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Efficacy of natural extract in controlling Bacterial Citrus Canker of Lime

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ABSTRACT

The present work was conducted to evaluate the efficacy of plant extracts against *Xanthomonas* spps. Isolated from lime. Among the individual plant extract neem extract was found to be most effective followed by Garlic extract. In different combination of plant extract Neem+Garlic and Neem+Haldi were most effective followed by Haldi+Tulsi and Neem+Tulsi.

Key Words - *Xanthomonas* spps., Garlic, Neem, Tulsi and Haldi

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INTRODUCTION

Citrus canker is a serious disease causing an enormous socioeconomic impact on the citrus cultivars. Citrus canker is a bacterial disease caused by *Xanthomonas citri* Subsp. *Citri* (Synonym: *X. axonopodispv*. citri), a gram negative, slender, rod-shaped bacterium. It affects the leaf, twigs and fruit of the citrus plant, which cause the leaf and unripe fruit to fall on the ground. Initially small lesions appear but with time grow to a large spots measuring 10mm in diameter causing premature drop of fruit leading to great lose in yield. The disease is easily recognized by a greenish yellow-brown ring or halo around the lesions. It is the third largest grown fruit crops after mango and banana. Plant extracts exhibit antibacterial, antifungal and insecticidal properties due to production of secondary metabolities like phenols, phenolic acids, quinones, flavones, flavonoids, flavanols, tannins and coumarins which exhibit defence mechanism against pathogenic microorganism. The objective of this investigation was to evaluate the potential of natural extract in controlling citrus canker of lime.

MATERIALS AND METHODS

Isolation, media and Bacterial culture

The infected fruit were collected from the local market of Ranchi and the infected part was cut into small pieces and using mortar and pestle crushed using distilled water.

YDCA Media (Dextrose-20g; Yeast extract-10g; $CaCO_3$-20g, Agar-20g; dH_2O-1l) was prepared. 0.1ml of bacterial culture was spreaded on the YDCA media and incubated for 24hrs at 30°C. Take a loop full culture and streak on another media plate for pure culture.

Preparation of extracts

Plant parts used for the preparation of plant extracts i.e. Haldi-Rhizome; Neem-Leaf; Tulsi-Leaf; Garlic-Clove. The plant parts were dipped in one per cent Sodium hypochloride for one minute. Then the extracts were freshly prepared using sterile distilled water. 1 gm of plant part in 5ml distilled water was grinded using motor and pestle, and then filtered using filter paper. The plant extract were prepared accordingly as given in Table 1. Sensitivity of the different extract was tested using disc diffusion method.

Effect of plant extracts on bacterial canker

Wells were prepared in the nutrient agar plant using cork borer and a loop full of the culture was spreaded on the nutrient agar media using spreader and 0.5ml of the plant extract were filled

in each well using micropipette. Plates were incubated at 30°C for 24hr after overnight incubation. The plates were observed for the zone of inhibition.

Table 1: Showing different combination of plant extract

Plants	Plant extract (ml)	Plant extract used (ml)
Haldi (*Curcuma longa*)	5	0.5
Neem (*Azadirachta indica*)	5	0.5
Tulsi (*Ocimum sanctum*)	5	0.5
Garlic (*Allium sativum*)	5	0.5
Neem+Haldi	1+1	0.5
Neem+Tulsi	1+1	0.5
Neem+Garlic	1+1	0.5
Haldi+Tulsi	1+1	0.5

RESULTS AND DISCUSSION

The result revealed that aqueous extract of plant were found to be more effective when applied in combination than single extract against the bacterial citrus canker.

The neem extract was found to be most effective the result was in accordance with V.M. Kharat *et al.*, (2020) followed by Garlic extract the results of the investigation was in confirmation with Alane and Swami (2016) and Ambedkar *et al.*, (2015). In combination Neem+ Garlic and Neem + Haldi were found to be most effective followed by Haldi + Tulsi and Neem + Tusli which was found significantly effective. The result was accordance with Prakash and Karmegam (2012).

A

B

C

Fig1: A. Pure culture of *Xanthomonas spps*. B. Showing the effect of individual plant extract on *Xanthomonas spps* C. Effect of different combination of plant extract on *Xanthomonas spps.*

CONCLUSION

Among the plant extracts neem and garlic were found to be most effective treated individually but when applied in combination Neem + Garlic and Neem + Haldi were found most effective followed by Haldi+ Tulsi and Neem+ Tulsi against Citrus canker. Hence, these should be used as an alternate strategy for management.

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