158

INDUCTION OF DEFENCE RELATED ENZYMES WITH PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPRS) IN BLACK PEPPER (*PIPER NIGRUM* L.) AND *PHYTOPHTHORA CAPSICI* PATHOSYSTEM

Diby Paul and Y.R. Sarma

Indian Institute of Spices Research, Calicut, Kerala-673 012, India.
E-Mail: sarmayr@yahoo.com

ABSTRACT

Plant growth promoting rhizobacteria are able to suppress root rot caused by *Phytophthora capsici* in black pepper significantly. Efficient strains of *Pseudomonas fluorescens* identified were evaluated for their efficacy in inducing defence enzymes in black pepper. Increased levels of Peroxidase (PO), Catalase, Phenylalanine Ammonia Lyase (PAL) and Poly Phenol Oxidase (PPO) were induced in leaves apart from the roots of treated plants indicating the systemic protection offered to black pepper by the strains exploring the prevention of even foliar infection by the pathogen. These defence enzymes synthesized in the plant contribute to the formation of defence barriers for reinforcing the cell structure and in the biosynthesis of phytoalexin and other Phenolic compounds. The induction of defence enzymes was sudden in roots and was gradual in the leaves. The synthesis of defence enzymes were maximum in the plant roots on the 2nd day itself and started gradually diminishing or remaining constant up to 14 days of the study period and in the leaves the highest quantities were produced on the 6th or 8th day after root bacterization. Another set of bacterized and the untreated control plants were challenge inoculated with the pathogen, *P. capsici* 7days after bacterization. *P.capsici* induced higher levels of these enzymes than the *P.fluorescens* strains may be due to that the mechanism of activation of defence genes by rhizobacteria is different from that of pathogen infection. PO and PAL showed a peak of maximum enzyme production on 3rd day and for PPO and Catalase the peak appeared only on 5th day of challenge inoculation. The increase in production of defence enzymes upon challenge were higher in the non bacterized plants compared to the bacterized plants, indicating the lesser requirement of defence enzymes in the bacterized plants upon encounter with the pathogen. The foliar protection rendered in the root-bacterized plants may be attributed to the enhanced level of PGPR induced defence enzymes in the leaves implicating the role of induced systemic resistance (ISR) in the treated plants. There also found a relatively higher quantity of lignification (30 – 100% over control) in the bacterized roots compared to the plants untreated.