

## ANTIBACTERIAL ACTIVITY OF SOME STEM EXTRACTS AGAINST *XANTHOMONAS CAMPESTRIS* PV. *MANGIFERAINDICAE*

B.T.PAWAR\* and P.B.PAPDIWAL

Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431004, India.

\*Department of Botany, Shri Muktanand College, Gangapur, Dist. Aurangabad-431109, India.

Mango bacterial canker disease (MBCD) caused by *Xanthomonas campestris* pv. *mangiferaeindicae* (*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. Favorable 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 stem extracts. Stem extracts of 5 plants were screened against 11 strains of *Xcmi*. Out of 5 stem extracts, 3 stem extracts showed antibacterial activity. The stem extract of *Terminalia muelleri* showed maximum activity; while *Azadirachta indica* showed minimum antibacterial activity against the *Xcmi* strains under investigation.

**Keywords:** Antibacterial activity; Stem extracts; *Xanthomonas campestris* pv. *mangiferaeindicae*.

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. *mangiferaeindicae* (Patel, Moniz & Kulkarni) Robbs, Ribeiro & Kimura. The pathogen affects different plant parts like leaf, stem and fruit. Favorable environmental conditions cause severe loss to the crop.

For the management of 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<sup>1,2</sup>. Medicinal properties of stems have been reported by many workers<sup>3-5</sup>. The medicinal properties of stem have also been mentioned by Kirtikar and Basu<sup>6</sup>.

The strains of causal organism of MBCD i.e. *Xanthomonas campestris* pv. *mangiferaeindicae* were collected from different parts of Aurangabad district. Studies were performed using these strains. They were maintained on Nutrient Agar (NA) medium.

*a) Preparation of stem extracts:* The stems of the plants were collected, thoroughly washed with tap water and then rinsed with sterile distilled water. For the study, stem extract was used. They were dried in shade until all moisture evaporated. Then these stems were powdered by using electric grinder and packed into

polythene bags. One gm of the powder was taken and added to 10 ml of sterile distilled water. Then it was subjected to ultracentrifuge for 20 min at -4°C at the 11000 rpm.

*b) Cup Plate method:* It is a method of testing antibacterial activity. For this, the bacterial suspension was prepared by adding 10 ml sterile 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<sup>7</sup>. The petridishes were incubated for 24 hrs at 25±2°C and the observations were recorded as diameter of inhibitory zone in mm. Cup cavity filled with sterile distilled water was used as control in all the experiments. All experiments were performed in duplicate.

It is observed from Table 1 that out of 5 stem extracts, 3 stem extracts showed the antibacterial activity. Maximum inhibition was shown by the stem extract of *T. muelleri* (Mean activity zone - 13.09 mm), while minimum by *A. indica* (Mean activity zone - 10.81 mm). Antibacterial activity of 5 stem extracts were studied by Pawar<sup>8</sup> against 5 phytopathogenic bacteria. In the present experiment, the efficacy of 5 stem extracts against *X. campestris* pv. *mangiferaeindicae* strains was assessed. Stem extract of *Curcuma longa* also showed good

Table 1. Antibacterial activity of stem extracts against *Xcmi* strains.

Sr. No	Name of the Plant	Zone of Inhibition (in mm)											Mean
		Xcmi 1	Xcmi 2	Xcmi 3	Xcmi 4	Xcmi 5	Xcmi 6	Xcmi 7	Xcmi 8	Xcmi 9	Xcmi 10	Xcmi 11	
1.	<i>Azadirachta indica</i> L.	12	10	10	11	10	11	10	12	12	10	11	10.81
2.	<i>Curcuma longa</i> L.	11	12	12	11	11	10	10	12	10	10	11	10.90
3.	<i>Peltoforum pterocarpum</i> (DC) Baker ex K. Heyne	-	-	-	-	-	-	-	-	-	-	-	-
4.	<i>Terminalia muelleri</i> Benth.	12	14	14	12	12	14	14	13	13	14	12	13.09
5.	<i>Zingiber officinale</i> Rosc.	-	-	-	-	-	-	-	-	-	-	-	-

- : No Activity.

antibacterial activity but the stem extract of *Peltoforum pterocarpum* and *Zingiber officinale* could not exhibit any antibacterial activity against 11 strains of *Xcmi*.

#### References

- Balandrin MF, Klocke JA, Wurtele ES and Bollinger WH 1985, Natural plant chemicals: Sources of industrial and medicinal materials. *Science* **228** 1154-1160.
- Hostettmann K and Wolfender J 1997, The search for biological active secondary metabolites. *Pesticides Sci.* **51** 471-482.
- Mishra Parasnath 1996, Ethno-botanical screening of the members of the family Leguminosae from Parasnath hills, Bihar. In : *Proceedings of 82<sup>nd</sup> Indian Science Congress, Calcutta.* (Abstr.)
- Naik VN 1998, *Marathwadyatil Samanya Vanaushadhi*. Amrut Prakashan, Aurangabad.
- Suhaila Mohamed, Saka Sizama, El Sharkawy SH, Ali AM and Sepial Muid 1996, Antimycotic screening of 58 Malasian plants against plant pathogens. *Pesticide Sci.* **43**(3) 259-264.
- Kirtikar KR and Basu BD 1991, *Indian Medicinal Plant*, Vol.I to IV. Bishen Singh Mahendrapal Singh Publishers, Dehra Dun.
- Pawar BT and Papdiwal PB 2011, Antibacterial activity of some fruit extracts against *Xanthomonas campestris* pv. *mangiferaeindicae*. *Flora and Fauna* **17**(2) 215-218.
- Pawar BG 1999, *Studies on the utilization of plant extracts for the management of phytopathogenic bacteria*. Ph.D. thesis, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.