

**Title of research project:**  
**"Biological control of Stem rot disease of groundnut caused by *Sclerotium rolfsii* Sacc."**

**Name of the Principal Investigator:** Dr. R. R. Rakh

**Department where work has progressed:** Department of Microbiology.

**UGC Reference No.:** 42-454/2013 (SR) dt. 22 March 2013

**Period of report:** from 01-04-2013 to 31-03-2017 (Four year)

**Grant approved and expenditure incurred during the period of the report:**

- a. **Total amount approved:** Rs. 387000.00 /-
- b. **Total expenditure:** Rs. 388918.00 /-

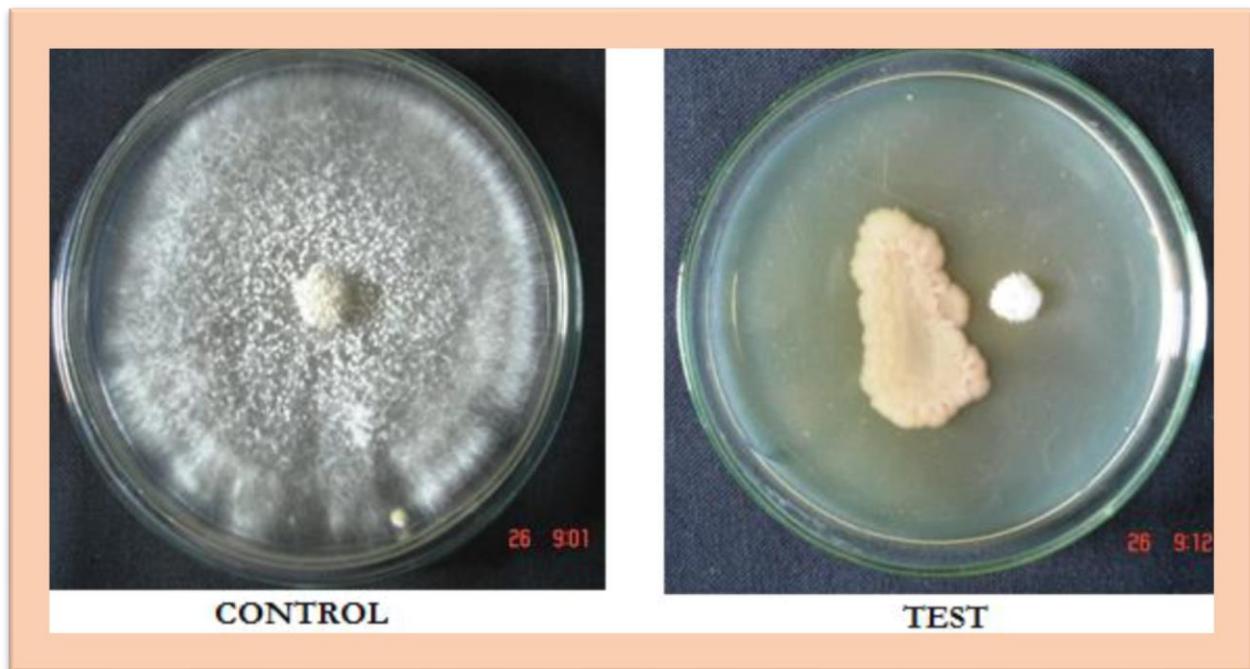
### **Executive Summary of the Major Research Project Report**

1. The phytopathogen, *Sclerotium rolfsii*, the causative agent of stem rot disease of groundnut, was isolated from infected groundnut parts and seeds, whose pathogenicity was confirmed against two groundnut varieties TAG 24 and SB XI.





2. Around 137 rhizobacterial species were isolated from rhizosphere of healthy plants such as soybean, Neem, Tur Groundnut etc. Amongst these, isolates, 67 were *Pseudomonas spp.*, 9 were *Azotobacter spp.* and 61 were *Bacillus spp.*
3. All these rhizospheric isolates were screened for antagonistic activity against the isolated phytopathogens of groundnut i.e. *S. rolfsii*, by dual culture method.
4. Two efficient *Pseudomonas spp.*, tentatively named SGBMP1 and SGBMP7 while one *Bacillus spp.* DSM57 were found as effective biocontrol agents against *S. rolfsii*.



5. Hence, efficient SGBMP1, SGBMP7 and DSM7, were identified (by using cultural, morphological, biochemical characteristics as well as 16s rRNA sequencing) as *Pseudomonas cf. monteilii* 9, *Pseudomonas aeruginosa* AL98, and *Bacillus thuringiensis* NCIM2130 respectively.

6. *Pseudomonas cf. monteili 9* produced non-volatile diffusible antibiotic, volatile metabolite, HCN, siderophore, IAA and able to solubilize phosphate while *Pseudomonas aeruginosa AL98* produced non-volatile diffusible antibiotic, volatile metabolite, siderophore, and Phosphate solubilization to inhibit *Sclerotium rolfsii*. *Bacillus thuringiensis NCIM2130* produced volatile metabolites and siderophore to inhibit *S. rolfsii*. These rhizospheric bacteria used this mechanism to control *S. rolfsii*.
7. In pot assay for growth promotion, considerable increase over untreated control was observed in terms of % germination (59-86%), shoot length (17-25), root length (6.1 - 10), no. of leaves (67- 177), chlorophyll content ( 0.178 – 0.387 ) and vigor index (1722.8 - 2872.4) also.
8. In pot assay for biocontrol activity, the percent decrease in disease incidence of *Pseudomonas cf. monteili 9* and *Pseudomonas aeruginosa AL98* treated seeds compared to the untreated check (Positive control), ranged from 40.16 to 54.54 % in stem rot of groundnut.



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