



Microbial Techniques for Value Added Products

Opportunity to students to add Certificates to their regular Degrees without affecting their regular study.



DEPARTMENT OF BIOTECHNOLOGY



About this Course

The course will cover aspects of Basic concepts of microbiology, tools and techniques used in industrial microbiology and microbial technology and bioprospecting methods and applications in industry. Participants will work through a structured process from identifying learning needs to isolate, screen and optimization of culture conditions and industrial production. This is done by theoretical classes, hands on experiments and discussion on related topics. The course provides space and time for learners to reflect, share, and build on their experiences through in-class assignments and discussions

What will you learn ?

CO No.	Expected Course Outcomes <i>Upon completion of this course, the students will be able to:</i>
1	Understand the basic concepts of Microbiology and explore the diversity of microbial life
2	Evaluate aseptic techniques and be able to perform routine culture handling tasks safely and effectively
3	Apply the tools and techniques for value added products
4	Examine the sterility and understand the fundamentals of microbial Quality Control
5	Gain experience in microbiological laboratory practices and skills in the design and execution of microbiology related research.

Who should attend ?

Science graduate students who wish to gain an extra credit course or to learn new techniques and applications of microbial techniques in industrial production of value added products

COURSE FACILITATORS

Dr. Jinu John

(Assistant Professor, Department of Biotechnology , CMS College Kottayam)

Mr. Harish B

(Assistant Professor, Department of Microbiology , Marthoma College, Thiruvalla)

Fees and registration

Visit CMS College website

CMS COLLEGE KOTTAYAM (Autonomous)
VALUE ADDED COURSE 2019- 2020

DEPARTMENT OF BIOTECHNOLOGY
Third Year B Sc Botany and Biotechnology (Double Core)

**Course : MICROBIAL TECHNIQUES FOR VALUE ADDED
PRODUCTS**

Course Co-ordinator : Dr Jinu John

VALUE ADDED COURSE 2019- 2020

DEPARTMENT OF BIOTECHNOLOGY

Third Year B Sc Botany and Biotechnology (Double Core)

Course : MICROBIAL TECHNIQUES FOR VALUE ADDED PRODUCTS

List of enclosures :

1. Copy of the minutes of the Department meeting where Value added courses were proposed to be held and Co-ordinators chosen.
2. Appointment order from the HOD, assigning co-ordinatorship.
3. Brochure with highlights of the course indicated.
4. Detailed syllabus.
5. List of students enrolled.
6. Marklists : A 1 form (internals) , A 2 form (externals) and B –form.
7. Question paper.
8. Feed back form from students.
9. Statement of expenditure and utilization certificate.



Dr Jinu John

(Course Co-ordinator)



Dr. SMITHA S.

(Dept. Co-ordinator)



CMS
COLLEGE
KOTTAYAM
(AUTONOMOUS)

ESTD:1817

Microbial Techniques for Value Added Products

Opportunity to students to add Certificates to their regular Degrees
without affecting their regular study.



DEPARTMENT OF BIOTECHNOLOGY



About this Course

The course will cover aspects of Basic concepts of microbiology, tools and techniques used in industrial microbiology and microbial technology and bioprospecting methods and applications in industry. Participants will work through a structured process from identifying learning needs to isolate, screen and optimization of culture conditions and industrial production. This is done by theoretical classes, hands on experiments and discussion on related topics. The course provides space and time for learners to reflect, share, and build on their experiences through in-class assignments and discussions

Course		Details		
Title	Microbial Techniques for Value Added Products			
Degree	Certificate/Diploma			
Branch(s)	Biotechnology			
Type	Add on Course			
Faculty	Dr. Jinu John			
Credits		Hrs/week		Total hours: 36 (18T; 18P)

CO No.	Expected Course Outcomes
	<i>Upon completion of this course, the students will be able to:</i>
1	Understand the basic concepts of Microbiology and explore the diversity of microbial life
2	Evaluate aseptic techniques and be able to perform routine culture handling tasks safely and effectively
3	Apply the tools and techniques for value added products
4	Examine the sterility and understand the fundamentals of microbial Quality Control
5	Gain experience in microbiological laboratory practices and skills in the design and execution of microbiology related research.

Module	Course Description	Hrs
1.0	Introduction to microbiology	6
1.1	Introduction to microbiology and microbial cells	1
1.2	Theory and practice of sterilization.	1
1.3	Types of microbial media and culture techniques	1
1.4	Isolation of microorganisms and preservation of microbial cultures.	1
1.5	Staining methods, microscopy	1
1.6	Screening for value added products	1
2.0	Applied Microbiology	12
2.1	Microbial metabolites	1
2.2	Microbial enzymes of industrial interest	2
2.3	wine production	1
2.4	single cell proteins	1
2.5	Types of Antibiotics: Bactericidal vs. Bacteriostatic & Narrow Spectrum vs. Broad Spectrum	2
2.6	food spoilage and preservation	1
2.7	production of dairy products (fermented milks and cheese)	1
2.8	Role of microbes in agriculture (biofertilizers, biopesticides)	2
2.9	Waste water treatment.	1
3.0	Hands on experiments/Demonstration	18
3.1	Media Preparation, Sterilization, Plating (pour)	2

3.2	Enumeration Methods – Serial Dilution, Plating (pour), Membrane Filtration, Plating	3
3.3	Culture Purification (streak), Preservation (slant) and Sterility Testing	2
3.4	Staining Methods: Simple and Differential Stains: Definition and Examples	2
3.5	Screening of industrially important enzymes	3
3.6	Antibiotic Susceptibility Testing	2
3.7	Fermentation/wine production	2
3.8	Biofertilizers : Formulation and development	2

References:

- Prescott, Harley and Klien's Microbiology, Willey, Sherwood, Woolverton, 7th edition, 2011, McGraw Hill Higher Education, ISBN-13: 978-0073302089
- Brock Biology of Microorganisms, Madigan, Martinko, Stahl, Clark, 13th edition, 2011, Benjamin Cummings, ISBN-13: 978-0321649638
- Microbiology An Introduction, Tortora, Funke and Chase, 9th edition, 2006, Benjamin Cummings, ISBN 13: 9780321733603
- General Microbiology, Stanier, Ingraham, Wheelis, 5th edition, 1987, MacMillan, ISBN-13: 978-0333417683
- Biotechnology A textbook of Industrial Microbiology, Crueger and Crueger, 2nd edition, 1990 Sinauer Associates Inc.,U.S., ISBN 13: 9780878931316
- Experiments in Microbiology, Plant Pathology and Biotechnology, Aneja KR, 4th edition, 2003, New Age International, ISBN: 9788122414943
- Microbiology: A laboratory Manual, Cappuccino and Sherman, 7th Edition, 2004, Benjamin Cummings, ISBN 13: 9780805328363

VALUE ADDED COURSES- STUDENT ENROLLMENT LISTSemester: **6TH**Name of the Department: **BIOTECHNOLOGY**Name of the College: **CMS COLLEGE, KOTTAYAM** Year: **2019– 2020**

COURSE: Microbial Techniques for Value Added Products				
Sl. No.	Reg. No.	Name of Candidate (s)	Male/ Female	Urban/ Rural
1	172112201	ABLE P SHAJI	Female	Rural
2	172112202	AISWARYA K	Female	Rural
3	172112203	AKSHAYA ABY	Female	Rural
4	172112204	AKSHAYA S	Female	Rural
5	172112205	ANEENA M A	Female	Rural
6	172112206	ANI SABU	Female	Rural
7	172112207	ANITTA BABY	Female	Rural
8	172112208	ANJALI MOHAN	Female	Rural
9	172112209	ANNAMMA ALEX	Female	Rural
10	172112210	ANUJA KRISHNAN	Female	Rural
11	172112211	ARYA SAJEEV	Female	Rural
12	172112212	ASIFA BANU T P	Female	Rural
13	172112213	ATHIRA NANDAKUMAR	Female	Rural
14	172112214	ATHIRA OMANAKUTTAN	Female	Rural
15	172112215	AYONA B R	Female	Rural
16	172112216	FARSANA MOL	Female	Rural
17	172112217	HANNA MARY JACOB	Female	Rural
18	172112218	HARSHA SANKAR S H	Female	Rural
19	172112219	JIS MARIA THOMAS	Female	Rural
20	172112220	KARTHIKA A O	Female	Rural
21	172112221	KARTHIKA SALI	Female	Rural
22	172112222	KRISHNA DAS M	Male	Rural
23	172112223	LIYA ANNU THOMAS	Female	Rural
24	172112224	PARVATHY VENUGOPAL	Female	Rural
25	172112225	POOJA GOPI	Female	Rural
26	172112226	RICHY ALEXANDER	Female	Rural
27	172112227	SHAMEENA IQBAL	Female	Rural

28	172112228	SNEHAMOL P	Female	Rural
29	172112229	SREELAKSHMI S	Female	Rural
30	172112230	SREEVINAYA N S	Female	Rural
31	172112231	SREYA SHERIN BIJU	Female	Rural

[Signature]

Dr. Jinu John

(Name & Signature of the Coordinator)

[Signature]

Dr. Unnikrishnan N

(Head- Dept. of Biotechnology)

[Signature]

Dr. Roy Sam Daniel

(Principal)



(College Seal)

VALUE ADDED COURSES- END SEMESTER EXAM RESULTS

Semester: **6TH**

Name of the Department: **BIOTECHNOLOGY**

Name of the College: **CMS COLLEGE, KOTTAYAM**

Year: **2019– 2020**

COURSE: Microbial Techniques for Value Added Products			
Sl. No.	Reg. No.	Name of Candidate (s)	End Sem Exam Max: 40
1	172112201	ABLE P SHAJI	28
2	172112202	AISWARYA K	27
3	172112203	AKSHAYA ABY	31
4	172112204	AKSHAYA S	26
5	172112205	ANEENA M A	31
6	172112206	ANI SABU	27
7	172112207	ANITTA BABY	30
8	172112208	ANJALI MOHAN	34
9	172112209	ANNAMMA ALEX	26
10	172112210	ANUJA KRISHNAN	25
11	172112211	ARYA SAJEEV	28
12	172112212	ASIFA BANU T P	30
13	172112213	ATHIRA NANDAKUMAR	28
14	172112214	ATHIRA OMANAKUTTAN	28
15	172112215	AYONA B R	27
16	172112216	FARSANA MOL	32
17	172112217	HANNA MARY JACOB	35
18	172112218	HARSHA SANKAR S H	36
19	172112219	JIS MARIA THOMAS	27
20	172112220	KARTHIKA A O	26
21	172112221	KARTHIKA SALI	24
22	172112222	KRISHNA DAS M	26
23	172112223	LIYA ANNU THOMAS	26
24	172112224	PARVATHY VENUGOPAL	27
25	172112225	POOJA GOPI	23

26	172112226	RICHY ALEXANDER	31
27	172112227	SHAMEENA IQBAL	27
28	172112228	SNEHAMOL P	29
29	172112229	SREELAKSHMI S	24
30	172112230	SREEVINAYA N S	24
31	172112231	SREYA SHERIN BIJU	29



Dr. Jinu John

(Name and Signature of the Coordinator)



Dr. Unnikrishnan N

(Head- Dept. of Biotechnology)



Dr. Roy Sam Daniel

(Principal)



(College Seal)

CMS COLLEGE, KOTTAYAM
DEPARTMENT OF BIOTECHNOLOGY


VALUE ADDED COURSE- MARK SHEET

Name of the Course: **Microbial Techniques for Value Added Products**

Year: **2019 – 2020**

SEMESTER: 6 th DEPARTMENT: Biotechnology							
Sl. No.	Reg. No.	Name of Candidate (s)	END SEMESTER	IN SEMESTER	TOTAL: Max: 100	% of Marks	GRADE
			Max: Marks 40	Max: Marks 60			
1	172112201	ABLE P SHAJI	28	43.0	71.0	71.0	B+
2	172112202	AISWARYA K	27	45.5	72.5	72.5	B+
3	172112203	AKSHAYA ABY	31	50.5	81.5	81.5	A
4	172112204	AKSHAYA S	26	49.0	75.0	75.0	A
5	172112205	ANEENA M A	31	40.0	71.0	71.0	B+
6	172112206	ANI SABU	27	45.5	72.5	72.5	B+
7	172112207	ANITTA BABY	30	39.5	69.5	69.5	B+
8	172112208	ANJALI MOHAN	34	44.0	78.0	78.0	A
9	172112209	ANNAMMA ALEX	26	42.5	68.5	68.5	B+
10	172112210	ANUJA KRISHNAN	25	41.5	66.5	66.5	B+
11	172112211	ARYA SAJEEV	28	52.0	80.0	80.0	A
12	172112212	ASIFA BANU T P	30	45.0	75.0	75.0	A
13	172112213	ATHIRA NANDAKUMAR	28	49.0	77.0	77.0	A
14	172112214	ATHIRA OMANAKUTTAN	28	34.0	61.0	61.0	B
15	172112215	AYONA B R	27	40.5	67.5	67.5	B+
16	172112216	FARSANA MOL	32	34.0	66.0	66.0	B+

17	172112217	HANNA MARY JACOB	35	41.5	76.5	76.5	A
18	172112218	HARSHA SANKAR S H	36	54.0	90.0	90.0	A+
19	172112219	JIS MARIA THOMAS	27	36.0	63.0	63.0	B
20	172112220	KARTHIKA A O	26	43.0	69.0	69.0	B+
21	172112221	KARTHIKA SALI	24	45.0	69.0	69.0	B+
22	172112222	KRISHNA DAS M	26	34.0	60.0	60.0	B
23	172112223	LIYA ANNU THOMAS	26	42.0	68.0	68.0	B+
24	172112224	PARVATHY VENUGOPAL	27	38.0	65.0	65.0	B+
25	172112225	POOJA GOPI	23	44.0	67.0	67.0	B+
26	172112226	RICHY ALEXANDER	31	40.0	71.0	71.0	B+
27	172112227	SHAMEENA IQBAL	27	36.5	63.5	63.5	B
28	172112228	SNEHAMOL P	29	42.5	71.5	71.5	B+
29	172112229	SREELAKSHMI S	24	47.0	71.0	71.0	B+
30	172112230	SREEVINAYA N S	24	43.0	67.0	67.0	B+
31	172112231	SREYA SHERIN BIJU	29	46.0	75.0	75.0	A


Dr. Jinu John
 (Name and Signature of the
 Coordinator)


Dr. Unnikrishnan N
 (Head, Dept. of Biotechnology)



Dr. Roy Sam Daniel
 (Principal)



(College Seal)

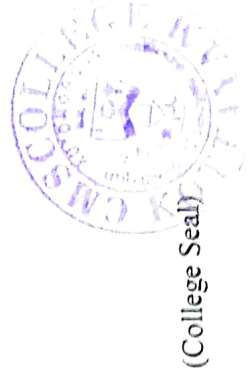
IN SEM EXAMINATIONS							
SL No.	Reg. No.	Name of Candidate (s)	Attendance Max: 10 Marks 1	Seminar (s) Max: 10 Marks 2	Assignment (s) Max: 10 Marks 3	Test Paper (s) Max: 30 Marks 4	TOTAL Max: 60 Marks (1+2+3+4)
1	172112201	ABLE P SHAJI	10	7	8.0	18	43.0
2	172112202	AISWARYA K	10	8	7.5	20	45.5
3	172112203	AKSHAYA ABY	10	8	8.5	24	50.5
4	172112204	AKSHAYA S	10	8	8.0	23	49.0
5	172112205	ANEENA M A	10	7	7.0	16	40.0
6	172112206	ANI SABU	10	8.5	9.0	18	45.5
7	172112207	ANITTA BABY	8	8	7.5	16	39.5
8	172112208	ANJALI MOHAN	10	8	9.0	17	44.0
9	172112209	ANNAMMA ALEX	10	9	7.5	16	42.5
10	172112210	ANUJA KRISHNAN	10	9	7.5	15	41.5
11	172112211	ARYA SAJEEV	10	9	9.0	24	52.0
12	172112212	ASIFA BANU T P	10	8	9.0	18	45.0
13	172112213	ATHIRA NANDAKUMAR	10	8	8.0	23	49.0
14	172112214	ATHIRA OMANAKUTTAN	10	2	9.0	13	34.0
15	172112215	AYONA B R	10	7.5	7.0	10	40.5
16	172112216	FARSANA MOL	10	2	7.0	15	34.0
17	172112217	HANNA MARY JACOB	10	8	7.5	10	41.5

18	172112218	HARSHA SANKAR S H	10	9.5	9.5	25	54.0
19	172112219	JIS MARIA THOMAS	6	7.5	7.5	15	36.0
20	172112220	KARTHIKA A O	10	8.5	9.5	15	43.0
21	172112221	KARTHIKA SALI	10	8	8.0	19	45.0
22	172112222	KRISHNA DAS M	8	2	8.0	16	34.0
23	172112223	LIYA ANNU THOMAS	10	2	9.0	21	42.0
24	172112224	PARVATHY VENUGOPAL	10	7	9.0	12	38.0
25	172112225	POOJA GOPI	10	8	7.0	19	44.0
26	172112226	RICHY ALEXANDER	10	2	7.0	21	40.0
27	172112227	SHAMEENA IQBAL	10	2	7.5	17	36.5
28	172112228	SNEHAMOL P	10	9	6.5	17	42.5
29	172112229	SREELAKSHMI S	10	8	8.0	21	47.0
30	172112230	SREEVINAYA N S	10	8	9.0	16	43.0
31	172112231	SREYA SHERIN BIJU	10	9	7.0	20	46.0


Dr. Jinu John
 (Name and Signature of the
 Coordinator)


Dr. Unnikrishnan N
 (Head, Dept. of Biotechnology)


Dr. Roy Sam Daniel
 (Principal)



(College Seal)

(To be kept in the College)

VALUE ADDED COURSES- Attendance

Semester: **6TH**

Name of the Department: **BIOTECHNOLOGY**

Name of the College: **CMS COLLEGE, KOTTAYAM** Year: **2019-2020**

DATE OF EXAMINATION: 05.03.2020 Time 10.00 -11.00AM

COURSE: Microbial Techniques for Value Added Products			
Sl. No.	Reg. No.	Name of Candidate (s)	Signature
1	172112201	ABLE P SHAJI	<i>Able</i>
2	172112202	AIWARYA K	<i>Aishwarya</i>
3	172112203	AKSHAYA ABY	<i>Akshaya</i>
4	172112204	AKSHAYA S	<i>Akshaya</i>
5	172112205	ANEENA M A	<i>Aneena</i>
6	172112206	ANI SABU	<i>Ani</i>
7	172112207	ANITTA BABY	<i>Anitta</i>
8	172112208	ANJALI MOHAN	<i>AM</i>
9	172112209	ANNAMMA ALEX	<i>Annamma</i>
10	172112210	ANUJA KRISHNAN	<i>Anuja</i>
11	172112211	ARYA SAJEEV	<i>Arya</i>
12	172112212	ASIFA BANU T P	<i>Asifa</i>
13	172112213	ATHIRA NANDAKUMAR	<i>Athira</i>
14	172112214	ATHIRA OMANAKUTTAN	<i>Athira</i>
15	172112215	AYONA B R	<i>Ayona</i>
16	172112216	FARSANA MOL	<i>Farsana</i>
17	172112217	HANNA MARY JACOB	<i>Hanna</i>
18	172112218	HARSHA SANKAR S H	<i>Harsha</i>
19	172112219	JIS MARIA THOMAS	<i>Jis</i>
20	172112220	KARTHIKA A O	<i>Karthika</i>
21	172112221	KARTHIKA SALI	<i>Karthika</i>
22	172112222	KRISHNA DAS M	<i>Krishna</i>
23	172112223	LIYA ANNU THOMAS	<i>Liya</i>
24	172112224	PARVATHY VENUGOPAL	<i>Parvathy</i>
25	172112225	POOJA GOPI	<i>Pooja</i>
26	172112226	RICHY ALEXANDER	<i>Richy</i>

27	172112227	SHAMEENA IQBAL	<i>Shameena</i>
28	172112228	SNEHAMOL P	<i>Snehamol</i>
29	172112229	SREELAKSHMI S	<i>Sreelakshmi</i>
30	172112230	SREEVINAYA N S	<i>Sreevinaya</i>
31	172112231	SREYA SHERIN BIJU	<i>Sreya</i>

J. John
Dr. Jinu John
 (Name and Signature of the Coordinator)



to be kept in the College)

VALUE ADDED COURSES- Attendance

Semester: **6TH**

Name of the Department: **BIOTECHNOLOGY**

Name of the College: **CMS COLLEGE, KOTTAYAM** Year: **2019-2020**

COURSE: Microbial Techniques for Value Added Products					
Sl. No.	Reg. No.	Name of Candidate (s)	18.11.19	19.11.19	20.11.19
1	172112201	ABLE P SHAJI	Able	Able	Able
2	172112202	AISWARYA K	Aishwarya	Aishwarya	Aishwarya
3	172112203	AKSHAYA ABY	Akshaya	Akshaya	Akshaya
4	172112204	AKSHAYA S	Akshaya	Akshaya	Akshaya
5	172112205	ANEENA M A	Aneena	Aneena	Aneena
6	172112206	ANI SABU	Ani	Ani	Ani
7	172112207	ANITTA BABY	Anitta	Anitta	Anitta
8	172112208	ANJALI MOHAN	AM	AM	AM
9	172112209	ANNAMMA ALEX	Annamma	Annamma	Annamma
10	172112210	ANUJA KRISHNAN	Anuja	Anuja	Anuja
11	172112211	ARYA SAJEEV	Arya	Arya	Arya
12	172112212	ASIFA BANU T P	Asifa	Asifa	Asifa
13	172112213	ATHIRA NANDAKUMAR	Athira	Athira	Athira
14	172112214	ATHIRA OMANAKUTTAN	Athira	Athira	Athira
15	172112215	AYONA B R	Ayona	Ayona	Ayona
16	172112216	FARSANA MOL	Farsana	Farsana	Farsana
17	172112217	HANNA MARY JACOB	Hanna	Hanna	Hanna
18	172112218	HARSHA SANKAR S H	Harsha	Harsha	Harsha
19	172112219	JIS MARIA THOMAS	JIS	JIS	JIS
20	172112220	KARTHIKA A O	Karthika	Karthika	Karthika
21	172112221	KARTHIKA SALI	Karthika	Karthika	Karthika
22	172112222	KRISHNA DAS M	Krishna	Krishna	Krishna
23	172112223	LIYA ANNU THOMAS	Liya	Liya	Liya
24	172112224	PARVATHY VENUGOPAL	Parvathy	Parvathy	Parvathy
25	172112225	POOJA GOPI	Pooja	Pooja	Pooja
26	172112226	RICHY ALEXANDER	Richy	Richy	Richy
27	172112227	SHAMEENA IQBAL	Shameena	Shameena	Shameena

28	172112228	SNEHAMOL P	<i>Sneha</i>	<i>Sneha</i>	<i>Sneha</i>
29	172112229	SREELAKSHMI S	<i>Sree</i>	<i>Sree</i>	<i>Sree</i>
30	172112230	SREEVINAYA N S	<i>Sree</i>	<i>Sree</i>	<i>Sree</i>
31	172112231	SREYA SHERIN BIJU	<i>Sreya</i>	<i>Sreya</i>	<i>Sreya</i>

J. J. John
Dr. Jinu John
 (Name and Signature of the Coordinator)



Value Added Course (2019-2020)

DEPARTMENT OF BIOTECHNOLOGY

IIIrd Year BSc Botany & Biotechnology (Double Main)

MICROBIAL TECHNIQUES FOR VALUE ADDED PRODUCTS

Course Report

The value added course on "Microbial Techniques for Value Added Products" was designed with the objective to provide theoretical knowledge and hands on exposure to the students as a primary effort to equip them for industrial applications of microbial techniques.

The course was started with expected outcomes of understand the basic concepts of Microbiology and explore the diversity of microbial life, to evaluate aseptic techniques and be able to perform routine culture handling tasks safely and effectively, enable the students to apply the tools and techniques for value added products and to examine the sterility and understand the fundamentals of microbial Quality Control. This course is expected to help them in gaining experience in microbiological laboratory practices and skills in the design and execution of microbiology related research.

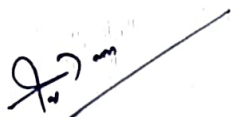
The course was conducted from 18th to 21st Nov. 2019, to the IIIrd Year BSc Botany & Biotechnology (Double Main) students. The first session on 18th was engaged by Dr. Jinu John. In this session he has explained the major objectives, course structure and expected outcome of the course. In the second session continued on the same day, he has given an introduction to microbiology and microbial techniques.

On second day, 19th November, 2019, the session started with the lecture on aspects and prospects of applied microbiology by Dr. Jinu John. He has explained the details of microbial products of industrial importance such as enzymes, antibiotics, wine etc. He has also discussed the applications of microbes in fermentation and dairy industry. The later

sessions were dealt with applications of microbial products in agriculture sector such as biofertilizers and their significances.

The experimental sessions were conducted during 20-21st of Nov. 2019 by Dr Jinu John and Mr. Harish R, Assistant Professor, Department of Biosciences, Mar Thoma College, Thiruvalla. The practical sessions included the experiments related to media preparation, sterilization, plating (pour), enumeration methods such as serial dilution. It also included the culture purification and staining methods such as simple and differential stains. The practical sessions demonstrated the experiments related to screening of industrially important enzymes, antibiotic susceptibility testing, fermentation/wine production as well as the formulation and development of biofertilizers.

Evaluation of the course was done by test papers and individual viva voce. Students have secured satisfactory marks and found to be a successful exercise, copy of the exam results are attached with this report. The effectiveness of the course was assessed by student feedback. Based on the feedback by the students, it was found that the students are satisfied with the conduct and progress of the program. This kind of value added courses will help the students to get some exposure to the industrial or day to day applications of the tools and techniques they study as part of their curriculum.



Dr. Jinu John

(Course coordinator)



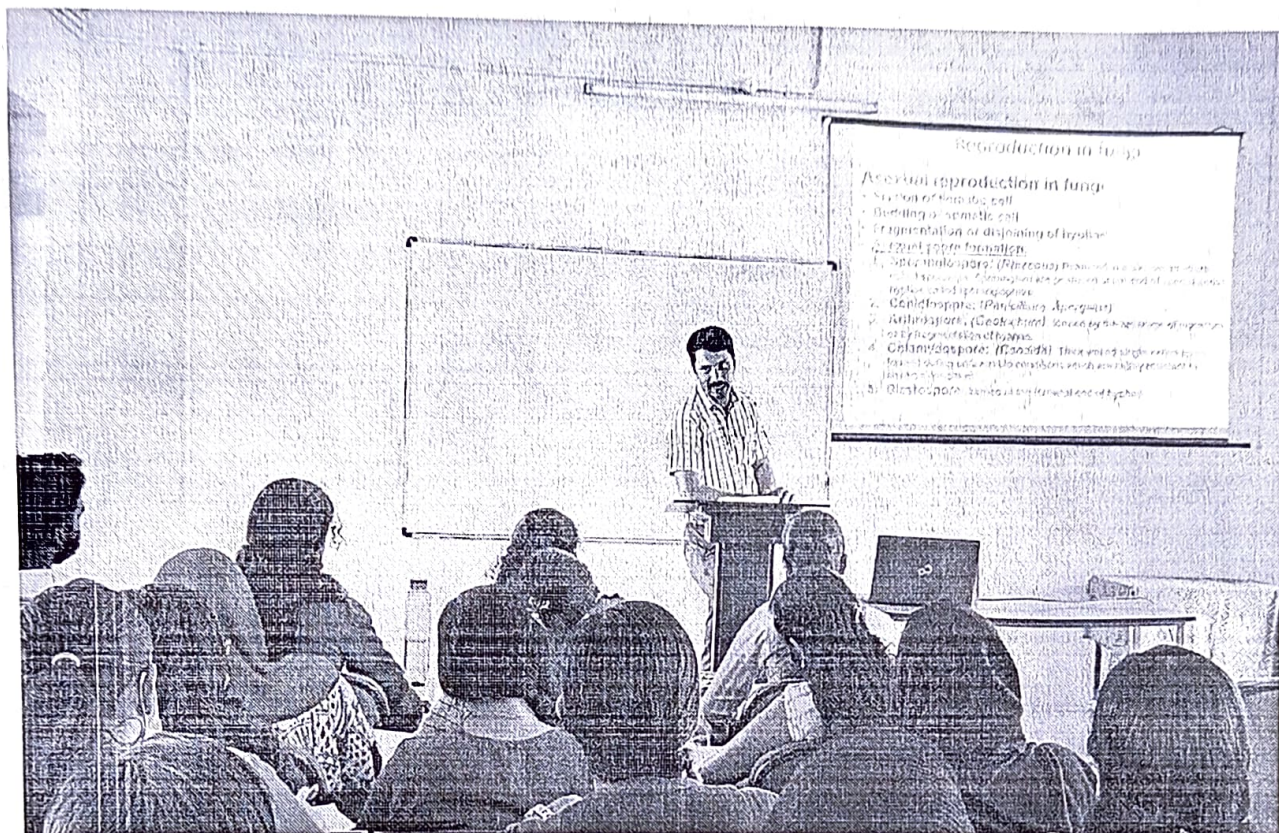


Fig. Classes engaged by Mr. Harish R, Assistant Professor, Department of Biosciences, Mar Thoma College, Thiruvalla.

