

Sanjivani Education Society's  
**Sant Tukaram College of Arts & Science**

Basmat Road, Parbhani -431 401 (M.S.)

(Affiliated to Swami Ramanand Teerth Marathwada University, Nanded.)

((Recognized under 2(f) & 12(B) by UGC Act 1956 [F-8-53/2002 (CPP-I)])



संजीवनी एज्युकेशन सोसायटीचे  
**संत तुकाराम कला व विज्ञान महाविद्यालय**

बसमत्ता रोड, परभणी - ४३१ ४०१ (महाराष्ट्र)

**Dr. Parale S.B.**

I/C Principal

M.A. Marathi, NET, Ph.D.

Tel. No.(O) 02452-248985

Mob. : 9850088571 Fax. : 02452-248646.

Email: stcpbn@gmail.com

Ref. No.

Date:

### B.Sc. Practical Examination Movement Order

संदर्भ : परीक्षा / विज्ञान / प्रा.प. / २०१७-१८ / ४१६२

दिनांक : १६.०२.२०१८

To,

03. Shri/Smt. Dr. Rakh R.R.  
Department of Microbiology  
S. G. B. M., Purna.

External Examiner

04. Shri/Smt. Raut L.S.  
Department of Microbiology,  
Sant Tukaram Arts and Science College, Parbhani.

External Examiner

Subject: Practical Examination Summer-2018 in the subject Microbiology

Class: B. Sc. I

Paper No.: V

Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer-2017.

Examination	Center	Date of commencement of Examination	Last Date of Examination	Time of Examination
B. Sc. I	Sant Tukaram Art's and Science College, Parbhani	06.03.2018	07.03.2018	09:00 AM to 01:00 PM & 02:00 PM to 06:00 PM

#### Instructions

- Examiners are requested to prepare mark list, submit sealed mark list and answer book bundle towards the principal of concern center.
- If any near blood relative of the examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- Examiners are requested to attend the practical examination center before one hour from the commencement of examination.
- Examiners are requested to communicate their acceptance to the center immediately after receipt of this order.
- Preparation day will be payable if examiners report the center one day before from the commencement of the practical examination for which only D.A. and conveyance allowance will be payable.
- Examiners are requested to attach the photocopy of this order while submitting the remuneration and T.A., D.A. bills.

*[Handwritten Signature]*

Col. Prasad  
IQAG

Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani - 431511 (M.S.)



*[Handwritten Signature]*  
I/C Principal  
Sant Tukaram Art's & Science College  
Parbhani

PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani



**Dr. Parale S.B.**

I/C Principal

M.A. Marathi, NET, Ph.D.

Tel. No.(O) 02452-248985

Mob. : 9850088571 Fax. : 02452-248646.

Email: stcpbn@gmail.com

Ref. No.

Date:

**B.Sc. Practical Examination Movement Order**

संदर्भ : परीक्षा / विज्ञान / प्रा.प. / २०१७-१८ / ४१६२

दिनांक : १६.०२.२०१८

To,

01. Shri/Smt. Dr. Rakh R.R.  
Department of Microbiology  
S. G. B. M., Purna.

External Examiner

02. Shri/Smt. Dr. Kamthane D.C.  
Department of Microbiology  
S. G. B. M., Purna.

External Examiner

Subject: Practical Examination Summer-2018 in the subject Microbiology

Class: B. Sc. III

Paper No.: XVI & XVII

Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer-2017.

Examination	Center	Date of commencement of Examination	Last Date of Examination	Time of Examination
B. Sc. III	Sant Tukaram Art's and Science College, Parbhani	12-13.2018	13.03.2018	09:00 AM to 01:00 PM & 02:00 PM to 06:00 PM

**Instructions**

1. Examiners are requested to prepare mark list, submit sealed mark list and answer book bundle towards the principal of concern center.
2. If any near blood relative of the examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
3. Examiners are requested to attend the practical examination center before one hour from the commencement of examination.
4. Examiners are requested to communicate their acceptance to the center immediately after receipt of this order.
5. Preparation day will be payable if examiners report the center one day before from the commencement of the practical examination for which only D.A. and convince allowance will be payable.
6. Examiners are requested to attach the photocopy of this order while submitting the remuneration and T.A., D.A. bills.

*[Signature]*

Co-ordinator  
IQAC

Shri Guri Buddhiswami Mahavidyalaya  
Purna (Dist. Parbhani) - 431511 (M.S.)



*[Signature]*  
I/c Principal

Sant Tukaram Art's & Science College  
Parbhani

PRINCIPAL

Shri Guri Buddhiswami Mahavidyalaya  
Purna (Dist. Parbhani) - 431511 (M.S.)



SHRI GURU BUDDHISWAMI SHIKSHAN PRASARAK SANSTHA'S  
**SHRI GURU BUDDHISWAMI MAHAVIDYALAYA, PURNA (Jn.)**

Pin - 431 511, Dist. Parbhani (M.S.) India.  
(Affiliated to Swami Ramanand Teerth Marathwada University, Nanded)  
Accredited with 'B' by NAAC and 2 (f) and 12 (B) under UGC Act 1956

Principal  
Dr. K.Rajkumar  
M. A., Ph.D.

Phone: (02452) 255213, 255205

Email- [sgbhpurna@yahoo.com](mailto:sgbhpurna@yahoo.com)

Ref:SRTMU/B.Sc. Pmc. EXAMS/Summer2018/

Date: 04/04/2018

**B.Sc. Practical Examination Movement Order**

To,

01. Shri/Smt. Shri Raut L.S. External Examiner  
Sant Tukaram College, Parbhani

02. Shri/Smt. Dr.Rakh R.R. Internal Examiner  
Shri Guru Buddhiswami College, Purna.

Subject: Practical Examination Summer-2018

Subject: Microbiology

Class: B.Sc. S.Y.

Paper No: X, XI and ESE (SECMB I & SECMB II)

Sir/ Madam,

As per S.R.T.M. University Instructions, I communicate here with the details of your assignment at the practical examination in summer 2018.

Examination	Center	Date of Commencement	Last Date of Examination	Time
B. Sc. II Year	Shri Guru Buddhiswami Mahavidyalaya, Purna (Jn.)	25/04/2018	26/04/2018	9.00 a.m. to 1.00 p.m. & 2.00p.m.to 6.00p.m.

**Instructions**

- 1) Examiners are requested to prepare mark list, submit sealed mark list and answer book bundle towards the principal of concern center.
- 2) If any near blood relative of the examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- 3) Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- 4) Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- 5) preparation day will be payable if examiners report the center one day before from the commencement of the practical examination for which only a D. A. will be payable.
- 6) Examiners are requested to attach the photo copy this order while submitting the remuneration and T. A., D. A. bills.

  
Principal



Principal

Copy to: 1. Director of Examination and Evaluation, S.R.T.M. University, Nanded  
2. Principal Sant Tukaram College, Parbhani.

  
Principal  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist.Parbhani.



## B.Sc. Practical Examination Movement Order

Ref: B. Sc. Practical Examination/Summer 2018-19/2366, dated 11.02.2019

To,

01. Dr. Ravindra R. Rakh  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna

External Examiner

02. Dr. S. R. Mukkawat  
Department of Microbiology,  
Sant Tukaram College of Arts and Science, Parbhani

External Examiner

Subject: Practical Examination summer -2019 in subject: Microbiology

Class B. Sc. III

Paper No. XVI, XVII & SEC

Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer- 2019.

EXAMINATION	CENTER	DATE OF COMMENCEMENT EXAMINATION	LAST DATE OF EXAMINATION	TIME OF EXAMINATION
B. Sc. III	Sant Tukaram College of Arts and Science, Parbhani	01.03.2019	02.03.2019	09:00 TO 01:00 & 02:00 TO 06:00

### INSTRUCTIONS

- Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
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- preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a D.A. will be payable
- Examiner are requested to attach the photo copy this order will submitting the remuneration and T.A.D.A. bills

Co-ordinator  
IQAD

Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani - 431011 (M.S.)



PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr.) Dist. Parbhani  
I/c Principal  
Sant Tukaram College of Arts & Science,  
Parbhani



## B.Sc. Practical Examination Movement Order

Ref: B. Sc. Practical Examination/Summer 2018-19/2366, dated 11.02.2019

To,

01. Dr. Ravindra R. Rakh  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna

External Examiner

02. Dr. Laxman S. Raut  
Department of Microbiology,  
Sant Tukaram College of Arts and Science, Parbhani

Internal Examiner

Subject: Practical Examination summer -2019 In subject: Microbiology

Class B. Sc. I

Paper No. V

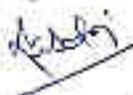
Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer- 2019.

EXAMINATION	CENTER	DATE OF COMMENCEMENT EXAMINATION	LAST DATE OF EXAMINATION	TIME OF EXAMINATION
B. Sc. I	Sant Tukaram College of Arts and Science, Parbhani	05.03.2019	06.03.2019	09:00 TO 01:00 & 02:00 TO 06:00

### INSTRUCTIONS

- 1) Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- 2) If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- 3) Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- 4) Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- 5) preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a D.A. will be payable
- 6) Examiner are requested to attach the photo copy this order will submitting the remuneration and T.A.D.A. bills

  
Co-ordinator  
ICAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr.) Dist. Parbhani - 431511 (M.S.)



  
Principal  
Sant Tukaram College of Arts & Science,  
Parbhani  
PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr.) Dist. Parbhani



**SHRI GURU BUDDHISWAMI SHIKSHAN PRASARAK SANSTHA'S  
SHRI GURU BUDDHISWAMI MAHAVIDYALAYA, PURNA (Jn.)**

Pin-431 511, Dist. Parbhani (Maharashtra)

(Affiliated to Swami Ramanand Teerth Marathwada University, Nanded)

Accredited with B by NAAC and 2 (f) and 12 (B) under UGC Act 1956

**Principal  
Dr. K.Rajkumar  
M. A., Ph.D.**

Phone: (02452) 255213, 255205

Email- [sgbmourna@yahoo.com](mailto:sgbmourna@yahoo.com)

SRTMU/B.Sc.Prac.EXAMS/Summer 2019

Date: 16/2/2019

**B.Sc.Practical Examination Movement Order**

TO,

Dr. L.S.Raut,

External Examiner

Sant Tukaram College, Parbhani.

Dr.R.R.Rakh

Internal Examiner

**Subject:** Practical Examination Summer 2019 in the subject: Microbiology

Sir/Madam,

As per S.R.T.M.University instructions, I communicate here with the details of your assignment at the practical examination in Summer 2019.

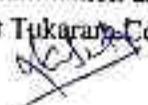
Examination	Center	Date of Commencement	Last date of Examination	Time
B.Sc.First Year	Shri Guru Buddhiswami Mahavidyalaya, Purna(Jn.)	07/03/2019	08/03/2019	9.00a.m. to 1.00 p.m.

**Instructions**

- 1) Examiners are requested to prepare marks list, submit marks list and answer book bundle towards the principal of concern center.
- 2) If any near blood relative of the examiner is examined for concerned subject then this appointment will be related as cancelled. Concerns are requested to communicate accordingly.
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Principal  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani

- Copy to: 1. Director of Examination and Evaluation, S.R.T.M. University, Nanded  
2. Principal, Sant Tukaram College, Parbhani

  
Co-ordinator  
IQAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani - 431511 (M.S.)



  
PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani

## 11. Isolation and Screening of *Bacillus* spp. for Microbiological Control of *Sclerotium Rolfsii* Sacc., A Stem Rot Pathogen of Groundnut

R. R. Rajh

Department of Microbiology, Sant Tukaram College of Arts and Science, Parbhani

L. S. Raut

Department of Microbiology, Shri Guru Buddhiswami Mahavidyalaya Purna (Jr.)

S. M. Dalvi

Department of Botany, Shri Guru Buddhiswami Mahavidyalaya, Purna (Jr.).

### Abstract

Stem rot is one of the most important disease of groundnut caused by *Sclerotium rolfsii* Sacc. which causes major crop losses. The present study was undertaken to search for the effective *Bacillus* spp. for microbiological control of *Sclerotium rolfsii* Sacc. 129 *Bacillus* spp. were isolated from different rhizospheric niches of healthy plants, and screened *in vitro* against *Sclerotium rolfsii*, by dual culture technique. Out of these *Bacillus* spp., *Bacillus* spp. 57 found effective in managing the phytopathogen by dual culture technique.

**Key words:** Groundnut, Stem rot, *Sclerotium rolfsii*, *Bacillus* spp.

### 1.0 Introduction

Stem rot caused by *Sclerotium rolfsii*, a broad host range fungus, is the major soil borne disease of groundnut (*Arachis hypogaea*). In India among the soil-borne fungal diseases of groundnut, stem rot caused by *S. rolfsii* is a potential threat to production and is of considerable economic significance for groundnut grown under irrigated conditions. Stem-rot caused by *S. rolfsii* is sporadic in most of the groundnut growing areas like Tamil Nadu, Andhra Pradesh, Karnataka (Pande, *et al.*, 2000).

The traditional agricultural practice to control the phytopathogen *S. rolfsii* is by using variety of fungicides e.g. Bavistin, Captan etc. but a severe disadvantage of the traditional method is that it is not effective to check the *Sclerotium* during the cropping period (90- 100 days) and is not eco-friendly. Because of the increased usage of chemical fungicides produced concern for the environment and human health, microbial inoculants have been experimented

PART - II Peer Reviewed Referral and UGC Listed

Co-ordinator  
IQAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr.) Dist. Parbhani - 431511 (M.S.)



PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr.) Dist. Parbhani



## IN VITRO ANTAGONISM OF *PSEUDOMONAS CF. MONTEILII* 9 AGAINST *FUSARIUM OXYSPORUM*, A CAUSATIVE AGENT OF *FUSARIUM* WILT DISEASE OF GROUNDNUT

R. R. Rakh<sup>1</sup>, L.S. Raut<sup>2</sup>, A. A. Atnoorkar<sup>1</sup> and S. M. Dalvi<sup>1</sup>

<sup>1</sup>Department of Microbiology, Shri Guru Buddhiswami Mahavidyalaya, Purna (Jn) (MS) - 431 511

<sup>2</sup>Department of Microbiology, Sant Tukaram College, Parbhani, (MS) - 431 401

<sup>3</sup>Department of Microbiology, Vni. Dhunda Maharaj Degloorkar College, Degloor Dist. Nanded

<sup>4</sup>Department of Botany, Shri Guru Buddhiswami Mahavidyalaya, Purna (Jn) (MS) - 431 511

Email: drrrrakh@gmail.com Mobile No.: 91 9545335680

Email: dalvisanjay777@rediffmail.com Mobile No.: 9921101210.

### ABSTRACT:

*Fusarium Wilt disease of groundnut is caused by Fusarium oxysporum Schlechtend. Emend Snyder & Hans., which leads to significant yield losses of crop. Control of fungal phytopathogens by using naturally occurring antagonistic microorganisms has been the focus of intense research throughout the world. This approach is popularly known as biological control of plant pathogens. Biological control is a bio-based, eco-friendly strategy which offers a practical and economical alternative for the management of plant pathogens with a potential to emerge as an alternative to chemical control. Pseudomonas spp. is one the candidate of the major fungal biocontrol agents found in the soil and the rhizosphere of various crop systems. 40 isolates of Pseudomonas were isolated from rhizosphere soil samples collected from various healthy ground nut - growing fields and were screened for in vitro antagonistic activity against F. oxysporum through dual culture technique. One isolate with promising antifungal activity against F. oxysporum was further identified through 16S rRNA sequencing as Pseudomonas cf. monteilii 9. Pseudomonas cf. monteilii 9 showed highest antagonism against F. oxysporum mycelia with the percentage inhibition up to 60.75%. The antifungal activities of Pseudomonas cf. monteilii 9 against F. oxysporum involved the secretion of volatile, non - volatile diffusible bioactive compounds, and siderophore.*

**KEYWORDS:** *Fusarium Wilt, Groundnut, Fusarium oxysporum, Pseudomonas cf. monteilii 9.*

### INTRODUCTION

Groundnut (*Arachis hypogaea* L.) crop is considered as most important crop in the World and is most important source of edible oil. Similarly, groundnut is ranked as 3<sup>rd</sup> most important source of vegetable protein in the world. Groundnut crop is prone to attack by many pathogens and to a much larger extent than many other crops. More than 100 pathogens, including viruses, have been reported to affect groundnut but only a few are economically important in India such as Leaf-spots (Tikka), Early leaf-spot (*Cercospora arachidicola*), Late leaf-spot (*C. Personatum*), Rust (*P. arachidis*), and aflatoxin contamination (*Aspergillus flavus* and *A. parasiticus*). The other diseases such as Collar rot (*A. niger*), *Fusarium wilt (Fusarium oxysporum)*, Stem-rot (*S. rolfsii*), Root-rot (*M. phaseolina*), Bud necrosis (tomato spotted wilt virus), Clump and peanut (groundnut) mottle disease are localized<sup>1</sup>.

*Fusarium oxysporum* is one of the most common soil fungi in cultivated soil all over the world. It includes a large diversity of strains, all saprophytic and most parasitic<sup>2</sup>. The wilt inducing strains of *F. oxysporum* cause a serious damage to many economically important agricultural crops<sup>3</sup>. *Fusarium* wilt pathogens are very host specific. Based on their host plant species and plant cultivars, there are more than 53 forms, 117 formae specialis and 29 varieties<sup>4</sup>. *Fusarium* wilt is one of the common disease of groundnut, caused by the fungus *Fusarium oxysporum* lead to significant yield losses. The pathogen infects the roots and colonizes the vascular tissue, leading to wilting and finally death of the plant<sup>5</sup>. The management of *Fusarium*



## B. Sc. Practical Examination Movement Order

Ref: B. Sc. Practical Examination/Summer 2018-19/2366, dated 11.02.2019

To,

**01. Dr. Ravindra R. Rakh**  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna

External Examiner

**02. Dr. Laxman S. Raut**  
Department of Microbiology,  
Sant Tukaram College of Arts and Science, Parbhani

Internal Examiner

**Subject: Practical Examination summer -2019 in subject: Microbiology**

**Class B. Sc. II**

**Paper No. X, XI & SEC**

Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer- 2019.

EXAMINATION	CENTER	DATE OF COMMENCEMENT EXAMINATION	LAST DATE OF EXAMINATION	TIME OF EXAMINATION
B. Sc. II	Sant Tukaram College of Arts and Science, Parbhani	13.04.2019	14.04.2019	09:00 TO 01:00 & 02:00 TO 05:00

### INSTRUCTIONS

- 1) Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- 2) If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled .concerns are requested to communicate accordingly.
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Co-ordinator  
IQAC

Sri Gura Buddhiswami Mahavidyalaya  
Purna (M.) Dist. Parbhani - 431511 (M.S.)





Principal

Sant Tukaram College Of Arts & Scie  
Parbhani



PRINCIPAL  
Sri Gura Buddhiswami Mahavidyalaya  
Purna (M.) Dist. Parbhani

**FOR SUSTAINABLE AGRICULTURE: ISOLATION AND SCREENING OF  
BACILLUS SPP. FOR MICROBIOLOGICAL CONTROL OF SCLEROTIUM  
ROLFSII SACC., A STEM ROT PATHOGEN OF GROUNDNUT**

**R. R. Rakh**

Department Of Microbiology, Shri Guru Buddhiswami Mahavidyalaya Purna (Jn.) – 431511

And

**L. S. Raut**

Department Of Microbiology, Sant Tukaram College Of Arts And Science, Parbhani – 431401

And

**S. M. Dalvi**

Department Of Botany, Shri Guru Buddhiswami Mahavidyalaya, Purna (Jn.) – 431511

**Abstract:**

*Sclerotium rolfsii* Sacc. is one of the most important pathogen of groundnut causing Stem rot disease which causes major crop losses. In present study, to search for the effective *Bacillus* spp. for microbiological control of *Sclerotium rolfsii* Sacc. 189 *Bacillus* spp. were isolated from different rhizospheric niches of healthy plants, and primarily screened for in vitro the antagonistic activity against *Sclerotium rolfsii*, by dual culture technique. Out of these *Bacillus* spp. 6, 15, 16, 18, 19, 20, 26, 29, 30, 31, 33, 34, 36, 37, 38, 39, 40, 41, 53 and 57 found effectively antagonistic against *Sclerotium rolfsii*, the stem rot pathogen of groundnut in vitro in contrast to other *Bacillus* spp. During the secondary screening, out of these Twenty *Bacillus* spp., only five *Bacillus* spp. i.e. *Bacillus* spp. 15, 16, 18, 36, and 53 found highly effective in controlling the phytopathogen, *Sclerotium rolfsii* in Vitro, in dual culture method. These *Bacillus* spp. 15, 16, 18, 36, and 53 effectively killing the growth of phytopathogen, *Sclerotium rolfsii* whose percent inhibition was 87.5, 92.30, 88.23, 80.55 and 78.37 respectively.

**Key words:** Groundnut, Stem rot, *Sclerotium rolfsii*, *Bacillus* spp.

**1.0 Introduction:**

*Sclerotium rolfsii*, a broad host range fungus, caused Stem rot, the major soilborne disease of groundnut (*Arachis hypogaea*). In India among the soil-borne fungal diseases of groundnut, stem rot caused by *S. rolfsii* is a potential threat to production and is of considerable economic significance for groundnut grown under irrigated conditions. Stem-rot caused by *S. rolfsii* is sporadic in most of the groundnut growing areas like Tamil Nadu, Andhra Pradesh, Karnataka (Pande, et al., 2000).

The traditional agricultural practice to control the phytopathogen *S. rolfsii* is by using variety of fungicides e.g. Bavistin, Captan etc. but a severe disadvantage of the traditional method is that it is not effective to check the *Sclerotium* during the growing period (90- 100 days) and is not eco-friendly. Because of the increased use of chemical fungicides produced congeners for the environment and human health, microbial inoculants have been experimented extensively during the last decade to



Principal  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani



**In Vitro Dominance of *Bacillus amyloliquefaciens* RRR15 for Microbiological Control of *Sclerotium rolfsii* Sacc., A Stem Rot Pathogen of Groundnut**

**R. R. RAKH<sup>†</sup> L. S. RAUT<sup>\*\*</sup> and S. M. DALVI<sup>†</sup>**

<sup>\*</sup> Department of Microbiology, Shri Guru Buddhiswami Mahavidyalaya Purna (Jn.) – 431511

<sup>\*\*</sup> Department of Microbiology, Sant Tukaram College of Arts and Science, Parbhani – 431401

<sup>†</sup> Department of Botany, Shri Guru Buddhiswami Mahavidyalaya, Purna (Jn.) – 431511

Email: [drrrakh@gmail.com](mailto:drrrakh@gmail.com)

Mobile no. - 9545335680

Email: [dalvisanjay777@rediffmail.com](mailto:dalvisanjay777@rediffmail.com)

**Abstract:**

Stem rot disease caused by *Sclerotium rolfsii* Sacc. is one of the most important disease of groundnut causing major crop losses. To pursue for the effective *Bacillus spp.* as microbiological control of *Sclerotium rolfsii* Sacc., 189 *Bacillus spp.* were isolated from different rhizospheric niches of healthy plants, and primarily screened *in vitro* for the antagonistic activity against *Sclerotium rolfsii*, by dual culture technique. During the primary screening, *Bacillus spp.* RRR15, found highly effective in killing the phytopathogen, *Sclerotium rolfsii in Vitro*. The *Bacillus spp.* RRR15, effectively slaughter the growth of phytopathogen, *Sclerotium rolfsii* whose percent inhibition recorded as 87.5. The *Bacillus spp.* RRR15 later identified as *Bacillus amyloliquefaciens* RRR15 by 16 S rRNA sequencing.

**Key words:** Groundnut, Stem rot, *Sclerotium rolfsii*, *Bacillus amyloliquefaciens* RRR15.

**1.0 Introduction:**

*Sclerotium rolfsii*, a broad host range fungus, caused Stem rot, the major soilborne disease of groundnut (*Arachis hypogaea*). In India among the soil-borne fungal diseases of groundnut, stem rot caused by *S. rolfsii* is a potential threat for groundnut grown under irrigated conditions. Stem rot caused by *S. rolfsii* is sporadic in most of the groundnut growing areas like Tamil Nadu, Andhra Pradesh, Karnataka (Pande, et al., 2000).

The traditional agricultural practice to control the phytopathogen *S. rolfsii* is by using variety of fungicides e.g. Bavistin, Captan etc. But a severe disadvantage of the traditional method is that it is not effective to check the *Sclerotium* during the cropping period (90- 100 days) and is

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Sanjivani Education Society's

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(Affiliated to Swami Ramanand Teerth Marathwada University, Nanded.)

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संजीवनी एज्युकेशन सोसायटीचे  
संत तुकाराम कला व विज्ञान महाविद्यालय

वसमत रोड, परभणी - ४३१ ४०१ (महाराष्ट्र)

(अनुबंधित स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठाशी, नानंद.)

[[उत्तराधिकारित २(फ) व १२(ब) द्वारे १९५६ [F-८-५३/२००२ (सीपी-१)]]

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Ref. No. strm/2019-20/ 1354

Date: 2/03/2020

**B. Sc. Practical/SEC Examination Movement Order**

Ref: B. Sc. Practical Examination/Summer 2019-20/2410, dated 29.02.2020

To,

01. Dr. R. R. RAKH

External Examiner

Department of microbiology

Shri Guru Buddhiswami Mahavidyalaya, Purna

02. Dr. L. S. Raut

Internal Examiner

Department of Microbiology

Sant Tukaram College of Arts and Science, Parbhani

Subject: Practical Examination summer -2020 in subject: Microbiology.

Paper No. V

Class: B. Sc. I

Sir/Madam,

I am to communicate herewith the details of your assignment at the practical examination in summer- 2020.

EXAMINATION	CENTER	DATE OF COMMENCEMENT EXAMINATION	LAST DATE OF EXAMINATION	TIME OF EXAMINATION
B. Sc. I	Sant Tukaram College of Arts and Science, Parbhani	17.03.2020	18.03.2020	09:00 TO 01:00

**INSTRUCTIONS**

- 1) Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- 2) If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. concerns are requested to communicate accordingly.
- 3) Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- 4) Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- 5) preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a D.A. will be payable
- 6) Examiner are requested to attach the photo copy this order will submitting the remuneration and T.A.D.A. bills

*[Signature]*

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IQAC

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Purna (Jn.) Dist. Parbhani



## Bacillus spp. for In-Vitro Microbiological Control of Sclerotium rolfsii Sacc., A Stem Rot Pathogen of Groundnut

R R Rakh<sup>1</sup>, L S Raut<sup>2</sup> and S M Dalvi<sup>3</sup>

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Received: 04 March 2020; Revised accepted: 12 April 2020

### ABSTRACT

*Sclerotium rolfsii* Sacc. is one of the most important soil borne pathogen of groundnut causing stem rot disease which causes critical crop losses in groundnut growing area. In first part of present research, stem rot pathogen of groundnut, *Sclerotium rolfsii*, was isolated from the infected groundnut plant part. In later part of research, to search for the effective *Bacillus* spp. for microbiological control of *Sclerotium rolfsii* Sacc. 189 *Bacillus* spp. were isolated from different rhizospheric niches of healthy plants, and primarily screened for *in vitro* the antagonistic activity against *Sclerotium rolfsii*, by dual culture technique. Out of these *Bacillus* spp. RRR6, RRR 15, RRR 16, RRR 18, RRR 19, RRR 20, RRR 26, RRR 29, RRR 30, RRR 31, RRR 33, RRR 34, RRR 36, RRR 37, RRR 38, RRR 39, RRR 40, RRR 41, RRR 53 and RRR 57 found effectively antagonistic against *Sclerotium rolfsii*, the stem rot pathogen of groundnut *in vitro* in contrast to other *Bacillus* spp. During the secondary screening, out of these twenty *Bacillus* spp., only four *Bacillus* spp. i.e. *Bacillus* spp. RRR 15, RRR 16, RRR 36, and RRR 53 found extremely active in controlling the phytopathogen, *Sclerotium rolfsii* *in vitro* in dual culture method. These *Bacillus* spp. RRR 15, RRR 16, RRR 36, and RRR 53 effectively killing the growth of phytopathogen, *Sclerotium rolfsii* whose percent inhibition was recorded as 87.5, 92.30, 80.55 and 78.37 respectively. These *Bacillus* spp. was later identified by 16S rRNA sequencing as *Bacillus* spp. RRR15 as *Bacillus amyloliquefaciens* RRR15 (MN744706), *Bacillus* spp. RRR16 as *Bacillus amyloliquefaciens* RRR16 (MN749517), *Bacillus* spp. RRR36 as *Bacillus mojavensis* RRR36 (MN749819) and *Bacillus* spp. RRR53 as *Bacillus mojavensis* RRR53 (MN788663) respectively.

**Key words:** Groundnut, Stem rot, *Sclerotium rolfsii*, *Bacillus* spp

*Sclerotium rolfsii*, a broad host range fungus, caused Stem rot, the major soil borne disease of groundnut (*Arachis hypogaea*). In India among the soil-borne fungal diseases of groundnut, stem rot caused by *S. rolfsii* is a potential threat to production and is of considerable economic significance for groundnut grown under irrigated conditions. Stem-rot caused by *S. rolfsii* is sporadic in most of the groundnut growing areas like Tamil Nadu, Andhra Pradesh, Karnataka (Pande *et al.* 2000). The traditional agricultural practice to control the phytopathogen *S. rolfsii* is

by using variety of fungicides e.g. Bavistin, Captan etc. but a severe disadvantage of the traditional method is that it is not effective to check the *Sclerotium* during the cropping period (90-100 days) and is not eco-friendly. Because of the increased usage of chemical fungicides produced concern for the environment and human health, microbial inoculants have been experimented extensively during the last decade to control wilt and other plant diseases (Siddiqui and Shakeel 2006, Chakraborty and Chatterjee 2008, Akhtar *et al.* 2010).

Biological control is an environment-friendly strategy to reduce crop damage caused by plant pathogens. Biological control of soil-borne pathogens with antagonistic bacteria and fungi has been intensively investigated (Paulitz *et al.* 1996). Antagonistic microorganisms from rhizosphere are ideal biocontrol agents, as the rhizospheric niches frontline defense for root against infection by

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## In vitro biocontrol scenarios of *Bacillus amyloliquefaciens* subsp. *amyloliquefaciens* strain RLS19 in response to *Alternaria macrospora*, an *Alternaria* leaf spot phytopathogen of Bt cotton

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### ARTICLE INFO

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### Key words:

*Alternaria macrospora*,  
Bt cotton,  
*Bacillus amyloliquefaciens* subsp.  
*amyloliquefaciens* strain RLS19,  
Non-volatile diffusible metabolites,  
Rhizosphere and Chitinase

### ABSTRACT

*Alternaria macrospora* (Zimm.) is most critical phytopathogen causing *Alternaria* leaf spot disease of transgenic cotton having regional, national, and international significance. In the present research work, *Bacillus amyloliquefaciens* subsp. *amyloliquefaciens* strain RLS19 previously isolated from rhizospheric niches of healthy of Bt cotton plant was screened against *A. macrospora* by dual culture technique. *Bacillus* sp. significantly killed the radial mycelial growth of *A. macrospora*, that is, 98.08%. On finding the mechanism, it was revealed that *B. amyloliquefaciens* subsp. *amyloliquefaciens* strain RLS19 produced diffusible non-volatile secondary metabolites, siderophore, and chitinase enzyme which make contributions to inhibit the mycelial growth of *A. macrospora* during dual culture screening. In addition, the gas chromatography-mass spectrometry evaluation of crude extract discovered the presence of three bioactive compounds specifically acetamide, *N*-methyl-*N*-(4-(3-hydroxypyrrolidinyl)-2-butynyl)-, pyrrolis[1,2-*a*] pyrazine-1,4-dione, hexahydro-, and 2,3-Piperazinedione, 3,6-bis(2-methylpropyl)- with the outstanding antimicrobial antibacterial and antifungal activity which contributed in the inhibition of *A. macrospora*.

### 1. INTRODUCTION

Economically cotton is most crucial cash crop cultivated in all of the cotton growing areas of India and different countries of the world. *Alternaria* leaf spot disease is worldwide in distribution and mentioned [1] a major constraint in cotton production. The bleached activity of *Alternaria macrospora* and *Alternaria alternate* results in the development of *Alternaria* leaf spot disease of cotton [2]. The transgenic and non-transgenic cotton hybrid varieties are equally susceptible to foliar diseases such as bacterial blight, *Alternaria* leaf spot, and gray mildew. Now a days in India, majority of the farmers cultivate Bt cotton instead of non-Bt cotton. This has created tremendous competitiveness in hybrid seed production as the production area for hybrid cotton has remained stagnant. In India, *Alternaria* leaf spot disease of cotton is common and reported variable percent disease incidence from South zones (10–35%), North zone (7.23–31.85%), and Central zone (9.66–31.30%). However, some environmental factors such as abiotic and biotic factors interfere the original productivity of crop. Among the biotic factors, several fungal

phytopathogens are responsible to cause different types of foliar diseases and serve as major constraints in crop production. The yield loss up to 33.07% was recorded due to *Alternaria* leaf spot of cotton [3]. Conventionally, the farmers use agrochemicals to protect the crop and increase the crop yield. The tremendous use of agrochemicals leads to develop pest resistance, kills beneficial microflora of soil as well as pollution of soil.

Considering the alarming situation of *Alternaria* leaf spot disease, to avoid yield losses and hazardous effect of agrochemicals, the plant pathologist diverted their research to find out the naturally occurring rhizospheric microflora as biological control agents. The biocontrol is a bio-based, eco-friendly approach which offers a realistic and cost-effective alternative to chemical control for the management of plant pathogens [4]. There are some evidences in which antagonistic bacteria and fungi used as biocontrol agents, such as *Trichoderma* sp. [5,6] *Pseudomonas* sp. [7,8], and *Bacillus* sp. [9–11] isolated from rhizosphere niches of different crop and found effective in controlling plant pathogens.

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## In Vitro Vetting for Phosphate Solubilizing Bacteria (PSB) from Healthy Plants Rhizospheric Niches

R. R. Rakh<sup>\*1</sup>, L. S. Raut<sup>2</sup> and S. M. Dalvi<sup>3</sup>

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### ABSTRACT

Soil samples from rhizospheric niches of Tur, Soya bean, Neem, Gram, Jowar and Bavanchya were collected in sterile polythene bags and brought to the laboratory. All the rhizospheric soil samples were tested for phosphate solubilizing bacteria on Pikovskaya agar by Serial Dilution Method. Among the soil samples tested, rhizospheric niches from the Soya bean displayed highest phosphate solubilizing bacteria, 114 than the other rhizospheric soil sample tested. The rhizospheric niches of Tur, Neem and Bavanchya demonstrated 47, 07, and 02 phosphate solubilizing bacteria. Among all the 170 phosphate solubilizing bacteria isolated from different rhizospheric niches, four isolates, SMD18, SMD36, SMD38 and SMD40 were found qualitatively produce more than 5 mm zone of solubilization on Pikovskaya's agar plates after 9 days incubation. Among the 4 bacterial isolates, two bacterial isolates, namely SMD 38 and SMD 40 when quantitatively analysed, showed maximum P solubilization on 7<sup>th</sup> day as 444 µg/ml and 421 µg/ml respectively in PKV broth supplemented with tri - calcium phosphate. While in comparison to these isolates, RRR18 and SMD36 isolates shown less phosphate solubilization as 109 and 400 respectively, when quantitatively analysed. By 16S rRNA sequencing and Phylogenetic analysis identified RRR18 as *Sporolactobacillus laevo-lacticus* RRR18, SMD36 as *Sporolactobacillus laevo-lacticus* SMD36, SMD38 as *Sporolactobacillus laevo-lacticus* SMD38 and SMD 40 as *Sporolactobacillus laevo-lacticus* SMD40.

**Key words:** Rhizospheric soil, Pikovskaya agar, Phosphate solubilizing bacteria

Phosphorous being one of the major growth-limiting macronutrients required for proper plant growth, particularly in tropical areas, due to its low availability in the soil [1-2]. Soluble Phosphorous plays an important role in virtually all major metabolic processes in plants including photosynthesis, energy transfer, signal transduction, macromolecular biosynthesis, and respiration [3]. Phosphorous also needed for the development of roots, strengthening the stalks and stems, formation of flowers and seeds, crop maturity and quality of crop, energy production, storage and transfer reactions, root growth, cell division and enlargement, N fixation in legumes, resistance to plant diseases [4], transformation of sugar to starch, and transporting of the genetic traits [5].

Although Phosphorous is abundant in soils in both inorganic and organic forms, it is the second most important macronutrient required by the plants, next to nitrogen as it is in an unavailable form for root uptake. The availability of soluble forms of Phosphorous for plants in the soils is limited

because of its fixation as insoluble phosphates of iron, aluminum, and calcium in the soil [6]. Soil Phosphorous dynamics is characterized by physicochemical (sorption-desorption) and biological (immobilization-mineralization) processes.

So, to cope up the requirement of Phosphorous, traditionally the soil phosphorus deficiency is addressed by the application of phosphorus fertilizers. However, the majority of the applied fertilizer phosphorus is not available to plants and the addition of inorganic fertilizers in excess of the amount that is commonly employed to overcome this effect can lead to environmental problems such as, groundwater contamination, waterway eutrophication and soil fertility depletion. Large amount of P applied as fertilizer enters in the soil as immobile pools through precipitation reaction with highly reactive Al<sup>3+</sup> and Fe<sup>3+</sup> in acidic, and Ca<sup>2+</sup> in calcareous or normal soils [7]. It is therefore of great interest to investigate management strategies that can improve phosphorus fertilization efficiency, increase crop yields and reduce environmental pollution caused by phosphorus loss from the soil.

Soil microorganisms enhance plant nutrient acquisition through a wide range of biological processes including the transformation of insoluble soil nutrients. Some are capable of solubilizing and mineralizing insoluble soil phosphorous for the growth of plants. Apart from chemical fertilization, microbial P-solubilization and mineralization is the only possible way to increase plant available phosphorous. In the natural environment numerous microorganisms in the soil and rhizosphere are effective at releasing phosphorus from insoluble

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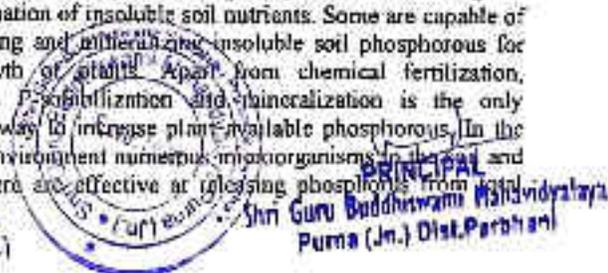
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Participants	Joined	Left	Duration
Dr. Ravindra Reosa	4-20-2021 16:48:34	4-20-2021 17:43:05	00:54:31
Apurva Deshmukh	4-20-2021 17:05:32	4-20-2021 17:43:05	00:37:33
Ashwini Makasare	4-20-2021 17:05:32	4-20-2021 17:05:33	00:00:01
Prakash Jamdhade	4-20-2021 17:05:32	4-20-2021 17:43:05	00:37:33
Prerana Kolhe	4-20-2021 17:05:32	4-20-2021 17:43:05	00:37:33
Priyanka Deshmane	4-20-2021 17:05:32	4-20-2021 17:43:05	00:37:33
shrdha Awchar	4-20-2021 17:05:32	4-20-2021 17:05:33	00:00:01
Presentation	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
AM SAM R	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Gayatri Salegaonkar	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Gyanoji Galkwad	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Mamta Solav	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
priyanka satpute	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Rupali Kadam	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Shubhangi Nadaska	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06
Supriya thorat	4-20-2021 17:42:59	4-20-2021 17:43:05	00:00:06

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# Daily Attendance Report for class-list: 2021-04-20

Show Attendance Summary

Class: class-list Meet ID: 909-9424-916 Date: 2021-04-20 Enlist Attend: 16/48 Start: 16:48 End: 17:43 Duration: 55 min

Sl. Name (Full Name)	16:48	17:00	17:12	17:24	17:36	17:48	18:00	18:12	18:24	18:36	18:48	19:00	19:12	19:24	19:36	19:48
Shraddha Awchar																
Priyanka Deshmukh																
Aparna Deshmukh																
Chyanya Gadekar																
Prakasa Jadhav																
Rajesh Kadam																
Prerna Kulkarni																
Ashwini Mahajan																
Shrithangi Nalavkar																
Ana Saha R.																
Dr. Savandha Rameshwar B.																
Gayatri Selagarkar																
Priyanka Satpute																
Mansi Soin																
Sapnya Thakur																

**Daily Attendance Legend:**

  The student was present.   The student was absent.   The student was late.   The student was excused.   The student was not present.   The student was not present.

The alternating background pattern indicates that the student was late and returned for Meet.  
 ✓ The student was marked present by the teacher (but did not show up in the Meet window).  
 The student missed the entire class.

*[Signature]*  
**Co-ordinator**  
**IGAB**

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Attendance for:	class-list	"Time"	"12:30"	"Meet ID:"	"File-yyyymm-dd-hh"	"# of Chats"	"Joined"	"Details"
Date:	"2021-04-21"	"Email"	"Comment"	"Arrival time"	"Last Seen"	"40"	"1"	
Names:	"2021-04-21"	"	"	"12:48"	"13:27"	"40"	"1"	
Ragini Agrawal	"✓"	"	"	"12:32"	"12:56"	"95"	"1"	
Shraddha Awchar	"✓"	"	"	"12:30"	"13:27"	"59"	"2"	"12:34 (54) 12:30 (5min)   12:34
Priva Bharose	"✓"	"	"	"	"	"	"	
Pooja Chavan	"✓"	"	"	"	"	"	"	
Priyanka Deshmane	"✓"	"	"	"	"	"	"	
Aparva Deshmukh	"✓"	"	"	"12:34"	"13:27"	"54"	"1"	
Manisha Dukere	"✓"	"	"	"	"	"	"	
Gyanooji Gaikwad	"✓"	"	"	"12:32"	"12:55"	"74"	"1"	
Vishal Gaikwad	"✓"	"	"	"12:31"	"13:27"	"57"	"1"	
Vatsinavi Jadhav	"✓"	"	"	"	"	"	"	
Prakash Jadhav	"✓"	"	"	"12:31"	"13:25"	"54"	"2"	"12:59   2   12:31 (27min)   12:57
Govind Jawale	"✓"	"	"	"	"	"	"	
Rupali Kadam	"✓"	"	"	"	"	"	"	
Aarti Kapse	"✓"	"	"	"12:31"	"13:27"	"41"	"4"	"13:27 (6min)   13:27   12:31 (2m) 12:33 (9m) 13:17   12:48 (30min)
Prerana Kollie	"✓"	"	"	"	"	"	"	
Ashwini Makasare	"✓"	"	"	"	"	"	"	
Shubhangi Narasakar	"✓"	"	"	"12:32"	"13:27"	"55"	"1"	
Shaikh Naushin	"✓"	"	"	"12:30"	"13:27"	"58"	"2"	"12:30 (18) 12:48 (40min)   13:27
Rutuja Puri	"✓"	"	"	"	"	"	"	
Ami Sam R	"✓"	"	"	"12:31"	"13:27"	"97"	"2"	"12:31 (5) 12:48 (40min)   13:27
Dr. Ravindra Raosaheb Raskh	"✓"	"	"	"12:30"	"13:27"	"58"	"1"	
Nikita Ranher	"✓"	"	"	"	"	"	"	
Gayatri Sailegaonkar	"✓"	"	"	"	"	"	"	
Priyanka Satpute	"✓"	"	"	"12:32"	"12:54"	"23"	"1"	
Dinesh Shelke	"✓"	"	"	"12:32"	"13:27"	"56"	"1"	
Neha Shinde	"✓"	"	"	"	"	"	"	
Mamita Solay	"✓"	"	"	"	"	"	"	
Supriya Thorat	"✓"	"	"	"12:30"	"13:27"	"58"	"1"	
Munja Vaidya	"✓"	"	"	"12:30"	"13:27"	"58"	"1"	
Ashwini Zade	"✓"	"	"	"	"	"	"	



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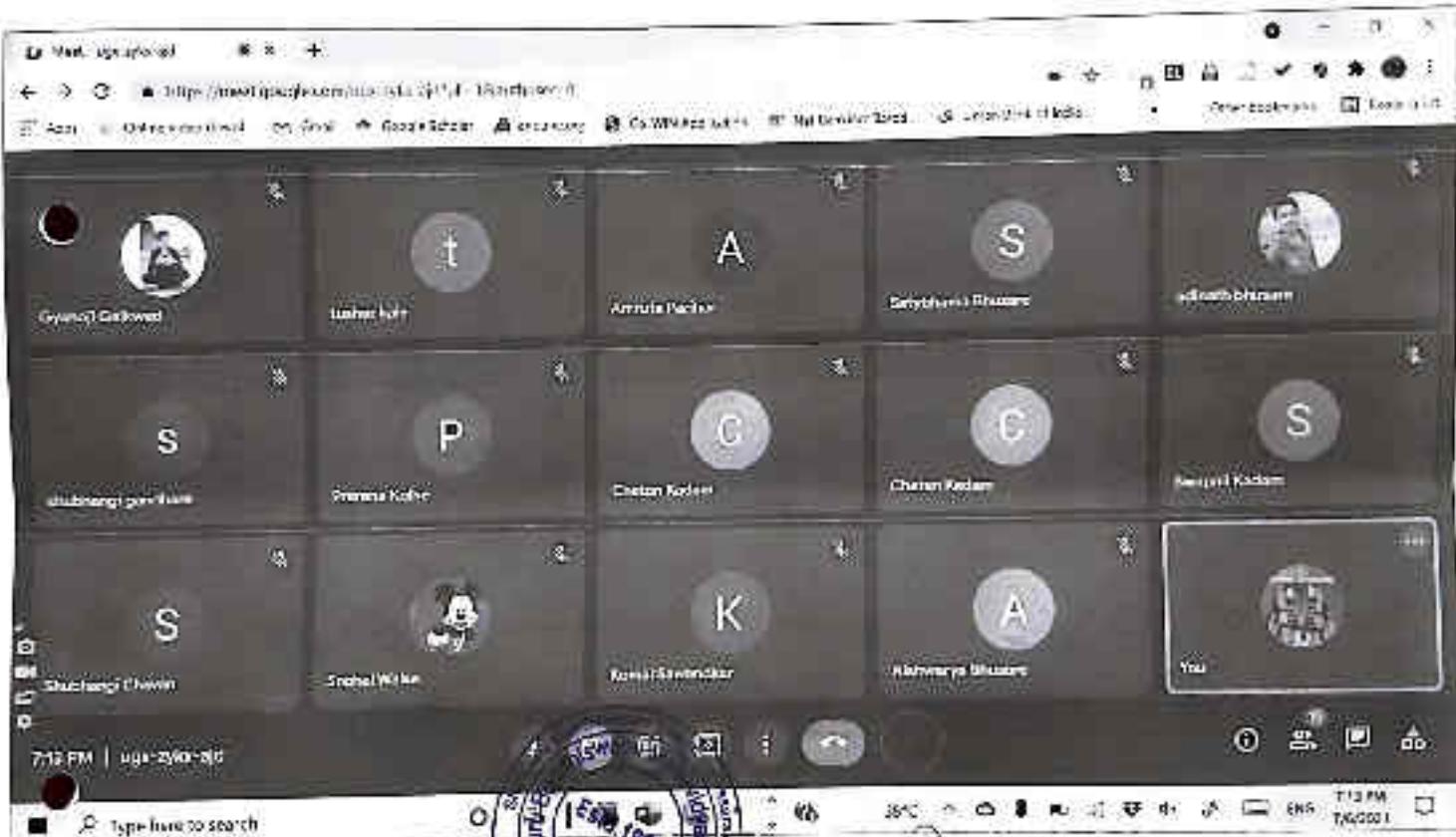
Help/more info: <https://tinyurl.com/y5pou3ak>  
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*Kabir*  
**Co-ordinator**  
**IQAC**  
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Purna (Jn) Dist. Parbhani - 431511 (M.S.)



*[Signature]*  
**PRINCIPAL**  
Shri Guru Buddhiswami Mahavidyalaya  
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*Sneha*  
**Co-ordinator**  
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*[Signature]*  
**PRINCIPAL**  
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Purna (Jn.) Dist. Parbhani

21



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**Co-ordinator  
IQAC**

**Shri Guru Buddhiswami Mahavidyalaya  
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Sanjivani Education Society's  
Sant Tukaram College Arts and Science,  
Basmat Road, Parbhani 431 401 (Maharashtra)



संजीवनी एज्युकेशन सोसायटीचे,  
संत तुकाराम कला व विज्ञान महाविद्यालय,  
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**Dr. P. V. Aher**

M. A. (Public Administration) Ph. D  
Incharge Principal  
Email: [stcpbn@gmail.com](mailto:stcpbn@gmail.com)

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Cell : 09373396401  
Web : [www.stcpbn.org](http://www.stcpbn.org)

Ref.

Date: 11 September 2021

To,

Dr. R. R. Rakh

Department of Microbiology.

S.B.G.M., Purna

Subject: **Thanksgiving Letter for your contribution as Subject Expert for the walk in interview dated 11.09.2021**

Dear Sir/Madam,

With reference to the above mentioned subject, I am grateful to you for your contribution as a **Subject expert** of Microbiology (subject) for the walk in interview of Assistant Professor on Clock Hour Basis (CHB) held on **11 September 2021 (Saturday)**.

Warmest thank you again and expect your kind co-operation in future as well.

Thanking you!

Co-ordinator  
IQAC

3rd Dom. Road, Purna, Dist. Parbhani-431401 (M.S.)  
T. No. 02452-248985



Yours **Principal**  
Sant Tukaram College of Arts & Science,  
Parbhani

PRINCIPAL

3rd Dom. Road, Purna, Dist. Parbhani

## Microbiological Management of Stem Rot Disease of Groundnut Caused by *Sclerotium rolfsii* Sacc., by Exploiting *Pseudomonas aeruginosa* AL98

Rakh R. R.<sup>1\*</sup>, S. M. Dalvi<sup>2</sup>, L. S. Raut<sup>3</sup> and A. V. Manwar<sup>4</sup>

Received: 13 Jan 2022 | Revised accepted: 01 Mar 2022 | Published online: 17 Mar 2022  
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### ABSTRACT

*Sclerotium rolfsii* Sacc. is one of the major phytopathogen of Groundnut causing stem rot disease, which was tough to control by conventional means by applying fungicides. Therefore, in the present investigation, an effort is being made to search for effective control measures in terms of biocontrol agent for the stem rot disease. In the present research, 58 *Pseudomonas* strains isolated from rhizospheric niches were screened for their biocontrol activity against *S. rolfsii* under *in vitro* conditions. One of the identified strain, *Pseudomonas aeruginosa* AL98 was selected for further studies because of its ability to content the mycelial growth of the pathogen significantly. During the *in vitro* dual culture study, the *Pseudomonas aeruginosa* AL98 repressed the growth of *Sclerotium rolfsii* up to 94.44% in comparison to control. When the mechanism behind the biocontrol revealed that *Pseudomonas aeruginosa* AL98 strain secreted Non-volatile diffusible metabolites, and volatile metabolites, which affects the growth of *Sclerotium rolfsii* in dual culture. While confirming the *in vitro* results, pot assay being conducted which shows decrease in the percent disease incidence of stem rot due to *Pseudomonas* treatment from 48.16 to 54.54%.

**Key words:** Groundnut, Rhizospheric niches, *Sclerotium rolfsii*, *Pseudomonas aeruginosa* AL98, Non-volatile diffusible metabolites, Volatile metabolites, Microbial control

Rhizospheric niches of plants is a good consortium where both kinds of microorganisms coexist i.e., phytopathogen and biocontrol agents. So, the rhizospheric niches of the plants serves as an excellent source for agents to control soil-borne plant pathogens. Various Bacterial species like *Bacillus*, *Pseudomonas*, *Serratia*, and *Arthrobacter* known to control the fungal diseases. Similarly, Bacteria present in the rhizospheric niches identified as plant growth-promoters as well as biocontrol strains which most often belong to the following genera: (i) *Bacillus* spp. [1-2], (ii) *Streptomyces* spp [3-5] and (iii) *Pseudomonas* [6-9] and *Trichoderma* spp. [10].

The *Pseudomonas* spp. very well recognized as superior biocontrol agent because of their adaptive metabolism and their ability to produce a wide range of antifungal compounds [11]. Examples of antifungal and secondary metabolites produced by *Pseudomonas* spp. include phenazines [12], 2,4-diacetylphloroglucinol [13], pyoluteorin [14], pyrrolizinin [15], cyclic lipopeptides [16], siderophores [17], volatile compounds [18], hydrolytic enzymes [19], and so on. Fluorescent pseudomonads, for example, *Pseudomonas aeruginosa* [20], *Pseudomonas putida* [21], and *Pseudomonas fluorescens* [22], are well-known to protect plants from fungal infections.

*Sclerotium rolfsii* Sacc is a soil-borne plant pathogen of worldwide importance with a very extensive host range including more than 500 plants species. Most *S. rolfsii* diseases have been reported on dicotyledonous hosts, but several monocotyledonous species are also being infected. *Sclerotium rolfsii* is especially severe on legumes, Solanaceous crops, cucurbits, and other vegetables grown in rotation with beans [23-24]. The traditional agricultural practice used to control the phytopathogen is by applying a wide variety of Fungicides e.g., Bavistin, Captaf, etc. but a severe disadvantage of the traditional approach is that it is not effective to check the cropping duration (90-100 days) and is not eco-friendly. Hence, an alternative approach has been made in the form of eco-friendly strategy for the control of *Sclerotium rolfsii*. This present research work mainly emphasises

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<sup>3</sup> Department of Microbiology, Sant Tukaram College, Parbhani - 431 401, Maharashtra, India

<sup>4</sup> Department of Microbiology, Dnyanesh College of Art's, Commerce and Science, Parbhani - 431 401, Maharashtra, India

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Purna (In) Dist. Parbhani

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Principal

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Fax: (02452) 254296

Email: sgbmpurna@yahoo.com

Ref: SGBMP/2021-22/ 533

Date: 13.05.2022

To  
The Principal,

Sri Tukaram College,  
Parbhani

Sub: Invitation for Participation in the Placement Recruitment Drive -ICICI Bank- Relation Manager, on 18<sup>th</sup> May 2022.

Dear Sir,

It gives us immense pleasure to inform you that the Career Guidance and Placement Cell of our College is going to conduct "Placement Recruitment Drive" for the Selection of Relation Manager in ICICI Bank on, 18<sup>th</sup> May 2022.

As a Partner-Institution, we hereby invite you to participate in the said Drive by sending your students.

The qualification and other details desired are:

1. Post: Relation Manager (Senior Officer).
2. Total vacancies: 400+
3. Package: 2.35 to 2.85 Lacs per annum.
4. Selection Process:
  - a) Essay Test
  - b) Interview
  - c) TAP Test (Aptitude test)
5. Eligibility criteria:
  - a) Any graduate (B.A./B.Sc./ B.Com etc)
  - b) Pass out students in the year 2019, 2020, 2021
  - c) Final year students of 2021-2022.
  - d) Minimum 50 % marks in 10<sup>th</sup>, 12<sup>th</sup>, and Graduation level
  - e) No education gap is allowed.
  - f) Age: 18-25 Years

Venue: Seminar Hall, Shri Gurubuddhiswami Mahavidyalaya, Purna.

(Dr. J. S. Palle)  
Coordinator

Career Guidance and Placement Cell

Principal  
Sri Tukaram College of Arts & Science,  
Parbhani

O/c  
Co-ordi  
IQAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn) Dist. Parbhani - 431511 (M.S.)



PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani



*Dr. Aher P.V.*

Tel. No. (0) 02452-248985

Fax : 02452-248646

I/C Principal

Mo. No. 9922870767

M.A., Ph.D. Pub. Adm.

E-mail: stcpbn@gmail.com,

Website: www.stcpbn.org

Ref: SRTMU/B. Sc. Practical Examination/summer 2022-23/143, dated 02.05.2022

Date: 13.05.2022

### B.Sc. Practical Examination Movement Order

To,

**01. Dr. Ravindra R. Rakh**  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna

External Examiner

**02. Mr. P.S. Pawar**  
Department of Microbiology,  
Sant Tukaram College of Arts and Science, Parbhani

Internal Examiner

**Subject: Practical Examination summer -2022 in subject Microbiology**

Class: B. Sc. II

Paper No.: X, XI and SEC I and II

Sir/Madam,

As per SRTMU Nanded Instructions, I communicate herewith the details of your assignment at the practical examination in summer- 2022.

Examination	Center	Date of commencement examination	Last date of examination	Time of examination
B. Sc. II	Sant Tukaram College of Arts and Science, Parbhani	23.05.2022	24.05.2022	09:00 to 01:00 & 02:00 to 06:00

#### INSTRUCTIONS

- Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concerned center.
- If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a T.A. will be payable.
- Examiners are requested to attach the photo copy this order with submitting the remuneration and T.A. D.A. bills.

*P.V. Aher*

02-05-2022  
IQAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani - 431511 (M.S.)



*[Signature]*  
PRINCIPAL  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani  
for [Signature]



**Dr. Aher P.V.**

V/C Principal  
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Mo. No. 9922870767

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Fax : 02452-248646

Website : www.stcpbn.org

Ref: SRTMU/B. Sc. Practical Examination/summer 2022-23/143, dated 02.05.2022

Date 13.05.2022

### B.Sc. Practical Examination Movement Order

To,

**01. Dr. Ravindra R. Rakh**  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna.

External Examiner

**02. Dr. Laxman S. Raut**  
Department of Microbiology,  
Sant Tukaram College of Arts and Science, Parbhani.

Internal Examiner

**Subject: Practical Examination summer -2022 in subject Microbiology**

Class B. Sc. I

Paper No. V

Sir/Madam,

As per SRTMU Nanded Instructions, I communicate herewith the details of your assignment at the practical examination in summer- 2022.

Examination	Center	Date of commencement examination	Last date of examination	Time of examination
B. Sc. I	Sant Tukaram College of Arts and Science, Parbhani	26.05.2022	27.05.2022	09:00 to 01:00

#### INSTRUCTIONS

- Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- Preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a D.A. will be payable
- Examiners are requested to attach the photo copy this order will be submitted for incrementation and T.A. D.A. bills

  
Co-ordinator  
IQAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani - 431511 (M.S.)



  
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Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jr) Dist. Parbhani  
Principal  
Sant Tukaram College of Arts & Science,  
Parbhani

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**संत तुकाराम कला व विज्ञान महाविद्यालय,**  
बसमत रोड परभणी - ४३१ ४०१ (महाराष्ट्र)

*Dr. After P.V.*

I/C Principal  
M.A., Ph.D. Pub. Adm.

Tel. No. (0) 02452-248985

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Website: www.stcpbn.org

Ref: SRTMU/B.Sc. Practical Examination/summer 2022-23/143, dated 02.05.2022

Date 13.05.2022

**B.Sc. Practical Examination Movement Order**

To,

01. Dr. Ravindra R. Rakh  
Department of Microbiology,  
S. G. B. Mahavidyalaya, Purna.

External Examiner

02. Dr. Anand A. Atnoorkar  
Department of Microbiology,  
Vai Dhunda Maharaj Deglurkar College, Degloor.

External Examiner

**Subject: Practical Examination summer -2022 in subject Microbiology**

**Class: B. Sc. III**

**Paper No.: XVI, XVII & SEC III and IV**

Sir/Madam,

As per SRTMU Nanded Instructions, I communicate herewith the details of your assignment at the practical examination in summer-2022.

Examination	Center	Date of commencement examination	Last date of examination	Time of examination
B. Sc. III	Sant Tukaram College of Arts and Science, Parbhani	28.05.2022	29.05.2022	09:00 to 01:00 & 02:00 to 06:00

**INSTRUCTIONS**

- Examiners are requested to prepare the mark list, submit the sealed mark list and answer book bundle towards the principal of concern center.
- If any near blood relative of examiner is examined for concerned subject then this appointment will be treated as cancelled. Concerns are requested to communicate accordingly.
- Examiners are requested to attend the practical examination center before one hour from the commencement of practical examination.
- Examiners are requested to communicate their acceptance to the center and university immediately after receipt of this order.
- preparation day will be payable if examiner reports the center one day before from the commencement of the practical examination for which only a D.A. will be payable.
- Examiners are requested to attach the photo copy this order will submitting the remuneration and T.A. D.A. bills.

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Co-Ord. IGAC  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani - 431511 (M.S.)



**PRINCIPAL**  
Shri Guru Buddhiswami Mahavidyalaya  
Purna (Jn.) Dist. Parbhani  
*Handwritten signature*  
**Principal**  
Sant Tukaram College of Arts & Science  
Parbhani