

ANTIBACTERIAL ACTIVITY OF MEDICINAL PLANT'S AGAINST *Xanthomonas citri*

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ABSTRACTS -

Leaf extract of twelve plant viz., *Allium sativum* L., *Ocimum sanctum* L., *Datura stramonium* L., *Eucalyptus globus*, *Calotropis procera* (Ait.) R.Br. *Azadirachta indica* A.Juss. *Tridax procumbens* L., *Catharanthus roseus* (L.) G.Don, *Vitex negundo*, *Ricinus communis* L., *Euphorbia hirta* L., and *Emblica officinalis* Gaertn. Were evaluated for the antibacterial activity against *Xanthomonas citri*. Among these plants *Allium sativum* L., *Ocimum sanctum* L., *Datura stramonium* L., *Eucalyptus globulus* and *Calotropis procera* (Ait.) R.Br, are more effective.

Among these plants *Allium sativum* L., *Emblica officinalis* Gaertn. *Eucalyptus globus* and *Azadirachta indica* A.Juss. are more effective. All the plant extracts show inhibitory effect on linear growth of *Xanthomonas axonopodis* pv. *citri*

Key words - *Xanthomonas axonopodis* pv. *citri*, Medicinal plants and diseased plant parts.

INTRODUCTION -

Plant based natural constituents can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, seeds etc. (Gordon and David, 2001). The beneficial effects of plant materials typically results from the combination of secondary products present in the plant.

India is striving hard to increase agricultural production with a view to accelerate food and oil production to feed the ever increasing population

through an integrated approach towards the application of farm technology (Neergard, 1977). *Xanthomonas axonopodis* pv. *citri* group produce colorless polysaccharides slime on media containing glucose and colonies of the sp. are mucoid, domed and shining on glucose NA or glucose yeast- chalk agar. The yellow pigment of the members of *Xanthomonas axonopodis*

pv. *citri* group that have been studied as a non-water soluble caotenoid.

Medicinal plants and herbs are one of the crucial components as far as the contribution of biodiversity to society is concerned. With a progressive loss of biodiversity all over the world, especially in the tropics, society is not only losing present benefits from current use but is being deprived of the option of future availability known as option value. Medicinal plants provide meaningful inputs for drugs. (Pushpam kumar april 2004)

The beneficial medicinal effects of plant materials typically result from the combinations of secondary products present in the plant. In plants, these compounds are mostly secondary metabolites such as alkaloids, steroids, tannins, and phenol compounds, which are synthesized and deposited in specific parts or in all parts of the plant. These compounds are more complex and specific and are found in certain taxa such as family, genus and species, but heterogeneity of secondary compounds is found in wild species Balandrin MFJ, Kjocke A, Wurtele E et al (1985).

Citrus canker, caused by *Xanthomonas citri* is a serious disease reducing the external quality of citrus fruits. It affects all types of citrus and severely infects *Citrus aurantifolia* (lime). It is one of the most feared of citrus diseases. The disease causes extensive damage to citrus and severity of this infection varies with different species and varieties and the prevailing climatic conditions. In India, citrus occupies third position among fruits after mango and banana and canker is one of the major constraints of its cultivation. Citrus canker was first reported from Punjab (Luthra and Sattar, 1942; Bedi, 1961).

MATERIALS AND METHODS –

From the above screened twelve plant leaf extracts, the most effective leaf extracts of the

different plants viz., *Allium sativum*, *Ocimum sanctum*, *Datura stramonium*, *Eucalyptus globulus*, *Calotropis procera*, *Azadirachta indica*, *Tridax procumbens*, *Cathranthus roseus*, *Vitex negundo*, *Ricinus communis*, *Euphorbia hirta* and *Emblica officinalis* were evaluated against the test pathogens *Xanthomonas axonopodis* pv. *citri*. The bacterial cultures were spread on the agar surface using sterile cotton swab. A well of 0.5 cm was made in the medium using sterile cork borer, 100 µl of each concentration of leaf extracts were transferred in to separate wells and plates were incubated at 37 ± 2°C. for 24 hours suitable controls were maintain. The data on the zone of inhibition of *Xanthomonas citri* around the well for each treatment were recorded. Each treatment was replicated three times.

Xanthomonas speices were identified (as per Bergeys's manual of determinative bacteriology, 1974) and further it was sub cultured on nutrient agar slants.

Treatments	Concentrations used
T ₀	Control
T ₁	25% leaf extract
T ₂	50% leaf extract
T ₃	100% leaf extract

Statistical analysis-

The statistical analysis of the obtained data was carried out by using the methods given by Panse, Sukhatme (1967) and Mungikar (1997).

RESULT AND DISCUSSION –

The effect of leaf extract of medicinal plants on the growth of *Xanthomonas axonopodis* pv. *citri* was observed, the growth was noted in the form of diameter of mycelial growth in mm. The results are recorded in the table1, and fig 1. It was

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seen that, as the concentration of medicinal plants increases, the growth of bacterial zone decreases. Data from table 1 and fig. 1 indicate the efficacy of leaf extract against *Xanthomonas citri*. The leaf extract of *Emblca officinalis* was found to be significantly effective in inhibition the pathogen growth recording inhibition of diameter as 24.4 mm followed by *Allium sativum* 23.5mm, *Eucalyptous globules* 21.2mm and *Azadirachta indica* (18.5mm) at their highest concentration of plant extracts i.e. (100%). Leaf extract of *Tridax procumbens* and *Catharanthus roseus* were the least effective treatment by recoding the inhibition diameter as 2.7.mm. as compared to other treatments but significant over control (M_0).

T_2 at 50% concentration, the treatments (M_6 - M_5), (M_4 - M_{11}), (M_8 - M_3), (M_7 - M_{10}) and (M_2) were found to be non-significant among each other but were significant over control (M_0).

Similarly T_1 at 25% concentration, all the treatments were found to be effective from other treatments and were superior over control (M_0). The Treatments (M_{12} - M_6), (M_5 - M_{11}) (M_1 - M_4) were found to be non-significant among themselves.

DISCUSSION-

In the present work, studied the efficacy of plant extracts against some selected fungi, shows the good results. Aqueous extract of selected twelve medicinal plants from different families were tested for their antibacterial potential against pathogenic Bacteria like *Xanthomonas axonopodis* pv. *citri*

Xanthomonas axonopodis pv. *citri*. The leaf extract of the following plants was found to be the most effective in the inhibition of the pathogen the *A. indica* and *E. globules* leaf extracts at all the concentration used *in -vitro*. The above findings are in agreement with those of Chandramohan (1989).

Sr. No	Medicinal Plants / Treatment	25% (T_1)	50% (T_2)	100% (T_3)
		M_0	Control	0.0
M_1	<i>Allium sativum</i>	6.5	11.9	23.5
M_2	<i>Ocimum sanctum</i>	1.0	2.0	3.6
M_3	<i>Datura stramonium</i>	2.4	2.6	3.4
M_4	<i>Eucalyptus globules</i>	2.7	9.2	21.2
M_5	<i>Calotropis procera</i>	13.2	14.5	15.6
M_6	<i>Azadirachta indica</i>	15.3	17.2	18.5
M_7	<i>Tridax procumbens</i>	2.0	2.3	2.7
M_8	<i>Catharanthus roseus</i>	1.5	2.4	2.7
M_9	<i>Vitex negundo</i>	1.9	2.4	5.3
M_{10}	<i>Ricinus communis</i>	0.0	1.7	2.5
M_{11}	<i>Euphorbia hirta</i>	7.4	12.8	13.1
M_{12}	<i>Emblca officinalis</i>	18.4	21.9	24.4
S.E		1.73	1.96	2.47
C.D at 5%		3.85	4.37	5.50

Table 1. Effect of leaf extract of medicinal plants on inhibiton zone of *Xanthomonas citri*.

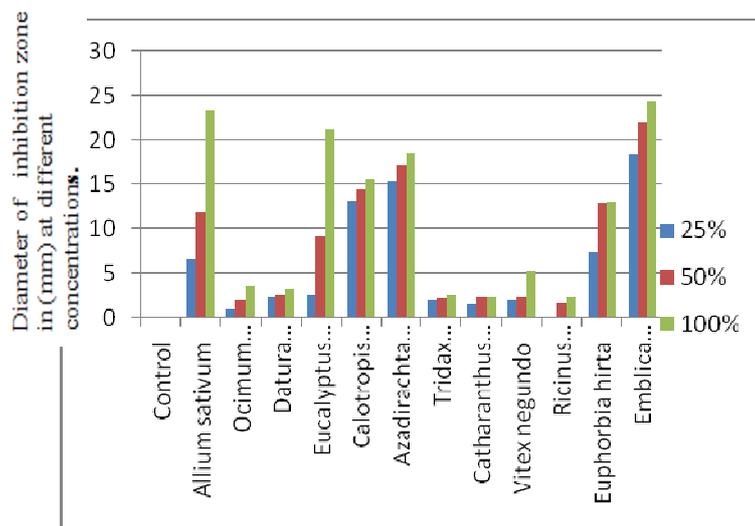


Fig 1. Effect of leaf extract of medicinal plants on inhibiton zone of *Xanthomonas citri*.

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