

Date: 10/12/2019

To,
The Principal
K. K. Wagh College of Agriculture,
Nashik

Subject Regarding permission for Certificate Course.....

Respected Sir,

On behalf of the Department of Plant Pathology, we humbly request permission to initiate a Certificate course titled **Biofertilizer Production Technology**. This course is scheduled from 15/12/2019 to 25/12/2019 and will involve approximately 39 Second -year students Especially for ELE EXTN 244. It is anticipated that this course will greatly benefit our students in enhancing their knowledge about advance techniques and practical skills in Production of Biofertilizer. We kindly ask for your approval for the implementation of this course.

Thanking You,

Yours faithfully,

permission granted

10/12



S. K. Sonawane
(Ms. S. K. Sonawane)
Course Coordinator



K. K. Wagh Education Society's

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(Affiliated to Mahatma Phule Krishi Vidyapeeth, Rahuri)

Saraswati Nagar, Panchavati, Nashik- 422 003. Maharashtra

College Code;11135

AISHE Code: C-50690

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Certificate course in

Biofertilizer Production Technology

Academic Year 2019-20

Syllabus Committee

| Sr no | Name of teacher | Designation | Department | Role in course |
|-------|--------------------|---------------------|-----------------|--------------------|
| 1 | Ms. S. K. Sonawane | Assistant Professor | Plant Pathology | Course coordinator |
| 2 | Dr. H. V. Deshmukh | Assistant Professor | Plant Pathology | Committee member |
| 3 | Ms. N. B. Bhoknal | Assistant Professor | Plant Pathology | Committee member |
| 4 | Miss S.D. Kharat | Technical Assitant | Plant Pathology | Committee member |

A. Sonawane
Course Coordinator



[Signature]
Principal
PRINCIPAL
K.K.Wagh College of Agriculture
Saraswatinagar, Panchavati, Nashik



Academic Year 2019-20
Department of Plant Pathology

Minutes of the Board of Studies Meeting for the Short-Term Certificate Course

A meeting of the Board of Studies for the Short-term Certificate Course in 'Biofertilizer Production Technology' was convened on 11/12/2019, at 12:00 PM in the Department of Plant Pathology. The meeting was attended by the following Syllabus Design Committee members:

| Sr no | Name of teacher | Designation | Sign |
|-------|--------------------|---------------------|------|
| 1 | Ms. S. K. Sonawane | Assistant Professor | |
| 2 | Dr. H. V. Deshmukh | Assistant Professor | |
| 3 | Ms. N. B. Bhoknal | Assistant Professor | |
| 4 | Miss S.D. Kharat | Technical Assitant | |

Minutes of Meeting

The Board of Studies convened a meeting on 11/12/2019, at 12:00 PM in the Department of Plant Pathology to discuss various aspects concerning the Short-Term Certificate Course in 'Biofertilizer Production Technology'. The meeting focused on the following key points:

- 1. Syllabus Formation:**
Members deliberated on developing a comprehensive syllabus emphasizing relevant knowledge and skills in biofertilizer production. The curriculum will cover the types of biofertilizers, the microorganisms involved, production techniques, and quality control.
- 2. Dissemination of Knowledge:**
Strategies for effectively teaching the fundamentals of biofertilizers, including microbial culture techniques and formulation methods, were discussed to aid students in the course.
- 3. Encouragement of Students:**
The meeting stressed the importance of offering guidance and motivation to students. Students will gain practical experience in isolating and cultivating beneficial microorganisms, producing biofertilizers, and understanding their application in sustainable agriculture. The course aims to equip students with the skills needed for entrepreneurship in biofertilizer production.
- 4. Examination of Short-Term Course:**
The examination structure and assessment methods for the short-term course were reviewed. The board explored ways to ensure fair and comprehensive evaluations that accurately assess students' understanding and practical skills.

The meeting concluded with a commitment to refining the course and its delivery methods to better meet the needs of students enrolled in the Certificate Course in 'Biofertilizer Production Technology'.

Course Coordinator



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Department of Plant Pathology
Certificate Course in 'Biofertilizer Production Technology'
Academic Year 2019-20


Syllabus Outcomes:

1. Gain an understanding of the historical and current perspectives on biofertilizer production.
2. Learn various methods for the production and application of biofertilizers.
3. Acquire knowledge about different types of microorganisms used in biofertilizers and their roles in plant growth.
4. Understand the processes involved in the isolation, identification, and maintenance of beneficial microorganisms.
5. Explore the methods for the production of different types of biofertilizers, including nitrogen-fixing, phosphate-solubilizing, and mycorrhizal biofertilizers.
6. Examine the commercial aspects and economic benefits of biofertilizer production.

| Sr no | Topic | Description | No of Lectures |
|--------------|--|--|-----------------|
| 1 | Introduction to Biofertilizers | Study the history, types, and importance of biofertilizers in sustainable agriculture. Discuss the benefits of using biofertilizers over chemical fertilizers. | 05 hours |
| 2 | Microbial Diversity in Biofertilizers | Understand the different types of microorganisms used in biofertilizers, including bacteria, fungi, and cyanobacteria. Learn about their roles in nutrient cycling and plant growth promotion. | 05 hours |
| 3 | Isolation and Culturing Techniques | Methods for isolating and culturing beneficial microorganisms from soil and plant roots. Learn to maintain pure cultures for biofertilizer production. | 05 hours |
| 4 | Production of Nitrogen-Fixing Biofertilizers | Techniques for the production of biofertilizers using nitrogen-fixing bacteria such as Rhizobium, Azospirillum, and Azotobacter. | 05 hours |
| 5 | Production of Phosphate-Solubilizing Biofertilizers | Methods for the production of phosphate-solubilizing biofertilizers using bacteria and fungi. Study the mechanisms of phosphate solubilization and its benefits. | 05 hours |
| 6 | Quality Control and Commercialization | Study the quality control measures, regulatory standards, and commercialization aspects of biofertilizers. Learn how to prepare a business plan and explore market opportunities. | 05 hours |
| Total | | | 30 hours |


Course Coordinator




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Date: 11/12/2019

Student Notice

All Second -year B.Sc. (Hons.) Agriculture students are informed that the Certificate Course on 'Biofertilizer Production Technology' for the academic year 2019-20 will be conducted from 15/12/2019 to 25/12/2019. Interested students should submit their names to the Certificate Course Coordinator, Ms. S. K. Sonawane, by 13/12/2019.

Duration: 30 hours

Dates: 15/12/2019 to 25/12/2019

Time:

- **Morning Session:** 09:00 AM to 10:00 AM
- **Afternoon Session:** 05:00 PM to 06:00 PM

Note: This course is free of cost for all students.

S. K. Sonawane
Course Coordinator



S. K. Sonawane
Principal

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Saraswati Nagar, Panchavati, Nashik



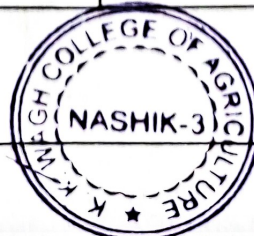
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Department of Plant pathology
Certificate course in
'Biofertilizer Production Technology'
Academic Year 2019-20

Enrolled Student List

| Sr. No. | Reg No. | Name of Student |
|---------|--------------|-----------------------------|
| 1 | AKN-2018/005 | Ate Nikhil Amardeep |
| 2 | AKN-2018/006 | Bachhav Prasad Dilip |
| 3 | AKN-2018/008 | Bagal Avinash Ramdas |
| 4 | AKN-2018/017 | Deokar Tejal Kishor |
| 5 | AKN-2018/018 | Desai Siddhesh Deepak |
| 6 | AKN-2018/019 | Deshmukh Rohit Kailas |
| 7 | AKN-2018/020 | Dhage Sachin Digambar |
| 8 | AKN-2018/022 | Dumbare Tejas Kailas |
| 9 | AKN-2018/023 | Gagare Prajwal Machindra |
| 10 | AKN-2018/027 | Gaikwad Vinit Vishnu |
| 11 | AKN-2018/033 | Gosavi Prashant Pandurang |
| 12 | AKN-2018/036 | Jadhav Kaustubh Manoj |
| 13 | AKN-2018/038 | Jagtap Akash Avinash |
| 14 | AKN-2018/040 | Kadam Vaibhav Jagdish |
| 15 | AKN-2018/041 | Kadoo Himanshu Shashikant |
| 16 | AKN-2018/043 | Kale Divya Chandrakant |
| 17 | AKN-2018/047 | Kapadnis Mahesh Jibhau |
| 18 | AKN-2018/049 | Karad Sandesh Tushar |
| 19 | AKN-2018/051 | Kathepuri Avinash Vikas |
| 20 | AKN-2018/053 | Kolhe Nayana Babasaheb |
| 21 | AKN-2018/054 | Kshirsagar Omkar Vishwanath |
| 22 | AKN-2018/055 | Kuwar Buddhahushan Sanjeev |





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| | | |
|----|--------------|-----------------------------|
| 23 | AKN-2018/057 | Mahajan Gaurav Eknath |
| 24 | AKN-2018/059 | Malpure Nikhil Vasudeo |
| 25 | AKN-2018/060 | Mamidwar Jagruti Vikas |
| 26 | AKN-2018/062 | Mane Vishal Balasaheb |
| 27 | AKN-2018/067 | More Kartik Vilas |
| 28 | AKN-2018/068 | More Sawari Pundalik |
| 29 | AKN-2018/069 | Nagare Rushikesh Sopan |
| 30 | AKN-2018/070 | Nagare Shubham Valmik |
| 31 | AKN-2018/071 | Nale Manoj Laxman |
| 32 | AKN-2018/075 | Nikumbh Dhananjay Vijaysing |
| 33 | AKN-2018/078 | Parase Ganesh Hanumant |
| 34 | AKN-2018/079 | Patil Bhumika Suryabhan |
| 35 | AKN-2018/080 | Patil Harshal Dipak |
| 36 | AKN-2018/081 | Patil Narayan Ramdas |
| 37 | AKN-2018/082 | Patil Omkar Vinod |
| 38 | AKN-2018/085 | Patil Pravin Balkrushna |
| 39 | AKN-2018/086 | Patil Rohan Rajendra |

A. K. Wagh
Course Coordinator



J. K. Wagh
Principal
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STUDENT REGISTRATION FORM

Academic Year: 2019-20
(Department of Plant Pathology)

CERTIFICATE COURSE

'Biofertilizer Production Technology'

For Department Use Only

Registration No.: A.K.N.-2018/033.....

| | | | | | | | |
|--|--|--|--|--|--|--|--|
| | | | | | | | |
|--|--|--|--|--|--|--|--|

Student ID: 0618021018

Name of the Student: Gosavi Prashant Pandurang.....

Mother's Name: Savita Pandurang Gosavi.....

Father's Name: Gosavi Pandurang Kashinath..... Year: 1st / 2nd / 3rd / 4th ✓

E-Mail ID: www.prashant.g.012604@gmail.com.....

Address: Teacher colony, Pathardi, Tal: Pathardi, Di → A. Nagar

State: Maharashtra..... PIN Code: 414102.....

Mobile No: 9657909819... Alternate contact number: 9834552488.....

Gender: Male

Female

Other

Religion: HINDU

Date of Birth: 26.10.2000.....

Educational Qualification (at the time of admission):

HSC 76%: 15%: Other


Signature of Student

Place: Nashik

Date:



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Department of Plant pathology
Certificate course in
'Biofertilizer Production Technology'
Academic Year 2019-20
Schedule of the course

| Sr no | Topic | Description | Name of the teacher | Department |
|-------|--|--|---------------------|-----------------|
| 1 | Introduction to Biofertilizers | Study the history, types, and importance of biofertilizers in sustainable agriculture. Discuss the benefits of using biofertilizers over chemical fertilizers. | Ms. S. K. Sonawane | Plant Pathology |
| 2 | Microbial Diversity in Biofertilizers | Understand the different types of microorganisms used in biofertilizers, including bacteria, fungi, and cyanobacteria. Learn about their roles in nutrient cycling and plant growth promotion. | Dr. H. V. Deshmukh | Plant Pathology |
| 3 | Isolation and Culturing Techniques | Methods for isolating and culturing beneficial microorganisms from soil and plant roots. Learn to maintain pure cultures for biofertilizer production. | Ms. N. B. Bhoknal | Plant Pathology |
| 4 | Production of Nitrogen-Fixing Biofertilizers | Techniques for the production of biofertilizers using nitrogen-fixing bacteria such as Rhizobium, Azospirillum, and Azotobacter. | Ms. N. B. Bhoknal | Plant Pathology |
| 5 | Production of Phosphate-Solubilizing Biofertilizers | Methods for the production of phosphate-solubilizing biofertilizers using bacteria and fungi. Study the mechanisms of phosphate solubilization and its benefits. | Miss S.D. Kharat | Plant Pathology |
| 6 | Quality Control and Commercialization | Study the quality control measures, regulatory standards, and commercialization aspects of biofertilizers. Learn how to prepare a business plan and explore market opportunities. | Ms. S. K. Sonawane | Plant Pathology |


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Department of Plant Pathology
Certificate course in
Bio fertilizer Production Technology
Academic Year 2019-20
Time Table

| Sr. No | Date | Time | | Topic |
|--------|------------|-------------------|---------------------|---|
| | | | | |
| 1 | 15/12/2019 | 10.00 am-01.00 pm | 02.00 pm - 05.00 pm | Introduction to Biofertilizers |
| 2 | 16/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Introduction to Biofertilizers |
| 3 | 17/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Microbial Diversity in Biofertilizers |
| 4 | 18/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Production of Nitrogen-Fixing Biofertilizers |
| 5 | 19/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Production of Nitrogen-Fixing Biofertilizers |
| 6 | 20/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Production of Phosphate-Solubilizing Biofertilizers |
| 7 | 21/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Production of Phosphate-Solubilizing Biofertilizers |
| 8 | 22/12/2019 | 10.00 am-01.00 pm | 02.00 pm - 05.00 pm | Isolation and Culturing Techniques |
| 9 | 23/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Quality Control and Commercialization |
| 10 | 24/12/2019 | 9.00 am-10.00 am | 05.00 pm - 06.00 pm | Quality Control and Commercialization |
| 11 | 25/12/2019 | 10.00 am-12.00 am | - | Quality Control and Commercialization |
| | 25/12/2019 | - | 01.00 pm-03.00 pm | Exam |


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| | | | | | | | | | | | | | |
|----|--------------|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 19 | AKN-2018/051 | Kathepuri Avinash Vikas | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 20 | AKN-2018/053 | Kolhe Nayana Babasaheb | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 21 | AKN-2018/054 | Kshirsagar Omkar Vishwanath | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar | Komkar |
| 22 | AKN-2018/055 | Kuwar Buddhabhushan Sanjeev | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar | Zuwar |
| 23 | AKN-2018/057 | Mahajan Gaurav Eknath | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan | Gomhajan |
| 24 | AKN-2018/059 | Malpure Nikhil Vasudeo | malpure | malpure | malpure | malpure | malpure | malpure | malpure | malpure | malpure | malpure | malpure |
| 25 | AKN-2018/060 | Mamidwar Jagruti Vikas | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar | Juwar |
| 26 | AKN-2018/062 | Mane Vishal Balasaheb | vishal | vishal | vishal | vishal | vishal | vishal | vishal | vishal | vishal | vishal | vishal |
| 27 | AKN-2018/067 | More Kartik Vilas | kmare | kmare | kmare | kmare | kmare | kmare | kmare | kmare | kmare | kmare | kmare |
| 28 | AKN-2018/068 | More Sawari Pundalik | smore | smore | smore | smore | smore | smore | smore | smore | smore | smore | smore |
| 29 | AKN-2018/069 | Nagare Rushikesh Sopan | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 30 | AKN-2018/070 | Nagare Shubham Valmik | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 31 | AKN-2018/071 | Nale Manoj Laxman | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 32 | AKN-2018/075 | Nikumbh Dhananjay Vijaysing | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN | AKN |
| 33 | AKN-2018/078 | Parase Ganesh Hanumant | Parase | Parase | Parase | Parase | Parase | Parase | Parase | Parase | Parase | Parase | Parase |
| 34 | AKN-2018/079 | Patil Bhumika Suryabhan | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil |
| 35 | AKN-2018/080 | Patil Harshal Dipak | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal | Harshal |
| 36 | AKN-2018/081 | Patil Narayan Ramdas | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan | Narayan |
| 37 | AKN-2018/082 | Patil Omkar Vinod | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar | Omkar |
| 38 | AKN-2018/085 | Patil Pravin Balkrushna | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil |
| 39 | AKN-2018/086 | Patil Rohan Rajendra | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil | Patil |

Course Coordinator

Principal

| | | | | | | | | | | | | |
|-----|--------------|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|
| 20. | AKN-2018/053 | Kolhe Nayana Babasaheb | KK | KK | KK | KK | KK | KK | KK | KK | KK | |
| 21. | AKN-2018/054 | Kshirsagar Omkar Vishwanath | Komkr | Komkr | Komkr | Komkr | Komkr | Komkr | Komkr | Komkr | Komkr | |
| 22. | AKN-2018/055 | Kuwar Buddhhabhushan Sanjeev | JKW | JKW | JKW | JKW | JKW | JKW | JKW | JKW | JKW | |
| 23. | AKN-2018/057 | Mahajan Gaurav Eknath | Gmkr | Gmkr | Gmkr | Gmkr | Gmkr | Gmkr | Gmkr | Gmkr | Gmkr | |
| 24. | AKN-2018/059 | Malpure Nikhil Vasudeo | Mlkr | Mlkr | Mlkr | Mlkr | Mlkr | Mlkr | Mlkr | Mlkr | Mlkr | |
| 25. | AKN-2018/060 | Mamidwar Jagruti Vikas | JW | JW | JW | JW | JW | JW | JW | JW | JW | |
| 26. | AKN-2018/062 | Mane Vishal Balasaheb | Vlkr | Vlkr | Vlkr | Vlkr | Vlkr | Vlkr | Vlkr | Vlkr | Vlkr | |
| 27. | AKN-2018/067 | More Kartik Vilas | Kmox | Kmox | Kmox | Kmox | Kmox | Kmox | Kmox | Kmox | Kmox | |
| 28. | AKN-2018/068 | More Sawari Pundalik | Smox | Smox | Smox | Smox | Smox | Smox | Smox | Smox | Smox | |
| 29. | AKN-2018/069 | Nagare Rushikesh Sopan | Rn | Rn | Rn | Rn | Rn | Rn | Rn | Rn | Rn | K |
| 30. | AKN-2018/070 | Nagare Shubham Valmik | NS | NS | NS | NS | NS | NS | NS | NS | NS | |
| 31. | AKN-2018/071 | Nale Manoj Laxman | NL | NL | NL | NL | NL | NL | NL | NL | NL | |
| 32. | AKN-2018/075 | Nikumbh Dhananjay Vijaysing | NK | NK | NK | NK | NK | NK | NK | NK | NK | |
| 33. | AKN-2018/078 | Parase Ganesh Hanumant | Pg | Pg | Pg | Pg | Pg | Pg | Pg | Pg | Pg | |
| 34. | AKN-2018/079 | Patil Bhumika Suryabhan | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | |
| 35. | AKN-2018/080 | Patil Harshal Dipak | Hd | Hd | Hd | Hd | A | Hd | Hd | Hd | Hd | |
| 36. | AKN-2018/081 | Patil Narayan Ramdas | Npat | Npat | Npat | Npat | Npat | Npat | Npat | Npat | Npat | |
| 37. | AKN-2018/082 | Patil Omkar Vinod | Opad | Opad | Opad | Opad | Opad | Opad | Opad | Opad | Opad | |
| 38. | AKN-2018/085 | Patil Pravin Balkrushna | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | Ppat | |
| 39. | AKN-2018/086 | Patil Rohan Rajendra | Rpat | Rpat | Rpat | Rpat | Rpat | Rpat | Rpat | Rpat | Rpat | |

Course Coordinator

Principal



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Department of Plant Pathology
Certificate course in
Biofertilizer Production Technology
Academic Year 2019-20

Examination Methodology


| Sr no | Nature of exam | Marks |
|-------|----------------|-------|
| 1 | Written | 30 |
| 2 | Practical | 20 |
| 3 | Total | 50 |

Reference:

- The Role of Microorganisms in Sustainable Agriculture**
T.K. Choudhury, S.P. Datta, and S. Swarup, *Biofertilizers: Types and Applications*.
Available from: http://agritech.tnau.ac.in/sustainable_agri/biofertilizer.html
- The Functionality of Nitrogen-Fixing Bacteria**
Rajan Singh Jolly, *Nitrogen Fixation and Biofertilizers* [Updated 2017 October 27]:
Available from: <https://caloriebee.com/nutrition/Nitrogen-Fixation-and-Biofertilizers>
- Phosphate-Solubilizing Microorganisms in Agriculture**
Role of Phosphate-Solubilizing Bacteria in Enhancing Plant Growth: Available from:
<https://www.phosphatesolubilizers.org>
- USDA, United States Department of Agriculture, Agricultural Research Service**
Biofertilizer Use and Management [Release 2018 April]: Available from:
<https://ndb.nal.usda.gov/ndb/foods/show/11260?fgcd=&manu=&format=Full&count=&max=25&offset=2600&sort=ndb&order=asc&qlookup=&ds=&qt=&qp=&qa=&qn=&q=&ing=>
- Wikipedia, The Free Encyclopedia**
Azospirillum [edited 2018 November 8]: Available from:
<https://en.wikipedia.org/wiki/Azospirillum>
- ICAR – Indian Council of Agricultural Research**
Directorate of Biofertilizer Research, Techniques and Applications [Printed: 2008, 1000 Copies]: Available from:
http://icarbiofertilizer.org/Techniques_Applications.pdf


Course Coordinator




Principal
PRINCIPAL
K. K. Wagh College of Agriculture
Saraswatinagar, Panchavati, Nashik



K. K. Wagh Education Society's
K. K. Wagh College of Agriculture,
(Affiliated to Mahatma PhuleKrishiVidyapeeth, Rahuri)
Saraswati Nagar, Panchavati, Nashik- 422 003. Maharashtra
College Code;11135 AISHE Code: C-50690

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Department of Plant Pathology

Certificate course in
Biofertilizer Production Technology
Academic Year 2019-20

Student Result

| Sr. No. | Registration no | Name of the students | Theory marks (30) | Practical Marks (20) | Mark Out of Total 50 |
|---------|-----------------|-----------------------------|-------------------|----------------------|----------------------|
| 1. | AKN-2018/005 | Ate Nikhil Amardeep | 26 | 17 | 43 |
| 2. | AKN-2018/006 | Bachhav Prasad Dilip | 25 | 18 | 43 |
| 3. | AKN-2018/008 | Bagal Avinash Ramdas | 28 | 18 | 46 |
| 4. | AKN-2018/017 | Deokar Tejal Kishor | 29 | 16 | 45 |
| 5. | AKN-2018/018 | Desai Siddhesh Deepak | 27 | 17 | 44 |
| 6. | AKN-2018/019 | Deshmukh Rohit Kailas | 26 | 18 | 44 |
| 7. | AKN-2018/020 | Dhage Sachin Digambar | 28 | 18 | 46 |
| 8. | AKN-2018/022 | Dumbare Tejas Kailas | 27 | 18 | 45 |
| 9. | AKN-2018/023 | Gagare Prajwal Machindra | 29 | 17 | 46 |
| 10. | AKN-2018/027 | Gaikwad Vinit Vishnu | 28 | 18 | 46 |
| 11. | AKN-2018/033 | Gosavi Prashant Pandurang | 30 | 18 | 48 |
| 12. | AKN-2018/036 | Jadhav Kaustubh Manoj | 28 | 18 | 46 |
| 13. | AKN-2018/038 | Jagtap Akash Avinash | 28 | 19 | 47 |
| 14. | AKN-2018/040 | Kadam Vaibhav Jagdish | 30 | 17 | 47 |
| 15. | AKN-2018/041 | Kadoo Himanshu Shashikant | 29 | 19 | 48 |
| 16. | AKN-2018/043 | Kale Divya Chandrakant | 27 | 17 | 44 |
| 17. | AKN-2018/047 | Kapadnis Mahesh Jibhau | 28 | 18 | 46 |
| 18. | AKN-2018/049 | Karad Sandesh Tushar | 29 | 17 | 46 |
| 19. | AKN-2018/051 | Kathepuri Avinash Vikas | 29 | 18 | 47 |
| 20. | AKN-2018/053 | Kolhe Nayana Babasaheb | 29 | 19 | 48 |
| 21. | AKN-2018/054 | Kshirsagar Omkar Vishwanath | 28 | 17 | 45 |
| 22. | AKN-2018/055 | Kuwar Buddhahushan Sanjeev | 28 | 18 | 46 |
| 23. | AKN-2018/057 | Mahajan Gaurav Eknath | 28 | 18 | 46 |





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| | | | | | |
|-----|--------------|-----------------------------|----|----|----|
| 24. | AKN-2018/059 | Malpure Nikhil Vasudeo | 28 | 19 | 47 |
| 25. | AKN-2018/060 | Mamidwar Jagruti Vikas | 28 | 19 | 47 |
| 26. | AKN-2018/062 | Mane Vishal Balasaheb | 26 | 17 | 43 |
| 27. | AKN-2018/067 | More Kartik Vilas | 28 | 19 | 47 |
| 28. | AKN-2018/068 | More Sawari Pundalik | 29 | 20 | 49 |
| 29. | AKN-2018/069 | Nagare Rushikesh Sopan | 26 | 17 | 43 |
| 30. | AKN-2018/070 | Nagare Shubham Valmik | 27 | 18 | 46 |
| 31. | AKN-2018/071 | Nale Manoj Laxman | 28 | 19 | 47 |
| 32. | AKN-2018/075 | Nikumbh Dhananjay Vijaysing | 27 | 18 | 46 |
| 33. | AKN-2018/078 | Parase Ganesh Hanumant | 27 | 18 | 46 |
| 34. | AKN-2018/079 | Patil Bhumika Suryabhan | 26 | 17 | 43 |
| 35. | AKN-2018/080 | Patil Harshal Dipak | 29 | 17 | 43 |
| 36. | AKN-2018/081 | Patil Narayan Ramdas | 28 | 19 | 47 |
| 37. | AKN-2018/082 | Patil Omkar Vinod | 27 | 18 | 46 |
| 38. | AKN-2018/085 | Patil Pravin Balkrushna | 28 | 19 | 47 |
| 39. | AKN-2018/086 | Patil Rohan Rajendra | 27 | 18 | 46 |


Course Coordinator




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Saraswatinagar, Panchavati, Nashik

K. K. Wagh College of Agriculture, Nashik
Department of Plant Pathology
 Certificate course in : **Mushroom Production Technology**
 Academic Year 2022-23

THEORY EXAMINATION

| | | | |
|------------------|--|------------------|--|
| Class: | | Semester : | |
| Day & Date: | | Time: | |
| Subject: | | Marks: | |
| Name of student: | | Registration no: | |

Multiple Choice Questions

| | |
|---|--------------------|
| Q.1.....media is used for isolation of PSB. | |
| a) Jensen's | c) Pikovaskayas |
| b) Fogg's | d) Carrot agar |
| | |
| Q. 2. Which of the following media is used for isolating Azotobacter? | |
| a) CRYEMA | c) Alexandrov agar |
| b) Jensen's | d) Both B and C |
| | |
| Q. 3. Congo red is used in isolation of..... | |
| a) Acetobacter | c) Azospirillum |
| b) Rhizobium | d) None of these |
| | |
| Q. 4. Direct dry heat is the principle of..... | |
| a) Hot air oven | c) Autoclave |
| b) Spirit lamp | d) Both A and B |
| | |

| | |
|--|--------------------------------|
| Q. 5 Glasswares are sterilized in | |
| a) Autoclave | c) Laminar air flow |
| b) Hot air oven | d) BOD incubator |
| Q. 6. Autoclave is used for sterilization of..... | |
| a) Soil | c) Glasswares |
| b) Media | d) Both A and B |
| Q. 7. Agar agar is obtained from..... | |
| a) Gelidium spp | c) Sea weed |
| b) Red algae | d) All of the above |
| Q. 8. Culture plates of microbes are kept in.....for growth. | |
| a) BOD incubator | c) Laminar air flow |
| b) Refrigerator | d) Oven |
| Q.9. Laminar air flow is used for..... | |
| a) Pouring media into petriplates | c) Both A and B |
| b) Isolation of microbes | d) Sterilization of glasswares |
| Q. 10. BGA is used incrop. | |
| a) Paddy | c) Azospirillum |
| b) Rhizobium | d) Acetobacter |

| | |
|--|-------------------------------------|
| Q. 11. In Sugar containing crops biofertilizer is used. | |
| a) Azotobacter | c) Rhizobium |
| b) Acetobacter | d) BGA |
| Q. 12. Cellulose agar media is used for..... | |
| a) Azotobacter | c) Organic matter decomposer |
| b) PSB | d) Sulphur oxidising microbes |
| Q. 13.% calcium carbonate is added with carrier for solid biofertilizer Production. | |
| a) 5 | c) 1 |
| b) 2 | d) 3 |
| Q. 14. Carrier used for solid biofertilizer Production havingmesh size. | |
| a) 250-300 | c) 100-150 |
| b) 200-250 | d) Both A and B |
| Q. 15. Thickness of biofertilizer packing bag is..... | |
| a) 0.2mm | c) 0.6mm |
| b) 0.5mm | d) 0.4mm |
| Q. 16.is Sulphur oxidising bacteria | |
| a) Clostridium | c) Bacillus subtilis |
| b) Thiobacillus thiooxidans | d) Azotobacter spp. |

Q. 17.fixes atmospheric nitrogen freely i.e. non-symbiotically.

a) *Azotobacter*

c) *Azolla*

b) *Rhizobium*

d) *Bacillus subtilis*

Q.18 *Azolla* is used as biofertilizer as it has.....

a) *Rhizobium*

c) *Mycorrhiza*

b) *Cyanobacteria*

d) large quantity of humus

Q.19 *Azolla* as biofertilizer increases the yield of rice fields by....

a) 10%

c) 30%

b) 20%

d) 50%

Q.20 The biofertilizers are.....

a) Cowdung and farm wastes

c) Quick growing crop ploughed under soil

b) *Azolla* and BGA

d) All of these

Q.21 A good example of biofertilizer which improves phosphorous uptake is

a) *Azospirillum*

c) Actinomycetes

b) *Rhizobium*

d) All of these

Q.22 A free living nitrogen fixing bacterium is

(a) *Clostridium*

(c) *Rhizobium*

(b) *Azotobacter*

(d) Both A and B

Q.23 Aquatic fern which is an excellent biofertilizer

(a) Salvinia

(c) Marsilea

(b) Azolla

(d) Pteridium

Q.24 Bacterial fertilizer is

(a) Anabaena

(c) Rhizobium

(b) Nostoc

(d) Phycomyces

Q.25 Biofertilizers include

(a) Cowdung manure and farmyard waste

(c) BGA / Anabaena and Azolla

(b) A quick growing crop ploughed back

(d) All the above

Q.26 Leaves of plant used as biofertilizer belong to

(a) Hibiscus

(c) Anabaena

(b) Mango

(d) Azolla

Q.27 Main sources of biofertilizers are

(a) Bacteria

(c) Fungi

(b) Cyanobacteria

(d) All the above

Q.28 Most famous nitrogen fixing bacterium / biofertilizer is

(a) Nitrobacter

(c) Nitrococcus

(b) Nitrosomonas

(d) Rhizobium

Q.29 Most suitable fertilizer of paddy fields is

(a) Mycorrhiza

(c) Symbiotic and nonsymbiotic cyanobacteria

(b) Azotobacter and clostridium

(d) Rhizobium

Q.30 Rhizobium enters the plant through

a) Leaf

c) Flower

b) Stem

d) Root hair



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Department of Plant Pathology
Certificate course in
Biofertilizer Production Technology
Academic Year 2019-20
Exam Block Report

Class- Final Year Date- 25/12/2019

Subject: Theory Paper of Bio fertilizer Production Technology course
Block no: 02

| Sr no | Registration no | Name of student | Sign |
|-------|-----------------|-----------------------------|----------|
| 1. | AKN-2018/005 | Ate Nikhil Amardeep | Nikate |
| 2. | AKN-2018/006 | Bachhav Prasad Dilip | Prasad |
| 3. | AKN-2018/008 | Bagal Avinash Ramdas | Bagal |
| 4. | AKN-2018/017 | Deokar Tejal Kishor | Tejal |
| 5. | AKN-2018/018 | Desai Siddhesh Deepak | Siddesh |
| 6. | AKN-2018/019 | Deshmukh Rohit Kailas | Rohit |
| 7. | AKN-2018/020 | Dhage Sachin Digambar | Sachin |
| 8. | AKN-2018/022 | Dumbare Tejas Kailas | Tejas |
| 9. | AKN-2018/023 | Gagare Prajwal Machindra | Prajwal |
| 10. | AKN-2018/027 | Gaikwad Vinit Vishnu | Vinit |
| 11. | AKN-2018/033 | Gosavi Prashant Pandurang | Prashant |
| 12. | AKN-2018/036 | Jadhav Kaustubh Manoj | Kaustubh |
| 13. | AKN-2018/038 | Jagtap Akash Avinash | Jagtap |
| 14. | AKN-2018/040 | Kadam Vaibhav Jagdish | Vaibhav |
| 15. | AKN-2018/041 | Kadoo Himanshu Shashikant | Himanshu |
| 16. | AKN-2018/043 | Kale Divya Chandrakant | Divya |
| 17. | AKN-2018/047 | Kapadnis Mahesh Jibhau | Mahesh |
| 18. | AKN-2018/049 | Karad Sandesh Tushar | Sandesh |
| 19. | AKN-2018/051 | Kathepuri Avinash Vikas | Avinash |
| 20. | AKN-2018/053 | Kolhe Nayana Babasaheb | Nayana |
| 21. | AKN-2018/054 | Kshirsagar Omkar Vishwanath | Omkar |





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| | | | |
|-----|--------------|-----------------------------|--------------------|
| 22. | AKN-2018/055 | Kuwar Buddhabhushan Sanjeev | <i>[Signature]</i> |
| 23. | AKN-2018/057 | Mahajan Gaurav Eknath | <i>[Signature]</i> |
| 24. | AKN-2018/059 | Malpure Nikhil Vasudeo | <i>[Signature]</i> |
| 25. | AKN-2018/060 | Mamidwar Jagruti Vikas | <i>[Signature]</i> |
| 26. | AKN-2018/062 | Mane Vishal Balasaheb | <i>[Signature]</i> |
| 27. | AKN-2018/067 | More Kartik Vilas | <i>[Signature]</i> |
| 28. | AKN-2018/068 | More Sawari Pundalik | <i>[Signature]</i> |
| 29. | AKN-2018/069 | Nagare Rushikesh Sopan | <i>[Signature]</i> |
| 30. | AKN-2018/070 | Nagare Shubham Valmik | <i>[Signature]</i> |
| 31. | AKN-2018/071 | Nale Manoj Laxman | <i>[Signature]</i> |
| 32. | AKN-2018/075 | Nikumbh Dhananjay Vijaysing | <i>[Signature]</i> |
| 33. | AKN-2018/078 | Parase Ganesh Hanumant | <i>[Signature]</i> |
| 34. | AKN-2018/079 | Patil Bhumika Suryabhan | <i>[Signature]</i> |
| 35. | AKN-2018/080 | Patil Harshal Dipak | <i>[Signature]</i> |
| 36. | AKN-2018/081 | Patil Narayan Ramdas | <i>[Signature]</i> |
| 37. | AKN-2018/082 | Patil Omkar Vinod | <i>[Signature]</i> |
| 38. | AKN-2018/085 | Patil Pravin Balkrushna | <i>[Signature]</i> |
| 39. | AKN-2018/086 | Patil Rohan Rajendra | <i>[Signature]</i> |

Total no of student:
No of student present:
No of students absent:

[Signature]
Name and Sign of Jr. Supervisor

Name and Sign of Sr. Supervisor





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Department of Plant Pathology

Certificate course in
Biofertilizer Production Technology
Academic Year 2019-20

Exam Time Table

All enrolled students of the Certificate Course are hereby informed that for the academic year 2019-20, the Certificate Course on **Biofertilizer Production Technology** has been completed. The examination for this certificate course is scheduled to be conducted on 25/12/2019. Therefore, all students are required to be present without exception.

Note: Time Table is as follow

| Sr no | Date | Time | Certificate course subject |
|-------|------------|-------------------|---|
| 1 | 25/12/2019 | 01:00 to 02:00 pm | Theory exam: Vegetable Grafting: Concept and Application course |
| 2 | | 02:00 to 03:00 pm | Practical Exam: Vegetable Grafting: Concept and Application course |


Course Coordinator

Exam Incharge

Principal
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K. K. Wagh College of Agriculture
Saraswatinagar, Panchavati, Nashik



30
30

K. K. Wagh College of Agriculture, Nashik
Department of Plant Pathology
 Certificate course in : **Biofertilizer Production Technology**
 Academic Year 2019-20
THEORY EXAMINATION

| | | | |
|------------------|-------------------------------|------------------|--------------|
| Class: | second year | Semester : | IV |
| Day & Date: | 25/12/2019 | Time: | |
| Subject: | Biofertilizer Production Tech | Marks: | |
| Name of student: | Gosavi Prashant, P. | Registration no: | AKN-2018/033 |

Multiple Choice Questions

| | | |
|--|-----------------------------------|--------------------------------|
| ✓ Q.1.media is used for isolation of PSB. | a) Jensen's | ✓ c) Pikovaskayas |
| | b) Fogg's | d) Carrot agar |
| ✓ Q. 2. Which of the following media is used for isolating Azotobacter? | a) CRYEMA | c) Alexandrov agar |
| | ✓ b) Jensen's | d) Both B and C |
| ✓ Q. 3. Congo red is used in isolation of..... | a) Acetobacter | c) Azospirillum |
| | ✓ b) Rhizobium | d) None of these |
| ✓ Q. 4. Direct dry heat is the principle of..... | a) Hot air oven | c) Autoclave |
| | ✓ b) Spirit lamp | d) Both A and B |
| ✓ Q. 5 Glasswares are sterilized in | a) Autoclave | c) Laminar air flow |
| | ✓ b) Hot air oven | d) BOD incubator |
| ✓ Q. 6. Autoclave is used for sterilization of..... | a) Soil | c) Glasswares |
| | ✓ b) Media | d) Both A and B |
| ✓ Q. 7. Agar agar is obtained from..... | a) Gelidium spp | c) Sea weed |
| | b) Red algae | ✓ d) All of the above |
| ✓ Q. 8. Culture plates of microbes are kept in.....for growth. | a) BOD incubator | c) Laminar air flow |
| | b) Refrigerator | d) Oven |
| ✓ Q.9. Laminar air flow is used for..... | a) Pouring media into petriplates | ✓ c) Both A and B |
| | b) Isolation of microbes | d) Sterilization of glasswares |
| ✓ Q. 10. BGA is used incrop. | a) Paddy | c) Azospirillum |
| | b) Rhizobium | d) Acetobacter |
| ✓ Q. 11. In Sugar containing crops biofertilizer is used. | a) Azotobacter | c) Rhizobium |
| | ✓ b) Acetobacter | d) BGA |
| ✓ Q. 12. Cellulose agar media is used for..... | a) Azotobacter | ✓ c) Organic matter decomposer |
| | b) PSB | d) Sulphur oxidising microbes |
| ✓ Q. 13.% calcium carbonate is added with carrier for solid biofertilizer Production. | a) 5 | ✓ c) 1 |
| | b) 2 | d) 3 |
| ✓ Q. 14. Carrier used for solid biofertilizer Production havingmesh size. | | |

| | |
|---|---|
| <input checked="" type="checkbox"/> a) 250-300 | c) 100-150 |
| <input type="checkbox"/> b) 200-250 | d) Both A and B |
| Q. 15. Thickness of biofertilizer packing bag is..... | |
| <input type="checkbox"/> a) 0.2mm | c) 0.6mm |
| <input checked="" type="checkbox"/> b) 0.5mm | d) 0.4mm |
| Q. 16.is Sulphur oxidising bacteria | |
| <input type="checkbox"/> a) Clostridium | c) Bacillus subtilis |
| <input checked="" type="checkbox"/> b) Thiobacillus thiooxidans | d) Azotobacter spp. |
| Q. 17.fixes atmospheric nitrogen freely i.e. non-symbiotically. | |
| <input checked="" type="checkbox"/> a) Azotobacter | c) Azolla |
| <input type="checkbox"/> b) Rhizobium | d) Bacillus subtilis |
| Q.18 Azolla is used as biofertilizer as it has..... | |
| <input type="checkbox"/> a) Rhizobium | c) Mycorrhiza |
| <input checked="" type="checkbox"/> b) Cyanobacteria | d) large quantity of humus |
| Q.19 Azolla as biofertilizer increases the yield of rice fields by.... | |
| <input type="checkbox"/> a) 10% | c) 30% |
| <input type="checkbox"/> b) 20% | <input checked="" type="checkbox"/> d) 50% |
| Q.20 The biofertilizers are..... | |
| <input type="checkbox"/> a) Cow dung and farm wastes | c) Quick growing crop ploughed under soil |
| <input checked="" type="checkbox"/> b) Azolla and BGA | d) All of these |
| Q.21 A good example of biofertilizer which improves phosphorous uptake is | |
| <input checked="" type="checkbox"/> a) Azospirillum | c) Actinomycetes |
| <input type="checkbox"/> b) Rhizobium | d) All of these |
| Q.22 A free living nitrogen fixing bacterium is | |
| <input type="checkbox"/> (a) Clostridium | <input type="checkbox"/> (c) Rhizobium |
| <input type="checkbox"/> (b) Azotobacter | <input checked="" type="checkbox"/> (d) Both A and B |
| Q.23 Aquatic fern which is an excellent biofertilizer | |
| <input type="checkbox"/> (a) Salvinia | <input type="checkbox"/> (c) Marsilea |
| <input checked="" type="checkbox"/> (b) Azolla | <input type="checkbox"/> (d) Pteridium |
| Q.24 Bacterial fertilizer is | |
| <input type="checkbox"/> (a) Anabaena | <input checked="" type="checkbox"/> (c) Rhizobium |
| <input type="checkbox"/> (b) Nostoc | <input type="checkbox"/> (d) Phycomyces |
| Q.25 Biofertilizers include | |
| <input type="checkbox"/> (a) Cow dung manure and farmyard waste | <input checked="" type="checkbox"/> (c) BGA / Anabaena and Azolla |
| <input type="checkbox"/> (b) A quick growing crop ploughed back | <input type="checkbox"/> (d) All the above |
| Q.26 Leaves of plant used as biofertilizer belong to | |
| <input type="checkbox"/> (a) Hibiscus | <input type="checkbox"/> (c) Anabaena |
| <input type="checkbox"/> (b) Mango | <input checked="" type="checkbox"/> (d) Azolla |
| Q.27 Main sources of biofertilizers are | |
| <input type="checkbox"/> (a) Bacteria | <input type="checkbox"/> (c) Fungi |
| <input checked="" type="checkbox"/> (b) Cyanobacteria | <input type="checkbox"/> (d) All the above |
| Q.28 Most famous nitrogen fixing bacterium / biofertilizer is | |
| <input type="checkbox"/> (a) Nitrobacter | <input type="checkbox"/> (c) Nitrococcus |
| <input type="checkbox"/> (b) Nitrosomonas | <input checked="" type="checkbox"/> (d) Rhizobium |
| Q.29 Most suitable fertilizer of paddy fields is | |
| <input checked="" type="checkbox"/> (a) Mycorrhiza | <input type="checkbox"/> (c) Symbiotic and nonsymbiotic cyanobacteria |
| <input type="checkbox"/> (b) Azotobacter and clostridium | <input type="checkbox"/> (d) Rhizobium |
| Q.30 Rhizobium enters the plant through | |
| <input type="checkbox"/> a) Leaf | <input type="checkbox"/> c) Flower |
| <input type="checkbox"/> b) Stem | <input checked="" type="checkbox"/> d) Root hair |



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Department of Plant Pathology
Certificate Course in Biofertilizer Production Technology
Academic Year 2019-20
Report

K.K. Wagh Education Society's K.K. Wagh College of Agriculture, Saraswatinagar, Nashik, offers education in agriculture at the undergraduate level. The college introduced a new Certificate Course in Biofertilizer Production Technology. A total of 39 students from the Department of Plant Pathology enrolled in this course. This course provided students with extensive knowledge about various types of biofertilizers and their applications in agriculture to enhance the quality and quantity of crop yields.

Course Outcome

1. Gain awareness of the historical and current perspectives of biofertilizer production.
2. Learn various methods for the production and application of biofertilizers.
3. Acquire knowledge about the different microorganisms used in biofertilizers and their roles in plant growth.
4. Understand the processes involved in the isolation, identification, and maintenance of beneficial microorganisms.
5. Explore the production methods of different biofertilizers, including nitrogen-fixing, phosphate-solubilizing, and mycorrhizal biofertilizers.
6. Examine the commercial aspects and economic benefits of biofertilizer production.


Students gained a comprehensive understanding of advanced methods in biofertilizer production and its application in agriculture. The course helped improve their practical skills, boosted their confidence, and enhanced their problem-solving abilities by addressing various factors affecting crop growth, especially biotic and abiotic stresses. The course highlighted the potential of biofertilizers as an environment-friendly and sustainable alternative to chemical fertilizers, fostering an interest in entrepreneurship among the students.

In the academic year 2019-20, thirty-nine students completed the certificate course, which comprised both theoretical and practical components. The course structure included a theory examination worth 30 marks and a practical examination worth 20 marks, totaling 50 marks. The course duration was from 15/12/2019 to 25/12/2019, encompassing 30 hours. Students who successfully completed the course received a certificate as an acknowledgment of their achievement.

The course coordinator was Ms. S. K. Sonawane, and the course committee members included Dr. H. V. Deshmukh, Ms. N. B. Bhoknal, and Ms. S. D. Kharat.


Course Coordinator




Principal
PRINCIPAL
K. K. Wagh College of Agriculture
Saraswatinagar, Panchavati, Nashik



K K Wagh Education Society's

K K WAGH COLLEGE OF AGRICULTURE

(Affiliated to Mahatma Phule Krishi Vidyapeeth, Rahuri)

Saraswatinagar, Panchavati, Nashik - 422 003

Certificate

This is to certify that Mr./Ms. Gosavi Prashant P.

Class S.Y.B.Sc. has completed Certificate Course on Bio-fertilizer production

Technology from 15/12/2019 to 25/12/2019 organized by

Department of Plant pathology in academic year 2019-20

Date : 26/12/2019

Place : Nashik


Course Coordinator



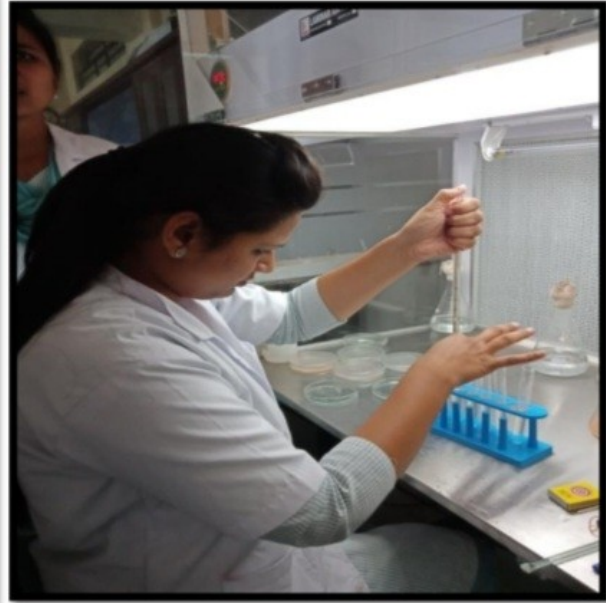

Principal
K K Wagh College of Agriculture
Nashik



K. K. Wagh Education Society's
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Saraswati Nagar, Panchavati, Nashik- 422 003. Maharashtra
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