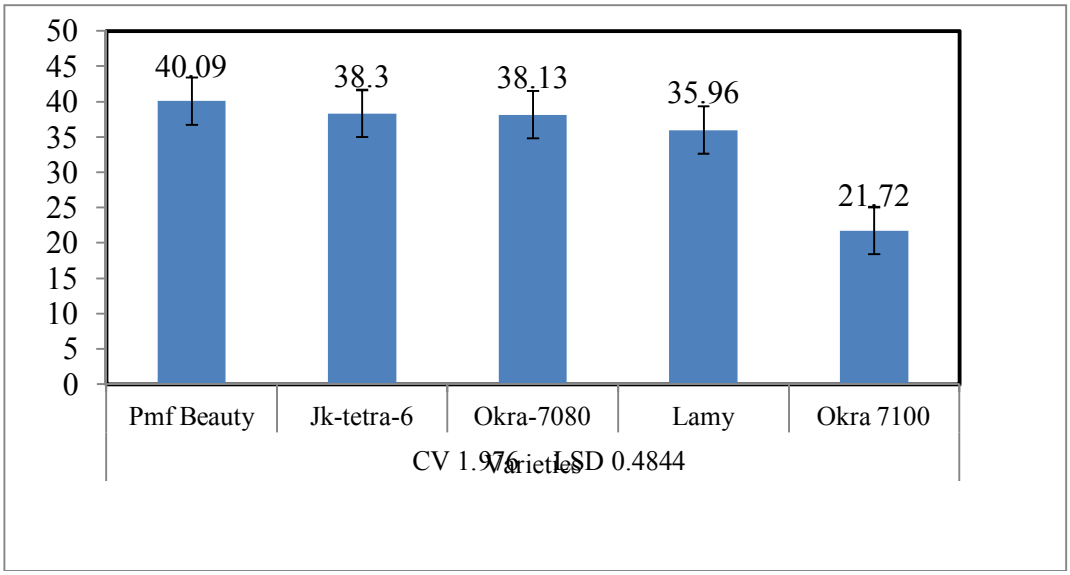


Fig. 2**. Response of different varieties against Okra yellow vein mosaic virus after spray of different plant extracts**

Interaction between treatments and varieties (TxV) expressed that *A.indica* expressed maximum reduction in disease was observed on okra-7100 (15.09%) followed by laxmy (32.10%), pmf beauty (31.28%), okra-7080 (32.47%) and jk-tetra-6 (34.46%) followed by spray of *Eucalyptus camaldulensis* and reduced disease incidence on okra-7100 (16.19%) followed by laxmy (33.20%), okra-7080 (33.88%), jk-tetra-6 (35.53%) and pmf beauty (38.25%) while *Melia azedarach* extract lessened the disease on okra-7100 was (17.24%) followed by laxmy (34.86%), okra-7080 (36.18%), jk-tetra-6 (37.88%), pmf beauty (38.91%) and *Cassia fistula* controlled the disease incidence on okra-7100 (19.72%) followed by laxmy (36.36%), okra-7080 (37.81%), jk-tetra-6 (38.90%) and pmf beauty (40.32%) respectively as compared to control (Table 4).

Table 4. **Reduction in disease incidence (%) in interaction of different treatments and varieties**

Sr#	Treatments	Pmf beauty	Jk-tetra-6	Okra-7080	Laxmy	Okra-7100
1	*Eucalyptus camaldulensis*	38.249fg	35.530hi	33.879 jk	33.199 kl	16.189 p
2	*Azadirachta indica*	31.276 n	34.458ij	32.469lm	32.106mn	15.091q
3	*Melia azedarach*	38.910 f	37.880fg	36.176 h	34.856 ij	17.244 p
4	*Cassia fistula*	40.324 e	38.896 f	37.809 g	36.362 h	19.724 o
5	Control	51.703 a	44.747c	50.311 b	43.268 d	40.343 e
	LSD	1.08				

*Mean values sharing similar letter do not differ significantly as determined by the LSD test at 5% level of probability.

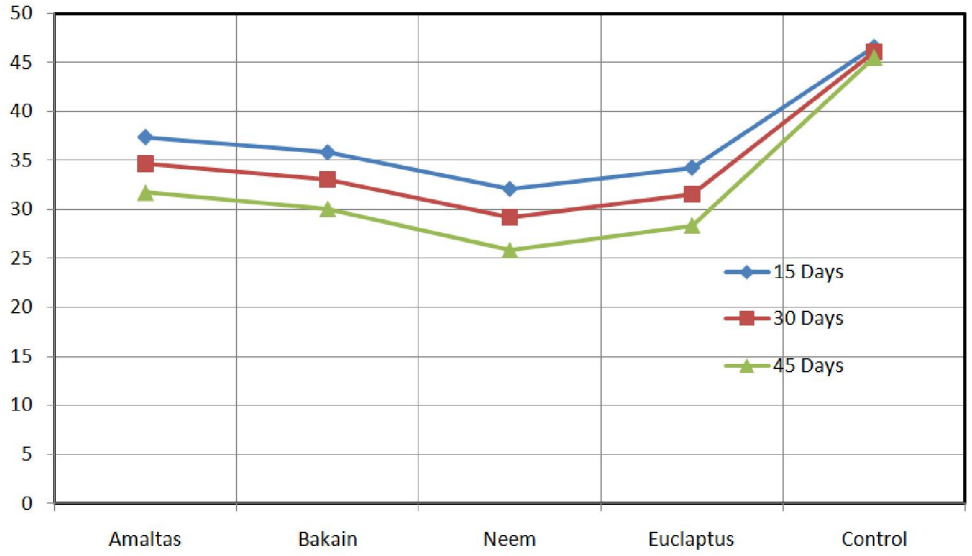
Table 5. **Mean values of disease incidence in interaction of treatments and days (TxD)**

Sr#	Treatments	15 days	30 days	45 days
T_1	*Eucalyptus camaldulensis*	34.30 e	31.55 g	28.37 j
T_2	*Azadirachta indica*	32.12 g	29.22 i	25.88 k
T_3	*Melia azedarach*	35.85 d	33.10 f	30.07 h
T_4	*Cassia fistula*	37.41 c	34.71 e	31.74 g
T_5	Control	46.59 a	46.07 ab	45.55 b
	LSD	0.84		

*Mean values sharing similar letter do not differ significantly as determined by the LSD test at 5% level of probability

Interaction between treatments and days (TxD) showed that maximum reduction in disease development was observed after 45 days of the application of all treatments. *Azadirachta indica* reduced disease 32.12%, 29.22% and 25.88% *Eucalyptus camaldulensis* (34.30%, 31.55% and 28.37%) *Melia azedarach* (35.85%, 33.10% and 30.07%) and *Cassia fistula* (37.41%, 34.71% and 31.74%) respectively after 15, 30 and 45 days respectively as shown in table.5 and fig.3.

In interaction of varieties and days (VxD), Okra-7100 reduced 23.76%, 21.2% and 20.21%, Pmf Beauty (42.74%, 40.1% and 37.44%), Jk-tetra-6 (40.64, 38.88 and 35.39%) Okra-7080 (41.56, 38.42 and 34.40%) and Laxmy (37.61, 36.16 and 34.19%) disease incidence after 15, 30 and 45 days of application of different plant extracts respectively as shown in table 6 and fig.4.



C V 1.976 LSD 0.8390

Fig.3 **Reduction in Okra yellow vein mosaic virus due to spray of different plant extracts after 15,30 and 45 days**

Table 6. **Reduction in disease incidence on different varieties in interaction of varieties and days**

Sr#	Varieties	15days	30days	45days
1	Pmf beauty	42.73 a	40.10 c	37.44 f
2	Jk-tetra-6	40.63 c	38.88 d	35.38 g
3	Okra-7080	41.56 b	38.42 de	34.40 lh
4	laxmy	37.61 ef	36.06 g	34.19 h
5	Okra-7100	23.75 i	21.20 j	20.20 k
	LSD	0.84		

*Mean values sharing similar letter do not differ significantly as determined by the LSD test at 5% level of probability.

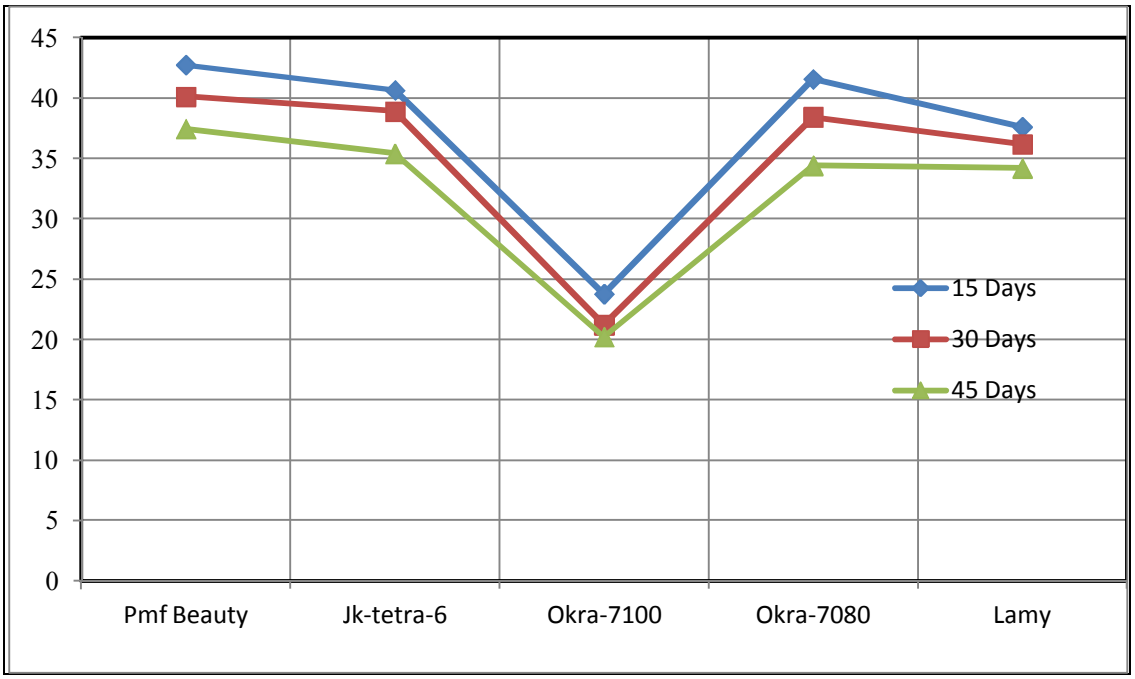


Fig. 4 **Comparison of mean values of disease incidence% on Varieties after 15, 30 and 45 days after application of**

Discussion

Plants extract have antimicrobial activity, feeding deterrents and insect growth regulators.

Datura and ginger gave a good degree of suppression of yellow vein mosaic virus symptoms on okra sprayed under the field conditions. Disease dissemination was recorded at low rate in treated plants compared to that in the controls sprayed with water only by controlling whitefly population. Neem (*Aazadirachta* indica) is a promising agent for control of plant virus such as "Yellow vein mosaic of okra". It contains azadirachtin which have antimicrobial capacity (Mallick and Rahman). Kruas (2002) reported that Bakain (*Melia azedarach*) extract contain a number of triterpenoids (the meliacarpin) that are similar but not identical to the azadirachtin and these have antimicrobial activities, also used as an abortifacient, an antiseptic, a purgative, a diuretic, an insect repellent (Batcher, 2000). Amaltas (*Cassia fistula*) leaf extract significantly reduce the egg laying and fecundity and recommended as a pest control agent (Raja *et al.,* 2000). It also has anti viral properties (Towers *et al*., 2001). *Eucalyptus camaldulensis* had antiseptic action against a wide variety of infectious of bacteria, viruses and fungi (Inouye *et al*., 2001). In the present studies four plant extracts were used against okra yellow vein mosaic virus on five varieties. Among these plant extracts maximum reduction in disease was observed by application of *A. indica* followed by *Eucalyptus camaldulensis*, *Melia azedarach* and *Cassia fistula* respectively. The results of present work is supported by Rao *et al.,* (1990) who evaluated different plant extracts against okra yellow vein mosaic virus and found that neem oil expressed pronounced results. Aitri *et al.,* (1991) used three recommended doses of synthetic chemicals in comparison with seed extracts of neem against Okra mosaic virus. All treatments significantly reduced the disease incidence. Dohroo and Gupta (1995) studied that Azadirachtin and limonids which products of *A. indica*, were efficient against okra yellow vein mosaic virus.

The results of studied in hand are in agreement with the work of Pun *et al.,* (2003) and Ali *et al.,* (2005) who evaluated the efficacy different plant (*Bougainvillea spectabilis, Prosopis chilensis, Sorghum vulgare, Thuja* sp., Neem oil and neem seed extracts) extracts for the management of okra yellow vein mosaic virus and concluded that Neem oil, neem seed extract lessened the disease significantly by reducing the population of *B.tabici,* the vector of okra yellow vein mosaic virus.

Conclusion

From the present studies, it is concluded that application of plants extract is the effective way to control the disease. This practice may helpful to minimize the losses due to attack of viral disease. Because there is no special chemical available for the control of virus, so this study should be considered as keystone for the management of plant viruses.

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