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# **ORIGINAL ARTICLE**

## Inhibition of Mosaic Virus Disease of Round Gourd (*Citrulus vulgaris*, Variety: Fistulosus) By Extract of Wild Plants

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#### ABSTRACT

Round Gourd (Citrulus vulgaris, variety: Fistulosus) is an important vegetable crop of family Cucurbitaceae. It is attacked by different types of pathogens, of which mosaic disease caused by virus is most important as it reduces the crop yield significantly due to its wide spread occurrence and quick spread by insect vector. In present study, attempts have been made to minimize the incidents of disease by the use of non-host wild plants. The leaf extract of seven plants viz., Azadirachta, indica, Boerhaavra diffusa, Cassia tora, Datura metal, Euphorbia hista, Ocimum sanctum and Prosopis juliflora was used at 3 different concentrations viz., 100ppm, 500ppm, and 1000ppm to control mosaic of round gourd. Practically, leaf extracts of all the plants controlled the disease to a variable extent but leaf extract of Datura metal and Prosopis juliflora at the concentration of 1000ppm decreased the disease to the extent of 79.10% and 79.00% respectively. However, the leaf extract of Ocimum sanctum showed minimum inhibition of 54.17% at this concentration. Thus, it is suggested that leaf extract of Datura metal and Prosopis juliflora can serve as cheap, eco friendly and effective control measure of mosaic of round gourd.

Key words: Round Gourd, Citrulus vulgaris, Fistulosus, Mosaic

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#### **INTRODUCTION**

Round gourd (*Citrulus vulgaris*, variety: Fistulosus) popularly known as 'Tinda' belongs to family Cucurbitaceae. It is a diffuse annual, creeping or climbing herb with stout stem and rounded fruits. The fruits are widely used as vegetable in different parts of India. Round gourd id highly susceptible to several pathogens like, bacteria, fungi, nematodes and viruses. Out of all the diseases, mosaic caused by virus, causes maximum damage to this crop. Ray Chaudhari (1980) have described virus diseases of Cucurbits from Delhi and reported that mosaic diseases of round gourd is most important as it reduces number and size of fruits causing considerable yield loss.

Round gourd is cultivated largely in Uttar Pradesh, Madhya Pradesh, Rajasthan, Punjab and Maharashtra and mosaic disease caused by virus is quite widespread in these regions and is transmitted by Thrips (Allen, *et. al.*, 2000). As such, control of this disease is very difficult. The traditional use of Chemicals for control of virus disease is quiet costly and is having residual toxicity. Moreover, the chemicals used to control virus diseases are quite complex and caused pollution of water and soil. On the other hand, pesticidal compounds of plant origin are more effective and have little or no side effects on human being. Further, these are less Phytotoxic, more systematic in action and easily biodegradable. In view of these facts, extract of some wild plants were screened against mosaic disease of round gourd and the findings are presented in the present communication.

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# MATERIALS AND METHODS

In the present investigation extract of leaf of seven commonly found wild plants viz., *Azadirachta indica, Boerhaavra diffusa, Cassia tora, Datura metal, Euphorbia hista, Ocimum sanctum* and *Prosopis juliflora* were screened for their antiviral property against their mosaic virus disease of round gourd. The leaf extract of these plants were prepared in sterilizes distilled water following Srivastava and Lal (1997). Further, dilutions of 1000ppm, 500ppm and 100ppm were prepared by adding distilled water. The standard virus inoculums was mixed with the different dilutions of plant extract in 1:1 ratio and kept at room temperature (25±2°C) for 30 minutes. Then, the virus was assayed was on the indicator plant (*Chenopodium amaranticolor* L). The inhibitory activity was expressed in terms of local lesion produced per leaf. Percentage inhibitions of local lesions were calculated by the following formulae as suggested by Manickam and Rajappa (1997).

Percentage reduction of virus lesion =  $\frac{A}{B} \times 100$ 

Where, A = Number of lesion produced by the inoculums containing extract of plant. B = Number of lesions produced by control (Virus).

S.No	Name of Plant	Concentrat ion in ppm	No. of Local Lesions per disc Exp.2	No. of Local Lesions per disc Exp.1	Mean	Percentage Inhibition
1.	Azadirachta	Control:	54.40	54.60	54.50	00.00
	indica	100	33.10	34.70	33.90	37.79
		500	22.50	22.70	22.60	58.53
		1000	15.10	15.10	15.05	72.38
2.	Boerhaavia	Control:	55.10	55.30	55.20	00.00
	diffusa	100	35.30	35.50	35.40	35.86
		500	29.90	29.40	29.65	46.28
		1000	20.20	20.40	20.30	63.22
3.	Cassia tora	Control:	54.50	54.40	54.45	00.00
		100	33.00	34.00	33.50	37.80
		500	22.50	22.70	22.60	58.55
		1000	15.10	15.10	15.05	72.40
4.	Datura metal	Control:	54.90	54.70	54.80	00.00
		100	30.70	29.40	30.05	45.16
		500	19.60	19.00	19.30	64.78
		1000	11.30	11.60	11.45	79.10
5.	Euphorbia	Control:	55.10	55.30	55.20	00.00
	hista	100	35.20	35.60	35.40	35.86
		500	29.80	29.50	29.65	46.28
		1000	20.00	20.40	20.20	63.30
6.	Ocimum	Control:	54.50	54.40	54.4	00.00
	sanctum	100	36.90	36.70	36.80	34.41
		500	33.90	34.10	34.00	37.55
		1000	24.90	24.60	24.95	54.17
7.	Prosopis	Control:	54.30	54.50	54.40	00.00
	juliflora	100	33.20	33.80	33.50	37.80
		500	19.20	19.60	19.40	64.80
		1000	11.30	11.50	11.40	79.00

**Table 1:** Inhibitory activity of plant extracts on Round Gourd Mosaic Virus

# **RESULTS AND DISCUSSION**

Perusal of table 1 clearly indicates that leaf extract of all the plants screened, showed antiviral potential to variable extent. Further, it was noted that antiviral potential of leaf extracts increased with increase in concentration from 100ppm to 1000ppm. However, maximum inhibition was recorded at 1000ppm concentration in all the cases. At this concentration inhibition of virus ranged from 54.17 % to 79.10 %. The maximum inhibition was noted in case of leaf extract *of Datura metal* (79.10 %), followed by extract

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of *Prosopis juliflora* (79.00%). In contrast the leaf extract of *Ocimum sanctum* showed the minimum inhibition of 54.17% at the concentration of 1000ppm. It is interesting to note that *Datura metal* and *Prosopis juliflora* grow wild near agricultural fields, hence easily available to the farmers for use as control of mosaic disease of round gourd.

It is noteworthy that the expression of disease symptoms was also delayed due to the effect of all the extracts. Besides affording local protection, these inhibitors were also found capable of inducing systemic resistance in several plants against a number of plants pathogenic viruses (Verma, 1982). It is supposed that the antiviral protein synthesis occurs in the treated cells and thereafter, diffuse to neighboring cells to inhibit virus multiplication. Rathore (2009) studied the effect of leaf extract of *Datura stramonium, Azadirachta indica, Calatropis gigentea, Prosopis juliflora* and bulb extract of *Allium sativum* on Foliar diseases incidence and yield of green gram. Non host plants growing wild near agricultural fields are known to have antimicrobial properties (Raja 2010). Hence, they can be exploited for cheap eco friendly management of plant diseases. Present study also indicates that *Datura metal* and *Prosopis juliflora* are wild plants growing near agricultural fields, there leaves contain many bioactive substances, hence can be successfully used in reducing mosaic disease incidence of round gourd. It Is suggested that 3 sprays at the interval of 15 days from seedling stage to flowering stage can significantly reduce disease incidence and increase yield of round gourd.

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