

ACTIVITY OF SOME ANTIBIOTICS ON *XANTHOMONAS CAMPESTRIS* PV. *MANGIFERAINDICAE*

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ABSTRACT : 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 cultivators. The pathogen affects different plant parts like leaf, stem and fruit. Favorable environmental conditions for the pathogen, causes severe loss to the crop. The *in-vitro* studies have been performed by using octodiscs to examine the activity of antibiotics on 11 strains of *Xcmi*. Amongst the 26 antibiotics tested, 17 antibiotics have shown inhibitory effect while 09 antibiotics could not exhibit any inhibitory activity against the *Xcmi* strains under investigation.

Keywords : Antibiotics, *Xanthomonas campestris* pv. *mangiferaeindicae*, Mango canker

INTRODUCTION

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 most severe disease of mango, which is caused by *Xanthomonas campestris* pv. *mangiferaeindicae*. This pathogen affects different plant parts of mango like leaf, stem and fruit. Favorable environmental conditions causes severe loss to the crop.

In order to manage plant diseases, various chemicals are used since last several years, the world over. In literature there are reports about the use of antibiotics in the management of bacterial plant diseases. Desai *et al.* (1967) observed control of bacterial blight disease of ragi by streptomycin. For control of bacterial canker of mango by chemicals, not many efforts have been taken. However, there are few reports for chemical control of mango bacterial canker (Rao *et al.*; 1978; Bose & Singh, 1980; Kishun & Sohi, 1984 and Kishun, 1988). In the field trials on seedling of mango var. alfanso, Kishun and Sohi (1984) observed that 4 sprays of Bavistin (100 ppm) or Bavistin + Agrimycin-100 (1000 and 100 ppm) at monthly intervals were effective in reducing the bacterial canker. Kishun (1988) used Bavistin (1000 ppm), Plantomycin (200 ppm) and Bavistin (1500 ppm) and observed 84.14 %, 82.45 % and 80.77% control respectively, against bacterial canker on mango seedling of var. alfanso. Misra & Prakash (1992) and Misra (1995) found that the antibiotic streptomycin gave best results in the control of MBCD. However, Kishun (1999) inferred that the MBCD can be managed with 3 sprays of the antibiotic streptomycin (100 ppm). Visser (1995) reported that copper sulphate was the most successful in eradication of *Xcmi*, amongst the various bactericides used.

MATERIAL AND METHODS

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

The bacterial suspension was prepared by adding 10 ml sterile distilled water to two days old NA slope culture. Five drops of *Xcmi* cell suspension were poured in sterilized petridishes into which 20 ml of nutrient agar was poured and thoroughly mixed. It was allowed to solidify. On the solidified medium, octodisc (HiMedia), was placed with sterile forcep. In all the methods, petriplates (in duplicate) were incubated at 30±2°C for 24 hours. The zone of inhibition was recorded in mm.

RESULTS AND DISCUSSION

In all 26 antibiotics were tested for their inhibitory activity against 11 strains of *Xcmi* (Table.1). Amongst the antibiotics tested, 17 have shown inhibitory effect while 9 could not exhibit any inhibitory activity against all the strains of *Xcmi* tested (Table.1).

of the 17 antibiotics exhibiting inhibitory activity, five antibiotics viz. Tetracycline, Amikacin, Erythromycin, Ciprofloxacin and Cephalothin were of two different concentrations (Table.1). The inhibitory activity of these 05 antibiotics was more at higher concentrations (Table.2).

It is further observed from Table.2 that, on an average the activity of antibiotics is 15.33 mm. In comparison to this value, significantly higher antibacterial activity was observed with 06 antibiotics viz. Chloramphenicol (30 mcg), Clindamycin (02 mcg), Tetracycline (30 mcg), Tetracycline (25 mcg), Vancomycin (30 mcg) and Norfloxacin (10 mcg). Eleven antibiotics showed significantly low antibacterial activity against 11 strains of *Xcmi*. viz. Tobramycin (10 mcg), Cephalothin (30 mcg), Lincomycin (02 mcg), Amikacin (10 mcg), Erythromycin (05 mcg), Ciprofloxacin (05 mcg), Cephalothin (05 mcg), Streptomycin (25 mcg), Nitrofurantoin (300 mcg), Cloxacillin (05 mcg) and Novobiocin (05 mcg).

Table. 1 Activity of 26 antibiotics tested against 11 strains of *Xcmi*.

S.	Antibiotic	Quantity	Inhibitory activity
1.	Amikacin	30 mcg	+
	Amikacin	10 mcg	+
2.	Amoxycillin	10 mcg	-
3.	Ampicillin	10 mcg	-
	Ampicillin	02 mcg	-
4.	Carbenicillin	100 mcg	-
5.	Cephalothin	30 mcg	+
	Cephalothin	05 mcg	+
6.	Cephotaxime	30 mcg	-
7.	Chloramphenicol	30 mcg	+
8.	Ciprofloxacin	10 mcg	+
	Ciprofloxacin	05 mcg	+
9.	Clindamycin	02 mcg	+
10.	Cloxacillin	05 mcg	+
11.	Co-trimazine	25 mcg	-
12.	Co-Trimoxazole	25 mcg	+
13.	Erythromycin	15 mcg	+
	Erythromycin	05 mcg	+
14.	Gentamicin	10 mcg	+
15.	Kanamycin	30 mcg	-
16.	Lincomycin	02 mcg	+
17.	Nalidixic acid	30 mcg	-
18.	Nitrofurantoin	300 mcg	+
19.	Norfloxacin	10 mcg	+
20.	Novobiocin	05 mcg	+
21.	Oxacillin	05 mcg	-
	Oxacillin	01 mcg	-
22.	Penicillin-G	01 unit	-
23.	Streptomycin	25 mcg	+
24.	Tetracycline	30 mcg	+
	Tetracycline	25 mcg	+
25.	Tobramycin	10 mcg	+
26.	Vancomycin	30 mcg	+

+ : Present, - : Absent

Raj and Moniz (1967) has observed inhibitory effect of streptocycline against *Xanthomonas oryzae in vitro*. Misra (1995) observed that for the control of MBCD, spraying of streptocycline (300 ppm) with copper oxy-chloride (0.3%) proved better, followed by streptocycline (300 ppm), when applied on mango fruits during the month of May. Such sprays before the rains proved to reduce inoculum and check disease build up significantly. Recently, Kishun (1999) stated that the MBCD can be managed with three sprays of antibiotic streptocycline at 100 ppm concentration.

Table. 2 Comparison of different antibiotics showing inhibitory activity against 11 strains of *Xcmi*.

S.	Antibiotics	Quantity	Mean activity zone (in mm)
1.	Chloramphenicol	30 mcg	22.54
2.	Clindamycin	02 mcg	19.72
3.	Tetracycline	30 mcg	19.18
4.	Tetracycline	25 mcg	18.27
5.	Vancomycin	30 mcg	17.27
6.	Norfloxacin	10 mcg	17.09
7.	Gentamicin	10 mcg	16.45
8.	Ciprofloxacin	10 mcg	16.18
9.	Co-Trimoxazole	25 mcg	15.36
10.	Erythromycin	15 mcg	15.36
11.	Amikacin	30 mcg	15.27
12.	Tobramycin	10 mcg	14.90
13.	Cephalothin	30 mcg	14.36
14.	Lincomycin	02 mcg	14.00
15.	Amikacin	10 mcg	13.72
16.	Erythromycin	05 mcg	13.54
17.	Ciprofloxacin	05 mcg	13.45
18.	Cephalothin	05 mcg	13.09
19.	Streptomycin	25 mcg	12.90
20.	Nitrofurantoin	300 mcg	12.81
21.	Cloxacillin	05 mcg	11.36
22.	Novobiocin	05 mcg	10.63

Mean : 15.33, S.D. : 2.85, S.E. : 0.60 , C.D. : 1.24 (p = 0.05).

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