*Research Paper :*

# Induced Systemic Resistance by Plant Products and Nutrients in Green Gram Challenged with Powdery Mildew Pathogen (*Erysiphe polygoni* DC.)

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**SUMMARY**

**Induced systemic resistance in green gram by foliar spray of plant products and mineral nutrients were studied for the management of powdery mildew pathogen. Foliar application of plant extracts *viz.*, *Allium sativum*, *Prosopis julifora*, *Trianthemum portulacastrum* and Zinc sulphate (0.1%) induced the enzyme activity *viz.*, peroxidase (P0), polyphenol oxidase (PPO) and phenyl alanine ammonia lyase (PAL) in green gram leaves challenged with the powdery mildew pathogen.**

**Key words :**
Green gram, Powdery mildew, Botanicals, Induced systemic, *Erysiphe graminis*

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Plant pathogens play an important role and pose challenges on the increased production of pulses, among which the fungi form the most important group of pathogens affecting pulse crops. In green gram, considerable losses in the production occur as a result of powdery mildew (*Eryisphe polygoni*.DC) in all areas having rice based cropping systems of the country (Abbaiah, 1993). Disease reduction by mineral nutrients is most often attributed to improved nutrition that boosts host defense or directly inhibits fungal growth and its activity. In few cases, nutrition indirectly stimulates the indigenous population of microorganisms that are beneficial to plant growth and act as antagonists to pathogen.Induction of plant defense genes by prior application of inducing agents is called induced systemic resistance (ISR) (Hammerschmidt and Kuc, 1982)and is thought to be a novel plant protection strategy.

## MATERIALS AND METHODS

Physiology and biochemical aspects of induction of resistance by nutrients

For assaying induced resistance by botanicals and mineral nutrients, the plants were sprayed with appropriate concentration of plant extracts and mineral nutrients on 30 days old crop. After 48 hours the treated plants were challenge inoculated with the conidial suspension of *E. polygoni* ($10^6$/ml) Then the plant samples were collected on 0,1,3,5 and 7 days after inoculation.

***Enzyme extraction:***

Using pre chilled pestle and mortar, 1 g of leaf sample was homogenized in 2 ml of 0.1 M sodium phosphate buffer (pH 7.0). The homogenate was centrifuged at 10,000 rpm for 10 minutes at 4°C and the supernatant was used as enzyme source for the assay of peroxidase activity (PO).

***Assay of peroxidase:***

Peroxidase activity was assayed spectrophotometrically. The reaction mixture consisted of 1.5 ml of 0.05 M pyrogallol, 0.5 ml of enzyme extract and 0.5 ml of one per cent $H_2O_2$ which was incubated at room temperature. At start of enzyme reaction, the absorbance of the mixture was set to zero at 420 nm in a spectrophotometer and the change in absorbency was recorded at 30 seconds intervals for 3 minutes. Boiled enzyme extract served as control. PO activity was expressed as change in the absorbance of the reaction mixture per min per g on fresh weight basis (Hammerschmidt and Kuc, 1982).

***Assay of polyphenol oxidase:***

The enzyme source for the assay of PPO was prepared as that of PO. The polyphenol oxidase was determined as per the procedure given by Mayer *et al*. (1965). The reaction mixture consisted of 1.5 ml of 0.1 M sodium