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### *In Vitro* Assay of Antibiotics Against *Pectobacterium Carotovorum* Causing Black Leg and Soft Rot of Potato

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**Abstract:** Twenty three numbers of antibiotics , i.e. Cefpodoxime, chloramphenicol, Vancomycin, Streptomycin, Rifampicin, Levofloxacin, Ceftriaxone, Clindamycin, Augmentation, Amikacin, Cefixime, Tetracycline Cefuroxime, Cephadroxil Augmentin, Penicillin, Cefachlor, Azithromycin, Erythromycin, Cefaperazone, Clarithromycin, Ciprofloxacin, Ampicillin were tested against *Pectobacterium carotovorum* were tested *in vitro* in the Department of Plant Pathology in the College of Agriculture, Orissa University of Agriculture and Technology, Bhubaneswar, Odisha in the year, 2010-11. Maximum zone of inhibition was observed in Ceftriaxone(29.97) followed by Ciprofloxacin(27.38mm). Nine antibiotic discs like , chloramphenicol, Levofloxacin, Ceftriaxone, Tetracycline, Cephotoxime, Cefachlor, , , Cefaperazone, Ciprofloxacin, Ampicillin show more than 20mm size zone of inhibition. Minimum zone of inhibition was observed in Amikacin (10.99mm).

**Key words:** *In vitro*, antibiotics, black leg and soft rot

#### INTRODUCTION

The potato is one the most preferred vegetable which has high demand throughout the state all over the year The potato production in the world was 376.83 million tons (Anonymous, 2016). India is the second largest producer of potato (47 million tons) in the world after China. Uttar Pradesh is leading state in area and production followed by West Bengal.

However, Odisha occupies 15<sup>th</sup> position in terms of production and productivity where the area under potato cultivation was 25000 hactre and the yield was 3.02 lakh tons (Anonymous, 2017). The crop in Odisha is affected by several fungal, bacterial and viral diseases. The black leg and soft rot disease caused by *Pectobacterium carotovorum* is a devastating disease causing pre-emergence, post-emergence

rotting, black leg in field and soft rot in storage condition (Czakowski, 2011). The chemical control is a part of integrated plant disease management (CPRI, 2011). In this context twenty three numbers of antibiotics, i.e. Cefpodoxime, chloramphenicol, Vancomycin, Streptomycin, Rifampicin, Levofloxacin, Cetriaxone, Clindamycin, Augmentation, Amikacin, Cefixime, Tetracycline Cefuroxime, Cephadroxil Augmentin, Penicillin, Cefachlor, Azithromycin, Erythromycin, Cefaperazone, Clarithromycin, Ciprofloxacin, Ampicillin were tested against *Pectobacterium carotovorum* were tested *in vitro*.

### MATERIALS AND METHODS

Two days old bacterial culture of *P. carotovorum* was taken. The bacterial cell suspension was prepared and smeared on Nutrient Sucrose Agar Petriplates. The commercially available antibiotic discs with minimum inhibitory concentration, i.e. Cefpodoxime, chloramphenicol, Vancomycin, Streptomycin, Rifampicin, Levofloxacin, Cetriaxone, Clindamycin, Augmentation, Amikacin, Cefixime, Tetracycline Cefuroxime, Cephadroxil Augmentin, Penicillin, Cefachlor, Azithromycin, Erythromycin, Cefaperazone, Clarithromycin, Ciprofloxacin, Ampicillin were placed in these Nutrient Sucrose Agar Petriplates (Table 1). Four discs were used. Each treatment was replicated thrice. Side by side control was maintained. The inoculated plates were incubated at 27°C for 24 to 48 hours. Observations on inhibition zone around the discs were recorded by measuring with the scale.

### RESULTS AND DISCUSSION

All antibiotic discs Cefpodoxime, chloramphenicol, Vancomycin, Streptomycin, Rifampicin, Levofloxacin, Cetriaxone, Clindamycin, Augmentation, Amikacin, Cefixime, Tetracycline Cefuroxime, Cephadroxil Augmentin, Penicillin, Cefachlor, Azithromycin, Erythromycin, Cefaperazone,

**Table 1**  
**List of antibiotics used against the test bacteria**

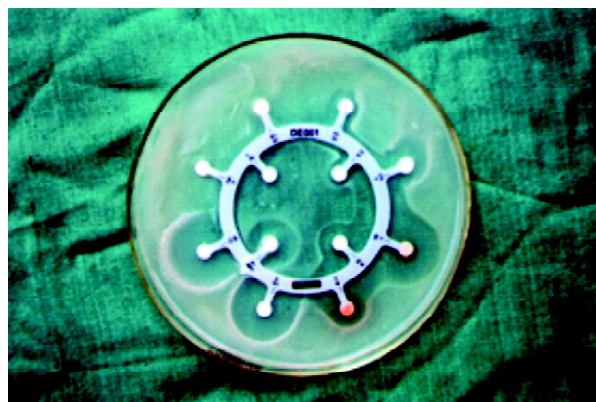
Sl. No	Antibiotic	Dose(mcg)	Units
1	Cefpodoxime	10	
2	Chloramphenicol	30	
3	Vancomycin	30	
4	Streptomycin	10	
5	Rifampicin	5	
6	Levofloxacin	5	
7	Cetriaxone	30	
8	Clindamycin	2	
9	Augmentation	30	
10	Amikacin	30	
11	Cefixime	5	
12	Tetracycline	30	
13	Cefuroxime	30	
14	Cephadroxil Augmentin	30	
15	Penicillin		10units
16	Cephotoxime	30	
17	Cefachlor	30	
19	Azithromycin	15	
19	Erythromycin	15	
20	Cefaperazone	Ore 75	
21	Clarithromycin	15	
22	Ciprofloxacin	5	
23	Ampicillin	10	

Clarithromycin, Ciprofloxacin, Ampicillin expressed zone of inhibition. In different discs the inhibition zone ranged from the 10.99 mm to 29.97 mm (Table 2, Fig. 1 and Fig. 2). Maximum zone of inhibition was observed in Cetriaxone (29.97) followed by Ciprofloxacin (27.38mm). Nine antibiotic discs like, chloramphenicol, Levofloxacin, Cetriaxone, Tetracycline, Cephotoxime, Cefachlor, Cefaperazone, Ciprofloxacin, Ampicillin show more than 20mm size zone of inhibition. Minimum zone of inhibition was observed in Amikacin (10.99mm). The effectiveness of antibiotics had already been

reported (Sholberg, and Boule, 2006; Hajhamed *et al*, 2007) Hence these antibiotics may be applied in field condition.

**Table 2**  
**Effect of antibiotics in inhibiting the growth of *Pectobacterium carotovorum***

Sl. No	Antibiotic	Dose(mcg)/ units	Diameter of zone of inhibition in mm
1	Cefpodoxime	10	17.99(4.99)
2	Chloramphenicol	30	25.31(5.08)
3	Vancomycin	30	15.02(3.94)
4	Sreptomycin	10	17.31(4.22)
5	Rifampicin	5	15.34(3.98)
6	Levofloxacin	5	24.00(4.95)
7	Cetriaxone	30	29.97(5.52)
8	Clindamycin	2	16.64(4.14)
9	Augmention	30	15.02(3.94)
10	Amikacin	30	10.99(3.39)
11	Cefixime	5	17.99(4.30)
12	Tetracycline	30	23.31(4.88)
13	Cefuroxime	30	17.99(4.30)
14	Cephadroxil Augmentin	30	17.99(4.30)
15	Pencillin	10 units	17.99(4.30)
16	Cephotaxime	30	22.64(4.81)
17	Cefachlor	30	24.70(5.02)
19	Azithromycin	15	15.02(3.94)
19	Erythromycin	15	17.99(4.30)
20	Cefaperazone	75	27.38(5.28)
21	Clarithromycin	15	16.97(4.18)
22	Ciprofloxacin	5	27.38(5.28)
23	Ampicillin	10	15.02(5.15)
24	Sterilized water		0.00(0.71)
	Se(m)±		0.37
	CD(0.05)		1.21



**Figure 1: Sensitivity test of antibiotics against *P. carotovorum* (Set-1)**



**Figure 2: Sensitivity test of antibiotics against *P. carotovorum* (Set-1I)**

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