ANNAMALAI UNIVERSITY

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ICAR ACCREDITATION

FACULTY OF AGRICULTURE

SELF STUDY REPORT FOR THE POST GRADUATE PROGRAMME

M.Sc. (Ag.) AGRICULTURAL MICROBIOLOGY

Annamalainagar – 608 002
Tamil Nadu
2018

6.4. Self Study Report for the Programme

Name of the Programme: M.Sc. (Ag.) Agricultural Microbiology

Conducted by: Department of Agricultural Microbiology

6.4.1. Brief History of M.Sc., (Ag.) Agricultural Microbiology Programme

The Division of Microbiology was established during 1958 under the Department of Agriculture for the first time in India by an eminent world renowned Microbiologist Dr.G.RANGASAMY. Even before attaining Department status, the division offered post graduate programme and Ph.D Programme in Microbiology. During 1980, the division got elevated as Department.

Sl.No.	Historical Itinerary	Year of Commencement/ Period
1	Division of Microbiology	1958
2	Post Graduate & Ph.D. Programme in Microbiology	1959 onwards
3	Department Status	1980

For the M.Sc. (Ag.) Microbiology programme a total of 55 credits are offered which includes 20 credits for major courses, 09 credits for minor courses, 05 credits for supporting courses,01 credit seminor and 20 credits for master thesis research. In addition to the 55 credits, 06 contact hours for non credit compulsory courses has also been included to improve the research and employability of the students. The latest revision of the curricula was carried out in the academic year 2017-2018.

Vision

- To grow into a leading centre in the integration of teaching and learing in Agrl. Microbiology.
- To support coastal and delta agriculture with sound and sustainable development of Agricultural productivity by lowcost technology like adoption of Bioinoculants.
- To function as a reputed centre for imparting hands on training to the farmers and PG students for entrepreneurship through Bioinoculants, organic farming, Single Cell Protein production and composting technologies.

Goals

- To provide quality education to the students with updated and latest developments in the subject and develop completely qualified microbiologist to excel in the field of agriculture and Agro industries.
- To promote research and training on sustainable and ecofriendly approaches for increasing the agricultural productivity using Bio-fertilizers and to encourage the PG students with entrepreneurship skills.
- To create environmental awareness and provide practical knowledge on waste management for clean environment.
- To estabilish a microbial culture collection bank.
- Establishment of Quality control laboratory for bioinoculants.

Objectives

- To impart quality education in relation to changing the scenario in the field of microbiology.
- To undertake research on need based, location specific problems, through survey and developing of stress tolerant strains to combat biotic and abiotic stresses.
- To offer hands on training in biofertlizer production (Bacterial Biofertilizers, Azolla, Blue green algae and AM Fungi mass production).
- To impart knowledge on the various technologies of composting, vermicoposting and waste water treatment methods.
- To develop a repository of microbial cultures.
- To make availability of microbial cultures for research and commercial purposes.
- To analyse the quality of various bioinoculants samples from various private bioinoculants producing companies.

Strategic plan to achieve Vision and Goal

Goal	Objectives	Implementation plan	Performance Metrics/Timeline	Outcome
To provide quality education to the students with updated and latest developments in the subject and develop completely qualified microbiologist to excel in the field of agriculture and Agro industries.	To impart quality education in relation to changing the scenario in the field of microbiology.	Periodical upgradation of course content covering both theoritical and practical informations by getting inputs from stake holders and referring the syllabus of pioneer institutes in India.	Once in three years.	A periodically updated curriculum adds up to the domain knowledge of the students. Imparting sound knowledge and motivation created by Faculties ,the higher number of students got Ph.D admissions in other institutes and have gone to abroad for higher studies . Increased number of our students got employement in private, public sectors and MNC's.
To Promote research and training on sustainable and ecofriendly approaches for increasing the agricultural productivity using Bio-fertilizers and to develop the PG students with entrepreneurship skills	To undertake research on need based, location specific problems, through survey, and developing of stress tolerant strains to combat biotic and abiotic stresses. To offer hands on training in biofertlizer production, (Bacterial Biofertilizers, Azolla, Blue green algae and AM Fungi mass production)	Motivating PG students to take part in conducting trials in farmers' field so as to assess the ground reality To identify locations specific problem and findout the solution by systematic research approaches Training the students in biofertilizers mass productions technologies	Every Year	Problems indentified through field trial conducted in farmers field in different locatins Developed solutions for the location specific problems Publishing the research findings in reputed journals for the benefit of young microbiologists Encouraging the students to present their research findings in national and international seminars/ conferences

Goal	Objectives	Implementation plan	Performance Metrics/Timeline	Outcome
				Possibility of starting Biofertilizer production unit by the students
To create environmental awareness and provide practical knowledge on waste management for clean environment.	To impart knowledge on the various technologies of composting , vermicoposting and waste water treatment methods.	Conducting students participatory environmental awareness campaigns. Training the studens on various composting techniques like aerobic, anaerobic, rotary drum and vermicomposting technologies. Developing technologies for effective utilization waste water for SCP & Biofuel production.	Every year	Creation of environmental awareness. Nutrient rich manures generation through waste composting. Generation of income by SCP production and clean environment by biofuel use.
To estabilish a microbial culture collection bank.	To develop a repository of microbial cultures To make availability of microbial cultures for research and commercial purpose.	Collection and maintenance of microbial cultures .	All round the year.	Deposits of variety of microbial cultures Income generation by mother culture sales
Establishment of Quality control laboratory for bioinoculants.	To analyse the quality of various bioinoculants samples from various private bioinoculants producing companies.	Periodic collection of the sample from needy person	All round the year.	Analysis of the samples in the department Income generation by sample analyses fee.

Accomplishments

The Division of Microbiology was started by the eminent world renowned Microbiologist Dr.G.Rangaswamy for the First time in India, Dr. G. Rangasamy, was trained under the able guidance of Nobel Laureat, Dr.S.A.Waksman. Then the Division of Microbiology was nourished by several dedicated and enthusiastic microbiologists such as Dr.A.Mahadevan (Eminent Scientist), Dr.N.N.Prasad (First person to introduce Lignite as carrier material for bioinoculant production in India, and he developed alternate feedstocks for biogas production), Dr.M.Deiveekasundaram, Dr.S.M.Muthukaruppan, Dr.N.Ramanathan, Dr.P.Tholkappian and Dr.D.Stella who is currently guiding the Department as the Head.

The alumni adoring various higher positions such as Dr.K.Ramasamy, the present vice chancellor of TNAU, Prof. Dr.S.Kannaiyan former Vice - Chancellor of TNAU, Dr.P.Santhanakrishnan, Former Registrar of TNAU and Prof. Dr.S.Kannaiyan also occupied the top position as the Chairman, National Bio Diversity Authority of India (NBA). Some of other alumni also occupied key positions like Director of IICPT, Thanjavur (Dr.K.Singaravadivel) The Director of Rubber Board (Dr.R.Kothandaraman) Deans of various Agriculture colleges affiliated to TNAU (Dr.S.Antony Raj, Dr.G.Prasad, Dr.N.O.Gopal, Dr.R.TamilVendan) and Professor and Heads of Department of Microbiology, TNAU, (Dr.D.Purushothaman, Dr.K.Kanthasamy Dr.S.P.Sundaram, Dr.P.Marimuthu, Dr.H.Gopal)

The first Department in India to organise three Summer Institute courses in Microbiology during 1964, 1965 and 1974 Sponsored by UGC & ICAR. The Department has conducted two Annual workshops of All India Coordinated Research Project (AICRP) on Biological Nitrogen Fixation during 1984 & 1990. The Department has conducted the 30th Annual Conference of Association of Microbiologists of India (AMI) during January 9-11, 1990. Department has conducted training for Agricultural Officers, Assistant Agricultural Officers and Farmers under Mission Mode Project funded by DBT during the year 1990-1992. The Department has also organized Southern Regional Conference on Microbial Bioinoculants on 21-22 March 2002 and three other National Conferences in the year 2006, 2013 and 2014.

The Department was instrumental to start M.Sc.,(Integrated) Five Years course in Microbiology during 2002 . Later in 2007 and 2009 M.Phil, Ph.D. and M.Sc Microbiology (two Years CBCS) courses were started by us on behalf of faculty of Science.

In the Department of Microbiology more than 100 Ph.Ds were awarded and to document the achievement, a compendium of Ph.D. was released on the occasion of the National seminar on Frontiers in Applied Microbiology held on 14th Feb.2014. Several International and National seminars were also conducted in the Department. Many numbers of special invited Lectures were organised in the banner of Microbiological Association.

The Department's research activities could be realised through the list of international and national collaborators such as PL480 IV & V (USDA), DBT, UGC, DST, DNES, MNES, NLC, and TNSTC.

There are six Endowments *Viz.*, Dr.G.Rangasamy Endowment, Vallalar Endowment, Srilochini Varadarajulu Endowment, Shri.M.P.Damodharan Endowment, Ramaswamy padayatchiar Endowment and Dr.N.N.Prasad Endowment, were constituted for the first rank holder in Postgraduate Degree Examinations. The Department has also motivated the students and handled special classes to take up national level competitive examinations like National Eligibility Test (NET) and Agricultural Research Scientist (ARS) Exam.

Specific cultures isolated and characterized in the department are being deposited in NCBI (National Centre for Biotechnology Information)

The Faculties also visited various countries (USA, Singapore, Srilanka, Thailand, Vietnam, Malaysia, Egypt, Indonesia, Philippines, Mauritius, Dubai and Hong Kong) and attended many conferences and workshops. They were also actively involved in professional development activities by becoming members in various professional bodies. Faculty members have qualified National Eligibility Test conducted by the Agricultural Scientists Recruitment board of the ICAR. They also update their subject of specialization by the periodical updates by attending orientation, refresher, Seminar, Conference, training and workshops conducted by UGC, ICAR, DBT, DST etc.,

At present, the Department focuses on the various thrust areas of Biological Nitrogen fixation, Integrated Nutrient Management, formulation of Bioinoculants, composting technologies, Food preservation, SCP production, Biosurfactants and Biopolymers.

Category	Total	Period (2013-18)
Number of Publications (Journals)	520	256
Number of Publications (Seminars/Conferences/ Workshop/ Symposium)	220	120
Number of Books & Book chapters published	59	14
Number of Projects obtained	62	30
Grant mobilization ***(Lakh Rupees)***	379	113
Number of Ph.D. Thesis Produced	154	89
Number of PG Thesis produced	341	33
Number of Seminars/ Workshops/ Conference/ Symposium organized	12	2
Number of Awards Received by the faculties	40	21
Professional Visits to the Foreign Countries by the faculties	25	10

Salient research achievements of the Department

1. Lignite was developed as a carrier material for the Biofertilizer production, as first report in India
2. An affordable biocontrol agent *Methylobacterium* against rice blast has been identified and developed as a biofloc that augmented the survival of *Methylobacterium* in rice rhizosphere.

3. An innovative technology was developed for the microbial conversion of water hyacinth to biocompost using bioinoculants Viz., *Cellulomonas sp. Penicillium sp. Trichoderma sp*.
4. PGPR and AM fungi consortium for medicinal plants was developed.
5. A new formulation of *Azospirillum* bioinoculant was developed to increase the shelf life up to 12 months
6. Alternate low cost carrier material for *Rhizobium* and *Azospirillum* bioinoculant had been developed using Biochar.
7. Strategies for enhancing biosurfactant production by *Serratia rubidaea* using agro industrial waste have been evolved
8. Deposited lipopeptide biosurfactant producing *Bacillus cereus* strain SNAU01 used as a biocontol agent against certain root pathogens.
9. Deposited *Pseudomonas aeruginosa* strain PBS29 – RHL001 rhamnosyltransferase gene, partial cds. Accession number: MG956726. (743 bases) (Protein id: AWD31663.1 residues 1 to 211), Using this biosurfactant, nanoparticles of less than 60nm size up to six months, was produced.
10. For the first time in India, Nano emulsion of olive and sunflower oil was found have the anti bacterial activity against human pathogen *E - coli.*
11. A significant Biofuel research finding was achieved in the production of biohydrogen from waste water to be used as a renewable energy source.
12. Significant research has been made on the biodiesel production from microalgae *Chlorella variabilis*
13. A notable research on agrowaste management for Bioethanol and vinegar production from cashew apple by using *Zymomonas mobilis* was done
14. An innovative technique for mass multiplication of *Spirulina platensis* to be used as SCP using rice mill effluent has been developed
15. Growth optimization of *Wautersia eutropha* was achieved for higher production of PHB to be used as biodegradable plastic.

6.4.2 Faculty Strength

Presently the Department's teaching, research and extension mandates are well taken care of with twenty five faculties who specialized in Bioinoculant technology ,Vermi Technology, Fungal Bioinoculant, Bio surfactant, Liquid Biofertilizer, Organic waste Management and Food Microbiology,

Sl. No.	Sanctioned Faculty	Faculty in place (as on August 2018)
1	Professor*	6
2	Assistant Professor*	19

* Assigned responsibilities for multiple programmes

Credentials of the Faculty

Sl.No	Name & Designation	Total Service (Years)	Field of Specialization	Total number of Students guided		Total number of publications	Total Number of Publications (2013 to 2018)
				PG	Ph.D.		
1.	Dr.P.Tholkappian Professor	25	Arbuscular Mycorrhizal Fungi	21	8	14	6
2.	Dr.D.Stella Professor & Head	24	Stress tolerant inoculant development	17	7	40	7
3.	Dr.V.Muralikrishnan Professor	24	Microbial inoculant Consortium for sugarcane, biofuel production.	17	7	12	12
4.	Dr.P.K.Sivakumaar	22	PGPR ISR	15	07	11	11
5.	Dr.S.Kalaiarasu	22	Bioremediation of xenobiotics.	16	08	42	16
6.	Dr.D.Reetha, Professor	18	New formulations and shelf life improvement of Biofertilizer	16	08	30	11
7.	Dr.R.Elango, Asst. Professor	18	Composting Techniques	16	06	31	16
8.	Dr..D.Kanchana , Asst. Professor	18	Food Preservation Techniques	11	04	38	19
9.	Dr.M.Jayanthi, Asst. Professor	18	Bioinoculant VAM	15	04	26	7
10.	Dr.G.Usharani , Asst. Professor	18	PGPR- Biocontrol	15	06	34	15
11.	Dr.B.Karthikeyan, Asst. Professor	17	Microbial interactions- medicinal plant	15	04	34	9
12.	Dr.K.Muthuselvam Asst. Professor	16	Vermi biotechnology	15	04	11	08
13.	Dr.J.Sriman Narayanan, Asst. Professor	16	Bio ethanol and Enzymology	12	04	13	07
14.	Dr.V.Prabudoss	16	*Glucanoacetobacter*- Sugarcane	16	03	27	22
15.	Dr.J.Divakaran, Asst. Professor	15	Management of muncipal solid waste	08	02	08	06
16.	Dr.S.Mahalakshmi, Asst. Professor	14	PGPR- formulation	10	-	06	03
17.	Dr.R.Parthasarathi ,	12	Biosurfactants and nanoscience	13	04	33	18

Sl.No	Name & Designation	Total Service (Years)	Field of Specialization	Total number of Students guided		Total number of publications	Total Number of Publications (2013 to 2018)
				PG	Ph.D.		
	Asst. Professor						
18.	Dr.S.Bharathiraja , Asst. Professor	12	AM fungal Symbiosis- Floriculture	13	01	10	05
19.	Dr.S.Dinakar Asst. Professor	12	Bioflocculation studies	15	02	12	07
20.	Dr.N.Pandeeswari Asst. Professor	12	Halophiles in coastal agriculture.	03	-	20	08
21.	Dr.M.Vijayapriya , Asst. Professor	12	Silicate solubilizing bacteria	12	-	07	02
22.	Dr.G.Kumaresan	12	SCP Technology	17	-	10	06
23.	Mrs.J.Jayachitra, Asst. Professor	12	Human Probiotics	17	-	07	05
24.	Mr.K.Sivakumar	10	Biodiesel from microalgae.	13	-	13	09
25.	Dr.P.Sivasakthivelan Asst. Professor	09	Agriculturally Beneficial Microbial consortium development	13	-	31	21

Awards/Recognitions/Abroad visits by Faculty

Sl.No.	Name of the Faculty	Awards/Recognitions	Countries visited	Purpose of the visit
1	Dr.P.Tholkappian	-	USA - 2006	International conference
			Canada -2006	International conference
			Srilanka - 2015	International conference
			Thailand - 2015	International conference
			Egypt - 2016	International conference
			Indonesia - 2016	International conference
			Philippines - 2017	International conference
			Mauritius - 2015	International conference

Sl.No.	Name of the Faculty	Awards/Recognitions	Countries visited	Purpose of the visit
			Dubai - 2014	International conference
			Hong Kong -2012	International conference
2	Dr.V.Muralikrishnan	Akshya Vignan Mitra, 2010	USA – 2007, 2015	International conference
			Singapore – 2004, 2014	International conference
			Thailand - 2014	International conference
			Philippines -2013	International conference
			Indonesia - 2017	International conference
3	Dr.R.Parthasarathi	Best Paper Presentation Award (International) Thailand, 2015	Philippines – 2017	International conference
			Nepal – 2013	International conference
			Sri lanka – 2015	International conference
			Thailand – 2015	International conference
			Egypt - 2016	International conference
4	Dr.R.Parthasarathi	Best Paper Presentation Award (International) Srilanka, 2015	Indonesia - 2016	International conference
5	Dr.R.Elango	Dr.Radhakrishnan Award, 2016	Egypt - 2016	International conference
			Indonesia - 2016	International conference
			Philippines - 2017	International conference
6	Dr.V.Prabudoss	Best Research Paper Award, 2016	-	
7	Dr.V.Prabudoss	Best Doctoral Thesis Award, 2015	-	
8	Dr.R.Elango	Best Paper Presentation Award, 2015	Philippines – 2017	International Conference
9	Dr.R.Parthasarathi	Best Oral Presentation Award, 2018	Thailand & Srilanka - 2015	International Conference
10	Dr.S.Bharathiraja	Young Scientist Award, 2018		
11	Dr.P.Sivasakthivelan	Young Scientist Award,2017	-	

Sl.No.	Name of the Faculty	Awards/Recognitions	Countries visited	Purpose of the visit
12	Dr.S.Bharathiraja	Best Doctoral Thesis Award, 2018		
12	Dr.S.Dinakar	Excellence in Research Award,2018		
13	Dr.S.Dinakar	Best Doctoral Thesis Award, 2018		
14	Dr.S.Kalaiarasu	Distinguished Scientist Award, 2018		
15	Dr.V.Prabudoss	Young Scientist Award, 2018		
16	Dr.S.Kalaiarasu	Outstanding Achievement Award, 2018	-	
17	Dr.S.Mahalakshmi	Best Teacher Award, 2018	-	
18	Dr.M.Vijayapriya	Best Teacher Award, 2018	-	
19	Dr.B.Karthikeyan	Srilochani Endowment Award (Best Publication in High Impact Factor Journal), 2008	-	
20	Dr.P.K.Sivakumar	Srilochani Endowment Award (Best Publication in High Impact Factor Journal), 2012	-	
21	Dr.B.Karthikeyan	Srilochani Endowment Award (Best Publication in High Impact Factor Journal), 2012	-	
22	Dr. K.Sivakumar	Best Poster Presentation Award, 2017	-	

List of funded Projects (2013-2018)

Sl.No.	Title of the project	Name of Principal investigator & Co Principal investigator	Period	Sponsoring agency	Out lay (In lakh rupees)
1	Development of spirulina SCP stress tolerant strains for mass cultivation in sea water and rice mill effluent in cuddalore district Tamil nadu.	Dr.N.Ramanathan Dr.D.Kanchana	2012 - 2014	UGC	04.52
2	Studies on the combined effect of Bacterial treated industrial effluent, compost mixtures, lignite fly ash and effective Microorganisms on the growth and yield of groundnut in cuddalore district. Tamil nadu	Dr.D.Stella, Dr.D.Reetha	2011 - 2014	UGC	09.01
3	Recycling of industrial effluents and organic wastes for the improvement of growth and yield of Groundnut-TMV 1 in Cuddalore district.	Dr.D. Stella Dr.D.Reetha	2011-13	TNSCST	02.00
4	Development of new formulations of *Azospirillum* Bioinoculant with longer shelf life and their performance on Maize(*Zea mays* L.)	Dr.D.Reetha, Dr.G.Kumaresan	2013 -16	UGC	13.08
5	Production of bacterial alginate from mangrove ecosystem as an alternative carrier for microbial inoculants	Dr.P.K.Sivakumaar Dr.R.Parthasarathi	2011 - 2014	UGC	07.45
6	Co-flocs of PGPR cells-A novel biotechnological approach for the maximization of Induced Systemic Resistance (ISR)- *Pyricularia oryzae* pathosystem under lowland Condition.	Dr.S.Kalaiarasu Dr.C.Sekar	2011-14	UGC	05.54
7	Innovative inspection on the microbial consortium mediated colichicin metabolite production and enhancement in *Gloriosa superba* L	Dr.R.Elango Dr.R.Parthasarathi	2012 – 2015	UGC	06.40.
8	Evaluation of bioefficacy of organic fertilizers formulation in certain agricultural and horticultural crops	Dr.R.Elango Dr.R.Parthasarathi	2013-2015	M/S Agro Cart, Madurai	02.30

Sl.No.	Title of the project	Name of Principal investigator & Co Principal investigator	Period	Sponsoring agency	Out lay (In lakh rupees)
9	Utilization and recycling of SCP enriched industrial effluents for the cultivation of Brinjal cv PLR (*Solanum melongena* L.)	Dr.G.Usharani Dr.G.Srinivasan	2013 -16	UGC	11.64
10	Development of Plant growth promoting rhizobacteria for their influence on disease management of certain species of commercially grown medicinal plant	Dr.B.Karthikeyan Dr.J.Sriman Narayanan	2011 - 2014	UGC	08.81
11	Bio surfactant mediated synthesis of silver nano particles – A novel approach	Dr.R.Parthasarathi Dr.R.Elango	2012 – 2015	UGC	10.10
12	Ecofriendly recycling of sugar mill effluent for the cultivation of *spirulina platensis*	Dr..S.Mahalakshmi Mis.R.Geetha	2012-2013	TNSCST	0.06
13	Bioefficacy studies of NZBBA 1106 against Bacterial Blight in paddy	Dr.P.Tholkappian Dr.K.Muthuselvam	2014-2015	Novazymes Pvt. Ltd., Bangalore	01.41
14	Bioefficacy studies of NZBBA 1106 against Bacterial Blast in paddy	Dr.P.Tholkappian Dr.K.Muthuselvam	2015	Novazymes Pvt. Ltd., Bangalore	01.36
15	Bioefficacy studies of NZBBA 1106 (TEAGRO)against Late Blight of Tomato	Dr.P.Tholkappian Dr.K.Muthuselvam	2015	Novazymes Pvt. Ltd., Bangalore	1.60
16	Bioefficacy studies of NZBBA 1106 (TEAGRO)against Bacterial wilt of Tomato	Dr.P.Tholkappian Dr.R.Parthasarathi	2015	Novazymes Pvt. Ltd., Bangalore	1.60
17	Bioefficacy studies of NZBBA 1106 against Blast in paddy	Dr.K.Muthuselvam Dr.R.Parthasarathi	2015	Novazymes Pvt. Ltd.,	01.41

Sl.No.	Title of the project	Name of Principal investigator & Co Principal investigator	Period	Sponsoring agency	Out lay (In lakh rupees)
				Bangalore	
18	Bioefficacy studies of NZBBA 1106 against Blast in paddy	Dr.K.Muthuselvam Dr.R.Parthasarathi	2015	Novazymes Pvt. Ltd., Bangalore	01.36
19	Studies on the efficacy of LCO foliar applications on Paddy	Dr.K.Muthuselvam Dr.J.Nambi	2015-2016	Novazymes Pvt. Ltd., Bangalore	01.54
20	Innovative research activities – Prospective of downstreaming ISR elicitors from organic wastes for Blast disease of paddy	Dr.K.Muthuselvam Dr.R.Parthasarathi	2015-2016	UGC	05.25
21	Bioefficacy studies of NZBBA 1106 against Powdery mildew in cucumber	Dr.J.Srimannarayanan Dr.R.Parthasarathi	2014-2015	Novazymes Pvt. Ltd., Bangalore	01.09
22	Bioefficacy studies of NZBBA 1106 against Powdery mildew in cucumber	Dr.J.Srimannarayanan Dr.R.Parthasarathi	2015	Novazymes Pvt. Ltd., Bangalore	01.23
23	Bioefficacy studies of NZBBA 1106 against Sheath Blight in paddy	Dr.R.Parthasarathi Dr.K.Muthuselvam	2014-2015	Novazymes Pvt. Ltd., Bangalore	01.41
24	NZBBS- 1106 (TEAGRO) bio-formulation against Rice Sheath Blight	Dr.R.Parthasarathi	2015	Novazymes	1.36

Sl.No.	Title of the project	Name of Principal investigator & Co Principal investigator	Period	Sponsoring agency	Out lay (In lakh rupees)
		Dr.K.Muthuselvam		Pvt. Ltd., Bangalore	
25	Studies on the Seed treatment technologies in paddy	Dr.R.Parthasarathi Dr.P.Sudhakar	2015-2016	Novazymes Pvt. Ltd., Bangalore	01.36
26	Studies on the efficacy of Mycorrhizal formulation (MYC 100) on Paddy	Dr.R.Parthasarathi Dr.J.Sriman Narayanan	2015-2016	Novazymes Pvt. Ltd., Bangalore	1.45
27	Bioefficacy testing of *Bacillus Subtilis* based biofungicide TAEGRO® (NZBBA1106) against late blight in tomato	Dr.R.Parthasarathi Dr. P.Tholkappian	2016-2017	Novazymes Pvt. Ltd., Bangalore	02.60
28	Bioefficacy testing of *Bacillus Subtilis* based biofungicide TAEGRO® (NZBBA1106) against powdery mildew in cucumber	Dr. P.Tholkappian Dr.R.Parthasarathi	2016-2017	Novazymes Pvt. Ltd., Bangalore	01.64
29	Bioefficacy testing of *Bacillus Subtilis* based biofungicide in tomato	Dr. P.Tholkappian Dr.R.Parthasarathi	2016-2017	Novazymes Pvt. Ltd., Bangalore	02.60
30	Evaluation and performance of different coconut indigenous medicine and mixer on growth and yield parameter of coastal coconut plantation of chidambaram	Dr.S.Dinakar Dr.S.Bharathiraja	2018-2019	Cocom & Co., Tiruvaiyar	02.15
Total					**113.33**

6.4.3 Technical and supporting staff

Nine Technical and supporting staff members in the Department are helping in academic, research and administrative activities.

Sl. No.	Sanctioned staff	Staff in place	Responsibilities
1	Secretarial Staff	4	Establishment & administrative work, purchase & budget , Data maintenance
2	Technical Staff	1	Computer operation , Issue of chemicals and glassware, maintenance of library , store keeping
3	Ministerial Staff	4	Maintenance of Pot culture yard, Despatch of letters and circulars, maintenance of Research field, green house. Maintenance of laboratories and make arrangements for practical class

6.4.4. Classrooms and Laboratories

The Department has well equipped class rooms and laboratories with wide range of instruments to provide comfortable in learning and research. Head room and office are well equipped with basic amenities such as Xeroxing, printing and computer facilities. Three separate laboratories for UG classes , one PG lab, two class rooms and separate store room for chemicals and glasswars are available the details are given below.

S.No	Facility	Number	Area (sq. ft)	Description & Equipments housed
1	Class Room	2	930 360	Conducting Theory classes
2	Laboratories	4	Lab - I -960 Lab –II- 570 Lab-III- 630 PG Lab- 360	A Laboratory with all basic instrumentation facilities Autoclave, Hot air oven, BOD incubator, Electronic Balance, Distillation Unit, Light Microscope, Alcohol Unit, Hot plate, Laminar Flow chamber.
3	Instrumentation room	1	570	Spectrophotometer, HPLC,Gas Chromotography, Gel documentation unit, Light microscopes , stereozoom microscope, High resolution Microscope with image capturing system ,ELISA Reader, Referigirator , UV- Visible double beam, Flame photometer, PCR,Centrifuge, Nitrogen Analyser system, Vacuum Desiccators , Hot air oven, Autoclave, , pHMeter, Mechanical Shaker

S.No	Facility	Number	Area (sq. ft)	Description & Equipments housed
4	Library	1	360	The Department Library is provisioned with 924 text and reference books, 200PG and 60 Ph.D. thesis, more than 10 national and international journals with conference proceedings and volumes, project work reports, reprints of published research papers.
5	Chemical & Glassware	1	360	All the chemicals, Glassware and rare chemicals required for the regular UG, PG & Ph.D. classes.
6	Pot culture yard	1	13080	Available for semi field research and pot culture studies. One green house to carry out specific in-situ enclosure studies. The area is provided with round the clock irrigation facility and necessary labour
7	Biofertilizer production unit room	1	360	To carry out the Mass production of Bio-fertilizers by using fermentors.
8	Implements & Fertilizer Room	1	67	For maintenance of implements and fertilizer required for the pot culture yard for the students trial purpose

6.4.5 Conduct of Practical and Hands-on-Training

Theory classes are conducted in single batch and during practical classes the students are divided into four groups and imparted with hands on training on Isolation, Identification and characterization of various microorganisms, conducting various staining methods for identification, estimation of microbial population from various sources, massmultiplication of bioinoculants, vermicomposting and handling of various instruments.

Staff student ratio was well maintained to deliver quality education. Periodical assessment was carried out by conducting Internal Assessment and class tests. Working models were made to make learning more creative. Outdoor classes were arranged for the sample collections and visits to various industries and institutions to update their knowledge.

6.4.6 Supervision of students in PG programmes

All the 25 faculties in the department are guiding PG scholars for their research work. For the past five years Department of Microbiology successfully produced 33 M.Sc.,(Ag) and 10 Ph.D. graduates from Agricultural Microbiology, 79 Ph.D. from Science Microbiology. During their research, each Post Graduate student shall have an advisory committee which is formed before end of the first semester to facilitate the student in carrying out the assigned thesis program. For Masters Programme, the advisory committee shall comprise of a chairman and two members, of which one member shall be from the

major Discipline and another from any other Discipline in the related field of thesis research. The chairman of the advisory committee will guide throughout the program and he helps the student in the selection of major and minor courses and seminar topics. Continuous monitoring of thesis research and maintaining research monitoring register for each student. Weekly ones the students' progress is reviewed by the chairman. The Professor and Head of the Department is taking up the monthly review to assess the progress of research done by PG students.

At the end of the each semester the evaluation of research is done by the advisory committee members by presenting their progress of research at the Department level where all the faculties and students attend and offer their remarks/ suggestions for improvement of their research.

Mid-semester examinations are conducted for each subject as per the scheme drawn by the Head of the Department/ PG coordinator and evaluated. The evaluated answer scripts are shown to the students.

Those students who fail to appear for the mid-semester examinations due to genuine / official reasons are permitted to take up missing examination of the particular course.

Final practical examinations are conducted separately towards the end of each semester by adopting a separate schedule proposed by the Head of the Department and approved by the Controller of Examinations. Two examiners (Internal and External) appointed by the University will conduct the practical examination and evaluate theory answer scripts. Re -valuation is also allowed for the needy students.

6.4.7 Feedback of stakeholders (Students, farmers, company, parents etc.)

An effective Mentor – Mentee system is functioning at Department level to get feedback from the students regarding curricular and co-curricular activities. The course teachers are getting feedback regularly in the prescribed format from each student regarding lecture delivery, hands on training *etc.*at the end of the semester. The feedback obtained is discussed in the Department staff meeting for necessary improvement in curricula, hands – on training and research faculities. In addition, feedback from nearby farming communities is regularly obtained by field visits.

During the RAWE programme, the staff in-charge are getting direct feedback from the farmers by conducting meeting in the villages. Parents are regularly informed about the progress of the students by the Mentor and in turn the feedback is also received from them. Company persons are regularly visiting us for discussing the progress of sponsored projects and in turn explain about the status of agro industries and farmers problems

6.4.8 Student intake and attrition in the programme for the last five years

Name of the programme	Actual students admitted in the last five years					Attrition (%)				
	2013-14	2014-15	2015-16	2016-17	2017-18	2013-14	2014-15	2015-16	2016-17	2017-18
M.Sc.(Ag.) Microbiology	4	7	10	14	15	0	0	0	0	0

Performance of PG students in Competitive examinations

Academic Year	Name of the Student	
	Ph.D. in ICAR institutes & State SAUs	NET/ARS Qualified
2014-15	K.DeepanRaj	K.DeepanRaj (NET)
2015-16	C.Rajesh, B.Suriyasabarinath	C.Rajesh (NET)
2016-17	Syed Nyamath (TNAU)	S. Ranjith(NET)
	R. Monisha (TNAU)	
	S. Ranjith (TNAU)	
	K. Sethupathi (TNAU)	

Employment Details of PG students

Academic Year	Number of students graduated	Employed in					Total	Percent employed	Ph.D. Admission
		Central	State	Bank	Private	Entrepreneur			
2013-14	-	-	-	-	-	-	-	-	-
2014-15	4	-	-	-	3	1	4	100	1
2015-16	7	-	-	-	6	-	6	90	2
2016-17	10	-	-	1	6	1	8	76	5
2017-18	14	-	-	2	7	-	9	64	-

6.4.9 ICT application in curricular delivery

ICT tools are used for handling both theory and practical classes. Staff members are in a habit of handling classes in OHP and Power point Presentation. Audio visual aids are used for delivering the lectures. Students were also trained in ICT applications through their assignment presentation for each course and also for their credit seminar. Moreover they have been trained to access online library, e - journals and open access web resources pertaining to their studies.

PPTs are designed and updated regularly to teach the syllabus content in a way to make the student understand better. A web browsing enclave linked computers have access to the UGC inflibnet portal "SodhSindhu" and "Sodhganga" for literature surveys. Also, some of the lab houses separate broadband connection and Wi-Fi facility to cater to the

needs of the students. Number of computers for Staff & student use is 12 and 8 are with networking facility.

6.4.10. The information pertaining to 6.4.1 to 6.4.9 shall be provided for each one of UG, PG and PhD Degree Programmes, separately, and to be presented College-wise.

6.4.11. Since the accreditation of Programmes is related to the All India Admission from ICAR and also having weightage for College accreditation, therefore the data presented in the section 6.4 is liable to the verification at any stage.

6.4.12. Certificate (Applicable when SSR is submitted for Programme)

I, the Dean K.THANUNATHAN hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college, and degree awarding university.

Signature of the Dean of the College with Date &

DEAN
FACULTY OF AGRICULTURE
ANNAMALAI UNIVERSITY

DEPARTMENT OF AGRICULTURAL MICROBIOLOGY

National Seminar on Golden Thoughts on Current Microbial

National Seminar on Frontiers in Applied Microbiology – 2014

Bio Fertilizer Packets

Department Library

Mentor - mentee meeting

PG Laboratory