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Full Length Research Article

PGPB Cells and Salicylic Acid on Challenge Inoculation of *Sclerotium rolfsii*

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Abstract

Bradyrhizobium and PPFM supply of Salicylic acid (SA) and inoculated against *Sclerotium rolfsii* in groundnut was investigated, including single strain inoculation, one strain with salicylic acid, co-inoculation, co-inoculation with salicylic acid, natural co-aggregates application, and natural co-aggregates. The EPS-rich natural co-aggregates of Bradyrhizobium and PPFM showed the greatest decrease. In groundnut plants, natural co-aggregates of Bradyrhizobium and PPFM isolates with salicylic acid enhanced the ISR against *Sclerotium rolfsii*.

***Key words*:** *Sclerotium rolfsii*, Groundnut, PGPB, Salicylic acid, Phenol, Peroxidase

In response to pathogenic assault, Plant growth-promoting rhizobacteria (PGPR) causes structural changes in cell walls [1-2]. The lignification of the cell wall is induced by PGPR treatment in beans [3]. Resistance in the host against pathogen is determined by phenolic chemicals [4]. Phenol components are carbon-based chemicals found in plants; some are produced naturally, while others are produced for pathogenic attack and are linked to the host's active defence response.

Protection techniques and a viable organism based solely on biological control to reduce the usage of synthetic chemical pesticides. Induced systemic resistance is defined as a phenomena in which plants develop greater resistance to a wide range of phytopathogens as a result of the activation of genetically programmed defence pathways prior to infection [5]. The ability of specific strains of Plant growth-promoting rhizobacteria (PGPR) to control disease in plants demonstrated [6]. Several determinants of Plant growth-promoting rhizobacteria (PGPR) control disease in plants, including lipopolysaccharides (LPS) [7], siderophores [8-9], salicylic acid [10], and exopolysaccharide (EPS) [11-13]. Furthermore, [14] suggested that the bacterial ACC plays a favourable effect in ethylene levels. in rhizosphere crops, and recommended it as an ISR elicitor in Arabidiopsis thaliana. In Arabidopsis, Bacillus-mediated SA-dependent induced resistance has been described [15-16] found that Methylobacterium bioinoculation improved growth of plant, as well as ISR-mediated biocontrol of *Sclerotium rolfsii* in groundnut crops. [17] examined, signaling, proposed that for ISR maximization, a mix of distinct rhizobacterial strains that stimulate diverse mechanism.

MATERIALS AND METHODS

Evaluation of certain resistance inducing chemicals against Sclerotium rolfsii

Groundnut seeds of the variety JL-24 were planted separately in rows in pots. The seedlings were grown in rainfed settings and their ages were determined from the time of seeding.

Effect of different formulations on growth in groundnut

Surface sterilization, germination, growth chamber preparation, installation of early growth of groundnut and conditions all completed. Purified exopolysaccharide (EPS) from Bradyrhizobium and Methylobacterium vegetative cells, as well as their co-aggregates, were prepared according to the instructions. Using sterile distilled water, the purified compound was brought to 200 ppm concentration. The ISR inducing chemicals, salicylic acid, were made in sterile distilled water at a concentration of 0.01 percent, 100 litres of purified pink pigmented facultative methylotrophic (PPFM) compounds were used as seed treatment.

RESULTS AND DISCUSSION

Evaluation of certain resistance inducing chemicals against Sclerotium rolfsii

Various concentrations of exopolysaccharide (EPS) used in all of the treatments, the purified compound was brought to 200 ppm application reduced stem rot infection level comparable to 300 ppm, however there was a significant

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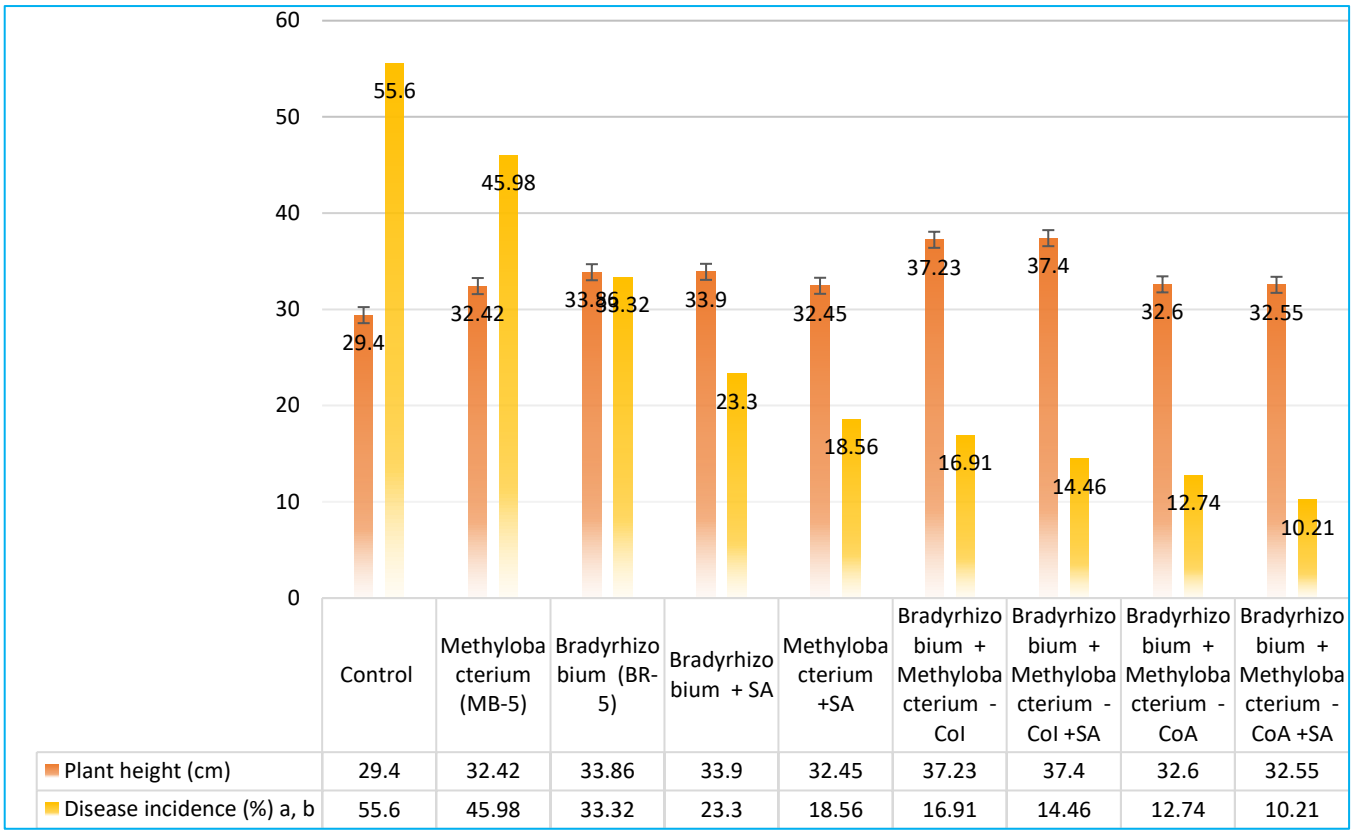
difference between application of purified compounds at different level. Impact of purified compounds at Two hundred parts per million on the efficient reduce of stem rot in groundnut was clearly demonstrated in the study, as shown in (Fig 1).



	Control	Methylobacterium (MB-5)	Bradyrhizobium (BR-5)	Bradyrhizobium + SA	Methylobacterium +SA	Bradyrhizobium + Methylobacterium - CoI	Bradyrhizobium + Methylobacterium - CoI +SA	Bradyrhizobium + Methylobacterium - CoA	Bradyrhizobium + Methylobacterium - CoA +SA
Plant height (cm)	29.4	32.42	33.86	33.9	32.45	37.23	37.4	32.6	32.55
Disease incidence (%) a, b	55.6	45.98	33.32	23.3	18.56	16.91	14.46	12.74	10.21

Fig 1 Response of different formulations of *Bradyrhizobium* and *Methylobacterium*

Reaction of rhizobacterial products at different concentration on stem rot (Sclerotium rolfsii) in groundnut

Cell wall protein collected from Bradyrhizobium alone, Cell wall protein of Methylobacterium, EPS collected from Bradyrhizobium and Methylobacterium coaggregates, and EPS collected from Bradyrhizobium and Methylobacterium Artificial coagregates of Bradyrhizobium and Methylobacterium were examined in vitro at varying concentrations of 100, 200, and 300 ppm, with the results shown in (Fig 2).

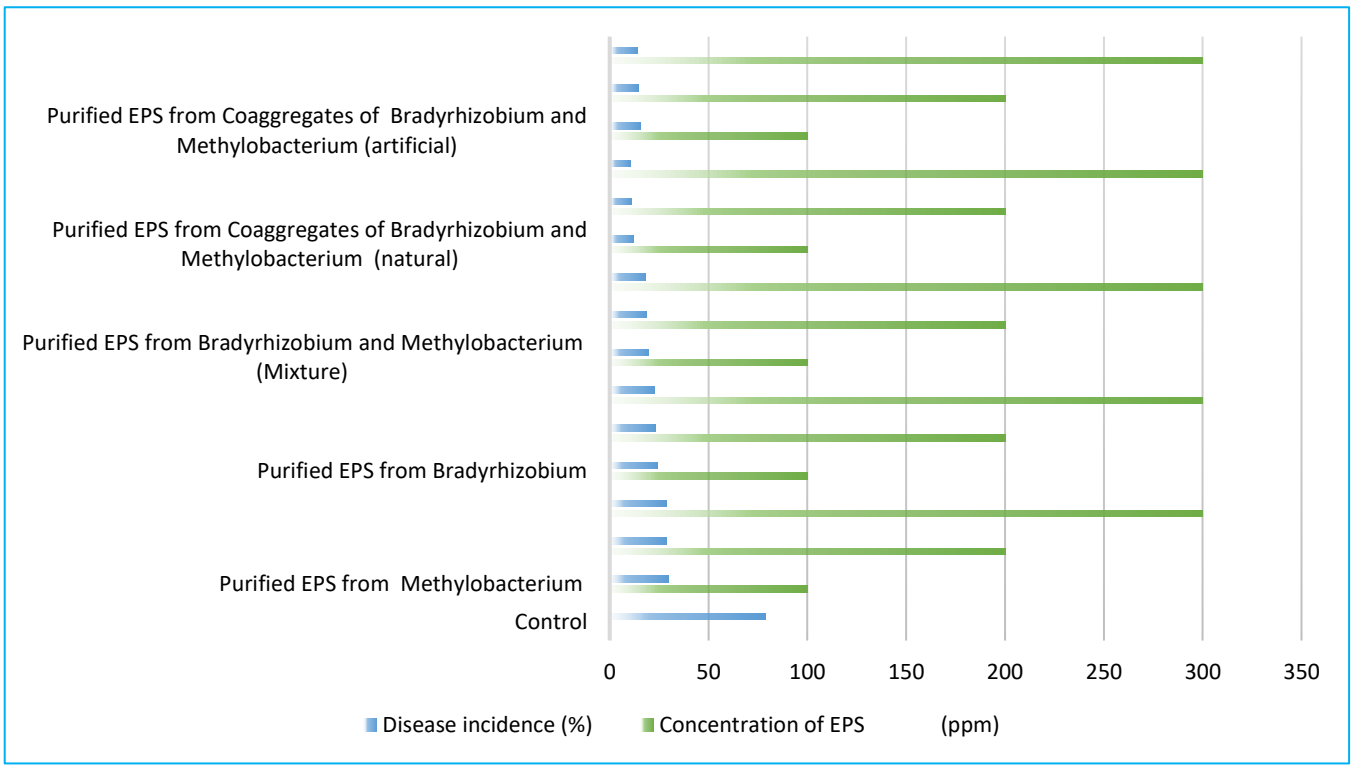


Fig 2 Response of *Brady rhizobium and methylobcterium* cell wall protein cell wall protein at different concentration on collar rot disease (*Sclerotium rolfsii*) groundnut

Effect of foliar application of certain resistance inducing chemicals on collar rot disease of groundnut

Various concentrations of cell wall protein used I treatments, two hundred parts per million of purified compounds stem rot level to comparable to three hundred parts per million ppm, however there was a significant difference between hundred and two hundred parts per million of cell wall protein. The usefulness of rhizobacterial cell wall protein inoculation at Two hundred parts per million in the efficient reducing of stem rot in groundnut was clearly demonstrated in this study.

Exogenous treatment of chemical inducers such as salicylic acid, naphthalene acetic acid, jasmonic acid, and acibenzolar at two doses, 0.075 and 0.1 percent, was used to induce systemic resistance to *Sclerotium rolfsii*, and the findings are shown in (Fig 3).

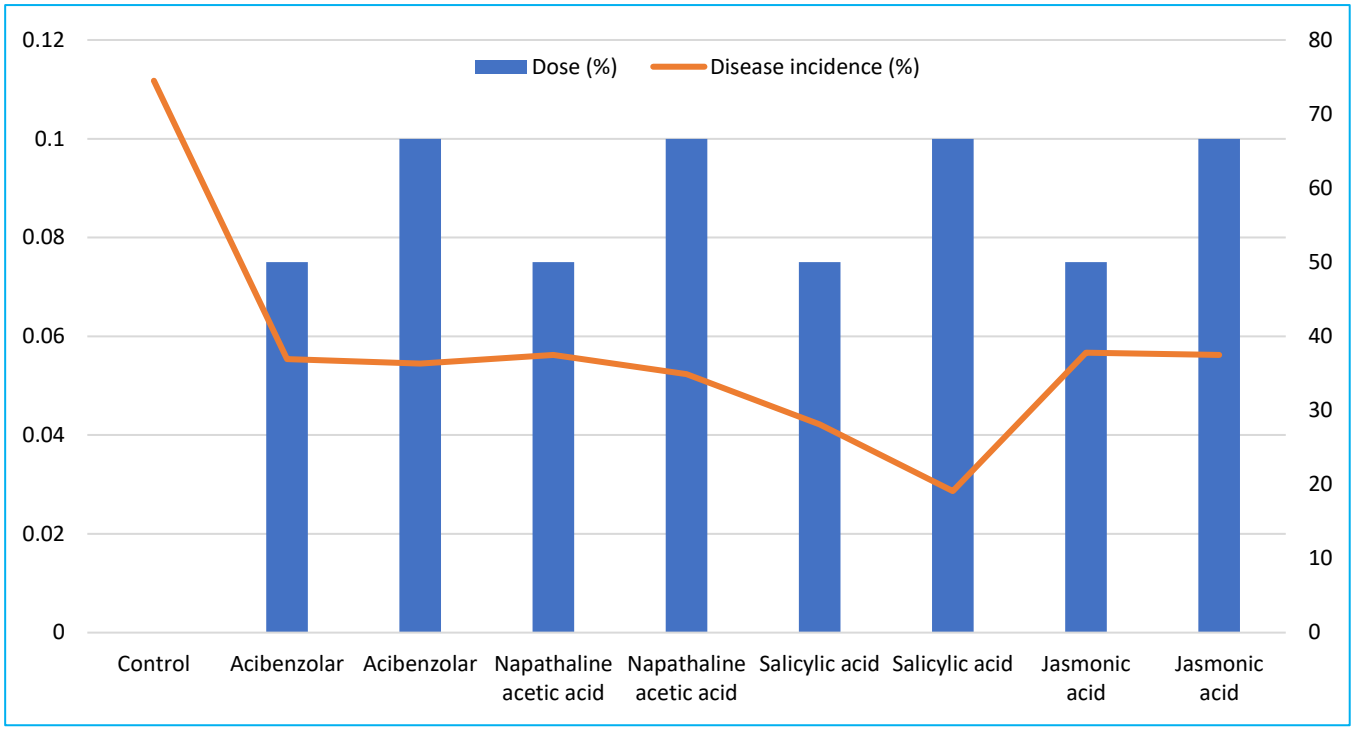


Fig 3 Effect of foliar application of certain resistance inducing chemicals on collar rot disease of groundnut

Sclerotium rolfsii is more effectively controlled by EPS prepared from Bradyrhizobium and Methylobacterium natural co-aggregates than by other exopolysaccharide (EPS) preparations. Surprisingly, there was a significant difference in the impact of PGPB EPS between hundred and two hundred parts per million against disease, although the bio-control effect between two hundred parts per million and three hundred parts per million was found to be comparable. As a result, the usage of PGPB EPS at a concentration of 200 ppm was determined to be the most effective for controlling *Sclerotium rolfsii* in groundnut. several concentrations pure exopolysaccharide (EPS) against maize pathogen and found that two hundred parts per million was the most effective concentration for Colletotrichum. The current study's findings clearly showed that the optimization of In line with previous findings [13], PGPB EPS (200 ppm) was found to be beneficial in controlling *Sclerotium rolfsii* occurrence in groundnut.

CONCLUSION

The current study's findings clearly showed that the optimization of In line with previous findings PGPB exopolysaccharide (EPS) (200 ppm) was found to be beneficial in controlling *Sclerotium rolfsii* occurrence in groundnut.

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