

RESEARCH NOTE

In vitro evaluation of antagonistic micro-organisms against the growth of *Erwinia chrysanthemi*

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ABSTRACT

Efficacy of three antagonistic bacteria viz., *Pseudomonas fluorescens*, *Pseudomonas virideflava* and *Bacillus subtilis* were tested for their inhibitory effect on the growth of *Erwinia chrysanthemi* causing rhizome rot of banana by inhibition zone assay method. Among the antagonistic bacteria, *Pseudomonas fluorescens* was found to be most effective (9.20 mm) followed by *Pseudomonas virideflava* (5.60 mm). *Bacillus subtilis* could not show any inhibitory effect on the growth of *Erwinia chrysanthemi*.

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Banana (*Musa* sp.) is one of the important tropical fruit crops and economically profitable crop in India having high export potential. The banana crop is affected by several diseases caused by fungi, bacteria, viruses, nematodes and other abiotic factors. Rhizome rot or tip over disease of banana incited by *Erwinia chrysanthemi* is a serious disease causing rotting of newly planted rhizomes with failure to sprout, stunting and yellowing of young plants. It is a major constraint for commercial cultivation of banana. Wardlaw (1934) for the first time reported the bacterial nature of bacterial head rot or rhizome rot of banana from Honduras. Edward *et al.* (1973) reported the tip-over disease of banana from Allahabad in Uttar Pradesh. Chattopadhyay and Mukherjee (1986) reported the pseudostem stem rot of banana caused by *Erwinia chrysanthemi* pv. *paradisica* on Gaint Governor in West Bengal. Khan and Nagaraj (1998) reported several disease in banana growing areas of Karnataka. Nagaraj *et al.* (2012) reported that the disease incidence ranged from 30-35 per cent in the districts of Bangalore and Kolar of Karnataka state. Hence, present studies were undertaken to evaluate the efficacy of antagonistic bacteria against the growth of *Erwinia chrysanthemi* under *in vitro* condition.

An *in vitro* experiment was conducted during 2012 at K.R.C. College of Horticulture, Arabhavi to find out the suitable antagonistic bacteria against growth of *Erwinia chrysanthemi*. The antagonistic bacteria viz., *Pseudomonas fluorescens*, *Pseudomonas virideflava*, *Bacillus subtilis* were tested for their inhibitory effect on the growth of *Erwinia chrysanthemi* by inhibition zone assay method.

A heavy suspension of *Erwinia chrysanthemi* I₁₁ (Muddebihal isolate) (7×10^8 cfu/ml) was mixed with molten (50°C) Nutrient agar contained in an Erlenmeyer flask, so as to get thick growth of the bacteria on the medium. The medium was poured into the sterilized Petriplates and allowed to solidify. A loopful of culture of each of the antagonistic bacterium was placed on seeded Nutrient agar medium. The plates were then incubated at 28°C for 48 hours. Observations were recorded for the production of zone of inhibition around antagonistic bacterium against *Erwinia chrysanthemi* by measuring the diameter of the inhibition zone.

The antagonistic bacteria such as *Pseudomonas fluorescens*, *Pseudomonas virideflava*, *Bacillus subtilis* were tested *in vitro* for their inhibitory effect on the growth of *Erwinia chrysanthemi* and the results are presented in Table 1 and Plate

1 which revealed that the tested antagonistic bacteria in inhibiting the growth of *Erwinia chrysanthemi* were significant. *Pseudomonas fluorescens* was found to be most effective (9.20 mm) followed by *Pseudomonas virideflava* (5.60 mm). *Bacillus subtilis* could not show any inhibitory effect on the growth of *Erwinia chrysanthemi*. Comparable results were reported by Abdelghafar and Abdel Sayed (1997) who reported that *Pseudomonas fluorescens* and *Pseudomonas putida* or their filtrates inhibited the growth of *Erwinia carotovora*. *Pseudomonas aeruginosa* was found to be effective against *Erwinia* sp. in *in vitro* condition followed by *Pseudomonas fluorescens* (Snehalatharani and Khan, 2009).

Table 1 : *In vitro* evaluation of antagonist micro-organisms against *Erwinia chrysanthemi*

Treatments	Mean zone inhibition (mm)
T ₁ - <i>Pseudomonas fluorescens</i>	9.20 (3.08)
T ₂ - <i>Pseudomonas virideflava</i>	5.60 (2.45)
T ₃ - <i>Bacillus subtilis</i>	0.00 (0.70)
T ₄ -Control	0.00 (0.70)
S. Em±	0.10
C.D. (P=0.05)	0.43

Figures in the parenthesis are the square root transformation values

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