

# Management of Watermelon Mosaic Virus Disease by Use of Leaf Extracts of Some Medicinal Plants

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## SUMMARY

The present investigation deals with effect of six medicinal plant extracts on the inhibition of three strains of WMV (Watermelon mosaic virus) viz. WMVMM, WMVB and WMVC on different intervals. Leaf extracts were sprayed at 15 days intervals from the date of inoculation up to 75 days. It was recorded that medicinal plant extracts were inhibitory for all the three strains. Maximum reduction in disease incidence was noted by leaf extracts of *Rauwolfia serpentina* for all the three strains up to 75 days. The extracts of this plant against WMV may be recommended for cultivators.

## Key words :

Management,  
Watermelon  
mosaic virus,  
*Cucurbita pepo*

The complexity of many virus diseases has led to the development of a large number of approaches for their control. The use of chemical insecticides at large scale has caused serious environmental problems. However, permanent elimination of any significant amount of broad spectrum synthetic pesticide also cannot be adopted. Thus new pesticides which can meet different standards, must be specific, non toxic to environment, less expensive and less prompt to the development of resistance by insects, pathogen etc. will have to be found. This has led to the search of natural pesticides, which are likely to satisfy the above stated consideration.

Many workers have investigated reduction in plant virus disease by application of several other methods and found increased yield. Griffing (1956) and Simons (1960) have studied effects of some insecticides and physical barrier method on the yield and spread of Pepper vein banding mosaic virus. The use of medicinal plants for the control of virus disease have been attempted by few workers for different plant virus disease on their host, but use of medicinal plant extracts for the management of watermelon mosaic virus has not been worked out so far watermelon mosaic virus is most prominent causing mosaic disease of Pumpkin throughout country. The present investigation have been planned to see the effect of leaf extract of some medicinal plants on

Pumpkin infected by watermelon mosaic virus (WMV).

The present investigation was undertaken to search sources of chemicals from medicinal plants for possible use of botanical pesticides. Among these the use of leaf extracts of some higher plants have been reported to induce resistance against infection of few viruses in hypersensitive host. (Verma *et al* 1982, 1984) Verma and Prasad 1983, nonhypersensitive host Verma and Prasad (1983).

A wide and varied range of naturally occurring inhibitors from plant have been studied (Verma and Raychaudhari, 1970; Awasthi *et al.*, 1984; Noronha *et al.*, 1984 and Aminudin and Singh, 1986).

## MATERIALS AND METHODS

All the experiments were conducted on *Cucurbita pepo* L. being a sensitive test plant grown in an insect proof chamber. The leaf extracts of medicinal plants were prepared by taking 100 gm of shade dried leaf and aqueous extracts were prepared by dissolving homogenized leaf powder for 40 hours. The extracts were filtered, centrifuged and were used for further studies.

Three strains of watermelon mosaic virus viz. (WMVMM, WMVB, WMVC) already maintained in laboratory were used as inoculum. Six days old *Cucurbita pepo* L. seedling were taken and divided into four

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groups. Each containing fifty seedling. Seedlings of I, II, III groups were inoculated with three strains of WMV while the IVth group was inoculated with neutral phosphate buffer, which served as control. Treatments were given at fifteen days interval upto 75 days.

## RESULTS AND DISCUSSION

Out of six plant extracts tested against three strains of watermelon mosaic virus. Six plant extracts of *Rauwolfia serpentina* was recorded incidence of the disease mosaic mottling strains WMVMM (14%), vein banding strain WMV, VB (9.10%) and chlorotic strain WMVC (12%) at 75 days after planting, which was superior than control treatments. Similar trends were also recorded at earlier stages viz. 15, 30, 45 and 60 days after planting.

The *Rouwolfia serpentina* reduced the disease incidence of WMVMM (68.52%), WMVVB (69.12%) and WMVC (76.04%) where as *Azardichta indica* and *Boorhauvia diffusa* reduced incidence of the mosaic disease (62.65%, 64.74%, 73.30%) and 60.71%, 57.36% and 68.68%) also show that at 75 days after planting (Table 1). *Clerodendrum aculeatum*, *Ocimum sanctum* and the minimum per cent reduction of disease was recorded by leaf extract of *Parthenium hysterophorus* for all the three strains of watermelon mosaic virus (WMV) upto 75 days after planting. Statistically maximum inhibition occurs after 75 days, afterwards it becomes static.

It is presumed the glycoproteinaceous inhibitors present in the extract when applied after virus inoculation induced synthesis of some translocable virus inhibitory substances in the host plant and thus the physiology of the host cell is altered in such a way that virus multiplication is affected. Furthermore, repeated and continuous spray of plant extracts is not associated with environmental pollution. These plant products, However, not yet received commercial attention.

It is clear from the result presented in Table 1 that leaf extract of different medicinal plant if applied before virus infection reduce disease incidence, symptoms severity and delayed symptoms appearance. The protective effect was more pronounced if the no. of sprays were increased upto 5, which showed highest reduction in the disease incidence in case of *Rauwolfia serpentina*.

Similar results were obtained and similar trend has been recorded by Verma *et al* 1983, 1984. *Rauwolfia serpentina* as being the medicinal plant has been attempted for the first time and proved inhibitory for watermelon mosaic virus infection. Therefore, the extract

Table 1 : Per cent disease incidence recorded (days after planting) per cent reduction

Treatment plant extract	15			30			45			60			75					
	WMV	MM	VB	WMV	MM	VB	WMV	MM	VB	WMV	MM	VB	WMV	MM	VB			
	MM	VB	C	MM	VB	C	MM	VB	C	MM	VB	C	MM	VB	C			
Parthenium hysterophorus	12.0	10.61	8.0	13.62	11.7	12.5	14.1	12.5	14.0	15.2	13.41	11.52	17.8	15.0	17.51	46.91	39.87	51.56
Rauwolfia serpentina	6.0	4.5	3.5	7.5	5.12	4.0	7.6	6.71	5.2	8.0	7.0	6.7	14.0	9.10	12.0	68.52	69.12	76.04
Azardichta indica	7.0	5.0	4.5	7.65	6.5	5.8	9.0	7.61	6.61	11.0	8.1	8.0	16.5	9.81	10.11	62.65	64.74	73.30
Boerhaavia diffusa	8.5	6.18	5.61	9.85	7.98	6.8	10.62	8.1	7.48	11.7	10.11	9.36	13.5	12.4	11.81	60.71	57.36	68.68
Clerodendrum aculeatum	9.5	7.81	6.5	9.52	8.5	7.8	10.68	9.8	9.79	12.1	10.5	11.0	14.51	12.1	13.0	59.03	53.59	63.34
Ocimum sanctum	10.5	8.11	7.0	11.98	10.50	8.5	12.1	11.98	9.21	13.65	12.7	10.84	16.5	14.0	12.4	52.75	45.75	63.42
Control	21.0	15.1	20.1	22.15	16.2	21.0	26.7	19.5	25.0	30.4	25.0	30.0	36.7	29.18	35.0	---	---	---
S.E. <sub>t</sub>	1.90	1.40	2.11	1.92	1.40	2.16	2.41	1.66	2.56	2.79	2.29	2.99	3.09	2.57	3.29	3.11	4.53	3.76

may be recommended to cultivators for spray against this disease.

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**REFERENCES**

**Aminuddin, M.A. and Singh, B.P.** (1986). Probable elimination of virus causing chlorotic stunt in Gerbera from infected tobacco explants in presence of virazole and dyestuffs. *Indian J. Exp. Biol.*, **24** : 130.

**Awasthi, L.P., Chowdhary, B. and Verma, H.N.** (1984). Prevention of plant Virus disease by *Boerhaavia diffusa* inhibitor. *Internat. J. Trop. Pl. Dis.*, **2** : 41.

**Griffing, B.** (1956). Concept of general combining ability in relation to diallel crossing system. *Australian J. Biol. Sci.*, **9** : 463-493.

**Noronha, A.B., Alexander, M.A.V. and Vicente, M.** (1984). Effect of natural inhibitors on some plant viruses. *Biotechnol. Symp.* Karl Marx Univ. Leipzig. 76.

**Simons, J.N.** (1960). Effects of foliar sprays of cytovirin on susceptibility and transmissibility of potato virus Y in pepper. *Phytopath.*, **50** : 109-111.

**Verma, H.N., Awasthi, L.P. and Mukherjee, K.** (1982). In "Advancing frontiers of Mycology and Plant Pathology" (K.S. Bilgrami, P.S. Misra and R.S. Misra eds.) Today and Tomorrow Printers and Publishers. New Delhi pp. 255-264.

**Verma, H.N. and Prasad, U.** (1983). In "Recent advances in Plant Pathology" (A Hussain, K. Singh, B.P. Singh and V.P. Agnihotri eds.), pp. 312, Print House (India) Lucknow.

**Verma, H.N. Chowdhury, B. and Rastogi, P.** (1984). Antiviral activity of leaf extracts of different *Clerodendrum* L. species. *Z. Pflanzenkos Pflanzens- chutz*, **91**: 34-41.

**Verma, V.S. and Raychaudhuri, S.P.** (1970). Effect of saponin on the infectivity of potato virus X. *Zentralbl. Bakteriol. Parasitenkd. Infektionskr. Hyg. Abr.*, **2** : 125.

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