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Research Note

Antibacterial activity of some seed extracts against *Xanthomonas campestris* pv. *mangiferae indicae*

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ABSTRACT

Mango bacterial canker disease (MBCD) caused by *Xanthomonas campestris* pv. *mangiferae indicae* (*Xcmi*) is one of the important diseases of mango affecting a number of commercial cultivars. The pathogen affects different plant parts like leaf, stem and fruit. Favourable environmental conditions cause severe loss to the crop. The *in vitro* studies have been performed by using cup-plate method to examine the antibacterial activity of some seed extracts. Seed extracts of 6 plants were screened against 11 strains of *Xcmi.* Out of 6 seed extracts, 4 seed extracts showed antibacterial activity. The seed extract of *Brassica juncea* showed maximum activity; while *Cyamopsis tetragonoloba* showed minimum antibacterial activity against the *Xcmi* strains under investigation.

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Bacterial diseases of fruit plants are known to cause great damages all over the world. Mango (*Mangifera indica* L.) is the most ancient among the tropical fruits. Among the bacterial diseases, bacterial canker is the most severe disease on mango, which is caused by *Xanthomonas campestris* pv. *mangiferae indicae* (Patel *et al.*) Robbs *et. al.* (Xcmi). The pathogen affects different plant parts like leaf, stem and fruit. Favourable environmental conditions cause severe loss to the crop.

In order to manage plant diseases, various chemicals are used since last several years, the world over. They tend to accumulate in animal tissues posing threat to human health. Green plants represent a reservoir of effective chemotherapeutants and can provide valuable sources of natural pesticides (Balandrin *et al.,* 1985; Hostettmann and Wolfender, 1997).

The seeds of various plants are known to have medicinal value. The same depicted in the literature of many authors *viz.* Kirtikar and Basu (1991), Wallis (1985) and Naik (1998). Pawar (1999) has studied the antibactrial activity of seed extracts of 10 plant species. During the present investigation, seed extracts of 6 plants were screened against 11 strains of *Xcmi*.

The strains of causal organism of mango bacterial canker disease (MBCD) *i.e. Xanthomonas campestris* pv. *mangiferae indicae* were collected from different parts of Aurangabad district. Studies were performed using these strains. They were maintained on Nutrient agar (NA) medium.

Preparation of seed extracts:

The seed extracts were prepared as per the method adopted by Pawar (1999). The seeds of the plants were collected, thoroughly washed with tap water and then rinsed with sterile distilled water. They were dried in shade until all moisture on the seed surface was evaporated. Then these seeds were powdered by using electric grinder and stored in polythene bags. One gm of the powder was taken and added to 10 ml of sterile distilled water. It was then subjected to ultracentrifuge for 20 min at –4°C at 11000 rpm speed. The supernatent was used for the investigation.

Cup plate method:

The antibacterial activity of the extract was tested by cup plate method as used by Pawar and Papdiwal (2010). The bacterial suspension was prepared by adding 10 ml sterile

Table 1 : Antibacterial activity of seed extracts against *Xcmi* strains

Sr. No	Name of the plant (seed extract)	Zone of Inhibition (in mm)											
		Xcmi 1	*Xcmi* 2	*Xcmi* 3	*Xcmi* 4	*Xcmi* 5	*Xcmi* 6	*Xcmi* 7	*Xcmi* 8	*Xcmi* 9	*Xcmi* 10	*Xcmi* 11	Mean
1.	*Albizia lebbeck*	–	–	–	–	–	–	–	–	–	–	–	–
2.	*Azadirachta indica*	10	11	11	12	12	12	13	11	14	13	12	11.90
3.	*Brassica juncea* Czern et. Coss.	20	21	20	18	19	20	20	21	19	18	18	19.45
4.	*Citrus aurantifolia*	–	–	–	–	–	–	–	–	–	–	–	–
5.	*Cyamopsis tetragonoloba*	10	12	12	10	11	12	12	10	12	12	10	11.18
6.	*Terminalia thorelii*	14	12	11	11	12	12	14	14	13	12	14	12.63

– : No Activity.

distilled water to 2 days old NA slope culture. Five drops of bacterial cell suspension were poured in sterilized Petridishes (9 cm diameter) onto which 20 ml of nutrient agar was poured and thoroughly mixed. It was allowed to solidify.

In the centre of the medium, a cup cavity of 8 mm diameter was made with sterilized No. 4 cork borer. This cup was filled with 0.1 ml of the stem extract. The Petridishes were incubated for 24 hrs at 25±2°C and the observations were recorded as diameter of inhibitory zone in mm. Cup plate filled with sterile distilled water was used as control in all the experiments. All experiments were in duplicate and the data are presented as the mean of the two.

Of the 6 extracts tested, the seed extracts of 4 plants showed antibacterial activity against *Xcmi* strains (Table 1). Among these, the seed extract of *B. juncea* showed maximum inhibition (Mean acitivity zone – 19.45 mm). There are few reports of antibacterial activity of seed extracts against bacteria. Hanafy and Hatem (1991) impregnanted filter paper discs with the diethyl ether extract of *Nigella sativa* seeds (25–400 µg extract/disc). It caused concentration dependent inhibition of Gram-positive bacteria represented by *Staphylococcus aureus*. Antibacterial and antioxidant activities of grape (*Vitis vinifera*) seed extracts was observed by Jayaprkasha *et al.,* (2003).

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